US EPA RECORDS CENTER REGION 5
487107

Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

Proposed Well ID	Location of Monitoring Well Screen[A]	Screen Length	Stratigraphic Sampling	Analytical Sampling[B]	Notes
SB-6	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-7	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-8	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-9	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-10	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-11	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-12	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-13	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-14	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-15	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay
SB-16	NA	NA	Continuous split spoon sampling	1 fill sample	Drill 2 feet into native clay

Notes:
[A] = All final well completion depths and screen lengths are subject to MDEQ approval prior to completion.
[B] = Soil samples will be collected in the vadose zone and interstitial water samples will be collected below the water table.
[C] = Stratigraphic samples will not be collected at this location because continuous sampling will be completed at an adjacent deeper well in the cluster.
NA = Not Applicable
Interstitial Water Sample = Saturated Soil Sample (i.e., soil sample collected beneath the water table).
* In general the: s wells will be screened across the saturated thickness of the fill unit.
i wells will be screened across the interface between the upper and lower clay units or in the uppermost portion of the lower clay unit.
d wells will be screened in the lower clay unit approximatley 3-5 ft beneath the bottom of the i well screen.

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

SE MICHIGAN DISTRICT OFFICE
38980 SEVEN MILE RD
LIVONIA MI 48152-1006

July 14, 2000

Mr. Thomas F. McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Dear Mr. McGourty:

SUBJECT: BASF-Riverview site, Wayne County, MI.

The Department of Environmental Quality (DEQ), Environmental Response Division (ERD), met with BASF-Corporation (BASF) on July 7, 2000, to discuss BASF's July 5, 2000 correspondence "Questions for the DEQ and Malcolm Pirnie concerning the Work Plan for the Riverview property". In this meeting some modifications were made to the work plan, which are incorporated in the enclosed "Site Investigation Work Plan Addendum No.1". This document will be incorporated into the work plan dated June 26, 2000. Enclosed is also Table 1-2 which has been revised to indicate SB-15 and SB-16. A revised Figure 1-2 and Malcolm Pirnie's standard groundwater collection log is being overnight mailed to you by Malcolm Pirnie.

If you have any questions please feel free to contact me at 734-953-1404.

Sincerely,

Beth Vens

Beth Vens, Project Manager
Environmental Response Division

encl.

cc: Ms. Mary Fulgham, USEPA
Mr. Michael Ribordy, USEPA
Ms. Kathy Cavanaugh, DAG
Ms. Nan Leemon, DEQ
Mr. Oyinsan Oladipo, DEQ
Ms. Patricia Brandt, DEQ
Mr. Greg Foote, Malcolm Pirnie

ATTACHMENT A
SITE INVESTIGATION WORK PLAN ADDENDUM NO. 1
BASF – RIVERVIEW SITE

BASF Comments Geophysical Survey:

1. May we lay out the survey on a (nearly) north to south grid instead of east to west?

2. The northwest corner of property historically has been the origin for survey work (0N,0E). The north property line is oriented at N61W. We propose orienting the survey perpendicular to this line. Is this acceptable?

Response: Both suggestions in comments No. 1 and 2 are acceptable. Ensure that gridding and plotting of data is corrected to reflect the northwest grid position. The grid should be maintained until test pitting is completed so geophysical anomolies can be accurately located in the field.

BASF Comments Test Pitting:

1. Locations for digging will be selected in consultation with DEQ and Malcolm Pirnie after results from the geophysical survey are interpreted.

Response: Locations for digging will be selected in the field after results from the geophysical survey are interpreted and will require DEQ approval.

2. We understood the purpose of digging test pits was to characterize subsurface anomalies. If some type of material is uncovered when digging, we should not have to dig up large areas to verify the extent of material. The geophysical data should provide information on the extent.

Response: The decision to expand an excavation will be determined in the field by DEQ.

3. Test pits on the order of 100 feet long by 6 feet wide will impart a disproportionate amount of damage on the property when compared to the information they can provide. We believe maximum dimensions on the order of 10 to 15 feet by 3 to 4 feet will be more than adequate.

Response: The approximate initial test pit dimensions will be modified to the following dimensions: 25 ft long by 15 ft deep by 6 ft wide. The test pit will be expanded until the anomoly is located/identified.

4. We do acknowledge that subsurface information that is inconsistent with geophysical data may warrant additional examination.

Response: Agreed.

5. The only protocol identified for sampling soils is the presence of stained soils or drums. Are there any other reasons or selection criteria for collecting samples of soil.

Response: An additional criterion will be detectable concentrations of organic vapors using a photoionization detector (PID).

6. BASF does not plan to complete library searches for tentatively identified compounds.

Response: DEQ will perform library searches on their split samples.

7. The work plan consistently implies that the presence of drums is a bad thing. While we agree the presence of intact drums full of some hazardous material is bad; the presence of a crushed, empty drum in a landfill should not convey a deleterious impact.

Response: No comment.

BASF Comments Methanol Preservation Soil Sampling:

1. May we use EnCore® samplers?

Response: Yes, per the DEQ "Procedure of Collection and Methanol Preservation of Soil Samples" guidance document dated May 1, 2000. DEQ will use the methanol preservation method for DEQ split samples.

2. The DEQ "Procedure of Collection and Methanol Preservation of Soil Samples" dated May 1, 2000 discusses the high-concentration methanol preservation option of Method 5035. The low-concentration preservation option is not discussed. Should BASF assume that regardless of the method employed (field methanol preservation or EnCore® sampling), only the high-concentration method for analysis is to be used?

Response: Yes the high-concentration method will be used. We realize that if the high-concentration method is used, the detection limits for some compounds may be above the Part 201 detection limits. This is acceptable for the purposes of this investigation and for those compounds, the attainable detection limit will be used instead of the detection limits in DEQ Operational Memorandum #6.

BASF Comments Drilling and Well Construction:

1. What are the three target water-bearing horizons for well installation? The work plan discusses upper, middle, and lower water-bearing zones, but the lower zone (bedrock) is not a target for this investigation.

Response: The upper and middle water bearing zones are the target for this investigation.

2. Figure 1-2 identifies "s" wells as in Fill Unit, "i" wells as in Peat, Sand, or Upper Clay, and "d" wells as in Lower Clay. However, the text of the work plan identifies "upper water-bearing zone" as the fill, sand, and peat layers and the "middle water-bearing zone" as the Lower Clay. There seems to be some overlapping use of these terms.

Response: Clarifications to the drilling programs are provided in amended Table 1-2 (attached) and on Figure 1-2 (attached). In general, the intent of the cluster wells is as follows:

a) Shallow wells (s) will screen across as much of the saturated thickness of the fill unit as possible using a 5-7 ft. long screen.

b) Intermediate wells (i) will be screened across the upper clay/lower clay interface or the upper portion of the lower clay unit.

c) Deep wells (d) will be screened in the lower clay unit approximately 3-5 ft below the bottom of the intermediate well screen. Adjustments to the proposed drilling/well installation depths presented in Table 1-2 may be made based on observations made in the field. Any adjustments to well drilling/installation depths will be made only with DEQ approval.

3. The SOP states that pilot holes will be drilled into the "upper-most confining layer", but this layer is not defined or identified. It seems implicit that a confining layer would separate the upper water-bearing zone (i.e., the fill, peat, and sand) from the middle water-bearing zone (i.e., the Lower Clay) If this is so, the confining layer must be the Upper Clay, yet this unit appears to be a target for well installation.

Response: The "pilot holes" will be advanced 2-3 ft. into the lower clay unit. The low clay unit is considered to be the confining layer because the upper clay unit is not contiguous across the site.

4. As discussed, BASF wishes the DEQ to make the first contact with Materials Processing Inc., (the former Firestone property) and the City of Riverview to gain access should work on their properties be necessary.

Response: BASF is responsible for all access inquiries and agreements during this investigation since BASF is the entity conducting the investigation.

5. May we use slotted PVC screens in place of wire wound PVC screens?

Response: No. Wire wound PVC screens must be used.

BASF Comments Split-Spoon Sampling:

1. Just for the record, most drilling companies no longer use a 140-pound hammer falling freely for 30 inches. They use a mechanical piston to drive the spoons at the force required for this test.

Response: These are equivalent methods and either method may be used.

2. Table 1-2 still calls for sampling of sediments at the offshore locations. This contradicts the text that states fill materials will be sampled.

Response: Table 1-2 (attached) has been amended to reflect that fill material not sediment will be sampled. If fill is not encountered and the DEQ concurs then no sample will be collected.

3. The footnotes on Table 1-2 state that "interstitial water" samples will be collected below the water table and soil samples will be collected from the vadose zone We believe it is unlikely to encounter a vadose zone under the river so sampling solids (the fill) at these locations is inconsistent with the plan. Also, DEQ previously did not support BASF's plan to sample groundwater any closer to the river than the current line of wells because of the perception we would be analyzing river water instead of groundwater. BASF still believes collecting samples will be advantageous to define the stratigraphy; we do not believe analyzing those samples of fill for chemical content will be meaningful.

Response: For the purposes of this investigation, interstitial water samples = saturated soil samples. Interstitial water samples will be collected and analyzed using the soil sampling and analysis procedures described in the Work Plan.

4. In conversations with DEQ, we learned that DEQ wishes to sample in the river bottom to understand if materials are contaminated. Yet, we are not aware of any published values that define acceptable concentrations or unacceptable levels of chemicals in sediments.

Response: The scope of the work plan does not include collection of samples from "the river bottom". In general however, the Environmental Response Division relies on sediment data provided in guidance from the State of New York and the Ontario Ministry of the Environment.

5. BASF does not plan to complete library search for tentatively identified compounds in the "solid waste encountered during drilling".

Response: DEQ will perform these analyses on their split samples.

BASF Comments Well Development:

1. At this time, we anticipate using the pumps on the drill rig to remove the water and fines during well development. Is this acceptable to the DEQ? We request additional guidance on an acceptable or "predetermined value" for turbidity.

Response: Development using the drill rig pump is acceptable. The decision to proceed with development will be determined in the field in conjunction with DEQ/DEQ representative approval. In general, development will proceed until turbidity appears to stabilize.

BASF Comments Slug testing:

1. The air-slug SOP says to repeat procedure 2 to 3 times on each well. The solid-slug SOP says to obtain two sets of rising head and falling head data for each well. The text on page 4-5 says that three slug test per well will be performed. What constitutes a "slug test"? Is it once through the SOP – that is, two or three times on each well? Is it one rising or one falling head test? Is it a rising and a falling head test?

Response: One "rising" or "falling" head test constitutes a slug test. Two or three slug tests will be performed for each tested well.

2. After we record three slug tests for each well, what can we do with the results? May we calculate representative results using either arithmetic or (preferably) geometric means? May we use our professional judgment to define representative results? How had Malcolm Pirnie managed, used, and applied this large volume of data previously?

Response: The slug testing results should be summarized in a table. The DEQ does not recommend averaging, but does recommend using the highest K because slug tests typically underestimate K when compared to pumping test data. If the data are averaged, specific rationale on why averaging was conducted should be provided to the DEQ. If averaging is conducted, ensure that slug test results are averaged only for wells screened in the same stratigraphic unit.

3. If the water table intersects a screened interval, the use of a falling head test is not representative of hydrogeological conditions. If this situation occurs, we do not plan to record or interpret data from the well.

Response: Agreed, however, rising head tests are still valid under such circumstances and should be performed.

4. BASF assumes that "PVC copper piping" is a typographical error. BASF proposes to use either a sealed, stainless steel slug or a PVC slug filled with sand.

Response: This statement is a typographical error and should read "PVC or Copper piping". BASF's proposed slug construction is acceptable.

BASF Comments Water Level Measurements:

1. Elevations for top of casing on all existing wells are on the north side of the rim whether there is a mark or not. All wells to be installed will be surveyed the same way.

Response: This is acceptable but mention of this fact should be made in the technical memorandum prepared at the completion of this investigation.

BASF Comments Groundwater Sampling:

1. The EPA publication presented in this section recommends well screens should be less than 1 meter (less than 39 inches), yet the work plan calls for 5-foot to 7-foot long screens (60 to 84 inches), is this inconsistent with our objectives or immaterial?

Response: The well screen lengths were increased to account for fluctuating water levels due to this sites proximity to a surface water body. Adhere to the guidance provided within the text of the work plan.

2. How important is the placement of the water intake tube at the mid-point of the screen? This was not a performance standard during previous DEQ sampling events.

Response: This is a suggestion. Excessive drawdown in the wells screened in low hydraulic conductivity (K) soils may necessitate placing the water intake near the bottom of the well.

3. How important is it that the water level does not drop into or below the screen? This was not a performance objective during previous DEQ sampling events.

Response: This is the objective for "typical" low-flow sampling. However, wells screened in low K soils may exhibit excessive drawdown causing the water level to drop into the screen.

4. The EPA protocol states that for low-recharge formations (<0.1 L/min and possibly similar to the Riverview property) the sampling equipment should be installed in the well a minimum of 48 hours before sampling. Is this a requirement or a suggestion? This protocol was not followed during previous DEQ sampling events.

Response: This is a suggestion for best sampling technique but may not be practical at this site.

5. The work plan uses the term "interstitial water", but does not define the term. The SOPs do not explain how samples of "interstitial water" are to be collected. Please clarify.

Response: See response to Split Spoon Sampling comment number 3.

BASF Comments Sampling Handling and Management:

1. This SOP discusses "detailed sample collection logs", but does not identify the detailed information to be collected or provide an example of the log. Please clarify.

Response: Malcolm Pirnie's standard groundwater collection log is attached. Any log used in the field should include at a minimum the information presented on this log.

2. The SOP does not discuss "appropriate" preservation techniques. May BASF propose the techniques? For example, we typically do not preserve samples for analyses of VOCs because the laboratory can complete their work within seven days. Also, if the method requires preservatives added to the sample, we prefer that the laboratory perform this work. The laboratory personnel can add the preservatives in a controlled environment prior to shipping the containers to the field crew.

Response: The DEQ groundwater splits for VOCs analysis will be preserved in the field to a pH of <2. BASF may follow an alternate method as long as EPA recommended holding times and sampling protocol are maintained.

3. We intend to use containers provided by the laboratory that the lab certifies are clean.

Response: This is acceptable.

4. Rather than store samples on ice, we intend to cool samples in a refrigerator on site and store them there until shipment.

Response: This is acceptable.

5. In the interest of efficient and economic use of the laboratory's resources, samples may be held on site longer than 48 hours. Samples may be held on until a batch of ten samples accumulates. As long as the samples are stored appropriately under chain of custody, we see no reason to ship the samples within 48 hours if a batch is not complete. We propose using published method holding times and the laboratory's capacity for performing the analyses to guide our schedule for shipping samples.

Response: This is acceptable except for the samples collected with the EnCore® samplers which BASF stated would be shipped to the laboratory on a daily basis.

BASF Comments Concrete Coring/Sampling:

1. As we discussed previously, BASF may choose to remove the concrete used as riprap from the shore and dispose of it appropriately. If we do so, sampling the concrete as described in the SOP will be unnecessary.

2. If BASF decides to retain the concrete on the shore, we will prepare a SOP for sampling the concrete. We do not believe the sampling procedure presented in the work plan is safe or effective.

3. Our preliminary plan for sampling the concrete is to use the winches on the drill rig to haul a piece onto the shore. We then would use NC-type coring tools and the rig to obtain samples.

Response: Coring of the concrete riprap shall be performed as specified in the work plan. An alternate method of coring may be used as long as a written procedure is supplied to and approved by DEQ prior to implementation of the coring activities.

BASF Comments Decontamination:

1. We prefer using distilled or de-ionized water for rinsing rather than top water.

Response: This is acceptable.

BASF Comments Investigation Derived Wastes:

1. We define these wastes as soils from drilling, groundwater from well development, water form decontamination activities, and the personal protective gear after it is used.

2. Soils and other materials generated during the digging of test pits will be pushed back into the pit once the assessment at that location is complete. We do not anticipate generating excess volume from this work.

3. BASF contacted representatives from the DEQ WMD and received some guidance for defining this term and managing these wastes. BASF proposes to manage the investigation derived wastes in the following manner:

   a) Soils from drilling and well installation will be moved to an area on site and left there. This area will be in a position where runoff to the river or to surrounding properties in unlikely. These soils are an intrinsic element of the site and ultimately will be managed according to the selected feasible alternative.

   b) Groundwater from well development and water from washing equipment will be collected and placed into a poly-tank on site. The water will be characterized, transported by a licensed hauler, and disposed at an appropriate facility. Previously, Michigan Recovery in Romulus accepted the water. Excess groundwater from purging and sampling will be poured back down the well from which it came.

c) Used personal protective gear (gloves, Tyvek®, boots, cartridges, hand towels, etc.) will be placed in a receptacle separated from other trash. This used protective equipment will be managed as a regulated waste. Michigan Disposal is able to accept this waste.

Response: It is BASF's responsibility to ensure that all wastes generated during the test pitting, drilling of soil borings, installation of monitor wells, decontamination activities, and other related field activities will be properly characterized and disposed of in accordance with all applicable state and federal laws and regulations.

BASF Comments Data Validation:

1. The Malcolm Pirnie plan did not present data validation procedures, data quality objectives, or a quality assurance plan. BASF proposes to validate laboratory-provided results and assure quality of all field and laboratory procedures according to our previously prepared quality assurance plan for the Riverview property dated April 19, 1999.

2. At this time, we will assume that BASF and URS will not be responsible for validating results from the DEQ's laboratory. However, we request DEQ to provide BASF with the data validation reports along with the analytical results for their split-samples.

Response: The sample-split data collected by DEQ/Malcolm Pirnie will be validated. BASF will be provided with data validation reports and analytical results from DEQ split samples.

FAX

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL RESPONSE DIVISION
38980 SEVEN MILE ROAD
LIVONIA, MICHIGAN 48152

Date 12/20/99

Time

Number of pages including cover sheet 4

To: Mike Ribordy

Dept.

Phone

Fax Phone 313-886-4071

CC:

From: Beth Venus

Phone 734-953-1499/953-1508

Fax Phone 734-953-1544

REMARKS:

This is the only summary I have - my own! Hope it helps!

Happy Holidays!

Beth Venus

DEQ

MDEQ RESULTS 3/97

	A	B	C	D	G	H	J	K	L
-RIMETHYL- ICYCLOHEPTANONE								1500	430
CAMPHOR		960						3900	1200
LINALYL ISOVANOATE								9300	4100
BORNEOL									540
METHYL- ENZENESULFON AMIDE									100
PHENANTHRENE ARBOXYLIC ACID									760
EUCALYPTOL								600	
THYL-HEXANOL			180	180					
ETHYL-METHYL- THYL- OXABICYCLO HEPTANE								340	
4,4'-DDT								106	
Benzene								610	
Toluene								420	
Xylene								77	
Fluorene							36		
ethyl-Phenol		260					49		
Dibenzofuran							47		
iphenyl Sulfone		3700					62		
ethoxy-methyl hoxy-methyl- ropanol			74	74					
inyl chloride				54					
amphene		7000							
arbazole		160							
Acetone		6500							
ethylene Chloride		3400							

MDEQ RESULTS 3/99

	A	B	C	D	G	H	J	K	L	DITCH
Naphthalene 13	15	840	26	220			990			
Phenanthrene 5		750		17			100	6.4		
Phenol 210		510		310						
2,4,6-Trichlorophenol 1.3	28			59						
2,4-Dimethylphenol 12		230	14	120						

FAX

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL RESPONSE DIVISION
38980 SEVEN MILE ROAD
LIVONIA, MICHIGAN 48152

VOLKMERD@MAIL.RFWESTON.COM

Date 7/13/99

Time

Number of pages including cover sheet 4

To: MIKE RIBORDY

Dept.

Phone 312-886-4071

Fax Phone

CC:

From: BETH VENS

Phone 734-953-1499/953-1508

Fax Phone 734-953-1544

REMARKS:

Here is the March data (mostly) from the BASF Riverview site - it's my own tables (rough form!) but they will give you some numbers to work with.

Hope it helps!

Beth Vens

DEQ

MDEQ RESULTS 3/99

	A	B	C	D	G	H	J	K	L
TRIMETHYL-BICYCLOHEPTANOLE								1500	430
CAMPHOR		960						3900	1200
LINALYL PROPANOATE								9300	4100
BORNEOL									540
METHYL-BENZENESULFONAMIDE									100
PHENANTHRENE CARBOXYLIC ACID									760
EUCALYPTOL								600	
ETHYL-HEXANOL			180	180					
METHYL-METHYL-ETHYL-OXABICYCLO HEPTANE								340	
4,4'-DDT								.106	
Benzene								610	
Toluene								420	
Xylene								77	
Fluorene							36		
Methyl-Phenol		260					49		
Dibenzofuran							47		
Diphenyl Sulfone		3700					62		
Methoxy-methyl ethoxy-methyl-propanol			74	74					
Vinyl chloride				54					
Camphene		7000							
Carbazole		160							
Acetone		6500							
Methylene chloride		3400							

DEQ RESULTS 3/99

	A	B	C	D	G	H	J	K	L	DITCH
Arsenic 50		101	199	DNT		94		57		
Mercury .2	2.6	71	5.9	680	.123	3.9	29	43	1.9	29
Chromium 120		240				140		410		
Cyanide 20	1000	3,300	1200	5000	80	1,800	490	21,000	150	300
Selenium 5		7.2		7.3	9.6	9.5		10		
Barium							270			
PCB's .2		63.6								
Ammonia 50	5200	13000	3100	26,000	560	3700	8800	48,000	90	160
Lead	52	<50	<50	<50	<50	<50	250	<25	225	27

BASF RESULTS 3/99

	A	B	C	D	G	H	J	K	L	DITCH
Arsenic	68	1610	286	11200		97		252		
Mercury	1.6	73	2.9	763	.3	1.1	19	43	1.1	29
Chromium		355				141		615		
Cyanide	1800	4250	1800	8030	88	2630	246	13200	153	304
Selenium		14				10		18		
Barium						268	192	288		
PCB's		43								
Ammonia	5670	13700	2660	25500	550	3560	4810	47200	150	410
Lead		15	18				112			20

MDEQ RESULTS 3/99

	A	B	C	D	G	H	J	K	L	DITCH
Naphthalene 13	15	840	26	220			970			
Phenanthrene 5		750		17			100	6.4		
Phenol 210		510		310						
Pentachlorophenol 1.3	28			59						
2,4-Dimethylphenol 12		230	14	120						

Michigan
Department of Environmental Quality

BETH VENS

Environmental Quality Analyst
Environmental Response Division

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38980 West Seven Mile Road
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SHRADER
Analytical and Consulting
LABORATORIES INC.

RECEIVED
DEC 9 1999
ENVIRONMENTAL RESPONSE DIVISION
S.E. MICHIGAN DISTRICT OFFICE

Report of Analytical Services

Submitted To:

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

Attn: MR. JACK LANIGAN

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Client project:	RIVERVIEW
Client sample:	WATER FROM WELLS
Sample description:	COLLECTED 10/07/99
Laboratory project:	I318
Analysis performed:	SVOC (8270C), VOC (8260B), CYANIDE, MI METALS & AMMONIA
Date received:	07-Oct-99
Date completed:	20-Oct-99
Report date:	22-Oct-99

Verified Laura J. Stephens
Laura Stephens, Environmental Manager

Approved Marianne L. Shrader
Marianne L. Shrader, Acting QA/QC Officer

Enclosure(s)

xc: Dr. Martin Schmidt, URS Greiner

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

BASF CORPORATION

Laboratory Project I318 001 (Continued) Friday, October 22, 1999

Sample Number 001 *Sample ID:* MW-A

Description: RIVERVIEW
Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.109	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.095	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0077	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.067	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	1.1	mg/L	0.12	9010B/9014	10/13/99	10/13/99	GENT
Nitrogen, Ammonia	12.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 002 *Sample ID:* MW-K

Description: RIVERVIEW
Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid//Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.212	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Barium	0.159	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/20/99	10/20/99	JONH
Chromium	0.582	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Mercury	0.0508	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/20/99	10/20/99	JONH
Cyanide	33.9	mg/L	2.5	9010B/9014	10/13/99	10/13/99	GENT
Nitrogen, Ammonia	49.4	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I318 003 (Continued) Friday, October 22, 1999

Sample Number 003 *Sample ID:* MW-L

Description: RIVERVIEW

Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT

N.D. = Not Detected
D.L. = Detection Limit

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	5
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	N.D.	5
O-CRESOL	19	5
P-CRESOL	28	4
2,4-DICHLOROPHENOL	Detected <	6
2,4-DIMETHYLPHENOL	32	5
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	9
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	20
PHENOL	19	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	14	10
TOTAL	118	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	3
ACENAPHTHYLENE	N.D.	2
ANILINE	13	2
ANTHRACENE	N.D.	2
BENZO(a)ANTHRACENE	N.D.	4
BENZO(b & k)FLUORANTHENES	N.D.	6
BENZO(a)PYRENE	N.D.	7
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	N.D.	7
bis(2-CHLOROETHOXY)METHANE	N.D.	20
bis(2-CHL'ETHYL)ETHER	N.D.	5
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	10
BUTYL BENZYL PHTHALATE	N.D.	5
CARBAZOLE	N.D.	2
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	6
CHRYSENE	N.D.	4
DIBENZO(a,h)ANTHRACENE	N.D.	7
DIBENZOFURAN	N.D.	1
1,2-DICHLOROBENZENE	10	5
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	4.2	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	8
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	2
FLUORENE	N.D.	2
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	6
ISOPHORONE	N.D.	50
2-METHYLNAPHTHALENE	Detected <	2
NAPHTHALENE	15	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	3
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	4
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	4
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	N.D.	2
PYRENE	N.D.	3
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	5

N.D. = Not detected TOTAL 43.6

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31801B Sample size : 1 ml
Description : MW-A
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	2,300	100
BENZENE	200	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	27	3
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	10
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	31	10
CIS-1,3-DICHLOROPROPENE	N.D.	7
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	Detected <	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	8
TOLUENE	75	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	19	5
o-XYLENE	17	5

N.D. = Not detected TOTAL 2,670

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	10
P-CHLORO-M-CRESOL	N.D.	10
2-CHLOROPHENOL	N.D.	7
O-CRESOL	7.1	7
P-CRESOL	82	6
2,4-DICHLOROPHENOL	N.D.	10
2,4-DIMETHYLPHENOL	N.D.	10
4,6-DINITRO-O-CRESOL	N.D.	40
2,4-DINITROPHENOL	N.D.	50
2-NITROPHENOL	N.D.	20
4-NITROPHENOL	N.D.	30
PENTACHLOROPHENOL	N.D.	40
PHENOL	140	6
2,4,5-TRICHLOROPHENOL	N.D.	20
2,4,6-TRICHLOROPHENOL	N.D.	20

N.D. = Not detected TOTAL 229

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	6
ACENAPHTHYLENE	N.D.	4
ANILINE	N.D.	3
ANTHRACENE	N.D.	5
BENZO(a)ANTHRACENE	N.D.	8
BENZO(b & k)FLUORANTHENES	N.D.	10
BENZO(a)PYRENE	N.D.	10
BENZO(ghi)PERYLENE	N.D.	10
BENZYL ALCOHOL	N.D.	5
bis(2-CHLOROETHOXY)METHANE	N.D.	30
bis(2-CHL'ETHYL)ETHER	N.D.	7
bis(2-CHLOROISOPROPYL)ETHER	N.D.	20
4-BROMOPHENYL PHENYL ETHER	N.D.	30
BUTYL BENZYL PHTHALATE	N.D.	10
CARBAZOLE	N.D.	4
p-CHLOROANILINE	N.D.	5
2-CHLORONAPHTHALENE	N.D.	6
4-CHLOROPHENYL PHENYL ETHER	N.D.	10
CHRYSENE	N.D.	7
DIBENZO(a,h)ANTHRACENE	N.D.	20
DIBENZOFURAN	N.D.	3
1,2-DICHLOROBENZENE	N.D.	7
1,3-DICHLOROBENZENE	N.D.	7
1,4-DICHLOROBENZENE	N.D.	6
3,3'-DICHLOROBENZIDINE	N.D.	50
DI-n-BUTYL PHTHALATE	N.D.	3
DIETHYL PHTHALATE	N.D.	20
DIMETHYL PHTHALATE	N.D.	5
2,4-DINITROTOLUENE	N.D.	20
2,6-DINITROTOLUENE	N.D.	30
DI-n-OCTYL PHTHALATE	N.D.	7
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	7
FLUORANTHENE	N.D.	5
FLUORENE	N.D.	5
HEXACHLOROBENZENE	N.D.	20
HEXACHLOROBUTADIENE	N.D.	20
HEXACHLOROCYCLOPENTADIENE	N.D.	30
HEXACHLOROETHANE	N.D.	20
INDENO(123-cd)PYRENE	N.D.	10
ISOPHORONE	N.D.	4
2-METHYLNAPHTHALENE	Detected <	3
NAPHTHALENE	7.1	3
2-NAPHTHYLAMINE	N.D.	6
m-NITROANILINE	N.D.	7
o-NITROANILINE	N.D.	10
p-NITROANILINE	N.D.	8
NITROBENZENE	N.D.	8
PARATHION	N.D.	30

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	8
N-NITROSO-DI-n-PROPYLAMINE	N.D.	40
PHENANTHRENE	N.D.	4
PYRENE	N.D.	7
PYRIDINE	N.D.	7
1,2,4-TRICHL'BENZENE	N.D.	10

N.D. = Not detected TOTAL 9.60

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31802B Sample size : 1 ml
Description : MW-K
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	200
BENZENE	640	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	9.1	7
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	8.7	4
sym-TETRACHL'ETHANE	N.D.	20
TETRACHLOROETHENE	N.D.	9
TOLUENE	430	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	43	5
o-XYLENE	30	6

N.D. = Not detected TOTAL 1,160

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	2
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	2
O-CRESOL	N.D.	2
P-CRESOL	N.D.	1
2,4-DICHLOROPHENOL	N.D.	2
2,4-DIMETHYLPHENOL	N.D.	2
4,6-DINITRO-O-CRESOL	N.D.	8
2,4-DINITROPHENOL	N.D.	9
2-NITROPHENOL	N.D.	3
4-NITROPHENOL	N.D.	5
PENTACHLOROPHENOL	N.D.	9
PHENOL	N.D.	2
2,4,5-TRICHLOROPHENOL	N.D.	4
2,4,6-TRICHLOROPHENOL	N.D.	4

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1
BENZO(a)ANTHRACENE	N.D.	1
BENZO(b & k)FLUORANTHENES	N.D.	2
BENZO(a)PYRENE	N.D.	2
BENZO(ghi)PERYLENE	N.D.	2
BENZYL ALCOHOL	N.D.	1
bis(2-CHLOROETHOXY)METHANE	N.D.	1
bis(2-CHL'ETHYL)ETHER	N.D.	2
bis(2-CHLOROISOPROPYL)ETHER	N.D.	5
4-BROMOPHENYL PHENYL ETHER	N.D.	6
BUTYL BENZYL PHTHALATE	N.D.	2
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1
4-CHLOROPHENYL PHENYL ETHER	N.D.	2
CHRYSENE	N.D.	1
DIBENZO(a,h)ANTHRACENE	N.D.	2
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	2
1,3-DICHLOROBENZENE	N.D.	2
1,4-DICHLOROBENZENE	N.D.	1
3,3'-DICHLOROBENZIDINE	N.D.	8
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	4
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	3
2,6-DINITROTOLUENE	N.D.	5
DI-n-OCTYL PHTHALATE	N.D.	1
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	4
HEXACHLOROBUTADIENE	N.D.	4
HEXACHLOROCYCLOPENTADIENE	N.D.	5
HEXACHLOROETHANE	N.D.	4
INDENO(123-cd)PYRENE	N.D.	2
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1
m-NITROANILINE	N.D.	1
o-NITROANILINE	N.D.	2
p-NITROANILINE	N.D.	2
NITROBENZENE	N.D.	1
PARATHION	N.D.	5

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	2
N-NITROSO-DI-n-PROPYLAMINE	N.D.	9
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1
PYRIDINE	N.D.	2
1,2,4-TRICHL'BENZENE	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31803B Sample size : 44 ml
Description : MW-L
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	10
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	5
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31804A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

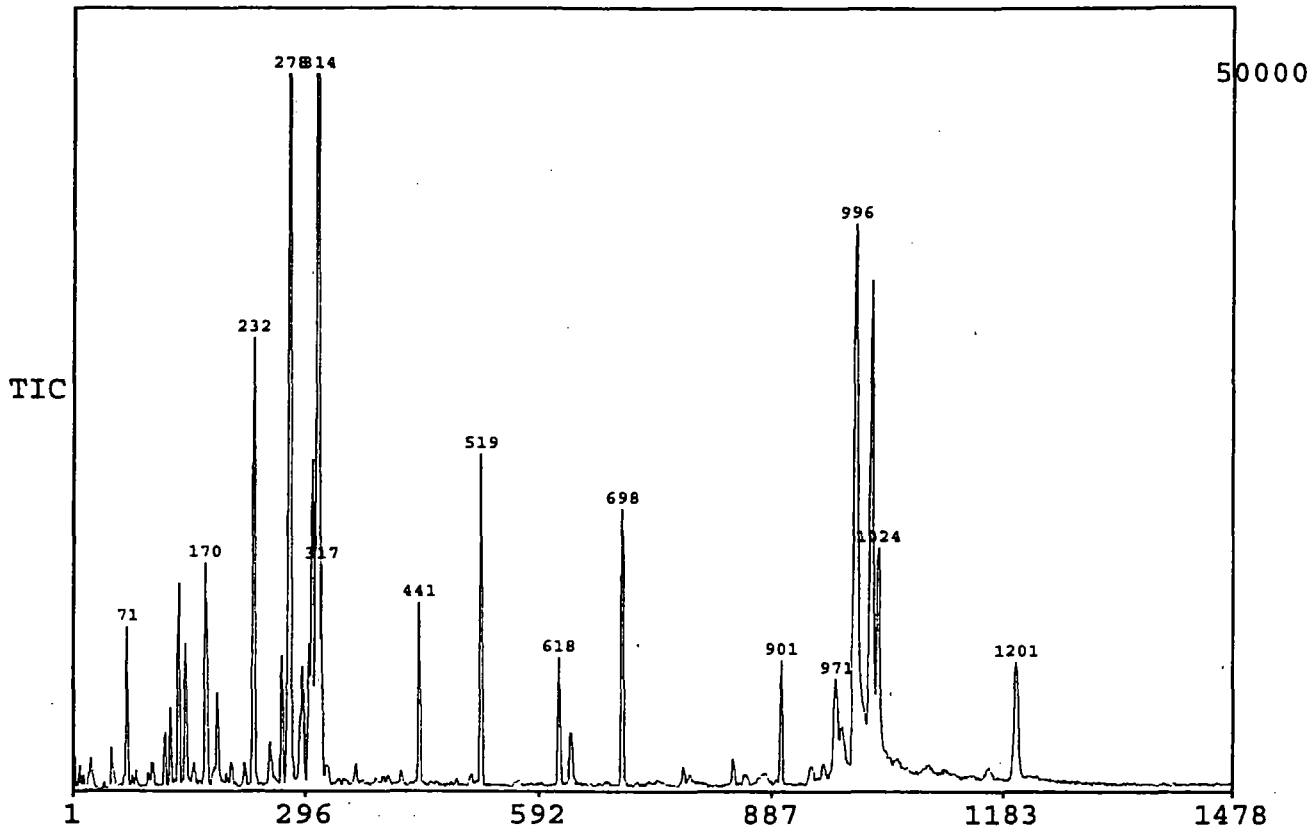
SEMI-VOLATILE CHROMATOGRAMS, SURROGATE RECOVERIES

AND

LABORATORY BLANKS

SHRADER LABORATORIES, INC.
10-14-1999

I31801AA MW-A RIVERVIEW
Date run : 10-14-1999(14:41:38) Instr. : Q1* Operator : ROBG



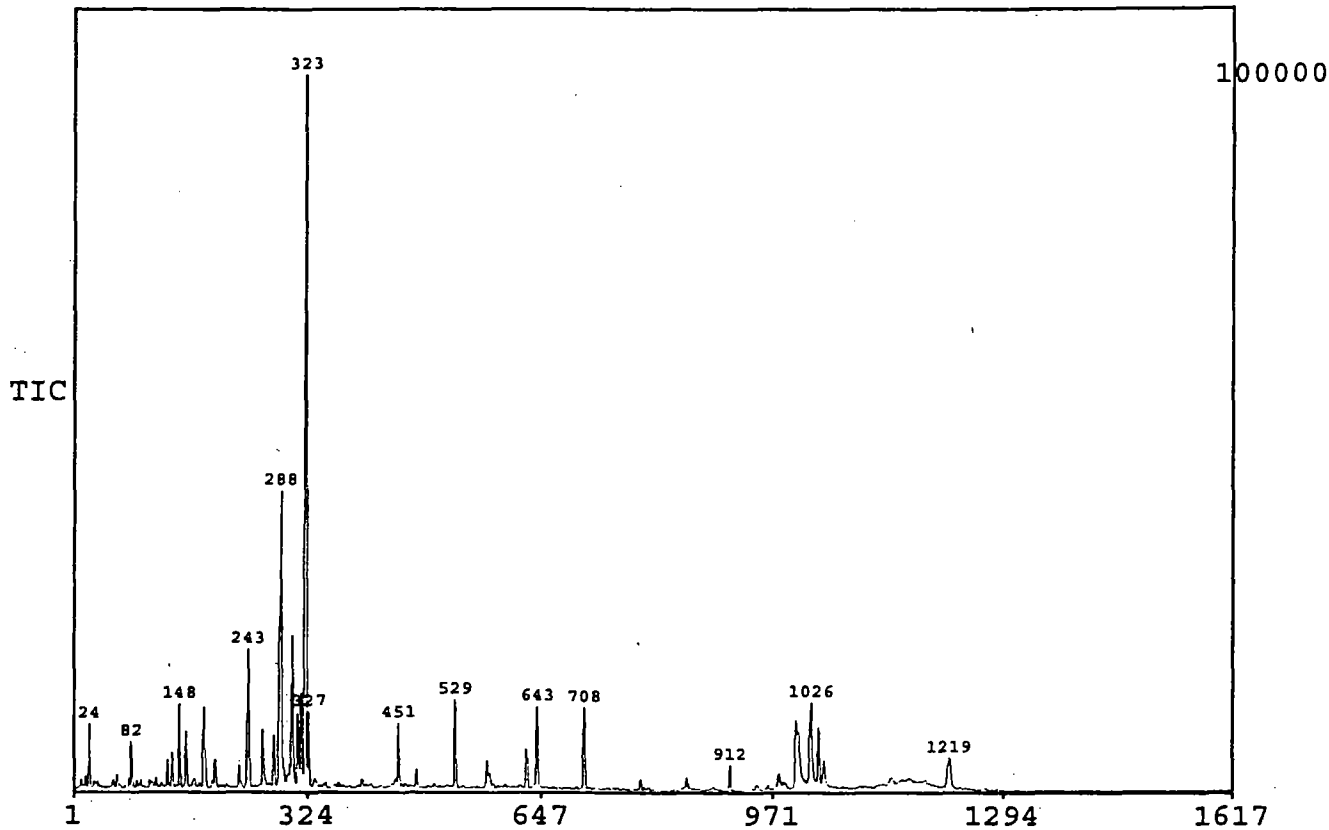
SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	190	250	76.0% 2
NITROBENZENE-D5	150	250	60.0% 2
TERPHENYL-D14	180	250	72.0% 1
2-FLUOROPHENOL	290	500	58.0% 1
PHENOL-D6	270	500	54.0% 1
TRIBROMOPHENOL	270	500	54.0% 1

SHRADER LABORATORIES, INC.
10-14-1999

I31802A MW-K RIVERVIEW
Date run : 10-13-1999(11:13:34) Instr. : Q1* Operator : ROBG



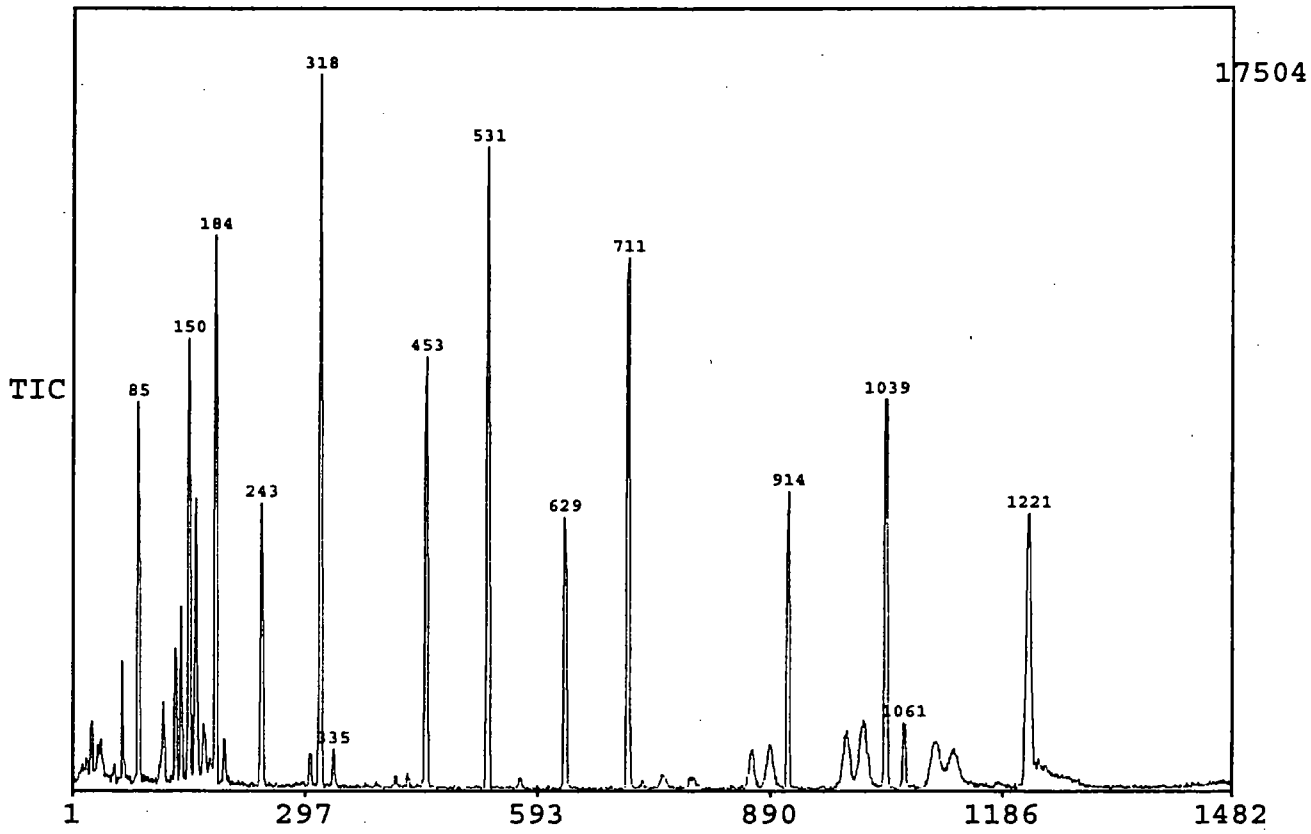
SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	200	250	80.0% 1
NITROBENZENE-D5	230	250	92.0% 1
TERPHENYL-D14	120	250	48.0% 3
2-FLUOROPHENOL	260	500	52.0% 2
PHENOL-D6	260	500	52.0% 1
TRIBROMOPHENOL	240	500	48.0% 2

SHRADER LABORATORIES, INC.
10-13-1999

I31803AA MW-L RIVERVIEW
Date run : 10-13-1999(13:28:51) Instr. : Q1* Operator : ROBG



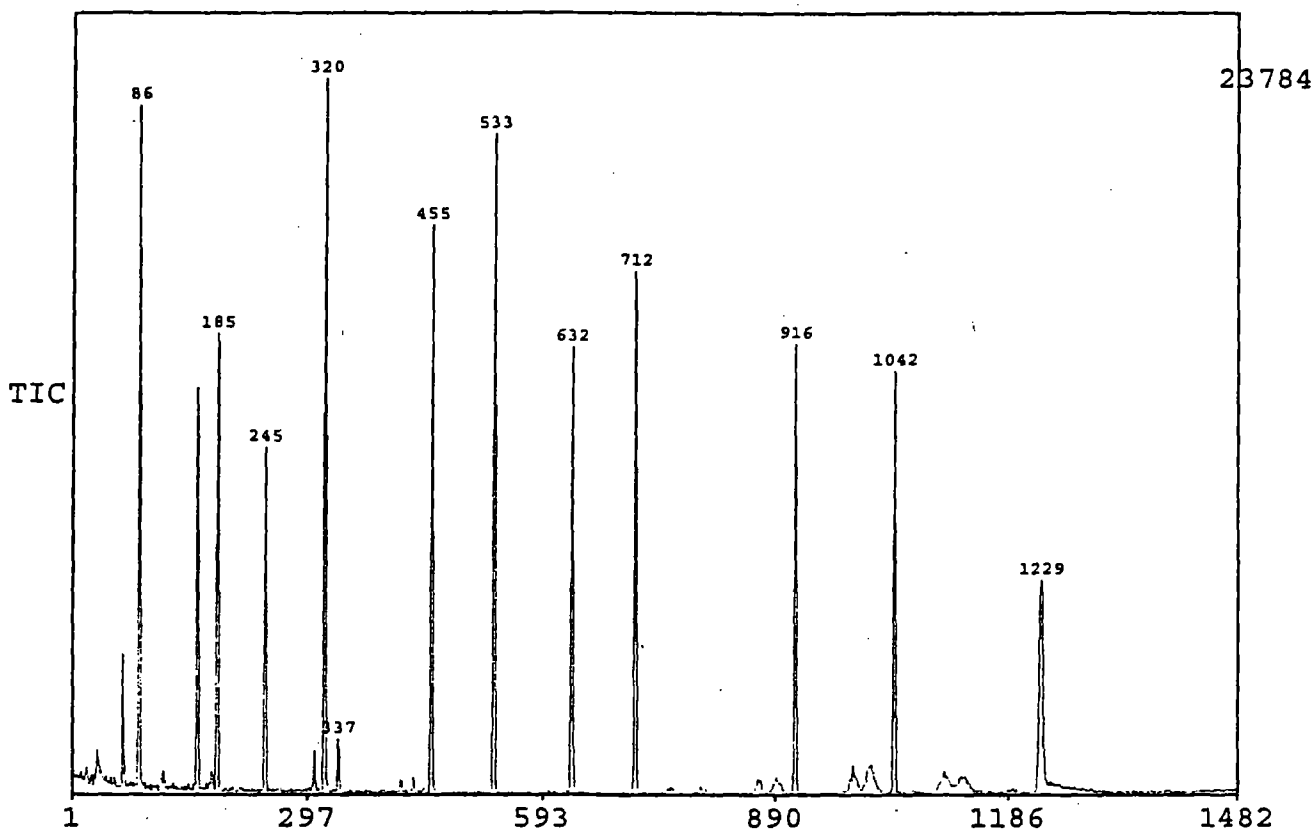
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	59	66.7	88.5% 1
NITROBENZENE-D5	69	66.7	103.4% 2
TERPHENYL-D14	55	66.7	82.5% 1
2-FLUOROPHENOL	72	133	54.1% 1
PHENOL-D6	58	133	43.6% 2
TRIBROMOPHENOL	76	133	57.1% 1

SHRADER LABORATORIES, INC.
10-13-1999

BK1011A QA/QC BLANK
Date run : 10-13-1999(09:58:47) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.

Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	46	53.3	86.3% 1
NITROBENZENE-D5	50	53.3	93.8% 1
TERPHENYL-D14	48	53.3	90.1% 1
2-FLUOROPHENOL	74	107	69.2% 1
PHENOL-D6	55	107	51.4% 1
TRIBROMOPHENOL	73	107	68.2% 1

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	1.0
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	1.0
O-CRESOL	N.D.	1.0
P-CRESOL	N.D.	1.0
2,4-DICHLOROPHENOL	N.D.	1
2,4-DIMETHYLPHENOL	N.D.	1.0
4,6-DINITRO-O-CRESOL	N.D.	4
2,4-DINITROPHENOL	N.D.	4
2-NITROPHENOL	N.D.	1
4-NITROPHENOL	N.D.	2
PENTACHLOROPHENOL	N.D.	4
PHENOL	N.D.	1.0
2,4,5-TRICHLOROPHENOL	N.D.	2
2,4,6-TRICHLOROPHENOL	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1.0
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1.0
BENZO(a)ANTHRACENE	N.D.	1.0
BENZO(b & k)FLUORANTHENES	N.D.	1
BENZO(a)PYRENE	N.D.	1
BENZO(ghi)PERYLENE	N.D.	1
BENZYL ALCOHOL	N.D.	1.0
bis(2-CHLOROETHOXY)METHANE	N.D.	1.0
bis(2-CHL'ETHYL)ETHER	N.D.	1.0
bis(2-CHLOROISOPROPYL)ETHER	N.D.	2
4-BROMOPHENYL PHENYL ETHER	N.D.	2
BUTYL BENZYL PHTHALATE	N.D.	1.0
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1.0
4-CHLOROPHENYL PHENYL ETHER	N.D.	1
CHRYSENE	N.D.	1.0
DIBENZO(a,h)ANTHRACENE	N.D.	1
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	1.0
1,3-DICHLOROBENZENE	N.D.	1.0
1,4-DICHLOROBENZENE	N.D.	1.0
3,3'-DICHLOROBENZIDINE	N.D.	3
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	2
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	1
2,6-DINITROTOLUENE	N.D.	2
DI-n-OCTYL PHTHALATE	N.D.	1.0
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	2
HEXACHLOROBUTADIENE	N.D.	2
HEXACHLOROCYCLOPENTADIENE	N.D.	2
HEXACHLOROETHANE	N.D.	2
INDENO(123-cd)PYRENE	N.D.	1.0
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1.0
m-NITROANILINE	N.D.	1.0
o-NITROANILINE	N.D.	1.0
p-NITROANILINE	N.D.	1.0
NITROBENZENE	N.D.	1.0
PARATHION	N.D.	2

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

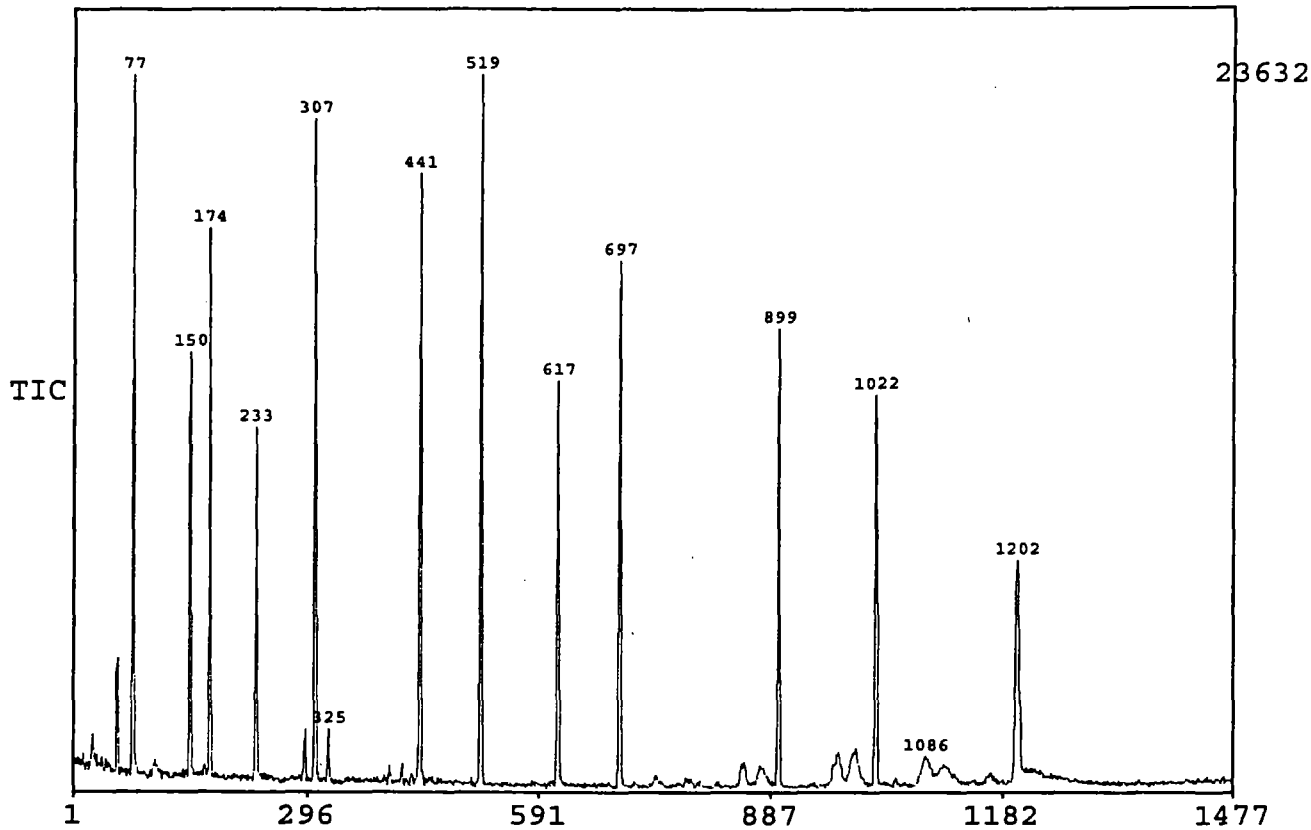
DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	1.0
N-NITROSO-DI-n-PROPYLAMINE	N.D.	4
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1.0
PYRIDINE	N.D.	1.0
1,2,4-TRICHL'BENZENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.
10-14-1999

BK1011AB QA/QC BLANK
Date run : 10-14-1999(11:18:13) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	45	53.3	84.4% 1
NITROBENZENE-D5	55	53.3	103.2% 2
TERPHENYL-D14	45	53.3	84.4% 1
2-FLUOROPHENOL	75	107	70.1% 1
PHENOL-D6	62	107	57.9% 1
TRIBROMOPHENOL	61	107	57.0% 1

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	1.0
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	1.0
O-CRESOL	N.D.	1.0
P-CRESOL	N.D.	1.0
2,4-DICHLOROPHENOL	N.D.	1
2,4-DIMETHYLPHENOL	N.D.	1.0
4,6-DINITRO-O-CRESOL	N.D.	3
2,4-DINITROPHENOL	N.D.	3
2-NITROPHENOL	N.D.	1
4-NITROPHENOL	N.D.	2
PENTACHLOROPHENOL	N.D.	3
PHENOL	N.D.	1.0
2,4,5-TRICHLOROPHENOL	N.D.	2
2,4,6-TRICHLOROPHENOL	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1.0
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1.0
BENZO(a)ANTHRACENE	N.D.	1.0
BENZO(b & k)FLUORANTHENES	N.D.	1
BENZO(a)PYRENE	N.D.	1
BENZO(ghi)PERYLENE	N.D.	1
BENZYL ALCOHOL	N.D.	1.0
bis(2-CHLOROETHOXY)METHANE	N.D.	1.0
bis(2-CHL'ETHYL)ETHER	N.D.	1.0
bis(2-CHLOROISOPROPYL)ETHER	N.D.	2
4-BROMOPHENYL PHENYL ETHER	N.D.	2
BUTYL BENZYL PHTHALATE	N.D.	1.0
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1.0
4-CHLOROPHENYL PHENYL ETHER	N.D.	1.0
CHRYSENE	N.D.	1.0
DIBENZO(a,h)ANTHRACENE	N.D.	1
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	1.0
1,3-DICHLOROBENZENE	N.D.	1.0
1,4-DICHLOROBENZENE	N.D.	1.0
3,3'-DICHLOROBENZIDINE	N.D.	4
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	1
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	1
2,6-DINITROTOLUENE	N.D.	2
DI-n-OCTYL PHTHALATE	N.D.	1.0
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	2
HEXACHLOROBUTADIENE	N.D.	2
HEXACHLOROCYCLOPENTADIENE	N.D.	2
HEXACHLOROETHANE	N.D.	1
INDENO(123-cd)PYRENE	N.D.	1.0
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1.0
m-NITROANILINE	N.D.	1.0
o-NITROANILINE	N.D.	1.0
p-NITROANILINE	N.D.	1.0
NITROBENZENE	N.D.	1.0
PARATHION	N.D.	2

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	1.0
N-NITROSO-DI-n-PROPYLAMINE	N.D.	4
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1.0
PYRIDINE	N.D.	1.0
1,2,4-TRICHL'BENZENE	N.D.	1.0

N.D. = Not detected TOTAL 0

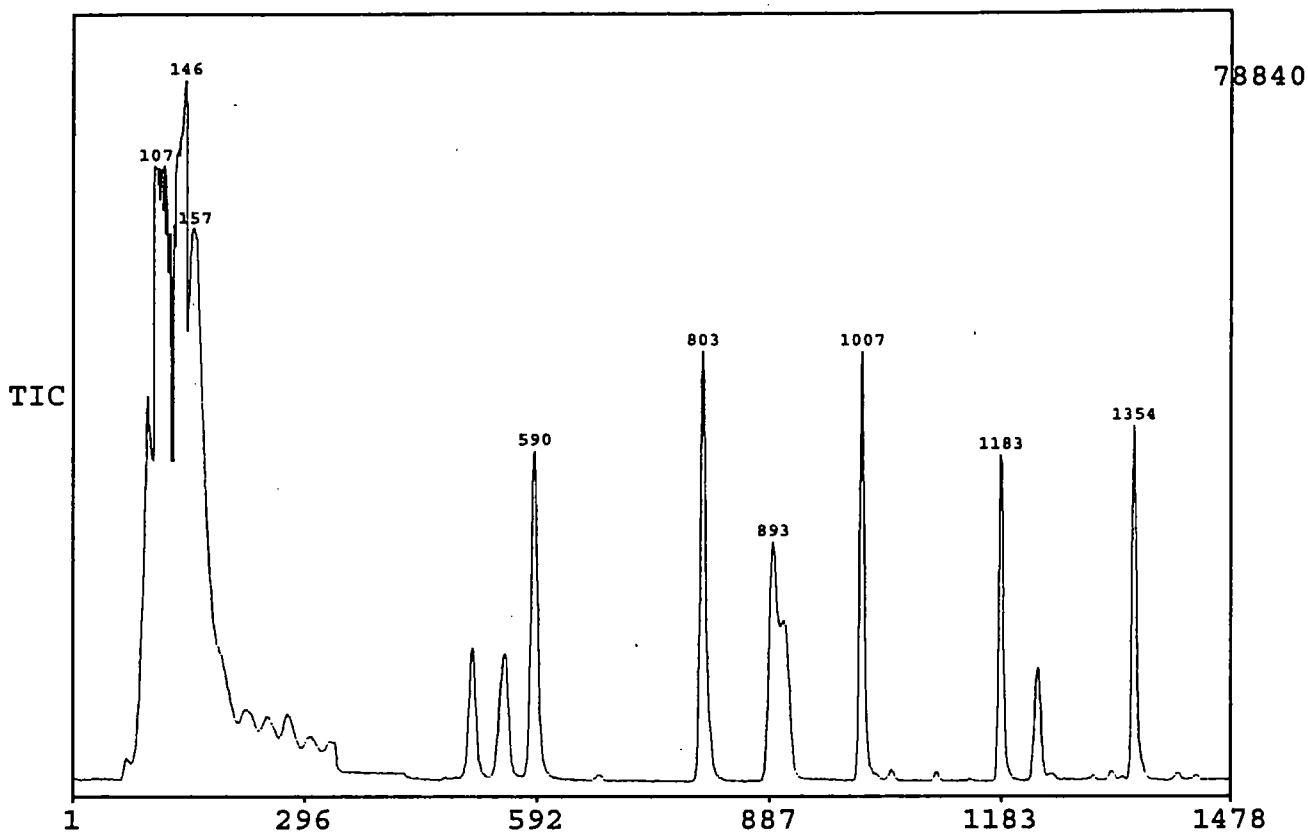
VOLATILE CHROMATOGRAMS, SURROGATE RECOVERIES

AND

LABORATORY BLANKS

SHRADER LABORATORIES, INC.
10-13-1999

I31801B MW-A
Date run : 10-13-1999(14:22:27) Instr. : Q2V* Operator : PALR



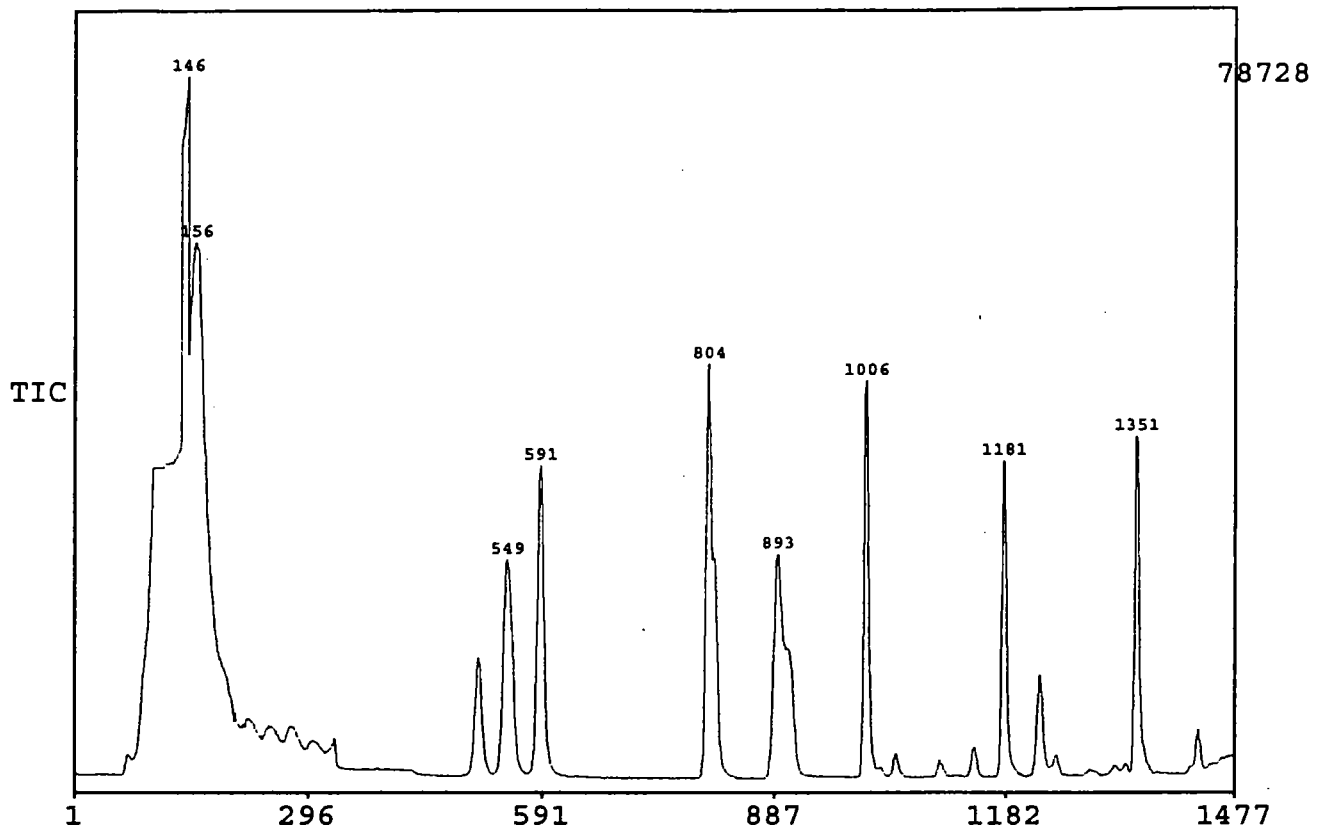
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31801B Sample size : 1 ml
Description : MW-A
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	980	1,000	98.0% 1
1,2-DICHL'ETHANE-D4	810	1,000	81.0% 3
TOLUENE-D8	990	1,000	99.0% 1
4-BROMOFLUOROBENZENE	970	1,000	97.0% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31802B MW-K
Date run : 10-13-1999(14:45:28) Instr. : Q2V* Operator : PALR



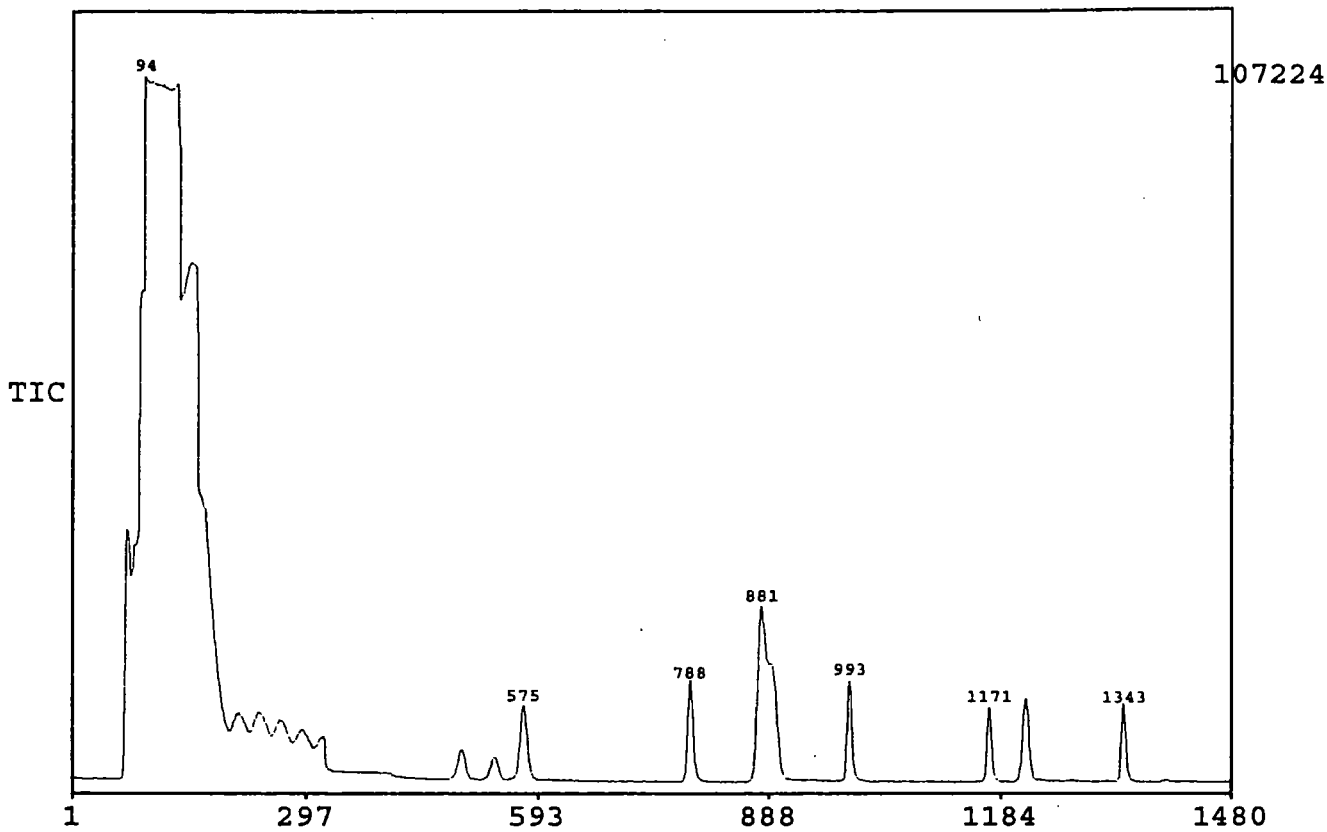
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31802B Sample size : 1 ml
Description : MW-K
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	950	1,000	95.0% 1
1,2-DICHL'ETHANE-D4	790	1,000	79.0% 3
TOLUENE-D8	980	1,000	98.0% 1
4-BROMOFLUOROBENZENE	1,000	1,000	100.0% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31803B MW-L
Date run : 10-13-1999(13:52:07) Instr. : Q2V* Operator : PALR



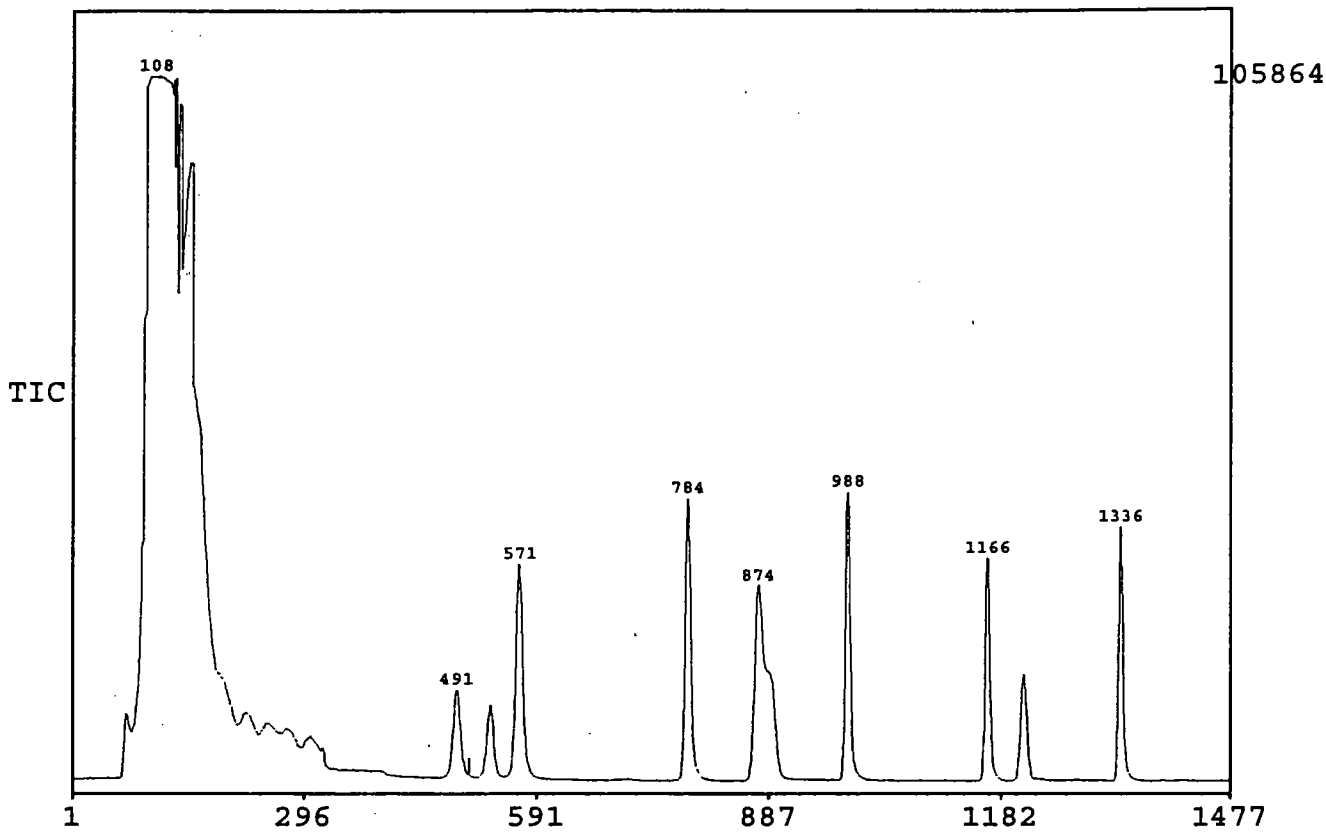
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31803B Sample size : 44 ml
Description : MW-L
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	47	45.5	103.3% 1
1,2-DICHL'ETHANE-D4	38	45.5	83.5% 3
TOLUENE-D8	44	45.5	96.7% 1
4-BROMOFLUOROBENZENE	47	45.5	103.3% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31804A TRIP BLANK
Date run : 10-13-1999(13:28:35) Instr. : Q2V* Operator : PALR



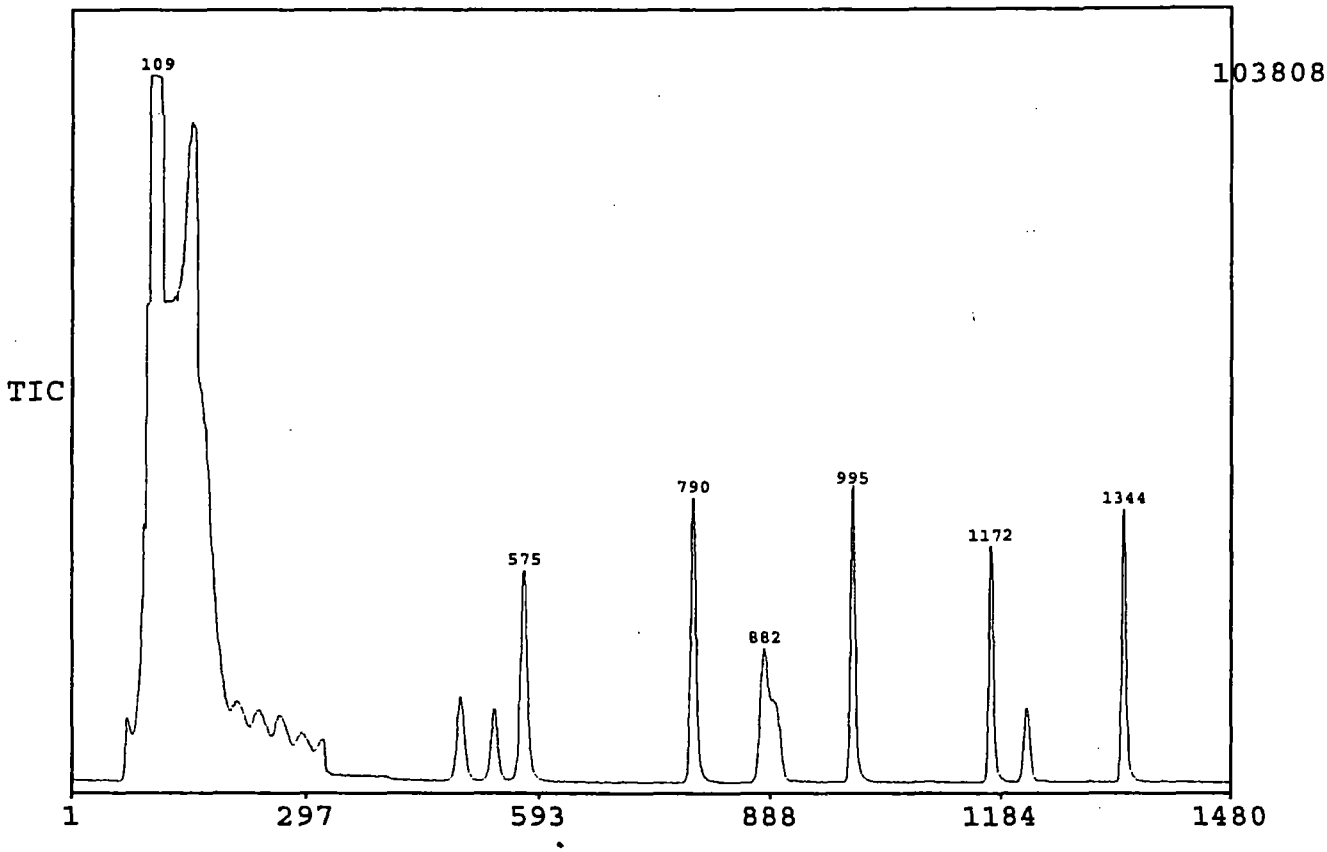
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31804A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	45	45.5	98.9% 1
1,2-DICHL'ETHANE-D4	40	45.5	87.9% 2
TOLUENE-D8	42	45.5	92.3% 2
4-BROMOFLUOROBENZENE	43	45.5	94.5% 1

SHRADER LABORATORIES, INC.
10-13-1999

1013BLK QA/QC BLANK
Date run : 10-13-1999(09:18:33) Instr. : Q2V* Operator : PALR



SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : 1013BLK Sample size : 22 ml
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	45	45.5	98.9% 1
1,2-DICHL'ETHANE-D4	40	45.5	87.9% 2
TOLUENE-D8	42	45.5	92.3% 2
4-BROMOFLUOROBENZENE	41	45.5	90.1% 2

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : 1013BLK Sample size : 22 ml
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(1)

Chain of Custody Record

T318

Customer: URS GREINER WOODWARD CLYDE
Project/Purchase Order #: BASF 38-8E06216
Sampling Site: WYANDOTTE / RIVERVIEW
By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
01A	MW-A				WATER	1032 10/7/99		SVOC
01B	↓				↓	↓		VOC
01C		NaOH	10/05 TG					CN
01D		HNO_3	↓					Metals
01E	✓	H_2SO_4	↓		✓	✓		NH_3
03A	MW-L				Water	0923 10/7/99		SVOC
03B	"				Water	1410 10/7/99		VOC
		NaOH	10/05 TG					CN
		HNO_3	↓					Metals
		H_2SO_4	↓					NH_3
04A				TRIP BLK				

~~No Sample~~ DRY

Method of Shipment:	Date:	Time:	Relinquished by: Timothy Hicks	Date: 10/7/99	Time: 1449
Received by: Gary Robbins	Date: 10-7-99	Time: 14 50	Relinquished by: Gary Robbins	Date: 10/7/99	Time: 15:30
Received by:	Date:	Time:	Relinquished by:	Date:	Time:

Time cooler opened: _____ Temperaure of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4409

(2)

I318

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: BASF WYANDOTTE / RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
02 A	MW-K				WATER	10/7/99 @ 0950		SVOC
02 B								VOC
02 C		NaOH	10/05 TG					CN
02 D		HNO_3						Metals
02 E		H_2SO_4						NH_3
								~~SVOC~~
								~~VOC~~
		~~NaOH~~	~~10/05 TG~~					~~CN~~
		~~HNO_3~~						~~Metals~~
		~~H_2SO_4~~						~~NH_3~~

Method of Shipment:	Date:	Time:	Relinquished by: Timothy Hicks	Date: 10/7/99	Time: 1445
Received by: Gary Robbins	Date: 10-7-99	Time: 14:50	Relinquished by: Gary Robbins	Date: 10/7/99	Time: 15:30
Received by:	Date:	Time:	Relinquished by:	Date:	Time:

Time cooler opened:_____ Temperaure of blank:_____ Time temperature taken:_____ By:_____

Michigan
Department of Environmental Quality

BETH VENS

Environmental Quality Analyst
Environmental Response Division

S.E. Michigan District Office
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Phone: (734) 953-1404
Fax: (734) 953-1544
E-Mail: vensb@state.mi.us

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $2,580.12

Lab Work Order # 9910042
Work Site ID: BASF - RIVERVIEW
Matrix: Water
Received: 10/8/1999
Reported: 11/16/1999
Client: ER_SE
Number of Samples: 3

TEST / UNITS	MW-L	MW-K	MW-A	
Ammonia mg N/L	.11	49	11	
Arsenic by Furnace ug/L	8 DM	INT	INT	
Arsenic in Water ug/L		194	120	
Barium in Water ug/L	17	150	13	
Cadmium by Furnace ug/L	K 1.0 DM	2.5 DM	K 1.0 DM	
Chromium by Furnace ug/L	14 DM	INT	136 DM	
Chromium in Water ug/L		560		
Copper by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Cyanide mg/L	.27	25	1.3	
Cyanide - Amenable	.21	7.0	.74	
FIELD - pH of Water pH		10	10	
Hex Chromium in Water ug/L	K 5 HT	INT HT	K 5 HT	
Lead by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Mercury in Water ug/L	INT	INT	INT	
Selenium in Water ug/L	K 1.0	9.6	1.9	
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Zinc in Water ug/L	13	19	58	

RECEIVED
NOV 18 1999
ENVIRONMENTAL RESPONSE DIVIS
S.E. MICHIGAN DISTRICT OFFIC

This is an original report: Laura C. Utenth Date: 11/16/99

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.2	1
108-95-2	Phenol	ND		10	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.0	1
95-57-8	2-Chlorophenol	ND		10	1
541-73-1	1,3-Dichlorobenzene	ND		1.0	1
106-46-7	1,4-Dichlorobenzene	ND		1.0	1
95-50-1	1,2-Dichlorobenzene	ND		1.0	1
95-48-7	2-Methylphenol (o-cresol)	ND		10	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.0	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.0	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.0	1
88-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		10	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.0	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
91-57-6	2-Methylnaphthalene	ND		5.2	1
77-47-4	Hexachlorocyclopentadiene	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.0	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.2	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.0	1
51-28-5	2,4-Dinitrophenol	ND		52	1
132-64-9	Dibenzofuran	ND		5.2	1
100-02-7	4-Nitrophenol	ND		52	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.2	1
86-73-7	Fluorene	ND		1.0	1
84-66-2	Diethyl phthalate	ND		1.0	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.0	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		52	1
85-01-8	Phenanthrene	ND		1.0	1
120-12-7	Anthracene	ND		1.0	1
86-74-8	Carbazole	ND		10	1
84-74-2	Di-n-butyl phthalate	ND		1.0	1
206-44-0	Fluoranthene	ND		1.0	1
129-00-0	Pyrene	ND		1.0	1
85-68-7	Butyl benzyl phthalate	ND		1.0	1
56-55-3	Benz(a)anthracene	ND		1.0	1
218-01-9	Chrysene	ND		1.0	1
117-81-7	Bis(2-ethylhexyl)phthalate	110		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.024	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.024	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.024	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.024	1.0
87-68-3	Hexachlorobutadiene	ND		0.024	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.024	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.024	1.0
91-58-7	2-Chloronaphthalene	ND		0.24	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.024	1.0
608-93-5	Pentachlorobenzene	ND		0.024	1.0
319-84-6	a-BHC	ND		0.024	1.0
118-74-1	Hexachlorobenzene	ND		0.024	1.0
319-85-7	b-BHC	ND		0.024	1.0
58-89-9	g-BHC (lindane)	ND		0.024	1.0
82-68-8	Pentachloronitrobenzene	ND		0.024	1.0
319-86-8	d-BHC	ND		0.024	1.0
76-44-8	Heptachlor	ND		0.024	1.0
309-00-2	Aldrin	ND		0.024	1.0
1024-57-3	Heptachlor epoxide	ND		0.024	1.0
5103-74-2	g-Chlordane	ND		0.024	1.0
959-98-8	Endosulfan I	ND		0.024	1.0
5103-71-9	a-Chlordane	ND		0.024	1.0
72-55-9	4,4'-DDE	ND		0.024	1.0
72-20-8	Endrin	ND		0.024	1.0
60-57-1	Dieldrin	ND		0.024	1.0
72-54-8	4,4'-DDD	ND		0.060	1.0
50-29-3	4,4'-DDT	ND		0.024	1.0
87-82-1	Hexabromobenzene	ND		0.024	1.0
72-43-5	Methoxychlor	ND		0.060	1.0
2385-85-5	Mirex	ND		0.024	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.24	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.24	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.24	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.24	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.24	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.24	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.24	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.24	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.24	1.0
59080-40-9	BP-6 (PBB)	ND		0.060	1.0
8001-35-2	*Toxaphene	ND		0.12	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/11/1999 by MW	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p-Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2-butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.3	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.1	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.3	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.1	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.3	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		53	1
132-64-9	Dibenzofuran	ND		5.3	1
100-02-7	4-Nitrophenol	ND		53	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.3	1
86-73-7	Fluorene	ND		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		53	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		53	1
85-01-8	Phenanthrene	7.9		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	7.6		1.1	1
129-00-0	Pyrene	6.4		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	ND		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	ND		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND	K	0.031	1.5
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND	K	0.041	2.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.052	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

Many UnID peaks
LH g-BHC through Toxaphene due to low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/12/1999 by LI	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	200	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	43	J	25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	690		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	5.6		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	29		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	450		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	10		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	14		5	5
108383,106423	m & p-Xylene	49		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	11		5	5
95-47-6	o-Xylene	39		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	5.4		5	5
95-63-6	1,2,4-Trimethylbenzene	10		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	ND		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.6	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		22	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.2	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.2	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.2	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.2	1
91-20-3	Naphthalene	18	J	1.1	1
87-68-3	Hexachlorobutadiene	ND		2.2	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.6	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.2	1
88-74-4	2-Nitroaniline	ND		22	1
208-96-8	Acenaphthylene	ND		1.1	1
131-11-3	Dimethyl phthalate	ND		2.2	1
606-20-2	2,6-Dinitrotoluene	ND		5.6	1
99-09-2	3-Nitroaniline	ND		22	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		56	1
132-64-9	Dibenzofuran	ND		5.6	1
100-02-7	4-Nitrophenol	ND		56	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.6	1
86-73-7	Fluorene	ND		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		22	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		56	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.2	1
103-33-3	Azobenzene	ND		2.2	1
101-55-3	4-Bromophenyl phenylether	ND		2.2	1
118-74-1	Hexachlorobenzene	ND		2.2	1
87-86-5	Pentachlorophenol	ND		56	1
85-01-8	Phenanthrene	2.4		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	ND		1.1	1
129-00-0	Pyrene	ND		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	ND		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	ND		2.2	1
117-84-0	Di-n-octyl phthalate	ND		2.2	1
205-99-2	Benzo(b)fluoranthene	ND		2.2	1
207-08-9	Benzo(k)fluoranthene	ND		2.2	1
50-32-8	Benzo(a)pyrene	ND		2.2	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.2	1
53-70-3	Dibenz(a,h)anthracene	ND		2.2	1
191-24-2	Benzo(g,h,i)perylene	ND		2.2	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND	K	0.041	2.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.052	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH g-BHC through Toxaphene due to low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/12/1999 by LI	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	820	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	56		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	14		5	5
71-43-2	Benzene	240		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	37		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	78		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	87		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
108-90-7	Chlorobenzene	37		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	8.6		5	5
108383,106423	m & p-Xylene	30		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	29		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	11		5	5
95-63-6	1,2,4-Trimethylbenzene	13		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	8.7		5	5
95-50-1	1,2-Dichlorobenzene	20		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	34		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	PROCEDURE	NO: PD-13
	LABORATORY SERVICES SECTION	DATE REV.:11/99

SUBJECT: Laboratory Result Remark Codes

EFFECTIVE DATE: October 1999

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance. if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed Is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. 0. indicated possible low recovery. Actual level may be higher.
LL	0. 0. indicated possible high recovery Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis
STR	settleable residue was not analyzed due to low suspended solids.

Approved by:

Bob H. Avery 11/12/99

Bob Avery, Lab Director Date

Toxic Reactive

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-042 PRIORITY H RECEIVED AT LAB BY DH DATE / / TIME ____ AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-L	99-10-7	9:17	
02	MW-K	99-10-7	9:50	pH=10
03	MW-A	99-10-7	10:32	pH=10
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_2, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
____ 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
____ 1 2 3 4 5

____ 1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO_3 + NO_2, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
____ 1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB ~~625 (BN)~~ 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA ~~625 (SC 8)~~ 1 2 3 4 5

SPECIAL REQUESTS
Ammonia
~~Ammonium~~ 1 2 3 4 5
BNA 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5	
Fe Co Li Mn	1 2 3 4 5	
Al Ba Be Mo V Ti	1 2 3 4 5	
B Sr	1 2 3 4 5	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5	

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

Pb Sample for Ammonia if enough sample is there.

Bottle not off @ lab DHL

FILE A: LABFORM.XLS

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

I. Type of Samples:

- X Environmental (surface, groundwater, soil, bottom sediment)
- ___ Waste Water
- ___ Municipal Sludge
- ___ Industrial Sludge
- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

II. Which of the following reasons causes you to think these samples are potentially hazardous?

- X Site Use History
- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $5,701.50

Lab Work Order # 9910031
Work Site ID: BASF- RIVERVIEW
Matrix: Water
Received: 10/7/1999
Reported: 11/16/1999
Client: ER_SE
Number of Samples: 7

TEST UNITS	MW-J	MW-D	MW-E	MW-H
Ammonia mg N/L	30	29	24	4.7
Arsenic by Furnace ug/L	52	INT	INT	140
Arsenic in Water ug/L	74	12200 DL	10500 DL	200
Barium in Water ug/L	440	28	70	270
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Chromium by Furnace ug/L	103 DM	138 DM	INT	INT
Chromium in Water ug/L			310	480
Copper by Furnace ug/L	27	2.5	1.2	5.2
Cyanide mg/L	1.7	6.0	6.9	3.2
Cyanide - Amenable	.40	INT	.30	.90
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	67 DM	6.7 DM	64 DM	K 5.0 DM
Mercury in Water ug/L	INT	INT	INT	4.0
Selenium in Water ug/L	3.5	4.1	5.1	19 DM
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Zinc in Water ug/L	50	26	60	50

RECEIVED ERD S.E. MICH.
NOV 19 1999
FILE
COUNTY

TEST UNITS	MW-B	MW-C	MW-I	
Ammonia mg N/L	20	18	7.3	
Arsenic by Furnace ug/L	INT	INT	INT	
Arsenic in Water ug/L	900	960	1300	
Barium in Water ug/L	159	480	90	
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Chromium by Furnace ug/L	INT	INT	86 DM	
Chromium in Water ug/L	420	670		
Copper by Furnace ug/L	22	55	30	
Cyanide mg/L	3.8	3.2	.56	
Cyanide - Amenable	.80	.50	.20	
Hex Chromium in Water ug/L	INT	INT	INT	
Lead by Furnace ug/L	95 DM	238 DM	36 DM	
Mercury in Water ug/L	INT	INT	3.5	
Selenium in Water ug/L	K 5.0 DM	7.9 DM	K 5.0 DM	
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Zinc in Water ug/L	130	250	100	

This is an original report: _____ Date: _____

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/2/1999 by GRINWISS	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		51	10
108-95-2	Phenol	ND		100	10
111-44-4	Bis(2-chloroethyl)ether	ND		10	10
95-57-8	2-Chlorophenol	ND		100	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	ND		10	10
95-48-7	2-Methylphenol (o-cresol)	ND		100	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		10	10
108394,106445	3/4-Methylphenol (m/p-cresol)	170	T	210	10
621-64-7	N-Nitrosodi-n-propylamine	ND		21	10
67-72-1	Hexachloroethane	ND		10	10
98-95-3	Nitrobenzene	ND		21	10
78-59-1	Isophorone	ND		10	10
88-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	ND		100	10
111-91-1	Bis(2-chloroethoxy)methane	ND		21	10
120-83-2	2,4-Dichlorophenol	ND		100	10
120-82-1	1,2,4-Trichlorobenzene	ND		21	10
91-20-3	Naphthalene	120		10	10
87-68-3	Hexachlorobutadiene	ND		21	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
91-57-6	2-Methylnaphthalene	ND		51	10
77-47-4	Hexachlorocyclopentadiene	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
91-58-7	2-Chloronaphthalene	ND		21	10
88-74-4	2-Nitroaniline	ND		210	10
208-96-8	Acenaphthylene	16		10	10
131-11-3	Dimethyl phthalate	ND		21	10
606-20-2	2,6-Dinitrotoluene	ND		51	10
99-09-2	3-Nitroaniline	ND		210	10
83-32-9	Acenaphthene	ND		10	10
51-28-5	2,4-Dinitrophenol	ND		510	10
132-64-9	Dibenzofuran	ND		51	10
100-02-7	4-Nitrophenol	ND		510	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		51	10
86-73-7	Fluorene	13		10	10
84-66-2	Diethyl phthalate	ND		10	10
100-01-6	4-Nitroaniline	ND		210	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		510	10
7005-72-3	4-Chlorophenyl phenylether	ND		10	10
156-10-5	N-Nitrosodiphenylamine	ND		21	10
103-33-3	Azobenzene	ND		21	10
101-55-3	4-Bromophenyl phenylether	ND		21	10
118-74-1	Hexachlorobenzene	ND		21	10
87-86-5	Pentachlorophenol	ND		510	10
85-01-8	Phenanthrene	37		10	10
120-12-7	Anthracene	ND		10	10
86-74-8	Carbazole	ND		100	10
84-74-2	Di-n-butyl phthalate	ND		10	10
206-44-0	Fluoranthene	ND		10	10
129-00-0	Pyrene	15		10	10
85-68-7	Butyl benzyl phthalate	ND		10	10
56-55-3	Benz(a)anthracene	ND		10	10
218-01-9	Chrysene	ND		10	10
117-81-7	Bis(2-ethylhexyl)phthalate	140		21	10
117-84-0	Di-n-octyl phthalate	ND		21	10
205-99-2	Benzo(b)fluoranthene	ND		21	10
207-08-9	Benzo(k)fluoranthene	ND		21	10
50-32-8	Benzo(a)pyrene	ND		21	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		21	10
53-70-3	Dibenz(a,h)anthracene	ND		21	10
191-24-2	Benzo(g,h,i)perylene	ND		21	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	0.032		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	0.031		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	0.036	T	0.052	1.0
50-29-3	4,4'-DDT	0.063		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	0.130	J,T	0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	0.120	J,T	0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by BUCHNER	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	950		120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	9.5		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	43		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	12		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p-Xylene	11		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	10		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	ND		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	240		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		55	10
108-95-2	Phenol	600		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	300		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	740		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	200		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	270		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	32	T	55	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	50		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		55	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		550	10
132-64-9	Dibenzofuran	ND		55	10
100-02-7	4-Nitrophenol	ND		550	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		55	10
86-73-7	Fluorene	44		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		550	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	ND		550	10
85-01-8	Phenanthrene	180		11	10
120-12-7	Anthracene	37		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	140		11	10
129-00-0	Pyrene	100		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	39		11	10
218-01-9	Chrysene	31		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	35		22	10
207-08-9	Benzo(k)fluoranthene	28		22	10
50-32-8	Benzo(a)pyrene	27		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.086	4.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.086	4.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.086	4.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.086	4.0
87-68-3	Hexachlorobutadiene	ND		0.086	4.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.086	4.0
77-47-4	Hexachlorocyclopentadiene	ND		0.086	4.0
91-58-7	2-Chloronaphthalene	ND		0.86	4.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.086	4.0
608-93-5	Pentachlorobenzene	0.120		0.086	4.0
319-84-6	a-BHC	ND		0.086	4.0
118-74-1	Hexachlorobenzene	ND		0.086	4.0
319-85-7	b-BHC	ND		0.086	4.0
58-89-9	g-BHC (lindane)	ND		0.086	4.0
82-68-8	Pentachloronitrobenzene	ND		0.086	4.0
319-86-8	d-BHC	ND		0.086	4.0
76-44-8	Heptachlor	ND		0.086	4.0
309-00-2	Aldrin	ND		0.086	4.0
1024-57-3	Heptachlor epoxide	ND		0.086	4.0
5103-74-2	g-Chlordane	ND		0.086	4.0
959-98-8	Endosulfan I	ND		0.086	4.0
5103-71-9	a-Chlordane	ND		0.086	4.0
72-55-9	4,4'-DDE	ND		0.086	4.0
72-20-8	Endrin	ND		0.086	4.0
60-57-1	Dieldrin	ND		0.086	4.0
72-54-8	4,4'-DDD	ND		0.216	4.0
50-29-3	4,4'-DDT	ND		0.086	4.0
87-82-1	Hexabromobenzene	ND		0.086	4.0
72-43-5	Methoxychlor	ND		0.216	4.0
2385-85-5	Mirex	ND		0.086	4.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.86	4.0
11097-69-1	Aroclor 1254 (PCB)	7.60	J	0.86	4.0
11096-82-5	Aroclor 1260 (PCB)	3.30	J	0.86	4.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.86	4.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.86	4.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.86	4.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	6.20	J	0.86	4.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.86	4.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.86	4.0
59080-40-9	BP-6 (PBB)	ND		0.216	4.0
8001-35-2	*Toxaphene	ND		0.43	4.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by BUCHNER	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	96		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1100		250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	320		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	ND		50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	150	J	10	10
71-43-2	Benzene	37	J	10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	ND		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	260	J	50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	330		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
100-41-4	Ethylbenzene	11		10	10
108383,106423	m & p-Xylene	37		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	20		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2-butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	13		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	13		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	390		50	10
91-57-6	2-Methylnaphthalene	58		50	10

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		56	10
108-95-2	Phenol	460		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	220		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	600		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	150		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	52		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	ND		56	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	ND		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		56	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		560	10
132-64-9	Dibenzofuran	ND		56	10
100-02-7	4-Nitrophenol	ND		560	10

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		56	10
86-73-7	Fluorene	ND		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		560	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	110	T	560	10
85-01-8	Phenanthrene	57		11	10
120-12-7	Anthracene	ND		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	44		11	10
129-00-0	Pyrene	24		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	ND		11	10
218-01-9	Chrysene	ND		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	ND		22	10
207-08-9	Benzo(k)fluoranthene	ND		22	10
50-32-8	Benzo(a)pyrene	ND		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.023	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	0.085		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	0.050		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	0.170		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND		0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND	K	0.034	1.5
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND		0.023	1.0
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND		0.057	1.0
50-29-3	4,4'-DDT	ND		0.023	1.0
87-82-1	Hexabromobenzene	ND		0.023	1.0
72-43-5	Methoxychlor	ND		0.057	1.0
2385-85-5	Mirex	ND		0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	1.90	J	0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	1.00	J	0.23	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	2.80	J	0.23	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND		0.057	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	670	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	110	J	25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	46	J	25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	54	J	5	5
71-43-2	Benzene	18	J	5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	120	J	25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	25		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	8.4		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p-Xylene	12		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	7.5		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	8.6		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	86		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.
J CODES FOR RESULTS OF METHYLENE CHLORIDE, MEK, 1,2-DCA, BENZENE, AND MIBK DUE TO LOW SURROGATE RECOVERY.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.2	1
108-95-2	Phenol	ND		10	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.0	1
95-57-8	2-Chlorophenol	ND		10	1
541-73-1	1,3-Dichlorobenzene	ND		1.0	1
106-46-7	1,4-Dichlorobenzene	ND		1.0	1
95-50-1	1,2-Dichlorobenzene	ND		1.0	1
95-48-7	2-Methylphenol (o-cresol)	ND		10	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.0	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.0	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.0	1
88-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		10	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.0	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
91-57-6	2-Methylnaphthalene	ND		5.2	1
77-47-4	Hexachlorocyclopentadiene	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.0	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.2	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.0	1
51-28-5	2,4-Dinitrophenol	ND		52	1
132-64-9	Dibenzofuran	ND		5.2	1
100-02-7	4-Nitrophenol	ND		52	1

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.2	1
86-73-7	Fluorene	ND		1.0	1
84-66-2	Diethyl phthalate	ND		1.0	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.0	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		52	1
85-01-8	Phenanthrene	ND		1.0	1
120-12-7	Anthracene	ND		1.0	1
86-74-8	Carbazole	ND		10	1
84-74-2	Di-n-butyl phthalate	ND		1.0	1
206-44-0	Fluoranthene	ND		1.0	1
129-00-0	Pyrene	ND		1.0	1
85-68-7	Butyl benzyl phthalate	ND		1.0	1
56-55-3	Benz(a)anthracene	ND		1.0	1
218-01-9	Chrysene	ND		1.0	1
117-81-7	Bis(2-ethylhexyl)phthalate	5.6		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.053	1.0
50-29-3	4,4'-DDT	0.130		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.053	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.053	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by WORM	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		10	2
74-87-3	Chloromethane	ND		10	2
75-01-4	Vinyl chloride	ND		10	2
74-83-9	Bromomethane	ND		10	2
75-00-3	Chloroethane	ND		10	2
75-69-4	Trichlorofluoromethane	ND		10	2
67-64-1	2-Propanone (Acetone)	ND		50	2
60-29-7	Diethyl ether	ND		20	2
75-35-4	1,1-Dichloroethene	ND		2	2
74-88-4	Methyl iodide	ND		2	2
107-13-1	Acrylonitrile	ND		10	2
75-09-2	Methylene chloride	ND		10	2
75-15-0	Carbon disulfide	ND		10	2
156-60-5	trans-1,2-Dichloroethene	ND		2	2
1634-04-4	Methyltertbutylether (MTBE)	ND		10	2
75-34-3	1,1-Dichloroethane	ND		2	2
78-93-3	2-Butanone (MEK)	ND		10	2
156-59-2	cis-1,2-Dichloroethene	ND		2	2
67-66-3	Chloroform	ND		2	2
74-97-5	Bromochloromethane	ND		2	2
71-55-6	1,1,1-Trichloroethane	ND		2	2
107-06-2	1,2-Dichloroethane	ND		2	2
71-43-2	Benzene	2.4		2	2
56-23-5	Carbon tetrachloride	ND		2	2
78-87-5	1,2-Dichloropropane	ND		2	2
79-01-6	Trichloroethene	ND		2	2
74-95-3	Dibromomethane	ND		2	2
75-27-4	Bromodichloromethane	ND		2	2
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		10	2
10061-01-5	cis-1,3-Dichloropropene	ND		2	2
10061-02-6	trans-1,3-Dichloropropene	ND		2	2
108-88-3	Toluene	ND		2	2
79-00-5	1,1,2-Trichloroethane	ND		2	2
591-78-6	2-Hexanone	ND		10	2
124-48-1	Dibromochloromethane	ND		2	2
106-93-4	1,2-Dibromoethane	ND		2	2

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		2	2
108-90-7	Chlorobenzene	ND		2	2
630-20-6	1,1,1,2-Tetrachloroethane	ND		2	2
100-41-4	Ethylbenzene	ND		2	2
108383,106423	m & p-Xylene	ND		4	2
75-25-2	Bromoform	ND		2	2
100-42-5	Styrene	ND		2	2
95-47-6	o-Xylene	ND		2	2
79-34-5	1,1,2,2-Tetrachloroethane	ND		2	2
96-18-4	1,2,3-Trichloropropane	ND		2	2
110-57-6	trans-1,4-Dichloro-2-butene	ND		2	2
98-82-8	Isopropylbenzene	ND		2	2
103-65-1	n-Propylbenzene	ND		2	2
108-67-8	1,3,5-Trimethylbenzene	ND		2	2
95-63-6	1,2,4-Trimethylbenzene	ND		2	2
541-73-1	1,3-Dichlorobenzene	ND		2	2
106-46-7	1,4-Dichlorobenzene	ND		2	2
95-50-1	1,2-Dichlorobenzene	ND		2	2
67-72-1	Hexachloroethane	ND		2	2
96-12-8	1,2-Dibromo-3-chloropropane	ND		10	2
120-82-1	1,2,4-Trichlorobenzene	ND		10	2
91-20-3	Naphthalene	ND		10	2
91-57-6	2-Methylnaphthalene	ND		10	2

LARGE UNIDENTIFIED PEAK.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		56	10
108-95-2	Phenol	210		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	110		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	430		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	120		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	22	T	110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	270		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	83		56	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	130		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		56	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	16		11	10
51-28-5	2,4-Dinitrophenol	ND		560	10
132-64-9	Dibenzofuran	60		56	10
100-02-7	4-Nitrophenol	ND		560	10

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		56	10
86-73-7	Fluorene	ND		11	10
84-66-2	Diethyl phthalate	100		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		560	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	82	T	560	10
85-01-8	Phenanthrene	330		11	10
120-12-7	Anthracene	110		11	10
86-74-8	Carbazole	140		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	240		11	10
129-00-0	Pyrene	130		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	66		11	10
218-01-9	Chrysene	55		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	51		22	10
207-08-9	Benzo(k)fluoranthene	59		22	10
50-32-8	Benzo(a)pyrene	42		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.180	8.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.180	8.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.180	8.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.180	8.0
87-68-3	Hexachlorobutadiene	ND		0.180	8.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.180	8.0
77-47-4	Hexachlorocyclopentadiene	ND		0.180	8.0
91-58-7	2-Chloronaphthalene	ND		1.80	8.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.180	8.0
608-93-5	Pentachlorobenzene	ND		0.180	8.0
319-84-6	a-BHC	ND		0.180	8.0
118-74-1	Hexachlorobenzene	ND		0.180	8.0
319-85-7	b-BHC	ND		0.180	8.0
58-89-9	g-BHC (lindane)	ND		0.180	8.0
82-68-8	Pentachloronitrobenzene	ND		0.180	8.0
319-86-8	d-BHC	ND		0.180	8.0
76-44-8	Heptachlor	ND		0.180	8.0
309-00-2	Aldrin	ND		0.180	8.0
1024-57-3	Heptachlor epoxide	ND		0.180	8.0
5103-74-2	g-Chlordane	ND		0.180	8.0
959-98-8	Endosulfan I	ND		0.180	8.0
5103-71-9	a-Chlordane	ND		0.180	8.0
72-55-9	4,4'-DDE	ND		0.180	8.0
72-20-8	Endrin	ND		0.180	8.0
60-57-1	Dieldrin	ND		0.180	8.0
72-54-8	4,4'-DDD	ND		0.449	8.0
50-29-3	4,4'-DDT	ND		1.01	45.0
87-82-1	Hexabromobenzene	ND		0.180	8.0
72-43-5	Methoxychlor	ND		0.449	8.0
2385-85-5	Mirex	ND		0.180	8.0
53469-21-9	Aroclor 1242 (PCB)	ND		2.25	10.0
11097-69-1	Aroclor 1254 (PCB)	98.0	J	2.25	10.0
11096-82-5	Aroclor 1260 (PCB)	31.0	J	2.25	10.0
12674-11-2	Aroclor 1016 (PCB)	ND		2.25	10.0
11104-28-2	Aroclor 1221 (PCB)	ND		2.25	10.0
11141-16-5	Aroclor 1232 (PCB)	ND		2.25	10.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	180	J	2.25	10.0
37324-23-5	Aroclor 1262 (PCB)	ND		2.25	10.0
11100-14-4	Aroclor 1268 (PCB)	ND		2.25	10.0
59080-40-9	BP-6 (PBB)	ND		0.449	8.0
8001-35-2	*Toxaphene	ND		0.90	8.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	5300	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	5300		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	66		50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	59		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
100-41-4	Ethylbenzene	52		50	50
108383,106423	m & p-Xylene	64	T	100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	60		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2-butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	70		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	1500		250	50
91-57-6	2-Methylnaphthalene	530	J	250	50

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		57	10
108-95-2	Phenol	130		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	85	T	110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	270		230	10
621-64-7	N-Nitrosodi-n-propylamine	ND		23	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		23	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	ND		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		23	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		23	10
91-20-3	Naphthalene	88		11	10
87-68-3	Hexachlorobutadiene	ND		23	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	25	T	57	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		23	10
88-74-4	2-Nitroaniline	ND		230	10
208-96-8	Acenaphthylene	42		11	10
131-11-3	Dimethyl phthalate	ND		23	10
606-20-2	2,6-Dinitrotoluene	ND		57	10
99-09-2	3-Nitroaniline	ND		230	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		570	10
132-64-9	Dibenzofuran	22	T	57	10
100-02-7	4-Nitrophenol	ND		570	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		57	10
86-73-7	Fluorene	37		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		230	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		570	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		23	10
103-33-3	Azobenzene	ND		23	10
101-55-3	4-Bromophenyl phenylether	ND		23	10
118-74-1	Hexachlorobenzene	ND		23	10
87-86-5	Pentachlorophenol	61	T	570	10
85-01-8	Phenanthrene	120		11	10
120-12-7	Anthracene	27		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	88		11	10
129-00-0	Pyrene	54		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	ND		11	10
218-01-9	Chrysene	ND		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		23	10
117-84-0	Di-n-octyl phthalate	ND		23	10
205-99-2	Benzo(b)fluoranthene	19	T	23	10
207-08-9	Benzo(k)fluoranthene	19	T	23	10
50-32-8	Benzo(a)pyrene	20	T	23	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		23	10
53-70-3	Dibenz(a,h)anthracene	ND		23	10
191-24-2	Benzo(g,h,i)perylene	ND		23	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.089	4.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.089	4.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.089	4.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.089	4.0
87-68-3	Hexachlorobutadiene	ND		0.089	4.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.089	4.0
77-47-4	Hexachlorocyclopentadiene	ND		0.089	4.0
91-58-7	2-Chloronaphthalene	ND		0.89	4.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.089	4.0
608-93-5	Pentachlorobenzene	0.220		0.089	4.0
319-84-6	a-BHC	ND		0.089	4.0
118-74-1	Hexachlorobenzene	ND		0.089	4.0
319-85-7	b-BHC	ND		0.089	4.0
58-89-9	g-BHC (lindane)	ND		0.089	4.0
82-68-8	Pentachloronitrobenzene	ND		0.089	4.0
319-86-8	d-BHC	ND		0.089	4.0
76-44-8	Heptachlor	ND		0.089	4.0
309-00-2	Aldrin	ND		0.089	4.0
1024-57-3	Heptachlor epoxide	ND		0.089	4.0
5103-74-2	g-Chlordane	ND		0.089	4.0
959-98-8	Endosulfan I	ND		0.089	4.0
5103-71-9	a-Chlordane	ND		0.089	4.0
72-55-9	4,4'-DDE	ND		0.089	4.0
72-20-8	Endrin	ND		0.089	4.0
60-57-1	Dieldrin	ND		0.089	4.0
72-54-8	4,4'-DDD	ND		0.223	4.0
50-29-3	4,4'-DDT	ND		0.089	4.0
87-82-1	Hexabromobenzene	ND		0.089	4.0
72-43-5	Methoxychlor	ND		0.223	4.0
2385-85-5	Mirex	ND		0.089	4.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.89	4.0
11097-69-1	Aroclor 1254 (PCB)	13.0	J	0.89	4.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.89	4.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.89	4.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.89	4.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.89	4.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	27.0	J	0.89	4.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.89	4.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.89	4.0
59080-40-9	BP-6 (PBB)	ND		0.223	4.0
8001-35-2	*Toxaphene	ND		0.45	4.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		500	100
74-87-3	Chloromethane	ND		500	100
75-01-4	Vinyl chloride	ND		500	100
74-83-9	Bromomethane	ND		500	100
75-00-3	Chloroethane	ND		500	100
75-69-4	Trichlorofluoromethane	ND		500	100
67-64-1	2-Propanone (Acetone)	5700	J	2500	100
60-29-7	Diethyl ether	ND		1000	100
75-35-4	1,1-Dichloroethene	ND		100	100
74-88-4	Methyl iodide	ND		100	100
107-13-1	Acrylonitrile	ND		500	100
75-09-2	Methylene chloride	4200		500	100
75-15-0	Carbon disulfide	ND		500	100
156-60-5	trans-1,2-Dichloroethene	ND		100	100
1634-04-4	Methyltertbutylether (MTBE)	ND		500	100
75-34-3	1,1-Dichloroethane	ND		100	100
78-93-3	2-Butanone (MEK)	ND		500	100
156-59-2	cis-1,2-Dichloroethene	ND		100	100
67-66-3	Chloroform	ND		100	100
74-97-5	Bromochloromethane	ND		100	100
71-55-6	1,1,1-Trichloroethane	ND		100	100
107-06-2	1,2-Dichloroethane	ND		100	100
71-43-2	Benzene	ND		100	100
56-23-5	Carbon tetrachloride	ND		100	100
78-87-5	1,2-Dichloropropane	ND		100	100
79-01-6	Trichloroethene	ND		100	100
74-95-3	Dibromomethane	ND		100	100
75-27-4	Bromodichloromethane	ND		100	100
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		500	100
10061-01-5	cis-1,3-Dichloropropene	ND		100	100
10061-02-6	trans-1,3-Dichloropropene	ND		100	100
108-88-3	Toluene	ND		100	100
79-00-5	1,1,2-Trichloroethane	ND		100	100
591-78-6	2-Hexanone	ND		500	100
124-48-1	Dibromochloromethane	ND		100	100
106-93-4	1,2-Dibromoethane	ND		100	100

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		100	100
108-90-7	Chlorobenzene	ND		100	100
630-20-6	1,1,1,2-Tetrachloroethane	ND		100	100
100-41-4	Ethylbenzene	ND		100	100
108383,106423	m & p-Xylene	ND		200	100
75-25-2	Bromoform	ND		100	100
100-42-5	Styrene	ND		100	100
95-47-6	o-Xylene	ND		100	100
79-34-5	1,1,2,2-Tetrachloroethane	ND		100	100
96-18-4	1,2,3-Trichloropropane	ND		100	100
110-57-6	trans-1,4-Dichloro-2-butene	ND		100	100
98-82-8	Isopropylbenzene	ND		100	100
103-65-1	n-Propylbenzene	ND		100	100
108-67-8	1,3,5-Trimethylbenzene	ND		100	100
95-63-6	1,2,4-Trimethylbenzene	ND		100	100
541-73-1	1,3-Dichlorobenzene	ND		100	100
106-46-7	1,4-Dichlorobenzene	ND		100	100
95-50-1	1,2-Dichlorobenzene	ND		100	100
67-72-1	Hexachloroethane	ND		100	100
96-12-8	1,2-Dibromo-3-chloropropane	ND		500	100
120-82-1	1,2,4-Trichlorobenzene	ND		500	100
91-20-3	Naphthalene	980		500	100
91-57-6	2-Methylnaphthalene	ND		500	100

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-07OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.7	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		23	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.3	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.3	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.3	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.3	1
91-20-3	Naphthalene	ND		1.1	1
87-68-3	Hexachlorobutadiene	ND		2.3	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.7	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.3	1
88-74-4	2-Nitroaniline	ND		23	1
208-96-8	Acenaphthylene	2.5		1.1	1
131-11-3	Dimethyl phthalate	ND		2.3	1
606-20-2	2,6-Dinitrotoluene	ND		5.7	1
99-09-2	3-Nitroaniline	ND		23	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		57	1
132-64-9	Dibenzofuran	ND		5.7	1
100-02-7	4-Nitrophenol	ND		57	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.7	1
86-73-7	Fluorene	2.8		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		23	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		57	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.3	1
103-33-3	Azobenzene	ND		2.3	1
101-55-3	4-Bromophenyl phenylether	ND		2.3	1
118-74-1	Hexachlorobenzene	ND		2.3	1
87-86-5	Pentachlorophenol	ND		57	1
85-01-8	Phenanthrene	10		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	12		1.1	1
129-00-0	Pyrene	7.4		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	4.7		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	66		2.3	1
117-84-0	Di-n-octyl phthalate	ND		2.3	1
205-99-2	Benzo(b)fluoranthene	5.2		2.3	1
207-08-9	Benzo(k)fluoranthene	ND		2.3	1
50-32-8	Benzo(a)pyrene	4.8		2.3	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.3	1
53-70-3	Dibenz(a,h)anthracene	ND		2.3	1
191-24-2	Benzo(g,h,i)perylene	ND		2.3	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-07POX

Date Collected: 10/6/1999

Date Analyzed: 10/9/1999 by WORM

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	ND		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1900	J	250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	ND		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	ND		50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	ND		10	10
71-43-2	Benzene	ND		10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	ND		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	ND		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
100-41-4	Ethylbenzene	ND		10	10
108383,106423	m & p-Xylene	ND		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	ND		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2-butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	ND		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	ND		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	ND		50	10
91-57-6	2-Methylnaphthalene	ND		50	10

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	PROCEDURE	NO: PD-13
	LABORATORY SERVICES SECTION	DATE REV.:11/99

SUBJECT: Laboratory Result Remark Codes

EFFECTIVE DATE: October 1999

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance. if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed Is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. 0. indicated possible low recovery. Actual level may be higher.
LL	0. 0. indicated possible high recovery Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis
STR	settleable residue was not analyzed due to low suspended solids.

Approved by:

Bob H. Avery 11/12/99

Bob Avery, Lab Director Date

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Toxic
Acidic
Reactive

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-031 PRIORITY A RECEIVED AT LAB BY DH DATE/TIME 10/7/99 730 AM/PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-J	99/10/06	0925	High pH (10) did not preserve metals
02	MW-D		1010	pH = 12 not preserved
03	MW-E		1040	pH = 11 " "
04	MW-H		1216	pH = 8.5 " "
05	MW-B		1420	pH = 10 " "

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
	_____	1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
	_____	1 2 3 4 5
	_____	1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
	_____	1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

VOLATILES

POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5

PEST & PCB

ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5

BASE NEUTRALS

OB	~~625 (BN)~~	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5

PHENOLS

OA	~~625 (SC 8)~~	1 2 3 4 5

SPECIAL REQUESTS

Ammonium	1 2 3 4 5
BNA	1 2 3 4 5

If possible

INORGANIC

MA	Total Metals	1 2 3 4 5
MAD	Diss-Field Filtered	1 2 3 4 5
MD	Diss-Lab Filtered	1 2 3 4 5

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5	
Fe Co Li Mn	1 2 3 4 5	
Al Ba Be Mo V Ti	1 2 3 4 5	
B Sr	1 2 3 4 5	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5	
Ca Mg Na K	1 2 3 4 5	
As - Arsenic	1 2 3 4 5	
Ag - Silver	1 2 3 4 5	
Hg - Mercury	1 2 3 4 5	
Se - Selenium	1 2 3 4 5	
Sb - Antimony	1 2 3 4 5	
Tl - Thallium	1 2 3 4 5	

MN	pH, Conductance	1 2 3 4 5
	Cl, SO_4, Total Alk	1 2 3 4 5
	HCO_3 - CO_3	1 2 3 4 5
	Cr^{+6}	1 2 3 4 5
OG	Oil & Grease	1 2 3 4 5

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

I. Type of Samples:

- X Environmental (surface, groundwater, soil, bottom sediment)
- ___ Waste Water
- ___ Municipal Sludge
- ___ Industrial Sludge
- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

II. Which of the following reasons causes you to think these samples are potentially hazardous?

- X Site Use History
- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

DNR

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-031 PRIORITY II RECEIVED AT LAB BY DH DATE TIME 10/7/99 730 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-14

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01 (06)	MW-C	99/10/06	14:10	pH = 10 Did not preserve metals
02 (07)	MW-I	" "	1205	pH = 9 " "
03				
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_2, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
_____ 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
_____ 1 2 3 4 5

_____ 1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
_____ 1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB 625 (BN) 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA 625 (SC 8) 1 2 3 4 5

SPECIAL REQUESTS
Ammonium 1 2 3 4 5
BNA 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5	
Fe Co Li Mn	1 2 3 4 5	
Al Ba Be Mo V Ti	1 2 3 4 5	
B Sr	1 2 3 4 5	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5	

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

99-10-031

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

I. Type of Samples:

- X Environmental (surface, groundwater, soil, bottom sediment)
- ___ Waste Water
- ___ Municipal Sludge
- ___ Industrial Sludge
- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

II. Which of the following reasons causes you to think these samples are potentially hazardous?

- X Site Use History
- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

RECEIVED ERD S.E. MICH.
SEP 27 1999
FILE
COUNTY

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Method: SW-846 8270
Matrix: Water
DL Multiplier: 7.0
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Trace ID: X113-05
Sample ID: MW-I
Batch ID: BNA062301W
% Solids: NA

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	18	ug/L
1,3-Dichlorobenzene	U	18	ug/L
1,4-Dichlorobenzene	U	18	ug/L
1,2-Dichlorobenzene	U	18	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	18	ug/L
N-Nitroso-di-n-propylamine	U	18	ug/L
Hexachloroethane	U	18	ug/L
Nitrobenzene	U	18	ug/L
Isophorone	U	18	ug/L
bis(2-Chloroethoxy)methane	U	18	ug/L
1,2,4-Trichlorobenzene	U	18	ug/L
Naphthalene	U	18	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	18	ug/L
2-Methylnaphthalene	U	18	ug/L
Hexachlorocyclopentadiene	U	35	ug/L
2-Chloronaphthalene	U	18	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	18	ug/L
Acenaphthylene	U	18	ug/L
2,6-Dinitrotoluene	U	18	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	18	ug/L
Dibenzofuran	U	18	ug/L
2,4-Dinitrotoluene	U	18	ug/L
Diethylphthalate	U	18	ug/L
Fluorene	U	18	ug/L
4-Chlorophenyl-phenylether	U	18	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	18	ug/L
4-Bromophenyl-phenylether	U	18	ug/L
Hexachlorobenzene	U	18	ug/L
Phenanthrene	U	18	ug/L
Anthracene	U	18	ug/L
Carbazole	U	18	ug/L
Di-n-butylphthalate	U	18	ug/L
Fluoranthene	U	18	ug/L
Pyrene	U	18	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-05
Sample ID: MW-I
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 7.0
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	18 ug/L
Benzo(a)anthracene	U	18 ug/L
Chrysene	U	18 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	18 ug/L
Di-n-octylphthalate	U	18 ug/L
Benzo(b)fluoranthene	U	18 ug/L
Benzo(k)fluoranthene	U	18 ug/L
Benzo(a)pyrene	U	18 ug/L
Indeno(1,2,3-cd)pyrene	U	18 ug/L
Dibenzo(a,h)anthracene	U	18 ug/L
Benzo(g,h,i)perylene	U	18 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	67 %	46 - 95
2-Fluorobiphenyl	66 %	40 - 93
p-Terphenyl-d14	62 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $841.53

Lab Work Order # 9906151
Work Site ID: BASF - RIVERVIEW
Matrix: Organic\Oil\Coal
Received: 6/21/1999 **Reported:** 8/19/1999
Client: ER_SE **Number of Samples:** 1

This is an original report: Lauri C Utter II Date: 8/19/99

RECEIVED ERD S.E. MICH.
AUG 30 1999
FILE
COUNTY

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected:	6/18/1999	Test Code:	OBN
		Test Name:	Base Neutral - Oil
Date Analyzed:	7/26/1999 by JRS	Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
111-44-4	bis(2-Chloroethyl) ether	ND		1000	20
541-73-1	1,3-Dichlorobenzene	ND		1000	20
106-46-7	1,4-Dichlorobenzene	ND		1000	20
95-50-1	1,2-Dichlorobenzene	ND		1000	20
108-60-1	bis(2-Chloroisopropyl) ether	ND		1000	20
621-64-7	N-Nitroso-di-n-propyl amine	ND		1000	20
67-72-1	Hexachloroethane	ND		1000	20
98-95-3	Nitrobenzene	ND		1000	20
78-59-1	Isophorone	ND		1000	20
111-91-1	bis(2-Chloroethoxy) methane	ND		1000	20
120-82-1	1,2,4-Trichlorobenzene	ND		1000	20
91-20-3	Naphthalene	ND		1000	20
87-68-3	Hexachlorobutadiene	ND		1000	20
77-47-4	Hexachlorocyclopentadiene	ND		2000	20
91-58-7	2-Chloronaphthalene	ND		1000	20
131-11-3	Dimethyl phthalate	ND		1000	20
208-96-8	Acenaphthylene	ND		1000	20
606-20-2	2,6-Dinitrotoluene	ND		1000	20
83-32-9	Acenaphthene	ND		1000	20
121-14-2	2,4-Dinitrotoluene	ND		1000	20
86-73-7	Fluorene	ND		1000	20
84-66-2	Diethyl phthalate	ND		1000	20
7005-72-3	4-Chlorodiphenyl ether	ND		1000	20
86-30-6	N-Nitrosodiphenyl amine	ND		1000	20
122-66-7	Azobenzene	ND		1000	20
101-55-3	4-Bromodiphenyl ether	ND		1000	20
118-74-1	Hexachlorobenzene	ND		1000	20
85-01-8	Phenanthrene	120	T	1000	20
120-12-7	Anthracene	ND		1000	20
84-74-2	Di-n-butyl phthalate	ND		1000	20
206-44-0	Fluoranthene	ND		1000	20
129-00-0	Pyrene	160	T	1000	20
85-68-7	Butyl benzyl phthalate	ND		1000	20
56-55-3	Benzo (a) anthracene	ND		1000	20
218-01-9	Chrysene	63	T	1000	20

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
117-81-7	bis(2-ethylhexyl) phthalate	ND		1000	20
117-84-0	Di-n-octyl phthalate	ND		1000	20
205-99-2	Benzo (b) fluoranthene	ND		1000	20
207-08-9	Benzo (k) fluoranthene	ND		1000	20
50-32-8	Benzo (a) pyrene	ND		1000	20
193-39-5	Indeno (1,2,3-c,d) pyrene	ND		1000	20
53-70-3	Dibenz (a,h) anthracene	ND		1000	20
191-24-2	Benzo (g,h,i) perylene	ND		1000	20

NM = not measured.
Reference method is 8270.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected:	6/18/1999	Test Code:	OPC
Date Extracted:	8/3/1999 by 1037-ks,	Test Name:	PCBs in Oil
Date Analyzed:	8/10/1999 by TAITS	Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
53469-21-9	Aroclor 1242 (PCB)	ND		1.0	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		1.0	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		1.0	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		1.0	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		1.0	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		1.0	1.0
12672-29-6	*Aroclor 1248 (PCB)	ND		1.0	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		1.0	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		1.0	1.0

ND = not detected at the specified detection limit.
* Results and detection limit reported semi-quantitatively. *
MM: Analytical method not validated for this matrix. Reference method is 8082.
NM = not measured.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OS1
		Test Name:	Scan 1 - Oil
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-35-4	1,1-Dichloroethene	ND		1.0	0.2
75-09-2	Methylene chloride	ND		5.0	0.2
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.2
75-34-3	1,1-Dichloroethane	ND		1.0	0.2
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.2
67-66-3	Chloroform	ND		1.0	0.2
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.2
56-23-5	Carbon tetrachloride	ND		1.0	0.2
107-06-2	1,2-Dichloroethane	ND		1.0	0.2
79-01-6	Trichloroethene	ND		1.0	0.2
78-87-5	1,2-Dichloropropane	ND		1.0	0.2
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.2
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.2
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.2
127-18-4	Tetrachloroethene	ND		1.0	0.2
108-90-7	Chlorobenzene	ND		1.0	0.2
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.2

ND = not detected at the specified detection limit.
NM = not measured.
Analytical methodology not validated for this matrix. Reference method is 8260.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OS2
		Test Name:	Scan 2 - Oil
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
71-43-2	Benzene	ND		1.0	0.2
108-88-3	Toluene	ND		1.0	0.2
100-41-4	Ethylbenzene	ND		1.0	0.2
108-38-3	Xylene isomers	ND		3.0	0.2

ND = not detected at the specified detection limit.
NM = not measured.
Analytical methodology not validated for this matrix. Reference method is 8260.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	FIN
		Test Name:	Fingerprinting
Date Analyzed: 7/26/1999 by JRS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS Date done	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Fingerprinting Date Done	7/26/1999			

-Fingerprinting Results -

Reference method 8270.

GC/MS semivolatile library search results:

The sample appears to ba a type of hydrocarbon oil. It does not have a pattern typical of a fuel or solvent.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	O_LIB
		Test Name:	Library Srch-GC/MS- Oil
Date Analyzed: 7/26/1999 by JRS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Library Search - GC/MS - Oil	7/26/1999			

Results of Library Search - GC/MS - Oil

Reference method is 8270.

GC/MS semivolatile library search results:

Compound	Est. Conc. (mg/kg)*
Naphthalene, trimethyl-	480
Undecane, dimethyl-	660
Heptadecane, dimethyl-	800
Phenanthrene, dimethyl-	370
Phenanthrene, dimethyl- (isomer)	490
Pentadecylcyclohexane	760
Octadecanoic acid, butyl ester	1000

Note: Some n-alkanes present in the sample.

* Results reported as mg/kg not ug/kg.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	O_VLIB
		Test Name:	Library Search-Oil-Volatiles
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Library Srch - Oil Volatiles	6/25/1999			

Results for Library Search - Oil - Volatiles

Reference method is 8260.

NO UNIDENTIFIED PEAKS.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	ENVIRONMENTAL LABORATORY PROCEDURE	NO: PD-13 DATE: Rev. 10/9/95

Subject: ***Laboratory Result Remark Codes***

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance, if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. C. indicated possible low recovery. Actual level may be higher.
LL	Q. C. indicated possible high recovery. Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used.
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis.
STR	settleable residue was not analyzed due to low suspended solids.

Approved by: George Su, Lab Section Chief 10/17/95 Date

bha:File R:\Worddocs\Codes.doc

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = ORGANIC / OIL / COAL

LAB ORDER # 9906151 PRIORITY II RECEIVED AT LAB BY [illegible] DATE TIME 6/21/99 9:35 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS Beth Vens PHONE (734) 953-1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Vens AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
43028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NO.	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	~~MW - F~~	~~99/6/18~~		
02	MW - M	99/6/18		
03				
04				
05				
06				
07				
08				

GENERAL CHEMISTRY

HW

Flashpoint 1 2 3 4 5 6 7 8
Solubility 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8

ORGANIC

OL

Volatile Oil 8260 1 2 3 4 5 6 7 8
PCB only 1 2 3 4 5 6 7 8
Pest & PCB 1 2 3 4 5 6 7 8
BN 1 2 3 4 5 6 7 8
Library Search 1 2 3 4 5 6 7 8
Pattern 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8

INORGANIC

MO

Cd Cr Cu Ni Pb Zn 1 2 3 4 5 6 7 8
Fe Co Li Mn 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
Al Ba Be Mo Ti V 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
Hg - Mercury 1 2 3 4 5 6 7 8
As - Arsenic 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
% Cl 1 2 3 4 5 6 7 8
BTU 1 2 3 4 5 6 7 8
% Sulfur 1 2 3 4 5 6 7 8
% Ash 1 2 3 4 5 6 7 8
% H2O 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $8,690.04

Lab Work Order # 9906150
Work Site ID: BASF - RIVERVIEW
Matrix: Water
Received: 6/21/1999
Reported: 8/11/1999
Client: ER_SE
Number of Samples: 12

TEST / UNITS	MW-D	MW-E	MW-H	MW-J
Ammonia mg N/L	29. ST	26. ST	3.9 ST	20. ST
Arsenic by Furnace ug/L	INT	INT	INT	INT
Arsenic in Water ug/L	14290 DL	11250 DL	219	79
Barium in Water ug/L	17	42	95	150
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	12 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	INT	INT	INT
Chromium in Water ug/L	120	260	280	130
Copper by Furnace ug/L	4.6	INT	INT	INT
Copper in Water ug/L	K 20	27	30	37
Cyanide mg/L	8.4 HT	7.1 HT	2.5 HT	.51 HT
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	K 10 DM	INT	24 DM	INT
Lead in Water ug/L	K 50	80	K 50	55
Mercury in Water ug/L	INT	INT	1.6 DM	INT
Nitrate + Nitrite mg/L	K 0.5 ST	0.5 ST	K 0.2 ST	K 0.2 ST
Oil & Grease-Water - Low Level mg/L	24	17	K 20	67

RECEIVED ERD S.E. MICH.
AUG 12 1999

TEST UNITS	MW-D	MW-E	MW-H	MW-J
Selenium in Water ug/L	4.9	5.5	12 DM	4.3
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	12. PI	7.9 PI	K 0.4 PI	8.5 PI
Zinc in Water ug/L	K 50	88	K 50	140

TEST UNITS	MW-I	MW-L	MW-K	MW-A
Ammonia mg N/L	6.2 ST	.16	49. ST	9.0 ST
Arsenic by Furnace ug/L	INT	64 DM	INT	65 DM
Arsenic in Water ug/L	1206 DL		172	
Barium in Water ug/L	46	15	130	13
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	8.6	INT	INT
Chromium in Water ug/L	57	K 20	690	82
Copper by Furnace ug/L	5.5	11	3.8	6.2
Copper in Water ug/L	K 20	K 20	K 20	K 20
Cyanide mg/L	.35 HT	.21	23 HT	1.3 HT
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	22 DM	11 DM	K 10 DM	K 10 DM
Lead in Water ug/L	K 50	K 50	K 50	K 50
Mercury in Water ug/L	1.4	1.3	18 DM	3.2

TEST UNITS	MW-I	MW-L	MW-K	MW-A
Nitrate + Nitrite mg N/L	K 0.5 ST	K .01	K 2. ST	K 0.2 ST
Oil & Grease-Water - Low Level mg/L	16	25	13	13
Selenium in Water ug/L	K 5.0 DM	K 1.0	6.3 DM	K 5.0 DM
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	2.4 PI	.05 PI	7.9 PI	15. PI
Zinc in Water ug/L	K 50	290	65	K 50

TEST UNITS	MW-B	MW-C	MW-G	MW-F
Ammonia mg N/L	16. ST	12. ST		24. ST
Arsenic by Furnace ug/L	INT	INT	16 DM	34 DM
Arsenic in Water ug/L	680 DL	587 DL		
Barium in Water ug/L	57	45	44	110
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	5.5 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	INT	10.8	INT
Chromium in Water ug/L	200	180	K 20	230
Copper by Furnace ug/L	8.9	INT	4.8	3.4
Copper in Water ug/L	K 20	78	K 20	K 20
Cyanide mg/L	3.3 HT	2.5 HT	.15 ST	.18
Hex Chromium in Water ug/L	INT	INT	INT	
Lead by Furnace ug/L	K 10 DM	INT	K 10 DM	K 10 DM

TEST UNITS	MW-B	MW-C	MW-G	MW-F
Lead in Water ug/L	K 50	75	K 50	K 50
Mercury in Water ug/L	INT	20 HT, DM	K .2 HT	.8 HT
Nitrate + Nitrite mg N/L	K 0.5 ST	K 0.1 ST		K 0.5 ST
Oil & Grease-Water - Low Level mg/L	97	67		21
Selenium in Water ug/L	6.0 DM	K 5.0 DM	2.4	2.0
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	50. PI	19. PI	.05 PI	
Zinc in Water ug/L	53	K 50	K 50	K 50

This is an original report: D Hartig Date: _____

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	430		100	10
95-57-8	2-Chlorophenol	ND		100	10
95-48-7	o-Cresol	230		100	10
108394,106445	m & p-Cresol	510		210	10
89-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	190		100	10
120-83-2	2,4-Dichlorophenol	ND		100	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
51-28-5	2,4-Dinitrophenol	ND		520	10
100-02-7	4-Nitrophenol	ND		520	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		520	10
87-86-5	Pentachlorophenol	180	T	520	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01ON

Date Collected:	6/18/1999	Test Code:	SC3
Date Extracted:	6/25/1999 by 4277, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/23/1999 by BronsonJ	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.020	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.020	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.020	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.020	1.0
87-68-3	Hexachlorobutadiene	ND		0.020	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.020	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.020	1.0
91-58-7	2-Chloronaphthalene	ND		0.20	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.020	1.0
608-93-5	Pentachlorobenzene	ND		0.020	1.0
319-84-6	a-BHC	ND		0.020	1.0
118-74-1	Hexachlorobenzene	ND		0.020	1.0
319-85-7	b-BHC	ND		0.020	1.0
58-89-9	g-BHC (lindane)	ND		0.020	1.0
82-68-8	Pentachloronitrobenzene	ND		0.020	1.0
319-86-8	d-BHC	ND		0.020	1.0
76-44-8	Heptachlor	ND		0.020	1.0
309-00-2	Aldrin	ND	K	0.060	3.0
1024-57-3	Heptachlor epoxide	ND		0.020	1.0
5103-74-2	g-Chlordane	ND		0.020	1.0
959-98-8	Endosulfan I	ND		0.020	1.0
5103-71-9	a-Chlordane	ND		0.020	1.0
72-55-9	4,4'-DDE	ND		0.020	1.0
72-20-8	Endrin	ND		0.020	1.0
60-57-1	Dieldrin	ND		0.020	1.0
72-54-8	4,4'-DDD	ND		0.050	1.0
50-29-3	4,4'-DDT	ND		0.020	1.0
87-82-1	Hexabromobenzene	ND		0.020	1.0
72-43-5	Methoxychlor	ND		0.050	1.0
2385-85-5	Mirex	ND		0.020	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.20	1.0
11097-69-1	Aroclor 1254 (PCB)	1.30	J	0.20	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.20	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.20	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.20	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.20	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.20	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.20	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.20	1.0
59080-40-9	BP-6 (PBB)	ND		0.050	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery
J=AR 1254 std slightly high

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	74		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1000	J	250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	400		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	47	T	50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	110		10	10
71-43-2	Benzene	37		10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	16		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	140		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	290		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
100-41-4	Ethylbenzene	ND		10	10
108383,106423	m & p Xylene	25		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	16		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2 butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	10		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	15		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	350		50	10
91-57-6	2-Methylnaphthalene	46	T	50	10

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02OA

Date Collected:	6/18/1999	Test Code:	SC8
Date Extracted:	6/24/1999 by 4276, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/28/1999 by KL	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	290		110	10
95-57-8	2-Chlorophenol	ND		110	10
95-48-7	o-Cresol	140		110	10
108394,106445	m & p-Cresol	320		210	10
89-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	98	T	110	10
120-83-2	2,4-Dichlorophenol	ND		110	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
51-28-5	2,4-Dinitrophenol	ND		530	10
100-02-7	4-Nitrophenol	ND		530	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		530	10
87-86-5	Pentachlorophenol	ND		530	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02ON

Date Collected: 6/18/1999		Test Code:	SC3
Date Extracted: 6/25/1999 by 4277, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/23/1999 by BronsonJ		Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND	K	0.082	4.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.051	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.051	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	3.70	J	0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.051	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J=AR 1254 std slightly high

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	17	T	25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	690	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	100		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	44		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	40		5	5
71-43-2	Benzene	16		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	23		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	130		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	12		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p Xylene	13		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	8.2		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	5.2		5	5
95-63-6	1,2,4-Trimethylbenzene	15		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	110		25	5
91-57-6	2-Methylnaphthalene	25	J	25	5

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03OA

Date Collected:	6/18/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		10	1
95-57-8	2-Chlorophenol	ND		10	1
95-48-7	o-Cresol	ND		10	1
108394,106445	m & p-Cresol	ND		20	1
89-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
120-83-2	2,4-Dichlorophenol	ND		10	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
51-28-5	2,4-Dinitrophenol	ND		50	1
100-02-7	4-Nitrophenol	ND		50	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		50	1
87-86-5	Pentachlorophenol	ND		50	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03ON

Date Collected:	6/18/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.020	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.020	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.020	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.020	1.0
87-68-3	Hexachlorobutadiene	ND		0.020	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.020	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.020	1.0
91-58-7	2-Chloronaphthalene	ND		0.20	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.020	1.0
608-93-5	Pentachlorobenzene	ND		0.020	1.0
319-84-6	a-BHC	ND		0.020	1.0
118-74-1	Hexachlorobenzene	ND		0.020	1.0
319-85-7	b-BHC	ND		0.020	1.0
58-89-9	g-BHC (lindane)	ND		0.020	1.0
82-68-8	Pentachloronitrobenzene	ND		0.020	1.0
319-86-8	d-BHC	ND		0.020	1.0
76-44-8	Heptachlor	ND		0.020	1.0
309-00-2	Aldrin	ND		0.020	1.0
1024-57-3	Heptachlor epoxide	ND		0.020	1.0
5103-74-2	g-Chlordane	ND		0.020	1.0
959-98-8	Endosulfan I	ND		0.020	1.0
5103-71-9	a-Chlordane	ND		0.020	1.0
72-55-9	4,4'-DDE	ND		0.020	1.0
72-20-8	Endrin	ND		0.020	1.0
60-57-1	Dieldrin	ND		0.020	1.0
72-54-8	4,4'-DDD	ND		0.050	1.0
50-29-3	4,4'-DDT	ND		0.020	1.0
87-82-1	Hexabromobenzene	ND		0.020	1.0
72-43-5	Methoxychlor	ND		0.050	1.0
2385-85-5	Mirex	ND		0.020	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.20	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.20	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.20	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.20	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.20	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.20	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.20	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.20	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.20	1.0
59080-40-9	BP-6 (PBB)	ND		0.050	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	1.7		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

UN-ID PEAKS.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04OA

Date Collected:	6/18/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		100	10
95-57-8	2-Chlorophenol	ND		100	10
95-48-7	o-Cresol	ND		100	10
108394,106445	m & p-Cresol	180	T	210	10
89-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	53	T	100	10
120-83-2	2,4-Dichlorophenol	ND		100	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
51-28-5	2,4-Dinitrophenol	ND		520	10
100-02-7	4-Nitrophenol	ND		520	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		520	10
87-86-5	Pentachlorophenol	ND		520	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04ON

Date Collected:	6/18/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.051	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.051	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.051	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04POX

Date Collected: 6/18/1999

Date Analyzed: 6/22/1999 by KL

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		120	25
74-87-3	Chloromethane	ND		120	25
75-01-4	Vinyl chloride	ND		120	25
74-83-9	Bromomethane	ND		120	25
75-00-3	Chloroethane	ND		120	25
75-69-4	Trichlorofluoromethane	ND		120	25
67-64-1	2-Propanone (Acetone)	1800	J	620	25
60-29-7	Diethyl ether	ND		250	25
75-35-4	1,1-Dichloroethene	ND		25	25
74-88-4	Methyl iodide	ND		25	25
107-13-1	Acrylonitrile	ND		120	25
75-09-2	Methylene chloride	ND		120	25
75-15-0	Carbon disulfide	ND		120	25
156-60-5	trans-1,2-Dichloroethene	ND		25	25
1634-04-4	Methyltertbutylether (MTBE)	ND		120	25
75-34-3	1,1-Dichloroethane	ND		25	25
78-93-3	2-Butanone (MEK)	ND		120	25
156-59-2	cis-1,2-Dichloroethene	ND		25	25
67-66-3	Chloroform	ND		25	25
74-97-5	Bromochloromethane	ND		25	25
71-55-6	1,1,1-Trichloroethane	ND		25	25
107-06-2	1,2-Dichloroethane	ND		25	25
71-43-2	Benzene	ND		25	25
56-23-5	Carbon tetrachloride	ND		25	25
78-87-5	1,2-Dichloropropane	ND		25	25
79-01-6	Trichloroethene	ND		25	25
74-95-3	Dibromomethane	ND		25	25
75-27-4	Bromodichloromethane	ND		25	25
591-78-6	2-Hexanone	ND		120	25
10061-01-5	cis-1,3-Dichloropropene	ND		25	25
10061-02-6	trans-1,3-Dichloropropene	ND		25	25
108-88-3	Toluene	ND		25	25
79-00-5	1,1,2-Trichloroethane	ND		25	25
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		120	25
124-48-1	Dibromochloromethane	ND		25	25
106-93-4	1,2-Dibromoethane	ND		25	25

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		25	25
630-20-6	1,1,1,2-Tetrachloroethane	ND		25	25
108-90-7	Chlorobenzene	ND		25	25
100-41-4	Ethylbenzene	ND		25	25
108383,106423	m & p Xylene	ND		50	25
75-25-2	Bromoform	ND		25	25
100-42-5	Styrene	ND		25	25
95-47-6	o-Xylene	ND		25	25
79-34-5	1,1,2,2-Tetrachloroethane	ND		25	25
96-18-4	1,2,3-Trichloropropane	ND		25	25
110-57-6	trans-1,4-Dichloro-2 butene	ND		25	25
98-82-8	Isopropylbenzene	ND		25	25
103-65-1	n-Propylbenzene	ND		25	25
108-67-8	1,3,5-Trimethylbenzene	ND		25	25
95-63-6	1,2,4-Trimethylbenzene	ND		25	25
541-73-1	1,3-Dichlorobenzene	ND		25	25
106-46-7	1,4-Dichlorobenzene	ND		25	25
95-50-1	1,2-Dichlorobenzene	ND		25	25
67-72-1	Hexachloroethane	ND		25	25
96-12-8	1,2-Dibromo-3-chloropropane	ND		120	25
120-82-1	1,2,4-Trichlorobenzene	ND		120	25
91-20-3	Naphthalene	240		120	25
91-57-6	2-Methylnaphthalene	ND		120	25

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		13	1
95-57-8	2-Chlorophenol	ND		13	1
95-48-7	o-Cresol	ND		13	1
108394,106445	m & p-Cresol	19	T	25	1
89-75-5	2-Nitrophenol	ND		13	1
105-67-9	2,4-Dimethylphenol	14		13	1
120-83-2	2,4-Dichlorophenol	ND		13	1
59-50-7	4-Chloro-3-methylphenol	ND		13	1
88-06-2	2,4,6-Trichlorophenol	9.5	T	13	1
95-95-4	2,4,5-Trichlorophenol	ND		13	1
51-28-5	2,4-Dinitrophenol	ND		63	1
100-02-7	4-Nitrophenol	ND		63	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		63	1
87-86-5	Pentachlorophenol	12	T	63	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05ON

Date Collected: 6/17/1999		Test Code:	SC3
Date Extracted: 6/22/1999 by 4274, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/1/1999 by TAITS		Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND	K	0.051	2.2
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	ND		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	ND		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND		0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND		0.023	1.0
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND	K	0.051	2.2
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND		0.058	1.0
50-29-3	4,4'-DDT	ND		0.023	1.0
87-82-1	Hexabromobenzene	ND		0.023	1.0
72-43-5	Methoxychlor	ND		0.058	1.0
2385-85-5	Mirex	ND		0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	0.500		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	0.470		0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.23	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.23	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND		0.058	1.0
8001-35-2	*Toxaphene	ND		0.12	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH Alpha-BHC to end - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05POX

Date Collected: 6/17/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/22/1999 by KL		Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		120	25
74-87-3	Chloromethane	ND		120	25
75-01-4	Vinyl chloride	ND		120	25
74-83-9	Bromomethane	ND		120	25
75-00-3	Chloroethane	ND		120	25
75-69-4	Trichlorofluoromethane	ND		120	25
67-64-1	2-Propanone (Acetone)	2100	J	620	25
60-29-7	Diethyl ether	ND		250	25
75-35-4	1,1-Dichloroethene	ND		25	25
74-88-4	Methyl iodide	ND		25	25
107-13-1	Acrylonitrile	ND		120	25
75-09-2	Methylene chloride	ND		120	25
75-15-0	Carbon disulfide	ND		120	25
156-60-5	trans-1,2-Dichloroethene	ND		25	25
1634-04-4	Methyltertbutylether (MTBE)	ND		120	25
75-34-3	1,1-Dichloroethane	ND		25	25
78-93-3	2-Butanone (MEK)	ND		120	25
156-59-2	cis-1,2-Dichloroethene	ND		25	25
67-66-3	Chloroform	ND		25	25
74-97-5	Bromochloromethane	ND		25	25
71-55-6	1,1,1-Trichloroethane	ND		25	25
107-06-2	1,2-Dichloroethane	ND		25	25
71-43-2	Benzene	ND		25	25
56-23-5	Carbon tetrachloride	ND		25	25
78-87-5	1,2-Dichloropropane	ND		25	25
79-01-6	Trichloroethene	ND		25	25
74-95-3	Dibromomethane	ND		25	25
75-27-4	Bromodichloromethane	ND		25	25
591-78-6	2-Hexanone	ND		120	25
10061-01-5	cis-1,3-Dichloropropene	ND		25	25
10061-02-6	trans-1,3-Dichloropropene	ND		25	25
108-88-3	Toluene	ND		25	25
79-00-5	1,1,2-Trichloroethane	ND		25	25
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		120	25
124-48-1	Dibromochloromethane	ND		25	25
106-93-4	1,2-Dibromoethane	ND		25	25

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		25	25
630-20-6	1,1,1,2-Tetrachloroethane	ND		25	25
108-90-7	Chlorobenzene	ND		25	25
100-41-4	Ethylbenzene	ND		25	25
108383,106423	m & p Xylene	ND		50	25
75-25-2	Bromoform	ND		25	25
100-42-5	Styrene	ND		25	25
95-47-6	o-Xylene	ND		25	25
79-34-5	1,1,2,2-Tetrachloroethane	ND		25	25
96-18-4	1,2,3-Trichloropropane	ND		25	25
110-57-6	trans-1,4-Dichloro-2 butene	ND		25	25
98-82-8	Isopropylbenzene	ND		25	25
103-65-1	n-Propylbenzene	ND		25	25
108-67-8	1,3,5-Trimethylbenzene	ND		25	25
95-63-6	1,2,4-Trimethylbenzene	ND		25	25
541-73-1	1,3-Dichlorobenzene	ND		25	25
106-46-7	1,4-Dichlorobenzene	ND		25	25
95-50-1	1,2-Dichlorobenzene	ND		25	25
67-72-1	Hexachloroethane	ND		25	25
96-12-8	1,2-Dibromo-3-chloropropane	ND		120	25
120-82-1	1,2,4-Trichlorobenzene	ND		120	25
91-20-3	Naphthalene	ND		120	25
91-57-6	2-Methylnaphthalene	ND		120	25

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		10	1
95-57-8	2-Chlorophenol	ND		10	1
95-48-7	o-Cresol	ND		10	1
108394,106445	m & p-Cresol	ND		21	1
89-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
120-83-2	2,4-Dichlorophenol	ND		10	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
51-28-5	2,4-Dinitrophenol	ND		52	1
100-02-7	4-Nitrophenol	ND		52	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
87-86-5	Pentachlorophenol	ND		52	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.026	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.026	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.026	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.026	1.0
87-68-3	Hexachlorobutadiene	ND		0.026	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.026	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.026	1.0
91-58-7	2-Chloronaphthalene	ND		0.26	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.026	1.0
608-93-5	Pentachlorobenzene	ND		0.026	1.0
319-84-6	a-BHC	ND		0.026	1.0
118-74-1	Hexachlorobenzene	ND		0.026	1.0
319-85-7	b-BHC	ND		0.026	1.0
58-89-9	g-BHC (lindane)	ND		0.026	1.0
82-68-8	Pentachloronitrobenzene	ND		0.026	1.0
319-86-8	d-BHC	ND	LH	0.026	1.0
76-44-8	Heptachlor	ND		0.026	1.0
309-00-2	Aldrin	ND		0.026	1.0
1024-57-3	Heptachlor epoxide	ND		0.026	1.0
5103-74-2	g-Chlordane	ND		0.026	1.0
959-98-8	Endosulfan I	ND		0.026	1.0
5103-71-9	a-Chlordane	ND		0.026	1.0
72-55-9	4,4'-DDE	ND		0.026	1.0
72-20-8	Endrin	ND		0.026	1.0
60-57-1	Dieldrin	ND		0.026	1.0
72-54-8	4,4'-DDD	ND		0.065	1.0
50-29-3	4,4'-DDT	ND		0.026	1.0
87-82-1	Hexabromobenzene	ND	LH	0.026	1.0
72-43-5	Methoxychlor	ND		0.065	1.0
2385-85-5	Mirex	ND		0.026	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.26	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.26	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.26	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.26	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.26	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.26	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.26	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.26	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.26	1.0
59080-40-9	BP-6 (PBB)	ND		0.065	1.0
8001-35-2	*Toxaphene	ND		0.13	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/22/1999 by KL	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		23	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	6.1	T	11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		57	1
100-02-7	4-Nitrophenol	ND		57	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		57	1
87-86-5	Pentachlorophenol	15	T	57	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND	LH	0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND	LH	0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND	LH	0.052	1.0
50-29-3	4,4'-DDT	ND	LH	0.021	1.0
87-82-1	Hexabromobenzene	ND	LH	0.021	1.0
72-43-5	Methoxychlor	ND	LH	0.052	1.0
2385-85-5	Mirex	ND	LH	0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND	LH	0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/22/1999 by KL	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	140	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	47		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	590		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	350		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	6.7		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
100-41-4	Ethylbenzene	10		5	5
108383,106423	m & p Xylene	35		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	8.1		5	5
95-47-6	o-Xylene	28		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	5.5		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	ND		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UN-ID PEAKS.
J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08OA

Date Collected: 6/17/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		22	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		55	1
100-02-7	4-Nitrophenol	ND		55	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		55	1
87-86-5	Pentachlorophenol	31	T	55	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.023	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	ND		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	ND		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND	LH	0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND	LH	0.023	1.0
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND		0.023	1.0
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND	LH	0.057	1.0
50-29-3	4,4'-DDT	ND	LH	0.023	1.0
87-82-1	Hexabromobenzene	ND	LH	0.023	1.0
72-43-5	Methoxychlor	ND	LH	0.057	1.0
2385-85-5	Mirex	ND	LH	0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.23	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.23	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND	LH	0.057	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	700	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	200		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	30		5	5
79-01-6	Trichloroethene	5.0		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	73		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	83		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	32		5	5
100-41-4	Ethylbenzene	7.0		5	5
108383,106423	m & p Xylene	24		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	23		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	8.1		5	5
95-63-6	1,2,4-Trimethylbenzene	10		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	6.9		5	5
95-50-1	1,2-Dichlorobenzene	17		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	28		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	250		110	10
95-57-8	2-Chlorophenol	ND		110	10
95-48-7	o-Cresol	160		110	10
108394,106445	m & p-Cresol	470		220	10
89-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	140		110	10
120-83-2	2,4-Dichlorophenol	ND		110	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
51-28-5	2,4-Dinitrophenol	ND		550	10
100-02-7	4-Nitrophenol	ND		550	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		550	10
87-86-5	Pentachlorophenol	ND		550	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.578	25.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.578	25.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.578	25.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.578	25.0
87-68-3	Hexachlorobutadiene	ND		0.578	25.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.578	25.0
77-47-4	Hexachlorocyclopentadiene	ND		0.578	25.0
91-58-7	2-Chloronaphthalene	ND		5.78	25.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.578	25.0
608-93-5	Pentachlorobenzene	ND		0.578	25.0
319-84-6	a-BHC	ND		0.578	25.0
118-74-1	Hexachlorobenzene	ND		0.578	25.0
319-85-7	b-BHC	ND		0.578	25.0
58-89-9	g-BHC (lindane)	ND		0.578	25.0
82-68-8	Pentachloronitrobenzene	ND		0.578	25.0
319-86-8	d-BHC	ND		0.578	25.0
76-44-8	Heptachlor	ND		0.578	25.0
309-00-2	Aldrin	ND		0.578	25.0
1024-57-3	Heptachlor epoxide	ND		0.578	25.0
5103-74-2	g-Chlordane	ND		0.578	25.0
959-98-8	Endosulfan I	ND		0.578	25.0
5103-71-9	a-Chlordane	ND		0.578	25.0
72-55-9	4,4'-DDE	ND		0.578	25.0
72-20-8	Endrin	ND		0.578	25.0
60-57-1	Dieldrin	ND	K	0.809	35.0
72-54-8	4,4'-DDD	ND		1.45	25.0
50-29-3	4,4'-DDT	ND		0.578	25.0
87-82-1	Hexabromobenzene	ND		0.578	25.0
72-43-5	Methoxychlor	ND		1.45	25.0
2385-85-5	Mirex	ND		0.578	25.0
53469-21-9	Aroclor 1242 (PCB)	ND		5.78	25.0
11097-69-1	Aroclor 1254 (PCB)	ND		5.78	25.0
11096-82-5	Aroclor 1260 (PCB)	ND		5.78	25.0
12674-11-2	*Aroclor 1016 (PCB)	ND		5.78	25.0
11104-28-2	*Aroclor 1221 (PCB)	ND		5.78	25.0
11141-16-5	*Aroclor 1232 (PCB)	ND		5.78	25.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		5.78	25.0
37324-23-5	*Aroclor 1262 (PCB)	ND		5.78	25.0
11100-14-4	*Aroclor 1268 (PCB)	ND		5.78	25.0
59080-40-9	BP-6 (PBB)	ND		1.45	25.0
8001-35-2	*Toxaphene	ND		2.89	25.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/21/1999 by MW	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	4600	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	4800		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	66	J	50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	54		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
100-41-4	Ethylbenzene	ND		50	50
108383,106423	m & p Xylene	ND		100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	ND		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2 butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	ND		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	890		250	50
91-57-6	2-Methylnaphthalene	ND		250	50

UN-ID PEAKS.
J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	280		120	10
95-57-8	2-Chlorophenol	ND		120	10
95-48-7	o-Cresol	190		120	10
108394,106445	m & p-Cresol	520		250	10
89-75-5	2-Nitrophenol	ND		120	10
105-67-9	2,4-Dimethylphenol	150		120	10
120-83-2	2,4-Dichlorophenol	ND		120	10
59-50-7	4-Chloro-3-methylphenol	ND		120	10
88-06-2	2,4,6-Trichlorophenol	ND		120	10
95-95-4	2,4,5-Trichlorophenol	ND		120	10
51-28-5	2,4-Dinitrophenol	ND		620	10
100-02-7	4-Nitrophenol	ND		620	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		620	10
87-86-5	Pentachlorophenol	ND		620	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.115	5.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.115	5.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.115	5.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.115	5.0
87-68-3	Hexachlorobutadiene	ND		0.115	5.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.115	5.0
77-47-4	Hexachlorocyclopentadiene	ND		0.115	5.0
91-58-7	2-Chloronaphthalene	ND		1.15	5.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.115	5.0
608-93-5	Pentachlorobenzene	ND		0.115	5.0
319-84-6	a-BHC	ND		0.115	5.0
118-74-1	Hexachlorobenzene	0.150		0.115	5.0
319-85-7	b-BHC	ND		0.115	5.0
58-89-9	g-BHC (lindane)	ND		0.115	5.0
82-68-8	Pentachloronitrobenzene	ND		0.115	5.0
319-86-8	d-BHC	ND		0.115	5.0
76-44-8	Heptachlor	ND		0.115	5.0
309-00-2	Aldrin	ND		0.115	5.0
1024-57-3	Heptachlor epoxide	ND		0.115	5.0
5103-74-2	g-Chlordane	ND		0.115	5.0
959-98-8	Endosulfan I	ND		0.115	5.0
5103-71-9	a-Chlordane	ND		0.115	5.0
72-55-9	4,4'-DDE	ND		0.115	5.0
72-20-8	Endrin	ND		0.115	5.0
60-57-1	Dieldrin	ND	K	0.207	9.0
72-54-8	4,4'-DDD	ND		0.287	5.0
50-29-3	4,4'-DDT	ND		0.115	5.0
87-82-1	Hexabromobenzene	ND		0.115	5.0
72-43-5	Methoxychlor	ND		0.287	5.0
2385-85-5	Mirex	ND		0.115	5.0
53469-21-9	Aroclor 1242 (PCB)	6.80		1.15	5.0
11097-69-1	Aroclor 1254 (PCB)	ND		1.15	5.0
11096-82-5	Aroclor 1260 (PCB)	ND		1.15	5.0
12674-11-2	*Aroclor 1016 (PCB)	ND		1.15	5.0
11104-28-2	*Aroclor 1221 (PCB)	ND		1.15	5.0
11141-16-5	*Aroclor 1232 (PCB)	ND		1.15	5.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		1.15	5.0
37324-23-5	*Aroclor 1262 (PCB)	ND		1.15	5.0
11100-14-4	*Aroclor 1268 (PCB)	ND		1.15	5.0
59080-40-9	BP-6 (PBB)	ND		0.287	5.0
8001-35-2	*Toxaphene	ND		0.57	5.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10POX

Date Collected: 6/17/1999

Date Analyzed: 6/21/1999 by MW

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	4600	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	1300		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	ND		50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	ND		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
100-41-4	Ethylbenzene	ND		50	50
108383,106423	m & p Xylene	ND		100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	ND		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2 butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	ND		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	ND		250	50
91-57-6	2-Methylnaphthalene	ND		250	50

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-11POX

Date Collected: 6/18/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/23/1999 by MW/KL		Sample ID:	MW-G

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	11		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	12		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	1.5		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-12OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-F

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		22	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		54	1
100-02-7	4-Nitrophenol	ND		54	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		54	1
87-86-5	Pentachlorophenol	ND		54	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-12POX

Date Collected: 6/18/1999

Date Analyzed: 6/23/1999 by MW/KL

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-F

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	1.0		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	ENVIRONMENTAL LABORATORY PROCEDURE	NO: PD-13 DATE: Rev. 10/9/95

Subject: ***Laboratory Result Remark Codes***

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance, if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. C. indicated possible low recovery. Actual level may be higher.
LL	Q. C. indicated possible high recovery. Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used.
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis.
STR	settleable residue was not analyzed due to low suspended solids.

Approved by: George Su, Lab Section Chief 10/17/95 Date

DEQ

bha:File R:\Worddocs\Codes.doc

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

RECEIVED ERD S.E. MICH.
JUL 12 1999
FILE
COUNTY

July 8, 1999

Ms. Beth Vens
MDEQ Southeast Michigan District
38980 W. Seven Mile Road
Livonia, MI 48152

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

Dear Ms. Vens:

Enclosed are the analytical results which represent the completed report for the above referenced project. All analyses were completed at Trace Analytical Laboratories, Inc.

The samples were received on June 21, 1999, in good condition, correctly labeled and properly preserved. Any problems encountered during sample receipt are addressed in the enclosed Sample Log-In Checklist.

Every practical effort was made to meet the quality control requirements of each analytical method, and the reporting limit specifications of the project. In several cases, reporting limits have been elevated due to matrix interferences.

The analytical data associated with this project has been reviewed for accuracy, precision, and completeness. Methods used for analyses are indicated on analytical reports. Any problems encountered during the handling and/or analyses of the samples have been addressed in the Statement of Data Qualifications Section. If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Ray V. Buhl

Ray V. Buhl
Laboratory Manager

Enclosures

Chain of Custody Form(s)
Sample Log-in Checklist(s)

1021 X113 1/3

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

Temp 10.

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 9906150 PRIORITY II RECEIVED AT LAB BY 97 DATE TIME 6/21/99 930 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS Beth Venis PHONE (734)-953-1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris, Venis DELIVERED BY M. Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Venis AT ADDRESS (if different than above office)

INDEX 48028 PCA 30719 PROJECT 455100 PH DC

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-D	99/6/18		
02	MW-E	99/6/18		
03	MW-H	99/6/18		
04	MW-J	99/6/18		
05	MW-I	99/6/17		

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_2, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
1 2 3 4 5

1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB 625 (BN) 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA 625 (SC 8) 1 2 3 4 5

SPECIAL REQUESTS
Q. Ammonium 1 2 3 4 5
1 2 3 4 5

TO TRACE

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit High Low
Cd Cr Cu Ni Pb Zn 1 2 3 4 5
Fe Co Li Mn 1 2 3 4 5
Al Ba Be Mo V Ti 1 2 3 4 5
B Sr 1 2 3 4 5
MICH TEN 1 2 3 4 5
(As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

FILE A: LABFORM.XLS

G Smith 6/2/99

1/4/96

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

2/3

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 9906150 PRIORITY II RECEIVED AT LAB BY [illegible] DATE TIME 6/21/99 930 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS B. Vens PHONE (734) - 953 1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris DELIVERED BY Mi Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Vens AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
06	MW - L	99/6/17		
07	MW - K	"		
08	MW - A	"		
09	MW - B	"		
10	MW - C	"		

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
		1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
		1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

VOLATILES

POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5

PEST & PCB

ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5

BASE NEUTRALS

OB	625 (BN)	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5

TO TRACE

PHENOLS

OA	625 (SC 8)	1 2 3 4 5

SPECIAL REQUESTS

Ammonium	1 2 3 4 5
	1 2 3 4 5

INORGANIC

MA	Total Metals	1 2 3 4 5
MAD	Diss-Field Filtered	1 2 3 4 5
MD	Diss-Lab Filtered	1 2 3 4 5

Detection Limit	High Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5
Fe Co Li Mn	1 2 3 4 5
Al Ba Be Mo V Ti	1 2 3 4 5
B Sr	1 2 3 4 5
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5
Ca Mg Na K	1 2 3 4 5
As - Arsenic	1 2 3 4 5
Ag - Silver	1 2 3 4 5
Hg - Mercury	1 2 3 4 5
Se - Selenium	1 2 3 4 5
Sb - Antimony	1 2 3 4 5
Tl - Thallium	1 2 3 4 5

MN	pH, Conductance	1 2 3 4 5
	Cl, SO_4, Total Alk	1 2 3 4 5
	HCO_3 - CO_3	1 2 3 4 5
	Cr^{+6}	1 2 3 4 5
OG	Oil & Grease	1 2 3 4 5

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

3/3

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 9906150 PRIORITY II RECEIVED AT LAB BY DY DATE TIME 6/21/99 930 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS Beth Vens PHONE (734-953-1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris DELIVERED BY M. Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Vens AT ADDRESS (if different than above office)

INDEX 48022 PCA 30719 PROJECT 455100 PH 00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-G	99/6/18	NOG.	
02	MW-F	99/6/18		
03				
04				
05				

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
		1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
		1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

VOLATILES

POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5

PEST & PCB

ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5

if enough

BASE NEUTRALS

OB	625 (BN)	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5

TO TRACE

PHENOLS

OA	625 (SC 8)	1 2 3 4 5

SPECIAL REQUESTS

Ammonium	1 2 3 4 5
	1 2 3 4 5

if enough

INORGANIC

MA	Total Metals	1 2 3 4 5
MAD	Diss-Field Filtered	1 2 3 4 5
MD	Diss-Lab Filtered	1 2 3 4 5

Detection Limit	High Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5
Fe Co Li Mn	1 2 3 4 5
Al Ba Be Mo V Ti	1 2 3 4 5
B Sr	1 2 3 4 5
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5
Ca Mg Na K	1 2 3 4 5
As - Arsenic	1 2 3 4 5
Ag - Silver	1 2 3 4 5
Hg - Mercury	1 2 3 4 5
Se - Selenium	1 2 3 4 5
Sb - Antimony	1 2 3 4 5
Tl - Thallium	1 2 3 4 5
MN pH, Conductance	1 2 3 4 5
Cl, SO_4, Total Alk	1 2 3 4 5
HCO_3 - CO_3	1 2 3 4 5
Cr^{+6}	1 2 3 4 5
OG Oil & Grease	1 2 3 4 5

THERE IS A SAMPLE

FILE A: LABFORM.XLS

1/4/96

SAMPLE LOG IN CHECKLIST

Date: 6/21/99 Client Name: DEQ # of Coolers:

HPN #: Project Name: BASE RiverVIEW Cooler #s:

Project #: X 113 Logged in by: J Smith Cooler #s:

Cooler Receipt

Cooler/samples delivered by: Trace courier ☑ Hand delivered ☐ Commercial courier ☐ Name of delivery person: JAN Name of courier service:

Did cooler come with a bill of lading? No ☑ Yes ☐ Way Bill or Tracking #:

COC Seals present and intact on cooler? No ☑ Yes ☐ Custody seals signed by:

Client COC number:

Type of packing in cooler:

Coolant and Temperature

Type of Coolant Used

	Yes	No
Slurry w/ crushed, cubed, or chip ice?	☐	☐
Multiple bags of ice around samples?	☑	☐
Ice Packs/ Blue Ice :	☐	☐
No Coolant Present:		☐

Temperature (as taken in Cooler)

Date: 6/21 99 Time: 2:10

Temperature Blank: °C

Range of 3 samples: 1.4 °C

Melt Water: °C

Ice still present upon receipt: ☑ Yes ☐ No

General

	Yes	No	NA
COC taped to inside of cooler lid?	☐	☑	☐
All bottles arrived unbroken with labels in good condition?	☑		☐
Each sample is in a sealed plastic bag?	☐	☑	☐
Labels filled out completely?	☑		☐
All bottle labels agree with Chain of Custody (COC)?	☑		☐
Sufficient sample to run tests requested?	☐		☑
pH checked and samples at correct pH?	☑		☐
Correct preservative added to samples?	☑		☐
DRO/GRO samples received and appropriate check in form completed?	☐		☑
Air bubbles absent from VOAs?	☐		☑
COC filled out properly and signed by client?	☑		☐
COC signed in by TRACE sample custodian?	☑		☐
Was project manager called and samples discussed?	☐	☐	☐

Contact: Date:

Notes:

Sample Results

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

CROSS REFERENCE TABLE

MDEQ ID	TRACE ID
MW-D	X113-01
MW-E	X113-02
MW-H	X113-03
MW-J	X113-04
MW-I	X113-05
MW-L	X113-06
MW-K	X113-07
MW-A	X113-08
MW-B	X113-09
MW-C	X113-10
MW-F	X113-11

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

ANALYTICAL RESULTS
STATEMENT OF DATA QUALIFICATIONS

TRACE ID:	X113-01 X113-02 X113-07 X113-08 X113-11	**Sample ID:**	MW-D MW-E MW-K MW-A MW-F
Parameter:	Base Neutral Surrogate	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
One of the base/neutral surrogate recoveries was outside the control limits.

Qualification/Narrative:
As the other two base/neutral surrogates were within the control limits, no data requires qualification.

TRACE ID:	X113-09 X113-10	**Sample ID:**	MW-B MW-C
Parameter:	Base Neutral Surrogates	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
A dilution of greater than 1:10 was required on this sample.

Qualification/Narrative:
Consequently, surrogate recoveries are not available.

TRACE ID:	X113-03	**Sample ID:**	MW-H
Parameter:	All Base Neutral Compounds	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
The surrogates were out of control low when compared to the control limits.

Qualification/Narrative:
Additional sample was not available for re-extraction. All positive results and reporting limits must be considered estimated.

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-01
Sample ID: MW-D
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 4.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	10	ug/L
1,3-Dichlorobenzene	U	10	ug/L
1,4-Dichlorobenzene	U	10	ug/L
1,2-Dichlorobenzene	U	10	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	10	ug/L
N-Nitroso-di-n-propylamine	U	10	ug/L
Hexachloroethane	U	10	ug/L
Nitrobenzene	U	10	ug/L
Isophorone	U	10	ug/L
bis(2-Chloroethoxy)methane	U	10	ug/L
1,2,4-Trichlorobenzene	U	10	ug/L
Naphthalene	220	10	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	10	ug/L
2-Methylnaphthalene	20	10	ug/L
Hexachlorocyclopentadiene	U	21	ug/L
2-Chloronaphthalene	U	10	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	10	ug/L
Acenaphthylene	20	10	ug/L
2,6-Dinitrotoluene	U	10	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	10	ug/L
Dibenzofuran	16	10	ug/L
2,4-Dinitrotoluene	U	10	ug/L
Diethylphthalate	U	10	ug/L
Fluorene	18	10	ug/L
4-Chlorophenyl-phenylether	U	10	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	10	ug/L
4-Bromophenyl-phenylether	U	10	ug/L
Hexachlorobenzene	U	10	ug/L
Phenanthrene	68	10	ug/L
Anthracene	14	10	ug/L
Carbazole	20	10	ug/L
Di-n-butylphthalate	U	10	ug/L
Fluoranthene	54	10	ug/L
Pyrene	28	10	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-01
Sample ID: MW-D
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 4.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	10 ug/L
Benzo(a)anthracene	U	10 ug/L
Chrysene	U	10 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	12	10 ug/L
Di-n-octylphthalate	U	10 ug/L
Benzo(b)fluoranthene	10	10 ug/L
Benzo(k)fluoranthene	U	10 ug/L
Benzo(a)pyrene	U	10 ug/L
Indeno(1,2,3-cd)pyrene	U	10 ug/L
Dibenzo(a,h)anthracene	U	10 ug/L
Benzo(g,h,i)perylene	U	10 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	78 %	46 - 95
2-Fluorobiphenyl	41 %	40 - 93
p-Terphenyl-d14	40 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-02
Sample ID: MW-E
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	22	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	9.3	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	57	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	7.7	5.0	ug/L
Hexachlorocyclopentadiene	U	10	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	6.4	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	7.6	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	8.9	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	38	5.0	ug/L
Anthracene	7.8	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	28	5.0	ug/L
Pyrene	20	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-02
Sample ID: MW-E
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	5.5	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	53 %	46 - 95
2-Fluorobiphenyl	49 %	40 - 93
p-Terphenyl-d14	29 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-03
Sample ID: MW-H
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	*	5.0	ug/L
1,3-Dichlorobenzene	U	*	5.0	ug/L
1,4-Dichlorobenzene	U	*	5.0	ug/L
1,2-Dichlorobenzene	U	*	5.0	ug/L
Benzyl alcohol	U	*	50	ug/L
bis(2-Chloroisopropyl)ether	U	*	5.0	ug/L
N-Nitroso-di-n-propylamine	U	*	5.0	ug/L
Hexachloroethane	U	*	5.0	ug/L
Nitrobenzene	U	*	5.0	ug/L
Isophorone	U	*	5.0	ug/L
bis(2-Chloroethoxy)methane	U	*	5.0	ug/L
1,2,4-Trichlorobenzene	U	*	5.0	ug/L
Naphthalene	U	*	5.0	ug/L
4-Chloroaniline	U	*	20	ug/L
Hexachloro-1,3-butadiene	U	*	5.0	ug/L
2-Methylnaphthalene	U	*	5.0	ug/L
Hexachlorocyclopentadiene	U	*	5.0	ug/L
2-Chloronaphthalene	U	*	5.0	ug/L
2-Nitroaniline	U	*	20	ug/L
Dimethylphthalate	U	*	5.0	ug/L
Acenaphthylene	U	*	5.0	ug/L
2,6-Dinitrotoluene	U	*	5.0	ug/L
3-Nitroaniline	U	*	20	ug/L
Acenaphthene	U	*	5.0	ug/L
Dibenzofuran	U	*	5.0	ug/L
2,4-Dinitrotoluene	U	*	5.0	ug/L
Diethylphthalate	U	*	5.0	ug/L
Fluorene	U	*	5.0	ug/L
4-Chlorophenyl-phenylether	U	*	5.0	ug/L
4-Nitroaniline	U	*	20	ug/L
N-Nitrosodiphenylamine	U	*	5.0	ug/L
4-Bromophenyl-phenylether	U	*	5.0	ug/L
Hexachlorobenzene	U	*	5.0	ug/L
Phenanthrene	U	*	5.0	ug/L
Anthracene	U	*	5.0	ug/L
Carbazole	U	*	10	ug/L
Di-n-butylphthalate	U	*	5.0	ug/L
Fluoranthene	U	*	5.0	ug/L
Pyrene	U	*	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
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X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-03
Sample ID: MW-H
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
Butylbenzylphthalate	U	*	5.0	ug/L
Benzo(a)anthracene	U	*	5.0	ug/L
Chrysene	U	*	5.0	ug/L
3,3'-Dichlorobenzidine	U	*	20	ug/L
bis(2-Ethylhexyl)phthalate	U	*	5.0	ug/L
Di-n-octylphthalate	U	*	5.0	ug/L
Benzo(b)fluoranthene	U	*	5.0	ug/L
Benzo(k)fluoranthene	U	*	5.0	ug/L
Benzo(a)pyrene	U	*	5.0	ug/L
Indeno(1,2,3-cd)pyrene	U	*	5.0	ug/L
Dibenzo(a,h)anthracene	U	*	5.0	ug/L
Benzo(g,h,i)perylene	U	*	5.0	ug/L
Surrogates	**RECOVERY**		**CONTROL LIMITS**	
Nitrobenzene-d5	43	% *	46 - 95	
2-Fluorobiphenyl	35	% *	40 - 93	
p-Terphenyl-d14	43	% *	54 - 116	

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
bis(2-Chloroethyl)ether	U		5.0	ug/L
1,3-Dichlorobenzene	U		5.0	ug/L
1,4-Dichlorobenzene	U		5.0	ug/L
1,2-Dichlorobenzene	U		5.0	ug/L
Benzyl alcohol	U		50	ug/L
bis(2-Chloroisopropyl)ether	22		5.0	ug/L
N-Nitroso-di-n-propylamine	U		5.0	ug/L
Hexachloroethane	U		5.0	ug/L
Nitrobenzene	U		5.0	ug/L
Isophorone	U		5.0	ug/L
bis(2-Chloroethoxy)methane	U		5.0	ug/L
1,2,4-Trichlorobenzene	U		5.0	ug/L
Naphthalene	170	E	5.0	ug/L
4-Chloroaniline	U		20	ug/L
Hexachloro-1,3-butadiene	U		5.0	ug/L
2-Methylnaphthalene	13		5.0	ug/L
Hexachlorocyclopentadiene	U		5.0	ug/L
2-Chloronaphthalene	U		5.0	ug/L
2-Nitroaniline	U		20	ug/L
Dimethylphthalate	U		5.0	ug/L
Acenaphthylene	11		5.0	ug/L
2,6-Dinitrotoluene	U		5.0	ug/L
3-Nitroaniline	U		20	ug/L
Acenaphthene	U		5.0	ug/L
Dibenzofuran	6.2		5.0	ug/L
2,4-Dinitrotoluene	U		5.0	ug/L
Diethylphthalate	U		5.0	ug/L
Fluorene	8.6		5.0	ug/L
4-Chlorophenyl-phenylether	U		5.0	ug/L
4-Nitroaniline	U		20	ug/L
N-Nitrosodiphenylamine	U		5.0	ug/L
4-Bromophenyl-phenylether	U		5.0	ug/L
Hexachlorobenzene	U		5.0	ug/L
Phenanthrene	16		5.0	ug/L
Anthracene	U		5.0	ug/L
Carbazole	U		10	ug/L
Di-n-butylphthalate	U		5.0	ug/L
Fluoranthene	8.7		5.0	ug/L
Pyrene	6.6		5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	59 %	46 - 95
2-Fluorobiphenyl	54 %	40 - 93
p-Terphenyl-d14	66 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04-2
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.2
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/06/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	X	5.5	ug/L
1,3-Dichlorobenzene	X	5.5	ug/L
1,4-Dichlorobenzene	X	5.5	ug/L
1,2-Dichlorobenzene	X	5.5	ug/L
Benzyl alcohol	X	50	ug/L
bis(2-Chloroisopropyl)ether	X	5.5	ug/L
N-Nitroso-di-n-propylamine	X	5.5	ug/L
Hexachloroethane	X	5.5	ug/L
Nitrobenzene	X	5.5	ug/L
Isophorone	X	5.5	ug/L
bis(2-Chloroethoxy)methane	X	5.5	ug/L
1,2,4-Trichlorobenzene	X	5.5	ug/L
Naphthalene	120	5.5	ug/L
4-Chloroaniline	X	20	ug/L
Hexachloro-1,3-butadiene	X	5.5	ug/L
2-Methylnaphthalene	X	5.5	ug/L
Hexachlorocyclopentadiene	X	11	ug/L
2-Chloronaphthalene	X	5.5	ug/L
2-Nitroaniline	X	20	ug/L
Dimethylphthalate	X	5.5	ug/L
Acenaphthylene	X	5.5	ug/L
2,6-Dinitrotoluene	X	5.5	ug/L
3-Nitroaniline	X	20	ug/L
Acenaphthene	X	5.5	ug/L
Dibenzofuran	X	5.5	ug/L
2,4-Dinitrotoluene	X	5.5	ug/L
Diethylphthalate	X	5.5	ug/L
Fluorene	X	5.5	ug/L
4-Chlorophenyl-phenylether	X	5.5	ug/L
4-Nitroaniline	X	20	ug/L
N-Nitrosodiphenylamine	X	5.5	ug/L
4-Bromophenyl-phenylether	X	5.5	ug/L
Hexachlorobenzene	X	5.5	ug/L
Phenanthrene	X	5.5	ug/L
Anthracene	X	5.5	ug/L
Carbazole	X	10	ug/L
Di-n-butylphthalate	X	5.5	ug/L
Fluoranthene	X	5.5	ug/L
Pyrene	X	5.5	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04-2
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.2
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/06/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	X	5.5 ug/L
Benzo(a)anthracene	X	5.5 ug/L
Chrysene	X	5.5 ug/L
3,3'-Dichlorobenzidine	X	20 ug/L
bis(2-Ethylhexyl)phthalate	X	5.5 ug/L
Di-n-octylphthalate	X	5.5 ug/L
Benzo(b)fluoranthene	X	5.5 ug/L
Benzo(k)fluoranthene	X	5.5 ug/L
Benzo(a)pyrene	X	5.5 ug/L
Indeno(1,2,3-cd)pyrene	X	5.5 ug/L
Dibenzo(a,h)anthracene	X	5.5 ug/L
Benzo(g,h,i)perylene	X	5.5 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% X	46 - 95
2-Fluorobiphenyl	% X	40 - 93
p-Terphenyl-d14	% X	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-06
Sample ID: MW-L
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-06
Sample ID: MW-L
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	58 %	46 - 95
2-Fluorobiphenyl	56 %	40 - 93
p-Terphenyl-d14	56 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-07
Sample ID: MW-K
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-07
Sample ID: MW-K
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	80 %	46 - 95
2-Fluorobiphenyl	55 %	40 - 93
p-Terphenyl-d14	38 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-08
Sample ID: MW-A
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	13	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	15	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-08
Sample ID: MW-A
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	57 %	46 - 95
2-Fluorobiphenyl	61 %	40 - 93
p-Terphenyl-d14	47 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-09
Sample ID: MW-B
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 140
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	350	ug/L
1,3-Dichlorobenzene	U	350	ug/L
1,4-Dichlorobenzene	U	350	ug/L
1,2-Dichlorobenzene	U	350	ug/L
Benzyl alcohol	U	350	ug/L
bis(2-Chloroisopropyl)ether	U	350	ug/L
N-Nitroso-di-n-propylamine	U	350	ug/L
Hexachloroethane	U	350	ug/L
Nitrobenzene	U	350	ug/L
Isophorone	U	350	ug/L
bis(2-Chloroethoxy)methane	U	350	ug/L
1,2,4-Trichlorobenzene	U	350	ug/L
Naphthalene	680	350	ug/L
4-Chloroaniline	U	350	ug/L
Hexachloro-1,3-butadiene	U	350	ug/L
2-Methylnaphthalene	U	350	ug/L
Hexachlorocyclopentadiene	U	700	ug/L
2-Chloronaphthalene	U	350	ug/L
2-Nitroaniline	U	350	ug/L
Dimethylphthalate	U	350	ug/L
Acenaphthylene	U	350	ug/L
2,6-Dinitrotoluene	U	350	ug/L
3-Nitroaniline	U	350	ug/L
Acenaphthene	U	350	ug/L
Dibenzofuran	U	350	ug/L
2,4-Dinitrotoluene	U	350	ug/L
Diethylphthalate	U	350	ug/L
Fluorene	U	350	ug/L
4-Chlorophenyl-phenylether	U	350	ug/L
4-Nitroaniline	U	350	ug/L
N-Nitrosodiphenylamine	U	350	ug/L
4-Bromophenyl-phenylether	U	350	ug/L
Hexachlorobenzene	U	350	ug/L
Phenanthrene	560	350	ug/L
Anthracene	U	350	ug/L
Carbazole	U	350	ug/L
Di-n-butylphthalate	U	350	ug/L
Fluoranthene	400	350	ug/L
Pyrene	U	350	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-09
Sample ID: MW-B
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 140
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	350 ug/L
Benzo(a)anthracene	U	350 ug/L
Chrysene	U	350 ug/L
3,3'-Dichlorobenzidine	U	350 ug/L
bis(2-Ethylhexyl)phthalate	U	350 ug/L
Di-n-octylphthalate	U	350 ug/L
Benzo(b)fluoranthene	U	350 ug/L
Benzo(k)fluoranthene	U	350 ug/L
Benzo(a)pyrene	U	350 ug/L
Indeno(1,2,3-cd)pyrene	U	350 ug/L
Dibenzo(a,h)anthracene	U	350 ug/L
Benzo(g,h,i)perylene	U	350 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% *	46 - 95
2-Fluorobiphenyl	% *	40 - 93
p-Terphenyl-d14	% *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-10
Sample ID: MW-C
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 26
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	65	ug/L
1,3-Dichlorobenzene	U	65	ug/L
1,4-Dichlorobenzene	U	65	ug/L
1,2-Dichlorobenzene	U	65	ug/L
Benzyl alcohol	U	65	ug/L
bis(2-Chloroisopropyl)ether	U	65	ug/L
N-Nitroso-di-n-propylamine	U	65	ug/L
Hexachloroethane	U	65	ug/L
Nitrobenzene	U	65	ug/L
Isophorone	U	65	ug/L
bis(2-Chloroethoxy)methane	U	65	ug/L
1,2,4-Trichlorobenzene	U	65	ug/L
Naphthalene	67	65	ug/L
4-Chloroaniline	U	65	ug/L
Hexachloro-1,3-butadiene	U	65	ug/L
2-Methylnaphthalene	U	65	ug/L
Hexachlorocyclopentadiene	U	130	ug/L
2-Chloronaphthalene	U	65	ug/L
2-Nitroaniline	U	65	ug/L
Dimethylphthalate	U	65	ug/L
Acenaphthylene	U	65	ug/L
2,6-Dinitrotoluene	U	65	ug/L
3-Nitroaniline	U	65	ug/L
Acenaphthene	U	65	ug/L
Dibenzofuran	U	65	ug/L
2,4-Dinitrotoluene	U	65	ug/L
Diethylphthalate	U	65	ug/L
Fluorene	U	65	ug/L
4-Chlorophenyl-phenylether	U	65	ug/L
4-Nitroaniline	U	65	ug/L
N-Nitrosodiphenylamine	U	65	ug/L
4-Bromophenyl-phenylether	U	65	ug/L
Hexachlorobenzene	U	65	ug/L
Phenanthrene	U	65	ug/L
Anthracene	U	65	ug/L
Carbazole	U	65	ug/L
Di-n-butylphthalate	U	65	ug/L
Fluoranthene	U	65	ug/L
Pyrene	U	65	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-10
Sample ID: MW-C
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 26
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	65 ug/L
Benzo(a)anthracene	U	65 ug/L
Chrysene	U	65 ug/L
3,3'-Dichlorobenzidine	U	65 ug/L
bis(2-Ethylhexyl)phthalate	U	65 ug/L
Di-n-octylphthalate	U	65 ug/L
Benzo(b)fluoranthene	U	65 ug/L
Benzo(k)fluoranthene	U	65 ug/L
Benzo(a)pyrene	U	65 ug/L
Indeno(1,2,3-cd)pyrene	U	65 ug/L
Dibenzo(a,h)anthracene	U	65 ug/L
Benzo(g,h,i)perylene	U	65 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% *	46 - 95
2-Fluorobiphenyl	% *	40 - 93
p-Terphenyl-d14	% *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-11
Sample ID: MW-F
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 5.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/08/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	13	ug/L
1,3-Dichlorobenzene	U	13	ug/L
1,4-Dichlorobenzene	U	13	ug/L
1,2-Dichlorobenzene	U	13	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	13	ug/L
N-Nitroso-di-n-propylamine	U	13	ug/L
Hexachloroethane	U	13	ug/L
Nitrobenzene	U	13	ug/L
Isophorone	U	13	ug/L
bis(2-Chloroethoxy)methane	U	13	ug/L
1,2,4-Trichlorobenzene	U	13	ug/L
Naphthalene	U	13	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	13	ug/L
2-Methylnaphthalene	U	13	ug/L
Hexachlorocyclopentadiene	U	25	ug/L
2-Chloronaphthalene	U	13	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	13	ug/L
Acenaphthylene	U	13	ug/L
2,6-Dinitrotoluene	U	13	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	13	ug/L
Dibenzofuran	U	13	ug/L
2,4-Dinitrotoluene	U	13	ug/L
Diethylphthalate	U	13	ug/L
Fluorene	U	13	ug/L
4-Chlorophenyl-phenylether	U	13	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	13	ug/L
4-Bromophenyl-phenylether	U	13	ug/L
Hexachlorobenzene	U	13	ug/L
Phenanthrene	U	13	ug/L
Anthracene	U	13	ug/L
Carbazole	U	13	ug/L
Di-n-butylphthalate	U	13	ug/L
Fluoranthene	U	13	ug/L
Pyrene	U	13	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-11
Sample ID: MW-F
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 5.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/08/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	13 ug/L
Benzo(a)anthracene	U	13 ug/L
Chrysene	U	13 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	13 ug/L
Di-n-octylphthalate	U	13 ug/L
Benzo(b)fluoranthene	U	13 ug/L
Benzo(k)fluoranthene	U	13 ug/L
Benzo(a)pyrene	U	13 ug/L
Indeno(1,2,3-cd)pyrene	U	13 ug/L
Dibenzo(a,h)anthracene	U	13 ug/L
Benzo(g,h,i)perylene	U	13 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	64 %	46 - 95
2-Fluorobiphenyl	89 %	40 - 93
p-Terphenyl-d14	50 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

Quality Control Results

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

QUALITY CONTROL RESULTS
STATEMENT OF DATA QUALIFICATIONS

There were no problems encountered during analysis of the samples that resulted in qualification or estimation of data. Quality control data which did not meet specifications, but had no impact on actual sample data, are narrated on the individual quality control reports.

The QA/QC results associated with the analysis of these samples have been reviewed by Mr. Ray V. Buhl. To the best knowledge of the signer, the QA/QC data is complete and accurate. The review was completed July 8 1999.

The percentage of unqualified measurements for this project was 92%.

TRACE ANALYTICAL LABORATORIES, Inc.

Ray V. Buhl

Ray V. Buhl
Laboratory Manager

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113 WB062301
Sample ID: Method Blank
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: NA
Sample Received: NA
Extraction Date: 06/23/99
Analysis Date: 07/01/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.0	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113 WB062301
Sample ID: Method Blank
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: NA
Sample Received: NA
Extraction Date: 06/23/99
Analysis Date: 07/01/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	46 %	46 - 95
2-Fluorobiphenyl	41 %	40 - 93
p-Terphenyl-d14	65 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Laboratory Control Spike Recovery and RPD Summary Report

Trace ID : WS062301/WSD062301
QC Batch ID: BNA 062301W
Analytical Batch: B70199
Extraction Date: 6-23-99
Analysis Date: 7-01-99

Analyst Initials: JM
Matrix: WATER
Method Number: 8270
Client: MDEQ
MS Multiplier: 1.00
MSD Multiplier: 1.00

Compound Name	Blank Conc. ug/l	LCS Spk Added ug/l	LCSD Spk Added ug/l	LCS Final ug/l	LCSD Final ug/l	LCS %Rec	LCSD %Rec	RPD	QC Limits RPD	QC Limits %Rec
1,4-Dichlorobenzene	0.0	50	50	22	21	44	42	4.9	19	38-83
N-Nitroso-di-n-propylamine	0.0	50	50	24	23	49	46 *	6.3	24	47-108
1,2,4-Trichlorobenzene	0.0	50	50	27	25	54	51	6.8	20	37-87
Acenaphthene	0.0	50	50	24	25	49	50	3.7	23	49-90
2,4-Dinitrotoluene	0.0	50	50	28	29	56	59	4.9	24	44-116
Pyrene	0.0	50	50	37	38	74	75	1.4	21	63-107

Surrogates	Amount Added	LCS Conc	LCSD Conc	LCS %Rec	LCSD %Rec	QC Limits % Rec
Nitrobenzene-d5	100	54	49	54	49	46-95
2-Fluorobiphenyl	100	49	46	49	46	40-93
p-Terphenyl-d14	100	70	72	70	72	54-116

* = see narrative below

N-Nitroso-di-n-propylamine	* The laboratory control sample duplicate recovery was out of control when compared to the control limits. Because the laboratory control sample recovery, and the relative percent difference between the laboratory control sample and the laboratory control sample duplicate were in control, no data requires qualification.

From: Shelly Simpson
To: Beth Vens
Date: Wed, Jul 28, 1999 10:32 AM
Subject: Inv. #30243 - Trace Lab

I do not have a funding authorization for the above invoice for the BASF Riverview (Federal Marine Term). Also you have used the PCA 30719, which is primarily used for salaries and wages. If you have a copy of the funding authorization you can fax it to me so I can't process the payment. If not, we will have to get one before I can pay it.

Thanks!

Shelly Simpson
DEQ-ERD Administration
Ph: (517) 241-8559
Fax: (517) 373-2637
email: simpsos@state.mi.us

7/30/99

Talked to Shelly - she will use a different PCA# and process this.

Beth Vens

MICHIGAN D

DATE:

DEQ An Equal Opportunity Employer

EPARTMENT OF ENVIRONMENTAL QUALITY – ENVIRONMENTAL RESPONSE DIVISION

INVOICE PAYMENT AUTHORIZATION

July 20, 1999

TO: Kathy Crawley, ERD Administration

FROM: **Beth Vens, SE Mi. D.O.**

Contract (PO/DPO/CR) Number: **Y80243**		Site Name and County: **BASF Riverview, Wayne Co.**	
Invoice Number(s) and Amount(s):(Maximum of 6 Invoices) **30243**			
Period Covered: **6/99-7/99**		Site ID (MERA Number): **820016**	
Contractor Name: **Trace Labs**		Payee I.D. Number:	
AY:	Index: **48028**	PCA: **30719**	Project/Phase: **455100/00**

In accordance with the contract documents, based on on-site observations and the data comprising the subject invoice, the Project Director certifies that the work has progressed to the point indicated; that to the best of the Project Director's knowledge, information and belief, the quality of the work is in accordance with the contract documents; and that the contractor is entitled to payment of the amount approved.

AMOUNT APPROVED FOR PAYMENT: **$1,320.00**	AUTHORIZED SIGNATURE: Beth Vens

COMMENTS:

(Explanation required if invoice amount differs from amount approved for payment. Use additional sheets as necessary)

EQ 4472e (Oct. 1998)

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

MDEQ Project/Site Name: BASE Riverview
MDEQ Manager: Beth Vens
District: SE Michigan
Date Authorized/Samples Received: 06/02/99
Date Report Issued: 07/08/99
Report Issued To: Beth Vens
Trace ID: X113

COPY

Trace Invoice Number: 30243
Invoice Date: 07/14/99
Due Date: 08/13/99
AY: Not Available
Index: 48028
PCA: 30719
Project/Phase: 455100/00
Contract Number: Y80243

Amount This Invoice: $1,320.00

REMIT TO: Trace Analytical Laboratories, Inc.
Attn: Marcy Coron
2241 Black Creek Road
Muskegon, MI 49444
(616) 773-5998

Questions regarding invoice: Ginger Martinez, Ext. 222

Invoice Number must be referenced with payment to ensure proper credit. If not paid within thirty (30) days this invoice shall be subject to 1/2 percent per month service charge effective as of the date of delivery. In the event it is necessary to commence collection proceedings buyer shall pay all collection costs incurred including reasonable attorney's fees.

RECEIVED ERD S.E. MICH.
JUL 20 1999
FILE
COUNTY

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

INVOICE SUMMARY

COPY

Client #	Lab #	Matrix	Task ID	Task	Cost Each	
MW-D	X113-01	Water	56	Base Neutrals	$90.00	
MW-D	X113-01	Water	26	Liquid Extraction	$20.00	$110.00
MW-E	X113-02	Water	56	Base Neutrals	$90.00	
MW-E	X113-02	Water	26	Liquid Extraction	$20.00	$110.00
MW-H	X113-03	Water	56	Base Neutrals	$90.00	
MW-H	X113-03	Water	26	Liquid Extraction	$20.00	$110.00
MW-J	X113-04	Water	56	Base Neutrals	$90.00	
MW-J	X113-04	Water	26	Liquid Extraction	$20.00	$110.00
MW-I	X113-05	Water	56	Base Neutrals	$90.00	
MW-I	X113-05	Water	26	Liquid Extraction	$20.00	$110.00
MW-L	X113-06	Water	56	Base Neutrals	$90.00	
MW-L	X113-06	Water	26	Liquid Extraction	$20.00	$110.00
MW-K	X113-07	Water	56	Base Neutrals	$90.00	
MW-K	X113-07	Water	26	Liquid Extraction	$20.00	$110.00
MW-A	X113-08	Water	56	Base Neutrals	$90.00	
MW-A	X113-08	Water	26	Liquid Extraction	$20.00	$110.00
MW-B	X113-09	Water	56	Base Neutrals	$90.00	
MW-B	X113-09	Water	26	Liquid Extraction	$20.00	$110.00
MW-C	X113-10	Water	56	Base Neutrals	$90.00	
MW-C	X113-10	Water	26	Liquid Extraction	$20.00	$110.00
MW-G	X113-11	Water	56	Base Neutrals	$90.00	
MW-G	X113-11	Water	26	Liquid Extraction	$20.00	$110.00
MW-F	X113-12	Water	56	Base Neutrals	$90.00	
MW-F	X113-12	Water	26	Liquid Extraction	$20.00	$110.00

Amount This Invoice: $1,320.00

Michigan
Department of Environmental Quality

BETH VENS

Environmental Quality Analyst
Environmental Response Division

S.E. Michigan District Office
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Phone: (734) 953-1404
Fax: (734) 953-1544
E-Mail: vensb@state.mi.us

MISSION

Our mission is to drive improvements in environmental quality for the protection of public health and natural resources to benefit current and future generations. This will be accomplished through effective administration of agency programs, providing for the use of innovative strategies, while helping to foster a strong and sustainable economy.

DEQ Internet Home Page: www.deq.state.mi.us
Environmental Assistance Center: 1-800-662-9278
For Pollution Emergency: 1-800-292-4706

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SHRADER
Analytical and Consulting
LABORATORIES INC.

RECEIVED
DEC 9 1999
ENVIRONMENTAL RESPONSE DIVISION
S.E. MICHIGAN DISTRICT OFFICE

Report of Analytical Services

Submitted To:

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

Attn: MR. JACK LANIGAN

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Client project:	RIVERVIEW
Client sample:	WATER FROM WELLS
Sample description:	COLLECTED 10/07/99
Laboratory project:	I318
Analysis performed:	SVOC (8270C), VOC (8260B), CYANIDE, MI METALS & AMMONIA
Date received:	07-Oct-99
Date completed:	20-Oct-99
Report date:	22-Oct-99

Verified Laura J. Stephens
Laura Stephens, Environmental Manager

Approved Marianne L. Shrader
Marianne L. Shrader, Acting QA/QC Officer

Enclosure(s)

xc: Dr. Martin Schmidt, URS Greiner

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

BASF CORPORATION

Laboratory Project I318 001 (Continued) Friday, October 22, 1999

Sample Number 001 *Sample ID:* MW-A

Description: RIVERVIEW
Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.109	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.095	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0077	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.067	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	1.1	mg/L	0.12	9010B/9014	10/13/99	10/13/99	GENT
Nitrogen, Ammonia	12.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 002 *Sample ID:* MW-K

Description: RIVERVIEW
Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid//Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.212	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Barium	0.159	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/20/99	10/20/99	JONH
Chromium	0.582	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Mercury	0.0508	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/20/99	10/20/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/20/99	10/20/99	JONH
Cyanide	33.9	mg/L	2.5	9010B/9014	10/13/99	10/13/99	GENT
Nitrogen, Ammonia	49.4	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I318 003 (Continued) Friday, October 22, 1999

Sample Number 003 *Sample ID:* MW-L

Description: RIVERVIEW

Date Sampled: 10/7/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT

N.D. = Not Detected
D.L. = Detection Limit

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	5
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	N.D.	5
O-CRESOL	19	5
P-CRESOL	28	4
2,4-DICHLOROPHENOL	Detected <	6
2,4-DIMETHYLPHENOL	32	5
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	9
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	20
PHENOL	19	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	14	10
TOTAL	118	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	3
ACENAPHTHYLENE	N.D.	2
ANILINE	13	2
ANTHRACENE	N.D.	2
BENZO(a)ANTHRACENE	N.D.	4
BENZO(b & k)FLUORANTHENES	N.D.	6
BENZO(a)PYRENE	N.D.	7
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	N.D.	7
bis(2-CHLOROETHOXY)METHANE	N.D.	20
bis(2-CHL'ETHYL)ETHER	N.D.	5
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	10
BUTYL BENZYL PHTHALATE	N.D.	5
CARBAZOLE	N.D.	2
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	6
CHRYSENE	N.D.	4
DIBENZO(a,h)ANTHRACENE	N.D.	7
DIBENZOFURAN	N.D.	1
1,2-DICHLOROBENZENE	10	5
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	4.2	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	8
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	2
FLUORENE	N.D.	2
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	6
ISOPHORONE	N.D.	50
2-METHYLNAPHTHALENE	Detected <	2
NAPHTHALENE	15	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	3
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	4
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	4
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	N.D.	2
PYRENE	N.D.	3
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	5

N.D. = Not detected TOTAL 43.6

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31801B Sample size : 1 ml
Description : MW-A
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	2,300	100
BENZENE	200	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	27	3
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	10
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	31	10
CIS-1,3-DICHLOROPROPENE	N.D.	7
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	Detected <	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	8
TOLUENE	75	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	19	5
o-XYLENE	17	5

N.D. = Not detected TOTAL 2,670

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	10
P-CHLORO-M-CRESOL	N.D.	10
2-CHLOROPHENOL	N.D.	7
O-CRESOL	7.1	7
P-CRESOL	82	6
2,4-DICHLOROPHENOL	N.D.	10
2,4-DIMETHYLPHENOL	N.D.	10
4,6-DINITRO-O-CRESOL	N.D.	40
2,4-DINITROPHENOL	N.D.	50
2-NITROPHENOL	N.D.	20
4-NITROPHENOL	N.D.	30
PENTACHLOROPHENOL	N.D.	40
PHENOL	140	6
2,4,5-TRICHLOROPHENOL	N.D.	20
2,4,6-TRICHLOROPHENOL	N.D.	20

N.D. = Not detected TOTAL 229

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	6
ACENAPHTHYLENE	N.D.	4
ANILINE	N.D.	3
ANTHRACENE	N.D.	5
BENZO(a)ANTHRACENE	N.D.	8
BENZO(b & k)FLUORANTHENES	N.D.	10
BENZO(a)PYRENE	N.D.	10
BENZO(ghi)PERYLENE	N.D.	10
BENZYL ALCOHOL	N.D.	5
bis(2-CHLOROETHOXY)METHANE	N.D.	30
bis(2-CHL'ETHYL)ETHER	N.D.	7
bis(2-CHLOROISOPROPYL)ETHER	N.D.	20
4-BROMOPHENYL PHENYL ETHER	N.D.	30
BUTYL BENZYL PHTHALATE	N.D.	10
CARBAZOLE	N.D.	4
p-CHLOROANILINE	N.D.	5
2-CHLORONAPHTHALENE	N.D.	6
4-CHLOROPHENYL PHENYL ETHER	N.D.	10
CHRYSENE	N.D.	7
DIBENZO(a,h)ANTHRACENE	N.D.	20
DIBENZOFURAN	N.D.	3
1,2-DICHLOROBENZENE	N.D.	7
1,3-DICHLOROBENZENE	N.D.	7
1,4-DICHLOROBENZENE	N.D.	6
3,3'-DICHLOROBENZIDINE	N.D.	50
DI-n-BUTYL PHTHALATE	N.D.	3
DIETHYL PHTHALATE	N.D.	20
DIMETHYL PHTHALATE	N.D.	5
2,4-DINITROTOLUENE	N.D.	20
2,6-DINITROTOLUENE	N.D.	30
DI-n-OCTYL PHTHALATE	N.D.	7
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	7
FLUORANTHENE	N.D.	5
FLUORENE	N.D.	5
HEXACHLOROBENZENE	N.D.	20
HEXACHLOROBUTADIENE	N.D.	20
HEXACHLOROCYCLOPENTADIENE	N.D.	30
HEXACHLOROETHANE	N.D.	20
INDENO(123-cd)PYRENE	N.D.	10
ISOPHORONE	N.D.	4
2-METHYLNAPHTHALENE	Detected <	3
NAPHTHALENE	7.1	3
2-NAPHTHYLAMINE	N.D.	6
m-NITROANILINE	N.D.	7
o-NITROANILINE	N.D.	10
p-NITROANILINE	N.D.	8
NITROBENZENE	N.D.	8
PARATHION	N.D.	30

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	8
N-NITROSO-DI-n-PROPYLAMINE	N.D.	40
PHENANTHRENE	N.D.	4
PYRENE	N.D.	7
PYRIDINE	N.D.	7
1,2,4-TRICHL'BENZENE	N.D.	10

N.D. = Not detected TOTAL 9.60

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31802B Sample size : 1 ml
Description : MW-K
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	200
BENZENE	640	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	9.1	7
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	8.7	4
sym-TETRACHL'ETHANE	N.D.	20
TETRACHLOROETHENE	N.D.	9
TOLUENE	430	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	43	5
o-XYLENE	30	6

N.D. = Not detected TOTAL 1,160

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	2
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	2
O-CRESOL	N.D.	2
P-CRESOL	N.D.	1
2,4-DICHLOROPHENOL	N.D.	2
2,4-DIMETHYLPHENOL	N.D.	2
4,6-DINITRO-O-CRESOL	N.D.	8
2,4-DINITROPHENOL	N.D.	9
2-NITROPHENOL	N.D.	3
4-NITROPHENOL	N.D.	5
PENTACHLOROPHENOL	N.D.	9
PHENOL	N.D.	2
2,4,5-TRICHLOROPHENOL	N.D.	4
2,4,6-TRICHLOROPHENOL	N.D.	4

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1
BENZO(a)ANTHRACENE	N.D.	1
BENZO(b & k)FLUORANTHENES	N.D.	2
BENZO(a)PYRENE	N.D.	2
BENZO(ghi)PERYLENE	N.D.	2
BENZYL ALCOHOL	N.D.	1
bis(2-CHLOROETHOXY)METHANE	N.D.	1
bis(2-CHL'ETHYL)ETHER	N.D.	2
bis(2-CHLOROISOPROPYL)ETHER	N.D.	5
4-BROMOPHENYL PHENYL ETHER	N.D.	6
BUTYL BENZYL PHTHALATE	N.D.	2
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1
4-CHLOROPHENYL PHENYL ETHER	N.D.	2
CHRYSENE	N.D.	1
DIBENZO(a,h)ANTHRACENE	N.D.	2
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	2
1,3-DICHLOROBENZENE	N.D.	2
1,4-DICHLOROBENZENE	N.D.	1
3,3'-DICHLOROBENZIDINE	N.D.	8
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	4
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	3
2,6-DINITROTOLUENE	N.D.	5
DI-n-OCTYL PHTHALATE	N.D.	1
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	4
HEXACHLOROBUTADIENE	N.D.	4
HEXACHLOROCYCLOPENTADIENE	N.D.	5
HEXACHLOROETHANE	N.D.	4
INDENO(123-cd)PYRENE	N.D.	2
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1
m-NITROANILINE	N.D.	1
o-NITROANILINE	N.D.	2
p-NITROANILINE	N.D.	2
NITROBENZENE	N.D.	1
PARATHION	N.D.	5

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	2
N-NITROSO-DI-n-PROPYLAMINE	N.D.	9
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1
PYRIDINE	N.D.	2
1,2,4-TRICHL'BENZENE	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31803B Sample size : 44 ml
Description : MW-L
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	10
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	5
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31804A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

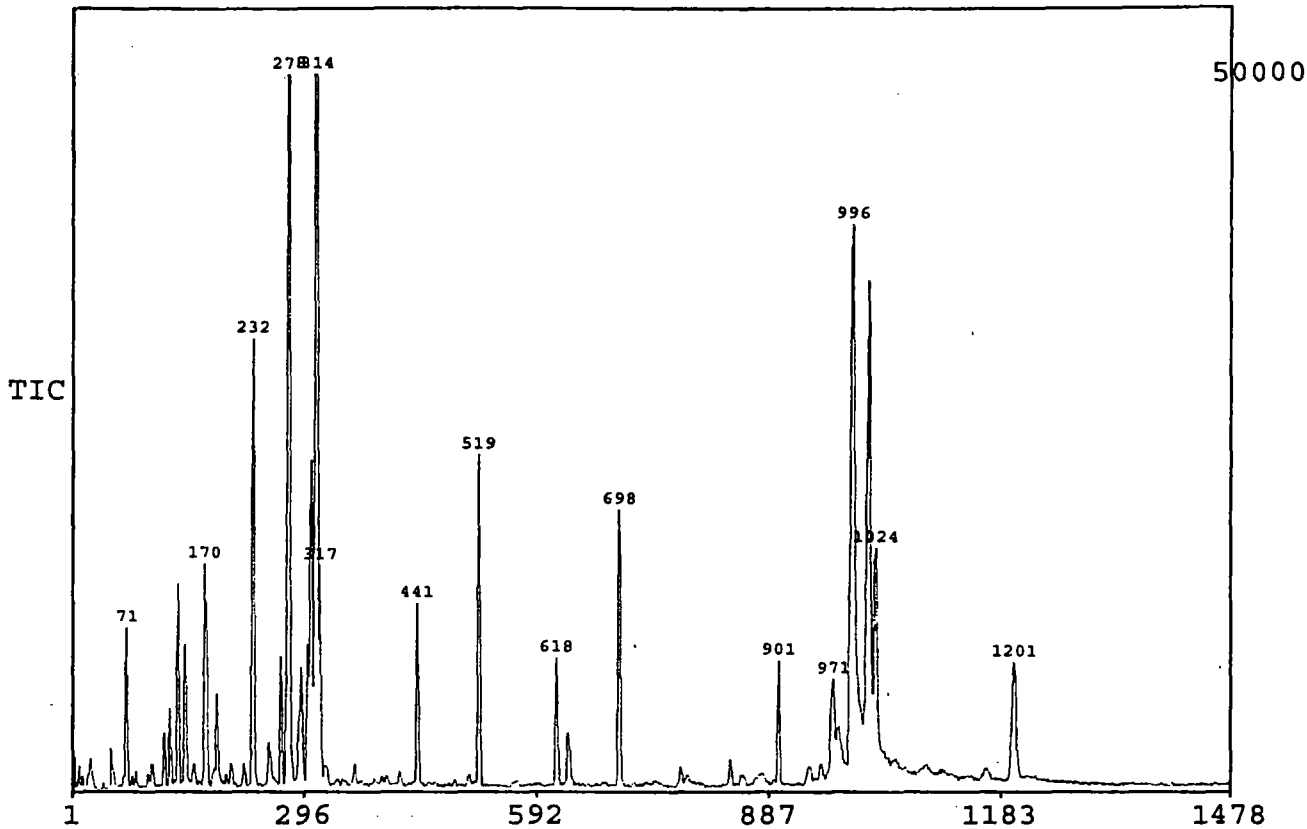
SEMI-VOLATILE CHROMATOGRAMS, SURROGATE RECOVERIES

AND

LABORATORY BLANKS

SHRADER LABORATORIES, INC.
10-14-1999

I31801AA MW-A RIVERVIEW
Date run : 10-14-1999(14:41:38) Instr. : Q1* Operator : ROBG



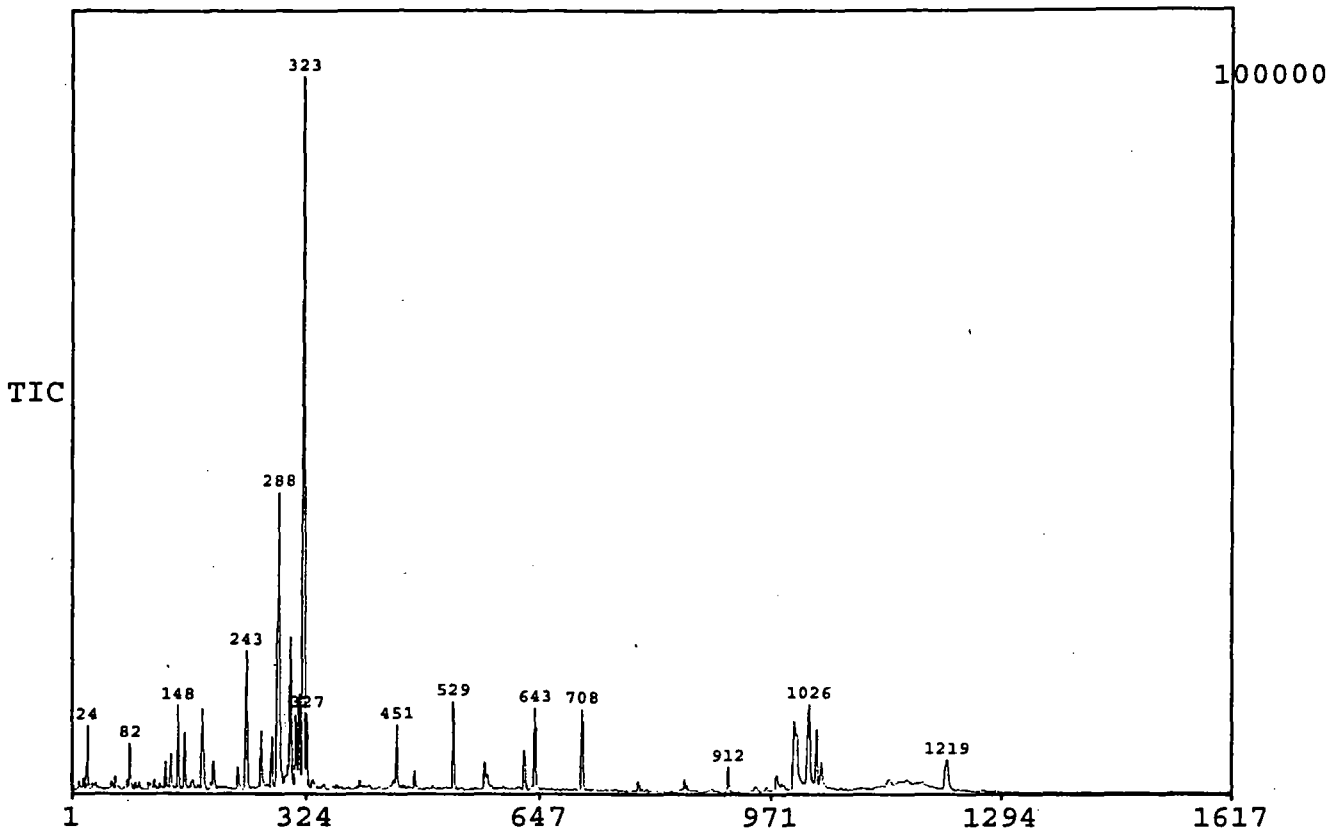
SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : I31801AA Sample size : 200 ml
Description : MW-A RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	190	250	76.0% 2
NITROBENZENE-D5	150	250	60.0% 2
TERPHENYL-D14	180	250	72.0% 1
2-FLUOROPHENOL	290	500	58.0% 1
PHENOL-D6	270	500	54.0% 1
TRIBROMOPHENOL	270	500	54.0% 1

SHRADER LABORATORIES, INC.
10-14-1999

I31802A MW-K RIVERVIEW
Date run : 10-13-1999(11:13:34) Instr. : Q1* Operator : ROBG



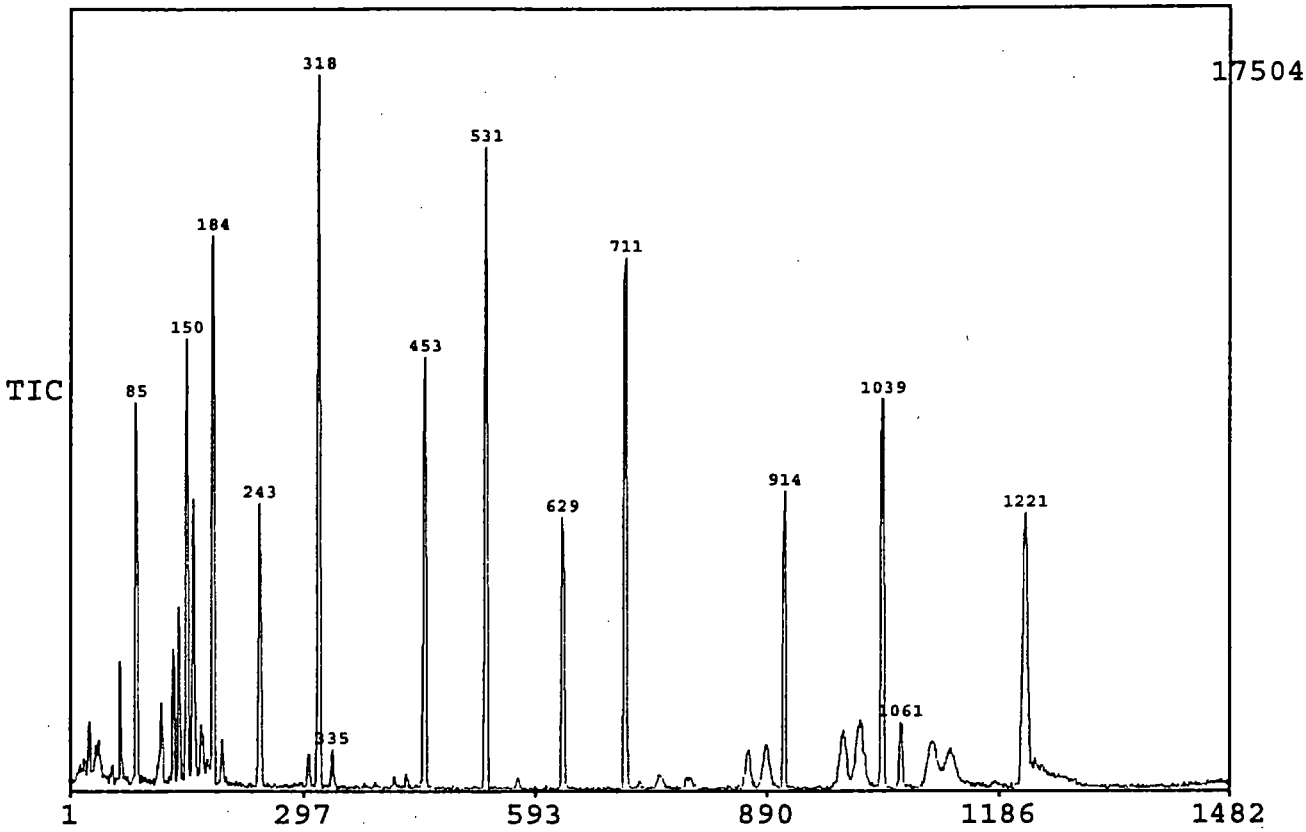
SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : I31802A Sample size : 200 ml
Description : MW-K RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	200	250	80.0% 1
NITROBENZENE-D5	230	250	92.0% 1
TERPHENYL-D14	120	250	48.0% 3
2-FLUOROPHENOL	260	500	52.0% 2
PHENOL-D6	260	500	52.0% 1
TRIBROMOPHENOL	240	500	48.0% 2

SHRADER LABORATORIES, INC.
10-13-1999

I31803AA MW-L RIVERVIEW
Date run : 10-13-1999(13:28:51) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.

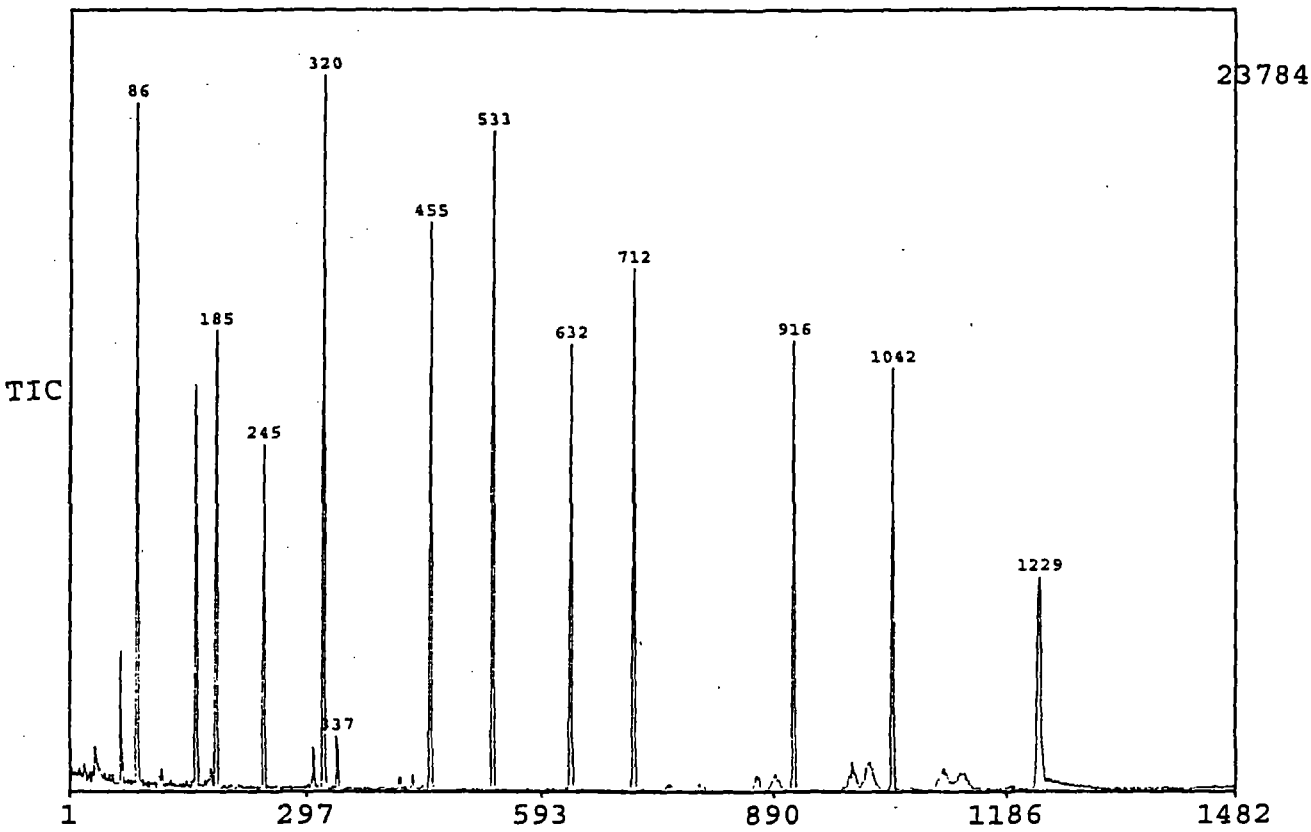
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31803AA Sample size : 750 ml
Description : MW-L RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	59	66.7	88.5% 1
NITROBENZENE-D5	69	66.7	103.4% 2
TERPHENYL-D14	55	66.7	82.5% 1
2-FLUOROPHENOL	72	133	54.1% 1
PHENOL-D6	58	133	43.6% 2
TRIBROMOPHENOL	76	133	57.1% 1

SHRADER LABORATORIES, INC.
10-13-1999

BK1011A QA/QC BLANK
Date run : 10-13-1999(09:58:47) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	46	53.3	86.3% 1
NITROBENZENE-D5	50	53.3	93.8% 1
TERPHENYL-D14	48	53.3	90.1% 1
2-FLUOROPHENOL	74	107	69.2% 1
PHENOL-D6	55	107	51.4% 1
TRIBROMOPHENOL	73	107	68.2% 1

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	1.0
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	1.0
O-CRESOL	N.D.	1.0
P-CRESOL	N.D.	1.0
2,4-DICHLOROPHENOL	N.D.	1
2,4-DIMETHYLPHENOL	N.D.	1.0
4,6-DINITRO-O-CRESOL	N.D.	4
2,4-DINITROPHENOL	N.D.	4
2-NITROPHENOL	N.D.	1
4-NITROPHENOL	N.D.	2
PENTACHLOROPHENOL	N.D.	4
PHENOL	N.D.	1.0
2,4,5-TRICHLOROPHENOL	N.D.	2
2,4,6-TRICHLOROPHENOL	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1.0
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1.0
BENZO(a)ANTHRACENE	N.D.	1.0
BENZO(b & k)FLUORANTHENES	N.D.	1
BENZO(a)PYRENE	N.D.	1
BENZO(ghi)PERYLENE	N.D.	1
BENZYL ALCOHOL	N.D.	1.0
bis(2-CHLOROETHOXY)METHANE	N.D.	1.0
bis(2-CHL'ETHYL)ETHER	N.D.	1.0
bis(2-CHLOROISOPROPYL)ETHER	N.D.	2
4-BROMOPHENYL PHENYL ETHER	N.D.	2
BUTYL BENZYL PHTHALATE	N.D.	1.0
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1.0
4-CHLOROPHENYL PHENYL ETHER	N.D.	1
CHRYSENE	N.D.	1.0
DIBENZO(a,h)ANTHRACENE	N.D.	1
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	1.0
1,3-DICHLOROBENZENE	N.D.	1.0
1,4-DICHLOROBENZENE	N.D.	1.0
3,3'-DICHLOROBENZIDINE	N.D.	3
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	2
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	1
2,6-DINITROTOLUENE	N.D.	2
DI-n-OCTYL PHTHALATE	N.D.	1.0
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	2
HEXACHLOROBUTADIENE	N.D.	2
HEXACHLOROCYCLOPENTADIENE	N.D.	2
HEXACHLOROETHANE	N.D.	2
INDENO(123-cd)PYRENE	N.D.	1.0
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1.0
m-NITROANILINE	N.D.	1.0
o-NITROANILINE	N.D.	1.0
p-NITROANILINE	N.D.	1.0
NITROBENZENE	N.D.	1.0
PARATHION	N.D.	2

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

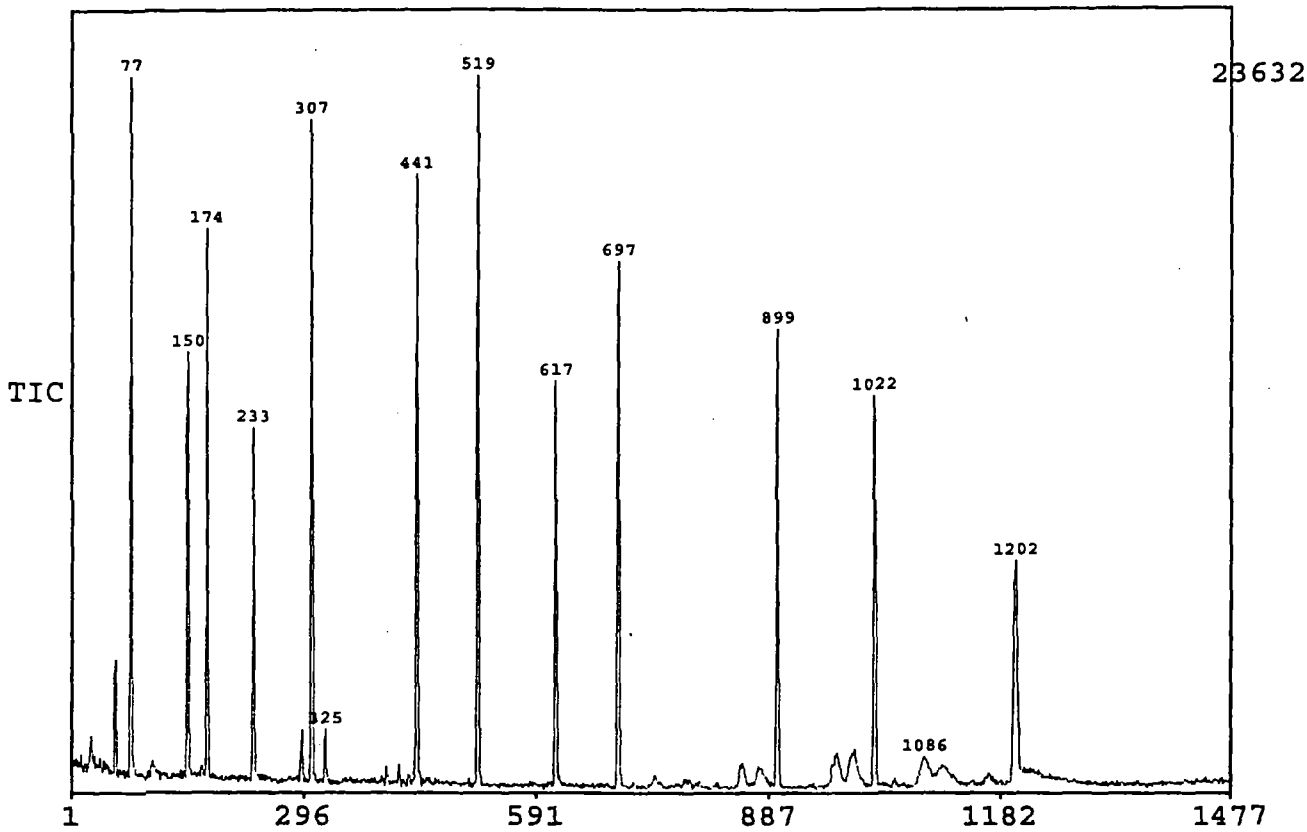
DATA file : BK1011A Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	1.0
N-NITROSO-DI-n-PROPYLAMINE	N.D.	4
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1.0
PYRIDINE	N.D.	1.0
1,2,4-TRICHL'BENZENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.
10-14-1999

BK1011AB QA/QC BLANK
Date run : 10-14-1999(11:18:13) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.
Report date : 10-14-1999 SPIKE RECOVERY REPORT

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	45	53.3	84.4% 1
NITROBENZENE-D5	55	53.3	103.2% 2
TERPHENYL-D14	45	53.3	84.4% 1
2-FLUOROPHENOL	75	107	70.1% 1
PHENOL-D6	62	107	57.9% 1
TRIBROMOPHENOL	61	107	57.0% 1

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	1.0
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	1.0
O-CRESOL	N.D.	1.0
P-CRESOL	N.D.	1.0
2,4-DICHLOROPHENOL	N.D.	1
2,4-DIMETHYLPHENOL	N.D.	1.0
4,6-DINITRO-O-CRESOL	N.D.	3
2,4-DINITROPHENOL	N.D.	3
2-NITROPHENOL	N.D.	1
4-NITROPHENOL	N.D.	2
PENTACHLOROPHENOL	N.D.	3
PHENOL	N.D.	1.0
2,4,5-TRICHLOROPHENOL	N.D.	2
2,4,6-TRICHLOROPHENOL	N.D.	2

N.D. = Not detected TOTAL 0

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	1.0
ACENAPHTHYLENE	N.D.	1.0
ANILINE	N.D.	1.0
ANTHRACENE	N.D.	1.0
BENZO(a)ANTHRACENE	N.D.	1.0
BENZO(b & k)FLUORANTHENES	N.D.	1
BENZO(a)PYRENE	N.D.	1
BENZO(ghi)PERYLENE	N.D.	1
BENZYL ALCOHOL	N.D.	1.0
bis(2-CHLOROETHOXY)METHANE	N.D.	1.0
bis(2-CHL'ETHYL)ETHER	N.D.	1.0
bis(2-CHLOROISOPROPYL)ETHER	N.D.	2
4-BROMOPHENYL PHENYL ETHER	N.D.	2
BUTYL BENZYL PHTHALATE	N.D.	1.0
CARBAZOLE	N.D.	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1.0
4-CHLOROPHENYL PHENYL ETHER	N.D.	1.0
CHRYSENE	N.D.	1.0
DIBENZO(a,h)ANTHRACENE	N.D.	1
DIBENZOFURAN	N.D.	1.0
1,2-DICHLOROBENZENE	N.D.	1.0
1,3-DICHLOROBENZENE	N.D.	1.0
1,4-DICHLOROBENZENE	N.D.	1.0
3,3'-DICHLOROBENZIDINE	N.D.	4
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	1
DIMETHYL PHTHALATE	N.D.	1.0
2,4-DINITROTOLUENE	N.D.	1
2,6-DINITROTOLUENE	N.D.	2
DI-n-OCTYL PHTHALATE	N.D.	1.0
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1.0
FLUORENE	N.D.	1.0
HEXACHLOROBENZENE	N.D.	2
HEXACHLOROBUTADIENE	N.D.	2
HEXACHLOROCYCLOPENTADIENE	N.D.	2
HEXACHLOROETHANE	N.D.	1
INDENO(123-cd)PYRENE	N.D.	1.0
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	N.D.	1.0
NAPHTHALENE	N.D.	1.0
2-NAPHTHYLAMINE	N.D.	1.0
m-NITROANILINE	N.D.	1.0
o-NITROANILINE	N.D.	1.0
p-NITROANILINE	N.D.	1.0
NITROBENZENE	N.D.	1.0
PARATHION	N.D.	2

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : BK1011AB Sample size : 750 ml
Description : QA/QC BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	1.0
N-NITROSO-DI-n-PROPYLAMINE	N.D.	4
PHENANTHRENE	N.D.	1.0
PYRENE	N.D.	1.0
PYRIDINE	N.D.	1.0
1,2,4-TRICHL'BENZENE	N.D.	1.0

N.D. = Not detected TOTAL 0

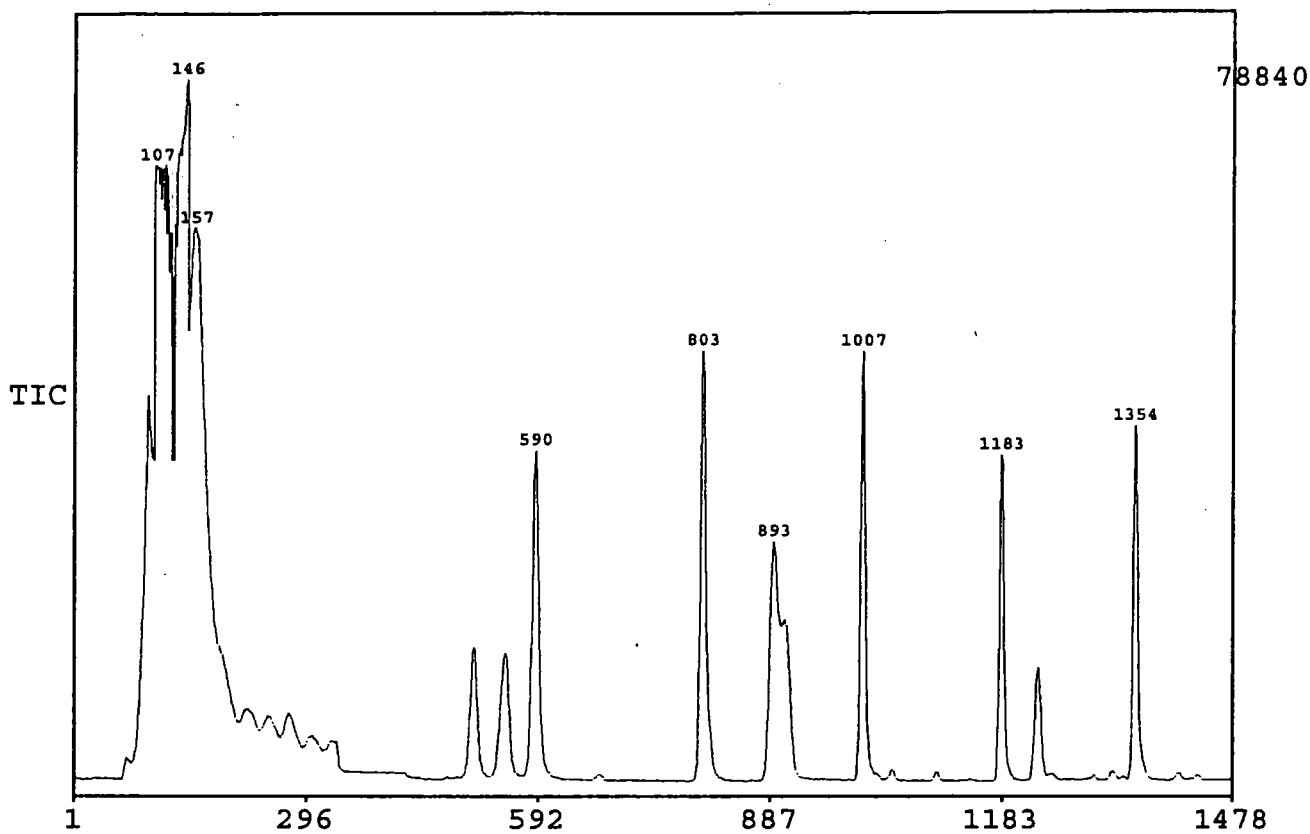
VOLATILE CHROMATOGRAMS, SURROGATE RECOVERIES

AND

LABORATORY BLANKS

SHRADER LABORATORIES, INC.
10-13-1999

I31801B MW-A
Date run : 10-13-1999(14:22:27) Instr. : Q2V* Operator : PALR



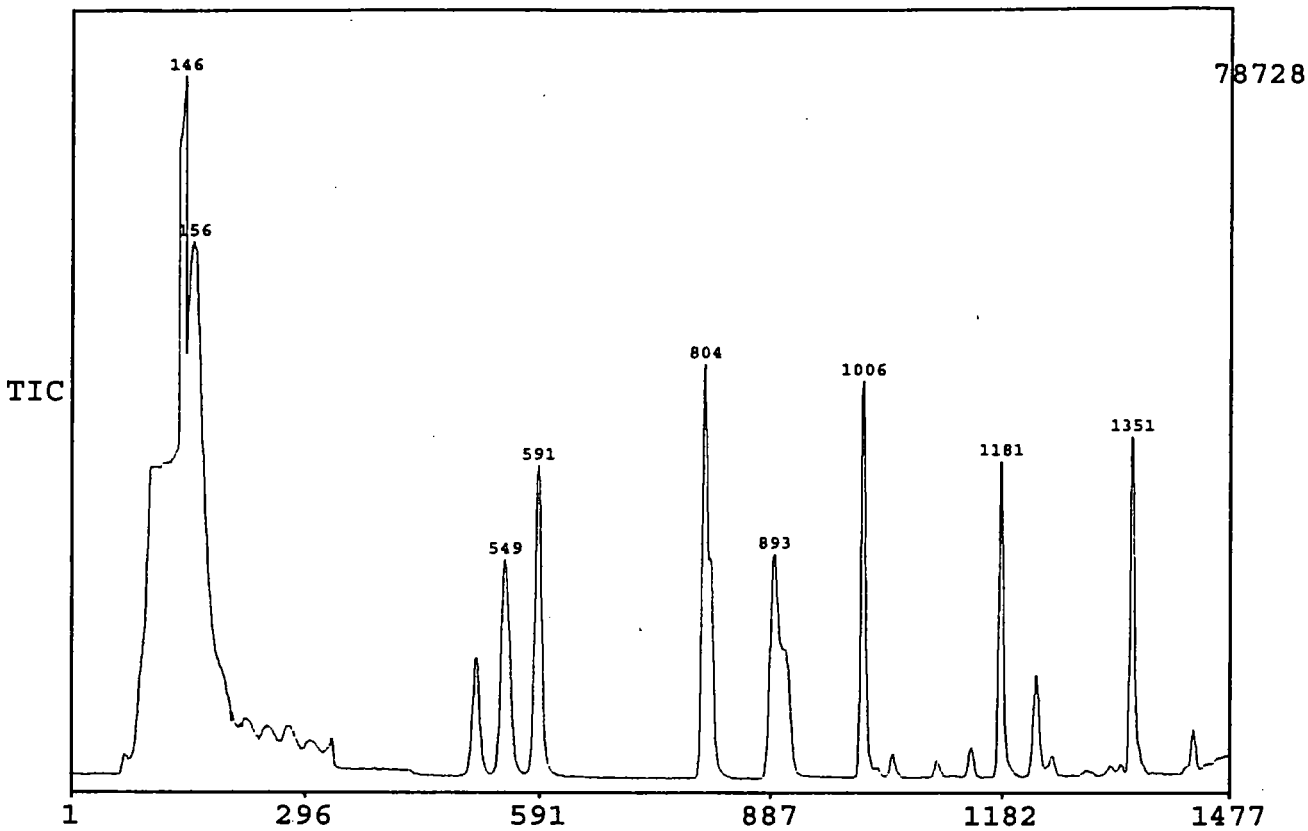
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31801B Sample size : 1 ml
Description : MW-A
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	980	1,000	98.0% 1
1,2-DICHL'ETHANE-D4	810	1,000	81.0% 3
TOLUENE-D8	990	1,000	99.0% 1
4-BROMOFLUOROBENZENE	970	1,000	97.0% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31802B MW-K
Date run : 10-13-1999(14:45:28) Instr. : Q2V* Operator : PALR



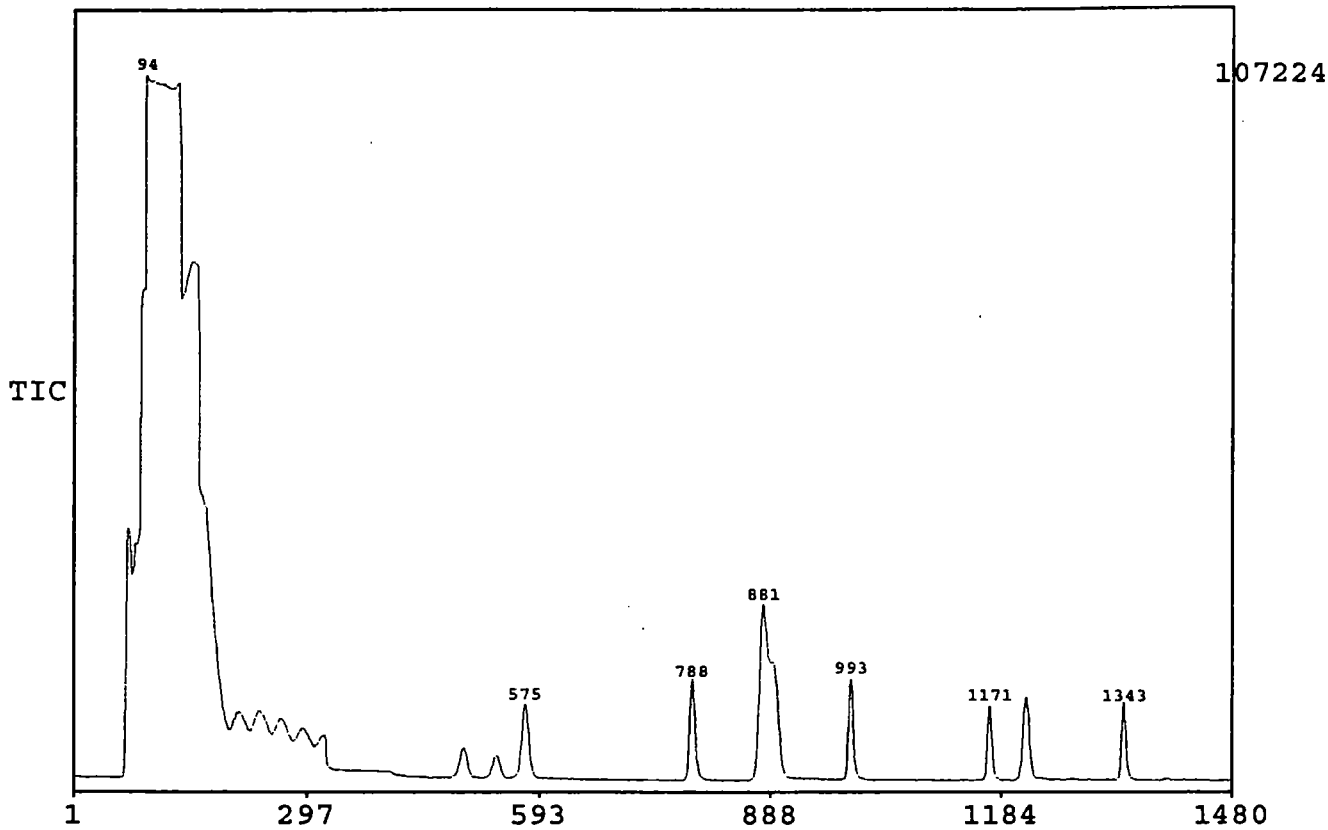
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31802B Sample size : 1 ml
Description : MW-K
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	950	1,000	95.0% 1
1,2-DICHL'ETHANE-D4	790	1,000	79.0% 3
TOLUENE-D8	980	1,000	98.0% 1
4-BROMOFLUOROBENZENE	1,000	1,000	100.0% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31803B MW-L
Date run : 10-13-1999(13:52:07) Instr. : Q2V* Operator : PALR



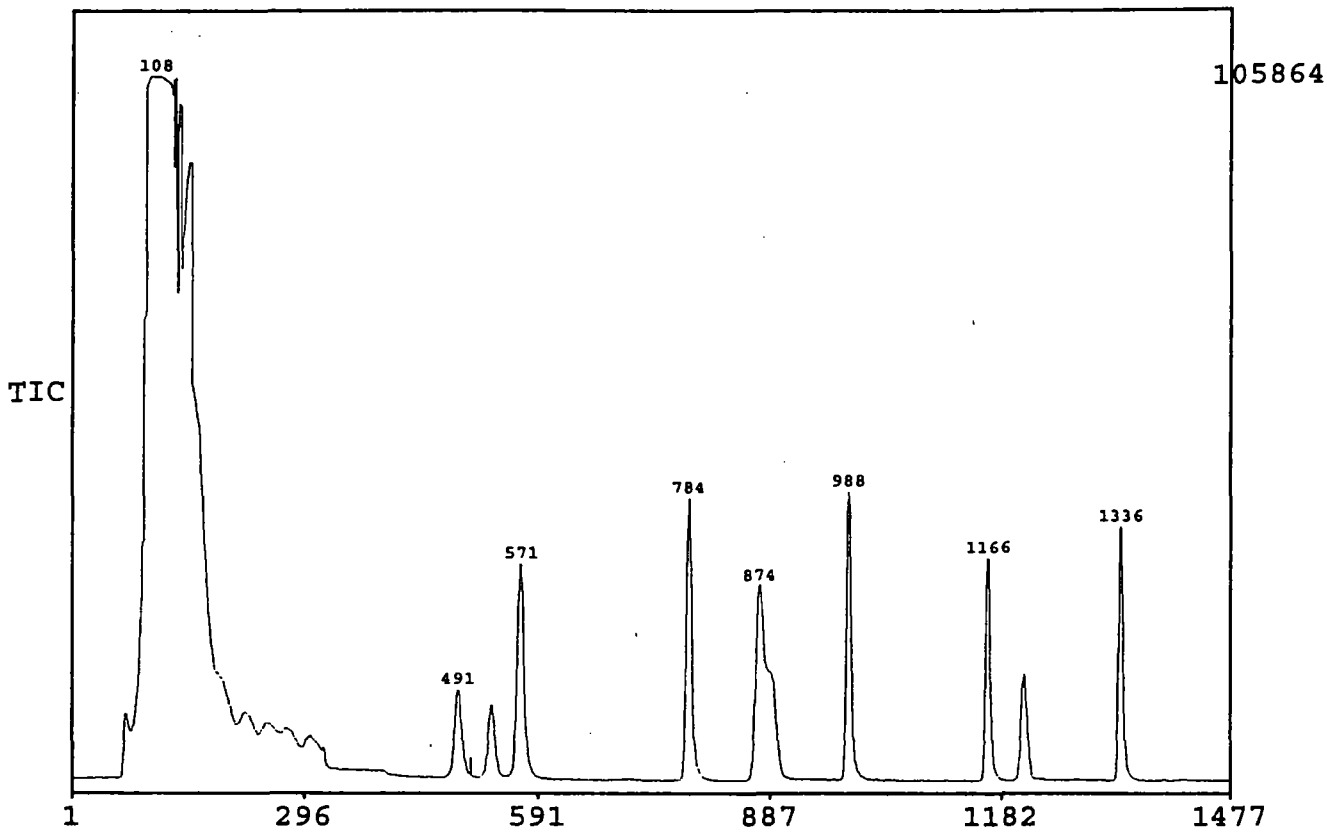
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31803B Sample size : 44 ml
Description : MW-L
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	47	45.5	103.3% 1
1,2-DICHL'ETHANE-D4	38	45.5	83.5% 3
TOLUENE-D8	44	45.5	96.7% 1
4-BROMOFLUOROBENZENE	47	45.5	103.3% 1

SHRADER LABORATORIES, INC.
10-13-1999

I31804A TRIP BLANK
Date run : 10-13-1999(13:28:35) Instr. : Q2V* Operator : PALR



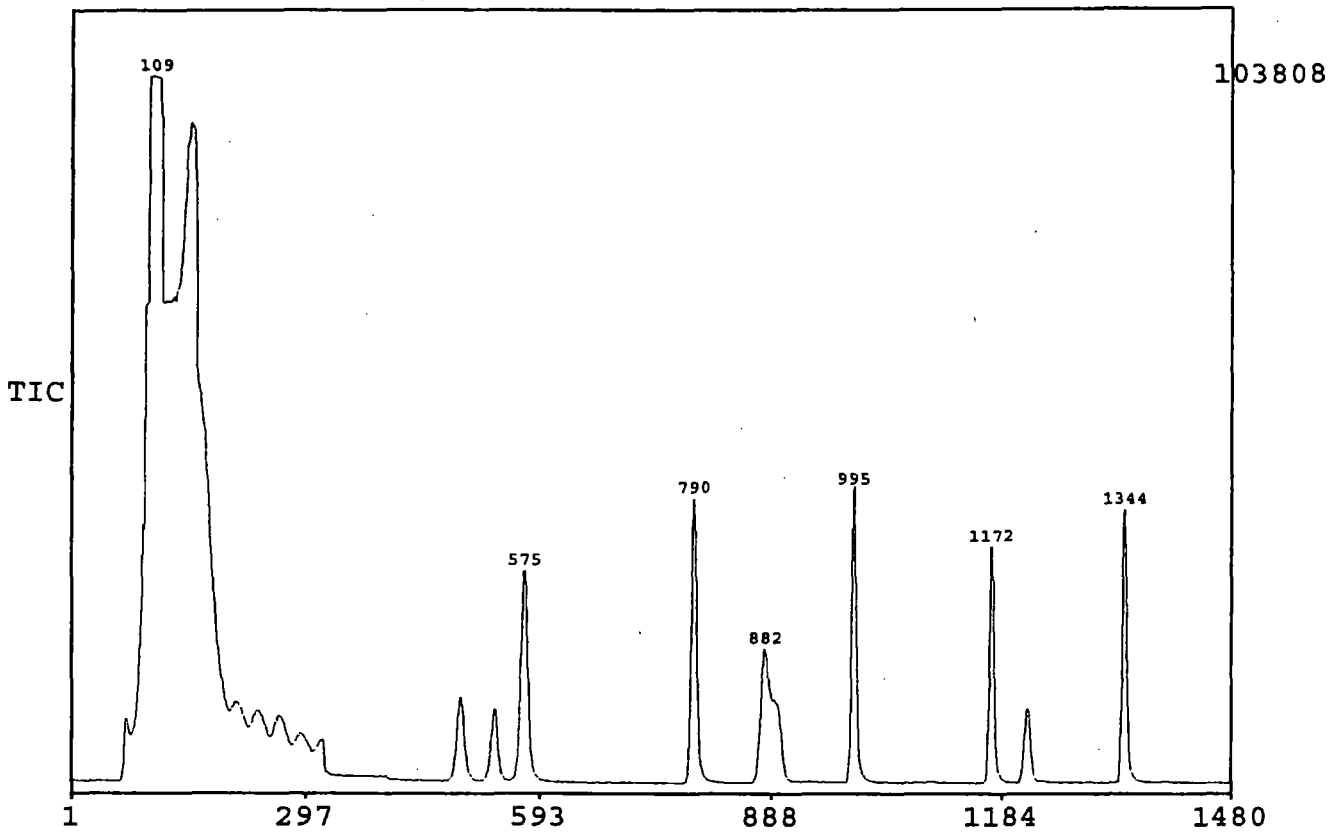
SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : I31804A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	45	45.5	98.9% 1
1,2-DICHL'ETHANE-D4	40	45.5	87.9% 2
TOLUENE-D8	42	45.5	92.3% 2
4-BROMOFLUOROBENZENE	43	45.5	94.5% 1

SHRADER LABORATORIES, INC.
10-13-1999

1013BLK QA/QC BLANK
Date run : 10-13-1999(09:18:33) Instr. : Q2V* Operator : PALR



SHRADER LABORATORIES, INC.
Report date : 10-13-1999 SPIKE RECOVERY REPORT

DATA file : 1013BLK Sample size : 22 ml
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
DIBROMOFLUOROMETHANE	45	45.5	98.9% 1
1,2-DICHL'ETHANE-D4	40	45.5	87.9% 2
TOLUENE-D8	42	45.5	92.3% 2
4-BROMOFLUOROBENZENE	41	45.5	90.1% 2

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : 1013BLK Sample size : 22 ml
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.

3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(1)

Chain of Custody Record

318

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF 38-8E06216

Sampling Site: WYANDOTTE / RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
01A	MW-A				WATER	1032 10/7/99		SVOC
01B	↓				↓	↓		VOC
01C		NaOH	10/05 TG					CN
01D		HNO_3	↓					Metals
01E	↓	H_2SO_4	↓		↓	↓		NH_3
03A	MW-L				Water	0923 10/7/99		SVOC
03B	"				Water	1410 10/7/99		VOC
		NaOH	10/05 TG					CN
		HNO_3	↓					Metals
		H_2SO_4	↓					NH_3
04A				TRIP BLK				

No Sample DRY

Method of Shipment:	Date:	Time:	Relinquished by: Timothy Hicks	Date: 10/7/99	Time: 1449
Received by: Gary Robbins	Date: 10-7-99	Time: 14 50	Relinquished by: Gary Robbins	Date: 10/7/99	Time: 15:30
Received by:	Date:	Time:	Relinquished by:	Date:	Time:

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

I318

(2)

Chain of Custody Record

Customer: YRS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: BASF WYANDOTTE / RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
02A	MW-K				WATER	10/7/99 @ 0980		SVOC
02B								VOC
02C		NaOH	10/05 TG					CN
02D		HNO_3						Metals
02E		H_2SO_4						NH_3
								SVOC
								VOC
		NaOH	10/05 TG					CN
		HNO_3						Metals
		H_2SO_4						NH_3

Method of Shipment:	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/7/99 Time: 1449
Received by: Gary Robbins	Date: 10-7-99 Time: 14:50	Relinquished by: Gary Robbins	Date: 10/7/99 Time: 15:30
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

SHRADER
Analytical and Consulting
LABORATORIES INC.

RECEIVED
DEC 9 1999
ENVIRONMENTAL RESPONSE DIVISION
S.E. MICHIGAN DISTRICT OFFICE

Report of Analytical Services

Submitted To:

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

Attn: MR. JACK LANIGAN

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Client project:	RIVERVIEW
Client sample:	WATER FROM WELLS
Sample description:	COLLECTED 10/06/99
Laboratory project:	I314
Analysis performed:	SVOC (8270C), VOC (8260B), PCB (MOD8082) CYANIDE, MI METALS & AMMONIA
Date received:	07-Oct-99
Date completed:	19-Oct-99
Report date:	21-Oct-99

Verified Laura J. Stephens
Laura Stephens, Environmental Manager

Approved Marianne L. Shrader
Marianne L. Shrader, Acting QA/QC Officer

Enclosure(s)

xc: Dr. Martin Schmidt, URS Greiner

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

BASF CORPORATION

Laboratory Project I314 001 (Continued) Thursday, October 21, 1999

Sample Number 001 *Sample ID:* MW-J

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.075	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.24	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.133	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.031	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.061	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.133	mg/L	0.0002	7470A	10/13/99	10/19/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	1.19	mg/L	0.1	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	31.6	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 002 *Sample ID:* MW-D

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	11	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.026	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.132	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	1.1	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	11.1	mg/L	0.5	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	30.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I314 003 (Continued) Thursday, October 21, 1999

Sample Number 003 *Sample ID:* MW-E

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done		0	3510C	10/11/99	10/11/99	GENT
Arsenic	10.6	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.046	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.294	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.043	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.072	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.905	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.154	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	8.13	mg/L	0.5	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	25.1	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 004 *Sample ID:* MW-H

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done		0	3510C	10/11/99	10/12/99	GENT
Arsenic	0.169	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.198	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.34	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.05	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0034	mg/L	0.0002	7470A	10/19/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.077	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	3.84	mg/L	0.2	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	7.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I314 005 (Continued) Thursday, October 21, 1999

Sample Number 005 *Sample ID:* MW-C

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	1.06	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.091	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.312	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.03	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.037	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0058	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.06	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	4.47	mg/L	0.2	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	19.3	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 006 *Sample ID:* MW-B

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arochlor-1016	N.D.	ug/L	0.1	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1221	N.D.	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1232	N.D.	ug/L	0.3	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1242	N.D.	ug/L	0.09	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1248	9.2	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1254	N.D.	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1260	N.D.	ug/L	0.3	MOD 8082	10/15/99	10/15/99	STEL
Arsenic	1.06	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.135	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.423	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.042	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.088	mg/L	0.02	6010B	10/19/99	10/19/99	JONH

BASF CORPORATION

Laboratory Project 1314 006 (Continued) Thursday, October 21, 1999

Mercury	0.126	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.144	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	5.51	mg/L	0.25	9010B/9014	10/13/99	10/13/99	GENT
Cyanide	5.36	mg/L	0.25	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	21	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

N.D. = Not Detected
D.L. = Detection Limit

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	2
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	2
O-CRESOL	31	2
P-CRESOL	150	1
2,4-DICHLOROPHENOL	4.1	3
2,4-DIMETHYLPHENOL	34	2
4,6-DINITRO-O-CRESOL	N.D.	9
2,4-DINITROPHENOL	N.D.	10
2-NITROPHENOL	N.D.	4
4-NITROPHENOL	N.D.	6
PENTACHLOROPHENOL	N.D.	10
PHENOL	23	2
2,4,5-TRICHLOROPHENOL	N.D.	5
2,4,6-TRICHLOROPHENOL	N.D.	5

N.D. = Not detected TOTAL 242
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	1.2	1
ACENAPHTHYLENE	12	1.0
ANILINE	N.D.	1.0
ANTHRACENE	8.5	1
BENZO(a)ANTHRACENE	6.6	2
BENZO(b & k)FLUORANTHENES	5.1	3
BENZO(a)PYRENE	4.6	3
BENZO(ghi)PERYLENE	N.D.	3
BENZYL ALCOHOL	N.D.	1
bis(2-CHLOROETHOXY)METHANE	N.D.	1
bis(2-CHL'ETHYL)ETHER	N.D.	2
bis(2-CHLOROISOPROPYL)ETHER	26	5
4-BROMOPHENYL PHENYL ETHER	N.D.	7
BUTYL BENZYL PHTHALATE	N.D.	2
CARBAZOLE	9.4	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1
4-CHLOROPHENYL PHENYL ETHER	N.D.	3
CHRYSENE	5.3	2
DIBENZO(a,h)ANTHRACENE	N.D.	3
DIBENZOFURAN	5.5	1.0
1,2-DICHLOROBENZENE	N.D.	2
1,3-DICHLOROBENZENE	N.D.	2
1,4-DICHLOROBENZENE	N.D.	2
3,3'-DICHLOROBENZIDINE	N.D.	10
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	5
DIMETHYL PHTHALATE	N.D.	1
2,4-DINITROTOLUENE	N.D.	4
2,6-DINITROTOLUENE	N.D.	6
DI-n-OCTYL PHTHALATE	N.D.	1
bis(2-ETHYLHEXYL)PHTHALATE	190	5
FLUORANTHENE	13	1
FLUORENE	9.8	1
HEXACHLOROBENZENE	N.D.	5
HEXACHLOROBUTADIENE	N.D.	5
HEXACHLOROCYCLOPENTADIENE	N.D.	6
HEXACHLOROETHANE	N.D.	4
INDENO(123-cd)PYRENE	N.D.	3
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	8.9	1.0
NAPHTHALENE	140	1.0
2-NAPHTHYLAMINE	N.D.	1
m-NITROANILINE	N.D.	2
o-NITROANILINE	N.D.	2
p-NITROANILINE	N.D.	2
NITROBENZENE	N.D.	2
PARATHION	N.D.	6

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	2
N-NITROSO-DI-n-PROPYLAMINE	N.D.	10
PHENANTHRENE	28	1
PYRENE	13	1
PYRIDINE	5.8	2
1,2,4-TRICHL'BENZENE	N.D.	2

N.D. = Not detected TOTAL 493
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31401B Sample size : 10 ml
Description : MW-J
Sample submitted by : BASF CORPORATION
Analyzed on 10-12-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	1,300	50
BENZENE	6.8	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	3
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1
c-1,2-DICHLOROETHENE	N.D.	1
t-1,2-DICHLOROETHENE	N.D.	1
1,2-DICHLOROPROPANE	2.8	1
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	1.5	1.0
2-HEXANONE	N.D.	3
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	8
METHYL ISOBUTYL KETONE	41	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	2
TETRACHLOROETHENE	N.D.	1
TOLUENE	9.4	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	7.4	1.0
o-XYLENE	6.6	1.0

N.D. = Not detected TOTAL 1,380

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	7
2-CHLOROPHENOL	N.D.	4
O-CRESOL	290	4
P-CRESOL	800	4
2,4-DICHLOROPHENOL	N.D.	8
2,4-DIMETHYLPHENOL	300	6
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	10
4-NITROPHENOL	N.D.	20
PENTACHLOROPHENOL	210	20
PHENOL	820	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	N.D.	10

N.D. = Not detected TOTAL 2,420

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	6.7	4
ACENAPHTHYLENE	33	2
ANILINE	N.D.	2
ANTHRACENE	24	3
BENZO(a)ANTHRACENE	8.9	4
BENZO(b & k)FLUORANTHENES	11	7
BENZO(a)PYRENE	N.D.	8
BENZO(ghi)PERYLENE	N.D.	8
BENZYL ALCOHOL	14	3
bis(2-CHLOROETHOXY)METHANE	N.D.	4
bis(2-CHL'ETHYL)ETHER	62	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	8
CARBAZOLE	51	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	12	3
DIBENZO(a,h)ANTHRACENE	N.D.	8
DIBENZOFURAN	18	2
1,2-DICHLOROBENZENE	10	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	4
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	55	3
FLUORENE	35	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	20
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	7
ISOPHORONE	6.8	3
2-METHYLNAPHTHALENE	23	2
NAPHTHALENE	280	2
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	6
p-NITROANILINE	N.D.	5
NITROBENZENE	N.D.	10
PARATHION	N.D.	20

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SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	120	3
PYRENE	43	3
PYRIDINE	50	4
1,2,4-TRICHL'BENZENE	N.D.	6
TOTAL	863	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31402B Sample size : 1 ml
Description : MW-D
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	2,500	200
BENZENE	32	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	94	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	18	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	6.4	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	400	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	320	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	8
TOLUENE	350	3
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	76	10
m & p-XYLENES	27	5
o-XYLENE	12	5
TOTAL	3,840	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	5
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	N.D.	5
O-CRESOL	76	5
P-CRESOL	200	5
2,4-DICHLOROPHENOL	N.D.	6
2,4-DIMETHYLPHENOL	71	5
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	9
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	20
PHENOL	180	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	N.D.	10

N.D. = Not detected TOTAL 527
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	3
ACENAPHTHYLENE	N.D.	2
ANILINE	N.D.	2
ANTHRACENE	3.6	3
BENZO(a)ANTHRACENE	N.D.	4
BENZO(b & k)FLUORANTHENES	N.D.	6
BENZO(a)PYRENE	N.D.	6
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	7.3	3
bis(2-CHLOROETHOXY)METHANE	N.D.	3
bis(2-CHL'ETHYL)ETHER	22	5
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	5
CARBAZOLE	8.1	2
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	N.D.	3
DIBENZO(a,h)ANTHRACENE	N.D.	6
DIBENZOFURAN	2.0	2
1,2-DICHLOROBENZENE	N.D.	5
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	3
FLUORENE	3.2	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	2
2-METHYLNAPHTHALENE	3.2	2
NAPHTHALENE	34	1
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	4
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	22	3
PYRENE	N.D.	3
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	5
TOTAL	105	

N.D. = Not detected
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31403B Sample size : 1 ml
Description : MW-E
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	1,300	200
BENZENE	8.3	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	12	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	N.D.	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	9
TOLUENE	18	4
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	Detected <	5
o-XYLENE	N.D.	6

N.D. = Not detected TOTAL 1,350

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	4
P-CHLORO-M-CRESOL	N.D.	5
2-CHLOROPHENOL	N.D.	3
O-CRESOL	N.D.	3
P-CRESOL	N.D.	3
2,4-DICHLOROPHENOL	N.D.	5
2,4-DIMETHYLPHENOL	6.7	4
4,6-DINITRO-O-CRESOL	N.D.	10
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	7
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	10
PHENOL	N.D.	3
2,4,5-TRICHLOROPHENOL	N.D.	8
2,4,6-TRICHLOROPHENOL	N.D.	8

N.D. = Not detected TOTAL 6.70

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	2
ACENAPHTHYLENE	N.D.	1
ANILINE	5.9	1
ANTHRACENE	N.D.	2
BENZO(a)ANTHRACENE	N.D.	3
BENZO(b & k)FLUORANTHENES	N.D.	5
BENZO(a)PYRENE	N.D.	6
BENZO(ghi)PERYLENE	N.D.	5
BENZYL ALCOHOL	N.D.	2
bis(2-CHLOROETHOXY)METHANE	N.D.	3
bis(2-CHL'ETHYL)ETHER	N.D.	3
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	9
BUTYL BENZYL PHTHALATE	N.D.	4
CARBAZOLE	N.D.	1
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	2
4-CHLOROPHENYL PHENYL ETHER	N.D.	4
CHRYSENE	N.D.	2
DIBENZO(a,h)ANTHRACENE	N.D.	6
DIBENZOFURAN	N.D.	1
1,2-DICHLOROBENZENE	N.D.	3
1,3-DICHLOROBENZENE	N.D.	3
1,4-DICHLOROBENZENE	N.D.	3
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	8
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	6
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1
FLUORENE	N.D.	2
HEXACHLOROBENZENE	N.D.	7
HEXACHLOROBUTADIENE	N.D.	8
HEXACHLOROCYCLOPENTADIENE	N.D.	9
HEXACHLOROETHANE	N.D.	7
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	2
2-METHYLNAPHTHALENE	N.D.	1
NAPHTHALENE	N.D.	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	2
o-NITROANILINE	N.D.	4
p-NITROANILINE	N.D.	3
NITROBENZENE	N.D.	3
PARATHION	N.D.	8

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SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	3
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	N.D.	1
PYRENE	N.D.	2
PYRIDINE	N.D.	3
1,2,4-TRICHL'BENZENE	N.D.	4

N.D. = Not detected TOTAL 5.90

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31404BB Sample size : 22 ml
Description : MW-H
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	7
BENZENE	1.8	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	3
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 1.80

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	8
2-CHLOROPHENOL	52	5
O-CRESOL	320	4
P-CRESOL	920	4
2,4-DICHLOROPHENOL	73	8
2,4-DIMETHYLPHENOL	310	7
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	10
4-NITROPHENOL	N.D.	20
PENTACHLOROPHENOL	170	30
PHENOL	740	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	69	10

N.D. = Not detected TOTAL 2,650

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	22	4
ACENAPHTHYLENE	100	4
ANILINE	N.D.	2
ANTHRACENE	78	3
BENZO(a)ANTHRACENE	41	5
BENZO(b & k)FLUORANTHENES	32	7
BENZO(a)PYRENE	34	8
BENZO(ghi)PERYLENE	N.D.	8
BENZYL ALCOHOL	N.D.	3
bis(2-CHLOROETHOXY)METHANE	N.D.	10
bis(2-CHL'ETHYL)ETHER	26	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	7
CARBAZOLE	190	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	41	4
DIBENZO(a,h)ANTHRACENE	N.D.	9
DIBENZOFURAN	52	2
1,2-DICHLOROBENZENE	5.1	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	30
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	4
bis(2-ETHYLHEXYL)PHTHALATE	35	5
FLUORANTHENE	160	3
FLUORENE	120	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	7
ISOPHORONE	N.D.	3
2-METHYLNAPHTHALENE	83	2
NAPHTHALENE	480	2
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	6
p-NITROANILINE	N.D.	5
NITROBENZENE	N.D.	5
PARATHION	N.D.	20

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SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	330	3
PYRENE	150	4
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	6

N.D. = Not detected TOTAL 1,980

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31405B Sample size : 1 ml
Description : MW-C
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	12,000	500
BENZENE	51	3
BROMODICHLOROMETHANE	N.D.	8
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	3
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	9
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	35	10
CIS-1,3-DICHLOROPROPENE	N.D.	9
TRANS-1,3-DICHL'PROPENE	N.D.	7
ETHYL BENZENE	N.D.	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	3,900	10
METHYL ETHYL KETONE	N.D.	80
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	7
TOLUENE	35	3
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	28	5
o-XYLENE	29	5

N.D. = Not detected TOTAL 16,100

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	58	4
O-CRESOL	420	4
P-CRESOL	1,300	5
2,4-DICHLOROPHENOL	79	7
2,4-DIMETHYLPHENOL	470	6
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	20
4-NITROPHENOL	N.D.	30
PENTACHLOROPHENOL	96	20
PHENOL	930	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	69	10

N.D. = Not detected TOTAL 3,420

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	50	3
ACENAPHTHYLENE	290	2
ANILINE	N.D.	2
ANTHRACENE	270	2
BENZO(a)ANTHRACENE	77	3
BENZO(b & k)FLUORANTHENES	28	6
BENZO(a)PYRENE	19	6
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	N.D.	3
bis(2-CHLOROETHOXY)METHANE	N.D.	4
bis(2-CHL'ETHYL)ETHER	42	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	10
BUTYL BENZYL PHTHALATE	N.D.	6
CARBAZOLE	330	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	12	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	6
CHRYSENE	58	3
DIBENZO(a,h)ANTHRACENE	N.D.	7
DIBENZOFURAN	120	1
1,2-DICHLOROBENZENE	Detected <	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	3
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	8
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	350	4
FLUORENE	300	4
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	9
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	7
2-METHYLNAPHTHALENE	200	2
NAPHTHALENE	790	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	3
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	5
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	830	2
PYRENE	360	3
PYRIDINE	N.D.	4
1,2,4-TRICHL'BENZENE	N.D.	5
TOTAL	4,130	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31406B Sample size : 1 ml
Description : MW-B
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	15,000	200
BENZENE	53	4
BROMODICHLOROMETHANE	N.D.	9
BROMOFORM	N.D.	30
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	5
CARBON TETRACHLORIDE	N.D.	7
CHLOROBENZENE	15	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	7
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	7
1,2-DICHLOROETHANE	15	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	46	10
CIS-1,3-DICHLOROPROPENE	N.D.	10
TRANS-1,3-DICHL'PROPENE	N.D.	10
ETHYL BENZENE	Detected <	8
2-HEXANONE	N.D.	30
METHYLENE CHLORIDE	4,800	10
METHYL ETHYL KETONE	N.D.	90
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	4
sym-TETRACHL'ETHANE	N.D.	20
TETRACHLOROETHENE	N.D.	10
TOLUENE	53	5
1,1,1-TRICHLO'ETHANE	N.D.	7
1,1,2-TRICHLO'ETHANE	N.D.	20
TRICHLOROETHENE	N.D.	10
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	39	6
o-XYLENE	38	7

N.D. = Not detected TOTAL 20,100

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31407A Sample size : 1 ml
Description : MW-I
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	4,800	100
BENZENE	N.D.	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	30
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	10
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	9
ETHYL BENZENE	N.D.	7
2-HEXANONE	N.D.	30
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	4
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	9
TOLUENE	6.8	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	N.D.	6
o-XYLENE	N.D.	6

N.D. = Not detected TOTAL 4,810

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31408A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-12-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(1)

Chain of Custody Record

T314

Customer: URS GREINER WOODWARD CLYDE
Project/Purchase Order #: BASF 38-8E06216
Sampling Site: RIVERVIEW / WYANDOTTE
By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
01A	MW-J				WATER	10/6/99 0925		SVOC
01B	↓				↓	↓		VOC
01C	↓	NaOH	10/05 TG		↓	↓		CN
01D	↓	HNO_3	↓		↓	↓		Metals
01E	↓	H_2SO_4	↓		↓	↓		NH_3
02A	MW-D				WATER	10/6/99 @ 1010		SVOC
02B	↓				↓	↓		VOC
02C	MW-D	NaOH	10/05 TG		↓	↓		CN
02D	↓	HNO_3	↓		↓	↓		Metals
02E	↓	H_2SO_4	↓		↓	↓		NH_3

Method of Shipment: del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [signature]	Date: 10/06 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(2)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
03 A	MW-E	*			WATER	10/6/99 @ 1040		SVOC
03 B								VOC
03 C		NaOH	10/05 TG					CN
03 D		HNO3						Metals
03 E		H2SO4						NH3
04 A	MW-H				WATER	10/6/99 @ 1216		SVOC
04 B								VOC
04 C		NaOH	10/05 TG					CN
04 D		HNO3						Metals
04 E		H2SO4						NH3

Method of Shipment: Cust. del	Date:	Time:	Relinquished by: Timothy Hicks	Date: 10/6/99	Time: 1630
Received by: [signature]	Date: 10/06/99	Time: 16:30	Relinquished by:	Date:	Time:
Received by:	Date:	Time:	Relinquished by:	Date:	Time:

All 1L bottles were labelled correctly except One bottle did not have well ID MW-E did not have 1L bottle The bottle was designated as MW-E by the Lab

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(4)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
05A	MW-C				WATER	10/6/99 @ 1530		SVOC
05B					WATER	10/6/99 @ 1410		VOC
05C		NaOH	10/05 TG			@ 1530		CN
05D		HNO_3						Metals
05E		H_2SO_4						NH_3
								SVOC
								VOC
		NaOH	10/05 TG					CN
		HNO_3						Metals
		H_2SO_4						NH_3

Method of Shipment: Courier del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [illegible]	Date: 10/06/99 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperaure of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4409

(3)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-BE06216

Sampling Site: RIVER VIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
07A	MW-I				~~WATER~~	~~10/6/99 @ 1305~~	~~WELL DRY~~	SVOC
					WATER	10/6/99 @ 1350		VOC — ONLY
		NaOH	10/05 TG		WELL DRY			CN
		HNO_3	↓					Metals
		H_2SO_4	↓					NH_3
06A	MW-B				WATER	10/6/99 @ 1420		SVOC
06B	"				↓	↓		VOC
06C	MW-B	NaOH	10/05 TG					CN
06D	↓	HNO_3	↓					Metals
06E		H_2SO_4	↓					NH_3
06F	↓				↓	↓		PCB

08A TRIP BLANK

Method of Shipment: Cust. del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [signature]	Date: 10/06/99 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperaure of blank: _____ Time temperature taken: _____ By: _____

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

RECEIVED ERD S.E. MICH.
SEP 27 1999
FILE
COUNTY

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Method: SW-846 8270
Matrix: Water
DL Multiplier: 7.0
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Trace ID: X113-05
Sample ID: MW-I
Batch ID: BNA062301W
% Solids: NA

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	18	ug/L
1,3-Dichlorobenzene	U	18	ug/L
1,4-Dichlorobenzene	U	18	ug/L
1,2-Dichlorobenzene	U	18	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	18	ug/L
N-Nitroso-di-n-propylamine	U	18	ug/L
Hexachloroethane	U	18	ug/L
Nitrobenzene	U	18	ug/L
Isophorone	U	18	ug/L
bis(2-Chloroethoxy)methane	U	18	ug/L
1,2,4-Trichlorobenzene	U	18	ug/L
Naphthalene	U	18	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	18	ug/L
2-Methylnaphthalene	U	18	ug/L
Hexachlorocyclopentadiene	U	35	ug/L
2-Chloronaphthalene	U	18	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	18	ug/L
Acenaphthylene	U	18	ug/L
2,6-Dinitrotoluene	U	18	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	18	ug/L
Dibenzofuran	U	18	ug/L
2,4-Dinitrotoluene	U	18	ug/L
Diethylphthalate	U	18	ug/L
Fluorene	U	18	ug/L
4-Chlorophenyl-phenylether	U	18	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	18	ug/L
4-Bromophenyl-phenylether	U	18	ug/L
Hexachlorobenzene	U	18	ug/L
Phenanthrene	U	18	ug/L
Anthracene	U	18	ug/L
Carbazole	U	18	ug/L
Di-n-butylphthalate	U	18	ug/L
Fluoranthene	U	18	ug/L
Pyrene	U	18	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-05
Sample ID: MW-I
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 7.0
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	18 ug/L
Benzo(a)anthracene	U	18 ug/L
Chrysene	U	18 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	18 ug/L
Di-n-octylphthalate	U	18 ug/L
Benzo(b)fluoranthene	U	18 ug/L
Benzo(k)fluoranthene	U	18 ug/L
Benzo(a)pyrene	U	18 ug/L
Indeno(1,2,3-cd)pyrene	U	18 ug/L
Dibenzo(a,h)anthracene	U	18 ug/L
Benzo(g,h,i)perylene	U	18 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	67 %	46 - 95
2-Fluorobiphenyl	66 %	40 - 93
p-Terphenyl-d14	62 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $841.53

Lab Work Order # 9906151
Work Site ID: BASF - RIVERVIEW
Matrix: Organic\Oil\Coal
Received: 6/21/1999
Reported: 8/19/1999
Client: ER_SE
Number of Samples: 1

This is an original report: Lauri C Uten II Date: 8/19/99

RECEIVED ERD S.E. MICH.
AUG 30 1999
FILE
COUNTY

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OBN
		Test Name:	Base Neutral - Oil
Date Analyzed: 7/26/1999 by JRS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
111-44-4	bis(2-Chloroethyl) ether	ND		1000	20
541-73-1	1,3-Dichlorobenzene	ND		1000	20
106-46-7	1,4-Dichlorobenzene	ND		1000	20
95-50-1	1,2-Dichlorobenzene	ND		1000	20
108-60-1	bis(2-Chloroisopropyl) ether	ND		1000	20
621-64-7	N-Nitroso-di-n-propyl amine	ND		1000	20
67-72-1	Hexachloroethane	ND		1000	20
98-95-3	Nitrobenzene	ND		1000	20
78-59-1	Isophorone	ND		1000	20
111-91-1	bis(2-Chloroethoxy) methane	ND		1000	20
120-82-1	1,2,4-Trichlorobenzene	ND		1000	20
91-20-3	Naphthalene	ND		1000	20
87-68-3	Hexachlorobutadiene	ND		1000	20
77-47-4	Hexachlorocyclopentadiene	ND		2000	20
91-58-7	2-Chloronaphthalene	ND		1000	20
131-11-3	Dimethyl phthalate	ND		1000	20
208-96-8	Acenaphthylene	ND		1000	20
606-20-2	2,6-Dinitrotoluene	ND		1000	20
83-32-9	Acenaphthene	ND		1000	20
121-14-2	2,4-Dinitrotoluene	ND		1000	20
86-73-7	Fluorene	ND		1000	20
84-66-2	Diethyl phthalate	ND		1000	20
7005-72-3	4-Chlorodiphenyl ether	ND		1000	20
86-30-6	N-Nitrosodiphenyl amine	ND		1000	20
122-66-7	Azobenzene	ND		1000	20
101-55-3	4-Bromodiphenyl ether	ND		1000	20
118-74-1	Hexachlorobenzene	ND		1000	20
85-01-8	Phenanthrene	120	T	1000	20
120-12-7	Anthracene	ND		1000	20
84-74-2	Di-n-butyl phthalate	ND		1000	20
206-44-0	Fluoranthene	ND		1000	20
129-00-0	Pyrene	160	T	1000	20
85-68-7	Butyl benzyl phthalate	ND		1000	20
56-55-3	Benzo (a) anthracene	ND		1000	20
218-01-9	Chrysene	63	T	1000	20

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
117-81-7	bis(2-ethylhexyl) phthalate	ND		1000	20
117-84-0	Di-n-octyl phthalate	ND		1000	20
205-99-2	Benzo (b) fluoranthene	ND		1000	20
207-08-9	Benzo (k) fluoranthene	ND		1000	20
50-32-8	Benzo (a) pyrene	ND		1000	20
193-39-5	Indeno (1,2,3-c,d) pyrene	ND		1000	20
53-70-3	Dibenz (a,h) anthracene	ND		1000	20
191-24-2	Benzo (g,h,i) perylene	ND		1000	20

NM = not measured.
Reference method is 8270.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OPC
Date Extracted: 8/3/1999 by 1037-ks,		Test Name:	PCBs in Oil
Date Analyzed: 8/10/1999 by TAITS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
53469-21-9	Aroclor 1242 (PCB)	ND		1.0	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		1.0	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		1.0	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		1.0	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		1.0	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		1.0	1.0
12672-29-6	*Aroclor 1248 (PCB)	ND		1.0	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		1.0	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		1.0	1.0

ND = not detected at the specified detection limit.
* Results and detection limit reported semi-quantitatively. *
MM: Analytical method not validated for this matrix. Reference method is 8082.
NM = not measured.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OS1
		Test Name:	Scan 1 - Oil
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-35-4	1,1-Dichloroethene	ND		1.0	0.2
75-09-2	Methylene chloride	ND		5.0	0.2
156-60-5	trans-1,2-Dichloroethene	ND		1.0	0.2
75-34-3	1,1-Dichloroethane	ND		1.0	0.2
156-59-2	cis-1,2-Dichloroethene	ND		1.0	0.2
67-66-3	Chloroform	ND		1.0	0.2
71-55-6	1,1,1-Trichloroethane	ND		1.0	0.2
56-23-5	Carbon tetrachloride	ND		1.0	0.2
107-06-2	1,2-Dichloroethane	ND		1.0	0.2
79-01-6	Trichloroethene	ND		1.0	0.2
78-87-5	1,2-Dichloropropane	ND		1.0	0.2
10061-01-5	cis-1,3-Dichloropropene	ND		1.0	0.2
10061-02-6	trans-1,3-Dichloropropene	ND		1.0	0.2
79-00-5	1,1,2-Trichloroethane	ND		1.0	0.2
127-18-4	Tetrachloroethene	ND		1.0	0.2
108-90-7	Chlorobenzene	ND		1.0	0.2
79-34-5	1,1,2,2-Tetrachloroethane	ND		1.0	0.2

ND = not detected at the specified detection limit.
NM = not measured.
Analytical methodology not validated for this matrix. Reference method is 8260.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	OS2
		Test Name:	Scan 2 - Oil
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS mg/Kg	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
71-43-2	Benzene	ND		1.0	0.2
108-88-3	Toluene	ND		1.0	0.2
100-41-4	Ethylbenzene	ND		1.0	0.2
108-38-3	Xylene isomers	ND		3.0	0.2

ND = not detected at the specified detection limit.
NM = not measured.
Analytical methodology not validated for this matrix. Reference method is 8260.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	FIN
		Test Name:	Fingerprinting
Date Analyzed: 7/26/1999 by JRS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS Date done	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Fingerprinting Date Done	7/26/1999			

-Fingerprinting Results -

Reference method 8270.

GC/MS semivolatile library search results:

The sample appears to ba a type of hydrocarbon oil. It does not have a pattern typical of a fuel or solvent.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	O_LIB
		Test Name:	Library Srch-GC/MS- Oil
Date Analyzed: 7/26/1999 by JRS		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Library Search - GC/MS - Oil	7/26/1999			

Results of Library Search - GC/MS - Oil

Reference method is 8270.

GC/MS semivolatile library search results:

Compound	Est. Conc. (mg/kg)*
Naphthalene, trimethyl-	480
Undecane, dimethyl-	660
Heptadecane, dimethyl-	800
Phenanthrene, dimethyl-	370
Phenanthrene, dimethyl- (isomer)	490
Pentadecylcyclohexane	760
Octadecanoic acid, butyl ester	1000

Note: Some n-alkanes present in the sample.

* Results reported as mg/kg not ug/kg.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906151-01OL

Date Collected: 6/18/1999		Test Code:	O_VLIB
		Test Name:	Library Search-Oil-Volatiles
Date Analyzed: 6/25/1999 by WORM		Sample ID:	MW-M

CAS #	COMPOUND	RESULTS	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
	Library Srch - Oil Volatiles	6/25/1999			

Results for Library Search - Oil - Volatiles

Reference method is 8260.

NO UNIDENTIFIED PEAKS.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	ENVIRONMENTAL LABORATORY PROCEDURE	NO: PD-13 DATE: Rev. 10/9/95

Subject: ***Laboratory Result Remark Codes***

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance, if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. C. indicated possible low recovery. Actual level may be higher.
LL	Q. C. indicated possible high recovery. Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used.
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis.
STR	settleable residue was not analyzed due to low suspended solids.

Approved by: George Su, Lab Section Chief — 10/17/95 Date

DEQ

bha:File R:\Worddocs\Codes.doc

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

MATRIX = ORGANIC / OIL / COAL

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 9906151 PRIORITY II RECEIVED AT LAB BY [illegible] DATE TIME 6/21/99 9:35 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS Beth Venis PHONE (734) 953-1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris DELIVERED BY M. Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Venis AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
43028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NO.	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	~~MW-F~~	~~99/6/18~~		
02	MW-M	99/6/18		
03				
04				
05				
06				
07				
08				

GENERAL CHEMISTRY

HW

Flashpoint	1 2 3 4 5 6 7 8
Solubility	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8

ORGANIC

OL

Volatile Oil 8260	1 2 3 4 5 6 7 8
PCB only	1 2 3 4 5 6 7 8
Pest & PCB	1 2 3 4 5 6 7 8
BN	1 2 3 4 5 6 7 8
LIBRARY SEARCH	1 2 3 4 5 6 7 8
PATTERN	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8

INORGANIC

MO

Cd Cr Cu Ni Pb Zn	1 2 3 4 5 6 7 8
Fe Co Li Mn	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
Al Ba Be Mo Ti V	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
Hg - Mercury	1 2 3 4 5 6 7 8
As - Arsenic	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8
% Cl	1 2 3 4 5 6 7 8
BTU	1 2 3 4 5 6 7 8
% Sulfur	1 2 3 4 5 6 7 8
% Ash	1 2 3 4 5 6 7 8
% H2O	1 2 3 4 5 6 7 8
	1 2 3 4 5 6 7 8

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $5,701.50

Lab Work Order # 9910031
Work Site ID: BASF- RIVERVIEW
Matrix: Water
Received: 10/7/1999
Reported: 11/16/1999
Client: ER_SE
Number of Samples: 7

TEST UNITS	MW-J	MW-D	MW-E	MW-H
Ammonia mg N/L	30	29	24	4.7
Arsenic by Furnace ug/L	52	INT	INT	140
Arsenic in Water ug/L	74	12200 DL	10500 DL	200
Barium in Water ug/L	440	28	70	270
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Chromium by Furnace ug/L	103 DM	138 DM	INT	INT
Chromium in Water ug/L			310	480
Copper by Furnace ug/L	27	2.5	1.2	5.2
Cyanide mg/L	1.7	6.0	6.9	3.2
Cyanide - Amenable	.40	INT	.30	.90
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	67 DM	6.7 DM	64 DM	K 5.0 DM
Mercury in Water ug/L	INT	INT	INT	4.0
Selenium in Water ug/L	3.5	4.1	5.1	19 DM
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Zinc in Water ug/L	50	26	60	50

RECEIVED ERD S.E. MICH.
NOV 19 1999
FILE
COUNTY

TEST UNITS	MW-B	MW-C	MW-I	
Ammonia mg N/L	20	18	7.3	
Arsenic by Furnace ug/L	INT	INT	INT	
Arsenic in Water ug/L	900	960	1300	
Barium in Water ug/L	159	480	90	
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Chromium by Furnace ug/L	INT	INT	86 DM	
Chromium in Water ug/L	420	670		
Copper by Furnace ug/L	22	55	30	
Cyanide mg/L	3.8	3.2	.56	
Cyanide - Amenable	.80	.50	.20	
Hex Chromium in Water ug/L	INT	INT	INT	
Lead by Furnace ug/L	95 DM	238 DM	36 DM	
Mercury in Water ug/L	INT	INT	3.5	
Selenium in Water ug/L	K 5.0 DM	7.9 DM	K 5.0 DM	
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	
Zinc in Water ug/L	130	250	100	

This is an original report: _____ Date: _____

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/2/1999 by GRINWISS	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		51	10
108-95-2	Phenol	ND		100	10
111-44-4	Bis(2-chloroethyl)ether	ND		10	10
95-57-8	2-Chlorophenol	ND		100	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	ND		10	10
95-48-7	2-Methylphenol (o-cresol)	ND		100	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		10	10
108394,106445	3/4-Methylphenol (m/p-cresol)	170	T	210	10
621-64-7	N-Nitrosodi-n-propylamine	ND		21	10
67-72-1	Hexachloroethane	ND		10	10
98-95-3	Nitrobenzene	ND		21	10
78-59-1	Isophorone	ND		10	10
88-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	ND		100	10
111-91-1	Bis(2-chloroethoxy)methane	ND		21	10
120-83-2	2,4-Dichlorophenol	ND		100	10
120-82-1	1,2,4-Trichlorobenzene	ND		21	10
91-20-3	Naphthalene	120		10	10
87-68-3	Hexachlorobutadiene	ND		21	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
91-57-6	2-Methylnaphthalene	ND		51	10
77-47-4	Hexachlorocyclopentadiene	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
91-58-7	2-Chloronaphthalene	ND		21	10
88-74-4	2-Nitroaniline	ND		210	10
208-96-8	Acenaphthylene	16		10	10
131-11-3	Dimethyl phthalate	ND		21	10
606-20-2	2,6-Dinitrotoluene	ND		51	10
99-09-2	3-Nitroaniline	ND		210	10
83-32-9	Acenaphthene	ND		10	10
51-28-5	2,4-Dinitrophenol	ND		510	10
132-64-9	Dibenzofuran	ND		51	10
100-02-7	4-Nitrophenol	ND		510	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		51	10
86-73-7	Fluorene	13		10	10
84-66-2	Diethyl phthalate	ND		10	10
100-01-6	4-Nitroaniline	ND		210	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		510	10
7005-72-3	4-Chlorophenyl phenylether	ND		10	10
156-10-5	N-Nitrosodiphenylamine	ND		21	10
103-33-3	Azobenzene	ND		21	10
101-55-3	4-Bromophenyl phenylether	ND		21	10
118-74-1	Hexachlorobenzene	ND		21	10
87-86-5	Pentachlorophenol	ND		510	10
85-01-8	Phenanthrene	37		10	10
120-12-7	Anthracene	ND		10	10
86-74-8	Carbazole	ND		100	10
84-74-2	Di-n-butyl phthalate	ND		10	10
206-44-0	Fluoranthene	ND		10	10
129-00-0	Pyrene	15		10	10
85-68-7	Butyl benzyl phthalate	ND		10	10
56-55-3	Benz(a)anthracene	ND		10	10
218-01-9	Chrysene	ND		10	10
117-81-7	Bis(2-ethylhexyl)phthalate	140		21	10
117-84-0	Di-n-octyl phthalate	ND		21	10
205-99-2	Benzo(b)fluoranthene	ND		21	10
207-08-9	Benzo(k)fluoranthene	ND		21	10
50-32-8	Benzo(a)pyrene	ND		21	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		21	10
53-70-3	Dibenz(a,h)anthracene	ND		21	10
191-24-2	Benzo(g,h,i)perylene	ND		21	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	0.032		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	0.031		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	0.036	T	0.052	1.0
50-29-3	4,4'-DDT	0.063		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	0.130	J,T	0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	0.120	J,T	0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-01POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by BUCHNER	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	950		120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	9.5		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	43		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	12		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p-Xylene	11		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	10		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	ND		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	240		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		55	10
108-95-2	Phenol	600		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	300		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	740		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	200		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	270		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	32	T	55	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	50		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		55	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		550	10
132-64-9	Dibenzofuran	ND		55	10
100-02-7	4-Nitrophenol	ND		550	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		55	10
86-73-7	Fluorene	44		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		550	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	ND		550	10
85-01-8	Phenanthrene	180		11	10
120-12-7	Anthracene	37		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	140		11	10
129-00-0	Pyrene	100		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	39		11	10
218-01-9	Chrysene	31		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	35		22	10
207-08-9	Benzo(k)fluoranthene	28		22	10
50-32-8	Benzo(a)pyrene	27		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.086	4.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.086	4.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.086	4.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.086	4.0
87-68-3	Hexachlorobutadiene	ND		0.086	4.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.086	4.0
77-47-4	Hexachlorocyclopentadiene	ND		0.086	4.0
91-58-7	2-Chloronaphthalene	ND		0.86	4.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.086	4.0
608-93-5	Pentachlorobenzene	0.120		0.086	4.0
319-84-6	a-BHC	ND		0.086	4.0
118-74-1	Hexachlorobenzene	ND		0.086	4.0
319-85-7	b-BHC	ND		0.086	4.0
58-89-9	g-BHC (lindane)	ND		0.086	4.0
82-68-8	Pentachloronitrobenzene	ND		0.086	4.0
319-86-8	d-BHC	ND		0.086	4.0
76-44-8	Heptachlor	ND		0.086	4.0
309-00-2	Aldrin	ND		0.086	4.0
1024-57-3	Heptachlor epoxide	ND		0.086	4.0
5103-74-2	g-Chlordane	ND		0.086	4.0
959-98-8	Endosulfan I	ND		0.086	4.0
5103-71-9	a-Chlordane	ND		0.086	4.0
72-55-9	4,4'-DDE	ND		0.086	4.0
72-20-8	Endrin	ND		0.086	4.0
60-57-1	Dieldrin	ND		0.086	4.0
72-54-8	4,4'-DDD	ND		0.216	4.0
50-29-3	4,4'-DDT	ND		0.086	4.0
87-82-1	Hexabromobenzene	ND		0.086	4.0
72-43-5	Methoxychlor	ND		0.216	4.0
2385-85-5	Mirex	ND		0.086	4.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.86	4.0
11097-69-1	Aroclor 1254 (PCB)	7.60	J	0.86	4.0
11096-82-5	Aroclor 1260 (PCB)	3.30	J	0.86	4.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.86	4.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.86	4.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.86	4.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	6.20	J	0.86	4.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.86	4.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.86	4.0
59080-40-9	BP-6 (PBB)	ND		0.216	4.0
8001-35-2	*Toxaphene	ND		0.43	4.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-02POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by BUCHNER	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	96		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1100		250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	320		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	ND		50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	150	J	10	10
71-43-2	Benzene	37	J	10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	ND		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	260	J	50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	330		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
100-41-4	Ethylbenzene	11		10	10
108383,106423	m & p-Xylene	37		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	20		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2-butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	13		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	13		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	390		50	10
91-57-6	2-Methylnaphthalene	58		50	10

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		56	10
108-95-2	Phenol	460		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	220		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	600		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	150		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	52		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	ND		56	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	ND		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		56	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		560	10
132-64-9	Dibenzofuran	ND		56	10
100-02-7	4-Nitrophenol	ND		560	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		56	10
86-73-7	Fluorene	ND		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		560	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	110	T	560	10
85-01-8	Phenanthrene	57		11	10
120-12-7	Anthracene	ND		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	44		11	10
129-00-0	Pyrene	24		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	ND		11	10
218-01-9	Chrysene	ND		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	ND		22	10
207-08-9	Benzo(k)fluoranthene	ND		22	10
50-32-8	Benzo(a)pyrene	ND		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.023	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	0.085		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	0.050		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	0.170		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND		0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND	K	0.034	1.5
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND		0.023	1.0
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND		0.057	1.0
50-29-3	4,4'-DDT	ND		0.023	1.0
87-82-1	Hexabromobenzene	ND		0.023	1.0
72-43-5	Methoxychlor	ND		0.057	1.0
2385-85-5	Mirex	ND		0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	1.90	J	0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	1.00	J	0.23	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	2.80	J	0.23	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND		0.057	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-03POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	670	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	110	J	25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	46	J	25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	54	J	5	5
71-43-2	Benzene	18	J	5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	120	J	25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	25		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	8.4		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p-Xylene	12		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	7.5		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	8.6		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	86		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.
J CODES FOR RESULTS OF METHYLENE CHLORIDE, MEK, 1,2-DCA, BENZENE, AND MIBK DUE TO LOW SURROGATE RECOVERY.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.2	1
108-95-2	Phenol	ND		10	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.0	1
95-57-8	2-Chlorophenol	ND		10	1
541-73-1	1,3-Dichlorobenzene	ND		1.0	1
106-46-7	1,4-Dichlorobenzene	ND		1.0	1
95-50-1	1,2-Dichlorobenzene	ND		1.0	1
95-48-7	2-Methylphenol (o-cresol)	ND		10	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.0	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.0	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.0	1
88-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		10	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.0	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
91-57-6	2-Methylnaphthalene	ND		5.2	1
77-47-4	Hexachlorocyclopentadiene	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.0	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.2	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.0	1
51-28-5	2,4-Dinitrophenol	ND		52	1
132-64-9	Dibenzofuran	ND		5.2	1
100-02-7	4-Nitrophenol	ND		52	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.2	1
86-73-7	Fluorene	ND		1.0	1
84-66-2	Diethyl phthalate	ND		1.0	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.0	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		52	1
85-01-8	Phenanthrene	ND		1.0	1
120-12-7	Anthracene	ND		1.0	1
86-74-8	Carbazole	ND		10	1
84-74-2	Di-n-butyl phthalate	ND		1.0	1
206-44-0	Fluoranthene	ND		1.0	1
129-00-0	Pyrene	ND		1.0	1
85-68-7	Butyl benzyl phthalate	ND		1.0	1
56-55-3	Benz(a)anthracene	ND		1.0	1
218-01-9	Chrysene	ND		1.0	1
117-81-7	Bis(2-ethylhexyl)phthalate	5.6		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.053	1.0
50-29-3	4,4'-DDT	0.130		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.053	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.053	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-04POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/8/1999 by WORM	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		10	2
74-87-3	Chloromethane	ND		10	2
75-01-4	Vinyl chloride	ND		10	2
74-83-9	Bromomethane	ND		10	2
75-00-3	Chloroethane	ND		10	2
75-69-4	Trichlorofluoromethane	ND		10	2
67-64-1	2-Propanone (Acetone)	ND		50	2
60-29-7	Diethyl ether	ND		20	2
75-35-4	1,1-Dichloroethene	ND		2	2
74-88-4	Methyl iodide	ND		2	2
107-13-1	Acrylonitrile	ND		10	2
75-09-2	Methylene chloride	ND		10	2
75-15-0	Carbon disulfide	ND		10	2
156-60-5	trans-1,2-Dichloroethene	ND		2	2
1634-04-4	Methyltertbutylether (MTBE)	ND		10	2
75-34-3	1,1-Dichloroethane	ND		2	2
78-93-3	2-Butanone (MEK)	ND		10	2
156-59-2	cis-1,2-Dichloroethene	ND		2	2
67-66-3	Chloroform	ND		2	2
74-97-5	Bromochloromethane	ND		2	2
71-55-6	1,1,1-Trichloroethane	ND		2	2
107-06-2	1,2-Dichloroethane	ND		2	2
71-43-2	Benzene	2.4		2	2
56-23-5	Carbon tetrachloride	ND		2	2
78-87-5	1,2-Dichloropropane	ND		2	2
79-01-6	Trichloroethene	ND		2	2
74-95-3	Dibromomethane	ND		2	2
75-27-4	Bromodichloromethane	ND		2	2
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		10	2
10061-01-5	cis-1,3-Dichloropropene	ND		2	2
10061-02-6	trans-1,3-Dichloropropene	ND		2	2
108-88-3	Toluene	ND		2	2
79-00-5	1,1,2-Trichloroethane	ND		2	2
591-78-6	2-Hexanone	ND		10	2
124-48-1	Dibromochloromethane	ND		2	2
106-93-4	1,2-Dibromoethane	ND		2	2

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		2	2
108-90-7	Chlorobenzene	ND		2	2
630-20-6	1,1,1,2-Tetrachloroethane	ND		2	2
100-41-4	Ethylbenzene	ND		2	2
108383,106423	m & p-Xylene	ND		4	2
75-25-2	Bromoform	ND		2	2
100-42-5	Styrene	ND		2	2
95-47-6	o-Xylene	ND		2	2
79-34-5	1,1,2,2-Tetrachloroethane	ND		2	2
96-18-4	1,2,3-Trichloropropane	ND		2	2
110-57-6	trans-1,4-Dichloro-2-butene	ND		2	2
98-82-8	Isopropylbenzene	ND		2	2
103-65-1	n-Propylbenzene	ND		2	2
108-67-8	1,3,5-Trimethylbenzene	ND		2	2
95-63-6	1,2,4-Trimethylbenzene	ND		2	2
541-73-1	1,3-Dichlorobenzene	ND		2	2
106-46-7	1,4-Dichlorobenzene	ND		2	2
95-50-1	1,2-Dichlorobenzene	ND		2	2
67-72-1	Hexachloroethane	ND		2	2
96-12-8	1,2-Dibromo-3-chloropropane	ND		10	2
120-82-1	1,2,4-Trichlorobenzene	ND		10	2
91-20-3	Naphthalene	ND		10	2
91-57-6	2-Methylnaphthalene	ND		10	2

LARGE UNIDENTIFIED PEAK.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		56	10
108-95-2	Phenol	210		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	110		110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	430		220	10
621-64-7	N-Nitrosodi-n-propylamine	ND		22	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		22	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	120		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		22	10
120-83-2	2,4-Dichlorophenol	22	T	110	10
120-82-1	1,2,4-Trichlorobenzene	ND		22	10
91-20-3	Naphthalene	270		11	10
87-68-3	Hexachlorobutadiene	ND		22	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	83		56	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		22	10
88-74-4	2-Nitroaniline	ND		220	10
208-96-8	Acenaphthylene	130		11	10
131-11-3	Dimethyl phthalate	ND		22	10
606-20-2	2,6-Dinitrotoluene	ND		56	10
99-09-2	3-Nitroaniline	ND		220	10
83-32-9	Acenaphthene	16		11	10
51-28-5	2,4-Dinitrophenol	ND		560	10
132-64-9	Dibenzofuran	60		56	10
100-02-7	4-Nitrophenol	ND		560	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		56	10
86-73-7	Fluorene	ND		11	10
84-66-2	Diethyl phthalate	100		11	10
100-01-6	4-Nitroaniline	ND		220	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		560	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		22	10
103-33-3	Azobenzene	ND		22	10
101-55-3	4-Bromophenyl phenylether	ND		22	10
118-74-1	Hexachlorobenzene	ND		22	10
87-86-5	Pentachlorophenol	82	T	560	10
85-01-8	Phenanthrene	330		11	10
120-12-7	Anthracene	110		11	10
86-74-8	Carbazole	140		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	240		11	10
129-00-0	Pyrene	130		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	66		11	10
218-01-9	Chrysene	55		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		22	10
117-84-0	Di-n-octyl phthalate	ND		22	10
205-99-2	Benzo(b)fluoranthene	51		22	10
207-08-9	Benzo(k)fluoranthene	59		22	10
50-32-8	Benzo(a)pyrene	42		22	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		22	10
53-70-3	Dibenz(a,h)anthracene	ND		22	10
191-24-2	Benzo(g,h,i)perylene	ND		22	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.180	8.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.180	8.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.180	8.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.180	8.0
87-68-3	Hexachlorobutadiene	ND		0.180	8.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.180	8.0
77-47-4	Hexachlorocyclopentadiene	ND		0.180	8.0
91-58-7	2-Chloronaphthalene	ND		1.80	8.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.180	8.0
608-93-5	Pentachlorobenzene	ND		0.180	8.0
319-84-6	a-BHC	ND		0.180	8.0
118-74-1	Hexachlorobenzene	ND		0.180	8.0
319-85-7	b-BHC	ND		0.180	8.0
58-89-9	g-BHC (lindane)	ND		0.180	8.0
82-68-8	Pentachloronitrobenzene	ND		0.180	8.0
319-86-8	d-BHC	ND		0.180	8.0
76-44-8	Heptachlor	ND		0.180	8.0
309-00-2	Aldrin	ND		0.180	8.0
1024-57-3	Heptachlor epoxide	ND		0.180	8.0
5103-74-2	g-Chlordane	ND		0.180	8.0
959-98-8	Endosulfan I	ND		0.180	8.0
5103-71-9	a-Chlordane	ND		0.180	8.0
72-55-9	4,4'-DDE	ND		0.180	8.0
72-20-8	Endrin	ND		0.180	8.0
60-57-1	Dieldrin	ND		0.180	8.0
72-54-8	4,4'-DDD	ND		0.449	8.0
50-29-3	4,4'-DDT	ND		1.01	45.0
87-82-1	Hexabromobenzene	ND		0.180	8.0
72-43-5	Methoxychlor	ND		0.449	8.0
2385-85-5	Mirex	ND		0.180	8.0
53469-21-9	Aroclor 1242 (PCB)	ND		2.25	10.0
11097-69-1	Aroclor 1254 (PCB)	98.0	J	2.25	10.0
11096-82-5	Aroclor 1260 (PCB)	31.0	J	2.25	10.0
12674-11-2	Aroclor 1016 (PCB)	ND		2.25	10.0
11104-28-2	Aroclor 1221 (PCB)	ND		2.25	10.0
11141-16-5	Aroclor 1232 (PCB)	ND		2.25	10.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	180	J	2.25	10.0
37324-23-5	Aroclor 1262 (PCB)	ND		2.25	10.0
11100-14-4	Aroclor 1268 (PCB)	ND		2.25	10.0
59080-40-9	BP-6 (PBB)	ND		0.449	8.0
8001-35-2	*Toxaphene	ND		0.90	8.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-05POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	5300	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	5300		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	66		50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	59		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
100-41-4	Ethylbenzene	52		50	50
108383,106423	m & p-Xylene	64	T	100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	60		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2-butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	70		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	1500		250	50
91-57-6	2-Methylnaphthalene	530	J	250	50

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	11/1/1999 by GRINWISS	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		57	10
108-95-2	Phenol	130		110	10
111-44-4	Bis(2-chloroethyl)ether	ND		11	10
95-57-8	2-Chlorophenol	ND		110	10
541-73-1	1,3-Dichlorobenzene	ND		11	10
106-46-7	1,4-Dichlorobenzene	ND		11	10
95-50-1	1,2-Dichlorobenzene	ND		11	10
95-48-7	2-Methylphenol (o-cresol)	85	T	110	10
108-60-1	Bis(2-chloroisopropyl)ether	ND		11	10
108394,106445	3/4-Methylphenol (m/p-cresol)	270		230	10
621-64-7	N-Nitrosodi-n-propylamine	ND		23	10
67-72-1	Hexachloroethane	ND		11	10
98-95-3	Nitrobenzene	ND		23	10
78-59-1	Isophorone	ND		11	10
88-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	ND		110	10
111-91-1	Bis(2-chloroethoxy)methane	ND		23	10
120-83-2	2,4-Dichlorophenol	ND		110	10
120-82-1	1,2,4-Trichlorobenzene	ND		23	10
91-20-3	Naphthalene	88		11	10
87-68-3	Hexachlorobutadiene	ND		23	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
91-57-6	2-Methylnaphthalene	25	T	57	10
77-47-4	Hexachlorocyclopentadiene	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
91-58-7	2-Chloronaphthalene	ND		23	10
88-74-4	2-Nitroaniline	ND		230	10
208-96-8	Acenaphthylene	42		11	10
131-11-3	Dimethyl phthalate	ND		23	10
606-20-2	2,6-Dinitrotoluene	ND		57	10
99-09-2	3-Nitroaniline	ND		230	10
83-32-9	Acenaphthene	ND		11	10
51-28-5	2,4-Dinitrophenol	ND		570	10
132-64-9	Dibenzofuran	22	T	57	10
100-02-7	4-Nitrophenol	ND		570	10

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		57	10
86-73-7	Fluorene	37		11	10
84-66-2	Diethyl phthalate	ND		11	10
100-01-6	4-Nitroaniline	ND		230	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		570	10
7005-72-3	4-Chlorophenyl phenylether	ND		11	10
156-10-5	N-Nitrosodiphenylamine	ND		23	10
103-33-3	Azobenzene	ND		23	10
101-55-3	4-Bromophenyl phenylether	ND		23	10
118-74-1	Hexachlorobenzene	ND		23	10
87-86-5	Pentachlorophenol	61	T	570	10
85-01-8	Phenanthrene	120		11	10
120-12-7	Anthracene	27		11	10
86-74-8	Carbazole	ND		110	10
84-74-2	Di-n-butyl phthalate	ND		11	10
206-44-0	Fluoranthene	88		11	10
129-00-0	Pyrene	54		11	10
85-68-7	Butyl benzyl phthalate	ND		11	10
56-55-3	Benz(a)anthracene	ND		11	10
218-01-9	Chrysene	ND		11	10
117-81-7	Bis(2-ethylhexyl)phthalate	ND		23	10
117-84-0	Di-n-octyl phthalate	ND		23	10
205-99-2	Benzo(b)fluoranthene	19	T	23	10
207-08-9	Benzo(k)fluoranthene	19	T	23	10
50-32-8	Benzo(a)pyrene	20	T	23	10
193-39-5	Indeno(1,2,3-cd)pyrene	ND		23	10
53-70-3	Dibenz(a,h)anthracene	ND		23	10
191-24-2	Benzo(g,h,i)perylene	ND		23	10

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06ON

Date Collected:	10/6/1999	Test Code:	SC3
Date Extracted:	10/7/1999 by 4347, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	10/22/1999 by bronsonj	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.089	4.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.089	4.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.089	4.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.089	4.0
87-68-3	Hexachlorobutadiene	ND		0.089	4.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.089	4.0
77-47-4	Hexachlorocyclopentadiene	ND		0.089	4.0
91-58-7	2-Chloronaphthalene	ND		0.89	4.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.089	4.0
608-93-5	Pentachlorobenzene	0.220		0.089	4.0
319-84-6	a-BHC	ND		0.089	4.0
118-74-1	Hexachlorobenzene	ND		0.089	4.0
319-85-7	b-BHC	ND		0.089	4.0
58-89-9	g-BHC (lindane)	ND		0.089	4.0
82-68-8	Pentachloronitrobenzene	ND		0.089	4.0
319-86-8	d-BHC	ND		0.089	4.0
76-44-8	Heptachlor	ND		0.089	4.0
309-00-2	Aldrin	ND		0.089	4.0
1024-57-3	Heptachlor epoxide	ND		0.089	4.0
5103-74-2	g-Chlordane	ND		0.089	4.0
959-98-8	Endosulfan I	ND		0.089	4.0
5103-71-9	a-Chlordane	ND		0.089	4.0
72-55-9	4,4'-DDE	ND		0.089	4.0
72-20-8	Endrin	ND		0.089	4.0
60-57-1	Dieldrin	ND		0.089	4.0
72-54-8	4,4'-DDD	ND		0.223	4.0
50-29-3	4,4'-DDT	ND		0.089	4.0
87-82-1	Hexabromobenzene	ND		0.089	4.0
72-43-5	Methoxychlor	ND		0.223	4.0
2385-85-5	Mirex	ND		0.089	4.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.89	4.0
11097-69-1	Aroclor 1254 (PCB)	13.0	J	0.89	4.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.89	4.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.89	4.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.89	4.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.89	4.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	27.0	J	0.89	4.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.89	4.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.89	4.0
59080-40-9	BP-6 (PBB)	ND		0.223	4.0
8001-35-2	*Toxaphene	ND		0.45	4.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J DUE TO MULTIPLE PCBs
MANY UNID PEAKS

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-06POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		500	100
74-87-3	Chloromethane	ND		500	100
75-01-4	Vinyl chloride	ND		500	100
74-83-9	Bromomethane	ND		500	100
75-00-3	Chloroethane	ND		500	100
75-69-4	Trichlorofluoromethane	ND		500	100
67-64-1	2-Propanone (Acetone)	5700	J	2500	100
60-29-7	Diethyl ether	ND		1000	100
75-35-4	1,1-Dichloroethene	ND		100	100
74-88-4	Methyl iodide	ND		100	100
107-13-1	Acrylonitrile	ND		500	100
75-09-2	Methylene chloride	4200		500	100
75-15-0	Carbon disulfide	ND		500	100
156-60-5	trans-1,2-Dichloroethene	ND		100	100
1634-04-4	Methyltertbutylether (MTBE)	ND		500	100
75-34-3	1,1-Dichloroethane	ND		100	100
78-93-3	2-Butanone (MEK)	ND		500	100
156-59-2	cis-1,2-Dichloroethene	ND		100	100
67-66-3	Chloroform	ND		100	100
74-97-5	Bromochloromethane	ND		100	100
71-55-6	1,1,1-Trichloroethane	ND		100	100
107-06-2	1,2-Dichloroethane	ND		100	100
71-43-2	Benzene	ND		100	100
56-23-5	Carbon tetrachloride	ND		100	100
78-87-5	1,2-Dichloropropane	ND		100	100
79-01-6	Trichloroethene	ND		100	100
74-95-3	Dibromomethane	ND		100	100
75-27-4	Bromodichloromethane	ND		100	100
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		500	100
10061-01-5	cis-1,3-Dichloropropene	ND		100	100
10061-02-6	trans-1,3-Dichloropropene	ND		100	100
108-88-3	Toluene	ND		100	100
79-00-5	1,1,2-Trichloroethane	ND		100	100
591-78-6	2-Hexanone	ND		500	100
124-48-1	Dibromochloromethane	ND		100	100
106-93-4	1,2-Dibromoethane	ND		100	100

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		100	100
108-90-7	Chlorobenzene	ND		100	100
630-20-6	1,1,1,2-Tetrachloroethane	ND		100	100
100-41-4	Ethylbenzene	ND		100	100
108383,106423	m & p-Xylene	ND		200	100
75-25-2	Bromoform	ND		100	100
100-42-5	Styrene	ND		100	100
95-47-6	o-Xylene	ND		100	100
79-34-5	1,1,2,2-Tetrachloroethane	ND		100	100
96-18-4	1,2,3-Trichloropropane	ND		100	100
110-57-6	trans-1,4-Dichloro-2-butene	ND		100	100
98-82-8	Isopropylbenzene	ND		100	100
103-65-1	n-Propylbenzene	ND		100	100
108-67-8	1,3,5-Trimethylbenzene	ND		100	100
95-63-6	1,2,4-Trimethylbenzene	ND		100	100
541-73-1	1,3-Dichlorobenzene	ND		100	100
106-46-7	1,4-Dichlorobenzene	ND		100	100
95-50-1	1,2-Dichlorobenzene	ND		100	100
67-72-1	Hexachloroethane	ND		100	100
96-12-8	1,2-Dibromo-3-chloropropane	ND		500	100
120-82-1	1,2,4-Trichlorobenzene	ND		500	100
91-20-3	Naphthalene	980		500	100
91-57-6	2-Methylnaphthalene	ND		500	100

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-07OB

Date Collected:	10/6/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.7	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		23	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.3	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.3	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.3	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.3	1
91-20-3	Naphthalene	ND		1.1	1
87-68-3	Hexachlorobutadiene	ND		2.3	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.7	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.3	1
88-74-4	2-Nitroaniline	ND		23	1
208-96-8	Acenaphthylene	2.5		1.1	1
131-11-3	Dimethyl phthalate	ND		2.3	1
606-20-2	2,6-Dinitrotoluene	ND		5.7	1
99-09-2	3-Nitroaniline	ND		23	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		57	1
132-64-9	Dibenzofuran	ND		5.7	1
100-02-7	4-Nitrophenol	ND		57	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.7	1
86-73-7	Fluorene	2.8		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		23	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		57	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.3	1
103-33-3	Azobenzene	ND		2.3	1
101-55-3	4-Bromophenyl phenylether	ND		2.3	1
118-74-1	Hexachlorobenzene	ND		2.3	1
87-86-5	Pentachlorophenol	ND		57	1
85-01-8	Phenanthrene	10		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	12		1.1	1
129-00-0	Pyrene	7.4		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	4.7		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	66		2.3	1
117-84-0	Di-n-octyl phthalate	ND		2.3	1
205-99-2	Benzo(b)fluoranthene	5.2		2.3	1
207-08-9	Benzo(k)fluoranthene	ND		2.3	1
50-32-8	Benzo(a)pyrene	4.8		2.3	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.3	1
53-70-3	Dibenz(a,h)anthracene	ND		2.3	1
191-24-2	Benzo(g,h,i)perylene	ND		2.3	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910031-07POX

Date Collected:	10/6/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/9/1999 by WORM	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	ND		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1900	J	250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	ND		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	ND		50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	ND		10	10
71-43-2	Benzene	ND		10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	ND		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	ND		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
100-41-4	Ethylbenzene	ND		10	10
108383,106423	m & p-Xylene	ND		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	ND		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2-butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	ND		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	ND		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	ND		50	10
91-57-6	2-Methylnaphthalene	ND		50	10

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	PROCEDURE	NO: PD-13
	LABORATORY SERVICES SECTION	DATE REV.:11/99

SUBJECT: Laboratory Result Remark Codes

EFFECTIVE DATE: October 1999

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance. if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed Is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. 0. indicated possible low recovery. Actual level may be higher.
LL	0. 0. indicated possible high recovery Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis
STR	settleable residue was not analyzed due to low suspended solids.

Approved by:

Bob Avery, Lab Director 11/12/99 Date

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Toxic
Acidic
Reactive

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-031 PRIORITY A RECEIVED AT LAB BY DH DATE TIME 10/7/99 7:30 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX 48028 PCA 30719 PROJECT 455100 PH 00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-J	99/10/06	0925	High pH (10) did not preserve under
02	MW-D		1010	pH = 12 not preserved
03	MW-E		1040	pH = 11 " "
04	MW-H		1216	pH = 8.5 " "
05	MW-B		1420	pH = 10 " "

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
		1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
		1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

VOLATILES

POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5

PEST & PCB

ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5

BASE NEUTRALS

OB	~~625 (BN)~~	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5

PHENOLS

OA	~~625 (SC 8)~~	1 2 3 4 5

SPECIAL REQUESTS

Ammonium	1 2 3 4 5
BNA	1 2 3 4 5

If possible

INORGANIC

MA	Total Metals	1 2 3 4
MAD	Diss-Field Filtered	1 2 3 4
MD	Diss-Lab Filtered	1 2 3 4

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4	
Fe Co Li Mn	1 2 3 4	
Al Ba Be Mo V Ti	1 2 3 4	
B Sr	1 2 3 4	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4	
Ca Mg Na K	1 2 3 4	
As - Arsenic	1 2 3 4	
Ag - Silver	1 2 3 4	
Hg - Mercury	1 2 3 4	
Se - Selenium	1 2 3 4	
Sb - Antimony	1 2 3 4	
Tl - Thallium	1 2 3 4	
MN pH, Conductance	1 2 3 4	
Cl, SO_4, Total Alk	1 2 3 4	
HCO_3 - CO_3	1 2 3 4	
Cr^{+6}	1 2 3 4	
OG Oil & Grease	1 2 3 4	

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

I. Type of Samples:

- X Environmental (surface, groundwater, soil, bottom sediment)
- ___ Waste Water
- ___ Municipal Sludge
- ___ Industrial Sludge
- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

II. Which of the following reasons causes you to think these samples are potentially hazardous?

- X Site Use History
- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

DNR

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-031 PRIORITY II RECEIVED AT LAB BY DH DATE TIME 10/7/99 730 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY M Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01 00	MW-C	99/10/06	14:10	pH = 10 Did not preserve metals
02 07	MW-I	" "	1205	pH = 9 " "
03				
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_2, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
1 2 3 4 5

1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB 625 (BN) 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA 625 (SC 8) 1 2 3 4 5

SPECIAL REQUESTS
Ammonium 1 2 3 4 5
BNA 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5	
Fe Co Li Mn	1 2 3 4 5	
Al Ba Be Mo V Ti	1 2 3 4 5	
B Sr	1 2 3 4 5	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5	

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

99-10-031

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

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- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

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- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

SHRADER
Analytical and Consulting
LABORATORIES INC.

RECEIVED
DEC 9 1999
ENVIRONMENTAL RESPONSE DIVISION
S.E. MICHIGAN DISTRICT OFFICE

Report of Analytical Services

Submitted To:

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

Attn: MR. JACK LANIGAN

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Client project:	RIVERVIEW
Client sample:	WATER FROM WELLS
Sample description:	COLLECTED 10/06/99
Laboratory project:	I314
Analysis performed:	SVOC (8270C), VOC (8260B), PCB (MOD8082) CYANIDE, MI METALS & AMMONIA
Date received:	07-Oct-99
Date completed:	19-Oct-99
Report date:	21-Oct-99

Verified Laura J. Stephens
Laura Stephens, Environmental Manager

Approved Marianne L. Shrader
Marianne L. Shrader, Acting QA/QC Officer

Enclosure(s)

xc: Dr. Martin Schmidt, URS Greiner

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

BASF CORPORATION

Laboratory Project I314 001 (Continued) Thursday, October 21, 1999

Sample Number 001 *Sample ID:* MW-J

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	0.075	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.24	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.133	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.031	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.061	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.133	mg/L	0.0002	7470A	10/13/99	10/19/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	1.19	mg/L	0.1	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	31.6	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 002 *Sample ID:* MW-D

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	11	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.026	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.132	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	1.1	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	N.D.	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	11.1	mg/L	0.5	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	30.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I314 003 (Continued) Thursday, October 21, 1999

Sample Number 003 *Sample ID:* MW-E

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done		0	3510C	10/11/99	10/11/99	GENT
Arsenic	10.6	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.046	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.294	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.043	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.072	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.905	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.154	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	8.13	mg/L	0.5	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	25.1	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 004 *Sample ID:* MW-H

Description: RIVERVIEW

Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done		0	3510C	10/11/99	10/12/99	GENT
Arsenic	0.169	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.198	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.34	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.05	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0034	mg/L	0.0002	7470A	10/19/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.077	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	3.84	mg/L	0.2	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	7.2	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

BASF CORPORATION

Laboratory Project I314 005 (Continued) Thursday, October 21, 1999

Sample Number 005 *Sample ID:* MW-C

Description: RIVERVIEW
Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arsenic	1.06	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.091	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.312	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.03	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.037	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Mercury	0.0058	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.06	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	4.47	mg/L	0.2	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	19.3	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

Sample Number 006 *Sample ID:* MW-B

Description: RIVERVIEW
Date Sampled: 10/6/99 *Matrix:* Water

Parameter	Result	Units	D.L.	Method	Start	Finish	By
Liquid/Liquid Extraction	Done			3510C	10/11/99	10/11/99	GENT
Arochlor-1016	N.D.	ug/L	0.1	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1221	N.D.	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1232	N.D.	ug/L	0.3	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1242	N.D.	ug/L	0.09	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1248	9.2	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1254	N.D.	ug/L	0.2	MOD 8082	10/15/99	10/15/99	STEL
Arochlor-1260	N.D.	ug/L	0.3	MOD 8082	10/15/99	10/15/99	STEL
Arsenic	1.06	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Barium	0.135	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Cadmium	N.D.	mg/L	0.005	6010B	10/19/99	10/19/99	JONH
Chromium	0.423	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Copper	0.042	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Lead	0.088	mg/L	0.02	6010B	10/19/99	10/19/99	JONH

BASF CORPORATION

Laboratory Project I314 006 (Continued) Thursday, October 21, 1999

Mercury	0.126	mg/L	0.0002	7470A	10/13/99	10/13/99	JONH
Selenium	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Silver	N.D.	mg/L	0.02	6010B	10/19/99	10/19/99	JONH
Zinc	0.144	mg/L	0.05	6010B	10/19/99	10/19/99	JONH
Cyanide	5.51	mg/L	0.25	9010B/9014	10/13/99	10/13/99	GENT
Cyanide	5.36	mg/L	0.25	9010B/9014	10/12/99	10/12/99	GENT
Nitrogen, Ammonia	21	mg/L	0.5	350.1	10/12/99	10/13/99	JONH

N.D. = Not Detected
D.L. = Detection Limit

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	2
P-CHLORO-M-CRESOL	N.D.	3
2-CHLOROPHENOL	N.D.	2
O-CRESOL	31	2
P-CRESOL	150	1
2,4-DICHLOROPHENOL	4.1	3
2,4-DIMETHYLPHENOL	34	2
4,6-DINITRO-O-CRESOL	N.D.	9
2,4-DINITROPHENOL	N.D.	10
2-NITROPHENOL	N.D.	4
4-NITROPHENOL	N.D.	6
PENTACHLOROPHENOL	N.D.	10
PHENOL	23	2
2,4,5-TRICHLOROPHENOL	N.D.	5
2,4,6-TRICHLOROPHENOL	N.D.	5

N.D. = Not detected TOTAL 242
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	1.2	1
ACENAPHTHYLENE	12	1.0
ANILINE	N.D.	1.0
ANTHRACENE	8.5	1
BENZO(a)ANTHRACENE	6.6	2
BENZO(b & k)FLUORANTHENES	5.1	3
BENZO(a)PYRENE	4.6	3
BENZO(ghi)PERYLENE	N.D.	3
BENZYL ALCOHOL	N.D.	1
bis(2-CHLOROETHOXY)METHANE	N.D.	1
bis(2-CHL'ETHYL)ETHER	N.D.	2
bis(2-CHLOROISOPROPYL)ETHER	26	5
4-BROMOPHENYL PHENYL ETHER	N.D.	7
BUTYL BENZYL PHTHALATE	N.D.	2
CARBAZOLE	9.4	1.0
p-CHLOROANILINE	N.D.	1.0
2-CHLORONAPHTHALENE	N.D.	1
4-CHLOROPHENYL PHENYL ETHER	N.D.	3
CHRYSENE	5.3	2
DIBENZO(a,h)ANTHRACENE	N.D.	3
DIBENZOFURAN	5.5	1.0
1,2-DICHLOROBENZENE	N.D.	2
1,3-DICHLOROBENZENE	N.D.	2
1,4-DICHLOROBENZENE	N.D.	2
3,3'-DICHLOROBENZIDINE	N.D.	10
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	5
DIMETHYL PHTHALATE	N.D.	1
2,4-DINITROTOLUENE	N.D.	4
2,6-DINITROTOLUENE	N.D.	6
DI-n-OCTYL PHTHALATE	N.D.	1
bis(2-ETHYLHEXYL)PHTHALATE	190	5
FLUORANTHENE	13	1
FLUORENE	9.8	1
HEXACHLOROBENZENE	N.D.	5
HEXACHLOROBUTADIENE	N.D.	5
HEXACHLOROCYCLOPENTADIENE	N.D.	6
HEXACHLOROETHANE	N.D.	4
INDENO(123-cd)PYRENE	N.D.	3
ISOPHORONE	N.D.	1.0
2-METHYLNAPHTHALENE	8.9	1.0
NAPHTHALENE	140	1.0
2-NAPHTHYLAMINE	N.D.	1
m-NITROANILINE	N.D.	2
o-NITROANILINE	N.D.	2
p-NITROANILINE	N.D.	2
NITROBENZENE	N.D.	2
PARATHION	N.D.	6

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31401AA Sample size : 200 ml
Description : MW-J RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	2
N-NITROSO-DI-n-PROPYLAMINE	N.D.	10
PHENANTHRENE	28	1
PYRENE	13	1
PYRIDINE	5.8	2
1,2,4-TRICHL'BENZENE	N.D.	2
TOTAL	493	

N.D. = Not detected
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31401B Sample size : 10 ml
Description : MW-J
Sample submitted by : BASF CORPORATION
Analyzed on 10-12-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	1,300	50
BENZENE	6.8	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	3
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1
c-1,2-DICHLOROETHENE	N.D.	1
t-1,2-DICHLOROETHENE	N.D.	1
1,2-DICHLOROPROPANE	2.8	1
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	1.5	1.0
2-HEXANONE	N.D.	3
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	8
METHYL ISOBUTYL KETONE	41	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	2
TETRACHLOROETHENE	N.D.	1
TOLUENE	9.4	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	7.4	1.0
o-XYLENE	6.6	1.0

N.D. = Not detected TOTAL 1,380

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	7
2-CHLOROPHENOL	N.D.	4
O-CRESOL	290	4
P-CRESOL	800	4
2,4-DICHLOROPHENOL	N.D.	8
2,4-DIMETHYLPHENOL	300	6
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	10
4-NITROPHENOL	N.D.	20
PENTACHLOROPHENOL	210	20
PHENOL	820	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	N.D.	10

N.D. = Not detected TOTAL 2,420

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	6.7	4
ACENAPHTHYLENE	33	2
ANILINE	N.D.	2
ANTHRACENE	24	3
BENZO(a)ANTHRACENE	8.9	4
BENZO(b & k)FLUORANTHENES	11	7
BENZO(a)PYRENE	N.D.	8
BENZO(ghi)PERYLENE	N.D.	8
BENZYL ALCOHOL	14	3
bis(2-CHLOROETHOXY)METHANE	N.D.	4
bis(2-CHL'ETHYL)ETHER	62	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	8
CARBAZOLE	51	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	12	3
DIBENZO(a,h)ANTHRACENE	N.D.	8
DIBENZOFURAN	18	2
1,2-DICHLOROBENZENE	10	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	4
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	55	3
FLUORENE	35	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	20
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	7
ISOPHORONE	6.8	3
2-METHYLNAPHTHALENE	23	2
NAPHTHALENE	280	2
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	6
p-NITROANILINE	N.D.	5
NITROBENZENE	N.D.	10
PARATHION	N.D.	20

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SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31402A Sample size : 200 ml
Description : MW-D RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	120	3
PYRENE	43	3
PYRIDINE	50	4
1,2,4-TRICHL'BENZENE	N.D.	6
TOTAL	863	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31402B Sample size : 1 ml
Description : MW-D
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	2,500	200
BENZENE	32	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	94	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	18	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	6.4	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	400	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	320	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	8
TOLUENE	350	3
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	76	10
m & p-XYLENES	27	5
o-XYLENE	12	5

N.D. = Not detected TOTAL 3,840

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	5
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	N.D.	5
O-CRESOL	76	5
P-CRESOL	200	5
2,4-DICHLOROPHENOL	N.D.	6
2,4-DIMETHYLPHENOL	71	5
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	9
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	20
PHENOL	180	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	N.D.	10

N.D. = Not detected TOTAL 527
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	3
ACENAPHTHYLENE	N.D.	2
ANILINE	N.D.	2
ANTHRACENE	3.6	3
BENZO(a)ANTHRACENE	N.D.	4
BENZO(b & k)FLUORANTHENES	N.D.	6
BENZO(a)PYRENE	N.D.	6
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	7.3	3
bis(2-CHLOROETHOXY)METHANE	N.D.	3
bis(2-CHL'ETHYL)ETHER	22	5
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	5
CARBAZOLE	8.1	2
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	N.D.	3
DIBENZO(a,h)ANTHRACENE	N.D.	6
DIBENZOFURAN	2.0	2
1,2-DICHLOROBENZENE	N.D.	5
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	3
FLUORENE	3.2	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	2
2-METHYLNAPHTHALENE	3.2	2
NAPHTHALENE	34	1
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	4
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-14-1999 QUANTITATION SUMMARY

DATA file : I31403A Sample size : 200 ml
Description : MW-E RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by ROBG Report prepared by STEL

COMPOUND	ESTIMATED CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	22	3
PYRENE	N.D.	3
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	5

N.D. = Not detected TOTAL 105
One or more surrogates failed QC criteria.
Concentrations are therefore reported as ESTIMATED.

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31403B Sample size : 1 ml
Description : MW-E
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	1,300	200
BENZENE	8.3	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	12	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	8
ETHYL BENZENE	N.D.	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	9
TOLUENE	18	4
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	Detected <	5
o-XYLENE	N.D.	6

N.D. = Not detected TOTAL 1,350

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	4
P-CHLORO-M-CRESOL	N.D.	5
2-CHLOROPHENOL	N.D.	3
O-CRESOL	N.D.	3
P-CRESOL	N.D.	3
2,4-DICHLOROPHENOL	N.D.	5
2,4-DIMETHYLPHENOL	6.7	4
4,6-DINITRO-O-CRESOL	N.D.	10
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	7
4-NITROPHENOL	N.D.	10
PENTACHLOROPHENOL	N.D.	10
PHENOL	N.D.	3
2,4,5-TRICHLOROPHENOL	N.D.	8
2,4,6-TRICHLOROPHENOL	N.D.	8

N.D. = Not detected TOTAL 6.70

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	N.D.	2
ACENAPHTHYLENE	N.D.	1
ANILINE	5.9	1
ANTHRACENE	N.D.	2
BENZO(a)ANTHRACENE	N.D.	3
BENZO(b & k)FLUORANTHENES	N.D.	5
BENZO(a)PYRENE	N.D.	6
BENZO(ghi)PERYLENE	N.D.	5
BENZYL ALCOHOL	N.D.	2
bis(2-CHLOROETHOXY)METHANE	N.D.	3
bis(2-CHL'ETHYL)ETHER	N.D.	3
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	9
BUTYL BENZYL PHTHALATE	N.D.	4
CARBAZOLE	N.D.	1
p-CHLOROANILINE	N.D.	2
2-CHLORONAPHTHALENE	N.D.	2
4-CHLOROPHENYL PHENYL ETHER	N.D.	4
CHRYSENE	N.D.	2
DIBENZO(a,h)ANTHRACENE	N.D.	6
DIBENZOFURAN	N.D.	1
1,2-DICHLOROBENZENE	N.D.	3
1,3-DICHLOROBENZENE	N.D.	3
1,4-DICHLOROBENZENE	N.D.	3
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1.0
DIETHYL PHTHALATE	N.D.	8
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	6
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	N.D.	1
FLUORENE	N.D.	2
HEXACHLOROBENZENE	N.D.	7
HEXACHLOROBUTADIENE	N.D.	8
HEXACHLOROCYCLOPENTADIENE	N.D.	9
HEXACHLOROETHANE	N.D.	7
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	2
2-METHYLNAPHTHALENE	N.D.	1
NAPHTHALENE	N.D.	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	2
o-NITROANILINE	N.D.	4
p-NITROANILINE	N.D.	3
NITROBENZENE	N.D.	3
PARATHION	N.D.	8

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31404AA Sample size : 200 ml
Description : MW-H RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	3
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	N.D.	1
PYRENE	N.D.	2
PYRIDINE	N.D.	3
1,2,4-TRICHL'BENZENE	N.D.	4

N.D. = Not detected TOTAL 5.90

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31404BB Sample size : 22 ml
Description : MW-H
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	7
BENZENE	1.8	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	3
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 1.80

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	8
2-CHLOROPHENOL	52	5
O-CRESOL	320	4
P-CRESOL	920	4
2,4-DICHLOROPHENOL	73	8
2,4-DIMETHYLPHENOL	310	7
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	30
2-NITROPHENOL	N.D.	10
4-NITROPHENOL	N.D.	20
PENTACHLOROPHENOL	170	30
PHENOL	740	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	69	10

N.D. = Not detected TOTAL 2,650

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	22	4
ACENAPHTHYLENE	100	4
ANILINE	N.D.	2
ANTHRACENE	78	3
BENZO(a)ANTHRACENE	41	5
BENZO(b & k)FLUORANTHENES	32	7
BENZO(a)PYRENE	34	8
BENZO(ghi)PERYLENE	N.D.	8
BENZYL ALCOHOL	N.D.	3
bis(2-CHLOROETHOXY)METHANE	N.D.	10
bis(2-CHL'ETHYL)ETHER	26	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	20
BUTYL BENZYL PHTHALATE	N.D.	7
CARBAZOLE	190	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	N.D.	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	7
CHRYSENE	41	4
DIBENZO(a,h)ANTHRACENE	N.D.	9
DIBENZOFURAN	52	2
1,2-DICHLOROBENZENE	5.1	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	4
3,3'-DICHLOROBENZIDINE	N.D.	30
DI-n-BUTYL PHTHALATE	N.D.	2
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	3
2,4-DINITROTOLUENE	N.D.	10
2,6-DINITROTOLUENE	N.D.	20
DI-n-OCTYL PHTHALATE	N.D.	4
bis(2-ETHYLHEXYL)PHTHALATE	35	5
FLUORANTHENE	160	3
FLUORENE	120	3
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	10
INDENO(123-cd)PYRENE	N.D.	7
ISOPHORONE	N.D.	3
2-METHYLNAPHTHALENE	83	2
NAPHTHALENE	480	2
2-NAPHTHYLAMINE	N.D.	3
m-NITROANILINE	N.D.	4
o-NITROANILINE	N.D.	6
p-NITROANILINE	N.D.	5
NITROBENZENE	N.D.	5
PARATHION	N.D.	20

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31405A Sample size : 200 ml
Description : MW-C RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	30
PHENANTHRENE	330	3
PYRENE	150	4
PYRIDINE	N.D.	5
1,2,4-TRICHL'BENZENE	N.D.	6

N.D. = Not detected TOTAL 1,980

SHRADER LABORATORIES, INC.

Report date : 10-13-1999 QUANTITATION SUMMARY

DATA file : I31405B Sample size : 1 ml
Description : MW-C
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by PALR

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	12,000	500
BENZENE	51	3
BROMODICHLOROMETHANE	N.D.	8
BROMOFORM	N.D.	20
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	3
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	6
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	9
1,1-DICHLOROETHANE	N.D.	6
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	35	10
CIS-1,3-DICHLOROPROPENE	N.D.	9
TRANS-1,3-DICHL'PROPENE	N.D.	7
ETHYL BENZENE	N.D.	6
2-HEXANONE	N.D.	20
METHYLENE CHLORIDE	3,900	10
METHYL ETHYL KETONE	N.D.	80
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	3
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	7
TOLUENE	35	3
1,1,1-TRICHLO'ETHANE	N.D.	6
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	9
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	28	5
o-XYLENE	29	5

N.D. = Not detected TOTAL 16,100

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BENZOIC ACID	N.D.	6
P-CHLORO-M-CRESOL	N.D.	6
2-CHLOROPHENOL	58	4
O-CRESOL	420	4
P-CRESOL	1,300	5
2,4-DICHLOROPHENOL	79	7
2,4-DIMETHYLPHENOL	470	6
4,6-DINITRO-O-CRESOL	N.D.	20
2,4-DINITROPHENOL	N.D.	20
2-NITROPHENOL	N.D.	20
4-NITROPHENOL	N.D.	30
PENTACHLOROPHENOL	96	20
PHENOL	930	4
2,4,5-TRICHLOROPHENOL	N.D.	10
2,4,6-TRICHLOROPHENOL	69	10
TOTAL	3,420	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACENAPHTHENE	50	3
ACENAPHTHYLENE	290	2
ANILINE	N.D.	2
ANTHRACENE	270	2
BENZO(a)ANTHRACENE	77	3
BENZO(b & k)FLUORANTHENES	28	6
BENZO(a)PYRENE	19	6
BENZO(ghi)PERYLENE	N.D.	6
BENZYL ALCOHOL	N.D.	3
bis(2-CHLOROETHOXY)METHANE	N.D.	4
bis(2-CHL'ETHYL)ETHER	42	4
bis(2-CHLOROISOPROPYL)ETHER	N.D.	10
4-BROMOPHENYL PHENYL ETHER	N.D.	10
BUTYL BENZYL PHTHALATE	N.D.	6
CARBAZOLE	330	2
p-CHLOROANILINE	N.D.	3
2-CHLORONAPHTHALENE	12	3
4-CHLOROPHENYL PHENYL ETHER	N.D.	6
CHRYSENE	58	3
DIBENZO(a,h)ANTHRACENE	N.D.	7
DIBENZOFURAN	120	1
1,2-DICHLOROBENZENE	Detected <	4
1,3-DICHLOROBENZENE	N.D.	4
1,4-DICHLOROBENZENE	N.D.	3
3,3'-DICHLOROBENZIDINE	N.D.	20
DI-n-BUTYL PHTHALATE	N.D.	1
DIETHYL PHTHALATE	N.D.	10
DIMETHYL PHTHALATE	N.D.	2
2,4-DINITROTOLUENE	N.D.	8
2,6-DINITROTOLUENE	N.D.	10
DI-n-OCTYL PHTHALATE	N.D.	3
bis(2-ETHYLHEXYL)PHTHALATE	N.D.	5
FLUORANTHENE	350	4
FLUORENE	300	4
HEXACHLOROBENZENE	N.D.	10
HEXACHLOROBUTADIENE	N.D.	10
HEXACHLOROCYCLOPENTADIENE	N.D.	10
HEXACHLOROETHANE	N.D.	9
INDENO(123-cd)PYRENE	N.D.	5
ISOPHORONE	N.D.	7
2-METHYLNAPHTHALENE	200	2
NAPHTHALENE	790	1
2-NAPHTHYLAMINE	N.D.	2
m-NITROANILINE	N.D.	3
o-NITROANILINE	N.D.	5
p-NITROANILINE	N.D.	4
NITROBENZENE	N.D.	5
PARATHION	N.D.	10

Continued on next page

SHRADER LABORATORIES, INC.

Report date : 10-15-1999 QUANTITATION SUMMARY

DATA file : I31406A Sample size : 200 ml
Description : MW-B RIVERVIEW
Sample submitted by : BASF CORPORATION
Analyzed on 10-14-1999 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
N-NITROSO-DIPHENYLAMINE	N.D.	5
N-NITROSO-DI-n-PROPYLAMINE	N.D.	20
PHENANTHRENE	830	2
PYRENE	360	3
PYRIDINE	N.D.	4
1,2,4-TRICHL'BENZENE	N.D.	5
TOTAL	4,130	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31406B Sample size : 1 ml
Description : MW-B
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	15,000	200
BENZENE	53	4
BROMODICHLOROMETHANE	N.D.	9
BROMOFORM	N.D.	30
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	5
CARBON TETRACHLORIDE	N.D.	7
CHLOROBENZENE	15	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	7
CHLOROMETHANE	N.D.	20
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	7
1,2-DICHLOROETHANE	15	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	46	10
CIS-1,3-DICHLOROPROPENE	N.D.	10
TRANS-1,3-DICHL'PROPENE	N.D.	10
ETHYL BENZENE	Detected <	8
2-HEXANONE	N.D.	30
METHYLENE CHLORIDE	4,800	10
METHYL ETHYL KETONE	N.D.	90
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	4
sym-TETRACHL'ETHANE	N.D.	20
TETRACHLOROETHENE	N.D.	10
TOLUENE	53	5
1,1,1-TRICHLO'ETHANE	N.D.	7
1,1,2-TRICHLO'ETHANE	N.D.	20
TRICHLOROETHENE	N.D.	10
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	39	6
o-XYLENE	38	7

N.D. = Not detected TOTAL 20,100

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31407A Sample size : 1 ml
Description : MW-I
Sample submitted by : BASF CORPORATION
Analyzed on 10-13-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	4,800	100
BENZENE	N.D.	3
BROMODICHLOROMETHANE	N.D.	7
BROMOFORM	N.D.	30
BROMOMETHANE	N.D.	20
CARBON DISULFIDE	N.D.	4
CARBON TETRACHLORIDE	N.D.	6
CHLOROBENZENE	N.D.	4
CHLOROETHANE	N.D.	20
CHLOROFORM	N.D.	5
CHLOROMETHANE	N.D.	10
DIBROMOCHLOROMETHANE	N.D.	10
1,1-DICHLOROETHANE	N.D.	5
1,2-DICHLOROETHANE	N.D.	10
1,1-DICHLOROETHENE	N.D.	10
c-1,2-DICHLOROETHENE	N.D.	10
t-1,2-DICHLOROETHENE	N.D.	10
1,2-DICHLOROPROPANE	N.D.	10
CIS-1,3-DICHLOROPROPENE	N.D.	8
TRANS-1,3-DICHL'PROPENE	N.D.	9
ETHYL BENZENE	N.D.	7
2-HEXANONE	N.D.	30
METHYLENE CHLORIDE	N.D.	10
METHYL ETHYL KETONE	N.D.	70
METHYL ISOBUTYL KETONE	N.D.	10
STYRENE	N.D.	4
sym-TETRACHL'ETHANE	N.D.	10
TETRACHLOROETHENE	N.D.	9
TOLUENE	6.8	4
1,1,1-TRICHLO'ETHANE	N.D.	5
1,1,2-TRICHLO'ETHANE	N.D.	10
TRICHLOROETHENE	N.D.	8
VINYL ACETATE	N.D.	10
VINYL CHLORIDE	N.D.	10
m & p-XYLENES	N.D.	6
o-XYLENE	N.D.	6

N.D. = Not detected TOTAL 4,810

SHRADER LABORATORIES, INC.

Report date : 10-19-1999 QUANTITATION SUMMARY

DATA file : I31408A Sample size : 44 ml
Description : TRIP BLANK
Sample submitted by : BASF CORPORATION
Analyzed on 10-12-1999 by PALR Report prepared by STEL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACETONE	N.D.	8
BENZENE	N.D.	1.0
BROMODICHLOROMETHANE	N.D.	1.0
BROMOFORM	N.D.	2
BROMOMETHANE	N.D.	2
CARBON DISULFIDE	N.D.	2
CARBON TETRACHLORIDE	N.D.	1.0
CHLOROBENZENE	N.D.	1.0
CHLOROETHANE	N.D.	2
CHLOROFORM	N.D.	1.0
CHLOROMETHANE	N.D.	2
DIBROMOCHLOROMETHANE	N.D.	1.0
1,1-DICHLOROETHANE	N.D.	1
1,2-DICHLOROETHANE	N.D.	1
1,1-DICHLOROETHENE	N.D.	1.0
c-1,2-DICHLOROETHENE	N.D.	1.0
t-1,2-DICHLOROETHENE	N.D.	1.0
1,2-DICHLOROPROPANE	N.D.	1.0
CIS-1,3-DICHLOROPROPENE	N.D.	1.0
TRANS-1,3-DICHL'PROPENE	N.D.	2
ETHYL BENZENE	N.D.	1.0
2-HEXANONE	N.D.	1
METHYLENE CHLORIDE	N.D.	5
METHYL ETHYL KETONE	N.D.	4
METHYL ISOBUTYL KETONE	N.D.	2
STYRENE	N.D.	1.0
sym-TETRACHL'ETHANE	N.D.	1.0
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	1.0
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	1
VINYL ACETATE	N.D.	1.0
VINYL CHLORIDE	N.D.	2
m & p-XYLENES	N.D.	1.0
o-XYLENE	N.D.	1.0

N.D. = Not detected TOTAL 0

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4469

(1)

Chain of Custody Record

T314

Customer: URS GREINER WOODWARD CLYDE
Project/Purchase Order #: BASF 38-8E06216
Sampling Site: RIVERVIEW / WYANDOTTE
By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
01A	MW-J				WATER	10/6/99 0925		SVOC
01B	↓				↓	↓		VOC
01C	↓	NaOH	10/05 TG		↓	↓		CN
01D	↓	HNO_3	↓		↓	↓		Metals
01E	↓	H_2SO_4	↓		↓	↓		NH_3
02A	MW-D				WATER	10/6/99 @ 1010		SVOC
02B	↓				↓	↓		VOC
02C	MW-D	NaOH	10/05 TG		↓	↓		CN
02D	↓	HNO_3	↓		↓	↓		Metals
02E	↓	H_2SO_4	↓		↓	↓		NH_3

Method of Shipment: Courier del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [signature]	Date: 10/06 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4489

(2)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
03 A	MW-E	*			WATER	10/6/99 @ 1040		SVOC
03 B								VOC
03 C		NaOH	10/05 TG					CN
03 D		HNO3						Metals
03 E		H2SO4						NH3
04 A	MW-H				WATER	10/6/99 @ 1216		SVOC
04 B								VOC
04 C		NaOH	10/05 TG					CN
04 D		HNO3						Metals
04 E		H2SO4						NH3

Method of Shipment: Cus. del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [signature]	Date: 10/06/99 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

All 1L bottles were labelled correctly except One bottle did not have well ID MW-E did not have 1L bottle The bottle was designated as MW-E by the Lab

Time cooler opened: Temperaure of blank: Time temperature taken: By:

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4469

(4)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: RIVERVIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
05A	MW-C				WATER	10/6/99 @ 1530		SVOC
05B					WATER	10/6/99 @ 1410		VOC
05C		NaOH	10/05 TG			@ 1530		CN
05D		HNO_3						Metals
05E		H_2SO_4						NH_3
								SVOC
								VOC
		NaOH	10/05 TG					CN
		HNO_3						Metals
		H_2SO_4						NH_3

Method of Shipment: Customer del	Date: Time:	Relinquished by: Timothy Hicks	Date: 10/6/99 Time: 1630
Received by: [illegible]	Date: 10/06/99 Time: 16:30	Relinquished by:	Date: Time:
Received by:	Date: Time:	Relinquished by:	Date: Time:

Time cooler opened: _____ Temperaure of blank: _____ Time temperature taken: _____ By: _____

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 Fax: 313/894-4469

(3)

Chain of Custody Record

Customer: URS GREINER WOODWARD CLYDE

Project/Purchase Order #: BASF / 38-8E06216

Sampling Site: RIVER VIEW

By: Tim Hicks

	SL #	Preservative	Added by & Date	Customer ID	Sample Type /Matrix	Sampling Date/Time	Parameters	Comments
07A	MW-I				~~WATER~~	~~10/6/99 @ 1205~~	~~WELL DRY~~	SVOC
					WATER	10/6/99 @ 1350		VOC — ONLY
		NaOH	10/05 TG		WELL DRY			CN
		HNO3	↓					Metals
		H2SO4	↓					NH3
06A	MW-B				WATER	10/6/99 @ 1420		SVOC
06B	"				↓	↓		VOC
06C	MW-B	NaOH	10/05 TG					CN
06D	↓	HNO3	↓					Metals
06E		H2SO4	↓					NH3
06F	↓				↓	↓		PCB
08A	TRIP BLANK							

Method of Shipment: Car del	Date:	Time:	Relinquished by: Timothy Hicks	Date: 10/6/99	Time: 1630
Received by: [signature]	Date: 10/06/99	Time: 16:30	Relinquished by:	Date:	Time:
Received by:	Date:	Time:	Relinquished by:	Date:	Time:

Time cooler opened: _____ Temperature of blank: _____ Time temperature taken: _____ By: _____

Michigan
Department of Environmental Quality

BETH VENS
Environmental Quality Analyst
Environmental Response Division

S.E. Michigan District Office
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Phone: (734) 953-1404
Fax: (734) 953-1544
E-Mail: vensb@state.mi.us

MISSION

Our mission is to drive improvements in environmental quality for the protection of public health and natural resources to benefit current and future generations. This will be accomplished through effective administration of agency programs, providing for the use of innovative strategies, while helping to foster a strong and sustainable economy.

DEQ Internet Home Page: www.deq.state.mi.us
Environmental Assistance Center: 1-800-662-9278
For Pollution Emergency: 1-800-292-4706
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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $2,580.12

Lab Work Order # 9910042
Work Site ID: BASF - RIVERVIEW
Matrix: Water
Received: 10/8/1999
Reported: 11/16/1999
Client: ER_SE
Number of Samples: 3

TEST / UNITS	MW-L	MW-K	MW-A
Ammonia mg N/L	.11	49	11
Arsenic by Furnace ug/L	8 DM	INT	INT
Arsenic in Water ug/L		194	120
Barium in Water ug/L	17	150	13
Cadmium by Furnace ug/L	K 1.0 DM	2.5 DM	K 1.0 DM
Chromium by Furnace ug/L	14 DM	INT	136 DM
Chromium in Water ug/L		560	
Copper by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM
Cyanide mg/L	.27	25	1.3
Cyanide - Amenable	.21	7.0	.74
FIELD - pH of Water pH		10	10
Hex Chromium in Water ug/L	K 5 HT	INT HT	K 5 HT
Lead by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM
Mercury in Water ug/L	INT	INT	INT
Selenium in Water ug/L	K 1.0	9.6	1.9
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM
Zinc in Water ug/L	13	19	58

RECEIVED
NOV 18 1999
ENVIRONMENTAL RESPONSE DIV
S.E. MICHIGAN DISTRICT OFFI

This is an original report: Laura C Utenth Date: 11/16/99

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.2	1
108-95-2	Phenol	ND		10	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.0	1
95-57-8	2-Chlorophenol	ND		10	1
541-73-1	1,3-Dichlorobenzene	ND		1.0	1
106-46-7	1,4-Dichlorobenzene	ND		1.0	1
95-50-1	1,2-Dichlorobenzene	ND		1.0	1
95-48-7	2-Methylphenol (o-cresol)	ND		10	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.0	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.0	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.0	1
88-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		10	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.0	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
91-57-6	2-Methylnaphthalene	ND		5.2	1
77-47-4	Hexachlorocyclopentadiene	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.0	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.2	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.0	1
51-28-5	2,4-Dinitrophenol	ND		52	1
132-64-9	Dibenzofuran	ND		5.2	1
100-02-7	4-Nitrophenol	ND		52	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.2	1
86-73-7	Fluorene	ND		1.0	1
84-66-2	Diethyl phthalate	ND		1.0	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.0	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		52	1
85-01-8	Phenanthrene	ND		1.0	1
120-12-7	Anthracene	ND		1.0	1
86-74-8	Carbazole	ND		10	1
84-74-2	Di-n-butyl phthalate	ND		1.0	1
206-44-0	Fluoranthene	ND		1.0	1
129-00-0	Pyrene	ND		1.0	1
85-68-7	Butyl benzyl phthalate	ND		1.0	1
56-55-3	Benz(a)anthracene	ND		1.0	1
218-01-9	Chrysene	ND		1.0	1
117-81-7	Bis(2-ethylhexyl)phthalate	110		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.024	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.024	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.024	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.024	1.0
87-68-3	Hexachlorobutadiene	ND		0.024	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.024	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.024	1.0
91-58-7	2-Chloronaphthalene	ND		0.24	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.024	1.0
608-93-5	Pentachlorobenzene	ND		0.024	1.0
319-84-6	a-BHC	ND		0.024	1.0
118-74-1	Hexachlorobenzene	ND		0.024	1.0
319-85-7	b-BHC	ND		0.024	1.0
58-89-9	g-BHC (lindane)	ND		0.024	1.0
82-68-8	Pentachloronitrobenzene	ND		0.024	1.0
319-86-8	d-BHC	ND		0.024	1.0
76-44-8	Heptachlor	ND		0.024	1.0
309-00-2	Aldrin	ND		0.024	1.0
1024-57-3	Heptachlor epoxide	ND		0.024	1.0
5103-74-2	g-Chlordane	ND		0.024	1.0
959-98-8	Endosulfan I	ND		0.024	1.0
5103-71-9	a-Chlordane	ND		0.024	1.0
72-55-9	4,4'-DDE	ND		0.024	1.0
72-20-8	Endrin	ND		0.024	1.0
60-57-1	Dieldrin	ND		0.024	1.0
72-54-8	4,4'-DDD	ND		0.060	1.0
50-29-3	4,4'-DDT	ND		0.024	1.0
87-82-1	Hexabromobenzene	ND		0.024	1.0
72-43-5	Methoxychlor	ND		0.060	1.0
2385-85-5	Mirex	ND		0.024	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.24	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.24	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.24	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.24	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.24	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.24	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.24	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.24	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.24	1.0
59080-40-9	BP-6 (PBB)	ND		0.060	1.0
8001-35-2	*Toxaphene	ND		0.12	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-01POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/11/1999 by MW	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p-Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2-butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.3	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		21	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.1	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.1	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.1	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.1	1
91-20-3	Naphthalene	ND		1.1	1
87-68-3	Hexachlorobutadiene	ND		2.1	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.3	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.1	1
88-74-4	2-Nitroaniline	ND		21	1
208-96-8	Acenaphthylene	ND		1.1	1
131-11-3	Dimethyl phthalate	ND		2.1	1
606-20-2	2,6-Dinitrotoluene	ND		5.3	1
99-09-2	3-Nitroaniline	ND		21	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		53	1
132-64-9	Dibenzofuran	ND		5.3	1
100-02-7	4-Nitrophenol	ND		53	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.3	1
86-73-7	Fluorene	ND		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		21	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		53	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.1	1
103-33-3	Azobenzene	ND		2.1	1
101-55-3	4-Bromophenyl phenylether	ND		2.1	1
118-74-1	Hexachlorobenzene	ND		2.1	1
87-86-5	Pentachlorophenol	ND		53	1
85-01-8	Phenanthrene	7.9		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	7.6		1.1	1
129-00-0	Pyrene	6.4		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	ND		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	ND		2.1	1
117-84-0	Di-n-octyl phthalate	ND		2.1	1
205-99-2	Benzo(b)fluoranthene	ND		2.1	1
207-08-9	Benzo(k)fluoranthene	ND		2.1	1
50-32-8	Benzo(a)pyrene	ND		2.1	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.1	1
53-70-3	Dibenz(a,h)anthracene	ND		2.1	1
191-24-2	Benzo(g,h,i)perylene	ND		2.1	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND	K	0.031	1.5
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND	K	0.041	2.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.052	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

Many UnID peaks
LH g-BHC through Toxaphene due to low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-02POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/12/1999 by LI	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	200	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	43	J	25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	690		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	5.6		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	29		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	450		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	10		5	5
108-90-7	Chlorobenzene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	14		5	5
108383,106423	m & p-Xylene	49		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	11		5	5
95-47-6	o-Xylene	39		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	5.4		5	5
95-63-6	1,2,4-Trimethylbenzene	10		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	ND		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03OB

Date Collected:	10/7/1999	Test Code:	WBNA
Date Extracted:	10/8/1999 by 4349, MJ	Test Name:	BNA - Water
Date Analyzed:	10/25/1999 by GRINWIS	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
62-75-9	N-Nitrosodimethylamine	ND		5.6	1
108-95-2	Phenol	ND		11	1
111-44-4	Bis(2-chloroethyl)ether	ND		1.1	1
95-57-8	2-Chlorophenol	ND		11	1
541-73-1	1,3-Dichlorobenzene	ND		1.1	1
106-46-7	1,4-Dichlorobenzene	ND		1.1	1
95-50-1	1,2-Dichlorobenzene	ND		1.1	1
95-48-7	2-Methylphenol (o-cresol)	ND		11	1
108-60-1	Bis(2-chloroisopropyl)ether	ND		1.1	1
108394,106445	3/4-Methylphenol (m/p-cresol)	ND		22	1
621-64-7	N-Nitrosodi-n-propylamine	ND		2.2	1
67-72-1	Hexachloroethane	ND		1.1	1
98-95-3	Nitrobenzene	ND		2.2	1
78-59-1	Isophorone	ND		1.1	1
88-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
111-91-1	Bis(2-chloroethoxy)methane	ND		2.2	1
120-83-2	2,4-Dichlorophenol	ND		11	1
120-82-1	1,2,4-Trichlorobenzene	ND		2.2	1
91-20-3	Naphthalene	18	J	1.1	1
87-68-3	Hexachlorobutadiene	ND		2.2	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
91-57-6	2-Methylnaphthalene	ND		5.6	1
77-47-4	Hexachlorocyclopentadiene	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
91-58-7	2-Chloronaphthalene	ND		2.2	1
88-74-4	2-Nitroaniline	ND		22	1
208-96-8	Acenaphthylene	ND		1.1	1
131-11-3	Dimethyl phthalate	ND		2.2	1
606-20-2	2,6-Dinitrotoluene	ND		5.6	1
99-09-2	3-Nitroaniline	ND		22	1
83-32-9	Acenaphthene	ND		1.1	1
51-28-5	2,4-Dinitrophenol	ND		56	1
132-64-9	Dibenzofuran	ND		5.6	1
100-02-7	4-Nitrophenol	ND		56	1

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
121-14-2	2,4-Dinitrotoluene	ND		5.6	1
86-73-7	Fluorene	ND		1.1	1
84-66-2	Diethyl phthalate	ND		1.1	1
100-01-6	4-Nitroaniline	ND		22	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		56	1
7005-72-3	4-Chlorophenyl phenylether	ND		1.1	1
156-10-5	N-Nitrosodiphenylamine	ND		2.2	1
103-33-3	Azobenzene	ND		2.2	1
101-55-3	4-Bromophenyl phenylether	ND		2.2	1
118-74-1	Hexachlorobenzene	ND		2.2	1
87-86-5	Pentachlorophenol	ND		56	1
85-01-8	Phenanthrene	2.4		1.1	1
120-12-7	Anthracene	ND		1.1	1
86-74-8	Carbazole	ND		11	1
84-74-2	Di-n-butyl phthalate	ND		1.1	1
206-44-0	Fluoranthene	ND		1.1	1
129-00-0	Pyrene	ND		1.1	1
85-68-7	Butyl benzyl phthalate	ND		1.1	1
56-55-3	Benz(a)anthracene	ND		1.1	1
218-01-9	Chrysene	ND		1.1	1
117-81-7	Bis(2-ethylhexyl)phthalate	ND		2.2	1
117-84-0	Di-n-octyl phthalate	ND		2.2	1
205-99-2	Benzo(b)fluoranthene	ND		2.2	1
207-08-9	Benzo(k)fluoranthene	ND		2.2	1
50-32-8	Benzo(a)pyrene	ND		2.2	1
193-39-5	Indeno(1,2,3-cd)pyrene	ND		2.2	1
53-70-3	Dibenz(a,h)anthracene	ND		2.2	1
191-24-2	Benzo(g,h,i)perylene	ND		2.2	1

ND = not detected at the specified reporting limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03ON

Date Collected:	10/7/1999	Test Code:	SC3
Date Extracted:	10/13/1999 by 4353, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	11/2/1999 by TAITS	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND	K	0.041	2.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.052	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.052	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
12672-29-6	Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified reporting limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH g-BHC through Toxaphene due to low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9910042-03POX

Date Collected:	10/7/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	10/12/1999 by LI	Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	820	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	56		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	14		5	5
71-43-2	Benzene	240		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	37		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	78		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	87		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTING LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
108-90-7	Chlorobenzene	37		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
100-41-4	Ethylbenzene	8.6		5	5
108383,106423	m & p-Xylene	30		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	29		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2-butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	11		5	5
95-63-6	1,2,4-Trimethylbenzene	13		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	8.7		5	5
95-50-1	1,2-Dichlorobenzene	20		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	34		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UNIDENTIFIED PEAKS.

ND = not detected at the specified reporting limit. NM = not measured.
Reference method is 8260/624.
USEPA Methods 8260 and 624 are used to quantitate volatile organic compounds that have boiling points below 200°C.
2-Methylnaphthalene and naphthalene are compounds with boiling points above 200°C and are better suited to quantitation by USEPA Methods 8270 or 625 as semivolatile organic compounds.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	PROCEDURE	NO: PD-13
	LABORATORY SERVICES SECTION	DATE REV.:11/99

SUBJECT: Laboratory Result Remark Codes

EFFECTIVE DATE: October 1999

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance. if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed Is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. 0. indicated possible low recovery. Actual level may be higher.
LL	0. 0. indicated possible high recovery Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis
STR	settleable residue was not analyzed due to low suspended solids.

Approved by:

Bob Avery, Lab Director 11/12/99 Date

Toxic Reactive

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 99-10-042 PRIORITY H RECEIVED AT LAB BY DH DATE / / TIME AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Harris DELIVERED BY

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-L	99-10-7	9:17	
02	MW-K	99-10-7	9:50	pH=10
03	MW-A	99-10-7	10:32	pH=10
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_3, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
1 2 3 4 5

1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB ~~625 (BN)~~ 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA ~~625 (SC 8)~~ 1 2 3 4 5

SPECIAL REQUESTS
Ammonia
~~Ammonium~~ 1 2 3 4 5
BNA 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit High Low
Cd Cr Cu Ni Pb Zn 1 2 3 4 5
Fe Co Li Mn 1 2 3 4 5
Al Ba Be Mo V Ti 1 2 3 4 5
B Sr 1 2 3 4 5
MICH TEN 1 2 3 4 5
(As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

Pb Sample for Ammonia if enough sample is there.

FILE A: LABFORM XLS

SAMPLE HAZARD INFORMATION FOR EMPLOYEE SAFETY

If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

I. Type of Samples:

- X Environmental (surface, groundwater, soil, bottom sediment)
- ___ Waste Water
- ___ Municipal Sludge
- ___ Industrial Sludge
- X Landfill Leachate
- ___ Contaminated Soil
- ___ Spill Material
- ___ Waste Drums
- ___ Other, Specify: _____

II. Which of the following reasons causes you to think these samples are potentially hazardous?

- X Site Use History
- ___ Site Inspections
- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

III. Indicate the type of potential hazard:

- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

Toxic Reactive

DNR

MICHIGAN DEPT. OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 99-10-042 PRIORITY H RECEIVED AT LAB BY DH DATE / / TIME AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS B. VENS PHONE (734) - 953-1

LOCATION SAMPLED BASF - RIVERVIEW COLLECTED BY Mike Davis DELIVERED BY McLain

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF BETH VENS AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	455100	00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW - L	99-10-7	9:17	
02	MW - K	99-10-7	9:50	pH=10
03	MW - A	99-10-7	10:32	pH = 10
04				
05				

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_2, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
1 2 3 4 5
1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

A Bottle
H off @
icib
DWL

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB ~~625 (BN)~~ 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA ~~625 (SC 8)~~ 1 2 3 4 5

SPECIAL REQUESTS
Ammonia
~~Ammonium~~ 1 2 3 4 5
BNA 1 2 3 4 5

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit	High	Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5	
Fe Co Li Mn	1 2 3 4 5	
Al Ba Be Mo V Ti	1 2 3 4 5	
B Sr	1 2 3 4 5	
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5	

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

Pls Sample for Ammonia if enough sample is there.

FILE A: LABFORM.XLS

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If you circled yes on the front side of this form indicating a safety warning, please complete the information below:

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- ___ Spill Material
- ___ Waste Drums
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- ___ Critical Materials Report(s)
- ___ Permit Applications(s)
- ___ Monthly Operating Reports
- ___ Citizen Complaint
- ___ Previous Analyses (results pending)
- ___ Previous Analyses (log numbers if known): _____
- ___ Inspection Crew Reaction: _____
- ___ Other: _____

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- X Highly Acidic
- ___ Highly Caustic
- ___ Ignitable
- ___ Toxic
- ___ Bio-Hazard
- X Reactive (generates HCN, H_2S, etc.)
- ___ Other _____

ARE VOLATILE TOXINS KNOWN OR LIKELY TO BE PRESENT IN CONCENTRATIONS OF CONCERN?

X YES ___ NO

PLEASE SPECIFY IF KNOWN: Mercury, Cyanide, Ammonia

WHAT SPECIAL PRECAUTIONS WERE TAKEN DURING THE COLLECTION OF THESE SAMPLES?

disposable gloves

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL LABORATORY (517) 335-9800

P.O. Box 30270
Lansing, MI 48909

Report To: Environmental Response Div.
38980 7 Mile Road
Livonia, MI 48152

Attn: BETH VENS
Total: $8,690.04

Lab Work Order # 9906150
Work Site ID: BASF - RIVERVIEW
Matrix: Water
Received: 6/21/1999
Reported: 8/11/1999
Client: ER_SE
Number of Samples: 12

TEST UNITS	MW-D	MW-E	MW-H	MW-J
Ammonia mg N/L	29. ST	26. ST	3.9 ST	20. ST
Arsenic by Furnace ug/L	INT	INT	INT	INT
Arsenic in Water ug/L	14290 DL	11250 DL	219	79
Barium in Water ug/L	17	42	95	150
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	12 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	INT	INT	INT
Chromium in Water ug/L	120	260	280	130
Copper by Furnace ug/L	4.6	INT	INT	INT
Copper in Water ug/L	K 20	27	30	37
Cyanide mg/L	8.4 HT	7.1 HT	2.5 HT	.51 HT
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	K 10 DM	INT	24 DM	INT
Lead in Water ug/L	K 50	80	K 50	55
Mercury in Water ug/L	INT	INT	1.6 DM	INT
Nitrate + Nitrite mg/L	K 0.5 ST	0.5 ST	K 0.2 ST	K 0.2 ST
Oil & Grease-Water - Low Level mg/L	24	17	K 20	67

RECEIVED ERD S.E. MICH.
AUG 12 1999

TEST UNITS	MW-D	MW-E	MW-H	MW-J
Selenium in Water ug/L	4.9	5.5	12 DM	4.3
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	12. PI	7.9 PI	K 0.4 PI	8.5 PI
Zinc in Water ug/L	K 50	88	K 50	140

TEST UNITS	MW-I	MW-L	MW-K	MW-A
Ammonia mg N/L	6.2 ST	.16	49. ST	9.0 ST
Arsenic by Furnace ug/L	INT	64 DM	INT	65 DM
Arsenic in Water ug/L	1206 DL		172	
Barium in Water ug/L	46	15	130	13
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	8.6	INT	INT
Chromium in Water ug/L	57	K 20	690	82
Copper by Furnace ug/L	5.5	11	3.8	6.2
Copper in Water ug/L	K 20	K 20	K 20	K 20
Cyanide mg/L	.35 HT	.21	23 HT	1.3 HT
Hex Chromium in Water ug/L	INT	INT	INT	INT
Lead by Furnace ug/L	22 DM	11 DM	K 10 DM	K 10 DM
Lead in Water ug/L	K 50	K 50	K 50	K 50
Mercury in Water ug/L	1.4	1.3	18 DM	3.2

TEST UNITS	MW-I	MW-L	MW-K	MW-A
Nitrate + Nitrite mg N/L	K 0.5 ST	K .01	K 2. ST	K 0.2 ST
Oil & Grease-Water - Low Level mg/L	16	25	13	13
Selenium in Water ug/L	K 5.0 DM	K 1.0	6.3 DM	K 5.0 DM
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	2.4 PI	.05 PI	7.9 PI	15. PI
Zinc in Water ug/L	K 50	290	65	K 50

TEST UNITS	MW-B	MW-C	MW-G	MW-F
Ammonia mg N/L	16. ST	12. ST		24. ST
Arsenic by Furnace ug/L	INT	INT	16 DM	34 DM
Arsenic in Water ug/L	680 DL	587 DL		
Barium in Water ug/L	57	45	44	110
Cadmium by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	5.5 DM
Cadmium in Water ug/L	K 20	K 20	K 20	K 20
Chromium by Furnace ug/L	INT	INT	10.8	INT
Chromium in Water ug/L	200	180	K 20	230
Copper by Furnace ug/L	8.9	INT	4.8	3.4
Copper in Water ug/L	K 20	78	K 20	K 20
Cyanide mg/L	3.3 HT	2.5 HT	.15 ST	.18
Hex Chromium in Water ug/L	INT	INT	INT	
Lead by Furnace ug/L	K 10 DM	INT	K 10 DM	K 10 DM

TEST UNITS	MW-B	MW-C	MW-G	MW-F
Lead in Water ug/L	K 50	75	K 50	K 50
Mercury in Water ug/L	INT	20 HT, DM	K .2 HT	.8 HT
Nitrate + Nitrite mg N/L	K 0.5 ST	K 0.1 ST		K 0.5 ST
Oil & Grease-Water - Low Level mg/L	97	67		21
Selenium in Water ug/L	6.0 DM	K 5.0 DM	2.4	2.0
Silver by Furnace ug/L	K 5.0 DM	K 5.0 DM	K 5.0 DM	K 5.0 DM
Sulfide in Water mg/L	50. PI	19. PI	.05 PI	
Zinc in Water ug/L	53	K 50	K 50	K 50

This is an original report: D Hartig Date: _____

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	430		100	10
95-57-8	2-Chlorophenol	ND		100	10
95-48-7	o-Cresol	230		100	10
108394,106445	m & p-Cresol	510		210	10
89-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	190		100	10
120-83-2	2,4-Dichlorophenol	ND		100	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
51-28-5	2,4-Dinitrophenol	ND		520	10
100-02-7	4-Nitrophenol	ND		520	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		520	10
87-86-5	Pentachlorophenol	180	T	520	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01ON

Date Collected: 6/18/1999		Test Code:	SC3
Date Extracted: 6/25/1999 by 4277, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/23/1999 by BronsonJ		Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.020	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.020	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.020	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.020	1.0
87-68-3	Hexachlorobutadiene	ND		0.020	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.020	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.020	1.0
91-58-7	2-Chloronaphthalene	ND		0.20	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.020	1.0
608-93-5	Pentachlorobenzene	ND		0.020	1.0
319-84-6	a-BHC	ND		0.020	1.0
118-74-1	Hexachlorobenzene	ND		0.020	1.0
319-85-7	b-BHC	ND		0.020	1.0
58-89-9	g-BHC (lindane)	ND		0.020	1.0
82-68-8	Pentachloronitrobenzene	ND		0.020	1.0
319-86-8	d-BHC	ND		0.020	1.0
76-44-8	Heptachlor	ND		0.020	1.0
309-00-2	Aldrin	ND	K	0.060	3.0
1024-57-3	Heptachlor epoxide	ND		0.020	1.0
5103-74-2	g-Chlordane	ND		0.020	1.0
959-98-8	Endosulfan I	ND		0.020	1.0
5103-71-9	a-Chlordane	ND		0.020	1.0
72-55-9	4,4'-DDE	ND		0.020	1.0
72-20-8	Endrin	ND		0.020	1.0
60-57-1	Dieldrin	ND		0.020	1.0
72-54-8	4,4'-DDD	ND		0.050	1.0
50-29-3	4,4'-DDT	ND		0.020	1.0
87-82-1	Hexabromobenzene	ND		0.020	1.0
72-43-5	Methoxychlor	ND		0.050	1.0
2385-85-5	Mirex	ND		0.020	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.20	1.0
11097-69-1	Aroclor 1254 (PCB)	1.30	J	0.20	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.20	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.20	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.20	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.20	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.20	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.20	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.20	1.0
59080-40-9	BP-6 (PBB)	ND		0.050	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery
J=AR 1254 std slightly high

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-01POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-D

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		50	10
74-87-3	Chloromethane	ND		50	10
75-01-4	Vinyl chloride	74		50	10
74-83-9	Bromomethane	ND		50	10
75-00-3	Chloroethane	ND		50	10
75-69-4	Trichlorofluoromethane	ND		50	10
67-64-1	2-Propanone (Acetone)	1000	J	250	10
60-29-7	Diethyl ether	ND		100	10
75-35-4	1,1-Dichloroethene	ND		10	10
74-88-4	Methyl iodide	ND		10	10
107-13-1	Acrylonitrile	ND		50	10
75-09-2	Methylene chloride	400		50	10
75-15-0	Carbon disulfide	ND		50	10
156-60-5	trans-1,2-Dichloroethene	ND		10	10
1634-04-4	Methyltertbutylether (MTBE)	ND		50	10
75-34-3	1,1-Dichloroethane	ND		10	10
78-93-3	2-Butanone (MEK)	47	T	50	10
156-59-2	cis-1,2-Dichloroethene	ND		10	10
67-66-3	Chloroform	ND		10	10
74-97-5	Bromochloromethane	ND		10	10
71-55-6	1,1,1-Trichloroethane	ND		10	10
107-06-2	1,2-Dichloroethane	110		10	10
71-43-2	Benzene	37		10	10
56-23-5	Carbon tetrachloride	ND		10	10
78-87-5	1,2-Dichloropropane	16		10	10
79-01-6	Trichloroethene	ND		10	10
74-95-3	Dibromomethane	ND		10	10
75-27-4	Bromodichloromethane	ND		10	10
591-78-6	2-Hexanone	ND		50	10
10061-01-5	cis-1,3-Dichloropropene	ND		10	10
10061-02-6	trans-1,3-Dichloropropene	ND		10	10
108-88-3	Toluene	140		10	10
79-00-5	1,1,2-Trichloroethane	ND		10	10
108-10-1	4-Methyl-2-pentanone (MIBK)	290		50	10
124-48-1	Dibromochloromethane	ND		10	10
106-93-4	1,2-Dibromoethane	ND		10	10

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		10	10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10	10
108-90-7	Chlorobenzene	ND		10	10
100-41-4	Ethylbenzene	ND		10	10
108383,106423	m & p Xylene	25		20	10
75-25-2	Bromoform	ND		10	10
100-42-5	Styrene	ND		10	10
95-47-6	o-Xylene	16		10	10
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10
96-18-4	1,2,3-Trichloropropane	ND		10	10
110-57-6	trans-1,4-Dichloro-2 butene	ND		10	10
98-82-8	Isopropylbenzene	ND		10	10
103-65-1	n-Propylbenzene	ND		10	10
108-67-8	1,3,5-Trimethylbenzene	ND		10	10
95-63-6	1,2,4-Trimethylbenzene	10		10	10
541-73-1	1,3-Dichlorobenzene	ND		10	10
106-46-7	1,4-Dichlorobenzene	ND		10	10
95-50-1	1,2-Dichlorobenzene	15		10	10
67-72-1	Hexachloroethane	ND		10	10
96-12-8	1,2-Dibromo-3-chloropropane	ND		50	10
120-82-1	1,2,4-Trichlorobenzene	ND		50	10
91-20-3	Naphthalene	350		50	10
91-57-6	2-Methylnaphthalene	46	T	50	10

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/24/1999 by 4276, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/28/1999 by KL		Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	290		110	10
95-57-8	2-Chlorophenol	ND		110	10
95-48-7	o-Cresol	140		110	10
108394,106445	m & p-Cresol	320		210	10
89-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	98	T	110	10
120-83-2	2,4-Dichlorophenol	ND		110	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
51-28-5	2,4-Dinitrophenol	ND		530	10
100-02-7	4-Nitrophenol	ND		530	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		530	10
87-86-5	Pentachlorophenol	ND		530	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02ON

Date Collected:	6/18/1999	Test Code:	SC3
Date Extracted:	6/25/1999 by 4277, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/23/1999 by BronsonJ	Sample ID:	MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND	K	0.082	4.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.051	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.051	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	3.70	J	0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.051	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

J=AR 1254 std slightly high

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-02POX

Date Collected: 6/18/1999

Date Analyzed: 6/23/1999 by MW/KL

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-E

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	17	T	25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	690	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	100		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	44		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	40		5	5
71-43-2	Benzene	16		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	23		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	130		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	12		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
100-41-4	Ethylbenzene	ND		5	5
108383,106423	m & p Xylene	13		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	8.2		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	5.2		5	5
95-63-6	1,2,4-Trimethylbenzene	15		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	110		25	5
91-57-6	2-Methylnaphthalene	25	J	25	5

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		10	1
95-57-8	2-Chlorophenol	ND		10	1
95-48-7	o-Cresol	ND		10	1
108394,106445	m & p-Cresol	ND		20	1
89-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
120-83-2	2,4-Dichlorophenol	ND		10	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
51-28-5	2,4-Dinitrophenol	ND		50	1
100-02-7	4-Nitrophenol	ND		50	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		50	1
87-86-5	Pentachlorophenol	ND		50	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03ON

Date Collected: 6/18/1999		Test Code:	SC3
Date Extracted: 6/22/1999 by 4274, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/1/1999 by TAITS		Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.020	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.020	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.020	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.020	1.0
87-68-3	Hexachlorobutadiene	ND		0.020	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.020	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.020	1.0
91-58-7	2-Chloronaphthalene	ND		0.20	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.020	1.0
608-93-5	Pentachlorobenzene	ND		0.020	1.0
319-84-6	a-BHC	ND		0.020	1.0
118-74-1	Hexachlorobenzene	ND		0.020	1.0
319-85-7	b-BHC	ND		0.020	1.0
58-89-9	g-BHC (lindane)	ND		0.020	1.0
82-68-8	Pentachloronitrobenzene	ND		0.020	1.0
319-86-8	d-BHC	ND		0.020	1.0
76-44-8	Heptachlor	ND		0.020	1.0
309-00-2	Aldrin	ND		0.020	1.0
1024-57-3	Heptachlor epoxide	ND		0.020	1.0
5103-74-2	g-Chlordane	ND		0.020	1.0
959-98-8	Endosulfan I	ND		0.020	1.0
5103-71-9	a-Chlordane	ND		0.020	1.0
72-55-9	4,4'-DDE	ND		0.020	1.0
72-20-8	Endrin	ND		0.020	1.0
60-57-1	Dieldrin	ND		0.020	1.0
72-54-8	4,4'-DDD	ND		0.050	1.0
50-29-3	4,4'-DDT	ND		0.020	1.0
87-82-1	Hexabromobenzene	ND		0.020	1.0
72-43-5	Methoxychlor	ND		0.050	1.0
2385-85-5	Mirex	ND		0.020	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.20	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.20	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.20	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.20	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.20	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.20	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.20	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.20	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.20	1.0
59080-40-9	BP-6 (PBB)	ND		0.050	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-03POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/23/1999 by MW/KL	Sample ID:	MW-H

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	1.7		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

UN-ID PEAKS.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04OA

Date Collected: 6/18/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		100	10
95-57-8	2-Chlorophenol	ND		100	10
95-48-7	o-Cresol	ND		100	10
108394,106445	m & p-Cresol	180	T	210	10
89-75-5	2-Nitrophenol	ND		100	10
105-67-9	2,4-Dimethylphenol	53	T	100	10
120-83-2	2,4-Dichlorophenol	ND		100	10
59-50-7	4-Chloro-3-methylphenol	ND		100	10
88-06-2	2,4,6-Trichlorophenol	ND		100	10
95-95-4	2,4,5-Trichlorophenol	ND		100	10
51-28-5	2,4-Dinitrophenol	ND		520	10
100-02-7	4-Nitrophenol	ND		520	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		520	10
87-86-5	Pentachlorophenol	ND		520	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04ON

Date Collected:	6/18/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND		0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND		0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND		0.051	1.0
50-29-3	4,4'-DDT	ND		0.021	1.0
87-82-1	Hexabromobenzene	ND		0.021	1.0
72-43-5	Methoxychlor	ND		0.051	1.0
2385-85-5	Mirex	ND		0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND		0.051	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-04POX

Date Collected:	6/18/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/22/1999 by KL	Sample ID:	MW-J

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		120	25
74-87-3	Chloromethane	ND		120	25
75-01-4	Vinyl chloride	ND		120	25
74-83-9	Bromomethane	ND		120	25
75-00-3	Chloroethane	ND		120	25
75-69-4	Trichlorofluoromethane	ND		120	25
67-64-1	2-Propanone (Acetone)	1800	J	620	25
60-29-7	Diethyl ether	ND		250	25
75-35-4	1,1-Dichloroethene	ND		25	25
74-88-4	Methyl iodide	ND		25	25
107-13-1	Acrylonitrile	ND		120	25
75-09-2	Methylene chloride	ND		120	25
75-15-0	Carbon disulfide	ND		120	25
156-60-5	trans-1,2-Dichloroethene	ND		25	25
1634-04-4	Methyltertbutylether (MTBE)	ND		120	25
75-34-3	1,1-Dichloroethane	ND		25	25
78-93-3	2-Butanone (MEK)	ND		120	25
156-59-2	cis-1,2-Dichloroethene	ND		25	25
67-66-3	Chloroform	ND		25	25
74-97-5	Bromochloromethane	ND		25	25
71-55-6	1,1,1-Trichloroethane	ND		25	25
107-06-2	1,2-Dichloroethane	ND		25	25
71-43-2	Benzene	ND		25	25
56-23-5	Carbon tetrachloride	ND		25	25
78-87-5	1,2-Dichloropropane	ND		25	25
79-01-6	Trichloroethene	ND		25	25
74-95-3	Dibromomethane	ND		25	25
75-27-4	Bromodichloromethane	ND		25	25
591-78-6	2-Hexanone	ND		120	25
10061-01-5	cis-1,3-Dichloropropene	ND		25	25
10061-02-6	trans-1,3-Dichloropropene	ND		25	25
108-88-3	Toluene	ND		25	25
79-00-5	1,1,2-Trichloroethane	ND		25	25
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		120	25
124-48-1	Dibromochloromethane	ND		25	25
106-93-4	1,2-Dibromoethane	ND		25	25

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		25	25
630-20-6	1,1,1,2-Tetrachloroethane	ND		25	25
108-90-7	Chlorobenzene	ND		25	25
100-41-4	Ethylbenzene	ND		25	25
108383,106423	m & p Xylene	ND		50	25
75-25-2	Bromoform	ND		25	25
100-42-5	Styrene	ND		25	25
95-47-6	o-Xylene	ND		25	25
79-34-5	1,1,2,2-Tetrachloroethane	ND		25	25
96-18-4	1,2,3-Trichloropropane	ND		25	25
110-57-6	trans-1,4-Dichloro-2 butene	ND		25	25
98-82-8	Isopropylbenzene	ND		25	25
103-65-1	n-Propylbenzene	ND		25	25
108-67-8	1,3,5-Trimethylbenzene	ND		25	25
95-63-6	1,2,4-Trimethylbenzene	ND		25	25
541-73-1	1,3-Dichlorobenzene	ND		25	25
106-46-7	1,4-Dichlorobenzene	ND		25	25
95-50-1	1,2-Dichlorobenzene	ND		25	25
67-72-1	Hexachloroethane	ND		25	25
96-12-8	1,2-Dibromo-3-chloropropane	ND		120	25
120-82-1	1,2,4-Trichlorobenzene	ND		120	25
91-20-3	Naphthalene	240		120	25
91-57-6	2-Methylnaphthalene	ND		120	25

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		13	1
95-57-8	2-Chlorophenol	ND		13	1
95-48-7	o-Cresol	ND		13	1
108394,106445	m & p-Cresol	19	T	25	1
89-75-5	2-Nitrophenol	ND		13	1
105-67-9	2,4-Dimethylphenol	14		13	1
120-83-2	2,4-Dichlorophenol	ND		13	1
59-50-7	4-Chloro-3-methylphenol	ND		13	1
88-06-2	2,4,6-Trichlorophenol	9.5	T	13	1
95-95-4	2,4,5-Trichlorophenol	ND		13	1
51-28-5	2,4-Dinitrophenol	ND		63	1
100-02-7	4-Nitrophenol	ND		63	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		63	1
87-86-5	Pentachlorophenol	12	T	63	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND	K	0.051	2.2
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	ND		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND		0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	ND		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND		0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND		0.023	1.0
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND	K	0.051	2.2
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND		0.058	1.0
50-29-3	4,4'-DDT	ND		0.023	1.0
87-82-1	Hexabromobenzene	ND		0.023	1.0
72-43-5	Methoxychlor	ND		0.058	1.0
2385-85-5	Mirex	ND		0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	0.500		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	0.470		0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.23	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.23	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND		0.058	1.0
8001-35-2	*Toxaphene	ND		0.12	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH Alpha-BHC to end - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-05POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/22/1999 by KL	Sample ID:	MW-I

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		120	25
74-87-3	Chloromethane	ND		120	25
75-01-4	Vinyl chloride	ND		120	25
74-83-9	Bromomethane	ND		120	25
75-00-3	Chloroethane	ND		120	25
75-69-4	Trichlorofluoromethane	ND		120	25
67-64-1	2-Propanone (Acetone)	2100	J	620	25
60-29-7	Diethyl ether	ND		250	25
75-35-4	1,1-Dichloroethene	ND		25	25
74-88-4	Methyl iodide	ND		25	25
107-13-1	Acrylonitrile	ND		120	25
75-09-2	Methylene chloride	ND		120	25
75-15-0	Carbon disulfide	ND		120	25
156-60-5	trans-1,2-Dichloroethene	ND		25	25
1634-04-4	Methyltertbutylether (MTBE)	ND		120	25
75-34-3	1,1-Dichloroethane	ND		25	25
78-93-3	2-Butanone (MEK)	ND		120	25
156-59-2	cis-1,2-Dichloroethene	ND		25	25
67-66-3	Chloroform	ND		25	25
74-97-5	Bromochloromethane	ND		25	25
71-55-6	1,1,1-Trichloroethane	ND		25	25
107-06-2	1,2-Dichloroethane	ND		25	25
71-43-2	Benzene	ND		25	25
56-23-5	Carbon tetrachloride	ND		25	25
78-87-5	1,2-Dichloropropane	ND		25	25
79-01-6	Trichloroethene	ND		25	25
74-95-3	Dibromomethane	ND		25	25
75-27-4	Bromodichloromethane	ND		25	25
591-78-6	2-Hexanone	ND		120	25
10061-01-5	cis-1,3-Dichloropropene	ND		25	25
10061-02-6	trans-1,3-Dichloropropene	ND		25	25
108-88-3	Toluene	ND		25	25
79-00-5	1,1,2-Trichloroethane	ND		25	25
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		120	25
124-48-1	Dibromochloromethane	ND		25	25
106-93-4	1,2-Dibromoethane	ND		25	25

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		25	25
630-20-6	1,1,1,2-Tetrachloroethane	ND		25	25
108-90-7	Chlorobenzene	ND		25	25
100-41-4	Ethylbenzene	ND		25	25
108383,106423	m & p Xylene	ND		50	25
75-25-2	Bromoform	ND		25	25
100-42-5	Styrene	ND		25	25
95-47-6	o-Xylene	ND		25	25
79-34-5	1,1,2,2-Tetrachloroethane	ND		25	25
96-18-4	1,2,3-Trichloropropane	ND		25	25
110-57-6	trans-1,4-Dichloro-2 butene	ND		25	25
98-82-8	Isopropylbenzene	ND		25	25
103-65-1	n-Propylbenzene	ND		25	25
108-67-8	1,3,5-Trimethylbenzene	ND		25	25
95-63-6	1,2,4-Trimethylbenzene	ND		25	25
541-73-1	1,3-Dichlorobenzene	ND		25	25
106-46-7	1,4-Dichlorobenzene	ND		25	25
95-50-1	1,2-Dichlorobenzene	ND		25	25
67-72-1	Hexachloroethane	ND		25	25
96-12-8	1,2-Dibromo-3-chloropropane	ND		120	25
120-82-1	1,2,4-Trichlorobenzene	ND		120	25
91-20-3	Naphthalene	ND		120	25
91-57-6	2-Methylnaphthalene	ND		120	25

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		10	1
95-57-8	2-Chlorophenol	ND		10	1
95-48-7	o-Cresol	ND		10	1
108394,106445	m & p-Cresol	ND		21	1
89-75-5	2-Nitrophenol	ND		10	1
105-67-9	2,4-Dimethylphenol	ND		10	1
120-83-2	2,4-Dichlorophenol	ND		10	1
59-50-7	4-Chloro-3-methylphenol	ND		10	1
88-06-2	2,4,6-Trichlorophenol	ND		10	1
95-95-4	2,4,5-Trichlorophenol	ND		10	1
51-28-5	2,4-Dinitrophenol	ND		52	1
100-02-7	4-Nitrophenol	ND		52	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		52	1
87-86-5	Pentachlorophenol	ND		52	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06ON

Date Collected: 6/17/1999		Test Code:	SC3
Date Extracted: 6/22/1999 by 4274, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/1/1999 by TAITS		Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.026	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.026	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.026	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.026	1.0
87-68-3	Hexachlorobutadiene	ND		0.026	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.026	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.026	1.0
91-58-7	2-Chloronaphthalene	ND		0.26	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.026	1.0
608-93-5	Pentachlorobenzene	ND		0.026	1.0
319-84-6	a-BHC	ND		0.026	1.0
118-74-1	Hexachlorobenzene	ND		0.026	1.0
319-85-7	b-BHC	ND		0.026	1.0
58-89-9	g-BHC (lindane)	ND		0.026	1.0
82-68-8	Pentachloronitrobenzene	ND		0.026	1.0
319-86-8	d-BHC	ND	LH	0.026	1.0
76-44-8	Heptachlor	ND		0.026	1.0
309-00-2	Aldrin	ND		0.026	1.0
1024-57-3	Heptachlor epoxide	ND		0.026	1.0
5103-74-2	g-Chlordane	ND		0.026	1.0
959-98-8	Endosulfan I	ND		0.026	1.0
5103-71-9	a-Chlordane	ND		0.026	1.0
72-55-9	4,4'-DDE	ND		0.026	1.0
72-20-8	Endrin	ND		0.026	1.0
60-57-1	Dieldrin	ND		0.026	1.0
72-54-8	4,4'-DDD	ND		0.065	1.0
50-29-3	4,4'-DDT	ND		0.026	1.0
87-82-1	Hexabromobenzene	ND	LH	0.026	1.0
72-43-5	Methoxychlor	ND		0.065	1.0
2385-85-5	Mirex	ND		0.026	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.26	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.26	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.26	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.26	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.26	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.26	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.26	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.26	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.26	1.0
59080-40-9	BP-6 (PBB)	ND		0.065	1.0
8001-35-2	*Toxaphene	ND		0.13	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-06POX

Date Collected:	6/17/1999	Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed:	6/22/1999 by KL	Sample ID:	MW-L

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		23	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	6.1	T	11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		57	1
100-02-7	4-Nitrophenol	ND		57	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		57	1
87-86-5	Pentachlorophenol	15	T	57	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.021	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.021	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.021	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.021	1.0
87-68-3	Hexachlorobutadiene	ND		0.021	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.021	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.021	1.0
91-58-7	2-Chloronaphthalene	ND		0.21	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.021	1.0
608-93-5	Pentachlorobenzene	ND		0.021	1.0
319-84-6	a-BHC	ND		0.021	1.0
118-74-1	Hexachlorobenzene	ND		0.021	1.0
319-85-7	b-BHC	ND	LH	0.021	1.0
58-89-9	g-BHC (lindane)	ND		0.021	1.0
82-68-8	Pentachloronitrobenzene	ND		0.021	1.0
319-86-8	d-BHC	ND	LH	0.021	1.0
76-44-8	Heptachlor	ND		0.021	1.0
309-00-2	Aldrin	ND		0.021	1.0
1024-57-3	Heptachlor epoxide	ND		0.021	1.0
5103-74-2	g-Chlordane	ND		0.021	1.0
959-98-8	Endosulfan I	ND		0.021	1.0
5103-71-9	a-Chlordane	ND		0.021	1.0
72-55-9	4,4'-DDE	ND		0.021	1.0
72-20-8	Endrin	ND		0.021	1.0
60-57-1	Dieldrin	ND		0.021	1.0
72-54-8	4,4'-DDD	ND	LH	0.052	1.0
50-29-3	4,4'-DDT	ND	LH	0.021	1.0
87-82-1	Hexabromobenzene	ND	LH	0.021	1.0
72-43-5	Methoxychlor	ND	LH	0.052	1.0
2385-85-5	Mirex	ND	LH	0.021	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.21	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.21	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.21	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.21	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.21	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.21	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.21	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.21	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.21	1.0
59080-40-9	BP-6 (PBB)	ND	LH	0.052	1.0
8001-35-2	*Toxaphene	ND		0.10	1.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-07POX

Date Collected: 6/17/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/22/1999 by KL		Sample ID:	MW-K

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	140	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	47		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	590		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	ND		5	5
79-01-6	Trichloroethene	ND		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	350		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	6.7		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	ND		5	5
100-41-4	Ethylbenzene	10		5	5
108383,106423	m & p Xylene	35		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	8.1		5	5
95-47-6	o-Xylene	28		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	ND		5	5
95-63-6	1,2,4-Trimethylbenzene	5.5		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	ND		5	5
95-50-1	1,2-Dichlorobenzene	ND		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	ND		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

UN-ID PEAKS.
J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08OA

Date Collected: 6/17/1999		Test Code:	SC8
Date Extracted: 6/21/1999 by 4273, MJ		Test Name:	Scan 8 - Water
Date Analyzed: 6/29/1999 by KL		Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		22	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		55	1
100-02-7	4-Nitrophenol	ND		55	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		55	1
87-86-5	Pentachlorophenol	31	T	55	1

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08ON

Date Collected: 6/17/1999		Test Code:	SC3
Date Extracted: 6/22/1999 by 4274, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/1/1999 by TAITS		Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.023	1.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.023	1.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.023	1.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.023	1.0
87-68-3	Hexachlorobutadiene	ND		0.023	1.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.023	1.0
77-47-4	Hexachlorocyclopentadiene	ND	LH	0.023	1.0
91-58-7	2-Chloronaphthalene	ND		0.23	1.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.023	1.0
608-93-5	Pentachlorobenzene	ND		0.023	1.0
319-84-6	a-BHC	ND		0.023	1.0
118-74-1	Hexachlorobenzene	ND		0.023	1.0
319-85-7	b-BHC	ND	LH	0.023	1.0
58-89-9	g-BHC (lindane)	ND		0.023	1.0
82-68-8	Pentachloronitrobenzene	ND		0.023	1.0
319-86-8	d-BHC	ND	LH	0.023	1.0
76-44-8	Heptachlor	ND		0.023	1.0
309-00-2	Aldrin	ND		0.023	1.0
1024-57-3	Heptachlor epoxide	ND		0.023	1.0
5103-74-2	g-Chlordane	ND		0.023	1.0
959-98-8	Endosulfan I	ND		0.023	1.0
5103-71-9	a-Chlordane	ND		0.023	1.0
72-55-9	4,4'-DDE	ND		0.023	1.0
72-20-8	Endrin	ND		0.023	1.0
60-57-1	Dieldrin	ND		0.023	1.0
72-54-8	4,4'-DDD	ND	LH	0.057	1.0
50-29-3	4,4'-DDT	ND	LH	0.023	1.0
87-82-1	Hexabromobenzene	ND	LH	0.023	1.0
72-43-5	Methoxychlor	ND	LH	0.057	1.0
2385-85-5	Mirex	ND	LH	0.023	1.0
53469-21-9	Aroclor 1242 (PCB)	ND		0.23	1.0
11097-69-1	Aroclor 1254 (PCB)	ND		0.23	1.0
11096-82-5	Aroclor 1260 (PCB)	ND		0.23	1.0
12674-11-2	*Aroclor 1016 (PCB)	ND		0.23	1.0
11104-28-2	*Aroclor 1221 (PCB)	ND		0.23	1.0
11141-16-5	*Aroclor 1232 (PCB)	ND		0.23	1.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		0.23	1.0
37324-23-5	*Aroclor 1262 (PCB)	ND		0.23	1.0
11100-14-4	*Aroclor 1268 (PCB)	ND		0.23	1.0
59080-40-9	BP-6 (PBB)	ND	LH	0.057	1.0
8001-35-2	*Toxaphene	ND		0.11	1.0

ND = not detected at the specified detection limit.
NM = not measured.
*. Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-08POX

Date Collected: 6/17/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/23/1999 by MW/KL		Sample ID:	MW-A

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		25	5
74-87-3	Chloromethane	ND		25	5
75-01-4	Vinyl chloride	ND		25	5
74-83-9	Bromomethane	ND		25	5
75-00-3	Chloroethane	ND		25	5
75-69-4	Trichlorofluoromethane	ND		25	5
67-64-1	2-Propanone (Acetone)	700	J	120	5
60-29-7	Diethyl ether	ND		50	5
75-35-4	1,1-Dichloroethene	ND		5	5
74-88-4	Methyl iodide	ND		5	5
107-13-1	Acrylonitrile	ND		25	5
75-09-2	Methylene chloride	ND		25	5
75-15-0	Carbon disulfide	ND		25	5
156-60-5	trans-1,2-Dichloroethene	ND		5	5
1634-04-4	Methyltertbutylether (MTBE)	ND		25	5
75-34-3	1,1-Dichloroethane	ND		5	5
78-93-3	2-Butanone (MEK)	ND		25	5
156-59-2	cis-1,2-Dichloroethene	ND		5	5
67-66-3	Chloroform	ND		5	5
74-97-5	Bromochloromethane	ND		5	5
71-55-6	1,1,1-Trichloroethane	ND		5	5
107-06-2	1,2-Dichloroethane	ND		5	5
71-43-2	Benzene	200		5	5
56-23-5	Carbon tetrachloride	ND		5	5
78-87-5	1,2-Dichloropropane	30		5	5
79-01-6	Trichloroethene	5.0		5	5
74-95-3	Dibromomethane	ND		5	5
75-27-4	Bromodichloromethane	ND		5	5
591-78-6	2-Hexanone	ND		25	5
10061-01-5	cis-1,3-Dichloropropene	ND		5	5
10061-02-6	trans-1,3-Dichloropropene	ND		5	5
108-88-3	Toluene	73		5	5
79-00-5	1,1,2-Trichloroethane	ND		5	5
108-10-1	4-Methyl-2-pentanone (MIBK)	83		25	5
124-48-1	Dibromochloromethane	ND		5	5
106-93-4	1,2-Dibromoethane	ND		5	5

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		5	5
630-20-6	1,1,1,2-Tetrachloroethane	ND		5	5
108-90-7	Chlorobenzene	32		5	5
100-41-4	Ethylbenzene	7.0		5	5
108383,106423	m & p Xylene	24		10	5
75-25-2	Bromoform	ND		5	5
100-42-5	Styrene	ND		5	5
95-47-6	o-Xylene	23		5	5
79-34-5	1,1,2,2-Tetrachloroethane	ND		5	5
96-18-4	1,2,3-Trichloropropane	ND		5	5
110-57-6	trans-1,4-Dichloro-2 butene	ND		5	5
98-82-8	Isopropylbenzene	ND		5	5
103-65-1	n-Propylbenzene	ND		5	5
108-67-8	1,3,5-Trimethylbenzene	8.1		5	5
95-63-6	1,2,4-Trimethylbenzene	10		5	5
541-73-1	1,3-Dichlorobenzene	ND		5	5
106-46-7	1,4-Dichlorobenzene	6.9		5	5
95-50-1	1,2-Dichlorobenzene	17		5	5
67-72-1	Hexachloroethane	ND		5	5
96-12-8	1,2-Dibromo-3-chloropropane	ND		25	5
120-82-1	1,2,4-Trichlorobenzene	ND		25	5
91-20-3	Naphthalene	28		25	5
91-57-6	2-Methylnaphthalene	ND		25	5

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	250		110	10
95-57-8	2-Chlorophenol	ND		110	10
95-48-7	o-Cresol	160		110	10
108394,106445	m & p-Cresol	470		220	10
89-75-5	2-Nitrophenol	ND		110	10
105-67-9	2,4-Dimethylphenol	140		110	10
120-83-2	2,4-Dichlorophenol	ND		110	10
59-50-7	4-Chloro-3-methylphenol	ND		110	10
88-06-2	2,4,6-Trichlorophenol	ND		110	10
95-95-4	2,4,5-Trichlorophenol	ND		110	10
51-28-5	2,4-Dinitrophenol	ND		550	10
100-02-7	4-Nitrophenol	ND		550	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		550	10
87-86-5	Pentachlorophenol	ND		550	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09ON

Date Collected: 6/17/1999		Test Code:	SC3
Date Extracted: 6/22/1999 by 4274, MJ		Test Name:	Scan 3 - Water
Date Analyzed: 7/1/1999 by TAITS		Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.578	25.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.578	25.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.578	25.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.578	25.0
87-68-3	Hexachlorobutadiene	ND		0.578	25.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.578	25.0
77-47-4	Hexachlorocyclopentadiene	ND		0.578	25.0
91-58-7	2-Chloronaphthalene	ND		5.78	25.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.578	25.0
608-93-5	Pentachlorobenzene	ND		0.578	25.0
319-84-6	a-BHC	ND		0.578	25.0
118-74-1	Hexachlorobenzene	ND		0.578	25.0
319-85-7	b-BHC	ND		0.578	25.0
58-89-9	g-BHC (lindane)	ND		0.578	25.0
82-68-8	Pentachloronitrobenzene	ND		0.578	25.0
319-86-8	d-BHC	ND		0.578	25.0
76-44-8	Heptachlor	ND		0.578	25.0
309-00-2	Aldrin	ND		0.578	25.0
1024-57-3	Heptachlor epoxide	ND		0.578	25.0
5103-74-2	g-Chlordane	ND		0.578	25.0
959-98-8	Endosulfan I	ND		0.578	25.0
5103-71-9	a-Chlordane	ND		0.578	25.0
72-55-9	4,4'-DDE	ND		0.578	25.0
72-20-8	Endrin	ND		0.578	25.0
60-57-1	Dieldrin	ND	K	0.809	35.0
72-54-8	4,4'-DDD	ND		1.45	25.0
50-29-3	4,4'-DDT	ND		0.578	25.0
87-82-1	Hexabromobenzene	ND		0.578	25.0
72-43-5	Methoxychlor	ND		1.45	25.0
2385-85-5	Mirex	ND		0.578	25.0
53469-21-9	Aroclor 1242 (PCB)	ND		5.78	25.0
11097-69-1	Aroclor 1254 (PCB)	ND		5.78	25.0
11096-82-5	Aroclor 1260 (PCB)	ND		5.78	25.0
12674-11-2	*Aroclor 1016 (PCB)	ND		5.78	25.0
11104-28-2	*Aroclor 1221 (PCB)	ND		5.78	25.0
11141-16-5	*Aroclor 1232 (PCB)	ND		5.78	25.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		5.78	25.0
37324-23-5	*Aroclor 1262 (PCB)	ND		5.78	25.0
11100-14-4	*Aroclor 1268 (PCB)	ND		5.78	25.0
59080-40-9	BP-6 (PBB)	ND		1.45	25.0
8001-35-2	*Toxaphene	ND		2.89	25.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-09POX

Date Collected: 6/17/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/21/1999 by MW		Sample ID:	MW-B

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	4600	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	4800		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	66	J	50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	54		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
100-41-4	Ethylbenzene	ND		50	50
108383,106423	m & p Xylene	ND		100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	ND		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2 butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	ND		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	890		250	50
91-57-6	2-Methylnaphthalene	ND		250	50

UN-ID PEAKS.
J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10OA

Date Collected:	6/17/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	280		120	10
95-57-8	2-Chlorophenol	ND		120	10
95-48-7	o-Cresol	190		120	10
108394,106445	m & p-Cresol	520		250	10
89-75-5	2-Nitrophenol	ND		120	10
105-67-9	2,4-Dimethylphenol	150		120	10
120-83-2	2,4-Dichlorophenol	ND		120	10
59-50-7	4-Chloro-3-methylphenol	ND		120	10
88-06-2	2,4,6-Trichlorophenol	ND		120	10
95-95-4	2,4,5-Trichlorophenol	ND		120	10
51-28-5	2,4-Dinitrophenol	ND		620	10
100-02-7	4-Nitrophenol	ND		620	10
534-52-1	2-Methyl-4,6-dinitrophenol	ND		620	10
87-86-5	Pentachlorophenol	ND		620	10

UN-ID PEAKS.
J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10ON

Date Collected:	6/17/1999	Test Code:	SC3
Date Extracted:	6/22/1999 by 4274, MJ	Test Name:	Scan 3 - Water
Date Analyzed:	7/1/1999 by TAITS	Sample ID:	MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
67-72-1	Hexachloroethane	ND		0.115	5.0
108-70-3	1,3,5-Trichlorobenzene	ND		0.115	5.0
120-82-1	1,2,4-Trichlorobenzene	ND		0.115	5.0
87-61-6	1,2,3-Trichlorobenzene	ND		0.115	5.0
87-68-3	Hexachlorobutadiene	ND		0.115	5.0
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		0.115	5.0
77-47-4	Hexachlorocyclopentadiene	ND		0.115	5.0
91-58-7	2-Chloronaphthalene	ND		1.15	5.0
634-66-2	1,2,3,4-Tetrachlorobenzene	ND		0.115	5.0
608-93-5	Pentachlorobenzene	ND		0.115	5.0
319-84-6	a-BHC	ND		0.115	5.0
118-74-1	Hexachlorobenzene	0.150		0.115	5.0
319-85-7	b-BHC	ND		0.115	5.0
58-89-9	g-BHC (lindane)	ND		0.115	5.0
82-68-8	Pentachloronitrobenzene	ND		0.115	5.0
319-86-8	d-BHC	ND		0.115	5.0
76-44-8	Heptachlor	ND		0.115	5.0
309-00-2	Aldrin	ND		0.115	5.0
1024-57-3	Heptachlor epoxide	ND		0.115	5.0
5103-74-2	g-Chlordane	ND		0.115	5.0
959-98-8	Endosulfan I	ND		0.115	5.0
5103-71-9	a-Chlordane	ND		0.115	5.0
72-55-9	4,4'-DDE	ND		0.115	5.0
72-20-8	Endrin	ND		0.115	5.0
60-57-1	Dieldrin	ND	K	0.207	9.0
72-54-8	4,4'-DDD	ND		0.287	5.0
50-29-3	4,4'-DDT	ND		0.115	5.0
87-82-1	Hexabromobenzene	ND		0.115	5.0
72-43-5	Methoxychlor	ND		0.287	5.0
2385-85-5	Mirex	ND		0.115	5.0
53469-21-9	Aroclor 1242 (PCB)	6.80		1.15	5.0
11097-69-1	Aroclor 1254 (PCB)	ND		1.15	5.0
11096-82-5	Aroclor 1260 (PCB)	ND		1.15	5.0
12674-11-2	*Aroclor 1016 (PCB)	ND		1.15	5.0
11104-28-2	*Aroclor 1221 (PCB)	ND		1.15	5.0
11141-16-5	*Aroclor 1232 (PCB)	ND		1.15	5.0

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
12672-29-6	*Aroclor 1248 (PCB)	ND		1.15	5.0
37324-23-5	*Aroclor 1262 (PCB)	ND		1.15	5.0
11100-14-4	*Aroclor 1268 (PCB)	ND		1.15	5.0
59080-40-9	BP-6 (PBB)	ND		0.287	5.0
8001-35-2	*Toxaphene	ND		0.57	5.0

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively.
Reference method is 8081/8082/608.

LH all - low surrogate recovery

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-10POX

Date Collected: 6/17/1999

Date Analyzed: 6/21/1999 by MW

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-C

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		250	50
74-87-3	Chloromethane	ND		250	50
75-01-4	Vinyl chloride	ND		250	50
74-83-9	Bromomethane	ND		250	50
75-00-3	Chloroethane	ND		250	50
75-69-4	Trichlorofluoromethane	ND		250	50
67-64-1	2-Propanone (Acetone)	4600	J	1200	50
60-29-7	Diethyl ether	ND		500	50
75-35-4	1,1-Dichloroethene	ND		50	50
74-88-4	Methyl iodide	ND		50	50
107-13-1	Acrylonitrile	ND		250	50
75-09-2	Methylene chloride	1300		250	50
75-15-0	Carbon disulfide	ND		250	50
156-60-5	trans-1,2-Dichloroethene	ND		50	50
1634-04-4	Methyltertbutylether (MTBE)	ND		250	50
75-34-3	1,1-Dichloroethane	ND		50	50
78-93-3	2-Butanone (MEK)	ND		250	50
156-59-2	cis-1,2-Dichloroethene	ND		50	50
67-66-3	Chloroform	ND		50	50
74-97-5	Bromochloromethane	ND		50	50
71-55-6	1,1,1-Trichloroethane	ND		50	50
107-06-2	1,2-Dichloroethane	ND		50	50
71-43-2	Benzene	ND		50	50
56-23-5	Carbon tetrachloride	ND		50	50
78-87-5	1,2-Dichloropropane	ND		50	50
79-01-6	Trichloroethene	ND		50	50
74-95-3	Dibromomethane	ND		50	50
75-27-4	Bromodichloromethane	ND		50	50
591-78-6	2-Hexanone	ND		250	50
10061-01-5	cis-1,3-Dichloropropene	ND		50	50
10061-02-6	trans-1,3-Dichloropropene	ND		50	50
108-88-3	Toluene	ND		50	50
79-00-5	1,1,2-Trichloroethane	ND		50	50
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		250	50
124-48-1	Dibromochloromethane	ND		50	50
106-93-4	1,2-Dibromoethane	ND		50	50

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		50	50
630-20-6	1,1,1,2-Tetrachloroethane	ND		50	50
108-90-7	Chlorobenzene	ND		50	50
100-41-4	Ethylbenzene	ND		50	50
108383,106423	m & p Xylene	ND		100	50
75-25-2	Bromoform	ND		50	50
100-42-5	Styrene	ND		50	50
95-47-6	o-Xylene	ND		50	50
79-34-5	1,1,2,2-Tetrachloroethane	ND		50	50
96-18-4	1,2,3-Trichloropropane	ND		50	50
110-57-6	trans-1,4-Dichloro-2 butene	ND		50	50
98-82-8	Isopropylbenzene	ND		50	50
103-65-1	n-Propylbenzene	ND		50	50
108-67-8	1,3,5-Trimethylbenzene	ND		50	50
95-63-6	1,2,4-Trimethylbenzene	ND		50	50
541-73-1	1,3-Dichlorobenzene	ND		50	50
106-46-7	1,4-Dichlorobenzene	ND		50	50
95-50-1	1,2-Dichlorobenzene	ND		50	50
67-72-1	Hexachloroethane	ND		50	50
96-12-8	1,2-Dibromo-3-chloropropane	ND		250	50
120-82-1	1,2,4-Trichlorobenzene	ND		250	50
91-20-3	Naphthalene	ND		250	50
91-57-6	2-Methylnaphthalene	ND		250	50

J code all results from bromochloromethane to trans-1,3-dichloropropene.

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-11POX

Date Collected: 6/18/1999

Date Analyzed: 6/23/1999 by MW/KL

Test Code: WPS
Test Name: 8260 Plus - Water
Sample ID: MW-G

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	11		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	12		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	ND		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	1.5		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-12OA

Date Collected:	6/18/1999	Test Code:	SC8
Date Extracted:	6/21/1999 by 4273, MJ	Test Name:	Scan 8 - Water
Date Analyzed:	6/29/1999 by KL	Sample ID:	MW-F

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
108-95-2	Phenol	ND		11	1
95-57-8	2-Chlorophenol	ND		11	1
95-48-7	o-Cresol	ND		11	1
108394,106445	m & p-Cresol	ND		22	1
89-75-5	2-Nitrophenol	ND		11	1
105-67-9	2,4-Dimethylphenol	ND		11	1
120-83-2	2,4-Dichlorophenol	ND		11	1
59-50-7	4-Chloro-3-methylphenol	ND		11	1
88-06-2	2,4,6-Trichlorophenol	ND		11	1
95-95-4	2,4,5-Trichlorophenol	ND		11	1
51-28-5	2,4-Dinitrophenol	ND		54	1
100-02-7	4-Nitrophenol	ND		54	1
534-52-1	2-Methyl-4,6-dinitrophenol	ND		54	1
87-86-5	Pentachlorophenol	ND		54	1

J CODE ALL RESULTS.

ND = not detected at the specified detection limit.
NM = not measured.
Reference method is 8270/625.

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

Work Order #: 9906150-12POX

Date Collected: 6/18/1999		Test Code:	WPS
		Test Name:	8260 Plus - Water
Date Analyzed: 6/23/1999 by MW/KL		Sample ID:	MW-F

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
75-71-8	Dichlorodifluoromethane	ND		5	1
74-87-3	Chloromethane	ND		5	1
75-01-4	Vinyl chloride	ND		5	1
74-83-9	Bromomethane	ND		5	1
75-00-3	Chloroethane	ND		5	1
75-69-4	Trichlorofluoromethane	ND		5	1
67-64-1	2-Propanone (Acetone)	ND		25	1
60-29-7	Diethyl ether	ND		10	1
75-35-4	1,1-Dichloroethene	ND		1	1
74-88-4	Methyl iodide	ND		1	1
107-13-1	Acrylonitrile	ND		5	1
75-09-2	Methylene chloride	ND		5	1
75-15-0	Carbon disulfide	ND		5	1
156-60-5	trans-1,2-Dichloroethene	ND		1	1
1634-04-4	Methyltertbutylether (MTBE)	ND		5	1
75-34-3	1,1-Dichloroethane	ND		1	1
78-93-3	2-Butanone (MEK)	ND		5	1
156-59-2	cis-1,2-Dichloroethene	ND		1	1
67-66-3	Chloroform	ND		1	1
74-97-5	Bromochloromethane	ND		1	1
71-55-6	1,1,1-Trichloroethane	ND		1	1
107-06-2	1,2-Dichloroethane	ND		1	1
71-43-2	Benzene	1.0		1	1
56-23-5	Carbon tetrachloride	ND		1	1
78-87-5	1,2-Dichloropropane	ND		1	1
79-01-6	Trichloroethene	ND		1	1
74-95-3	Dibromomethane	ND		1	1
75-27-4	Bromodichloromethane	ND		1	1
591-78-6	2-Hexanone	ND		5	1
10061-01-5	cis-1,3-Dichloropropene	ND		1	1
10061-02-6	trans-1,3-Dichloropropene	ND		1	1
108-88-3	Toluene	ND		1	1
79-00-5	1,1,2-Trichloroethane	ND		1	1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		5	1
124-48-1	Dibromochloromethane	ND		1	1
106-93-4	1,2-Dibromoethane	ND		1	1

MDEQ ENVIRONMENTAL LABORATORY
ANALYTICAL REPORT

CAS #	COMPOUND	RESULTS ug/L	REMARK	REPORTED DETECTION LIMIT	DILUTION FACTOR
127-18-4	Tetrachloroethene	ND		1	1
630-20-6	1,1,1,2-Tetrachloroethane	ND		1	1
108-90-7	Chlorobenzene	ND		1	1
100-41-4	Ethylbenzene	ND		1	1
108383,106423	m & p Xylene	ND		2	1
75-25-2	Bromoform	ND		1	1
100-42-5	Styrene	ND		1	1
95-47-6	o-Xylene	ND		1	1
79-34-5	1,1,2,2-Tetrachloroethane	ND		1	1
96-18-4	1,2,3-Trichloropropane	ND		1	1
110-57-6	trans-1,4-Dichloro-2 butene	ND		1	1
98-82-8	Isopropylbenzene	ND		1	1
103-65-1	n-Propylbenzene	ND		1	1
108-67-8	1,3,5-Trimethylbenzene	ND		1	1
95-63-6	1,2,4-Trimethylbenzene	ND		1	1
541-73-1	1,3-Dichlorobenzene	ND		1	1
106-46-7	1,4-Dichlorobenzene	ND		1	1
95-50-1	1,2-Dichlorobenzene	ND		1	1
67-72-1	Hexachloroethane	ND		1	1
96-12-8	1,2-Dibromo-3-chloropropane	ND		5	1
120-82-1	1,2,4-Trichlorobenzene	ND		5	1
91-20-3	Naphthalene	ND		5	1
91-57-6	2-Methylnaphthalene	ND		5	1

ND = not detected at the specified detection limit.
NM = not measured.
* Results and detection limit reported semi-quantitatively. *
Reference method is 8260/624.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY	ENVIRONMENTAL LABORATORY PROCEDURE	NO: PD-13 DATE: Rev. 10/9/95

Subject: ***Laboratory Result Remark Codes***

A	value reported is the mean of two or more determinations.
C	value calculated from other independent parameters.
J	estimated value or value not accurate.
K	actual value is known to be less than the value given, i.e. substance, if present, is below detection limit.
L	actual value is known to be greater than the value given.
T	value reported is less than criteria of detection.
W	value observed is less than lowest value reportable under "T" code.
DL	sample analyzed using a dilution(s).
DM	dilution required due to matrix problems.
HT	recommended laboratory holding time was exceeded before analysis.
LH	Q. C. indicated possible low recovery. Actual level may be higher.
LL	Q. C. indicated possible high recovery. Actual level may be lower.
MM	analytical method or matrix is not within SOP of this laboratory.
NC	no confirmation by a second technique.
NH	non-homogeneous sample made analysis of a representative sample questionable.
PI	possible interference may have affected the accuracy of the laboratory result.
QC	quality control problems exists.
RB	Reagent Blank. The level of reagent blank contamination is reported in the comment column and may be subtracted from the analyte value by the user.
ST	recommended sample collection/preservation technique not used.
ACC	laboratory accident resulted in no obtainable value.
FCN	free cyanide was not analyzed due to low level of total cyanide.
INT	interference encountered during analysis resulted in no obtainable value.
IST	Improper sample collection/preservation. Sample not suitable for analysis.
NAV	requested analysis not available.
QNS	quantity not sufficient to perform requested analysis.
STR	settleable residue was not analyzed due to low suspended solids.

Approved by: George Su, Lab Section Chief 10/17/95 Date

DEQ

bha:File R:\Worddocs\Codes.doc

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

RECEIVED ERD S.E. MICH.
JUL 12 1999
FILE
COUNTY

July 8, 1999

Ms. Beth Vens
MDEQ Southeast Michigan District
38980 W. Seven Mile Road
Livonia, MI 48152

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

Dear Ms. Vens:

Enclosed are the analytical results which represent the completed report for the above referenced project. All analyses were completed at Trace Analytical Laboratories, Inc.

The samples were received on June 21, 1999, in good condition, correctly labeled and properly preserved. Any problems encountered during sample receipt are addressed in the enclosed Sample Log-In Checklist.

Every practical effort was made to meet the quality control requirements of each analytical method, and the reporting limit specifications of the project. In several cases, reporting limits have been elevated due to matrix interferences.

The analytical data associated with this project has been reviewed for accuracy, precision, and completeness. Methods used for analyses are indicated on analytical reports. Any problems encountered during the handling and/or analyses of the samples have been addressed in the Statement of Data Qualifications Section. If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Ray V. Buhl

Ray V. Buhl
Laboratory Manager

Enclosures

Chain of Custody Form(s)
Sample Log-in Checklist(s)

1021 X113 1/3

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

Temp 10.

MATRIX = WATER

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

LAB ORDER # 9906150 PRIORITY II RECEIVED AT LAB BY 97 DATE TIME 6/2/99 930 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS Beth Venis PHONE (734)-953-1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris, Venis DELIVERED BY M. Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Venis AT ADDRESS (if different than above office)

INDEX 48028 PCA 30719 PROJECT 455100 PH DCS

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-D	99/6/18		
02	MW-E	99/6/18		
03	MW-H	99/6/18		
04	MW-J	99/6/18		
05	MW-I	99/6/17		

GENERAL CHEMISTRY

DO Diss Oxygen 1 2 3 4 5

GN NO_3, o-Phos 1 2 3 4 5
Residue SS 1 2 3 4 5
Residue TDS 1 2 3 4 5
1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
1 2 3 4 5

1 2 3 4 5

GA COD 1 2 3 4 5
TOC 1 2 3 4 5
$NO_3 + NO_2$, NH_3 1 2 3 4 5
KJEL N, Tot P 1 2 3 4 5
1 2 3 4 5

GG Phenolics 1 2 3 4 5
GP Phenolics(NPDES) 1 2 3 4 5

GB Total CN 1 2 3 4 5
Free CN 1 2 3 4 5

ORGANIC

VOLATILES
POV (BTEX only) 1 2 3 4 5
624/8260 1 2 3 4 5
624/8260 plus 1 2 3 4 5
(Library Search) 1 2 3 4 5

PEST & PCB
ON 608/612 (Sc 3) 1 2 3 4 5
PCB (only) 1 2 3 4 5

BASE NEUTRALS
OB 625 (BN) 1 2 3 4 5
(Lib. Search) 1 2 3 4 5

PHENOLS
OA 625 (SC 8) 1 2 3 4 5

SPECIAL REQUESTS
Q. Ammonium 1 2 3 4 5
1 2 3 4 5

TO TRACE

INORGANIC

MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Detection Limit High Low
Cd Cr Cu Ni Pb Zn 1 2 3 4 5
Fe Co Li Mn 1 2 3 4 5
Al Ba Be Mo V Ti 1 2 3 4 5
B Sr 1 2 3 4 5
MICH TEN 1 2 3 4 5
(As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)

Ca Mg Na K 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Ag - Silver 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
Tl - Thallium 1 2 3 4 5

MN pH, Conductance 1 2 3 4 5
Cl, SO_4, Total Alk 1 2 3 4 5
HCO_3 - CO_3 1 2 3 4 5
Cr^{+6} 1 2 3 4 5

OG Oil & Grease 1 2 3 4 5

FILE A: LABFORM.XLS

G Smith 6/2/99

1/4/96

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

2/3

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 9906150 PRIORITY TT RECEIVED AT LAB BY [illegible] DATE TIME 6/21/99 930 AM PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE Mich CONTACT PERSON FOR QUESTIONS B. Venis PHONE (734) 953 1404

LOCATION SAMPLED BASF - Riverview COLLECTED BY Mike Harris DELIVERED BY M. Harris

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Bob Venis AT ADDRESS (if different than above office)

INDEX	PCA	PROJECT	PH
48028	30719	45-5100	OC

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
06	MW-L	99/6/17		
07	MW-K	"		
08	MW-A	"		
09	MW-B	"		
10	MW-C	"		

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
		1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
		1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

VOLATILES

POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5

PEST & PCB

ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5

BASE NEUTRALS

OB	625 (BN)	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5

TO TRACE

PHENOLS

OA	625 (SC 8)	1 2 3 4 5

SPECIAL REQUESTS

Ammonium	1 2 3 4 5
	1 2 3 4 5

INORGANIC

MA	Total Metals	1 2 3 4 5
MAD	Diss-Field Filtered	1 2 3 4 5
MD	Diss-Lab Filtered	1 2 3 4 5

Detection Limit	High Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5
Fe Co Li Mn	1 2 3 4 5
Al Ba Be Mo V Ti	1 2 3 4 5
B Sr	1 2 3 4 5
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5
Ca Mg Na K	1 2 3 4 5
As - Arsenic	1 2 3 4 5
Ag - Silver	1 2 3 4 5
Hg - Mercury	1 2 3 4 5
Se - Selenium	1 2 3 4 5
Sb - Antimony	1 2 3 4 5
Tl - Thallium	1 2 3 4 5

MN	pH, Conductance	1 2 3 4 5
	Cl, SO_4, Total Alk	1 2 3 4 5
	HCO_3 - CO_3	1 2 3 4 5
	Cr^{+6}	1 2 3 4 5
OG	Oil & Grease	1 2 3 4 5

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
LABORATORY ANALYSIS REQUEST SHEET

3/3

**** SAFETY WARNING ****
YES / NO - INFO ON BACK

MATRIX = WATER

LAB ORDER # 9906150 PRIORITY II RECEIVED AT LAB BY [illegible] DATE TIME 6/21/99 930 AM/PM

SUBMITTER DIVISION ERD DISTRICT OR OFFICE SE MICH CONTACT PERSON FOR QUESTIONS Beth Venis PHONE (734-953-1404

LOCATION SAMPLED BASF - [illegible] COLLECTED BY MIKE HARRIS DELIVERED BY M. HARRIS

ACCEPT "HT" CODE YES / NO SEND RESULTS TO ATTENTION OF Beth Venis AT ADDRESS (if different than above office)

INDEX 48022 PCA 30719 PROJECT 465100 PH 00

SAMPLE REMARKS:

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION
01	MW-G	99/6/18	NO 9.	
02	MW-F	99/6/18		
03				
04				
05				

GENERAL CHEMISTRY

DO	Diss Oxygen	1 2 3 4 5
GN	NO_2, o-Phos	1 2 3 4 5
	Residue SS	1 2 3 4 5
	Residue TDS	1 2 3 4 5
		1 2 3 4 5
	BOD Tot 5 day	1 2 3 4 5
	BOD Carb 5 day	1 2 3 4 5
		1 2 3 4 5
		1 2 3 4 5
GA	COD	1 2 3 4 5
	TOC	1 2 3 4 5
	$NO_3 + NO_2$, NH_3	1 2 3 4 5
	KJEL N, Tot P	1 2 3 4 5
		1 2 3 4 5
GG	Phenolics	1 2 3 4 5
GP	Phenolics(NPDES)	1 2 3 4 5
GB	Total CN	1 2 3 4 5
	Free CN	1 2 3 4 5

ORGANIC

	VOLATILES	
POV	(BTEX only)	1 2 3 4 5
	624/8260	1 2 3 4 5
	624/8260 plus	1 2 3 4 5
	(Library Search)	1 2 3 4 5
	PEST & PCB	
ON	608/612 (Sc 3)	1 2 3 4 5
	PCB (only)	1 2 3 4 5
	BASE NEUTRALS	
OB	625 (BN)	1 2 3 4 5
	(Lib. Search)	1 2 3 4 5
	PHENOLS	
OA	625 (SC 8)	1 2 3 4 5
	SPECIAL REQUESTS	
	Ammonium	1 2 3 4 5
		1 2 3 4 5

if enough

if enough

TO TRACE

INORGANIC

MA	Total Metals	1 2 3 4 5
MAD	Diss-Field Filtered	1 2 3 4 5
MD	Diss-Lab Filtered	1 2 3 4 5

Detection Limit	High Low
Cd Cr Cu Ni Pb Zn	1 2 3 4 5
Fe Co Li Mn	1 2 3 4 5
Al Ba Be Mo V Ti	1 2 3 4 5
B Sr	1 2 3 4 5
MICH TEN (As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)	1 2 3 4 5
Ca Mg Na K	1 2 3 4 5
As - Arsenic	1 2 3 4 5
Ag - Silver	1 2 3 4 5
Hg - Mercury	1 2 3 4 5
Se - Selenium	1 2 3 4 5
Sb - Antimony	1 2 3 4 5
Tl - Thallium	1 2 3 4 5
MIN pH, Conductance	1 2 3 4 5
Cl, SO_4, Total Alk	1 2 3 4 5
HCO_3 - CO_3	1 2 3 4 5
Cr^{+6}	1 2 3 4 5
OG Oil & Grease	1 2 3 4 5

THERE IS A SAMPLE

FILE A: LABFORM.XLS

1/4/96

SAMPLE LOG IN CHECKLIST

Date: 6/21/99 Client Name: DEQ # of Coolers:

HPN #: Project Name: BASE Riverview Cooler #s:

Project #: X 113 Logged in by: J Smith Cooler #s:

Cooler Receipt

Cooler/samples delivered by: Trace courier ☑ Hand delivered ☐ Commercial courier ☐ Name of delivery person: JAN Name of courier service:

Did cooler come with a bill of lading? No ☑ Yes ☐ Way Bill or Tracking #:

COC Seals present and intact on cooler? No ☑ Yes ☐ Custody seals signed by:

Client COC number:

Type of packing in cooler:

Coolant and Temperature

Type of Coolant Used

	Yes	No
Slurry w/ crushed, cubed, or chip ice?	☐	☐
Multiple bags of ice around samples?	☑	☐
Ice Packs/ Blue Ice :	☐	☐
No Coolant Present:		☐

Temperature (as taken in Cooler)

Date: 6/21 99 Time: 2:10

Temperature Blank: °C

Range of 3 samples: 1, 4 °C

Melt Water: °C

Ice still present upon receipt: ☑ Yes ☐ No

General

	Yes	No	NA
COC taped to inside of cooler lid?	☐	☑	☐
All bottles arrived unbroken with labels in good condition?	☑		☐
Each sample is in a sealed plastic bag?	☐	☑	☐
Labels filled out completely?	☑		☐
All bottle labels agree with Chain of Custody (COC)?	☑		☐
Sufficient sample to run tests requested?	☐		☑
pH checked and samples at correct pH?	☑		☐
Correct preservative added to samples?	☑		☐
DRO/GRO samples received and appropriate check in form completed?	☐		☑
Air bubbles absent from VOAs?	☐		☑
COC filled out properly and signed by client?	☑		☐
COC signed in by TRACE sample custodian?	☑		☐
Was project manager called and samples discussed?	☐	☐	☐

Contact: Date:

Notes:

Sample Results

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

CROSS REFERENCE TABLE

MDEQ ID	TRACE ID
MW-D	X113-01
MW-E	X113-02
MW-H	X113-03
MW-J	X113-04
MW-I	X113-05
MW-L	X113-06
MW-K	X113-07
MW-A	X113-08
MW-B	X113-09
MW-C	X113-10
MW-F	X113-11

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

ANALYTICAL RESULTS
STATEMENT OF DATA QUALIFICATIONS

TRACE ID:	X113-01 X113-02 X113-07 X113-08 X113-11	**Sample ID:**	MW-D MW-E MW-K MW-A MW-F
Parameter:	Base Neutral Surrogate	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
One of the base/neutral surrogate recoveries was outside the control limits.

Qualification/Narrative:
As the other two base/neutral surrogates were within the control limits, no data requires qualification.

TRACE ID:	X113-09 X113-10	**Sample ID:**	MW-B MW-C
Parameter:	Base Neutral Surrogates	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
A dilution of greater than 1:10 was required on this sample.

Qualification/Narrative:
Consequently, surrogate recoveries are not available.

TRACE ID:	X113-03	**Sample ID:**	MW-H
Parameter:	All Base Neutral Compounds	**Method:**	EPA SW-846 8270

Qualifier:
*

Explanation:
The surrogates were out of control low when compared to the control limits.

Qualification/Narrative:
Additional sample was not available for re-extraction. All positive results and reporting limits must be considered estimated.

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-01
Sample ID: MW-D
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 4.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	10	ug/L
1,3-Dichlorobenzene	U	10	ug/L
1,4-Dichlorobenzene	U	10	ug/L
1,2-Dichlorobenzene	U	10	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	10	ug/L
N-Nitroso-di-n-propylamine	U	10	ug/L
Hexachloroethane	U	10	ug/L
Nitrobenzene	U	10	ug/L
Isophorone	U	10	ug/L
bis(2-Chloroethoxy)methane	U	10	ug/L
1,2,4-Trichlorobenzene	U	10	ug/L
Naphthalene	220	10	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	10	ug/L
2-Methylnaphthalene	20	10	ug/L
Hexachlorocyclopentadiene	U	21	ug/L
2-Chloronaphthalene	U	10	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	10	ug/L
Acenaphthylene	20	10	ug/L
2,6-Dinitrotoluene	U	10	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	10	ug/L
Dibenzofuran	16	10	ug/L
2,4-Dinitrotoluene	U	10	ug/L
Diethylphthalate	U	10	ug/L
Fluorene	18	10	ug/L
4-Chlorophenyl-phenylether	U	10	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	10	ug/L
4-Bromophenyl-phenylether	U	10	ug/L
Hexachlorobenzene	U	10	ug/L
Phenanthrene	68	10	ug/L
Anthracene	14	10	ug/L
Carbazole	20	10	ug/L
Di-n-butylphthalate	U	10	ug/L
Fluoranthene	54	10	ug/L
Pyrene	28	10	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-01
Sample ID: MW-D
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 4.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	10 ug/L
Benzo(a)anthracene	U	10 ug/L
Chrysene	U	10 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	12	10 ug/L
Di-n-octylphthalate	U	10 ug/L
Benzo(b)fluoranthene	10	10 ug/L
Benzo(k)fluoranthene	U	10 ug/L
Benzo(a)pyrene	U	10 ug/L
Indeno(1,2,3-cd)pyrene	U	10 ug/L
Dibenzo(a,h)anthracene	U	10 ug/L
Benzo(g,h,i)perylene	U	10 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	78 %	46 - 95
2-Fluorobiphenyl	41 %	40 - 93
p-Terphenyl-d14	40 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run *- Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-02
Sample ID: MW-E
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	22	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	9.3	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	57	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	7.7	5.0	ug/L
Hexachlorocyclopentadiene	U	10	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	6.4	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	7.6	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	8.9	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	38	5.0	ug/L
Anthracene	7.8	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	28	5.0	ug/L
Pyrene	20	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-02
Sample ID: MW-E
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	5.5	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	53 %	46 - 95
2-Fluorobiphenyl	49 %	40 - 93
p-Terphenyl-d14	29 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-03
Sample ID: MW-H
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	*	5.0	ug/L
1,3-Dichlorobenzene	U	*	5.0	ug/L
1,4-Dichlorobenzene	U	*	5.0	ug/L
1,2-Dichlorobenzene	U	*	5.0	ug/L
Benzyl alcohol	U	*	50	ug/L
bis(2-Chloroisopropyl)ether	U	*	5.0	ug/L
N-Nitroso-di-n-propylamine	U	*	5.0	ug/L
Hexachloroethane	U	*	5.0	ug/L
Nitrobenzene	U	*	5.0	ug/L
Isophorone	U	*	5.0	ug/L
bis(2-Chloroethoxy)methane	U	*	5.0	ug/L
1,2,4-Trichlorobenzene	U	*	5.0	ug/L
Naphthalene	U	*	5.0	ug/L
4-Chloroaniline	U	*	20	ug/L
Hexachloro-1,3-butadiene	U	*	5.0	ug/L
2-Methylnaphthalene	U	*	5.0	ug/L
Hexachlorocyclopentadiene	U	*	5.0	ug/L
2-Chloronaphthalene	U	*	5.0	ug/L
2-Nitroaniline	U	*	20	ug/L
Dimethylphthalate	U	*	5.0	ug/L
Acenaphthylene	U	*	5.0	ug/L
2,6-Dinitrotoluene	U	*	5.0	ug/L
3-Nitroaniline	U	*	20	ug/L
Acenaphthene	U	*	5.0	ug/L
Dibenzofuran	U	*	5.0	ug/L
2,4-Dinitrotoluene	U	*	5.0	ug/L
Diethylphthalate	U	*	5.0	ug/L
Fluorene	U	*	5.0	ug/L
4-Chlorophenyl-phenylether	U	*	5.0	ug/L
4-Nitroaniline	U	*	20	ug/L
N-Nitrosodiphenylamine	U	*	5.0	ug/L
4-Bromophenyl-phenylether	U	*	5.0	ug/L
Hexachlorobenzene	U	*	5.0	ug/L
Phenanthrene	U	*	5.0	ug/L
Anthracene	U	*	5.0	ug/L
Carbazole	U	*	10	ug/L
Di-n-butylphthalate	U	*	5.0	ug/L
Fluoranthene	U	*	5.0	ug/L
Pyrene	U	*	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
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X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-03
Sample ID: MW-H
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
Butylbenzylphthalate	U	*	5.0	ug/L
Benzo(a)anthracene	U	*	5.0	ug/L
Chrysene	U	*	5.0	ug/L
3,3'-Dichlorobenzidine	U	*	20	ug/L
bis(2-Ethylhexyl)phthalate	U	*	5.0	ug/L
Di-n-octylphthalate	U	*	5.0	ug/L
Benzo(b)fluoranthene	U	*	5.0	ug/L
Benzo(k)fluoranthene	U	*	5.0	ug/L
Benzo(a)pyrene	U	*	5.0	ug/L
Indeno(1,2,3-cd)pyrene	U	*	5.0	ug/L
Dibenzo(a,h)anthracene	U	*	5.0	ug/L
Benzo(g,h,i)perylene	U	*	5.0	ug/L
Surrogates	**RECOVERY**		**CONTROL LIMITS**	
Nitrobenzene-d5	43 %	*	46 - 95	
2-Fluorobiphenyl	35 %	*	40 - 93	
p-Terphenyl-d14	43 %	*	54 - 116	

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS		REPORTING LIMITS	
bis(2-Chloroethyl)ether	U		5.0	ug/L
1,3-Dichlorobenzene	U		5.0	ug/L
1,4-Dichlorobenzene	U		5.0	ug/L
1,2-Dichlorobenzene	U		5.0	ug/L
Benzyl alcohol	U		50	ug/L
bis(2-Chloroisopropyl)ether	22		5.0	ug/L
N-Nitroso-di-n-propylamine	U		5.0	ug/L
Hexachloroethane	U		5.0	ug/L
Nitrobenzene	U		5.0	ug/L
Isophorone	U		5.0	ug/L
bis(2-Chloroethoxy)methane	U		5.0	ug/L
1,2,4-Trichlorobenzene	U		5.0	ug/L
Naphthalene	170	E	5.0	ug/L
4-Chloroaniline	U		20	ug/L
Hexachloro-1,3-butadiene	U		5.0	ug/L
2-Methylnaphthalene	13		5.0	ug/L
Hexachlorocyclopentadiene	U		5.0	ug/L
2-Chloronaphthalene	U		5.0	ug/L
2-Nitroaniline	U		20	ug/L
Dimethylphthalate	U		5.0	ug/L
Acenaphthylene	11		5.0	ug/L
2,6-Dinitrotoluene	U		5.0	ug/L
3-Nitroaniline	U		20	ug/L
Acenaphthene	U		5.0	ug/L
Dibenzofuran	6.2		5.0	ug/L
2,4-Dinitrotoluene	U		5.0	ug/L
Diethylphthalate	U		5.0	ug/L
Fluorene	8.6		5.0	ug/L
4-Chlorophenyl-phenylether	U		5.0	ug/L
4-Nitroaniline	U		20	ug/L
N-Nitrosodiphenylamine	U		5.0	ug/L
4-Bromophenyl-phenylether	U		5.0	ug/L
Hexachlorobenzene	U		5.0	ug/L
Phenanthrene	16		5.0	ug/L
Anthracene	U		5.0	ug/L
Carbazole	U		10	ug/L
Di-n-butylphthalate	U		5.0	ug/L
Fluoranthene	8.7		5.0	ug/L
Pyrene	6.6		5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
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X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	59 %	46 - 95
2-Fluorobiphenyl	54 %	40 - 93
p-Terphenyl-d14	66 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04-2
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.2
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/06/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	X	5.5	ug/L
1,3-Dichlorobenzene	X	5.5	ug/L
1,4-Dichlorobenzene	X	5.5	ug/L
1,2-Dichlorobenzene	X	5.5	ug/L
Benzyl alcohol	X	50	ug/L
bis(2-Chloroisopropyl)ether	X	5.5	ug/L
N-Nitroso-di-n-propylamine	X	5.5	ug/L
Hexachloroethane	X	5.5	ug/L
Nitrobenzene	X	5.5	ug/L
Isophorone	X	5.5	ug/L
bis(2-Chloroethoxy)methane	X	5.5	ug/L
1,2,4-Trichlorobenzene	X	5.5	ug/L
Naphthalene	120	5.5	ug/L
4-Chloroaniline	X	20	ug/L
Hexachloro-1,3-butadiene	X	5.5	ug/L
2-Methylnaphthalene	X	5.5	ug/L
Hexachlorocyclopentadiene	X	11	ug/L
2-Chloronaphthalene	X	5.5	ug/L
2-Nitroaniline	X	20	ug/L
Dimethylphthalate	X	5.5	ug/L
Acenaphthylene	X	5.5	ug/L
2,6-Dinitrotoluene	X	5.5	ug/L
3-Nitroaniline	X	20	ug/L
Acenaphthene	X	5.5	ug/L
Dibenzofuran	X	5.5	ug/L
2,4-Dinitrotoluene	X	5.5	ug/L
Diethylphthalate	X	5.5	ug/L
Fluorene	X	5.5	ug/L
4-Chlorophenyl-phenylether	X	5.5	ug/L
4-Nitroaniline	X	20	ug/L
N-Nitrosodiphenylamine	X	5.5	ug/L
4-Bromophenyl-phenylether	X	5.5	ug/L
Hexachlorobenzene	X	5.5	ug/L
Phenanthrene	X	5.5	ug/L
Anthracene	X	5.5	ug/L
Carbazole	X	10	ug/L
Di-n-butylphthalate	X	5.5	ug/L
Fluoranthene	X	5.5	ug/L
Pyrene	X	5.5	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-04-2
Sample ID: MW-J
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 2.2
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/06/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	X	5.5 ug/L
Benzo(a)anthracene	X	5.5 ug/L
Chrysene	X	5.5 ug/L
3,3'-Dichlorobenzidine	X	20 ug/L
bis(2-Ethylhexyl)phthalate	X	5.5 ug/L
Di-n-octylphthalate	X	5.5 ug/L
Benzo(b)fluoranthene	X	5.5 ug/L
Benzo(k)fluoranthene	X	5.5 ug/L
Benzo(a)pyrene	X	5.5 ug/L
Indeno(1,2,3-cd)pyrene	X	5.5 ug/L
Dibenzo(a,h)anthracene	X	5.5 ug/L
Benzo(g,h,i)perylene	X	5.5 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% X	46 - 95
2-Fluorobiphenyl	% X	40 - 93
p-Terphenyl-d14	% X	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-06
Sample ID: MW-L
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-06
Sample ID: MW-L
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	58 %	46 - 95
2-Fluorobiphenyl	56 %	40 - 93
p-Terphenyl-d14	56 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-07
Sample ID: MW-K
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-07
Sample ID: MW-K
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	80 %	46 - 95
2-Fluorobiphenyl	55 %	40 - 93
p-Terphenyl-d14	38 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-08
Sample ID: MW-A
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	13	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	15	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.5	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-08
Sample ID: MW-A
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.1
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	57 %	46 - 95
2-Fluorobiphenyl	61 %	40 - 93
p-Terphenyl-d14	47 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-09
Sample ID: MW-B
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 140
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	350	ug/L
1,3-Dichlorobenzene	U	350	ug/L
1,4-Dichlorobenzene	U	350	ug/L
1,2-Dichlorobenzene	U	350	ug/L
Benzyl alcohol	U	350	ug/L
bis(2-Chloroisopropyl)ether	U	350	ug/L
N-Nitroso-di-n-propylamine	U	350	ug/L
Hexachloroethane	U	350	ug/L
Nitrobenzene	U	350	ug/L
Isophorone	U	350	ug/L
bis(2-Chloroethoxy)methane	U	350	ug/L
1,2,4-Trichlorobenzene	U	350	ug/L
Naphthalene	680	350	ug/L
4-Chloroaniline	U	350	ug/L
Hexachloro-1,3-butadiene	U	350	ug/L
2-Methylnaphthalene	U	350	ug/L
Hexachlorocyclopentadiene	U	700	ug/L
2-Chloronaphthalene	U	350	ug/L
2-Nitroaniline	U	350	ug/L
Dimethylphthalate	U	350	ug/L
Acenaphthylene	U	350	ug/L
2,6-Dinitrotoluene	U	350	ug/L
3-Nitroaniline	U	350	ug/L
Acenaphthene	U	350	ug/L
Dibenzofuran	U	350	ug/L
2,4-Dinitrotoluene	U	350	ug/L
Diethylphthalate	U	350	ug/L
Fluorene	U	350	ug/L
4-Chlorophenyl-phenylether	U	350	ug/L
4-Nitroaniline	U	350	ug/L
N-Nitrosodiphenylamine	U	350	ug/L
4-Bromophenyl-phenylether	U	350	ug/L
Hexachlorobenzene	U	350	ug/L
Phenanthrene	560	350	ug/L
Anthracene	U	350	ug/L
Carbazole	U	350	ug/L
Di-n-butylphthalate	U	350	ug/L
Fluoranthene	400	350	ug/L
Pyrene	U	350	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-09
Sample ID: MW-B
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 140
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	350 ug/L
Benzo(a)anthracene	U	350 ug/L
Chrysene	U	350 ug/L
3,3'-Dichlorobenzidine	U	350 ug/L
bis(2-Ethylhexyl)phthalate	U	350 ug/L
Di-n-octylphthalate	U	350 ug/L
Benzo(b)fluoranthene	U	350 ug/L
Benzo(k)fluoranthene	U	350 ug/L
Benzo(a)pyrene	U	350 ug/L
Indeno(1,2,3-cd)pyrene	U	350 ug/L
Dibenzo(a,h)anthracene	U	350 ug/L
Benzo(g,h,i)perylene	U	350 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% *	46 - 95
2-Fluorobiphenyl	% *	40 - 93
p-Terphenyl-d14	% *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-10
Sample ID: MW-C
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 26
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	65	ug/L
1,3-Dichlorobenzene	U	65	ug/L
1,4-Dichlorobenzene	U	65	ug/L
1,2-Dichlorobenzene	U	65	ug/L
Benzyl alcohol	U	65	ug/L
bis(2-Chloroisopropyl)ether	U	65	ug/L
N-Nitroso-di-n-propylamine	U	65	ug/L
Hexachloroethane	U	65	ug/L
Nitrobenzene	U	65	ug/L
Isophorone	U	65	ug/L
bis(2-Chloroethoxy)methane	U	65	ug/L
1,2,4-Trichlorobenzene	U	65	ug/L
Naphthalene	67	65	ug/L
4-Chloroaniline	U	65	ug/L
Hexachloro-1,3-butadiene	U	65	ug/L
2-Methylnaphthalene	U	65	ug/L
Hexachlorocyclopentadiene	U	130	ug/L
2-Chloronaphthalene	U	65	ug/L
2-Nitroaniline	U	65	ug/L
Dimethylphthalate	U	65	ug/L
Acenaphthylene	U	65	ug/L
2,6-Dinitrotoluene	U	65	ug/L
3-Nitroaniline	U	65	ug/L
Acenaphthene	U	65	ug/L
Dibenzofuran	U	65	ug/L
2,4-Dinitrotoluene	U	65	ug/L
Diethylphthalate	U	65	ug/L
Fluorene	U	65	ug/L
4-Chlorophenyl-phenylether	U	65	ug/L
4-Nitroaniline	U	65	ug/L
N-Nitrosodiphenylamine	U	65	ug/L
4-Bromophenyl-phenylether	U	65	ug/L
Hexachlorobenzene	U	65	ug/L
Phenanthrene	U	65	ug/L
Anthracene	U	65	ug/L
Carbazole	U	65	ug/L
Di-n-butylphthalate	U	65	ug/L
Fluoranthene	U	65	ug/L
Pyrene	U	65	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-10
Sample ID: MW-C
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 26
Sample Date: 06/17/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/02/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	65 ug/L
Benzo(a)anthracene	U	65 ug/L
Chrysene	U	65 ug/L
3,3'-Dichlorobenzidine	U	65 ug/L
bis(2-Ethylhexyl)phthalate	U	65 ug/L
Di-n-octylphthalate	U	65 ug/L
Benzo(b)fluoranthene	U	65 ug/L
Benzo(k)fluoranthene	U	65 ug/L
Benzo(a)pyrene	U	65 ug/L
Indeno(1,2,3-cd)pyrene	U	65 ug/L
Dibenzo(a,h)anthracene	U	65 ug/L
Benzo(g,h,i)perylene	U	65 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	% *	46 - 95
2-Fluorobiphenyl	% *	40 - 93
p-Terphenyl-d14	% *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-11
Sample ID: MW-F
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 5.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/08/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	13	ug/L
1,3-Dichlorobenzene	U	13	ug/L
1,4-Dichlorobenzene	U	13	ug/L
1,2-Dichlorobenzene	U	13	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	13	ug/L
N-Nitroso-di-n-propylamine	U	13	ug/L
Hexachloroethane	U	13	ug/L
Nitrobenzene	U	13	ug/L
Isophorone	U	13	ug/L
bis(2-Chloroethoxy)methane	U	13	ug/L
1,2,4-Trichlorobenzene	U	13	ug/L
Naphthalene	U	13	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	13	ug/L
2-Methylnaphthalene	U	13	ug/L
Hexachlorocyclopentadiene	U	25	ug/L
2-Chloronaphthalene	U	13	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	13	ug/L
Acenaphthylene	U	13	ug/L
2,6-Dinitrotoluene	U	13	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	13	ug/L
Dibenzofuran	U	13	ug/L
2,4-Dinitrotoluene	U	13	ug/L
Diethylphthalate	U	13	ug/L
Fluorene	U	13	ug/L
4-Chlorophenyl-phenylether	U	13	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	13	ug/L
4-Bromophenyl-phenylether	U	13	ug/L
Hexachlorobenzene	U	13	ug/L
Phenanthrene	U	13	ug/L
Anthracene	U	13	ug/L
Carbazole	U	13	ug/L
Di-n-butylphthalate	U	13	ug/L
Fluoranthene	U	13	ug/L
Pyrene	U	13	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
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Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113-11
Sample ID: MW-F
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 5.0
Sample Date: 06/18/99
Sample Received: 06/21/99
Extraction Date: 06/23/99
Analysis Date: 07/08/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	13 ug/L
Benzo(a)anthracene	U	13 ug/L
Chrysene	U	13 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	13 ug/L
Di-n-octylphthalate	U	13 ug/L
Benzo(b)fluoranthene	U	13 ug/L
Benzo(k)fluoranthene	U	13 ug/L
Benzo(a)pyrene	U	13 ug/L
Indeno(1,2,3-cd)pyrene	U	13 ug/L
Dibenzo(a,h)anthracene	U	13 ug/L
Benzo(g,h,i)perylene	U	13 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	64 %	46 - 95
2-Fluorobiphenyl	89 %	40 - 93
p-Terphenyl-d14	50 % *	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

Quality Control Results

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

July 8, 1999
Ms. Beth Vens
MDEQ

RE: TRACE ID X113
MDEQ-ERD Project: #455100/BASF Riverview

QUALITY CONTROL RESULTS
STATEMENT OF DATA QUALIFICATIONS

There were no problems encountered during analysis of the samples that resulted in qualification or estimation of data. Quality control data which did not meet specifications, but had no impact on actual sample data, are narrated on the individual quality control reports.

The QA/QC results associated with the analysis of these samples have been reviewed by Mr. Ray V. Buhl. To the best knowledge of the signer, the QA/QC data is complete and accurate. The review was completed July 8 1999.

The percentage of unqualified measurements for this project was 92%.

TRACE ANALYTICAL LABORATORIES, Inc.

Ray V. Buhl

Ray V. Buhl
Laboratory Manager

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113 WB062301
Sample ID: Method Blank
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: NA
Sample Received: NA
Extraction Date: 06/23/99
Analysis Date: 07/01/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS	
bis(2-Chloroethyl)ether	U	5.0	ug/L
1,3-Dichlorobenzene	U	5.0	ug/L
1,4-Dichlorobenzene	U	5.0	ug/L
1,2-Dichlorobenzene	U	5.0	ug/L
Benzyl alcohol	U	50	ug/L
bis(2-Chloroisopropyl)ether	U	5.0	ug/L
N-Nitroso-di-n-propylamine	U	5.0	ug/L
Hexachloroethane	U	5.0	ug/L
Nitrobenzene	U	5.0	ug/L
Isophorone	U	5.0	ug/L
bis(2-Chloroethoxy)methane	U	5.0	ug/L
1,2,4-Trichlorobenzene	U	5.0	ug/L
Naphthalene	U	5.0	ug/L
4-Chloroaniline	U	20	ug/L
Hexachloro-1,3-butadiene	U	5.0	ug/L
2-Methylnaphthalene	U	5.0	ug/L
Hexachlorocyclopentadiene	U	5.0	ug/L
2-Chloronaphthalene	U	5.0	ug/L
2-Nitroaniline	U	20	ug/L
Dimethylphthalate	U	5.0	ug/L
Acenaphthylene	U	5.0	ug/L
2,6-Dinitrotoluene	U	5.0	ug/L
3-Nitroaniline	U	20	ug/L
Acenaphthene	U	5.0	ug/L
Dibenzofuran	U	5.0	ug/L
2,4-Dinitrotoluene	U	5.0	ug/L
Diethylphthalate	U	5.0	ug/L
Fluorene	U	5.0	ug/L
4-Chlorophenyl-phenylether	U	5.0	ug/L
4-Nitroaniline	U	20	ug/L
N-Nitrosodiphenylamine	U	5.0	ug/L
4-Bromophenyl-phenylether	U	5.0	ug/L
Hexachlorobenzene	U	5.0	ug/L
Phenanthrene	U	5.0	ug/L
Anthracene	U	5.0	ug/L
Carbazole	U	10	ug/L
Di-n-butylphthalate	U	5.0	ug/L
Fluoranthene	U	5.0	ug/L
Pyrene	U	5.0	ug/L

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 231-773-5998 • Fax 231-773-6537

Ms. Beth Vens
MDEQ
Project: #455100/BASF Riverview

Trace ID: X113 WB062301
Sample ID: Method Blank
Batch ID: BNA062301W
% Solids: NA

Method: SW-846 8270
Matrix: Water
DL Multiplier: 1.0
Sample Date: NA
Sample Received: NA
Extraction Date: 06/23/99
Analysis Date: 07/01/99
Report Date: 07/08/99

Semi-Volatile Organic Analytes	RESULTS	REPORTING LIMITS
Butylbenzylphthalate	U	5.0 ug/L
Benzo(a)anthracene	U	5.0 ug/L
Chrysene	U	5.0 ug/L
3,3'-Dichlorobenzidine	U	20 ug/L
bis(2-Ethylhexyl)phthalate	U	5.0 ug/L
Di-n-octylphthalate	U	5.0 ug/L
Benzo(b)fluoranthene	U	5.0 ug/L
Benzo(k)fluoranthene	U	5.0 ug/L
Benzo(a)pyrene	U	5.0 ug/L
Indeno(1,2,3-cd)pyrene	U	5.0 ug/L
Dibenzo(a,h)anthracene	U	5.0 ug/L
Benzo(g,h,i)perylene	U	5.0 ug/L
Surrogates	**RECOVERY**	**CONTROL LIMITS**
Nitrobenzene-d5	46 %	46 - 95
2-Fluorobiphenyl	41 %	40 - 93
p-Terphenyl-d14	65 %	54 - 116

TRACE ID Suffix Key: DUP - Duplicate MS - Matrix Spike MSD - Matrix Spike Duplicate RPD - Relative Percent Difference QC - Additional Quality Control - # - Rerun
Qualifier Key: U - Compound not detected J - Estimated value B - Analyte present in blank E - Exceeded the range of calibration D - Quantified from a dilution
X - Quantified from a previous run S - Quantified from a subsequent run * - Results do not meet QC acceptance criteria, see narrative

TRACE Analytical Laboratories, Inc.
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Laboratory Control Spike Recovery and RPD Summary Report

Trace ID : WS062301/WSD062301
QC Batch ID: BNA 062301W
Analytical Batch: B70199
Extraction Date: 6-23-99
Analysis Date: 7-01-99

Analyst Initials: JM
Matrix: WATER
Method Number: 8270
Client: MDEQ
MS Multiplier: 1.00
MSD Multiplier: 1.00

Compound Name	Blank Conc. ug/l	LCS Spk Added ug/l	LCSD Spk Added ug/l	LCS Final ug/l	LCSD Final ug/l	LCS %Rec	LCSD %Rec	RPD	QC Limits RPD	QC Limits %Rec
1,4-Dichlorobenzene	0.0	50	50	22	21	44	42	4.9	19	38-83
N-Nitroso-di-n-propylamine	0.0	50	50	24	23	49	46 *	6.3	24	47-108
1,2,4-Trichlorobenzene	0.0	50	50	27	25	54	51	6.8	20	37-87
Acenaphthene	0.0	50	50	24	25	49	50	3.7	23	49-90
2,4-Dinitrotoluene	0.0	50	50	28	29	56	59	4.9	24	44-116
Pyrene	0.0	50	50	37	38	74	75	1.4	21	63-107

Surrogates	Amount Added	LCS Conc	LCSD Conc	LCS %Rec	LCSD %Rec	QC Limits % Rec
Nitrobenzene-d5	100	54	49	54	49	46-95
2-Fluorobiphenyl	100	49	46	49	46	40-93
p-Terphenyl-d14	100	70	72	70	72	54-116

* = see narrative below

N-Nitroso-di-n-propylamine

* The laboratory control sample duplicate recovery was out of control when compared to the control limits. Because the laboratory control sample recovery, and the relative percent difference between the laboratory control sample and the laboratory control sample duplicate were in control, no data requires qualification.

From: Shelly Simpson
To: Beth Vens
Date: Wed, Jul 28, 1999 10:32 AM
Subject: Inv. #30243 - Trace Lab

I do not have a funding authorization for the above invoice for the BASF Riverview (Federal Marine Term). Also you have used the PCA 30719, which is primarily used for salaries and wages. If you have a copy of the funding authorization you can fax it to me so I can't process the payment. If not, we will have to get one before I can pay it.

Thanks!

Shelly Simpson
DEQ-ERD Administration
Ph: (517) 241-8559
Fax: (517) 373-2637
email: simpsos@state.mi.us

7/30/99

Talked to Shelly - she will use a different PCA# and process this.

Beth Vens

DEQ An Equal Opportunity Employer

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – ENVIRONMENTAL RESPONSE DIVISION

INVOICE PAYMENT AUTHORIZATION

DATE: July 20, 1999

TO: Kathy Crawley, ERD Administration

FROM: **Beth Vens, SE Mi. D.O.**

Contract (PO/DPO/CR) Number: **Y80243**		Site Name and County: **BASF Riverview, Wayne Co.**	
Invoice Number(s) and Amount(s):(Maximum of 6 Invoices) **30243**			
Period Covered: **6/99-7/99**		Site ID (MERA Number): **820016**	
Contractor Name: **Trace Labs**		Payee I.D. Number:	
AY:	Index: **48028**	PCA: **30719**	Project/Phase: **455100/00**

In accordance with the contract documents, based on on-site observations and the data comprising the subject invoice, the Project Director certifies that the work has progressed to the point indicated; that to the best of the Project Director's knowledge, information and belief, the quality of the work is in accordance with the contract documents; and that the contractor is entitled to payment of the amount approved.

AMOUNT APPROVED FOR PAYMENT: **$1,320.00**	AUTHORIZED SIGNATURE: Beth Vens

COMMENTS:

(Explanation required if invoice amount differs from amount approved for payment. Use additional sheets as necessary)

EQ 4472e (Oct. 1998)

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

MDEQ Project/Site Name: BASE Riverview
MDEQ Manager: Beth Vens
District: SE Michigan
Date Authorized/Samples Received: 06/02/99
Date Report Issued: 07/08/99
Report Issued To: Beth Vens
Trace ID: X113

COPY

Trace Invoice Number: 30243
Invoice Date: 07/14/99
Due Date: 08/13/99
AY: Not Available
Index: 48028
PCA: 30719
Project/Phase: 455100/00
Contract Number: Y80243

Amount This Invoice: $1,320.00

REMIT TO: Trace Analytical Laboratories, Inc.
Attn: Marcy Coron
2241 Black Creek Road
Muskegon, MI 49444
(616) 773-5998

Questions regarding invoice: Ginger Martinez, Ext. 222

Invoice Number must be referenced with payment to ensure proper credit. If not paid within thirty (30) days this invoice shall be subject to 1/2 percent per month service charge effective as of the date of delivery. In the event it is necessary to commence collection proceedings buyer shall pay all collection costs incurred including reasonable attorney's fees.

RECEIVED ERD S.E. MICH.
JUL 20 1999
FILE
COUNTY

TRACE Analytical Laboratories, Inc.
2241 Black Creek Road • Muskegon, MI 49444-2673 • Phone 616-773-5998 • Fax 616-773-6537

INVOICE SUMMARY

COPY

Client #	Lab #	Matrix	Task ID	Task	Cost Each	
MW-D	X113-01	Water	56	Base Neutrals	$90.00	
MW-D	X113-01	Water	26	Liquid Extraction	$20.00	$110.00
MW-E	X113-02	Water	56	Base Neutrals	$90.00	
MW-E	X113-02	Water	26	Liquid Extraction	$20.00	$110.00
MW-H	X113-03	Water	56	Base Neutrals	$90.00	
MW-H	X113-03	Water	26	Liquid Extraction	$20.00	$110.00
MW-J	X113-04	Water	56	Base Neutrals	$90.00	
MW-J	X113-04	Water	26	Liquid Extraction	$20.00	$110.00
MW-I	X113-05	Water	56	Base Neutrals	$90.00	
MW-I	X113-05	Water	26	Liquid Extraction	$20.00	$110.00
MW-L	X113-06	Water	56	Base Neutrals	$90.00	
MW-L	X113-06	Water	26	Liquid Extraction	$20.00	$110.00
MW-K	X113-07	Water	56	Base Neutrals	$90.00	
MW-K	X113-07	Water	26	Liquid Extraction	$20.00	$110.00
MW-A	X113-08	Water	56	Base Neutrals	$90.00	
MW-A	X113-08	Water	26	Liquid Extraction	$20.00	$110.00
MW-B	X113-09	Water	56	Base Neutrals	$90.00	
MW-B	X113-09	Water	26	Liquid Extraction	$20.00	$110.00
MW-C	X113-10	Water	56	Base Neutrals	$90.00	
MW-C	X113-10	Water	26	Liquid Extraction	$20.00	$110.00
MW-G	X113-11	Water	56	Base Neutrals	$90.00	
MW-G	X113-11	Water	26	Liquid Extraction	$20.00	$110.00
MW-F	X113-12	Water	56	Base Neutrals	$90.00	
MW-F	X113-12	Water	26	Liquid Extraction	$20.00	$110.00

Amount This Invoice: $1,320.00

The basis for the Agency's initial scoring is reflected in this public record. The Agency carefully considers every written comment, including late comments to the extent practicable, before adding a site to the NPL. The Agency responds to all site-specific comments in a "Support Document" such as this, which is available in the EPA Headquarters Superfund Docket in Washington, D.C., and the appropriate Regional Superfund Docket when the final rule is published in the Federal Register. The Agency has been, and will continue to be, rigorous in its adherence to regulations and policies to ensure that individual and corporate rights to due process are not violated.

Regarding Monsanto's concerns for adverse economic impacts including the costs of remediating the Sauget Area 1 site, *the NPL serves primarily as an informational list. Inclusion of a site or facility on the list does not in itself reflect a judgment of the activities of its owner or operator, but rather reflects EPA's judgment that a significant release or threat of release has occurred, and that the site is a priority for further investigation under CERCLA. Furthermore, the focus of the CERCLA program is to identify and, where necessary, address hazardous substance releases that may pose a threat to health or the environment.* In the present case, the only PRPs that are identified in the record are those whose link to the site is incontrovertible. Their "reputation in the business and residential communities" should not be unduly damaged by the listing of the site.

> ~~**Note to EPA: I have modified the end of the above canned response (#25--Adverse Economic Impacts) because the Court is now clearly concerned about this aspect of the listing process. For example, "This circuit has clearly recognized the harmful effects of being linked to a site placed on the NPL. Bd. of Regents of Univ. of Wash. v. EPA, 86 F.3d 1214, 1217 (D.C. Cir. 1996); see also Kent County v. EPA, 963 F.2d 391, 394 (D.C. Cir. 1992) (damage to business reputation, loss of property value and other considerable costs)." (Mead Corp. v. EPA [1996 WL 653637 (D.C. Cir.), November 12, 1996]). The canned response two paragraphs above is taken from $10--Due Process/Access to Decision-Making Process.**~~

Mike: This might help w/ scoring BASF

X.1.3.2 Aggregation

Many of the comments submitted on the Sauget Area 1 site had to do with the aggregation of the sources into a single site. Monsanto also identified examples of other NPL sites at which EPA did not aggregate even though it claimed there was more reason to do so than at Sauget Area 1. The general issue of source aggregation and the specific examples of NPL sites at which the Agency declined to combine sites are ~~is~~ addressed in this section of the Support Document. Comments on the inclusion of specific sources are addressed in other sections below.

Aggregation Policy

Cerro and Monsanto claimed that EPA violated its own policies in aggregating the nine "sites" for HRS scoring. They cited EPA's general aggregation policy that states "For purposes of the NPL, EPA has

decided that in most cases such sites should be scored and listed individually because the HRS scores more accurately reflect the hazards associated with a site if the site is scored individually." [48 FR 40663, September 8, 1983] Further, the commenters argued that EPA's anticipation of a consolidated response does not warrant aggregating the sites for listing purposes. Monsanto cited several EPA publications in which the Agency has indicated that it may place sites individually on the NPL, yet combine their remedy. [1, 6, 7, 29, 126, 129, 130] Monsanto stated, "Lacking information that could even arguably support HRS scores of 28.5 or higher for each of the nine sites, EPA improperly aggregated them," thereby "grossly" exaggerating their threat. [131]

The commenters reviewed the site in relationship to each of the components of EPA's aggregation policy. Monsanto and Cerro argued that these sites were not "part of the same operation which deposited similar substances using similar means of disposal." They reviewed ownership of the operations and concluded "EPA's own descriptions could not demonstrate more clearly that the distinct areas were *not* all part of the same operation." Monsanto argued that substances at the sites were not deposited using similar means of disposal, stating that EPA "alleges" some sites to be landfills, others to be impoundments, and one contaminated soil. [The commenter elsewhere disagreed with some of these designations, as discussed in Section X.1.3.5 of this document, Source Characterization.] Monsanto also stated that EPA "fails to demonstrate that similar substances were deposited at the nine sites." It claimed that while "sampling data relied upon by EPA may indicate some overlap in substances found at some of the nine sites,. . .that does not demonstrate whether those substances were deposited at each of the sites or migrated to them." [8, 9, 136, 137, 138]

Cerro also argued that the sites included are non-contiguous and that there is a substantial distance between them. It claimed that the entire Sauget Area 1 site "extends more than two miles." Monsanto said, "EPA's. . .error lies in its attempts to aggregate the nine distinct and disparate areas that spread between the villages of Sauget and Cahokia into a single 'site.'" [10, 38]

Monsanto cited EPA's policy of aggregating sites if a single cleanup strategy is appropriate. It pointed out that this is not the case at the Sauget Area 1 sites because some of the sites are landfills, while others are impoundments or contaminated soil. Finally, Monsanto cited the EPA aggregation policy provision that sites may be aggregated if they involve the same potentially responsible parties and stated that the nine sites in Sauget Area 1 "involve a large number of different PRPs." [139, 140]

Monsanto asserted that aggregation has "tainted" each of the nine sites. It cited the extrapolation of the allegedly incorrect observed release to surface water and air to all nine sources and the inflated value assigned to Hazardous Waste Quantity as examples. [132, 134, 135]

A technical report on the listing proposal, prepared by Menzie-Cura and Associates for Monsanto, based its objections to the listing on its alleged inconsistency with the *Hazard Ranking System Guidance Manual.*

The report references Highlight 4-6 on page 51 of the Manual, titled "Checklist for Source Aggregation," which lists six criteria that must be addressed before aggregating sources for purposes of scoring a particular pathway. These include similarity of source type, target populations, containment, and waste characteristics, and whether the sites are affecting the same watershed or aquifer. [Menzie-Cura report at Section 2.2, page 23]

In a second comment letter, Monsanto stated that ". . .on Tuesday, November 12, 1996, the United States Court of Appeals for the District of Columbia Circuit held unlawful EPA's use of its Aggregation Policy to list sites on the NPL that would not otherwise meet the criteria for listing. See *Mead Corp. v. EPA*, . . . This highly significant development is dispositive of the Agency's proposal to list the 'Sauget Area 1' sites on the NPL." Monsanto stated that the Court ". . .flatly rejected EPA's contention that its Aggregation Policy is authorized by CERCLA section 104(d)(4). . .For the sake of argument, the court assumed that CERCLA section 105(a)(8)(B). . .might be construed to permit aggregating sites on the NPL. However, the court concluded that even under such a construction, each site so aggregated must individually qualify for listing." This comment was submitted both as a comment on the proposed listing of Sauget Area 1 on the NPL and as a formal petition to rescind the proposal. [NPL-U20-3-12-L1-R5] [143]

~~**Examples**~~

~~Cerro cited several examples of other NPL facilities that EPA had "refused" to aggregate despite significant similarities: Delaware Sand and Gravel and Army Creek landfills, the Woodland Route 72 and Woodland Route 532 landfills and the Rogers Road and Jacksonville landfills. It claimed that the Sauget Area 1 "sites" fall "far short of the substantial similarities shared by ..." these other sites. [12, 13, 14, 15]~~

In response, all of the comments summarized above interpret the proposed listing of the Sauget Area 1 site on the NPL as a misapplication of EPA's aggregation policy or EPA guidance, or challenge the legality of the aggregation policy itself. This is, however, a misinterpretation of the proposed listing. The policy referenced in the comments was originally published in the preamble to the initial NPL (48 FR 40663, September 8, 1983). The policy briefly discussed circumstances under which the Agency might treat two or more non-contiguous facilities as one for purposes of NPL listing.

Commenters have correctly identified the components of that policy as including whether sites are part of the same operation, such that the substances deposited and the means of disposal are similar, whether a single strategy for cleanup is appropriate, whether PRPs are the same, or whether target populations are the same or substantially overlapping. The statement did not stipulate how many of these similarities would need to apply in order for sites to be combined in any particular instance; it merely identified the kinds of factors that would be relevant to such an action. The statement concludes, "Where the combination of these factors indicates that two non-contiguous locations should be addressed as a single site, the locations will be listed as a single site for purposes of the NPL."

In the present case, however, the aggregation policy referred to by the commenters (whether lawful or unlawful) is not the basis for the proposed listing of the Sauget Area 1 site, nor is it germane to EPA's final listing decision. The Agency concedes, however, that the HRS documentation record and accompanying references at the time of proposal may have been misleading on this point. While the Summary of Sources Evaluated (page 16 of the documentation record at proposal) discusses the combination of "sources" into a single site, the Summary refers to the 1992 "aggregation memorandum" prepared by the State of Illinois. That memorandum (included as Reference 10 at proposal) discusses the aggregation of "sites." The Agency apologizes for any confusion caused by the wording of these two documents. It should be noted, however, that in deciding what sources should be included in a site for proposal to the NPL (whether located on a single facility or on several), the Agency considers the same types of factors as those historically included in its site aggregation policy.

~~The key difference is the contiguityContiguity of the sources is important here. Because the~~The sources making up the Sauget Area 1 site, however, are contiguous, lying both in and on both sides of Dead Creek, and EPA had no need to even consider the~~, EPA is not reliant on an~~ aggregation policy to justify their combination. Rather, the Agency relies on the HRS definition of site, in Section 1.1, as: "where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located. *Such areas may include multiple sources and may include the area between sources* [emphasis added]" [51587].

All of the sources included in the Sauget Area 1 site are contributing to a single area of environmental contamination (Dead Creek), the remediation of which will likely require several different, but coordinated, responses. All of the sources have used the Dead Creek watershed for waste deposition either directly through dumping or surface water outfalls or indirectly through uncontrolled runoff. While the wastes from the sources are not in all cases identical, there is considerable overlap of substances contained in the individual sources, and there is firm documentation of commingling of materials between many of the sources. See, for example, the discussion of Sources 2 and 8 in Section X.1.3.5 of this document. Aroclor 1254 was detected in six of the sources, and Aroclor 1260 was detected in Sources 1 through 8. In fact, most of the wastes are so widely distributed in the various sources making up the site and so intermingled in the soils and sediments of the Dead Creek watershed that to identify a specific contaminant in a release sample as being from any specific source would be impossible. The distribution of contaminants in sources at the site is provided in Section 4.1.2.2.1 of the HRS documentation record as proposed (pages 100 through 102).

Regarding the fact that the site as proposed is comprised of several different source types, this is also not relevant to the site definition. Many sites on the NPL are made up of multiple sources and source types, including sites that are made up of more than one property, as well as those limited to a single facility or property boundary. In the present case, all sources are part of a single environmental problem to which the same potential target populations apply. The threat posed by the site would not be eliminated by the cleanup of any one, or even several, of the sources. Downstream surface water and wetland resources will

continue to be threatened until the site as a whole is addressed.

Neither is the reference to the HRS Guidance Manual discussion of aggregating sources appropriate to the present discussion. That guidance addresses a separate consideration; namely, when individual sources at a site are sufficiently similar (i.e., meet all of the criteria in Highlight 4-6 on page 51 of the Guidance Manual as noted by the Menzie-Cura report), it may provide some benefit to the site scorer, or to the general understanding of the site, to consider them as one source for purposes of scoring individual HRS rating factors (waste quantity, for example). The guidance says specifically "In general, it is advantageous to aggregate sources where possible because this should limit the number of separate sources evaluated without generally changing the overall site score." This is not the case at the Sauget Area 1 site. Multiple sources have not been combined into a single source to facilitate scoring. While a review of the criteria in Highlight 4-6 would suggest that some of the sources in the Sauget site may have been eligible for such combination, it is not a requirement of the HRS and, in the present case, would have offered little economy of effort or improved understanding of the site.

EPA has frequently combined adjacent or nearby sources on separate properties into a single site when these sources contributed to the same release as is the case at Sauget Area 1. The Agency has been consistent in its assertion that property ~~facility~~ boundaries are not relevant or "determinative" considerations in NPL site definition. Many sites, for which the source or sources are limited to a single property are defined and listed as including releases that extend beyond specific ~~the~~ property boundaries. Many other sites are made up of multiple sources on multiple properties contributing to the same surface or ground water problem (as in the present case). Still others are listed simply as area-wide sites where the sources of contamination are unknown or only partially known at the time of listing.

As the Agency has stated repeatedly, the main purpose of the NPL is to identify those sites that may warrant further investigation to assess the nature and extent of the public health and environmental threats associated with the site relative to other candidate sites (52 FR 27509, May 10, 1993). Generally, EPA does not delineate the exact boundaries of a site at NPL listing because the Agency's understanding of a hazardous waste site broadens during subsequent steps in the Superfund process as more information becomes available. The fact that insufficient information is currently available to allow the Agency to determine which particular component of an observed release is attributable to which specific source, among several interacting sources, should not preclude the site's listing. Indeed, the Agency regards listing of the Sauget Area 1 site as critical to its efforts to develop a better understanding and ultimate remediation of the area.

Concerning Monsanto's charge that aggregation has tainted each of the nine sources, EPA disagrees. Monsanto claimed that "EPA compounds this error [the observed release] by attempting to apply its defective conclusion to all nine sites, without properly attributing the alleged release to any one of them." However, the application of the observed release to all nine sources appears nowhere in the HRS documentation record as proposed. The requirement for an observed release is that some portion of the

release be attributable to the "site." It is not a specific requirement of the HRS that a release be traced to a particular source. In the present case, such attribution would be impossible given the complex interaction of the sources making up the site. In the absence of any other known sites in the vicinity likely to have contributed to the contamination in sample X111, and the presence of these contaminants throughout the Dead Creek watershed from years of direct deposition of wastes by local industry, there can be little doubt that contaminants in the wetland originated in Dead Creek.

It should also be pointed out that~~,~~ even if a substance in the observed release to surface water could be attributed to a specific single source, this would not alter the definition of the site. All sources with non-zero containment values and some likelihood of releasing contaminants to Dead Creek would still be included in the site. Monsanto's objection extends to the combination of values from each source to evaluate waste quantity. This objection, however, is without foundation. As explained in Section 2.4.2 of the HRS, hazardous waste quantity for a site is determined by adding the quantities associated with each source [51590].

Examples

Cerro cited several examples of other NPL facilities that EPA had "refused" to aggregate despite significant similarities: Delaware Sand and Gravel and Army Creek landfills, the Woodland Route 72 and Woodland Route 532 landfills, and the Rogers Road and Jacksonville landfills. It claimed that the Sauget Area 1 "sites" fall "far short of the substantial similarities shared by ..." these other sites. [12, 13, 14, 15]

Regarding the three pairs of sites that Cerro identified as being more appropriately combined than the Sauget Area 1 sources, these sites were listed separately because the Agency had sufficient information available at the time of listing. ~~to enable the Agency to do so, consistent with Agency policy to list sites separately whenever possible~~. The commenter has failed to identify any instance where EPA "refused" to list various contaminated parcels together. EPA's earlier decisions to list certain releases separately do not imply any requirement that EPA do so again in the future, and have no bearing on the decision to list the Sauget Area 1 site.

For example, in the case of Delaware Sand and Gravel and Army Creek (EPA Region 3 sites included on the original NPL), the HRS evaluations are quite different. ~~of the ground water pathway is substantially similar.~~ In the surface water pathway, ~~however,~~ the Army Creek score is based partly on an observed release from the site to surface water, while the Delaware Sand and Gravel site was evaluated for its potential to release. Similarly, in the air pathway, the Army Creek evaluation included an observed release from the site to the air. Indeed, a significant portion of the site's overall HRS score derives from the air pathway. At the Delaware Sand and Gravel site, however, no such observed release to air was noted and the pathway was not evaluated. [The original Hazard Ranking System required an observed release in order for the air pathway to be scored (47 FR 31180, July 16, 1982).] While the commenter is correct in noting that there were some similarities between these two sites, the Agency believed the relative risk posed by the sites was best reflected by evaluating and listing them separately and had sufficient site-specific data

to do so.

In the case of the Woodland Township Route 72 and 532 landfills (EPA Region 2 sites included in the first update of the NPL), ~~the similarities between the sites are more pronounced. Both received similar wastes from similar PRPs. But they~~ the sites are located approximately 3 miles apart and impact different populations. While the Route 72 landfill was evaluated for an observed release to ground water, the Route 532 site was evaluated for potential to release to ground water. As indicated by the Record of Decision (ROD) for the Woodland Township Route 72 site (submitted to the Agency as Reference 31 to Cerro's comment), the Route 72 and 532 sites are being remediated simultaneously. The economies gained from this coordinated remediation are explained in the ROD and are consistent with CERCLA Section 104(d)(4) which provides for the treatment of two or more facilities as one for purposes of remediation. For the purpose of NPL listing, however, the objective of informing the public of the relative threats posed by the two sites was best served by listing the sites separately. ~~, and there was ample data available to do so.~~

~~The similarities between the~~ The Jacksonville and Rogers Road landfills (EPA Region 6 sites included in the third update of the NPL) ~~are the most striking of the pairs suggested by Cerro. But here too the sites~~ are located one-half mile apart and have quite distinct impacts. There was no intermingling of wastes from the two sites that would complicate their individual assessment and evaluation. As with the other sites discussed, their listing was consistent with Agency policy to list sites individually whenever possible in order to better reflect relative risks.

The Agency believes that the above pairs of sites were appropriately listed separately based on their relative risk to nearby populations and the information available at the time of listing. The Sauget Area 1 site, however, is a very different type of site. In addition to the fact that ~~While~~ there is more information available on the historical waste management practices at each of the sources contributing to contamination in Dead Creek than was available for the sites discussed above at the time of their listing, the nature of the Sauget site itself advises against ~~precludes~~ their discrete examination. The interaction of the sources with one another, the commingling of their wastes throughout the Dead Creek watershed and their combined potential impact on human populations and environmental resources all urge ~~necessitate~~ their evaluation as a single NPL site.

As made clear in this response, the Monsanto petition to rescind this proposal also suggests a misunderstanding of the issues affecting site definition. Other than that the site includes ~~consists of~~ more than one source, the Sauget Area 1 site bears no resemblance to the Tennessee Products site that was the subject of the *Mead v. EPA* decision on which Monsanto bases its petition. Indeed, the present site does not involve the aggregation of multiple non-contiguous facilities as explained in detail above. Rather, the site consists of multiple adjacent sources, the wastes from which are commingled in the sediments of Dead Creek. Listing these sources as a single NPL site is entirely consistent with the HRS definition of "site" [51587], EPA policy, historical practices, and the objectives of CERCLA.[1]

FAX

MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL RESPONSE DIVISION
38980 SEVEN MILE ROAD
LIVONIA, MICHIGAN 48152

Date 7/8/99

Time

Number of pages including cover sheet 5

To: Mike Riboroy

Dept.

Phone

Fax Phone

CC.

From: Beth Vens

Phone 734-953-1499/953-1508

Fax Phone 734-953-1544

REMARKS:

Here is the draft 7/1/99 letter - I have no idea if it went out or if it was modified. Hope it helps!

Beth Vens

DEQ

STATE OF MICHIGAN

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
"Better Service for a Better Environment"
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973
INTERNET: www.deq.state.mi.us
RUSSELL J. HARDING, Director

REPLY TO:
ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

July 1, 1999

DRAFT
DO NOT DISTRIBUTE

Mr. Thomas McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Dear Mr. McGourty:

SUBJECT: BASF–Riverview April 20, 1999 Workplan, Riverview, Wayne County, MI

It was a pleasure to meet with you and BASF representatives on June 15, 1999 regarding the BASF–Riverview site and the Michigan Department of Environmental Quality (MDEQ), Environmental Response Division (ERD) review comments on the April 20, 1999 workplan in our letter dated June 4, 1999

At the meeting it was agreed that it is very important that the company take necessary response actions to prevent contaminated groundwater at this facility from migrating to the Trenton Channel of the Detroit River as expeditiously as possible. To advance that objective, the April 20, 1999 workplan is hereby approved subject to the following understandings:

- BASF agreed to sample the existing wells quarterly for one year, using low flow sampling techniques. The contaminants required for sampling in existing and new wells will be determined by mutual agreement after review of the results of the sampling that occurred June 17-18, 1999. Please note, the United States Environmental Protection Agency (EPA) very recently promulgated the clean mercury method (Method 1631) for sampling water, which takes effect July 3, 1999. Surface Water Division (SWD) is currently discussing implementation of this method with the EPA. This new sampling method will need to be taken into consideration when conducting future sampling events.

- We have reviewed the existing information available to us to determine if nested wells are appropriate to further define shallow groundwater at the site in upgradient locations. The existing boring information from 1978 does not provide reliable characterization and is not useful to document areas as dry. Documentation is still necessary regarding the presence or absence of water on the upgradient side of the site. BASF agreed to work with senior geologist Steve Hoin to resolve this issue. Resolution may necessitate additional borings. If existing or new boring data indicates water is present, additional wells may be needed. The thickness of the

DRAFT

- saturated zone would control whether nested wells would be needed. The proposed well nest SMW-3/DMW-3 is located in the extreme southwest corner of the site and this well nest will not sufficiently characterize upgradient groundwater at the site. A nested well should be located northeasterly of the proposed SMW-3/DMW-3 for adequate characterization. OUT

- In order to address the potential for the previous soil borings into the deep bedrock aquifer to act as conduits for downward migration of site contamination, BASF agreed to the installation of one monitoring well into that deep aquifer. The location of the well will be mutually agreed to based upon a review of the locations of the borings through the clay to the bedrock and the contaminant levels associated with each boring area along with the contaminants to be sampled. If contamination is not present above agreed upon levels, the well may be permanently closed and the MDEQ will not require the company to undertake any additional evaluation of this aquifer relative to the Riverview site. Please contact Mr. Hoin to discuss the specific location of the well.

- Precautions should be taken so that geoprobe borings located adjacent to the Trenton Channel are not located in such close proximity to the channel that flushing in the area of the borings occurs (i.e. periodic flooding and associated bank storage). This influence of the Detroit River could result in erroneous analyses that would not be reflective of actual groundwater conditions. Additional wells will be needed outside of the area of influence to adequately characterize the contaminant discharge into the river. Please evaluate proposed locations and ensure they are properly located to characterize contaminant migration at the site. Water/leachate in these wells should be analyzed for Michigan ten metals, chromium III and IV, cyanide, phenols, base neutrals, PCB's, volatiles (8260+) and ammonia. The DEQ recommends that the proposed borings be converted into monitor wells.

- BASF agreed to provide continuous measurements of groundwater levels for three months to obtain an accurate picture of groundwater flow dynamics, with follow up monthly measurements.

- Unless remedial actions are taken to eliminate the surface water runoff contaminant migration pathway, soil contaminant characterization is necessary. The soils at the site present an ongoing source of contamination to the Trenton Channel. This item is not related to reuse of the property.

- ERD agreed that determination of the extent and the recovery of free product will not require product investigation, assuming adequate removal is undertaken.

- BASF agreed that the old concrete cell lids that are being used as riprap along the riverbank for erosion control are to be sampled. The sampling program will be developed and mutually agreed to by BASF and ERD.

DRAFT

- BASF agreed to review the potential for the previous underground utilities to act as preferential pathways for contaminant migration.

- The mixing zone determination has been completed by the Surface Water Quality Division and is attached.

- Sediments impacted from the BASF – Riverview site will continue to be evaluated in conjunction with activities at this site and with SWQD.

During the on-site visit by the EPA and the Michigan Department of Attorney General (MDAG), concerns were raised regarding the area between the fenced site area and the Trenton Channel where soils were distressed. Soils should be sampled to determine if a direct contact exceedance is present in that area. Soils should be analyzed for Michigan ten metals, chromium III and Iv, cyanide, phenols, polynuclear byphenyls base neutrals, volatiles (8260+), and ammonia. If an exceedence of direct contact criteria is present, it will need to be addressed to satisfy due care obligations BASF has for the site. There may be alternative presumptive remedies that obviate the need for such characterization as well.

The workplan schedule will need to be modified to reflect the agreement reached that needed response activity be expedited. Response actions and the proposed implementation schedule is subject to MDEQ and EPA approval. It is suggested that the report of findings should be submitted to the MDEQ by October 31, 1999.

The EPA has provided a copy of the April 20, 1999 workplan. The EPA has informed us it will be represented at future settlement discussions, but they agree the state will maintain the lead with BASF during this process.

If you have any questions or concerns, please feel free to contact the project manager for this site, Ms. Beth Vens, of the Southeast Michigan District Office, at 734-953-1404, or you may wish to contact me.

Sincerely,

Daniel Schultz, Chief
Field Operations Section
Environmental Response Division
517-241-7708

Attachment

cc: Ms. Mary Fulgham, EPA
Ms. Kathy Cavanaugh, MDAG

Mr. Gary Klepper, MDEQ
Mr. Steven Hoin, MDEQ
Ms. Beth Vens, MDEQ

DRAFT

STATE OF MICHIGAN

JOHN ENGLER, Governor
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RUSSELL J. HARDING, Director

REPLY TO:
ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

July 9, 1999

Mr. Thomas McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Dear Mr. McGourty:

SUBJECT: BASF–Riverview April 20, 1999 Workplan, Riverview, Wayne County, MI

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At the meeting it was agreed that it is very important that the company take necessary response actions to prevent contaminated groundwater at this facility from migrating to the Trenton Channel of the Detroit River as expeditiously as possible. To advance that objective, the April 20, 1999 workplan is hereby approved subject to the following understandings:

- BASF agreed to sample the existing wells quarterly for one year, using low flow sampling techniques. The contaminants required for sampling in existing and new wells will be determined by mutual agreement after review of the results of the sampling that occurred June 17-18, 1999. Please note, the United States Environmental Protection Agency (EPA) very recently promulgated the clean mercury method (Method 1631) for sampling water, which takes effect July 3, 1999. Surface Water Quality Division (SWQD) is currently conferring with the EPA on implementation of this method. This new sampling method will need to be taken into consideration when conducting future sampling events.

- We have reviewed the existing information available to us to determine if nested wells are appropriate to further define shallow groundwater at the site in upgradient locations. The existing boring information from 1978 does not provide reliable characterization and is not useful to document areas as dry. Documentation is still necessary regarding the presence or absence of water on the upgradient side of the site. Proposed well locations will be agreed to mutually. BASF agreed to work with senior geologist Steve Hoin to resolve this issue. Resolution may necessitate additional borings. If existing or new boring data indicates water is present, additional wells may be needed. The thickness of the saturated zone would control whether nested wells would be needed.

- In order to address the potential for the previous soil borings into the deep bedrock aquifer to act as conduits for downward migration of site contamination, BASF agreed to the installation of one monitoring well into that deep aquifer. The location of the well will be mutually agreed to based upon a review of the locations of the borings through the clay to the bedrock and the contaminant levels associated with each boring area along with the contaminants to be sampled. If contamination is not present above agreed upon levels, the well may be permanently closed and the MDEQ will not require the company to undertake any additional evaluation of this aquifer relative to the Riverview site. Please contact Mr. Hoin to discuss the specific location of the well.

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- BASF agreed to provide continuous measurements of groundwater levels for three months to obtain an accurate picture of groundwater flow dynamics, with follow up monthly measurements.

- Soil contamination characterization is necessary for reuse, redevelopment, and final closure under Part 201 of the NREPA.

- ERD agreed that determination of the extent and the recovery of free product will not require product investigation, assuming adequate removal is undertaken.

- BASF agreed that the old concrete cell lids that are being used as riprap along the riverbank for erosion control are to be sampled. The sampling program will be developed and mutually agreed to by BASF and ERD.

- BASF agreed to review the potential for the previous underground utilities to act as preferential pathways for contaminant migration.

- The mixing zone determination has been completed by the Surface Water Quality Division and is attached.

- Sediments impacted from the BASF – Riverview site will continue to be evaluated in conjunction with activities at this site and with SWQD.

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a direct contact exceedance is present in that area. Soils should be analyzed for Michigan ten metals, chromium III and IV, cyanide, phenols, polynuclear byphenyls, base neutrals, volatiles (8260+), and ammonia. If an exceedence of direct contact criteria is present, it will need to be addressed to satisfy due care obligations BASF has for the site. There may be alternative presumptive remedies that obviate the need for such characterization as well.

The workplan schedule will need to be modified to reflect the agreement reached that needed response activity be expedited. Response actions and the proposed implementation schedule is subject to MDEQ and EPA approval. The report of findings should be submitted to the MDEQ by October 31, 1999.

The EPA has been provided with a copy of the April 20, 1999 workplan. The EPA has informed us it will be represented at future settlement discussions, but they agree the state will maintain the lead with BASF during this process.

If you have any questions or concerns, please feel free to contact the project manager for this site, Ms. Beth Vens, of the Southeast Michigan District Office, at 734-953-1404, or you may wish to contact me.

Sincerely,

Carole Cranston, Acting

Daniel Schultz, Chief
Field Operations Section
Environmental Response Division
517-241-7706

Attachment

cc: Ms. Mary Fulgham, EPA
Ms. Kathy Cavanaugh, MDAG
Mr. Gary Klepper, MDEQ
Mr. Steven Hoin, MDEQ
Ms. Beth Vens, MDEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

June 15, 1999

RECEIVED
JUN 15 1999
FIELD OPERATIONS

TO: Daniel Schultz, Field Operations Supervisor
Environmental Response Division

FROM: Sara Bonnette
Great Lakes and Environmental Assessment Section
Surface Water Quality Division

SUBJECT: BASF - Riverview
Mixing Zone Determination Request
Southeast Michigan District

We have reviewed the information dated May 3, 1999, requesting us to evaluate potential impacts of venting groundwater from BASF - Riverview.

Contaminants are discharged to the Trenton Channel of the Detroit River via a groundwater surface water interface (GSI). The lowest monthly 95 percent exceedance flow, harmonic mean, and 90dQ10 flows for the Trenton Channel are 29,200 cfs, 47,000 cfs, and 41,600 cfs, respectively. The groundwater discharge rate used in calculations was 0.069 cfs.

Based upon our review, using both the Part 4 Water Quality Standards and Part 8 rules, we have determined that there is a reasonable potential for the discharge of the chemicals in Tables 1 and 2 to cause or contribute to exceedances of Water Quality Standards. The potential effluent quality (PEQ) of chemicals in Table 1 exceeded their acute values. **Therefore, we are recommending acute limits for the chemicals in Table 1. We recommend that monitoring for the chemicals in Table 1 continue to ensure that GSI discharge concentrations remain at or below the acute limits.**

In addition, the PEQ of chemicals in Table 2 exceeded their chronic values. **Therefore, we are recommending chronic limits for the chemicals in Table 2 (mercury and PCBs). We recommend that monitoring for the chemicals in Table 2 continue to ensure that GSI discharge concentrations remain at or below their chronic limits. See Attachments A and B for guidelines.**

We recommend that monitoring of selenium continue. The PEQ approached the acute value for this chemical.

Barium, vinyl chloride, and xylene are not being discharged at levels harmful to human health or aquatic life. Therefore, we have no recommendations for these chemicals.

We do not have sufficient data on the human health and aquatic effects of the chemicals in Table 3. Therefore, we are unable to provide recommendations for these chemicals.

EQ 0101e
(1/96)

Please feel free to contact me if you have any questions.

sb:ls

Attachments

cc/att: Gary Klepper, Southeast Michigan District Supervisor, ERD
Roy Schrameck, Southeast Michigan District Supervisor, SWQD
William Creal/VGW File

Table 1. Parameters for which the Potential Effluent Quality was higher than the acute value calculated using Rule 57 of the Part 4 Water Quality Standards at BASF - Riverview.

Parameter	Reported Value (µg/l)	Daily Maximum Potential Effluent Quality (µg/l)	Acute Value (µg/l)
DDT	0.106	0.66	0.057
Acetone	6500	40000	30000
Ammonia (total)	48000	300000	12000
Arsenic	199	1200	680
Chromium	615	3800	1700
Cyanide, amenable	30	190	44
2,4-dimethylphenol	230	1400	160
Lead	250	1600	820
Methylene chloride	3400	21000	17000
Naphthalene	840	5200	200
o-cresol	300	1900	1500
Pentachlorophenol	59	370	17
Phenanthrene	750	4700	43
Phenol	510	3200	3200
Benzene	610	3800	1800
Toluene	420	2600	1700

Table 2. Parameters for which the Potential Effluent Quality was higher than the chronic value calculated using Rule 57 of the Part 4 Water Quality Standards at BASF - Riverview.

Parameter	Reported Value (µg/l)	Monthly Potential Effluent Quality (µg/l)	Chronic Value (µg/l)
Mercury	680	4200	0.0013*
PCBs	63.6	390	0.00012*

*water quality-based effluent limitation is less than the quantification limit (see Attachments A and B)

Table 3. Chemicals for which no recommendations can be given due to lack of data on human health and aquatic life.

fluorene
camphene
carbazole
borneol
camphor
diphenyl sulfone
ethyl-hexanol
eucalyptol
linalyl propanoate
methoxy-methylethoxy-methyl-propanol
methyl-benzenesulfonamide
methyl-methylethyl-oxabicyclohepatane
m-cresol
p-cresol
phenanthrecarboxylic acid
trimethyl-bicycloheptanone

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Z 459 767 449

November 19, 1999

Mr. Michael Ribordy
Remedial Project Manager
U.S. Environmental Protection Agency
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604

Subject: BASF Corporation Riverview Site Inspection Report
Fall 1999 Riverview, Michigan

Dear Mr. Ribordy:

Please find enclosed the Fall 1999 inspection report for the BASF Corporation Riverview Site. Submittal of this report is required by Consent Decree No. 80-73699 of July 1984. BASF wishes to point out four major changes in this report compared to previous reports:

- Central concrete ditch is gone,
- Deep-rooted vegetation was planted around capped areas,
- Large area of the property does not have a vegetative cover, and
- Several additional monitoring wells are on the property.

These changes are described below.

Under the terms of the Consent Decree, BASF was to maintain a concrete ditch through the center of the property. The ditch directed surface water runoff to the River. The level of the ditch was below the high-water table, and due to cracks and breaks in the ditch, groundwater occasionally moved directly into the ditch and flowed to the River. BASF broke-up the concrete ditch and covered the broken pieces with clay. BASF then laid a 40-mil, HDPE fabric over the clay, covered the fabric with more clay, and re-graded the area. Completion of this work prevents groundwater from seeping to the ground surface, mixing with runoff, and flowing into the River. Runoff from precipitation is directed to the River as before; however, the grade is much lower and the width of the drainage swale is much wider. BASF anticipates completing final grades in the Spring 2000 when the area will receive top soil and seed.

As such, the section in our inspection report describing the condition of the concrete drainage ditch and joints numbered 1 through 30 has been ignored and will be deleted.

The Riverview property is essentially a 30-acre lawn. The Consent Decree only permits deep-rooted vegetation in uncapped areas. BASF believes the absence of trees, shrubs, and other similar vegetation contributes to the high water table present on the property. We therefore believe the use of fast-growing, water-scavenging trees will consume large volumes of groundwater and mitigate potential adverse effects on the River.

BASF planted a multitude of hybrid poplar trees on uncapped portions of the property. The planting occurred during Spring and Summer 1999, and it will continue in Spring 2000. Planting was concentrated along the upgradient (western) portions of the property to cut of water that

1609 Biddle Avenue, Wyandotte, Michigan 48192 (734) 324-6000

may be moving onto the property. The planting in this area also was done so it would not interfere with the site assessment activities. Additional planting may occur along the River front if feasible. Currently, consulting firms are evaluating the agronomic properties of the soil and groundwater to identify candidate species for planting.

Since completing the new drainage area, BASF has been searching for acceptable topsoil for the final cover on the newly filled areas. Soils from several candidate areas were not acceptable due to elevated concentrations of selected parameters (i.e., metals above background). As such, BASF has been unable to acquire enough topsoil to cover the site and seed it. Hopefully this will change in the Spring with new building projects beginning.

The Consent Decree specifies that BASF inspect the integrity of each of the nine monitoring wells on the property. Currently there are 37 monitoring wells on the property. BASF will inspect each of these wells and report their condition in the semi-annual reports.

Please feel free to call me at 734-324-6209, or Mr. Jack Lanigan at 734-324-6219, with questions.

Sincerely,

Thomas F. McGourty
Manager, Ecology Services Department

Enclosure

cc: Beth Vens, MDEQ
Keith Mast, URSGWC
John Gerlach, BASF
Jack Lanigan

i:\ecology\offsitep\riv-ltr5-epa.doc

1609 Biddle Avenue, Wyandotte, Michigan 48192 (734) 324-6000

30580 1490M6.RTE

FOLDER NUMBER: 1490M6.RTE

Inspection Date: 9 November 1999 Agency Report Date: Fall 1999

AGENCY REPORT IS DUE WITHIN TWO WEEKS AFTER INSPECTION.

UPON REVIEW AND APPROVAL, RETURN THIS PM TO ECOLOGY FOR PREPARATION OF PRINTED REPORT AND FILING BY SITE ENGINEERING.

This PM requires the inspector to look at many things and walk or drive over a large area. The inspector should read this PM completely prior to making the inspection so that no wasted effort has to occur "Going Back".

I. Inspect entire fence.

A. Fence must be completely intact, including 3 strands of barbed wire on top. All gates must be locked.

I.A. Make a list of any broken barbed wire, broken or deformed fence, bent or damaged fence posts or rails, gate hinges, locks, etc.

Observation: Fences and wires are in good condition. Wire disconnected at one position for temporary truck access. Gates locked.

Response: Will repair by 03/31/00 JK

B. Inspect signs on fence. Signs must face outward from property. The signs must be spaced at 100' intervals on all four sides of the property. The signs must be in good condition with 1-1/2" high letters.

WARNING
KEEP OUT
MANAGED INDUSTRIAL WASTE DISPOSAL AREA

I.B. 1. Are signs spaced every 100 ft.? Yes ✓ No___

2. Make a list of missing, rusted, bent, illegible, etc., signs.

Observation: All signs in place

Response:

II. Inspect vegetation from Jefferson/to the water and from the common property line with Firestone to the municipal ramp.

A. Look for any "bare" areas (spots or areas which do not have plant life growing).

II.A. List "bare" areas. Describe size and location of bare spot.

Observation: Bare spot on east side between cap and river. Bare area between caps and sod after filling & grading.

Response:

B. Measure the height of the vegetation. As the vegetation is measured, look for areas where growth is stunted.

II.B. List the "average" height of the vegetation.

Observation: LAWN IS IN GOOD CONDITION
AVERAGE HEIGHT OF GRASS IS 3 TO 4 INCHES.

Response:

III. Inspect the shoreline for stability.

III. List any shoreline erosion, washing, other deterioration or accumulation of debris.

Observation: SHORE IN GOOD CONDITION; NO EROSION
RIVER LEVEL DOWN OVER ONE FOOT FROM LAST YEAR

Response:

IV. Review the integrity of the compacted clay cover.

A. Inspect the entire area for the physical condition of the surface.

IV.A. List any erosion, standing pools of water, weathering, change in drainage patterns, etc.

Observation: NO EVIDENCE OF EROSION, WEATHERING.
DRAINAGE ADJUSTED SLIGHTLY WITH NEW CONSTRUCTION. SMALL AMOUNT OF STANDING WATER IN NEW SWALE. AWAITING FINAL COVER.

Response:

B. Look for any deep-rooted vegetation (trees or other plant life which might or does have tap roots). Any vegetation which is taller than surrounding vegetation should be considered deep-rooted.

IV.B. List deep-rooted vegetation.

Observation: NO DEEP-ROOTED VEGETATION WITHIN 15 FEET OF CAPPED AREAS.

Response:

V. Inspect the berm which is constructed along the common property line with Firestone. This berm is constructed to eliminate water flowing from the Firestone property onto the site.

V. Is the berm at least 6 inches above the level of the Firestone property at the property line?

Yes ✓ No ___

Is there any evidence of water flowing from the Firestone property onto the site?

Yes ___ No ✓

VI. Inspect the two concrete drainage ditches on the site, one through the center and one at the northeast corner.

A. Look at overall condition of the ditches.

VI.A. List any cracks in the concrete, leaking through the cracks. accumulated debris, standing water, etc.

Observation: North ditch in fine shape. Central ditch is gone.

Response:

B. There are thirty (30) joints in the center ditch. Note condition of each joint. Is joint in place or is it protruding above the surface of the concrete? Is the joint leaking? If there is standing water at the joint, is it clear or off color?

VI.B. List condition of each joint.

Concrete ditch broken and buried. No joints to inspect. See attached letter dated 19 November 1999.

☐☐Joint 1:

Observation: N/A

Response:

☐ Joint 2:

☐ Observation: NA

Response:

☐☐☐Joint 3:

Observation: N/A

☐

Response:

☐ Joint 4:

Observation: NA

Response:

Joint 5:

Observation: NA

Response:

Joint 6:
Observation: NA
Response:

Joint 7:
Observation: NA
Response:

Joint 8:
Observation: NA
Response:

Joint 9:
Observation: NA
Response:

Joint 10:
Observation: NA
Response:

Joint 11:
Observation: NA
Response:

VI. B. (Cont'd.) There are thirty (30) joints in the center ditch. Note condition of each joint. Is joint in place or is it protruding above the surface of the concrete? Is the joint leaking? If there is standing water at the joint, is it clear or off color?

VI.B. List condition of each joint.

Joint 12:
Observation: NA
Response:

Joint 13:
Observation: NA
Response:

Joint 14:
Observation: NA
Response:

Joint 15:
Observation: NA
Response:

Joint 16:
Observation: NA
Response:

Joint 17:
Observation: NA

Joint 18:
Observation: NA

Response: _____ Response: _____

Joint 19:
Observation: NA

Response: _____

Joint 20:
Observation: NA

Response: _____

Joint 21:
Observation: NA

Response: _____

Joint 22:
Observation: NA

Response: _____

Joint 23:
Observation: NA

Response: _____

Joint 24:
Observation: NA

Response: _____

Joint 25:
Observation: NA

Response: _____

Joint 26:
Observation: NA

Response: _____

VI. B. (Cont'd.) There are thirty (30) joints in the center ditch. Note condition of each joint. Is joint in place or is it protruding above the surface of the concrete? Is the joint leaking? If there is standing water at the joint, is it clear or off color?

VI.B. List condition of each joint.

Joint 27:
Observation: NA

Response: _____

Joint 28:
Observation: NA

Response: _____

Joint 29:
Observation: NA

Response: _____

Joint 30:
Observation: NA

Response: _____

There are four (4) joints in the north ditch. Note condition of each joint. Is joint in place or is it protruding above the surface of the concrete? Is the joint leaking? If there is standing water at the joint, is it clear or off color?

Joint A:
Observation: Joint Fine, NO standing water
Response:

Joint B:
Observation: Joint Fine, NO standing water.
Response:

Joint C:
Observation: Joint Fine, NO standing water
Response:

Joint D:
Observation: Joint Fine, NO standing water
Response:

VII. Inspect each of the nine (9) monitoring wells for integrity.

VII. List any problems with the wells.
Observation: Currently 37 monitoring wells on the property. All wells are in good condition.
Response:

Upon completion of this PM, it must be routed for signature/comments as indicated on page 1.

Inspected by: [signature] Date Inspected: 9 November 1999

PM Reviewed and Response initiated by: John L Gerlach Date: 11/18/99

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Z 459 767 448

November 19, 1999

Ms. Beth Vens
Environmental Quality Analyist
Department of Environmental Quality
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Subject: BASF Corporation Riverview Site Inspection Report
Fall 1999 Riverview, Michigan

Dear Ms. Vens:

Please find enclosed the Fall 1999 inspection report for the BASF Corporation Riverview Site. Submittal of this report is required by Consent Decree No. 80-73699 of July 1984. BASF wishes to point out four major changes in this report compared to previous reports:

- Central concrete ditch is gone,
- Deep-rooted vegetation was planted around capped areas,
- Large area of the property does not have a vegetative cover, and
- Several additional monitoring wells are on the property.

These changes are described below.

Under the terms of the Consent Decree, BASF was to maintain a concrete ditch through the center of the property. The ditch directed surface water runoff to the River. The level of the ditch was below the high-water table, and due to cracks and breaks in the ditch, groundwater occasionally moved directly into the ditch and flowed to the River. BASF broke-up the concrete ditch and covered the broken pieces with clay. BASF then laid a 40-mil, HDPE fabric over the clay, covered the fabric with more clay, and re-graded the area. Completion of this work prevents groundwater from seeping to the ground surface, mixing with runoff, and flowing into the River. Runoff from precipitation is directed to the River as before; however, the grade is much lower and the width of the drainage swale is much wider. BASF anticipates completing final grades in the Spring 2000 when the area will receive top soil and seed.

As such, the section in our inspection report describing the condition of the concrete drainage ditch and joints numbered 1 through 30 has been ignored and will be deleted.

The Riverview property is essentially a 30-acre lawn. The Consent Decree only permits deep-rooted vegetation in uncapped areas. BASF believes the absence of trees, shrubs, and other similar vegetation contributes to the high water table present on the property. We therefore believe the use of fast-growing, water-scavenging trees will consume large volumes of groundwater and mitigate potential adverse effects on the River.

BASF planted a multitude of hybrid poplar trees on uncapped portions of the property. The planting occurred during Spring and Summer 1999, and it will continue in Spring 2000. Planting was concentrated along the upgradient (western) portions of the property to cut of water that

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may be moving onto the property. The planting in this area also was done so it would not interfere with the site assessment activities. Additional planting may occur along the River front if feasible. Currently, consulting firms are evaluating the agronomic properties of the soil and groundwater to identify candidate species for planting.

Since completing the new drainage area, BASF has been searching for acceptable topsoil for the final cover on the newly filled areas. Soils from several candidate areas were not acceptable due to elevated concentrations of selected parameters (i.e., metals above background). As such, BASF has been unable to acquire enough topsoil to cover the site and seed it. Hopefully this will change in the Spring with new building projects beginning.

The Consent Decree specifies that BASF inspect the integrity of each of the nine monitoring wells on the property. Currently there are 37 monitoring wells on the property. BASF will inspect each of these wells and report their condition in the semi-annual reports.

Please feel free to call me at 734-324-6209, or Mr. Jack Lanigan at 734-324-6219, with questions.

Sincerely,

Thomas F. McGourty
Manager, Ecology Services Department

Enclosure

cc: Michael Ribordy, EPA
Keith Mast, URSGWC
John Gerlach, BASF
Jack Lanigan

z:\ecology\offsitep\riverview\deq-ltr15.doc

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A Division of URS Corporation

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Fax: 440.349.1514
Offices Worldwide

January 25, 2000
38-8E06216.00

Mr. Mike Ribordy
RPM, Superfund Division
USEPA
77 W. Jackson Blvd. (SR-6J)
Chicago, Illinois 60604

Subject: Transmittal of Continuous Water Level Data
BASF Riverview Site
Riverview, Michigan

Dear Mr. Ribordy:

On Behalf of BASF Corporation (BASF), URS Greiner Woodward Clyde is submitting the attached letter and charts that were previously transmitted to Ms. Beth Vens of the Michigan Department of Environmental Quality on January 19, 2000. At BASF's request, you will be included on future transmittals of data.

Please contact URSGWC or Mr. Jack Lanigan at the phone number provided below with any comments or questions.

Sincerely,

URS Greiner Woodward Clyde

Keith C. Mast

Keith C. Mast, P.E.
Vice President

Timothy L. Whipple, CHMM
Senior Project Manager

Attachment

CC (without attachment): Mr. Jack Lanigan, BASF, Wyandotte, Michigan (734-324-6219)
Ms. Beth Vens, MDEQ

URS Greiner Woodward Clyde
A Division of URS Corporation

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Offices Worldwide

January 19, 2000
38-8E06216.00

Ms. Beth Vens
Environmental Response Division
Michigan Department of Environmental Quality
38980 Seven Mile Road
Livonia, Michigan 48152-1006

Subject: Transmittal of Continuous Water Level Data
BASF Riverview Site
Riverview, Michigan

Dear Ms. Vens:

On Behalf of BASF Corporation (BASF), URS Greiner Woodward Clyde (URSGWC) is submitting the attached charts that summarize the continuous water levels readings collected at the referenced property. The water levels summarized on the charts were recorded from six piezometers and one stilling well (the Trenton Channel) between October 14 and December 9, 1999. The data were collected using In-Situ "Trolls" as described in URSGWC's "Addendum to EE/CA Work Plan" dated June 30, 1999.

The "Detroit River Trend" on the chart is a smoothed adaptation of the stilling well data. Please note that the data for piezometer PZ-5 and PZ-4 may be transposed. URSGWC is field verifying the data. Any corrections to the data will be made in subsequent data transmissions. We anticipate that the final set of data will be forwarded to you in early February 2000. The Trolls will be removed from the wells following collection of the final set of data.

Please contact URSGWC or Mr. Jack Lanigan at the phone number provided below with any comments or questions.

Sincerely,

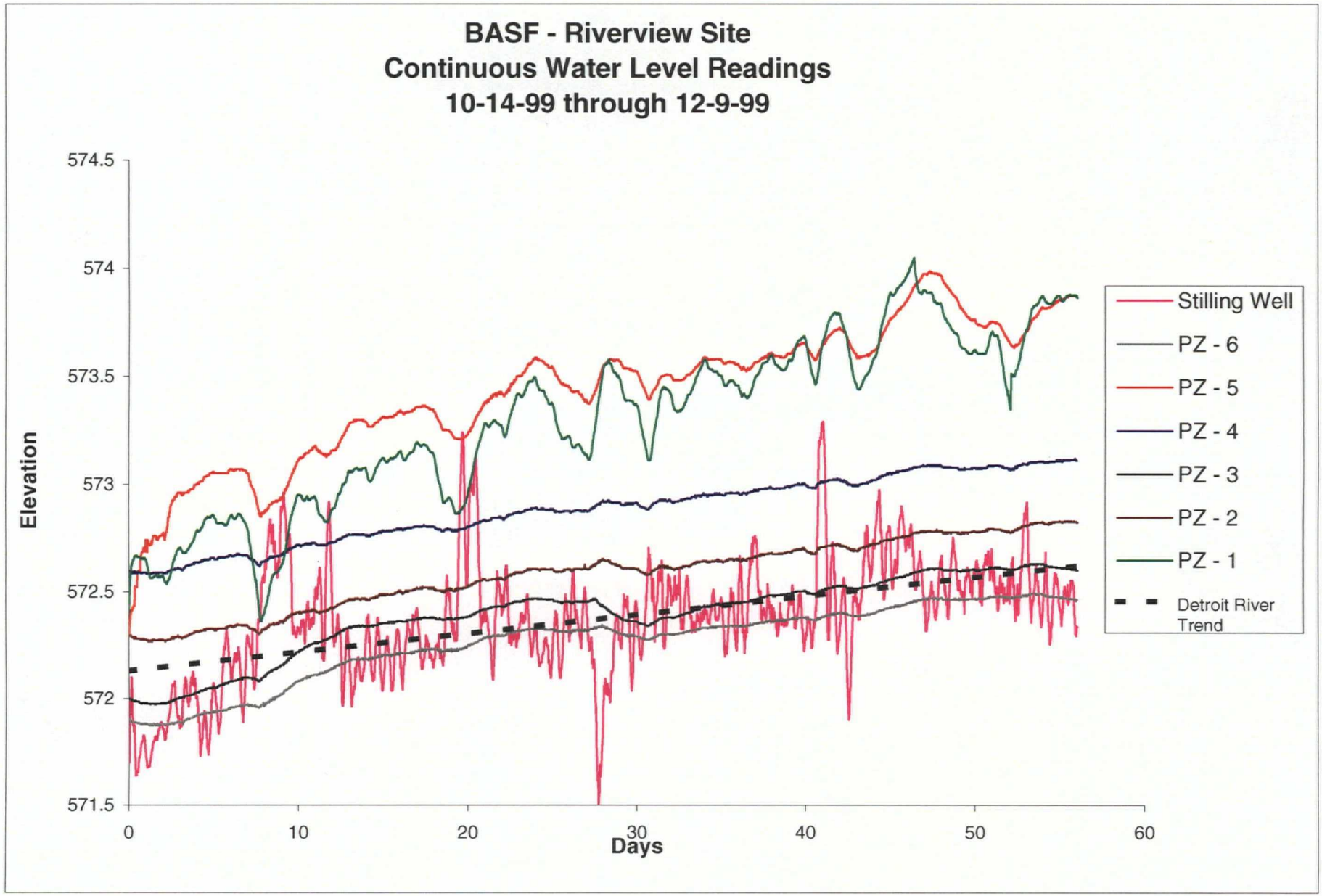
URS Greiner Woodward Clyde

Keith C. Mast

Keith C. Mast, P.E.
Vice President

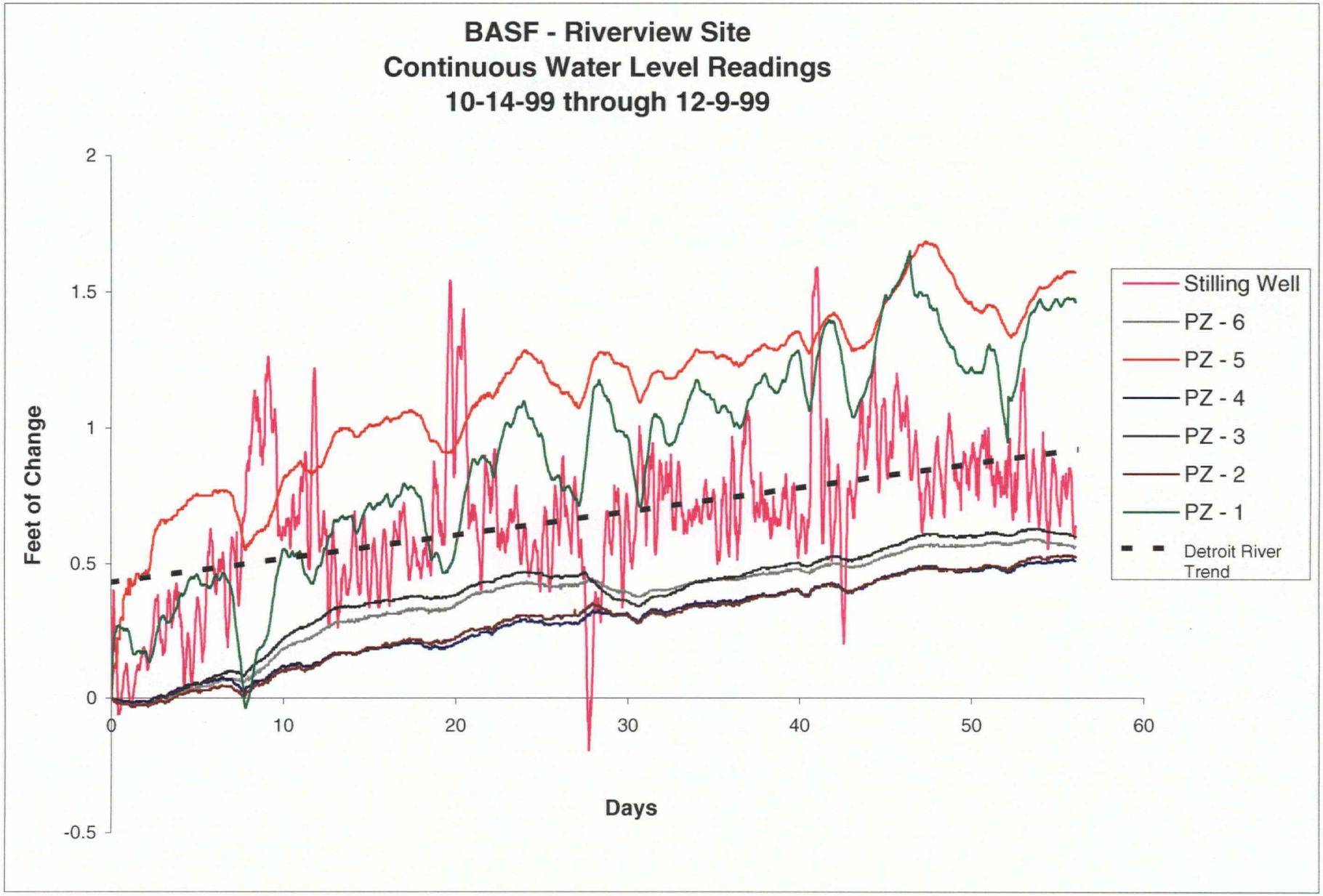
Timothy L. Whipple, CHMM
Senior Project Manager

CC: Mr. Jack Lanigan, BASF, Wyandotte, Michigan (734-324-6219)
Attachments



w:\BASF\Riverview\EECA\Trolls\Sheet1 Chart 2

FIGURE 2



w:\BASF\Riverview\EECA\Trolls\Sheet1 Chart 1

FIGURE 1

BASF Corporation

BASF

March 15, 2000

VIA FACSIMILE AND US MAIL

Mr. Gary Klepper
District Supervisor
Michigan Department of Environmental Quality
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Subject: BASF Corporation's Riverview Property:
Response to Denial of Addendum to the Work Plan

Dear Mr. Klepper:

In a letter from the Livonia District Office to BASF Corporation dated January 14, 2000, the Department of Environmental Quality denied approval on our Work Plan Addendum dated July 14, 1999. You may recall that BASF prepared the Addendum to describe how we intended to perform work items agreed upon during our meeting in Lansing on June 15, 1999.

In summary, the DEQ's denial letter was prepared over two months after the work was accomplished and the report was presented to the DEQ. While we understand the DEQ has six months in which to comment on a work plan if they desire, the length of time taken for this review is not consistent with the DEQ's stated goal of expediency on this project. The letter states that insufficient time was allotted for review between the presentation of the Addendum and the beginning of field work. However, the scope and detail of the work items already had been discussed and (we thought) agreed to on June 15. Now that the plan is denied and the work is complete and documented, much additional time has expired. We will be no closer to accomplishing the project goals if the work must be done again. The letter and especially its timing are counter productive and contrary to written and oral agreements between BASF and the DEQ.

BASF wishes to present a few responses to the DEQ's comments.

Modification #1 – Analytical Program
BASF and DEQ must agree to an analytical program for this property as well as to any changes to the program. BASF agrees with this statement. BASF proposed an analytical program consistent with the chemicals detected on the property previously. We ask the DEQ to concur with this list.

Modification #3 – The Bedrock Monitoring Well
The addendum described how the bedrock monitoring well was to be installed. It did not discuss a specific location for the well; that was to be selected jointly by DEQ and BASF. BASF contacted your representative and suggested a location during a visit to the site, as we agreed. The DEQ representatives did not comment on the proposed location; drilling began a week later and was completed 10 days after that. The first indication that the DEQ may not accept the proposed location was in a letter to BASF from the Attorney General's office – not from the DEQ – stating BASF was not abiding with the agreement. BASF in fact abided by the agreement, contacted your designated representative, requested input, and waited a reasonable amount of time for a response. Drilling rigs on stand-by cost $175 per hour; we could not wait long. Does

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the DEQ believe another location for the bedrock well was more appropriate? If so, we believe that location could have been shared with BASF when the DEQ first requested the bedrock well.

As discussed in other correspondence, the concentration of ammonia detected in the bedrock well is lower than background levels found elsewhere in Riverview. BASF does not envision additional characterization of the groundwater within the bedrock is needed or warranted.

Modification #4 – Continuous Water Level Measurements
The DEQ denies this work plan item because the time frame proposed for collecting data was too short. BASF proposed a three-month monitoring period for only one reason, the DEQ initially requested it.

The DEQ also states the stilling well is not installed properly. We dispute that the design proposed by the DEQ reviewer is any better than the one currently installed. Additionally, the DEQ reviewer states the water level data clearly show the well is not successfully stilling river levels; however, the data logger within the stilling well measures water levels every 30 minutes, so there is no basis for the reviewer's conclusion.

Modification #5 – Analytical Program
Again, BASF proposes an analytical program consistent with chemicals detected on the property through a joint sampling effort by the DEQ and BASF. DEQ continues to ask for analyses of over 180 chemicals even though less than half have ever been detected on the property and only a fraction of them may be of a concern.

Modification #8 – Analyzing Samples of Concrete for Mercury
During our meeting on June 15, 1999, BASF described the proposed method for sampling the concrete used as rip rap. There was general agreement with the proposed method and no dissention or concerns were raised. We do not understand the DEQ's concern with vertical and lateral sampling, coring, variability in deposition, or mercury hot spots. The concrete cell lids had a common source, and all were placed on the shore during remedial construction in 1985. The purpose of the sampling and analyses was to investigate the mercury content of these cell lids. As it turns out, three of seven lids contained detectable concentrations of mercury, but the mercury did not occur in a form that leaches.

We look forward to discussing the work plan, feasibility study, and report issues with you and your staff on March 21, 2000. You may call me at (734) 324-6209, or Mr. Jack Lanigan at (734) 324-6219, if you wish to discuss these issues before our scheduled meeting.

Sincerely,

Thomas F. McGourty
Manager, Safety, Health, and the Environment

cc: Beth Vens, DEQ – Livonia
Mike Ribordy, EPA Region V
Keith Mast, URS Corporation

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STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

SE MICHIGAN DISTRICT OFFICE
38980 SEVEN MILE RD
LIVONIA MI 48152-1006

RECEIVED
JAN 18 2000
QUALITY &
ECOLOGY SERVICES DEPT.

January 14, 2000

Mr. Thomas McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Dear Mr. McGourty:

SUBJECT: BASF-Riverview "Addendum to EE/CA Work Plan", Riverview, Wayne County, MI

The "Addendum to EE/CA Work Plan" (Addendum) submitted on July 15, 1999 for the BASF-Riverview site has been reviewed. The original work plan for the site was submitted on April 20, 1999 and approved with conditions in a Michigan Department of Environmental Quality (DEQ) letter dated July 9, 1999. The Addendum was not reviewed prior to work plan implementation (July-mid August 1999) due to insufficient time being allowed for DEQ review of the Addendum. Therefore, the DEQ has not provided comments prior to this date, but does so now to meet the requirements of Section 20114(8) of Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended. This Section states that "any request for approval of a plan shall be granted or denied within 6 months of the submittal of the information necessary or required for the department to make its decision".

The "Addendum to EE/CA Work Plan" submitted on July 15, 1999, for the BASF-Riverview site is denied. Specific comments are supplied with the attached memorandum.

If you have any questions please feel free to contact myself or the project manager for this site, Ms. Beth Vens.

Sincerely,

Jon E Russell, for

Gary Klepper, Supervisor
Environmental Response Division
734-953-1424

Attachment
cc: Ms. Beth Vens, DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

January 14, 2000

TO: Mr. Gary Klepper, District Supervisor, Southeast Michigan D.O.

FROM: Steve Hoin, Senior Geologist, ERD, Beth Vens, project manager, ERD

SUBJECT: Review- July 15, 1999 "Addendum to EE/CA Work Plan", BASF Riverview site

We have reviewed the "Addendum to EE/CA Work Plan" submittal received on July 15, 1999 and have the following comments:

Modification #1:

Results from June 1999 groundwater sampling were to be reviewed by DEQ and BASF Corporation and future sampling requirements were to be determined upon mutual agreement. This work plan states that changes to the BASF proposed parameters will be made only if these changes are warranted based on the July 1999 results. BASF and DEQ must mutually agree to any analytical parameter list changes.

Modification #2:

No comment.

Modification #3:

This proposal is denied. This was already discussed in DEQ correspondence dated September 26,1999. Additionally, results from the deep well indicate a need for further characterization of the aquifer. Therefore this well will not be sufficient to address potential contamination in the bedrock and additional wells will be needed to characterize the nature and extend of impact within the bedrock aquifer.

Modification #4:

This proposal is denied. Although the data collected from this investigation step will be valuable, the DEQ cannot approve of the approach because it may be necessary to collect data over a longer period of time to accurately evaluate the relationship between the river and groundwater. In addition, the stilling well is not constructed properly. The proposal utilizes a standard well screen for collecting river level data. This technique typically is not successful in "stilling" the short-term river level variations. A typical stilling well consists of a well casing with a closed end and a small diameter hole (usually less than ½ inch). The data already produced clearly indicates that the well was not successful in stilling the river levels. BASF must both extend the monitoring period to include additional seasons and must modify the stilling well.

Modification #5:

The sampling parameters proposed by BASF are not agreed to. Soils collected from the distressed area between the Trenton Channel and the fence should be analyzed for Michigan Ten metals, chromium III and IV, cyanide, phenols, PCB's, base neutrals, volatiles, and ammonia.

Modification #6:

No comment.

The riprap sampling and analysis procedure is denied. It is not acceptable to collect chips of the riprap using a rock hammer. The riprap should be characterized such that the vertical distribution of mercury in the riprap is understood. Cores of the riprap should be collected to eliminate effects of weathering, etc. on the riprap. In addition, the sample locations should be adequate to reflect expected variability in riprap deposition. This should include samples collected both vertically and laterally such that there is a high degree of assurance that mercury "hot spots" within the riprap would not go undetected.

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A Division of URS Corporation

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Offices Worldwide

March 17, 2000
38-8E06216.00

Ms. Beth Vens
Environmental Response Division
Michigan Department of Environmental Quality
38980 Seven Mile Road
Livonia, Michigan 48152-1006

Mr. Mike Ribordy
RPM, Superfund Division
USEPA
77 W. Jackson Blvd. (SR-6J)
Chicago, Illinois 60604

Subject: Transmittal of Continuous Water Level Data
BASF Riverview Site
Riverview, Michigan

Dear Ms. Vens & Mr. Ribordy

On behalf of BASF Corporation (BASF), URS Greiner Woodward Clyde (URSGWC) is submitting the attached chart that summarizes the continuous water level readings collected at the referenced property. The water levels summarized on the chart were recorded from six piezometers and one stilling well in the Trenton Channel. The measurements were obtained between October 14 and February 11, 2000. The data were collected using In-Situ "Trolls" as described in URSGWC's "Addendum to EE/CA Work Plan" dated June 30, 1999.

The "Detroit River Trend" on the chart is a straight linear regression of the stilling well data. The data show an overall decrease in water levels in the river and in the wells. We were unable to recover data from PZ-1 in the field. This data may be recovered following removal of the unit from the peizometer. It appears that PZ-5 is not tracking data in a manner similar to the other piezometers. This data will be verified when the unit is removed.

Please note that the previous submission of data (dated January 19, 2000) incorrectly showed an overall increase in water levels. The Troll depth-to-water data was incorrectly interpreted as a positive number, resulting in a mirror image of the plotted data. The depth-to-water has been correctly interpreted as a negative number in this transmittal.

Please contact URSGWC or Mr. Jack Lanigan at the phone number provided below with any comments or questions.

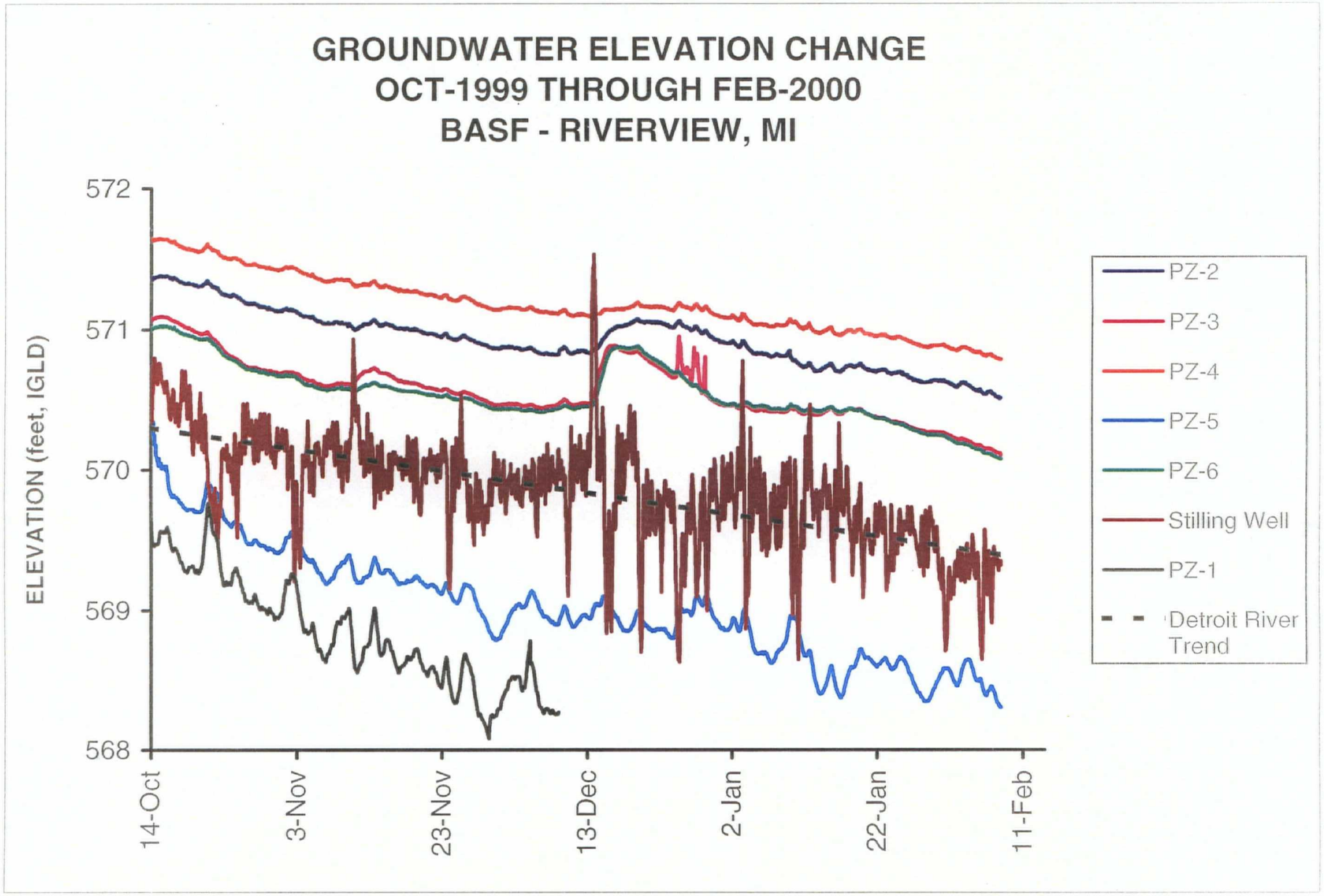
Sincerely,
URS Greiner Woodward Clyde

Keith C. Mast

Keith C. Mast, P.E.
Vice President

Timothy L. Whipple, CHMM
Senior Project Manager

CC: Mr. Jack Lanigan, BASF, Wyandotte, Michigan (734-324-6219)
Attachment



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BASF Corporation

BASF

March 20, 2000

Ms. Beth Vens
Environmental Quality Analyst
Department of Environmental Quality
38980 West Seven Mile Road
Livonia, Michigan 48152

Subject: Remedial Action Elements Feasibility Study
Proposed Plan
BASF Riverview Property
Riverview, Michigan

Dear: Ms. Vens:

This letter summarizes a proposed approach to complete a focused feasibility study for the Riverview property. BASF Corporation and URS Greiner Woodward Clyde (URSGWC) prepared this approach in response to the Michigan Department of Environmental Quality's (DEQ's) January 21, 2000, comments to BASF's November 2, 1999 report titled *Engineering Evaluation/Cost Analysis (EECA), BASF Riverview Site, Riverview Michigan.*

This letter briefly describes BASF's and URSGWC's approach to evaluate feasible remedial alternatives. The DEQ's January 21, 2000, letter requested BASF to provide this response by April 3, 2000. BASF is presenting our approach two-weeks earlier than requested as a demonstration of our ongoing commitment to expedite the schedule for a remedial action. That letter also requested BASF to commit to completing the feasibility study and presenting the results and implementation schedule by July 30, 2000 (four months from now). BASF wishes to discuss this schedule further before committing to an agreement. While this letter proposes a list of potentially feasible options, we currently cannot commit to completing necessary bench-scale tests successfully by that date. The timing and duration of some laboratory testing, as well as the availability of laboratory space, simply is beyond our control. We would feel more comfortable agreeing to present a feasibility study and implementation schedule to the DEQ within six months of the DEQ agreeing to and approving our approach.

Identification of Impacted Media

Three distinct saturated zones lie beneath the site. The upper saturated zone is in the fill and in natural soil outside the filled areas. The middle saturated zone consists of naturally occurring groundwater in the clay till. The lower saturated zone is located in the bedrock. The results of the EECA showed the shallow saturated zone is the primary route (if not the only route) for the movement of target chemicals from the site and into the River. This zone will be the target of the groundwater control portion of the feasibility study.

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Selected areas of surface soils may contain chemicals above applicable criteria. These areas typically lie between the landfill caps and the Trenton Channel. The soils may have contacted chemicals in groundwater during the very high water levels in the Detroit River experienced during 1997 and 1998. At this time, we envision eventual construction of the groundwater remedial systems will be a higher priority than any action with these soils. Additionally, these soils most likely will be disturbed by construction of any groundwater remedial action. We propose a simple capping or containment action for this area during remedial construction knowing that the final remedy will not be inconsistent with this approach.

Potential Exposure Pathways

A complete exposure pathway consists of the following four elements:

- a source of chemical release;
- a transport medium (e.g. groundwater);
- an exposure point (e.g. a water faucet); and
- an exposure route (e.g. ingestion).

The objective of the focused feasibility study is to evaluate cost-effective remedial technologies that will eliminate one or more of these elements, thus making the pathway incomplete and reducing the risk to zero. Eliminating the source of chemical releases may be an effective option, yet it also may be a cost-prohibitive option. Therefore, the feasibility study will focus on methods to eliminate one of the other elements. Alternatives that eliminate the transport mechanism and the exposure points are the primary subject of this letter. Alternatives that eliminate the exposure routes (and to some degree the exposure point) fall into the realm of institutional controls. While these controls eventually will be woven into the final remedial action plan, they are not being discussed in this presentation.

Remedial Technologies

The potential remedial technologies of each of the impacted site media are briefly discussed in this section. In this initial screening, remedial technologies that are considered cost-effective, technically feasible, and effective in meeting cleanup criteria will be retained and included in the focused feasibility study. The remaining technologies will be eliminated. Remedial technologies and alternatives remaining after the initial screening will be evaluated further and according to the following criteria:

- Effectiveness in protecting public health and the environment;
- Detailed cost estimation;
- Engineering implementation, reliability, and constructability;
- Technical feasibility;
- Possibility for recycling, reuse, or other innovative technologies;
- Analysis of adverse environmental impacts;

- Analysis of risk remaining after implementation; and
- Compliance with applicable or relevant and appropriate requirements.

Technologies for Soil and Fill

The purposes of conducting remedial measures on the soil and fill materials are (1) to reduce the amount of leachate that may be generated and that can migrate into groundwater, (2) to reduce or eliminate potential exposure through direct contact, and (3) for selected areas, to reduce the possibility that runoff may carry chemicals away from the property. For the purpose of this initial discussion, the volume of fill material at the site has been estimated as follows:

Capped Area - 10 acres (sq. ft)	Est. Avg. Thickness of fill (ft)	Est. Vol. of Fill (cu. ft.)	Est. Vol. of Fill (cu. yd.)
435,600	10	4,356,000	161,333

The following four remedial technologies for soil and fill are being considered for the site:

1. Excavation and Offsite Transportation -- With this alternative, the impacted soil and fill would be excavated, transported off site, and disposed. The excavated area would be backfilled with clean fill. Based on an estimated disposal cost of $150 per cubic yard and the volume of soil to be excavated and backfilled, this alternative is cost prohibitive and will not be carried through the focused feasibility study.

2. In-Situ Solidification -- With this alternative, the impacted soil and fill would be solidified by mixing it in-place with a cement grout. The material ultimately will solidify, and the target chemicals will be contained in the solidified matrix. Based on the variable nature of the fill material, attaining the proper consistency of the fill and grout can not be guaranteed to prevent leaching and migration. As a result, this alternative will not be carried through the focused feasibility study.

3. In-Situ Treatment – With this alternative, the impacted soil and fill would be addressed using a treatment technology such as soil vapor extraction or soil washing. Based on the variable nature of the fill material and the range of target chemicals, multiple treatment technologies likely will be required. As a result, this alternative will not be carried through the focused feasibility study.

4. In-Place Containment – With this alternative, fill material would be contained in-place with a multi-layer cap system. The multi-layer cap system would include a vegetative cover, a protective soil layer, a drainage layer, and both geosynthetic and clay covers. Surface water drainage controls also would be installed as part of this option. Based on the volume of fill material, the variable nature of that material, and the variety of target compounds in the fill, this alternative appears viable and will be

evaluated in the focused feasibility study. A cap system reduces the volume of water for collection and treatment. So, in addition to adding protection for the direct contact pathway, this alternative can add a benefit to the groundwater control alternatives.

Technologies Preventing Groundwater from Reaching the River

This section discusses methods to control groundwater flow to the river. These methods have two components: (1) a physical barrier between the river and the property and (2) a way to deal with the excess groundwater. Several technologies are presented for each component. For physical barriers, two control technologies have been evaluated for the site: cut-off walls and hydraulic barriers.

1. Cut-off Walls. With this alternative, a cut-off wall would be installed to prevent groundwater flow into the river. One of three types of cut-off walls could be installed along the eastern edge and partially along the northern and southern edges of the property. URSGWC has tentatively identified the following three cut-off wall design alternatives for the site:

- Concrete Slurry Wall - A concrete slurry wall would be installed along the northern, eastern and southern boundaries of the Site. The concrete slurry wall would be installed by excavating a trench and backfilling it with a cement-bentonite slurry. The concrete slurry wall would parallel the existing slurry wall along the eastern boundary of the site. Depending on their characteristics, soil outside of the concrete wall on the eastern boundary may be excavated and placed inside the wall. The existing slurry wall will be tied into the new wall in some manner. Groundwater would be recovered by some method inside the wall.

- Mixed Soil Wall - A mixed soil wall would be installed along the northern, eastern and southern boundaries of the Site. The mixed soil wall is constructed using large diameter augers to mix cement-bentonite slurry with the soil. A wall of treated soil is constructed in this manner. Depending on their characteristics, soil outside of the mixed soil wall on the eastern boundary may be excavated and placed inside of the wall. The existing slurry wall will be tied into the new wall in some manner. Groundwater would be recovered by some method inside the wall.

- Double Sheet Pile Wall – A double sheet pile wall would be installed along the eastern boundaries of the Site. Excavation and placement of soil inside the landfill would not be necessary since the outer wall would be installed at the edge of the river. A single sheet pile wall would be installed outside of the existing slurry wall along the eastern boundary of the site. This would protect the existing slurry wall, which would act as the inner wall along that portion of the site boundary. Groundwater would be recovered from a trench or sumps located between the walls

and west of the inside wall. A single wall would be installed along the northern and southern boundaries of the Site.

All three of these cut-off wall alternatives are economically and technically feasible at this site and will be included in the focused FS.

2. Hydraulic Barrier Wall – With this alternative, establishing a hydraulic barrier along the river's edge prevents groundwater flow to the river. This is accomplished by recovering groundwater from a series of recovery wells or a trench before the water reaches the river. Recovered groundwater would be treated as described in the following section. With this technology both groundwater and river water would be recovered, resulting in an enormous volume of water to be treated. As a result, this technology is cost prohibitive and will not be included in the focused feasibility study.

Technologies to Collect and Treat Groundwater.

Regardless of the method of hydraulic control selected, groundwater will need to be collected and treated. The mutual objective of BASF and the DEQ is to eliminate groundwater containing chemicals at concentrations above the applicable GSI values from entering the river. This section discusses both *in-situ* and above-ground collection and treatment technologies that may be both feasible and cost-effective in meeting the objective. Additionally, water collected during remedial construction would be treated using one of the technologies discussed in this section.

1. *In-Situ* Treatment (including "Funnel and Gate"). Using this treatment alternative, groundwater is funneled to an area by one of the physical barriers described above. The groundwater then passes through a permeable gate. An *in-situ* treatment system (e.g., a reactive barrier) is used to reduce the concentrations of metals and volatile organic compounds in groundwater as the water passes through the gate. The use of iron filings in a reactive barrier is one example of such technology that is effective in some applications. Other *in-situ* treatments will be evaluated in the focused feasibility study.

2. Collection and Above-Ground Treatment. Using this alternative, a groundwater collection and treatment system would be installed. Groundwater would be recovered from a series of recovery wells or a trench and piped to a treatment facility. Once groundwater is in the treatment unit, there are several methods that may be applied effectively. For example, sulfonated carbon has been effective in removing mercury from some fluid streams, and preliminary bench-scale work with electro-chemical systems also show promise in removing mercury. Traditional activated carbon units or UV/oxidation systems are proven technologies for most organic compounds. BASF contracted Jacques Whitford Environment Limited to evaluate the applicability of an electro-chemical treatment method to remove mercury from groundwater. Preliminary results could be available during April 2000.

BASF will share the results with the DEQ as appropriate. URSGWC will continue evaluating several other water treatment alternatives for this site. These other treatment methods will be identified as the feasibility study progresses. As applicable and effective, they will be evaluated as single-pass units or in combinations. BASF will notify the DEQ as new technologies are added to the feasibility study for evaluation. Results of the evaluations will be presented in the focused feasibility study report.

After treatment, groundwater will need to be discharged. Currently three alternatives are being considered: (1) discharge to a storm sewer or the river under an NPDES permit, (2) discharge to a sanitary sewer, or (3) used to irrigate the site during appropriate seasons.

Phyto-Remedial Actions

BASF initiated a phyto-remedial action along the western portion of the property. To date, we planted several thousand, water-scavenging, poplar trees with some measure of success. Our consultant for this effort, Roux Associates, is conducting additional evaluations of the soil's agricultural properties to enhance growth and increase evapotransiration. This action is strictly voluntary. We plan to continue the phyto-remedial efforts in parallel with any other remedial action. BASF will include measurements of our success (ie, reduction in groundwater volume, reduction in recharge) into the feasibility study report, as appropriate.

In summary, BASF and URSGWC propose the following treatment remedial alternatives for evaluation during the focused feasibility study:

1. In-place containment of soil including the installation of a multi-layer cap system;

2. Installation of a cut-off wall to prevent contaminated groundwater from entering the river. We intend to evaluate the following technologies: concrete slurry wall; mixed soil wall; or double sheet pile wall prevent groundwater flow into the river.

3. Groundwater collection and treatment using either an *in-situ* treatment technology or above-ground treatment. *In-situ* methods will focus on reactive barrier technologies. Collection and above-ground treatment methods will focus on one or more active systems that destroy or remove chemicals from water. The ultimate system may employ more than one treatment method.

4. Discharged of treated water through an appropriate avenue.

Regardless of the technologies chosen, the focused feasibility study will discuss a schedule for implementing the selected remedial action, the groundwater monitoring requirements, and the operations and maintenance activities.

Please contact either Keith Mast at URSGWC (440-349-2708) or Jack Lanigan at BASF (734-324-6219) with comments or questions regarding these remedial alternatives. BASF will continue our evaluation of selected remedial technologies; however, we await the DEQ's approval of this plan prior to proceeding in earnest.

Sincerely,

Thomas F. McGourty
Manager, Safety, Health, and the Environment

cc: Mike Ribordy, EPA
Keith Mast, URS
Jack Lanigan
Brian Diepeveen

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BASF – RIVERVIEW
March 21, 2000 Meeting
Preliminary agenda

I. Site objective and Feasibility Study for interim response action – thanks for agreeing. Confirm BASF commitment to April 3, 2000 and July 30, 2000 dates for FS submittals. Briefly discuss that expedited implementation of IRAP will be expected.

II. Brief Response to February 23, 2000 letter

- Performance of IR will be incorporated into RAP. Work will not be performed twice.

- GSI Criteria for mercury. Effective 9/30/2000 GSI criteria is 1.3ppt, detection limit is 0.5ppt.

- DEQ review is timely (2-2 1/2 months). DEQ cannot commit to 30 day review time.

- Remedial action alternatives – need to be technically proven, effective, timely, cost-effective

- Public comments are only a part of the RAP approval process

IV. Introduce concept of amended consent decree

STATE OF MICHIGAN

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
"Better Service for a Better Environment"
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us
RUSSELL J. HARDING, Director

REPLY TO:
ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

April 25, 2000

Mr. Thomas McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

SUBJECT: BASF-Riverview site, correspondences dated March 15, 2000, Wayne County, Michigan

Dear Mr. McGourty:

Correspondence dated March 15, 2000 from BASF Corporation (BASF) to Mr. Gary Klepper, District Supervisor, Department of Environmental Quality (DEQ), Environmental Response Division (ERD), and correspondence dated March 15, 2000 from BASF to Ms. Beth Vens, DEQ-ERD have been reviewed. The DEQ has the following comments/responses:

March 15, 2000 correspondence to Mr. Gary Klepper:

Modification #1 - Analytical program
In the "EE/CA Work Plan" BASF proposed that the analytical parameters for the site include: Selected PAH's, selected phenols, PCBs (1 well), arsenic, mercury, ammonia, cyanide, chromium, lead, selected solvents and xylenes.

BASF and the DEQ have concurred that current activities are focused on the groundwater-surface interface (GSI) pathway. Therefore, the analytical parameters selected for this pathway should at a minimum address contaminants that exceed the GSI criteria established in the June 15, 1999 Mixing Zone Determination from Surface Water Quality Division, DEQ.

BASF has proposed that selected phenols, metals, solvents and PAH's be analyzed. It is the DEQ's experience that laboratories run a full scan for phenols (Scan 8), Michigan ten metals (EPA method 6010), volatiles (8260+) and semivolatiles (8270) for the same cost as analyzing for a few of the chemicals in a scan. Therefore, the DEQ proposes that full scans be run for Scan 8, EPA method 6010, 8260+ and 8270 for sampling parameters. Please note the new mercury method (EPA Method 1631) should be used.

The DEQ concurs that ammonia and cyanide should be included in the analytical (or target) list.

All samples should be analyzed for PCBs.

It is agreed that the DEQ will not request BASF to analyze for DDT or hexavalent chromium. The DEQ may wish to collect samples and analyze for these parameters in the future at DEQ cost.

Modification #3 – The Bedrock Monitoring Well

First paragraph: This issue was responded to in DEQ correspondence dated September 28, 1999.

Second paragraph: It is the DEQ's opinion that the source of ammonia in the bedrock well has not been determined currently with field work, as conducted. Additional work will be needed to determine if the source is from the site contaminants or represents "background levels".

Modification #4 – Continuous Water Level Measurements

First Paragraph: The DEQ workplan approval letter dated July 9, 1999 requested "continuous measurements of groundwater levels for three months to obtain an accurate picture of groundwater flow dynamics, with follow-up monthly measurements." The DEQ did not state that three months of measurements alone was sufficient. DEQ has received additional water level data from BASF on January 24, 2000 and on March 17, 2000. The DEQ has concluded that the data have provided the desired information regarding the interaction between the River and the site and will not require that BASF continue monitoring. However, it is our opinion that additional data collection would provide useful information, at a limited cost. For example the data would allow for a more accurate estimate of the average gradient at the site, and this information may assist BASF is designing a interim response activity.

Second Paragraph: The DEQ does not concur that the stilling well is designed properly and as a result is subject to rapid fluctuations such as those caused by wave action. Stilling well design information is available in many references, and those references clearly suggest that the design incorporate a very small diameter water entrance within the well. Because BASF used a well screen the data from the stilling well fluctuates rapidly and masks the short-term water level events, such as those caused by storms. Therefore the data supplied by BASF from the stilling well are of limited use in assessing the effects of those events on the site groundwater. However, the data are useful in assessing the relationship of the site groundwater level to longer term river level changes and therefore the DEQ is not requesting any action with regard to the construction of the stilling well.

Modification #5 – Analytical Program

Sampling discussed in this section applied only to the two surficial soil samples that were to be collected and analyzed for stated parameters as requested in the DEQ July 9, 1999 correspondence. Sampling that was conducted by BASF did not analyze for all of the parameters or full scans as requested by the DEQ

Modification #8 – Analyzing Samples of Concrete for Mercury

There was no agreement at the June 15, 1999 meeting between BASF and DEQ that chipping of the rip-rap was an adequate sampling method. The DEQ asserts that a combination of sampling methods, chipping, cores and crushing would be the best characterization of the rip-rap. These methods were discussed in DEQ correspondence dated June 4, 1999. Chipping alone does not characterize the vertical distribution of the mercury in the rip-rap. Cores of the rip-rap would characterize the distribution of mercury within the cell material. It is likely that the mercury has already leached from the near surface of the cell material. This could explain the leaching results from the samples collected. The DEQ continues to recommend that the rip-rap be sampled using coring methods at locations selected based upon both knowledge of the source of the rip-rap and based upon a sound statistical sampling approach. This additional sampling may not be needed if BASF decides to presumptively handle the rip-rap material through disposal or on-site containment.

March 15, 2000 correspondence to Ms. Beth Vens:

1) No comment.

2) The January 11, 2000 technical review memorandum stated that "the report of findings would include proposed response actions along with an implementation schedule." No reference is found to "more than one response action plan" in the technical memorandum. It was agreed to by BASF and DEQ at a June 15, 1999 meeting that if the investigation confirmed a discharge above GSI criteria to the Trenton Channel, that the Report would propose an acceptable interim response activity to cease the discharge which would be implemented immediately. The Report proposed to "reduce" the flow of water being discharged above GSI criteria to the Trenton Channel and the proposed activities did not include an implementation schedule, criteria when the phases of the activities would occur, and provided no technical basis why the proposed activities were selected. Therefore, the DEQ could not approve of the objective or the proposed interim response activity(ies).

3) & 4) Section Eight of the Report discussed "Remedial Action" scope, goal, and objectives. The reference by BASF to "Remedial Action" in the Report required DEQ to consider the Report a "Remedial Action Plan" (RAP) submittal. Therefore, the DEQ responded that the Report did not meet Part 201 administrative requirements and was insufficient because a RAP under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, must address all relevant exposure pathways for the facility. This issue was discussed and clarified in the March 15, 2000 meeting with BASF and DEQ. It has been agreed by BASF and DEQ that current efforts are focused on addressing the GSI pathway only, and therefore, proposed activities are considered interim response activities, not remedial actions.

The April 20, 1999 workplan submitted by BASF was approved in July 9, 1999 DEQ correspondence. The "Addendum to EE/CA Work Plan" submitted on July 15, 1999 by BASF was not approved. Any changes proposed in the Addendum or those items in the July 9, 1999 DEQ letter that were not complied with are not approved by the DEQ. All other items were approved through the July 9, 1999 DEQ letter.

5) The "BASF-Riverview" (a.k.a. Federal Marine Terminals) file is available to BASF under F.O.I.A. Please contact Ms. Lori Jackson at 734-953-1487 to schedule an appointment is BASF wishes to review these files. Please be advised that in January 2000, DEQ staff located archived files that have now been incorporated into the current file known as "BASF-Riverview".

6) In the Report submitted by BASF, page 1-2 under "Summary of Presumptive Remedy" states that "the presumed remedy at the Site is to reduce the ability of surface water to recharge groundwater and reduce the volume of groundwater entering the Trenton Channel." The DEQ did not "re-phrase" the objective.

The new mercury method (USEPA Method 1631) should be used for sampling of mercury. Method 1631 which has a detection limit of 0.5 part per trillion (ppt) allows compliance with the GSI criteria for mercury of 1.3 ppt to be measured and monitored and will be required after September 30, 2000.

7) The clay surface map was "hand sketched" based upon the data discussed and is considered draft. The map is available for BASF's visual review and will be provided at a future meeting if requested. The map can be produced by BASF by reviewing the boring logs that include elevation information.

8) At this time, the DEQ only intends on reviewing available literature and information regarding the bedrock aquifer. This information will not likely be sufficient to allow BASF to assess the groundwater flow conditions in the bedrock at the site. As discussed during a March 21, 2000 meeting between BASF and DEQ, the DEQ agreed that the ammonia impact within the bedrock aquifer does not present an immediate danger and need not be addressed as part of current activities at the site.

9) The DEQ acknowledges BASF's contention that the ammonia in bedrock at the site represents background conditions. Further review of information on background levels in groundwater suggests that BASF is likely correct. The DEQ requests that BASF present their argument and information when additional Part 201 pathways are being addressed.

10) No comment.

11) See DEQ comment #3 & #4.

12) These groundwater flow issues were discussed during the March 21, 2000 meeting. The DEQ raised issues with the groundwater flow data in an effort to inform BASF of their Part 201 obligations to address all relevant exposure pathways. In particular, current data are not adequate to determine if groundwater, impacted above criteria, is migrating from the site onto adjacent properties. BASF will need to investigate offsite groundwater migration in the future to meet Part 201 obligations.

13) The purpose of the comment was to point out that site data indicate that the confining conditions vary across the site and that any groundwater flow measurements should consider the potential effects of these variable confining conditions.

14) Well SMW-6 was erroneously referenced with regard to on-site flow. Well SMW-7 is the well that suggests on-site groundwater flow. Well SMW-6 indicates possible lateral offsite flow.

15) The DEQ agrees that additional discussion regarding the site hydraulic conductivity is not constructive. The DEQ agrees that all groundwater containing PCBs, mercury, or other hazardous substances above applicable GSI criteria must be prevented from discharging into the Trenton Channel.

16) The DEQ did not request BASF to "estimate the volume of water passing through a slurry wall". In the Report, Section 7.2, when groundwater discharge to the river is being estimated, BASF subtracted the width of the wall (300 feet) from the width of the site (1,200 feet) in its calculations. Since the wall is incomplete, it is incorrect to deduct the 300 feet from the 1,200 feet, as the water will flow around the wall. Therefore any estimates that do not include the linear dimension of the wall will result in estimates that are low.

17) See DEQ comment under Modification #5 regarding soil samples. See Modification #1 regarding water sampling. Recent groundwater sampling at the site was conducted at DEQ's request and DEQ's expense. BASF chose to split samples from the DEQ sampling. The DEQ does not foresee additional quarterly sampling.

18) Additional discussion of the finer points of the interpretation of the long term piezometer data at this time is not constructive. BASF and the DEQ agree that the data are important primarily in assessing the average gradient towards the river. The DEQ agrees that any ambiguities with regard to gradient and flow volume can be overcome via system design, if necessary.

19) BASF concurs that the groundwater volume estimates are likely inaccurate and has agreed to rely upon conservative engineering design assumptions if collection and treatment are necessary. The DEQ is willing to support this approach.

20) See DEQ comment #14. The DEQ agrees the objective is to eliminate discharge of water contaminated above applicable GSI criteria to the Trenton Channel rather than eliminating groundwater flow to the Trenton Channel.

21) No comment.

22) The DEQ was referring to the same data that BASF referenced (i.e., the 1981 E&E Data). It is possible that intact drums may exist in the landfill area. This possibility should be taken into consideration prior to selecting and designing a interim response activity(ies). At a minimum, contingencies should be in place to address unexpected contaminants that may be introduced into a treatment system, if such as system is utilized.

23) BASF's response does not address the DEQ comments in the technical memorandum. DEQ comments focus on addressing whether or not the additional recent sampling is adequate to assess the lateral extent of free product. The DEQ asserts that borings and temporary wells are not sufficient to assess whether or not free product is present at lateral locations. During the March 21, 2000 meeting, it was discussed that it is not known if the source of the free product is on-site or off-site. It was discussed that at a future date BASF will adequately characterize the distribution of free product at the site.

24) See DEQ comment under Modification #8.

25) No comment.

26) See DEQ comment #9.

27) See DEQ comment under Modification #1.

28) See DEQ comment under Modification #1.

29) The Report identified the presumptive remedy to be to reduce the volume of groundwater entering the Trenton Channel and indicated that the preferred alternative was capping the site with groundwater monitoring. The objective to "reduce" the discharge was not acceptable to the DEQ. Since this objective was not acceptable, the proposed interim response activity(ies) were also not acceptable to the DEQ. Additionally, the proposed activities did not include an implementation schedule, criteria when the phases would occur, and provided no technical basis why the proposed activities were selected.

30) The objective selected by BASF in the Report was not acceptable to the DEQ. Therefore, to ensure that the objective of preventing the discharge of water contaminated above GSI criteria to the Trenton Channel in a technically sound manner was met, the DEQ requested a Feasibility Study be conducted by BASF. BASF and the DEQ have agreed on this approach.

31) No comment.

32) The DEQ cannot accept any interim response activity(ies) that does not prevent discharge of contaminated water above GSI criteria to the Trenton Channel. A proposal which "may" have eliminated the discharge or which "reduced" the discharge was not acceptable to the DEQ.

BASF may wish to investigate the issues raised on page –9- of the technical memorandum dated January 11, 2000 regarding phytoremediation.

33) The DEQ requested an active groundwater system operate while BASF was conducting a pilot program for phytoremediation because it had not been demonstrated that phytoremediation eliminated flow of contaminated water above GSI criteria to the Trenton Channel. Therefore, until/unless this was demonstrated, it was necessary to request a method to prevent the discharge of groundwater above GSI criteria to the Trenton Channel.

34) DEQ will be meeting with BASF on May 3, 2000 to discuss elements of the final Feasibility Study.

35) As a property owner, BASF can abandon monitor wells not specified in the 1984 consent decree without DEQ approval. However, the DEQ can request that monitor wells be installed to replace those wells at BASF expense if it is determined that those wells are necessary to meet Part 201 obligations.

36) The DEQ fully understands the difficulty involved in treating mercury contaminated groundwater. The DEQ statement regarding treatment as the alternative with "the most reasonable chance of success" was made in relation to the alternatives presented by BASF in the Report. Of the alternatives presented by BASF, that alternative was the only alternative presented that, in the DEQ's opinion, would prevent the discharge of contaminated water above GSI criteria to the Trenton Channel.

37. See DEQ comments #3, #4, #30, DEQ comment under Modification #8.

BASF Responses to EPA's comments:
The United States Environmental Protection Agency (U.S. EPA) Project Manager, Mr. Michael Ribordy, for this site indicated that the U.S. EPA did not have any specific responses to this section. The U.S. EPA and the DEQ will continue to work collaboratively and in close communication on this project.

Sincerely,

Beth Vens, Project Manager
Environmental Response Division
734-953-1404

Steven J. Hoin, Senior Geologist
Environmental Response Division
734-953-1296

cc: Mr. Michael Ribordy, U.S. EPA
Mr. Mary Fulgham, U.S. EPA
Ms. Kathy Cavanaugh, DAG
Ms. Patricia Brandt, DEQ
Mr. Dipo Oyinsan, DEQ

19) BASF concurs that the groundwater volume estimates are likely inaccurate and has agreed to rely upon conservative engineering design assumptions if collection and treatment are necessary. The DEQ is willing to support this approach.

20) See DEQ comment #14. The DEQ agrees the objective is to eliminate discharge of water contaminated above applicable GSI criteria to the Trenton Channel rather than eliminating groundwater flow to the Trenton Channel.

21) No comment.

22) The DEQ was referring to the same data that BASF referenced (i.e., the 1981 E&E Data). It is possible that intact drums may exist in the landfill area. This possibility should be taken into consideration prior to selecting and designing a interim response activity(ies). At a minimum, contingencies should be in place to address unexpected contaminants that may be introduced into a treatment system, if such as system is utilized.

23) BASF's response does not address the DEQ comments in the technical memorandum. DEQ comments focus on addressing whether or not the additional recent sampling is adequate to assess the lateral extent of free product. The DEQ asserts that borings and temporary wells are not sufficient to assess whether or not free product is present at lateral locations. During the March 21, 2000 meeting, it was discussed that it is not known if the source of the free product is on-site or off-site. It was discussed that at a future date BASF will adequately characterize the distribution of free product at the site.

24) See DEQ comment under Modification #8.

25) No comment.

26) See DEQ comment #9.

27) See DEQ comment under Modification #1.

28) See DEQ comment under Modification #1.

29) The Report identified the presumptive remedy to be to reduce the volume of groundwater entering the Trenton Channel and indicated that the preferred alternative was capping the site with groundwater monitoring. The objective to "reduce" the discharge was not acceptable to the DEQ. Since this objective was not acceptable, the proposed interim response activity(ies) were also not acceptable to the DEQ. Additionally, the proposed activities did not include an implementation schedule, criteria when the phases would occur, and provided no technical basis why the proposed activities were selected.

30) The objective selected by BASF in the Report was not acceptable to the DEQ. Therefore, to ensure that the objective of preventing the discharge of water contaminated above GSI criteria to the Trenton Channel in a technically sound manner was met, the DEQ requested a Feasibility Study be conducted by BASF. BASF and the DEQ have agreed on this approach.

31) No comment.

32) The DEQ cannot accept any interim response activity(ies) that does not prevent discharge of contaminated water above GSI criteria to the Trenton Channel. A proposal which "may" have eliminated the discharge or which "reduced" the discharge was not acceptable to the DEQ.

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS & CONSULTANTS

May 5, 2000

RECEIVED ERD S.E. MICH.
MAY - 8 2000
FILE
COUNTY

Ms. Beth Vens
Michigan Department of Environmental Quality
Environmental Response Division
38982 Seven Mile Road
Livonia, Michigan 48152

RE: BASF Riverview Site
Final File Review Summary and Preliminary
Site investigation Work Plan Addendum
Malcolm Pirnie Project Number: 3940-014-H20

Dear Ms. Vens:

Attached are two copies of the final File Review Summary and Preliminary Site Investigation Work Plan Addendum (Attachment A). We have incorporated your written comments received May 2 into this document. We will provide our standard field procedures for activities that will be performed during this investigation under separate cover.

Should you have any questions, please feel free to contact us.

Very truly yours,

MALCOLM PIRNIE, INC.

Greg Foote, CPG
Senior Hydrogeologist

Christopher J. Englert, P.E.
Project Manager

Enclosure

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1500 ABBOTT ROAD SUITE 210 EAST LANSING, MI 48823 517-337-0111 fax 517-337-0417 http://www.pirnie.com

RECYCLED PAPER

ATTACHMENT A

FILE REVIEW SUMMARY & PRELIMINARY SITE INVESTIGATION WORK PLAN ADDENDUM

BASF RIVERVIEW SITE

1.0 INTRODUCTION

As directed by the Michigan Department of Environmental Quality (MDEQ) evaluation of the groundwater surface water interface (GSI) pathway is the primary interim response objective for the site at this time. It is not possible to fully evaluate potential interim response alternatives for eliminating the GSI pathway using only data from the previous investigations. Therefore, we have developed a work plan to conduct preliminary investigations to address the data gaps for this pathway. A more detailed discussion of data gaps is presented in section 3.0. Malcolm Pirnie has reviewed the project file to evaluate available site data needed to assess potential interim response alternatives at the BASF Riverview site (Figure 1-1). Through this review, we have identified deficiencies in the data developed during the previous investigations. In general, these deficiencies include:

- Incomplete assessment of the nature and extent of contamination
- Insufficient assessment of the nature and extent of the fill material covering the site

2.0 PHYSICAL SITE DESCRIPTION

The BASF Riverview site is a thirty-acre parcel of land located in Riverview, Michigan. The site is situated along the western bank of the Trenton Channel of the Detroit River. The following discussion of site geology, hydrogeology, and contaminant characterization is based upon reports of previous investigations by URS Greiner Woodward Clyde (URSGWC) in 1999, Applied Environmental Research (AER) in 1980, and Neyer, Tiseo, & Hindo (NTH) in 1979.

2.1 Site Geology

Approximately 50 test boring and 40 monitoring well drilling logs provide a basis for the stratigraphy. However, because several different consultants prepared the logs, there are discrepancies in the stratigraphic descriptions. Two geologic cross-sections, depicted on Figures 1-3 and 1-4, were prepared. As shown on the cross-sections, the following generalized stratigraphy is present at the site:

2.1.1 Fill Unit

The fill unit is comprised of soils with varying amounts of slag, brick, concrete blocks, wood, glass, and unidentified organic debris. URSGWC describes the fill as "concrete rubble, scrap metal, glassware, soda ash, caustics, cardboard and steel drums, coke, cinders, bricks, carbon anode and cell parts, surfactants, and miscellaneous trash from all Wyandotte sites." During excavation activities performed by AER in 1979, metal containers ranging in size from five-gallon cans to fifty-five gallon drums were uncovered. These containers were reported to be mostly intact and filled with solid and/or liquid substances. In some areas of the site, a strong chemical odor and staining is reported in the boring logs. The fill appears to range in thickness from 1 to 3 feet at the western edge of the property and 8 to 14 feet thick along the river edge. URSGWC reported that the fill is "less than five feet thick, and in most areas it is less than three feet." However, the boring logs included in the same report (Engineering Evaluation/Cost Analysis - EE/CA) show the fill to be more than ten feet thick in some areas.

2.1.2 Peat Unit

The peat unit is comprised of peat and/or black organic rich silt and ranges from 1 to 3 feet thick. In general, this unit appears to only be present within 200 feet of the Trenton Channel shoreline. Boring logs indicate the peat unit has a strong chemical like odor.

2.1.3 Sand Unit

The sand unit is comprised of gray to black fine to medium grained sand with traces of clay. It appears to be a large sand lens present only near the shoreline. This unit is likely a paleochannel fluvial deposit or more recent bank deposit from the Trenton Channel. Boring logs indicate the sand unit ranges from 0 to 5 feet thick, is stained, and has a chemical like odor.

2.1.4 Upper Clay Unit

The upper clay unit is comprised of very soft, gray silty clay with some black staining. It is continuous over most of the site and appears to thin toward the shoreline of the Trenton Channel until it is no longer present (see cross-section A-A'). The upper clay unit is likely lacustrine and ranges from about 10 to 15 feet thick where present

2.1.5 Lower Clay Unit

The lower clay unit is comprised of brown silty clay with little fine to coarse-grained sand and gravel fingers. It overlies bedrock and is approximately 20 feet thick. Heterogeneities in this unit may provide contaminant migration pathways.

2.1.6 Dundee Limestone (bedrock)

The Dundee Limestone consists of a medium to hard grayish brown limestone, with soft seams, and fractures. Boring logs indicate the upper 8 feet of the bedrock is weathered and fractured and that it is first encountered at a depth of approximately 40 feet below ground surface (bgs).

2.2 Hydrogeology

URSGWC describes three distinct water-bearing zones at the site as follows:

- The upper water-bearing zone consists of the saturated portion of the fill and some naturally occurring sediments (i.e. the sand and peat units).
- URSGWC identifies that the "middle water-bearing zone" consists of the lower clay unit. Slug test performed by URSGWC yielded hydraulic conductivities ranging from 5.4×10^{-3} to 3.7×10^{-4} feet/day. Boring logs indicate that more conductive lenses and heterogeneities may be present.
- The lower water-bearing unit consists of the Dundee Limestone. URSGWC reported hydraulic conductivities from the limestone unit ranging from 7.4×10^{-3} to 6.3×10^{-3} feet/day. Groundwater exists primarily in macroporosity such as fractures in the limestone; therefore these hydraulic conductivities of the bulk rock have little practical meaning.

River levels have shown elevations ranging from 572.39 to 576.96. The changes in river levels may greatly influence the water level in the uppermost water-bearing zone.

2.3 Contaminant Characterization

Table 1-1 summarizes the highest contaminant concentrations detected in groundwater during quarterly sampling of wells MW-A through MW-M, PZ-1 through PZ-6, SMW-1, SMW-2, SMW-6, SMW-8 performed from March 1999 through January 2000. As shown on this table, numerous components are present in groundwater at concentrations exceeding the Part 201 GSI criteria (and in some cases exceed by a number of orders of magnitude). Non-aqueous phase liquids (NAPLs) have been observed in some of these wells (MW-M, and MW-F).

3.0 DATA GAPS

The following is a discussion of data gaps identified thus far. Additional data gaps may be identified as further field investigations are performed.

3.1 Physical Well Data

There is some uncertainty with respect to well construction because of poor documentation and conflicting information. For example, the top of casing elevations for wells MW-A through MW-M supplied by BASF, in a letter addressed to Ms. Beth Vens of the MDEQ dated February 24, 1999, conflicts these reported by URSGWC, in Table 2-1 of the EE/CA report dated November 1, 1999. Some of the well elevations varied by up to 0.5 feet. Also, poor quality construction logs for wells MW-K, MW-L, MW-M create uncertainty in the well completion depths. Because of this uncertainty, some of the data obtained from these wells is questionable.

Also, well design problems affect the data obtained from some of the wells. This is exemplified by the screened length and completion depth of wells MW-A through MW-M is inadequate to be used for monitoring potential NAPL and contaminant present near the top of the water table in the fill unit.

3.2 Type and Extent of Fill

Historical documentation is vague as to the extent and nature of the fill material. Because this layer is the most likely contaminant source, it is necessary to determine its composition and

lateral limits. In addition, previous investigations did not provide sufficient information to determine the extent of the fill present beneath the water in Trenton Channel.

3.3 Groundwater Flow

Based on available file information, groundwater flow direction at the site is unclear for several of the stratigraphic units. The existing network of monitoring wells is insufficient to assess the groundwater flow direction in most of the stratigraphic units present at the site. Figure 1-2 shows the locations of the existing wells and indicates the stratigraphic unit each well is screened in. Based on the well coverage for each unit, only the upper clay unit has enough wells to accurately construct a potentiometric surface map. Because the wells screened in the fill are limited to the perimeter of the site, an accurate water table map can not be constructed. However, the limited available data suggests that groundwater flow in the uppermost saturated unit is towards the Trenton Channel. Additional characterization of the stratigraphic units at the site will provide useful info to further assess the GSI pathway.

3.4 Extent of Contamination

The following are data gaps pertaining to the extent of site contamination:

- No wells are screened in the fill unit down gradient of the suspected source area(s)
- Inadequate GSI monitoring points are present to assess compliance with Part 201 regulations
- Soil sampling analytical data is not available above the water table

3.5 Aquifer Properties

Previous investigations included limited analyses of aquifer properties. Rising head slug tests and variable head permeability tests were performed at wells screened in the lower clay unit only. Aquifer testing of other stratigraphic units was not performed.

We suspect the groundwater flow rate in the fill and sand units is substantially faster than in the lower clay unit. Therefore, the velocity analyses presented by URSGWC do not apply to the other stratigraphic units.

3.6 Riprap Leaching Potential

Additional riprap sampling is necessary because the procedure used by URSGWC to determine the leachability of the riprap at this site was not documented and the sampling method is not reported.

4.0 PROPOSED SCOPE OF WORK

To address the above data gaps, and to gather additional info to assist in selecting the most appropriate interim response alternative, the following investigation tasks will be performed.

4.1 Well Inventory and General Site Inspection

A well inventory and general site inspection will be completed to aid in the development of a strategic plan to fill data gaps. This task will include a complete inventory of existing monitoring wells, an inspection of each well for damage or vandalism, measurement of water

level and total depth in each well, identification of surficial structures that may affect runoff/discharge and/or infiltration. The 13 wells installed by BASF in 1985 and 1987 (MW-A through MW-M) will be tested for sensitivity (i.e. biofouling and responsiveness) because of poor construction logs and the age of the wells. A slug of water will be dropped in each well and the response will be monitored for the sensitivity analysis. In addition, the top-of-casing elevations and locations of the existing monitoring wells will be surveyed to alleviate questions as to the accuracy of the previous data.

4.2 Geophysical Survey and Test Pits

A magnetic and electromagnetic geophysical survey will be conducted to help delineate the horizontal extent of the fill (not including fill extending into the Trenton Channel) and to provide vital information about the nature and depths of materials buried at the site.

Up to six test pits will be excavated to evaluate and describe fill materials where geophysical anomalies are identified. Fill will not be removed for disposal during the test pitting activities. Up to four samples of soil, chemical waste, or other materials may be collected from each of the pits for laboratory analysis (up to 24 total samples). The analysis will include a library search and analysis for the following:

- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Phenols
- Total Cyanide (CN^-)
- Michigan 10 Metals + new necessary method (if available)
- Polychlorinated biphynols (PCBs)
- Ammonia (NH_3)

4.3 Monitoring Wells

Monitoring wells will be drilled at the 13 locations shown on Figure 1-2 to develop more detailed hydrogeological information at the site, to evaluate contaminant migration pathways, and to evaluate the extent of contamination.

In conjunction with existing monitoring wells, these wells will be used to monitor contaminant concentrations in each stratigraphic unit, evaluate aquifer properties, and determine groundwater flow in each stratigraphic unit. Stratigraphic data collected during drilling will aid in the development of more detailed cross-sections, provide data about the physical soil properties of each stratigraphic unit, and help assess the extent of contamination.

Nested wells consisting of one shallow and one or more deeper wells will be installed at several locations. The proposed drilling program including drilling depths, well-screen intervals, sampling intervals, and purpose of each well is summarized in Table 1-2. Soil samples will be collected from each of the unconsolidated stratigraphic units encountered during drilling at locations MW-1, MW-2, MW-4, MW-6, MW-7, MW-8, MW-9, and MW-10. Up to six samples will be collected from each of these borings. Soil samples will be collected above the water table and groundwater samples will be collected below the water table. Additionally, up to ten soil samples will be collected from the existing borings at the site. Each sample will be submitted to the MDEQ laboratory and analyzed for:

- VOCs
- SVOCs

- Phenols
- CN^-
- Michigan 10 Metals
- PCBs
- NH_3

If solid wastes are encountered during drilling activities, these samples will be collected and submitted to the MDEQ laboratory for a library search to identify unknown compounds in the waste.

Groundwater level and free product measurements will be made in each of the monitoring wells to determine groundwater flow direction in each layer. Twelve of the monitoring wells (see Table 1-2) installed in the fill will also be used to delineate the lateral extent of NAPL.

The well clusters along the shoreline will allow for GSI monitoring for exceedences in each stratigraphic unit. This will provide information about preferential pathways and extent of contaminants.

4.4 Off-Shore Soil Borings

Off shore borings will be drilled to a depth of 8-12 feet from a barge mounted drill rig at the four locations shown on Figure 1-2. These borings will provide information about the extent of fill beneath the Trenton Channel, extent of contamination.

4.5 Groundwater and NAPL Sampling

The new and existing monitoring wells will be sampled to evaluate the extent and magnitude of groundwater contamination and presence of NAPL. The analytical results of groundwater sampling will also be used to aid in evaluation of the feasibility of potential interim response alternatives. The groundwater samples will be submitted to the MDEQ laboratory for: VOCs, SVOCs, phenols, total CN^-, Michigan 10 Metals, PCBs, and NH_3.

Additionally, six selected groundwater samples will be submitted to the MDEQ laboratory for analysis of parameters that influence the effectiveness and cost of treatment technologies. These analytical parameters are as follows:

- pH
- Eh
- Dissolved oxygen (DO)
- Conductivity
- Total dissolved solids (TDS)
- Reduced Iron (Fe^{2+})
- Total iron
- Dissolved iron
- Manganese
- Hardness
- Alkalinity (as CO_3^{2-} and HCO_3^-)
- Chemical oxygen demand (COD)

- Total organic carbon (TOC)
- Sulfate (SO_4^{2-})
- Chloride (Cl^-)
- Nitrate (NO_3^-)
- Phosphate (PO_4^{3-})

4.6 Aquifer Properties

Slug tests will be performed at two wells screened in each stratigraphic unit (total of eight wells) to estimate hydraulic conductivities. The derived hydraulic conductivities will be used in assessments of flow velocities, contaminant migration pathways, and in the feasibility study.

4.7 Riprap Leaching Potential

Samples of the concrete riprap will be collected and submitted to the MDEQ laboratory for analysis. Up to five samples will be collected and analyzed for PCBs and mercury using methods outlined in the Michigan Department of Natural Resources interoffice communication MERA Operational Memorandum #12, Revision #2 dated January 5, 1995. Samples will be collected with an appropriate rock coring device.

5.0 POTENTIAL FUTURE INVESTIGATIONS

Malcolm Pirnie is conducting a study to evaluate potential interim response alternatives concurrent with the site investigation activities identified in this Work Plan. In general, the potential interim response alternatives will be evaluated in terms of their effectiveness at achieving the interim response objective established for the site, implementability, reliability, constructability, and cost. The evaluation will be primarily based on the results of previous investigations, Malcolm Pirnie's experience with the potential interim response alternatives, and technical literature (e.g., EPA documents, professional journals, and peer-reviewed papers). Up to two bench – scale tests will be performed to provide data needed to assess treatment technologies.

Table 1-1
BASF Riverview Site
Maximum Concentrations of Analytes Detected in Groundwater (ug/L)
March 1999 through January 2000

Compound_Name	Mixing Zone[2] or GSI[3] Criteria	WELL ID									Maximum Reported Concentration
		MW-A	MW-B	MW-C	MW-D	MW-E	MW-F	MW-G	MW-H	MW-I	
1,2-Dichlorobenzene	16	20	18	1.2	15	5.7	24,000				24,000
1,2-Dichloroethane	6	5.2		35	150	54					150
1,2-Dichloropropane	9.1	37	46	69	24	7.9					69
2,4,6-Trichlorophenol	TDL[4]= 5.0	14	69	75						9.5	75
2,4-Dichlorophenol	19	5.4	2,400	75	400	200					2,400
2,4-Dimethylphenol	160	57	840	320		210			16	14	840
2-Chlorophenol	22		58	52							58
Acenaphthene	19		50	22	16						50
Acetone	30,000	2,300	15,000	12,000	2,500	2,100				4,800	15,000
Ammonia	12,000	12,200	21,000	19,300	33,600	26,000		560	8,240	7,300	86,700
Arsenic	680	120	1200	1,060	14,290	11,400	34	16	290	1,300	14,290
Barium	190	13	1,880	480	146	161	110	115	270	90	1,880
Benzene	1,800	220	66	51	37	18	1		2.4		690
Cadmium	2.5	20	20	20	20	20	20	20	20	20	112
Carbazole	TDL[4]= 10		360		51	8.1					360
Chloride	50,000	833,000	2,120,000	1,310,000	647,000	248,000		191,000	2,250,000		2,250,000
Chromium	1700	136	436	670	138	346	230	20	480	86	783
Cyanide (total)	TDL[4]= 20	1,300	5,510	4,470	11,100	8,140	180	150	3,840	560	110,000
Ethylbenzene	18	16	52		23	2.8					50
Fluoranthene	1.6		640	220	140	44				12	640
Fluorene	12		360	120	44	10				2.8	360
Lead	820	52	95	238	50	1,130	50	50	155	50	1,130
Mercury	TDL[4]= 0.2	52	126	35.3	1,100	1,440	0.8	0.4	4	3.5	1,440
Naphthalene	200	34	1,500	980	390	110			3.7		1,500
PCBs (total)	TDL[4]= 0.2	0.075	9,509	40	17.1	9.4				0.97	9,509
Pentachlorophenol	59	34	300	240	220	110				12	300
Phenanthrene	43	2.4	1200	320	180	57				10	120,000
Phenol	3,200	147	1,800	1,300	1,500	1,000			59		1,800
Sodium	160,000	2,550,000	8,580,000	3,590,000		1,300,000	4,270,000	1,390,000	6,990,000	15,900,000	15,900,000
Selenium	5	5	14	7.9	7.3	5.5	2	9.6	28	5	28
Sulfate	NA	463,000	833,000	487,000	1,820,000			2,020,000	586,000		2,020,000
Toluene	1,700	100	59	35	350	25				6.8	450
Vinyl chloride	15				96	24					96
Xylenes	35	26	50	19	29	5.1					111

Notes: 1- Only analytes with concentrations exceeding GSI or Mixing Zone criteria are reported. Other detected analytes (except for sulfate) are not reported on this table.

2- Mixing zone concentrations based on acute values calculated using Rule 57 of the Part 4 Water Quality Standards. Source: Table 1 from MDEQ interoffice communication from Sara Bonnette to Daniel Schultz dated June 15, 1999.

3- GSI criteria obtained from Revised Part 201 Operational Memoraneum #18 Cleanup Criteria Tables.

4- TDL = target detection limit. GSI criteria defaults to TDL because GSI is less than the target detection limit.

5- Blank cells indicate the analyte was either not detected or not analyzed.

6- Values reported are the highest encountered concentrations during the sampling period using results from MDEQ analysis and BASF analysis.

7- Highlighted values indicate maximum reported concentration at the site for each analyte.

8- NA = not available

Table 1-1 (continued)
BASF Riverview Site
Maximum Concentrations of Analytes Detected in Groundwater (ug/L)
March 1999 through January 2000

Compound_Name	Mixing Zone[2] or GSI[3] Criteria	Well ID														Maximum Reported Concentration
		MW-J	MW-K	MW-L	MW-M	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	SMW-1	SMW-2	SMW-6	SMW-8	
1,2-Dichlorobenzene	16	2.8														24,000
1,2-Dichloroethane	6															150
1,2-Dichloropropane	9.1															69
2,4,6-Trichlorophenol	TDL[4]= 5.0		9.8													75
2,4-Dichlorophenol	19	55														2,400
2,4-Dimethylphenol	160	68	26			24	13		240	16	300					840
2-Chlorophenol	22															58
Acenaphthene	19	1.2				6.7			4.2							50
Acetone	30,000	5,100	470			870	960		2,400	1,000	1,500					15,000
Ammonia	12,000	31,600	51,000	200		5,810	7,850	1,330	6,960	7,920	12,700	1,820	19,000	86,700	3,840	86,700
Arsenic	680	110	339	64		107	108	8	270	417	246	178	182	144	7	14,290
Barium	190	440	164	25												1,880
Benzene	1,800	9.5	690													690
Cadmium	2.5	112	20	20												112
Carbazole	TDL[4]= 10	20														360
Chloride	50,000	237,000	1,520,000	261,000												2,250,000
Chromium	1700	160	690	34		56	63		151	632	109	395	783	102	8	783
Cyanide (total)	TDL[4]= 20	1,800	110,000	360		1,520	1,510	114	1,930	7,760	2,690	1,290	651	4,400		110,000
Ethylbenzene	18	1.5	14													50
Fluoranthene	1.6	47	13													640
Fluorene	12	36	4						15	13	21					360
Lead	820	250	50	50		24	20		399	170	473	62	107		12	1,130
Mercury	TDL[4]= 0.2	133	72.8	2.1		15.5	11.4	0.2	57.5	41.6	211	2.2	1.4	1.2	0.4	1,440
Naphthalene	200	440	11			56	99		46	14	210		3.5			1,500
PCBs (total)	TDL[4]= 0.2	0.25	0.66													9,509
Pentachlorophenol	59		38			110	80		210	20	320					300
Phenanthrene	43	100	20		120,000	7.7	4.2		69	43	55		8.9	1.5		120,000
Phenol	3,200	100	280			44	43		210	25	340	32				1,800
Sodium	160,000	694,000														15,900,000
Selenium	5	5.2	10	2.6												28
Sulfate	NA	1,050,000	320,000	814,000												450
Toluene	1,700	15	450													96
Vinyl chloride	15							4.1								111
Xylenes	35	7.9	10.5			21	39		4.5	4.2	111		1.1	1.1		111

Notes: 1- Only analytes with concentrations exceeding GSI or Mixing Zone criteria are reported. Other detected analytes (except for sulfate) are not reported on this table.

2- Mixing zone concentrations based on acute values calculated using Rule 57 of the Part 4 Water Quality Standards. Source: Table 1 from MDEQ interoffice communication

3- GSI criteria obtained from Revised Part 201 Operational Memoraneum #18 Cleanup Criteria Tables.

4- TDL = target detection limit. GSI criteria defaults to TDL because GSI is less than the target detection limit.

5- Blank cells indicate the analyte was either not detected or not analyzed.

6- Values reported are the highest encountered concentrations during the sampling period using results from MDEQ analysis and BASF analysis.

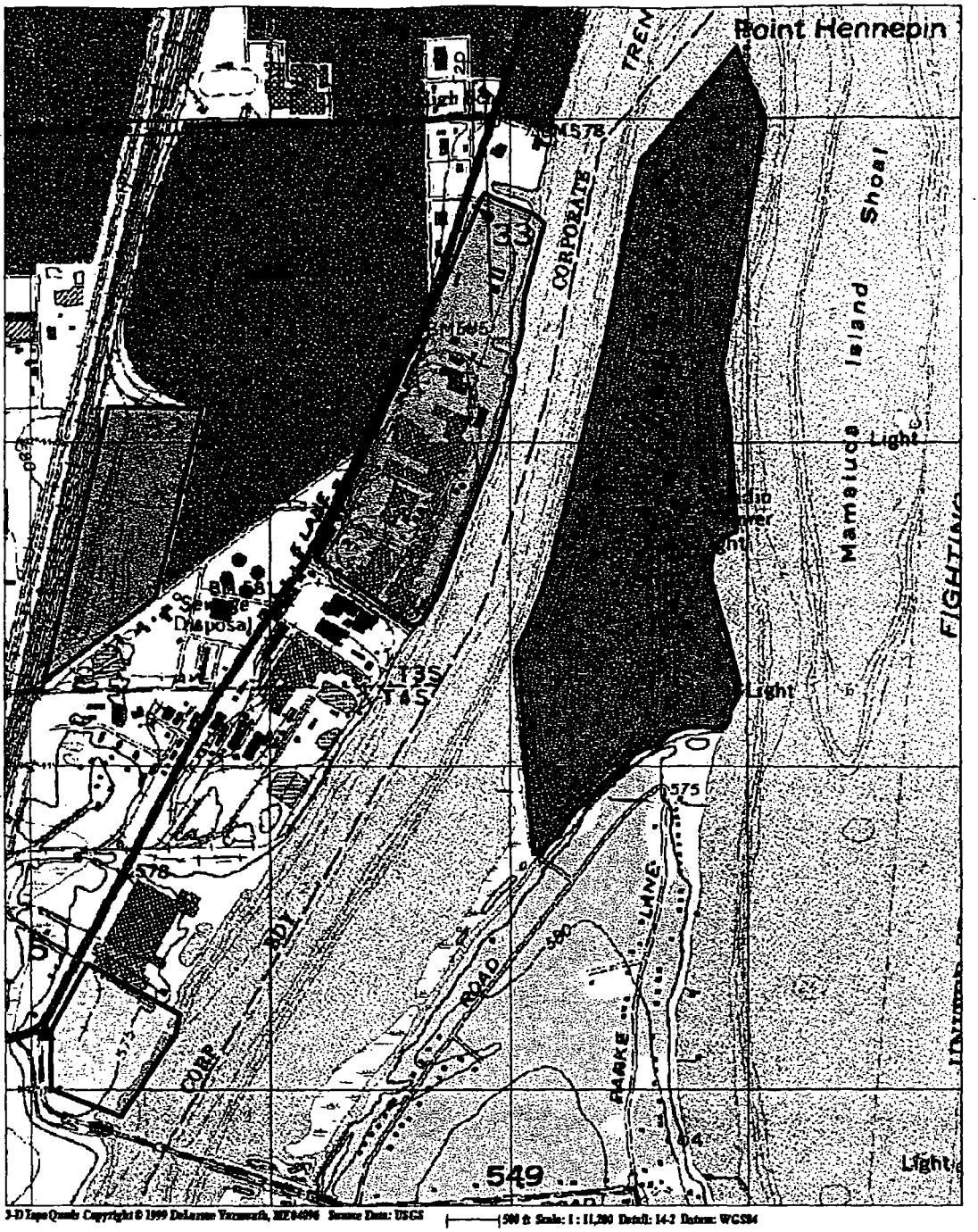
7- Highlighted values indicate maximum reported concentration at the site for each analyte.

8- NA = not available

Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

Well ID	Approximate Depth (feet)	Stratigraphic Unit	Screen length	Analytical Sampling	Purpose of Well	Notes
MW-1s	2-7	fill	5 feet	-	GSI Evaluation	
MW-1i	7-12	upper clay	5 feet	-	GSI Evaluation	
MW-1d	18-23	lower clay	5 feet	6 soil samples	GSI Evaluation	double cased to 16 feet
MW-2s	2-7	fill	5 feet	-	GSI Evaluation	
MW-2i	7-12	upper clay	5 feet	-	GSI Evaluation	
MW-2d	18-23	lower clay	5 feet	6 soil samples	GSI Evaluation	double cased to 16 feet
MW-3s	1-6	fill	5 feet	1 soil sample	GSI Evaluation	
MW-4s	1-6	fill	5 feet	-	GSI Evaluation	
MW-4i	6-11	upper clay	5 feet	-	GSI Evaluation	
MW-4d	15-20	lower clay	5 feet	6 soil samples	GSI Evaluation	double cased to 16 feet
MW-5s	1-6	fill	5 feet	1 soil sample	GSI Evaluation	
MW-6s	1-6	fill	5 feet	-	GSI Evaluation	
MW-6i	7-12	upper clay	5 feet	-	GSI Evaluation	
MW-6d	15-20	lower clay	5 feet	6 soil samples	GSI Evaluation	double cased to 16 feet
MW-7s	1-6	fill	5 feet	1 soil sample	NAPL Delineation & Evaluation Fill Concentrations	
MW-8s	1-6	fill	5 feet	-	NAPL Delineation & Evaluation Fill Concentrations	
MW-8i	7-12	upper clay	5 feet	-	Evaluation of Vertical Distribution of Contaminants	
MW-8d	20-25	lower clay	5 feet	-	Evaluation of Vertical Distribution of Contaminants	double cased to 16 feet
MW-9s	1-6	fill	5 feet	-	NAPL Delineation & Evaluation Fill Concentrations	
MW-9i	7-12	upper clay	5 feet	-	Evaluation of Vertical Distribution of Contaminants	
MW-9d	20-25	lower clay	5 feet	-	Evaluation of Vertical Distribution of Contaminants	double cased to 16 feet
MW-10s	1-6	fill	5 feet	1 soil sample	NAPL Delineation & Evaluation Fill Concentrations	
MW-11s	1-6	fill	5 feet	1 soil sample	NAPL Delineation & Evaluation Fill Concentrations	
MW-12s	1-6	fill	5 feet	1 soil sample	NAPL Delineation & Evaluation Fill Concentrations	
MW-13i	10-13	upper clay	5 feet	2 samples	GSI Evaluation	

Note:
The deepest well at each location will be continuously sampled to a depth of 15 feet.
At depths greater than 15 feet, split spoon samples will be collected at least every five feet.
Refer to work plan text for list of analytes.



N

- ☐ = Riverview
- ▒ = Central Avenue
- ▒ = Southworks
- ■ = Point Hennepin

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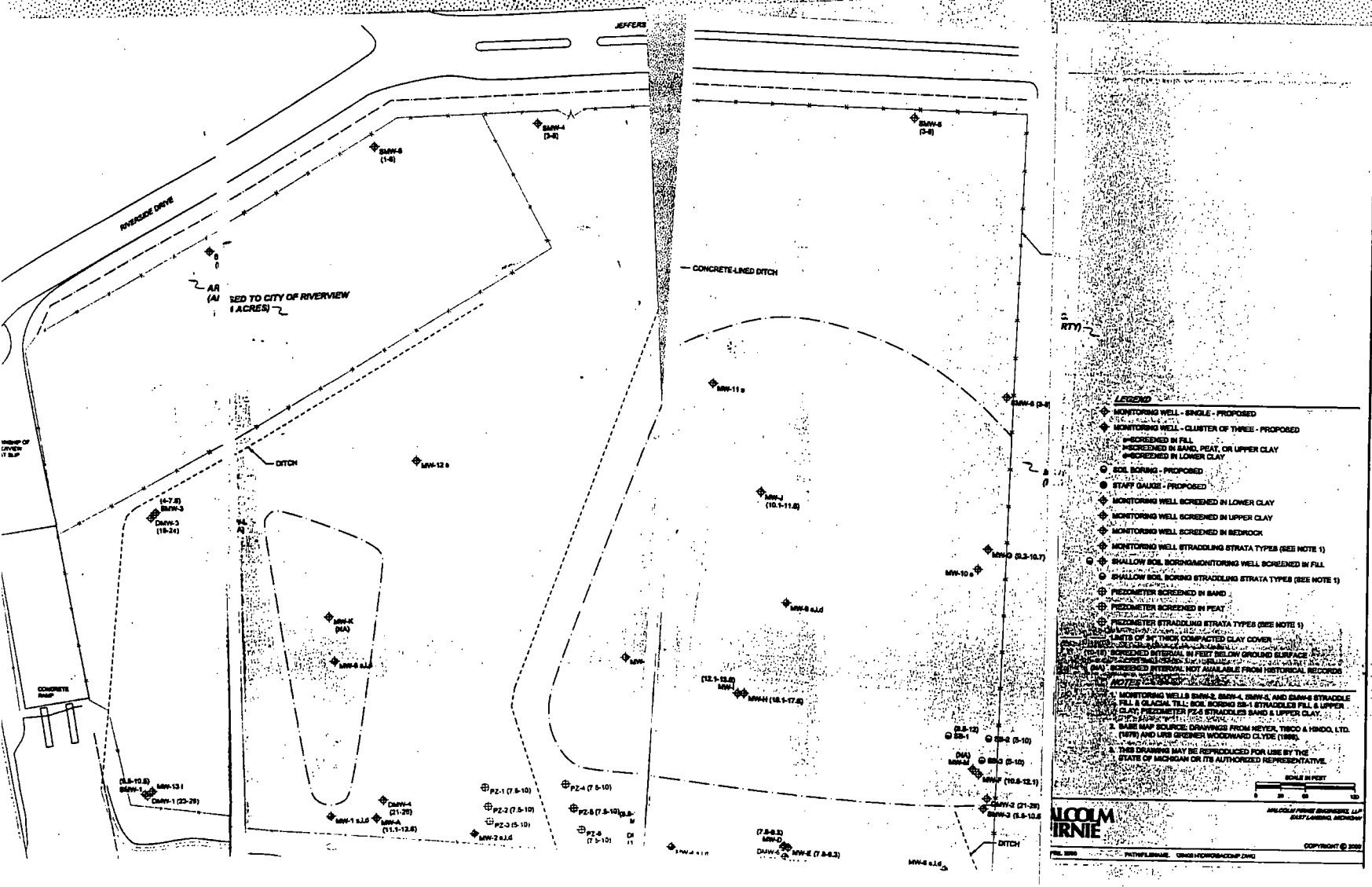
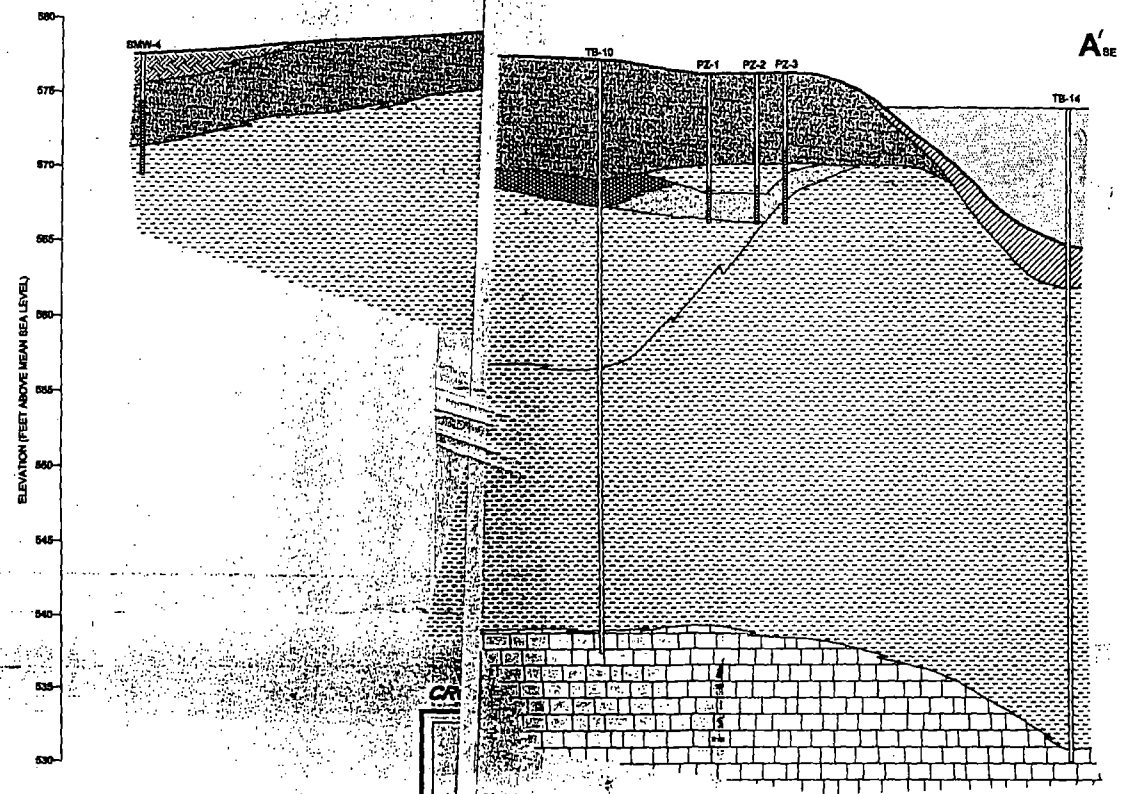
Site Location Map

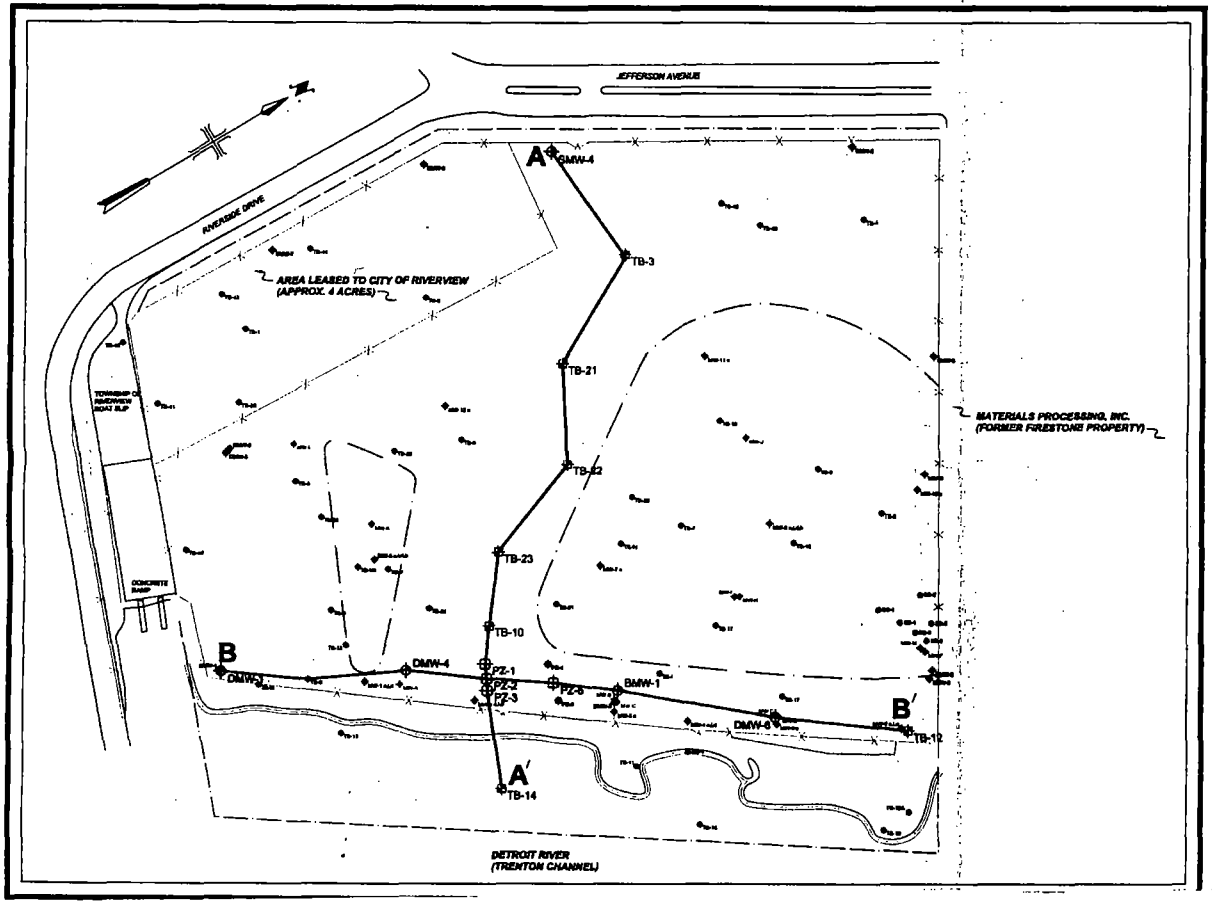
BASF MULTI-SITES

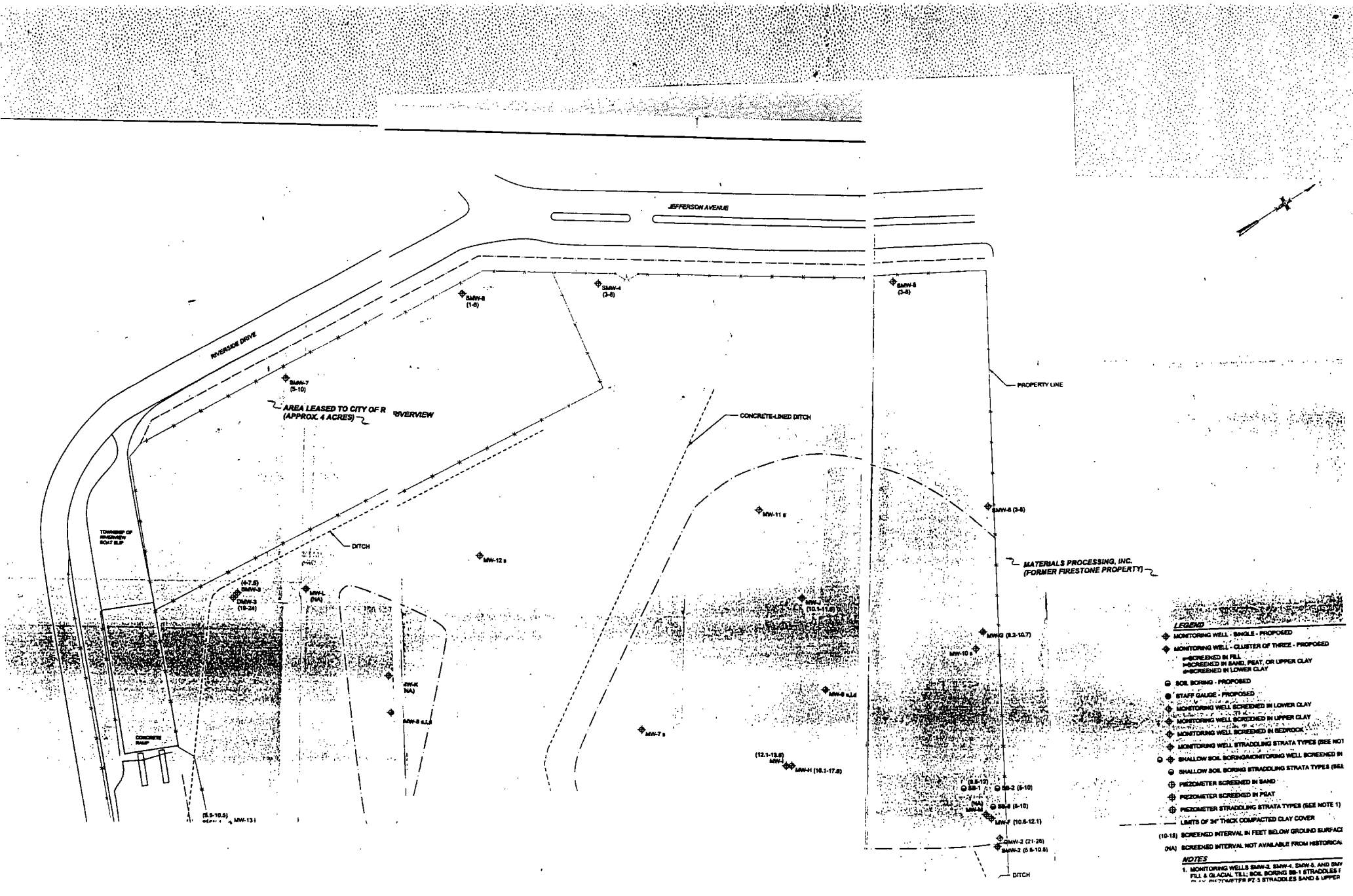
Figure 1-1


RIVERSIDE DRIVE
JEFFERS
SEED TO CITY OF RIVERVIEW
CONCRETE-LINED DITCH
DITCH
CONCRETE RAMP
SMW-4 (3-8)
SMW-5 (1-8)
SMW-6 (3-8)
MW-12 s
MW-11 s
MW-J (10.1-11.8)
MW-10 s
MW-8 s,i,d
MW-K (NA)
MW-6 s,i,d
MW-H (10.1-17.8)
MW-1 s,i,d
MW-4 (11.1-12.8)
MW-2 s,i,d
MW-13 i
DMW-1 (23-28)
DMW-3 (19-24)
DMW-4 (21-26)
DMW-2 (21-26)
SMW-2 (5.8-10.8)
SB-1
SB-2 (5-10)
SB-3 (5-10)
MW-F (10.8-12.1)
PZ-1 (7.5-10)
PZ-2 (7.5-10)
PZ-3 (5-10)
PZ-4 (7.5-10)
PZ-5 (7.5-10)
PZ-6 (7.5-10)
MW-E (7.8-8.3)
DMW-6
MW-5 s,i,d
LEGEND
MONITORING WELL - SINGLE - PROPOSED
MONITORING WELL - CLUSTER OF THREE - PROPOSED
=SCREENED IN FILL
=SCREENED IN SAND, PEAT, OR UPPER CLAY
=SCREENED IN LOWER CLAY
SOIL BORING - PROPOSED
STAFF GAUGE - PROPOSED
MONITORING WELL SCREENED IN LOWER CLAY
MONITORING WELL SCREENED IN UPPER CLAY
MONITORING WELL SCREENED IN BEDROCK
MONITORING WELL STRADDLING STRATA TYPES (SEE NOTE 1)
SHALLOW SOIL BORING/MONITORING WELL SCREENED IN FILL
SHALLOW SOIL BORING STRADDLING STRATA TYPES (SEE NOTE 1)
PIEZOMETER SCREENED IN SAND
PIEZOMETER SCREENED IN PEAT
PIEZOMETER STRADDLING STRATA TYPES (SEE NOTE 1)
LIMITS OF 24" THICK COMPACTED CLAY COVER
(10-18) SCREENED INTERVAL IN FEET BELOW GROUND SURFACE
(NA) SCREENED INTERVAL NOT AVAILABLE FROM HISTORICAL RECORDS
NOTES
1. MONITORING WELLS SMW-2, SMW-4, SMW-5, AND SMW-6 STRADDLE FILL & GLACIAL TILL; SOIL BORING SB-1 STRADDLES FILL & UPPER CLAY; PIEZOMETER PZ-6 STRADDLES SAND & UPPER CLAY.
2. BASE MAP SOURCE: DRAWINGS FROM NEVEA, TIBCO & HINDO, LTD. (1979) AND URS GREINER WOODWARD CLYDE (1998).
3. THIS DRAWING MAY BE REPRODUCED FOR USE BY THE STATE OF MICHIGAN OR ITS AUTHORIZED REPRESENTATIVE.
SCALE IN FEET
0 30 60 120
MALCOLM PIRNIE
MALCOLM PIRNIE ENGINEERS, LLP
EAST LANSING, MICHIGAN
COPYRIGHT © 2000
PATHFILENAME: 'DRGS HDRGS\ACOMP.DWG


A NW
A' SE
ELEVATION (FEET ABOVE MEAN SEA LEVEL)
580
575
570
565
560
555
550
545
540
535
530
BMW-4
TB-10
PZ-1
PZ-2
PZ-3
TB-14
LEGEND
TOPSOIL
FILL
SAND
PEAT

CROSS-SECTION LOCATIONS




JEFFERSON AVENUE
RIVERSIDE DRIVE
SMW-8 (1-6)
SMW-4 (3-8)
SMW-5 (3-8)
SMW-7 (5-10)
AREA LEASED TO CITY OF R (APPROX. 4 ACRES)
RIVERVIEW
PROPERTY LINE
CONCRETE-LINED DITCH
TOWNSHIP OF RIVERVIEW BOAT SLIP
DITCH
MW-11 s
SMW-6 (3-8)
MW-12 s
MATERIALS PROCESSING, INC. (FORMER FIRESTONE PROPERTY)
(4-7.5) SMW-3
DMW-3 (19-24)
MW-L (NA)
MW-I (10.1-11.5)
MW-G (8.2-10.7)
MW-10 s
MW-K (NA)
MW-8 s,i,d
MW-8 s,i,d
MW-7 s
(12.1-13.5) MW-J
MW-H (16.1-17.5)
(8.5-12) SB-1
SB-2 (5-10)
SB-4 (5-10)
(NA) MW-E
MW-F (10.5-12.1)
SMW-2 (21-25)
SMW-2 (5.5-10.5)
DITCH
CONCRETE RAMP
(5.5-10.5) MW-13 i
LEGEND
MONITORING WELL - SINGLE - PROPOSED
MONITORING WELL - CLUSTER OF THREE - PROPOSED
s=SCREENED IN FILL
i=SCREENED IN SAND, PEAT, OR UPPER CLAY
d=SCREENED IN LOWER CLAY
SOIL BORING - PROPOSED
STAFF GAUGE - PROPOSED
MONITORING WELL SCREENED IN LOWER CLAY
MONITORING WELL SCREENED IN UPPER CLAY
MONITORING WELL SCREENED IN BEDROCK
MONITORING WELL STRADDLING STRATA TYPES (SEE NOT
SHALLOW SOIL BORING/MONITORING WELL SCREENED IN
SHALLOW SOIL BORING STRADDLING STRATA TYPES (SE
PIEZOMETER SCREENED IN SAND
PIEZOMETER SCREENED IN PEAT
PIEZOMETER STRADDLING STRATA TYPES (SEE NOTE 1)
LIMITS OF 24" THICK COMPACTED CLAY COVER
(10-15) SCREENED INTERVAL IN FEET BELOW GROUND SURFACE
(NA) SCREENED INTERVAL NOT AVAILABLE FROM HISTORICAL
NOTES
1. MONITORING WELLS SMW-3, SMW-4, SMW-5, AND SMV
FILL & GLACIAL TILL; SOIL BORING SB-1 STRADDLES F
PIEZOMETER PZ-1 STRADDLES SAND & UPPER

STATE OF MICHIGAN

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
"Better Service for a Better Environment"
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us
RUSSELL J. HARDING, Director

REPLY TO:

ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

April 25, 2000

Mr. Thomas McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

SUBJECT: BASF-Riverview site, correspondences dated March 15, 2000, Wayne County, Michigan

Dear Mr. McGourty:

Correspondence dated March 15, 2000 from BASF Corporation (BASF) to Mr. Gary Klepper, District Supervisor, Department of Environmental Quality (DEQ), Environmental Response Division (ERD), and correspondence dated March 15, 2000 from BASF to Ms. Beth Vens, DEQ-ERD have been reviewed. The DEQ has the following comments/responses:

March 15, 2000 correspondence to Mr. Gary Klepper:

Modification #1 - Analytical program
In the "EE/CA Work Plan" BASF proposed that the analytical parameters for the site include: Selected PAH's, selected phenols, PCBs (1 well), arsenic, mercury, ammonia, cyanide, chromium, lead, selected solvents and xylenes.

BASF and the DEQ have concurred that current activities are focused on the groundwater-surface interface (GSI) pathway. Therefore, the analytical parameters selected for this pathway should at a minimum address contaminants that exceed the GSI criteria established in the June 15, 1999 Mixing Zone Determination from Surface Water Quality Division, DEQ.

BASF has proposed that selected phenols, metals, solvents and PAH's be analyzed. It is the DEQ's experience that laboratories run a full scan for phenols (Scan 8), Michigan ten metals (EPA method 6010), volatiles (8260+) and semivolatiles (8270) for the same cost as analyzing for a few of the chemicals in a scan. Therefore, the DEQ proposes that full scans be run for Scan 8, EPA method 6010, 8260+ and 8270 for sampling parameters. Please note the new mercury method (EPA Method 1631) should be used.

The DEQ concurs that ammonia and cyanide should be included in the analytical (or target) list.

All samples should be analyzed for PCBs.

It is agreed that the DEQ will not request BASF to analyze for DDT or hexavalent chromium. The DEQ may wish to collect samples and analyze for these parameters in the future at DEQ cost.

Modification #3 – The Bedrock Monitoring Well

First paragraph: This issue was responded to in DEQ correspondence dated September 28, 1999.

Second paragraph: It is the DEQ's opinion that the source of ammonia in the bedrock well has not been determined currently with field work, as conducted. Additional work will be needed to determine if the source is from the site contaminants or represents "background levels".

Modification #4 – Continuous Water Level Measurements

First Paragraph: The DEQ workplan approval letter dated July 9, 1999 requested "continuous measurements of groundwater levels for three months to obtain an accurate picture of groundwater flow dynamics, with follow-up monthly measurements." The DEQ did not state that three months of measurements alone was sufficient. DEQ has received additional water level data from BASF on January 24, 2000 and on March 17, 2000. The DEQ has concluded that the data have provided the desired information regarding the interaction between the River and the site and will not require that BASF continue monitoring. However, it is our opinion that additional data collection would provide useful information, at a limited cost. For example the data would allow for a more accurate estimate of the average gradient at the site, and this information may assist BASF is designing a interim response activity.

Second Paragraph: The DEQ does not concur that the stilling well is designed properly and as a result is subject to rapid fluctuations such as those caused by wave action. Stilling well design information is available in many references, and those references clearly suggest that the design incorporate a very small diameter water entrance within the well. Because BASF used a well screen the data from the stilling well fluctuates rapidly and masks the short-term water level events, such as those caused by storms. Therefore the data supplied by BASF from the stilling well are of limited use in assessing the effects of those events on the site groundwater. However, the data are useful in assessing the relationship of the site groundwater level to longer term river level changes and therefore the DEQ is not requesting any action with regard to the construction of the stilling well.

Modification #5 – Analytical Program

Sampling discussed in this section applied only to the two surficial soil samples that were to be collected and analyzed for stated parameters as requested in the DEQ July 9, 1999 correspondence. Sampling that was conducted by BASF did not analyze for all of the parameters or full scans as requested by the DEQ

Modification #8 – Analyzing Samples of Concrete for Mercury

There was no agreement at the June 15, 1999 meeting between BASF and DEQ that chipping of the rip-rap was an adequate sampling method. The DEQ asserts that a combination of sampling methods, chipping, cores and crushing would be the best characterization of the rip-rap. These methods were discussed in DEQ correspondence dated June 4, 1999. Chipping alone does not characterize the vertical distribution of the mercury in the rip-rap. Cores of the rip-rap would characterize the distribution of mercury within the cell material. It is likely that the mercury has already leached from the near surface of the cell material. This could explain the leaching results from the samples collected. The DEQ continues to recommend that the rip-rap be sampled using coring methods at locations selected based upon both knowledge of the source of the rip-rap and based upon a sound statistical sampling approach. This additional sampling may not be needed if BASF decides to presumptively handle the rip-rap material through disposal or on-site containment.

March 15, 2000 correspondence to Ms. Beth Vens:

1) No comment.

2) The January 11, 2000 technical review memorandum stated that "the report of findings would include proposed response actions along with an implementation schedule." No reference is found to "more than one response action plan" in the technical memorandum. It was agreed to by BASF and DEQ at a June 15, 1999 meeting that if the investigation confirmed a discharge above GSI criteria to the Trenton Channel, that the Report would propose an acceptable interim response activity to cease the discharge which would be implemented immediately. The Report proposed to "reduce" the flow of water being discharged above GSI criteria to the Trenton Channel and the proposed activities did not include an implementation schedule, criteria when the phases of the activities would occur, and provided no technical basis why the proposed activities were selected. Therefore, the DEQ could not approve of the objective or the proposed interim response activity(ies).

3) & 4) Section Eight of the Report discussed "Remedial Action" scope, goal, and objectives. The reference by BASF to "Remedial Action" in the Report required DEQ to consider the Report a "Remedial Action Plan" (RAP) submittal. Therefore, the DEQ responded that the Report did not meet Part 201 administrative requirements and was insufficient because a RAP under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, must address all relevant exposure pathways for the facility. This issue was discussed and clarified in the March 15, 2000 meeting with BASF and DEQ. It has been agreed by BASF and DEQ that current efforts are focused on addressing the GSI pathway only, and therefore, proposed activities are considered interim response activities, not remedial actions.

The April 20, 1999 workplan submitted by BASF was approved in July 9, 1999 DEQ correspondence. The "Addendum to EE/CA Work Plan" submitted on July 15, 1999 by BASF was not approved. Any changes proposed in the Addendum or those items in the July 9, 1999 DEQ letter that were not complied with are not approved by the DEQ. All other items were approved through the July 9, 1999 DEQ letter.

5) The "BASF-Riverview" (a.k.a. Federal Marine Terminals) file is available to BASF under F.O.I.A. Please contact Ms. Lori Jackson at 734-953-1487 to schedule an appointment is BASF wishes to review these files. Please be advised that in January 2000, DEQ staff located archived files that have now been incorporated into the current file known as "BASF-Riverview".

6) In the Report submitted by BASF, page 1-2 under "Summary of Presumptive Remedy" states that "the presumed remedy at the Site is to reduce the ability of surface water to recharge groundwater and reduce the volume of groundwater entering the Trenton Channel." The DEQ did not "re-phrase" the objective.

The new mercury method (USEPA Method 1631) should be used for sampling of mercury. Method 1631 which has a detection limit of 0.5 part per trillion (ppt) allows compliance with the GSI criteria for mercury of 1.3 ppt to be measured and monitored and will be required after September 30, 2000.

7) The clay surface map was "hand sketched" based upon the data discussed and is considered draft. The map is available for BASF's visual review and will be provided at a future meeting if requested. The map can be produced by BASF by reviewing the boring logs that include elevation information.

8) At this time, the DEQ only intends on reviewing available literature and information regarding the bedrock aquifer. This information will not likely be sufficient to allow BASF to assess the groundwater flow conditions in the bedrock at the site. As discussed during a March 21, 2000 meeting between BASF and DEQ, the DEQ agreed that the ammonia impact within the bedrock aquifer does not present an immediate danger and need not be addressed as part of current activities at the site.

9) The DEQ acknowledges BASF's contention that the ammonia in bedrock at the site represents background conditions. Further review of information on background levels in groundwater suggests that BASF is likely correct. The DEQ requests that BASF present their argument and information when additional Part 201 pathways are being addressed.

10) No comment.

11) See DEQ comment #3 & #4.

12) These groundwater flow issues were discussed during the March 21, 2000 meeting. The DEQ raised issues with the groundwater flow data in an effort to inform BASF of their Part 201 obligations to address all relevant exposure pathways. In particular, current data are not adequate to determine if groundwater, impacted above criteria, is migrating from the site onto adjacent properties. BASF will need to investigate offsite groundwater migration in the future to meet Part 201 obligations.

13) The purpose of the comment was to point out that site data indicate that the confining conditions vary across the site and that any groundwater flow measurements should consider the potential effects of these variable confining conditions.

14) Well SMW-6 was erroneously referenced with regard to on-site flow. Well SMW-7 is the well that suggests on-site groundwater flow. Well SMW-6 indicates possible lateral offsite flow.

15) The DEQ agrees that additional discussion regarding the site hydraulic conductivity is not constructive. The DEQ agrees that all groundwater containing PCBs, mercury, or other hazardous substances above applicable GSI criteria must be prevented from discharging into the Trenton Channel.

16) The DEQ did not request BASF to "estimate the volume of water passing through a slurry wall". In the Report, Section 7.2, when groundwater discharge to the river is being estimated, BASF subtracted the width of the wall (300 feet) from the width of the site (1,200 feet) in its calculations. Since the wall is incomplete, it is incorrect to deduct the 300 feet from the 1,200 feet, as the water will flow around the wall. Therefore any estimates that do not include the linear dimension of the wall will result in estimates that are low.

17) See DEQ comment under Modification #5 regarding soil samples. See Modification #1 regarding water sampling. Recent groundwater sampling at the site was conducted at DEQ's request and DEQ's expense. BASF chose to split samples from the DEQ sampling. The DEQ does not foresee additional quarterly sampling.

18) Additional discussion of the finer points of the interpretation of the long term piezometer data at this time is not constructive. BASF and the DEQ agree that the data are important primarily in assessing the average gradient towards the river. The DEQ agrees that any ambiguities with regard to gradient and flow volume can be overcome via system design, if necessary.

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS & CONSULTANTS

June 9, 2000

RECEIVED ERD S.E. MICH
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COUNTY

Ms. Beth Vens
Michigan Department of Environmental Quality
Environmental Response Division
38982 Seven Mile Road
Livonia MI 48152

Re: BASF Riverview Site
Final File Review Summary and Preliminary
Site Investigation Scope of Work
Malcolm Pirnie Project Number: 3940-014-H20

Dear Ms. Vens:

Attached are two copies of the final File Review Summary and Preliminary Site Investigation Scope of Work (Attachment A). This document was amended to include additional data, some scope changes, and data corrections provided by BASF during a May 25, 2000 meeting and in a subsequent letter dated June 2, 2000. We will develop this Scope of Work into a Work Plan that includes discussion of field procedures upon receipt of your concurrence to proceed.

Should you have any questions, please feel free to contact us.

Very truly yours,

MALCOLM PIRNIE INC

Greg Foote, CPG
Senior Hydrogeologist

Christopher J. Englert, P.E.
Project Manager

/bls

Enclosure

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ATTACHMENT A

FILE REVIEW SUMMARY & PRELIMINARY SITE INVESTIGATION SCOPE OF WORK

BASF RIVERVIEW SITE

1.0 INTRODUCTION

As directed by the Michigan Department of Environmental Quality (MDEQ) evaluation of the groundwater surface water interface (GSI) pathway is the primary interim response objective for the BASF Riverview site (Figure 1-1) at this time. However, based on Malcolm Pirnie's review of available MDEQ file documents, it is not possible to fully evaluate potential interim response alternatives for eliminating the GSI pathway using only data from the previous investigations. Therefore, we have developed a Scope of Work to conduct preliminary investigations to address the data gaps for this pathway. The Scope of Work is organized as follows:

- Chapter 2.0 provides a description of site setting and a brief overview of site hydrogeology
- Chapter 3.0 provides an overview of data gaps identified
- Chapter 4.0 describes the scope of investigation activities that will be performed to address identified data gaps.

2.0 SITE DESCRIPTION AND HYDROGEOLOGY

The BASF Riverview site is a thirty-acre (i.e., 27 acres of land and 3 acres of water) parcel located in Riverview, Michigan. The site is situated along the western bank of the Trenton Channel of the Detroit River. The following discussion of site geology, hydrogeology, and contaminant characterization is based upon reports of previous investigations by URS Greiner Woodward Clyde (URSGWC) in 1999, Applied Environmental Research (AER) in 1980, and Neyer, Tiseo, & Hindo (NTH) in 1979.

2.1 Site Geology

Approximately 50 test boring and 40 monitoring well drilling logs provide a basis for interpreting site stratigraphy. However, because several different consultants performed work at the site and prepared boring logs, there are discrepancies in the stratigraphic descriptions. Two geologic cross-sections, depicted on Figures 1-3 and 1-4, were prepared to illustrate site geology based on our interpretation of the available boring logs. As shown on the cross-sections, the following generalized stratigraphy is present at the site.

2.1.1 Fill Unit

The fill unit is comprised of soils with varying amounts of slag, brick, concrete blocks, wood, glass, and unidentified organic debris. URSGWC describes the fill as "concrete rubble, scrap metal, glassware, soda ash, caustics, cardboard and steel drums, coke, cinders, bricks, carbon anode and cell parts, surfactants, and miscellaneous trash from all Wyandotte sites." During excavation activities performed by AER in 1979, metal containers ranging in size from five-gallon cans to fifty-five gallon drums were uncovered. These containers were reported to be mostly intact and filled with solid and/or liquid substances. It is unclear based on available file documents how many containers are present and in which areas of the site these containers are present. In some areas of the site, a strong chemical odor and staining is reported in the boring logs. The fill appears to range in thickness from 1 to 3 feet at the western edge of the property and 8 to 14 feet thick near the river's edge. A maximum fill thickness of 23 feet was reported by URSGWC near the eastern margin of the site. There appear to be some conflicting reports pertaining to the description of this unit in the various documents in the MDEQ file.

2.1.2 Peat Unit

The peat unit is comprised of peat and/or black organic rich silt and ranges from 1 to 3 feet thick. In general, this unit appears to only be present within approximately 200 feet of the Trenton Channel shoreline. Boring logs indicate the peat unit has a strong chemical like odor.

2.1.3 Sand Unit

The sand unit is comprised of gray to black fine to medium grained sand with traces of clay. This unit appears to be a large sand lens present only near the shoreline and is likely a paleochannel fluvial deposit or more recent bank deposit from the Trenton Channel. Boring logs indicate that the sand unit ranges from 0 to 5 feet thick, is stained, and has a chemical like odor.

2.1.4 Upper Clay Unit

The upper clay unit is comprised of very soft, gray silty clay with some black staining. It is continuous over most of the site and appears to thin toward the shoreline of the Trenton Channel until it is no longer present (see cross-section A-A'). The upper clay unit is likely lacustrine and ranges from about 10 to 15 feet thick where present.

2.1.5 Lower Clay Unit

The lower clay unit is comprised of brown silty clay with little fine to coarse-grained sand and gravel fingers. It overlies bedrock and is approximately 20 feet thick. Heterogeneities in this unit may provide contaminant migration pathways.

2.1.6 Dundee Limestone (bedrock)

The Dundee Limestone consists of a medium to hard grayish brown limestone, with soft seams, and fractures. Boring logs indicate the upper 8 feet of the bedrock is weathered and fractured and that it is first encountered at a depth of approximately 40 feet below ground surface (bgs).

2.2 Hydrogeology

URSGWC describes three distinct water-bearing zones at the site as follows:

- Upper Water-Bearing Zone - The upper water-bearing zone consists of the saturated portion of the fill and some naturally occurring sediments (i.e. the sand and peat units). Groundwater flow in this unit appears to be towards the Trenton Channel in most areas of the site. Hydraulic conductivity is estimated to range from 2.98×10^{-8} to 3.69×10^{-4} cm/s based on slug tests performed in wells screened in this unit. Although, the 2.98×10^{-8} cm/s value from well SMW-1 appears anomalously low in comparison with testing results from other wells screened in the upper water-bearing zone.
- Middle Water-Bearing Zone - The middle water-bearing zone consists of the lower clay unit. Slug tests performed by URSGWC yielded hydraulic conductivity estimates ranging from 5.4×10^{-3} to 3.7×10^{-4} feet/day. Boring logs indicate that highly conductive lenses and heterogeneities (i.e., coarse zones) may be present in this unit.
- Lower Water-Bearing Unit - The lower water-bearing unit consists of the Dundee Limestone. URSGWC reported hydraulic conductivities from the limestone unit ranging from 7.4×0^{-3} to 6.3×10^{-3} feet/day. Typically in limestone, secondary porosity, such as fractures will likely provide the predominant pathway for groundwater migration. Therefore, hydraulic conductivity estimates from slug tests performed in wells screened in this unit may not be accurate assessments of the "bulk" conductivity of this unit.

Based on review of MDEQ files, river level elevations range from 572.39 to 576.96. The variation in river levels may greatly influence the water level elevation in the uppermost water-bearing zone.

2.3 Contaminant Characterization

Table 1-1 summarizes the highest contaminant concentrations detected in groundwater above applicable criteria during quarterly sampling of wells MW-A through MW-M, PZ-1 through PZ-6, SMW-1, SMW-2, SMW-6, and SMW-8 performed from March 1999 through January 2000. As shown on this table, numerous contaminants are present in groundwater at concentrations exceeding the Part 201 GSI criteria (and in some cases the GSI criterion is exceeded by a number of orders of magnitude). Non-aqueous phase liquids (NAPLs) have been observed in some of these wells (MW-M, and MW-F).

3.0 DATA GAPS

The following is a discussion of data gaps identified thus far. Additional data gaps may be identified as further field investigations are performed.

3.1 Physical Well Data

There is some uncertainty with respect to well construction because of poor documentation and conflicting information. For example, the top of casing elevations for wells MW-A through MW-M supplied by BASF in a letter addressed to Ms. Beth Vens of the MDEQ

dated February 24, 1999, conflicts these reported by URSGWC, in Table 2-1 of the EE/CA report dated November 1, 1999. Some of the well elevations varied by up to 0.5 feet.

Furthermore, poor quality construction logs for wells MW-K, MW-L, MW-M create uncertainty concerning the well completion depths. Because of this uncertainty, some of the data obtained from these wells is questionable.

Also, well design problems affect the data obtained from some of the wells. The screened length and completion depth of wells MW-A through MW-M is inadequate in most instances for monitoring potential NAPL and contaminants present near the top of the water table or the bottom of the fill unit.

3.2 Type and Extent of Fill

Historical documentation is vague as to the extent and nature of the fill material. Because this layer is the most likely contaminant source, it is necessary to determine its composition and lateral limits. In addition, previous investigations did not provide sufficient information to determine the extent of the fill present beneath the water in Trenton Channel.

3.3 Groundwater Flow

Based on available file information, groundwater flow direction at the site is unclear for several of the stratigraphic units. The existing network of monitoring wells is insufficient to assess the groundwater flow direction in most of the stratigraphic units present at the site. Figure 1-2 shows the locations of the existing wells and indicates the stratigraphic unit each well is screened in. Screen depths are also shown on Figure 1-2 based upon data provided by BASF. Based on the well coverage for each unit, only the upper water-bearing zone has enough wells to construct a potentiometric surface map. The limited available data suggests that groundwater flow in the uppermost saturated unit is towards the Trenton Channel. However, additional wells in the upper water-bearing zone would be useful to further evaluate groundwater flow direction. Additional characterization of the stratigraphic units at the site will provide useful information to further assess the groundwater flow direction and the GSI pathway.

3.4 Extent and Nature of Contamination

The following are data gaps pertaining to the extent and nature of site contamination:

- An insufficient network of monitoring wells is present at the site to evaluate potential remedial technologies.
- Insufficient soil sampling analytical data are available to assess potential remedial technologies.

3.5 Aquifer Properties

Previous investigations included limited analyses of aquifer properties. Rising head slug tests and variable head permeability tests were performed on a number of wells screened in the upper, middle, and lower water-bearing zones. However, because hydraulic conductivity is a key parameter in assessing potential remedial technologies, additional aquifer testing is necessary. Additional slug testing of wells is needed, and if a treatment technology involving groundwater collection is selected, a pumping test should be performed to further evaluate aquifer parameters.

3.6 Riprap Leaching Potential

Additional riprap sampling is necessary because the procedure used by URSGWC to determine the leachability of the riprap at this site was not documented and the sampling method is not reported.

4.0 SCOPE OF WORK

To address the above data gaps, and to gather additional information need to evaluate an appropriate interim response alternative, the following investigation tasks will be performed.

4.1 Site Survey

The base map provided as part of this Scope of Work (Figure 1-2) was prepared by digitizing maps prepared by Neyer, Tisco, and Hindo, LTD (1979) and URS Geiner Woodward Clyde (1999). During a meeting between BASF, MDEQ, and Malcolm Pirnie on May 25, 2000, a map showing a number of additional "hand drawn" site features was provided to MDEQ by BASF. Additional site features identified on this map include a steel sheeting sea wall, a gravel drive, new capped areas, and poplar tree areas. A survey will be performed because an accurately surveyed base map showing the location of significant site features is not available. Site features, well top-of-casing elevations and locations, and topography will be surveyed by a licensed surveyor. Locations will be surveyed relative to state plane coordinates and elevations will be surveyed to a U.S.G.S. vertical datum. In addition, an inventory of existing monitoring wells, an inspection of each well for damage or vandalism, measurement of water level and total depth in each well, and an identification of surficial structures that may affect runoff/discharge and/or infiltration will be performed.

4.2 Geophysical Survey and Test Pits

A magnetic and electromagnetic geophysical survey will be conducted to help delineate the horizontal extent of the fill (not including fill extending into the Trenton Channel) and to provide vital information about the nature and depths of materials buried at the site.

Up to six test pits will be excavated to evaluate and describe fill materials where geophysical anomalies are identified. Fill will not be removed for disposal during the test pitting activities. Up to four samples of soil, chemical waste, or other materials may be collected from each of the pits for laboratory analysis (up to 24 total samples). The analysis will include a library search and analysis for the following:

- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Phenols
- Total Cyanide (CN^-)
- Michigan 10 Metals + new mercury method (if available)
- Polychlorinated biphynols (PCBs)
- Ammonia (NH_3)

4.3 Monitoring Wells

Monitoring wells will be drilled at the 31 proposed locations shown on Figure 1-2 to develop additional data needed to assess potential remedial technologies.

In conjunction with existing monitoring wells, these wells will be used to monitor contaminant concentrations in each stratigraphic unit, evaluate aquifer properties, and determine groundwater flow in each stratigraphic unit. Stratigraphic data collected during drilling will aid in the development of more detailed cross-sections, provide data about the physical soil properties of each stratigraphic unit, and provide information necessary to evaluate potential contaminant migration pathways.

Nested wells consisting of one shallow and one or more deeper wells will be installed at several locations. The proposed drilling program including drilling depths, well-screen intervals, sampling intervals, and notes pertaining to well installation is summarized in Table 1-2. Soil and/or interstitial water samples will be collected according to the protocol outlined in Table 1-2. Each sample will be submitted to the MDEQ laboratory and analyzed for:

- VOCs
- SVOCs
- Phenols
- CN^-
- Michigan 10 Metals + Mercury
- PCBs
- NH_3

In addition, soil samples will be collected for stratigraphic description purposes according to the protocol outlined in Table 1-2.

If solid wastes are encountered during drilling, samples of the wastes will be collected and submitted to the MDEQ laboratory for a library search to identify unknown compounds in the waste. Groundwater level and free product measurements will be made in the monitoring wells to determine groundwater flow direction in each water-bearing zone and to evaluate the occurrence of NAPL.

4.4 Off-Shore Soil Borings

Off-shore borings will be drilled along four transects shown on Figure 1-2 using a barge mounted drill rig. Each transect will consist of four borings oriented perpendicular to shore, spaced approximately 25 ft apart. The borings will be drilled into the river bottom sediment until 2 ft of native clay is encountered. One sediment sample will be collected from each boring at a depth determined in the field and approved by MDEQ. The sediment samples will be submitted to the MDEQ laboratory for analysis of the analytes described above in Section 4.3. These borings will provide information about the extent and nature of fill extending into the Trenton Channel.

4.5 Groundwater and NAPL Sampling

The new and existing monitoring wells will be sampled to assess groundwater contamination and presence of NAPL, and to provide additional data needed to evaluate potential treatment technologies. The groundwater samples will be submitted to the MDEQ laboratory for: VOCs, SVOCs, phenols, total CN^-, Michigan 10 Metals, PCBs, and NH_3.

Additionally, six groundwater samples selected by MDEQ will be submitted to the MDEQ laboratory for analysis of parameters that influence the effectiveness and cost of treatment technologies. These analytical parameters are as follows:

- pH
- Eh
- Dissolved oxygen (DO)
- Conductivity
- Total dissolved solids (TDS)
- Reduced Iron (Fe^{2+})
- Total iron
- Dissolved iron
- Manganese
- Hardness
- Alkalinity (as CO_3^{2-} and HCO_3^-)
- Chemical oxygen demand (COD)
- Total organic carbon (TOC)
- Sulfate (SO_4^{2-})
- Chloride (Cl^-)
- Nitrate (NO_3^-)
- Phosphate (PO_4^{3-})

4.6 Aquifer Properties

Slug tests will be performed in each of the new monitoring wells (total of 31 wells) to estimate hydraulic conductivity. A total of three slug tests per well will be performed. The estimated hydraulic conductivity data will be used to assess flow velocities, contaminant migration pathways, and potential remedial technologies.

4.7 Riprap Leaching Potential

Five samples of the concrete riprap will be collected and submitted to the MDEQ laboratory for analysis of PCBs and mercury using methods outlined in the Michigan Department of Natural Resources interoffice communication MERA Operational Memorandum #12, Revision #2 dated January 5, 1995. Samples will be collected with an appropriate rock coring device.

4.8 Bench Scale Testing

Up to two bench scale tests will be performed to provide data needed to assess treatment technologies. One bench scale test will be performed to assess in-situ treatment technologies and a second bench scale test will be performed to assess treatment of potential extracted water. The nature of the bench scale tests will be determined after completion of the field activities described in Section 4.1 through 4.7 and further evaluation of potentially applicable remedial technologies by MDEQ.

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported (ug/L)
March 1999 through January 2000

Compound Name	Mixing Zone[1] or GSI[2] Criteria	Maximum Concentration	Well ID									
			MW-A	MW-B	MW-C	MW-D	MW-E	MW-F	MW-G	MW-H	MW-I	MW-J
1,2-Dichlorobenzene	16[2]	20	20									
1,2-Dichloroethane	6[2]	150		18		150	54J					
1,2-Dichloropropane	9.1[2]	46	37	46	35	24J						
2,4,6-Trichlorophenol	5[3]	97	14	97	69						9.5T	
2,4-Dichlorophenol	19[2]	2,400		2,400	75		200					55T
2,4-Dimethylphenol	160[1]	840		840	320	400	210					
2-Chlorophenol	22[2]	58		58	52							
Acenaphthene	19[2]	50		50	22							
Ammonia	12,000[1]	86,700	12,200	21,000	19,300	33,600						31,600
Arsenic	680[1]	14,290DL		1,200	1,060	14,290DL	11,400			290	1,300	
Barium	190[2]	480			480					270		440
Carbazole	10[3]	360		360		51						20
Chloride	50,000[4]	2,250,000	833,000	2,120,000	1,310,000	756,000	248,000		191,000	2,250,000		237,000
Cyanide (total)	20[3]	110,000	1,300	5,510	4,470	11,100	8,140	180		3,840	560	1,800
Ethylbenzene	18[2]	52		52		23						
Fluoranthene	1.6[2]	640		640	220	140	44					47
Fluorene	12[2]	360		360	120	44						36
Lead	820[1]	1,130					1,130					
Mercury	0.0013[1]	1,440	7.7	126	35.3	1,100	1,440		0.4	4	3.5	133
Naphthalene	200[1]	1,500		1,500	980	390						440
PCBs (total)	0.00012[1]	309J	0.075T	309J	40J	17.1J	5.7J				0.97	0.25J,T
Pentachlorophenol	17[1]	320	34	300	240	220	110T					
Phenanthrene	43[1]	120,000T *		1,200	320	180	57					100
Selenium	5[2]	28		14	7.9DM	7.3	5.5		9.6	28		5.2DM
Silver	0.2[2]	2.5							2.5			
Sodium	160,000[5]	15,900,000	2,550,000	8,580,000	3,590,000	10,200,000	912,000		1,300,000	6,070,000	1,390,000	6,990,000
Vinyl chloride	15[2]	96				96	24T					
Xylenes	35[2]	111		50								

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported (ug/L)
March 1999 through January 2000

Compound Name	Mixing Zone[1] or GSI[2] Criteria	Maximum Concentration	Well ID												
			MW-K	MW-L	MW-M	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	SMW-1	SMW-2	SMW-6	SMW-8
1,2-Dichlorobenzene	16[2]	20													
1,2-Dichloroethane	6[2]	150													
1,2-Dichloropropane	9.1[2]	46													
2,4,6-Trichlorophenol	5[3]	97													
2,4-Dichlorophenol	19[2]	2,400													
2,4-Dimethylphenol	160[1]	840							240		300				
2-Chlorophenol	22[2]	58													
Acenaphthene	19[2]	50													
Ammonia	12,000[1]	86,700	51,000								12,700		19,000	86,700	
Arsenic	680[1]	14,290DL													
Barium	190[2]	480													
Carbazole	10[3]	360													
Chloride	50,000[4]	2,250,000	1,520,000	261,000											
Cyanide (total)	20[3]	110,000	110,000	360		1,520	1,510	114	1,930	7,760	2,690	1,290	651	4,400	
Ethylbenzene	18[2]	52													
Fluoranthene	1.6[2]	640	13												
Fluorene	12[2]	360							15	13	21				
Lead	820[1]	1,130													
Mercury	0.0013[1]	1,440	72.8	2.1		15.5	11.4	0.2	57.5	41.6	211	2.2	1.4	1.2	0.4
Naphthalene	200[1]	1,500	11			56	99		46	14	210		3.5		
PCBs (total)	0.00012[1]	309J	0.66T												
Pentachlorophenol	17[1]	320	38			110	80		210	20	320				
Phenanthrene	43[1]	120,000T *			120,000T *				69	43	55				
Selenium	5[2]	28	10												
Silver	0.2[2]	2.5													
Sodium	160,000[5]	15,900,000	15,900,000	694,000											
Vinyl chloride	15[2]	96													
Xylenes	35[2]	111					39				111				

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported in (ug/L)
March 1999 through January 2000

Notes:

1- Mixing zone concentrations based on values calculated using Rule 57 of the Part 4 Water Quality Standards.
Source: Tables 1 and 2 from MDEQ interoffice communication from Sara Bonnette to Daniel Schultz dated June 15, 1999.

2- GSI criteria obtained from Revised Part 201 Operational Memorandum #18 Cleanup Criteria Tables, dated May 28, 1999.

3- TDL = target detection limit. GSI criteria defaults to TDL because GSI is less than the target detection limit.

4- The GSI criteria for Chloride (50,000 ug/l) was obtained from the MDEQ Toxicology Department on April 10, 2000. This value is not currently listed on the Part 201 Operational Memorandum #18 Tables. However, according to the MDEQ, the value will be listed in the next revision of the memorandum.

5- The criteria listed for Sodium is the Residential and Commercial I Drinking Water Value obtained from the Part 201 Operational Memorandum #18 Cleanup Criteria Tables, dated May 28, 1999. According to the MDEQ Toxicology Department, GSI criteria is not expected to be established for Sodium. This value is listed for general reference only.

* Only analytes with concentrations exceeding GSI or Mixing Zone criteria are reported. Other detected analytes (except for sodium) are not reported on this table.

* Values reported are the highest encountered concentrations during the sampling period (March 1999 - January 2000) using results from MDEQ analysis and BASF analysis.

* Blank cells indicate the analyte has not been detected over GSI or Mixing Zone criteria

* Laboratory data qualifiers are as follows:

  NA = not available
  * = reported concentration is from a sample of NAPL
  DM = indicates that a dilution was required due to matrix interference
  DL = indicates that the sample was analyzed using a dilution
  J = indicates an estimated value
  T = indicates that the value reported is less than the criteria of detection

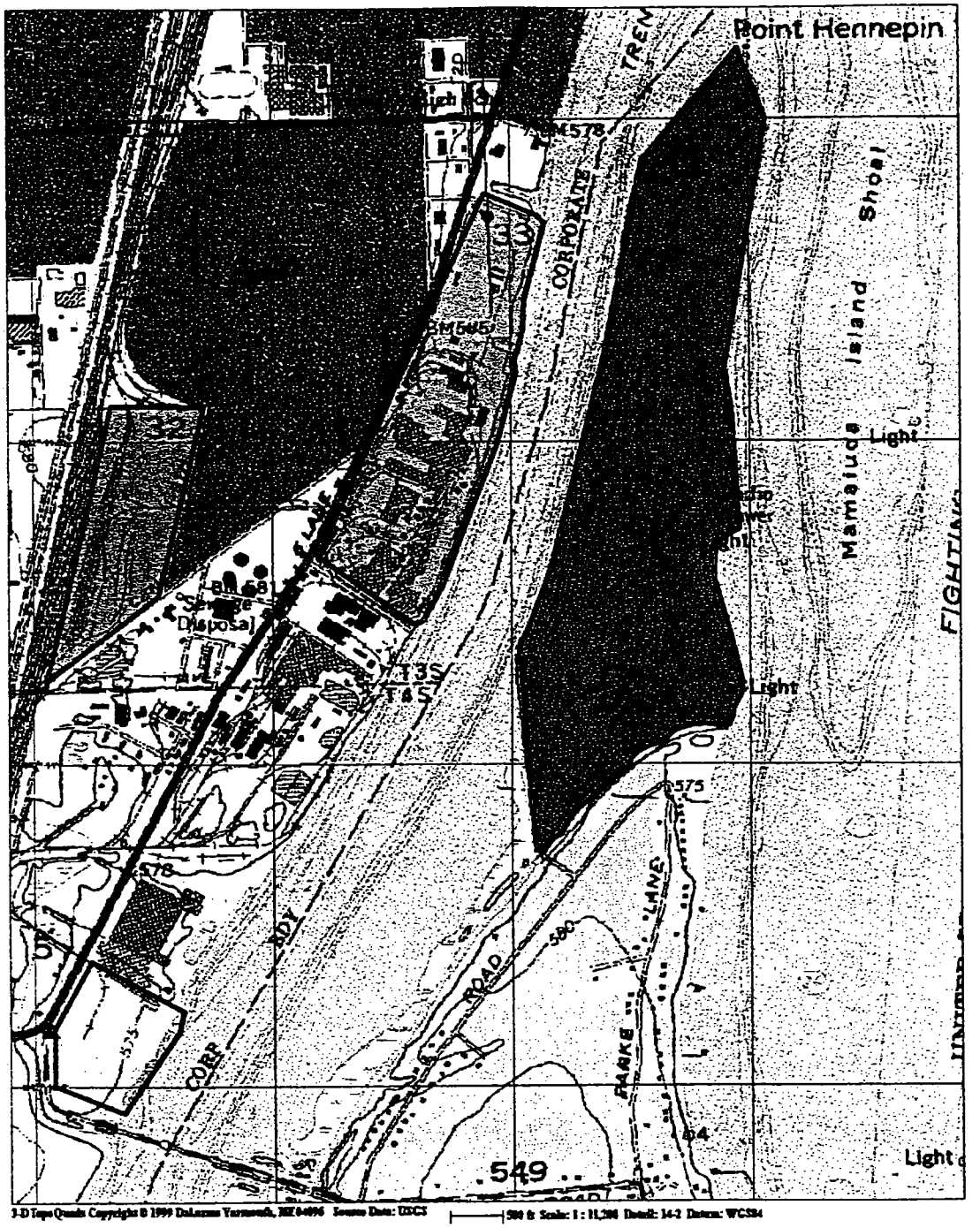
Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

Proposed Well ID	Location of Monitoring Well Screen[A]	Screen Length	Stratigraphic Sampling	Analytical Sampling[B]	Notes
MW-1s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-2s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-2i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-2d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-3s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-3i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-4s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-4i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-4d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-5s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-5i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-6s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-6i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-6d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-7s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-8s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-8i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-8d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-9s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-9i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-9d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-10s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-11s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-12s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-13i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-14s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-15s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-16s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-17s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-18s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-19s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
SB-1	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-2	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-3	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-4	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-5	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay

Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

Proposed Well ID	Location of Monitoring Well Screen[A]	Screen Length	Stratigraphic Sampling	Analytical Sampling[B]	Notes
SB-6	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-7	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-8	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-9	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-10	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-11	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-12	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-13	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-14	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay

Notes:
[A] = All final well completion depths and screen lengths are subject to MDEQ approval prior to completion.
[B] = Soil samples will be collected in the vadose zone and interstitial water samples will be collected below the water table.
[C] = Stratigraphic samples will not be collected at this location because continuous sampling will be completed at an adjacent deeper well in the cluster.
NA = Not Applicable



N

□ = Riverview
▩ = Central Avenue
▨ = Southworks
■ = Point Hennepin

MALCOLM PIRNIE

MALCOLM PIRNIE ENGINEERS, LLP
EAST LANSING, MICHIGAN

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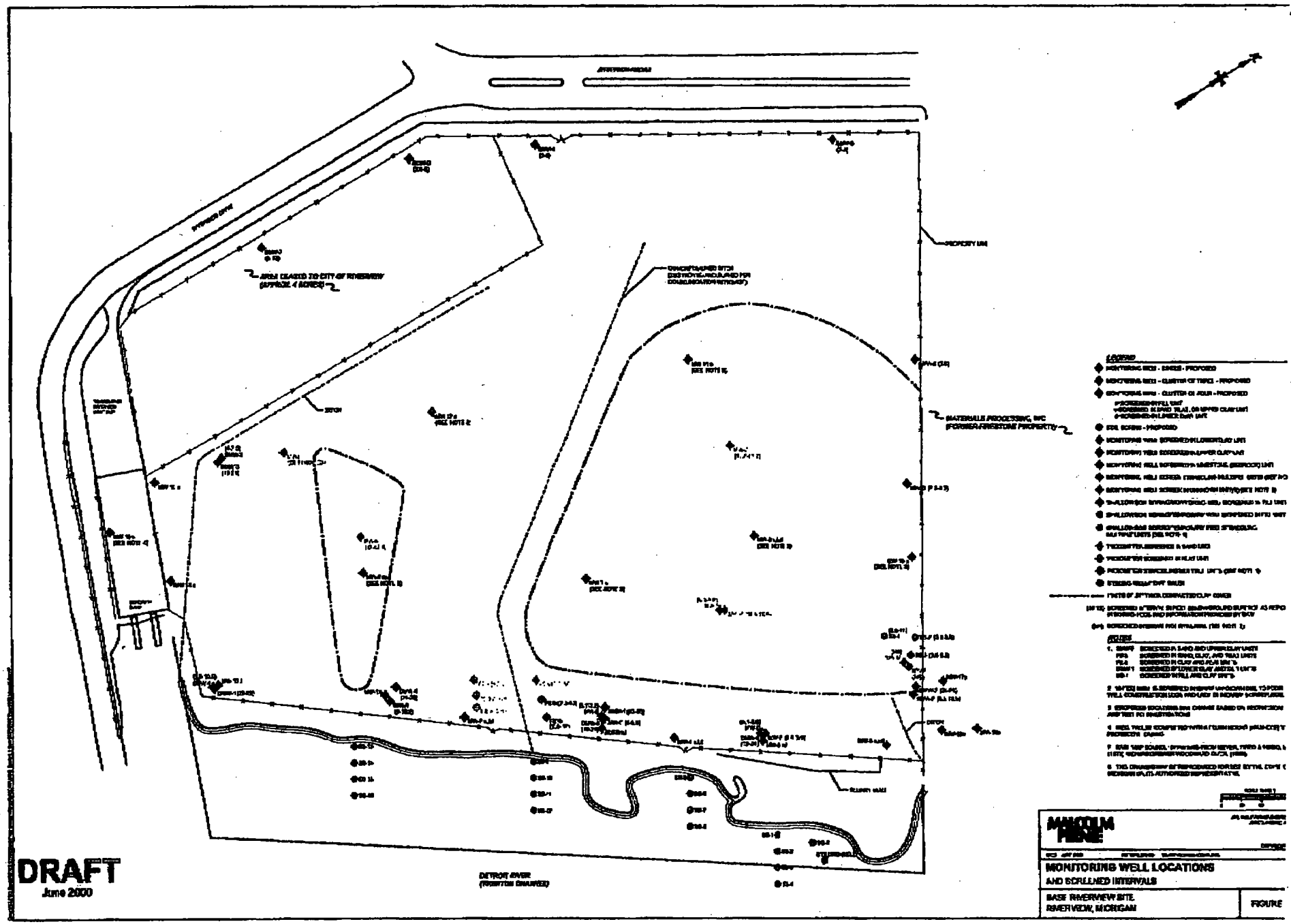
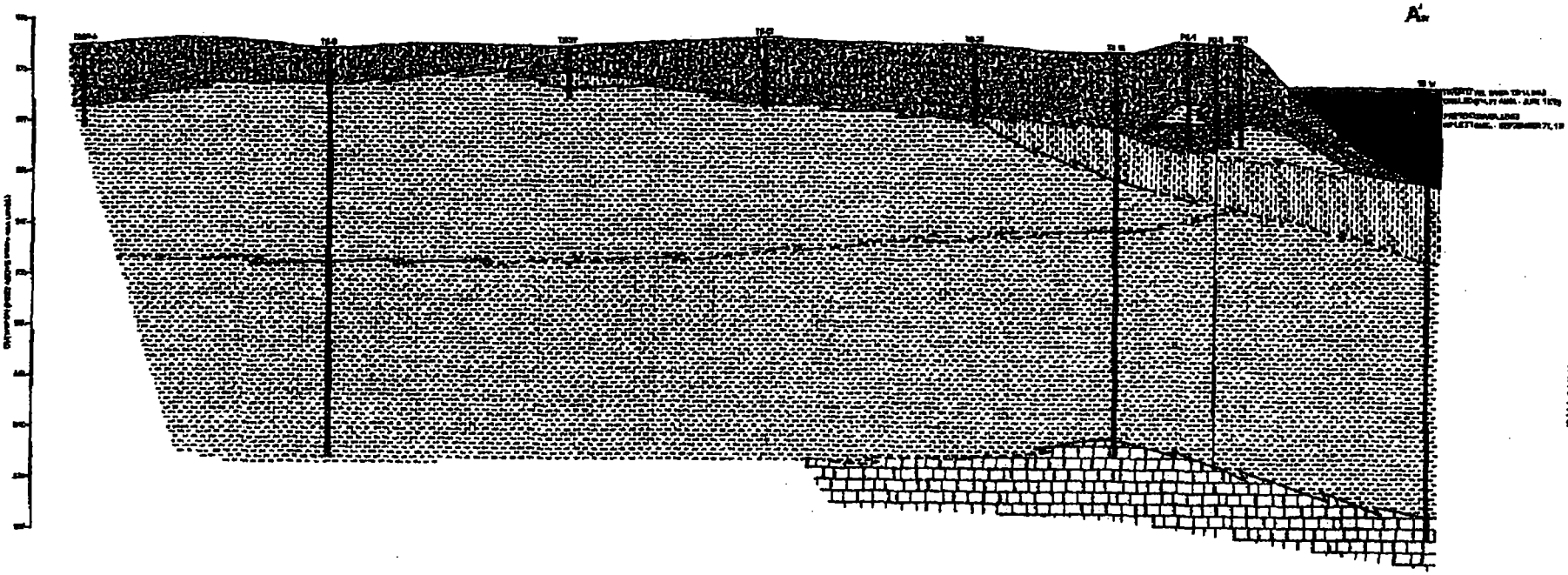
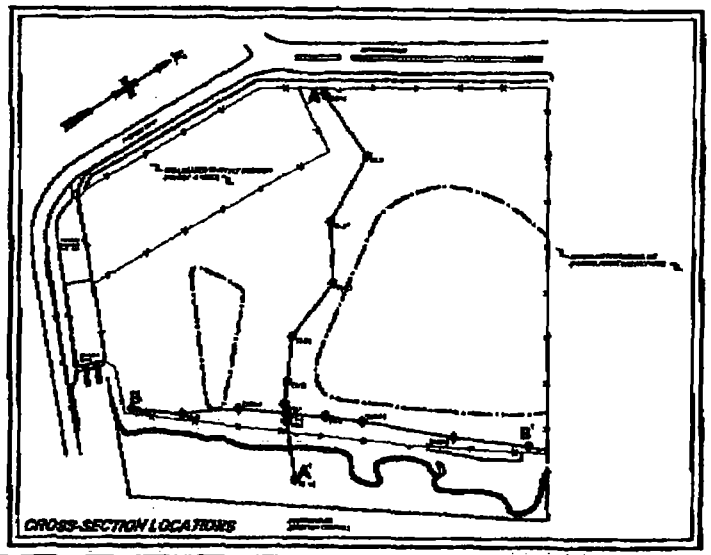
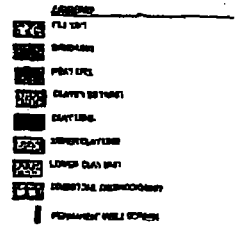
Site Location Map

BASF MULTI-SITES | Figure 1-1


DRAFT
June 2000
DETROIT RIVER
(TRENTON CHANNEL)
MATERIALS PROCESSING, INC
(FORMER FIRESTONE PROPERTY)
PROPERTY LINE
MALCOLM PIRNIE
MONITORING WELL LOCATIONS
AND SCREENED INTERVALS
BASF RIVERVIEW SITE
RIVERVIEW, MICHIGAN
FIGURE





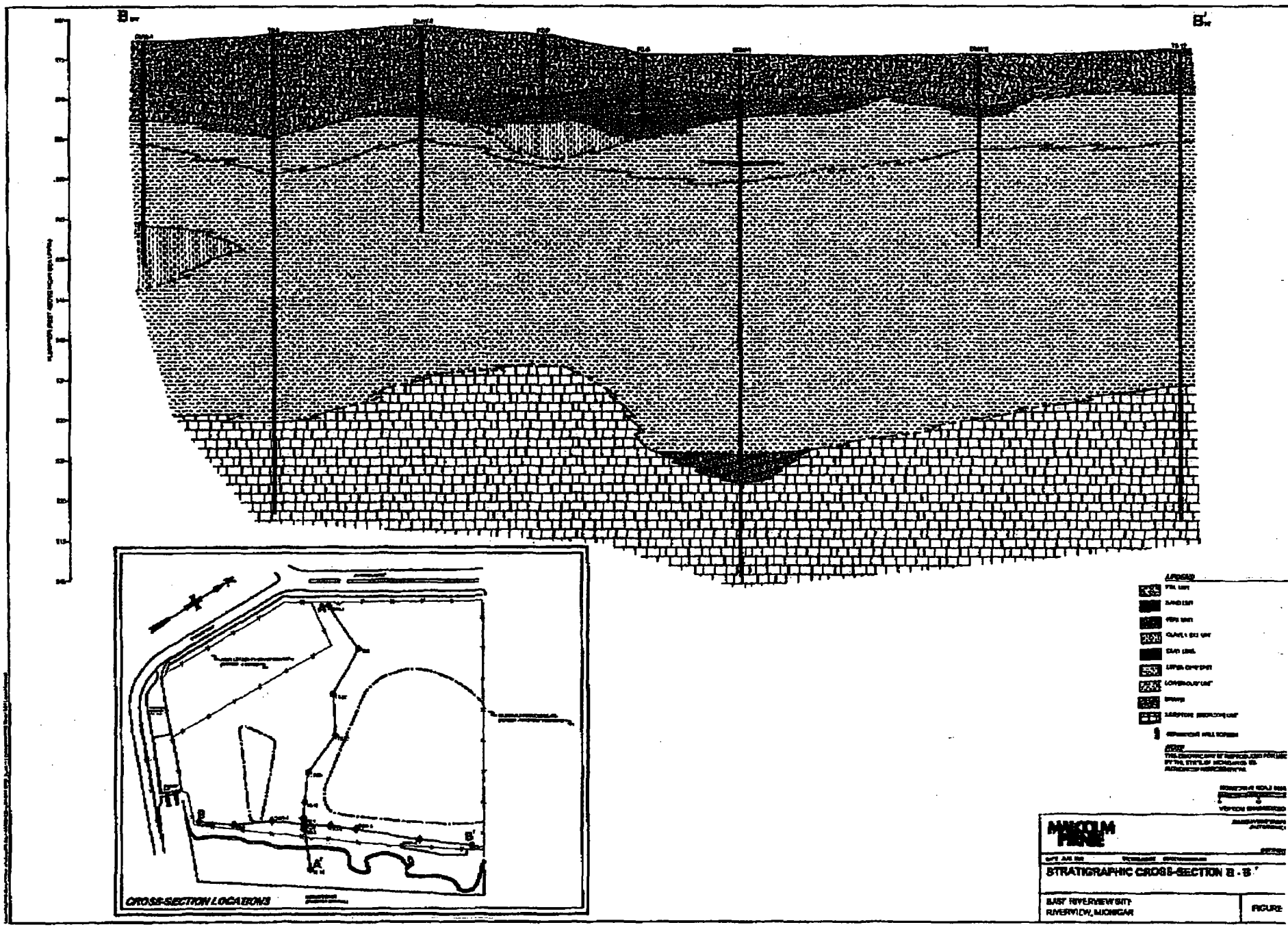


MALCOLM PIRNIE

STRATIGRAPHIC CROSS-SECTION A - A'

BASF RIVERVIEW SITE
RIVERVIEW, MICHIGAN

FIGURE


B
B'
CROSS-SECTION LOCATIONS
MALCOLM PIRNIE
STRATIGRAPHIC CROSS-SECTION B - B'
EAST RIVERVIEW SITE
RIVERVIEW, MICHIGAN
FIGURE

BASF Corporation

BASF

March 15, 2000

VIA FACSIMILE AND US MAIL

Ms. Beth Vens
Environmental Quality Analyst
Michigan Department of Environmental Quality
38980 West Seven Mile Road
Livonia, Michigan 48152-1006

Subject: BASF Corporation's Riverview Property: DEQ's January 21, 2000, Letter Commenting on the EE/CA Report dated November 2, 1999

Dear Ms. Vens:

BASF Corporation received the subject letter on January 25, 2000. BASF's responses to comments from the Department of Environmental Quality are listed below. Responses follow in the same order as the comments appeared in an Interoffice Communication from Steve Hoin and Beth Vens (unsigned) to Daniel Schultz dated January 11, 2000. A copy of that communication is attached, and numbers in the margin correspond to the comments numbered below.

BASF's Responses to DEQ's January 11, 2000 Comments

1. On behalf of the BASF Corporation's Ecology Services Department, Mr. Jack Lanigan delivered the EE/CA Report to the DEQ offices in Livonia on the afternoon of November 2, 1999, not November 3. Ms. Vens was not in her office on November 2 to take delivery, but the Receptionist received it.

2. This paragraph implies the DEQ expected more than one response action plan. In meeting notes from the June 15, 1999, meeting in Lansing and in the July 9, 1999, letter to Mr. Thomas McGourty, there are no references to more than one recommended plan of action. The DEQ has stated that they wished to see construction begin during the winter 1999-2000. BASF and URS would have been hard pressed to develop and evaluate multiple, detailed alternatives by the November 2, 1999, delivery date. BASF's understanding has always been the DEQ wanted a plan. Stating that DEQ expected a plan they could accept is arbitrary since DEQ did not specify or provide any evaluation criteria. The State agreed to cap the property previously. This plan was consistent with a previously approved approach, but it improved on the original design.

3. The DEQ states the plan did not address most administrative requirements. BASF operated under an approved work plan. Please cite the items in the work plan that were not accomplished. Additionally, BASF requests the DEQ to list any necessary administrative requirements that were not met. Since the plan was submitted on November 2, the DEQ has approximately two months of the six-month review period remaining to complete the list.

4. BASF understands we were operating under an approved work plan. Please identify the information and/or requirements specified in the approved work plan that were not provided to the DEQ.

5. BASF requests copies (or at least citations) of the "DEQ site files" interpreted for this review.

6. There are at least three instances in the approved work plan where BASF stated the objective as "...focus on preventing or reducing exposure to chemicals of concern..." (see pages 3-2, 3-4, and 3-6 of the April 20, 1999, Work Plan, for example). We find it difficult to understand why the objective must be re-phrased now.

   In past correspondence, the DEQ alluded to a new method for analyzing water for mercury. BASF requests the DEQ to provide the method detection limit and the resultant GSI.

7. Please provide a copy of this map illustrating topography on the clay surface. In the 1982 E&E Report, the subsurface boring logs do not identify ground elevations, so it is impossible to construct an accurate representation of the clay surface. Additionally, only 10 of the 19 borings drilled across the 30-acre site are interpreted to have reached the clay unit. This paucity of information makes it difficult to present an accurate rendition of a channel, if it is present.

8. In a letter from Mr. Schultz to Mr. McGourty dated July 28, 1999, the DEQ stated they would be undertaking an assessment of the bedrock aquifer in the Downriver area. Presumably, this report will describe groundwater flow directions and water quality. BASF sees no reason to duplicate efforts the DEQ committed to undertake.

9. Ammonia indeed was present in the bedrock aquifer at a concentration of 0.4 mg/L. This concentration is one-fiftieth the concentration detected in the shallow zone, and approximately equal to the concentrations detected in the clay unit. However, there is not a single other chemical in the bedrock aquifer that also was detected in the shallow zone. These chemicals include the readily mobile acetone, methylene chloride, arsenic, and cyanide. Except for the occurrence of ammonia, there are no similarities between the bedrock aquifer and the shallow water-bearing zone.

   Analytical data from the three background monitoring wells around the City of Riverview's landfill contain concentrations of ammonia slightly higher than detected at BASF's Riverview property. The City's landfill lies on the opposite side of the Sibley Quarry from BASF's property. The City of Riverview submits these monitoring data to the DEQ regularly. Results from the 1999 compliance sampling are attached.

   Analytical data from domestic supply wells in Oakland County, as reported by the USGS, found ammonia at concentrations up to 0.83 mg/L in groundwater. This concentration is more than twice the level found at BASF's Riverview property.

   We hold the opinion that the ammonia is a natural occurrence and not the result of migrating surficial contamination. We plan no further assessment of the bedrock unit.

10. The report does not use the term "Deep and Middle Clay" zones. This is the "middle saturated zone", as that term is used consistently throughout the report.

11. The DEQ use the terms "interim response action" and "remedial action plan" almost interchangeably. BASF has completed several "interim response actions" and/or "interim

measures" at this property already. We wish to pursue an approved remedial action. Since an interim response action should be consistent with the final remedial action, the interim response action is not considered permanent. We wish to pursue a permanent remedy.

12. In this paragraph, the DEQ reviewer states the groundwater map in the report is similar to past flow conditions, yet the map may not accurately represent flow conditions. The DEQ states that dry wells suggest westward flow is being diverted laterally, but no rationale is provided. Later in the comments, DEQ states that groundwater may be flowing onto the property in this same area where it is said it be moving off (see # 14 and 20 below).

    Groundwater flow directions on the property undoubtedly are influenced by the Detroit River on the east and Monguagon Creek on the west.

    Catch basins are indeed present near the site's periphery. The storm sewers under West Jefferson Avenue collect runoff and divert it into Monguagon Creek at the Jefferson Avenue Bridge. There is one catch basin on the Riverview property. It is located on the north property line, and it was installed as required in the 1984 Consent Decree. According to drawings obtained from the City of Riverview, it appears water entering this catch basin is directed into the sanitary sewer system and eventually reaches the POTW on Pennsylvania Avenue. The sanitary sewers are present near the northwestern corner of the property..

    BASF understands from the City of Riverview engineers that the Hawkins Trucking building (across Jefferson Avenue from the property) historically had held the primary wastewater treatment system for the City of Riverview. Effluent discharge was through a sewer running under the drive between MPI and BASF. The invert elevations of the sanitary sewers near the property are approximately 556 feet.

13. BASF personnel do not understand this comment. Please explain further.

14. The water level in well SMW-6 is cited as evidence that groundwater is flowing off the site. This same well is cited later as evidence of groundwater migration onto site (see # 20 below). Please clarify these comments. Well MW-F was not used in the construction of water level maps (please refer to the notation on Figure 2-5).

15. Hydraulic conductivity: The remedial action/feasibility study report will describe BASF's measurements and calculations of hydraulic conductivity in detail. Data cited by the DEQ for the shallow zone are over 15 years old and were acquired before the site was compacted during construction of the cap. Under some circumstances, the data may be useful. In an effort to close this data gap, BASF's consultant, URS Corporation, performed slug tests in ten of the monitoring wells along the river that are completed in the fill material. These test results show hydraulic conductivity ranges between 5.7E-4 and 3.0E-8 cm/sec. After removing the lowest hydraulic conductivity from the calculation, the geometric mean of the nine remaining values is 5.5E-5 cm/sec – coincidentally, almost identical to the value presented in E&E's 1982 Report. Data sheets from the February 2000 slug tests are attached.

    As an additional observation, the references to the amount of groundwater leaving the property is relevant only when used to calculate the capacity of a groundwater collection

and/or treatment system. As we understand the DEQ's position, one gallon of groundwater leaving the site is unacceptable if it contains mercury above detectable concentrations; so, why should we spend time and energy arguing about a couple thousand gallons?

For now, we find it non-constructive to argue about historical measurements of hydraulic conductivity and to select data for inclusion and exclusion arbitrarily. The DEQ has cited a report by E&E prepared during 1982 to describe hydraulic conductivity in the fill. That report (3/82) cites 4E-5 cm/s as the likely hydraulic conductivity based on measurements they conducted. Their estimate of 56,000 gal/year leaving the site was described as a worst case, because the measurements were made in the spring when height of saturated zone is greatest and because they used the steepest gradient.

The DEQ also uses data from a 1978 report prepared by Dames & Moore (on behalf of BASF Wyandotte Corporation). That report measured hydraulic conductivity at sixteen locations. The DEQ chose to use only the greatest hydraulic conductivity value of 1.0E-3 cm/s. The geometric mean conductivity value when using all seven measurements on the fill materials was slightly less than 1E-5 cm/s, and more accurately representative of conditions for the property.

As a summary, the continuing references to historical measurements of hydraulic conductivity will accomplish nothing. BASF collected additional measurements and is sharing the results with the DEQ. BASF intends to use these new values during the feasibility study, as appropriate.

16. Slurry wall: The DEQ states that BASF should estimate the volume of water passing through a slurry wall. This was not a work plan objective, nor does it appear to be practical. The DEQ's statement that since the wall is not complete, "...water that encounters that wall will migrate laterally around the wall" appears to be quite accurate. The wall reduces the cross-sectional area where water can flow; that is its designed purpose. The cross-sectional area is one of the three variables needed to calculate flow through a porous medium (Darcy's Law). As stated in Section 3.6, the wall is approximately 270 feet long. This will be corrected in section 7.2.

    As we stated on repeated occasions, we have searched all our files and cannot find drawings or design documents for how the wall was built. Please recall that construction of this feature was required of FMT – not BASF. We do have notes and descriptions from the Corps of Engineers and the State directing FMT on how to build the slurry wall, and some field notations describe the work, but we have nothing definitive. Ms. Mary Van der Laan was a consultant to FMT, and she was on the site during construction of the wall. She should be able to provide the DEQ with reliable descriptions of how it was built.

17. Samples of surficial soils were obtained in an area slightly east and south of wells MW-D/E. This is where the distressed vegetation occurs. The locations will be identified on a map. These two samples were requested by DEQ. Additionally, BASF has some results from soil sampling during September 1998 near this same location. They are attached.

    BASF and DEQ must reach an agreement on the analytical parameters for this property before proceeding further. The DEQ requests a laundry list of chemicals, and BASF

suggested a shorter list based on previous sampling and analytical results. Obviously, BASF does not see the need to analyze for chemicals that have not been detected previously.

During the period March 3, 1999, to January 12, 2000, the DEQ and BASF collected water samples from most of the Consent Decree monitoring wells on four occasions. Every well was not sampled every time due to low water volumes and time constraints. However, during those four quarterly events, DEQ and BASF collected 38 samples of groundwater, split the samples, and had the samples analyzed by our laboratories. The analytical programs looked for more than 180 different analytes and detected 94 of them in at least one sample on at least one occasion. Of all those chemicals and analyses, 35 chemicals were detected in at least one sample on at least one occasion at a concentration above the GSI criterion (7 metals, ammonia, cyanide, 7 phenolics, 4 PNAs, 2 phthalates, 4 aroclors, DDT, and 8 VOCs (BETX, acetone, vinyl chloride, methylene chloride, and 1,2-dichlorobenzene). By increasing the occurrence to at least twice and/or considering mixing-zone concentrations, many of these 35 chemicals fall off the list. The cost for these data? Approximately $95,000 -- $33,000 for BASF and $62,000 by Michigan taxpayers.

BASF believes these data are useful for making decisions. The occurrence and concentrations of many of these 35 chemicals will not influence the remedial action one iota. Mercury, PCBs, and ammonia are likely to drive the remedial process. We collected and paid for all these data, let's use the results to save money now.

18. BASF and our consultant experienced delays when obtaining trolls for long-term monitoring. BASF has provided additional groundwater levels to the DEQ and EPA. Data through the middle of December were provided to DEQ and EPA recently. An additional batch of measurements were obtained in mid February and are being examined. Those data will be transmitted to the DEQ and the EPA soon.

    The DEQ reviewer contends that the groundwater gradient is toward the river the majority of the time. While this is true, the water level chart shows the water in the Trenton Channel is – on occasion -- higher than the groundwater level in the well 110 feet from shore. Also, the chart shows that significant storms can influence groundwater flow for several days. The letter states the reversals occur less than 50 feet from the River. In fact well PZ-6 is the closest well to the river being approximately 60 feet away and PZ-3 is the next closest being approximately 70 feet away. These findings are consistent with data provided to the DEQ over the years; the water levels in the River are higher than the groundwater on occasion. (This also was the case when E&E performed their field work in February 1981.)

    BASF does not understand the comment concerning daily fluctuations of groundwater levels. The data and measurements are what they are. If groundwater fluctuations lag behind river levels by a week, well then they do.

    Even if the groundwater in wells PZ-1 and PZ-5 is confined and behaving differently than the other wells and the river, BASF does not understand why this would bring to question the validity of the data. Please explain. As described in the transmittal letter, URS Corporation believes the transducers in piezometers PZ-1 and PZ-5 malfunctioned.

This also appears to be a good time to point out that all calculations of groundwater gradients used to calculate discharge to the Trenton Channel assume a gradient toward the River all the time. Obviously, this is not the case; reversals occur that reduce and eliminate groundwater flow to the Trenton Channel. The data BASF acquired at the request of the DEQ show that these periods are measurable. The only benefit to acquiring realistic estimates of groundwater flow is for BASF to size a treatment system if we choose to proceed in that direction. We are willing to leave it to the conservative nature of design engineers to select and appropriate flow volume.

19. Discharge to the river. BASF concurs with the DEQ that: 1) impacted groundwater appears to be entering the river, 2) the estimated volumes are known only within a few orders of magnitude, 3) the middle zone contributes an insignificant amount of groundwater, and 4) any remedial strategy must consider the possibility that groundwater flow may be higher than anticipated. We will disagree with the rest of the section because the DEQ disregards the presence of the slurry wall, relies on unknown effects from barometric pressure, inflates estimates of both the hydraulic conductivity and the groundwater gradients, and ignores any contribution from the landfill caps. (By the way, in 1982 E&E estimated groundwater flow to the river at 56,000 gallons per year, not 56,000 cubic feet per year.) BASF is willing to rely on the conservative, engineering design assumptions if a collection and treatment system is needed.

20. This section states that the data suggest groundwater is moving onto the property in the vicinity of well SMW-6 and from the south. We see no such evidence, and request DEQ to clarify the statement. Additionally, DEQ previously stated that measurements indicated groundwater was moving off the site at SMW-6 (see #14 above).

    Lastly, the objective is not to eliminate groundwater flow to the Trenton Channel. The objective is to prevent contaminated groundwater from entering the Trenton Channel.

21. Consistent with the approved work plan and discussions with DEQ on June 15, 1999, the EE/CA did not evaluate contaminants in the fill materials. BASF and the DEQ discussed sampling surface soils if, and only if, BASF planned to allow redevelopment of the surface of the property (ie, a reasonable and relevant exposure pathway). The City of Riverview is interested in this piece of property for its redevelopment potential, and BASF is not opposed to reaching an agreement with the City for that purpose. However, currently, there is no agreement in place or in preparation.

22. Drums. Investigation or assessment of possible buried drums was not a task in the approved work plan.

    The DEQ should reference the geophysical data cited in this paragraph. The only geophysical data BASF personnel are aware of were acquired by E&E during 1981. Those measurement pre-date remedial efforts, waste relocation, grading, cap construction, and monitoring. Additionally, those interpretations are presented without a scale or supporting information, and maps in the same report are inconsistent with each other. Additionally, this site is a landfill. BASF and the DEQ understand that wastes were placed here and buried. Digging up the cap and landfill will only expose waste materials and open pathways better

left incomplete.

23. LNAPL. We believe the report describes removal of this material from the wells and observations afterwards. BASF will continue to investigate the presence of oily substances in these wells during the Winter 2000 and act accordingly. We will keep the DEQ informed.

    As for migration of LNAPL, please review how these materials migrate – they float on water as probably is demonstrated in these wells. When a confining layer is present (such as a clay landfill cap), the LNAPL can rise on the water layer along the underside of the confining layer. The LNAPL will continue to rise as long as it is more buoyant than the water or until its movement is restricted. The oil and gas industry has exploited this physical property of LNAPL for many, many years.

24. Rip Rap. Preparing sampling logs was not a task in the approved work plan. If these details are needed, please explain their purpose and use. Please recall why this work was performed. The "rip rap" in question is composed of concrete cell lids from the manufacturing of soda ash. The DEQ raised some concern that these cell lids may have been from the chlor-alkaline process and may have contacted mercury. These cell lids all came from a single source, and all the shore-stabilizing materials were placed at the same time – during remedial construction in 1985. As described during the meeting on June 15 and presented in the work plan addendum dated July 14, 1999, BASF agreed to collect samples of the concrete by knocking off a sample with a rock hammer. The sample would be analyzed to assess if these samples of concrete contained mercury. As it turned out, three of the seven samples contained detectable concentrations of mercury; however, the TCLP test did not find detectable concentrations of mercury in leachate. BASF believes it is sufficient to state the laboratory followed Method 1311, to include conforming with the particles size requirements.

25. This paragraph simply states facts as they were presented in the Report.

26. The reference to ammonia being present in the clay unit and in the bedrock unit is correct; the conclusion that the ammonia originated in the shallow zone is likely to be false. Data available from other locations show that the background concentration for ammonia in this area is higher than was found in the bedrock well. Ammonia is a naturally occurring degradation product in a reducing environment. As stated earlier in this letter, the DEQ stated they were undertaking an assessment of groundwater within the bedrock. We see no reason for BASF to duplicate that effort.

27. This paragraph cites "sampling requirements" for the facility. The only "requirements" BASF is aware of are the six chemicals listed in the 1984 Consent Decree. The July 9, 1999, letter cited in this paragraph states, "The contaminants required for sampling in new and existing wells will be determined by mutual agreement after review of the results of the sampling that occurred June 17-18, 1999." In the work plan addendum presented to DEQ on July 14, 1999, BASF suggested a list of chemicals for analyses; DEQ chose not to respond to that suggestion until January 14, 2000. BASF is still trying to reach a "mutual agreement" with DEQ.

    As an example, the DEQ continues to request analysis for hexavalent chromium and the 10

Michigan metals. To date, BASF and DEQ have results from 52 water samples analyzed for hexavalent chromium and 76 samples for silver (one of the 10 Michigan metals). Not a single sample contained detectable concentrations of either hex-chrome or silver; yet, the DEQ continues to request these analyses. We believe it is time to apply the analytical results already acquired, along with the objectives for this work, and prepare a "mutually agreeable" analytical program. Please review this same topic discussed at Comment #17, above.

28. As we consider future groundwater sampling, DEQ and BASF need to reach an agreement. There is little doubt or dispute that groundwater under the property is contaminated. The need to continuously confirm that knowledge is pointless. As DEQ has stated, the objective of this remedial action will be to prevent the flow of contaminated groundwater from reaching the Trenton Channel. Therefore, it appears the only future sampling necessary will monitor BASF's progress towards that goal. Sampling should be between the River and the remedial solution.

    The DEQ performed mixing zone calculations on the groundwater venting from the property. Those calculations did not find issue with every chemical even when using conservative estimates of groundwater flow to the Trenton Channel. (This may be a good time for the DEQ to revisit this topic, now that additional data are available.) Additionally, let us look at the analytical program from a performance point of view. There is little doubt that mercury, PCBs, and maybe ammonia in groundwater will drive the remedial program. The other chemicals will be ancillary. Let's not lose sight of that issue.

29. Alternatives. DEQ did not ask for multiple alternatives. If BASF presented "... only two alternatives ...", how many did DEQ expect? Actually, in addition to the no-action alternative, BASF provided three alternatives.

    BASF will not attempt to convince the DEQ that the recommended alternative is the "be-all-and-end-all" of remedial actions. We prepared it because it is a fast and effective means for significantly reducing the volume of groundwater that can leave the property and enter the Trenton Channel. This was the objective stated in the approved work plan, and the DEQ repeatedly stated they wanted a remedy implemented quickly. The alternative allowed for follow on work or additional phases, as appropriate, if monitoring information showed additional barriers were justified.

30. The DEQ never suggested previously they wished to see a feasibility study. (If the DEQ requested a feasibility study in February 1999 instead of a response action plan, the feasibility study would be complete by now.) BASF and DEQ need to agree on a list of alternatives for evaluation. BASF will provide the DEQ with a list of potentially feasible alternatives. As BASF understands the rules for conducting feasibility studies, we must develop remedies in the following categories: alternatives for the treatment, disposal, waste minimization recycling, or destruction at an off-site facility; alternatives for the treatment, disposal, waste minimization, recycling, or destruction at an on-site facility; no-action alternative; and alternatives that provide for a reduction in risk that is sufficient to meet the cleanup criteria (R299.5513). Currently, BASF does not expect that "excavation and removal" or "solidification" will be reasonable or feasible alternatives. We do expect that alternatives that reduce risk and contain the materials on site will be appropriate and

desirable. We intend to work on those alternatives that display a reasonable chance of success.

31. While we understand that the DEQ considers the no-action alternative "..simply unacceptable", its presentation is a required component of the evaluation process as stated at R299.5513(2).

32. BASF proposed a multi-layer cap over the site with continued monitoring and evaluation. The cap would significantly reduce infiltration and venting groundwater AND may eliminate them altogether. Our approach was to construct this cap and measure its effect on groundwater flow. If off-site migration was not reduced significantly or eliminated altogether, BASF proposed groundwater cut off and treatment as a follow-on remedy.

    The DEQ never "bought into" the phyto-remedial effort. This effort is strictly a voluntary action undertaken at BASF's sole risk and initiative. If it works, it works. If it does not work, it does not work. The bottom line is every liter of water used by the trees is one less liter BASF needs to contain, treat, or otherwise deal with.

33. The DEQ states here that BASF must have an active groundwater removal system if we pursue a phyto-remedial option. We do not understand the need to link these two actions at this time. BASF understands they may become linked as we evaluate alternatives. As an aside, BASF may consider using extracted groundwater as irrigation water. Regardless, BASF was under the impression the owner/operator proposes the alternative.

34. Since the DEQ is requesting a feasibility study, BASF sees no point in addressing this comment. BASF intends to consider passive, *in-situ* methods and has initiated some bench-scale tests. BASF will share this work with the DEQ, as appropriate and applicable.

35. Some wells may need to be plugged and abandoned whether DEQ approves or not. If a well is in the way of construction, BASF will remove it. The well may be replaced, if it is deemed necessary to monitor performance. BASF and the DEQ can decide on these needs later.

36. The DEQ states that the groundwater collection and treatment alternative has "... the most reasonable chance of success." It is obvious the DEQ has little experience treating water to remove mercury. If BASF cannot design an efficient and cost-effective system for treating mercury to an acceptable (and as yet undefined) level, the alternative will change to: collection and transport off site for disposal. BASF does not view off-site transport as an attractive solution.

37. The recommendations provided would have been much more valuable if discussed with BASF a year ago. BASF provided a work plan to the DEQ that stated we would evaluate measures to prevent or reduce exposures to chemicals at Riverview, and the DEQ approved that plan. The DEQ did not request a feasibility study last year, but now considers one needed. The DEQ continues to request an interim response action rather than a remedial action indicating their willingness for an extended construction program (not expedited implementation). As discussed previously, BASF has performed several interim response actions at the Riverview property; we are not interested in another. Data presented in the

Report show that the mercury found in the rip rap does not leach. Is the DEQ disputing these data, or does the DEQ simply want more information?

BASF's Responses to EPA's Comments dated January 4, 2000

A. The EPA states correctly that the DEQ received the EE/CA report on November 2, 1999.

B. As stated by the EPA, BASF believes working under a consent agreement with a consistent scope of work may be beneficial to all concerned parties. BASF is not advocating creation of an administrative agreement at this time.

C. This comment strengthens BASF's contentions that the EPA representatives need to be involved in the meetings, discussions, and agreements reached for this property. It is obvious, the DEQ did not brief the EPA on the objective for this project as discussed during several meetings between February and June 1999.

1. The DEQ and the EPA need to reach agreement on the scope of work and schedule. The EPA states that this can either be a non-time-critical action or follow the scope of work for an interim response activity. The DEQ has not provided a scope of work. BASF wishes to pursue a remedial action plan.

2. The EPA states that a RAP still is required. BASF wishes to pursue a RAP instead of an interim plan.

3. BASF understands that in Michigan, the responsible party proposes the remedy. Our report and approach is consistent with this authority.

4. BASF is willing to replace the language in this section as suggested. The revision is consistent with our stated approach.

5. BASF can include an update on the trees and our approach to the phyto-remedial efforts. Please remember, this is a voluntary action performed solely at BASF's risk and initiative.

6. BASF does not plan to address sediments or to conduct any studies of sediments in the Trenton Channel unilaterally or without a strategy for the entire Detroit River. Numerous studies state that this area is a natural depositional area for sediments. If this area were cleaned before cleaning the upstream sources, this area would need to be cleaned again.

7. BASF will consider these suggestions and incorporate them into the revised report to the extent the DEQ finds them valuable. This comment again illustrates the need for the DEQ to keep the EPA abreast of decisions and agreements on this property.

8. The DEQ requested BASF to provide a plan. BASF was not requested to provide multiple alternatives or to evaluate them separately.

9. The DEQ requested BASF to provide a plan. BASF was not requested to provide multiple alternatives or to evaluate them separately.

BASF understands the DEQ's concerns with this property. BASF is concerned as well, and we are committed to performing the necessary actions to protect human health and the environment. Our prompt construction and evaluation activities during 1999 demonstrate this commitment.

We again request the DEQ to work cooperatively and proactively with BASF personnel. All BASF requests is some consistency from the DEQ and more timely responses to our work plans and reports.

Please contact me at 734-324-6209, or Mr. Jack Lanigan at 734-324-6219, if you wish to discuss these issues further.

Sincerely,

Thomas F. McGourty
Manager, Safety, Health, and the Environment

Attachments
Attachment 1: January 11, 2000, Memorandum from Hoin and Vens to Schultz
Attachment 2: City of Riverview's groundwater compliance sampling results
Attachment 3: Data sheets from February 2000 slug tests at Riverview
Attachment 4: Analytical results from three soil samples collected September 1998

cc: Mike Ribordy, EPA Region V
Keith Mast, URS Corp.

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ATTACHMENT 1

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

ENVIRONMENTAL RESPONSE DIVISION

Interoffice Communication

January 11, 2000

TO: Mr. Daniel Schultz, Field Operations Supervisor, ERD

FROM: Steve Hoin, Senior Geologist, ERD, Beth Vens, Project Manager, ERD

SUBJECT: Review – November 3, 1999 EE/CA, BASF Riverview Site

1 The Michigan Department of Environmental Quality (DEQ) SE Michigan office received, on November 3, 1999, an Engineering Evaluation/ Cost Analysis (EE/CA) report (or the Report) for the BASF Riverview site. The Report came to us in response to the July 9, 1999 DEQ workplan approval letter, which requested a report of findings, be submitted by October 31, 1999. During a meeting held on June 15, 1999 between DEQ and BASF Corporation, it was agreed if the report of findings indicated response actions were necessary, that the report of findings would include 2 proposed response actions along with a implementation schedule. It was also agreed that the proposed response actions would be acceptable to the DEQ and would be implemented on an expedited schedule.

We have reviewed the EE/CA and consider the information supplied to be insufficient to make a decision regarding the adequacy of the proposed response actions. More specifically, the review 3 could not address all of the Part 201 administrative and technical requirements because most of the administrative requirements were not addressed in the report and the technical presentation was lacking in detail and content. Therefore the Report is not considered subject to Section 14(8) under 4 Part 201 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, and we reserve the opportunity to review and comment upon further submissions.

The review focused on whether or not the available data were adequate to develop an acceptable remedial approach that would be protective of the primary exposure pathways of concern (GSI and direct contact). The review also addressed, in general, whether the proposed remedial alternatives 5 could adequately address those pathways. Because the report was lacking in necessary technical information and explanation it was typically necessary to review the data in the EE/CA and the DEQ site files and then to present an interpretation of that data. Unless otherwise noted, the interpretations presented in this memorandum are that of the DEQ.

For simplicity, this review is written to follow the approximate structure of the EE/CA Report.

Project Goals and Objectives

The project objectives are written in a confusing manner. The following is a clarification of the EE/CA goals and objectives.

6 It appears that the overall objective or goal (Section 1.2) is to evaluate the applicability of the presumptive remedy for the site. The presumptive remedy (Section 1.3) is stated to be to *"reduce*

the volume of water entering the Trenton Channel". This overall goal will not meet BASF's Part 201 requirements for the site if Mercury or PCBs continue to enter the river at detectable levels and significant quantities. The goal should be to cease all detectable discharges of mercury and PCBs to the Trenton Channel (of River) from this facility and to meet the GSI criteria for all other hazardous substances discharging to the River. The presumptive remedy goal should be modified to reflect this more stringent requirement rather than reducing the discharge.

Hydrogeology/Geology

Following is a summary of the site geology and hydrogeology.

Geology - The site is located along the Detroit River in an area where glacial moraine and lacustrine deposits exist above bedrock to about 40 feet below ground surface. Historical maps indicate that some sand deposits existed at the site above these glacial materials. These sands are usually aeolian (wind blown), remnant beach ridges or river deposits. The glacial and lascustrine materials (dominantly clay) are often protective of the deeper bedrock zones. The environmentally sensitive geological formations in the area of this site are the shallow sands or fill, which connect with surface water.

The critical geological questions for this site are listed following with associated DEQ interpretations.

1) What is the primary route of groundwater migration at the site?

The shallow fill soils and sands are the primary route of migration for groundwater at the site. This will be discussed further in the section on groundwater flow.

2) Are the glacial soils continuous between the shallow soils and bedrock?

The boring log data presented in the Report indicate that the glacial moraine and/or lascustrine clays are continuous between the shallow impacted soils and the deeper bedrock. This is typical of the geology in this area of SE Michigan.

3) Are there features such as channels or channel deposits that might influence groundwater flow?

7 A map of the clay surface that was constructed utilizing the data presented in the various reports indicates that a low area exists in the center of the site. This feature was also discussed in a previous report by E&E and may represent a local channel. The EE/CA report also suggests that the sands found at the site may be indicative of channel deposit.

4) How thick are the permeable soils and fill near the River?

The cross-sections presented in the report show fill at a maximum thickness of about 15 feet. Other past borings suggest that this fill and/or permeable sediments may be greater than 22 feet thick near the river.

Groundwater Flow – The groundwater flow discussion is separated into the various hydrogeologic zones.

8 Bedrock – The groundwater flow direction in bedrock has not been defined. A single well was constructed in bedrock and the groundwater level is significantly lower than within the more shallow wells. The flow direction in this deeper zone is unknown. Ammonia has been detected in bedrock at levels above the GSI criteria. This ammonia may be from the shallow zones. The fate of this ammonia is unknown at this time. Further information is needed regarding groundwater flow in bedrock before the potential impact to this zone can be fully understood. In addition, the pathway for introducing the ammonia to the bedrock has not been determined. The most likely pathway is via down improperly closed deep boreholes. This impact to the bedrock needs to be further characterized.

9

10 Deep and Middle Clay Zones – The groundwater flow volume in the "deep and middle saturated zones" is likely limited and therefore will likely not represent a significant migration pathway to the river because of this limited volume. Groundwater data indicate that most contaminants are not migrating within this zone, although ammonia was detected at low levels (400 ug/l). Therefore it is reasonable to exclude groundwater capture from this zone as part of an interim response action. Contaminant migration should be further characterized as part of a remedial action plan.

11

Shallow Zone – Flow in the shallow zone has been characterized based upon a single flow event, although past data are available and show similar flow conditions. The potentiometric surface is drawn showing a high (or mound) running through the center of the site with potential flow both to the west away from the river and east toward the river. This potentiometric surface may not accurately represent flow conditions at the site. It is clear that groundwater flows toward the river, it is not clear what happens to groundwater flowing to the west. Wells along the western periphery of the site are dry. These wells suggest that groundwater flowing to the west is being diverted laterally. This groundwater may eventually flow toward the river or laterally offsite. Catch basins are apparently present on the site periphery. These catch basins and sewer lines may be diverting groundwater and may help to explain the flow pattern. Previous reports suggest that flow may be controlled by local shallow depressions in the clay (remnant channels) and the clay data support this assertion. These clay depressions may be diverting or influencing flow.

12

Also, the piezometer monitoring data suggests the significant variations in water level may occur as a result of varying confining conditions. This could be influencing the water levels and may partly or wholly explain the apparent "mounding" through the center of the site. This potential "anomaly" may influence the selection of the interim response action and should be considered during the feasibility study.

13

Explanation is also required regarding the fate of groundwater exiting the site laterally to the north and south. The proposed remedy(s) may not be adequate in preventing lateral off-site migration of impacted groundwater. Wells SMW-6, SMW-8, DMW-3, MW-G, MW-F, DMW-2 and SMW-2 indicate the contaminated water from the BASF site is migrating off site onto adjacent properties. Investigation of contaminant migration onto these off-site properties should be conducted.

14

15 **Hydraulic Conductivity** – The methods used in the EE/CA to estimate the Hydraulic Conductivity of the shallow aquifer materials may have introduced significant error in the flow volume estimates. Apparently the hydraulic conductivity (K) of the shallow soils was estimated in the EE/CA based upon descriptions of soils and comparison to literature based values. The resulting K was in the range of 10^{-4} to 10^{-6} cm/sec. A review of the boring log descriptions from the EE/CA Report and previous reports suggest that the actual K could be significantly higher. Most of the borings describe some sand or coarse material within the saturated zone. Typically these coarse materials play a significant role in controlling groundwater flow. Ecology and Environment's 1982 reports suggest that an average K for the fill may be approximately $5x10^{-5}$ cm/sec. However, a geometric mean was used to "minimize the distortion of a normal distribution average caused by a few unusually high permeabilities". The report found K values as high as 13 ft/day (~$5.0E^{-03}$ cm/sec). These high K's may actually control flow. Any proposed remedial action should take into consideration the potential for additional groundwater flow from the site.

16 **Slurry wall** – The hydraulic effect of the existing slurry wall has not been accurately characterized in the EE/CA. The calculations completed in the EE/CA to estimate the volume of flow into the river do not include the volume of water that could pass through the slurry wall. The slurry wall clearly is not complete and the water that encounters that wall will migrate laterally around the wall.

Section 3.5 states that the slurry wall was determined to be 270 feet long. In Section 7.2 it is stated that the slurry wall is 300 feet long. Please correct this number for any future reports. Also BASF needs to provide the DEQ with any specific technical supporting documentation regarding the depth of the existing slurry wall.

17 Page 3-13 of the EE/CA discusses collection of two soil samples from an area having "distressed vegetation". The report figure (figure 1-2) does not include the location of these soil samples. BASF should provide the location of these samples on a site map. The report should also include the rationale for these samples. It is unclear whether or not these were soil samples requested by the DEQ to be collected between the fenced area and the Trenton Channel. If this is the case, then it appears that analytical data are missing for PCB's, the complete SVOC scan, the full Michigan ten metals and the complete VOC scan.

18 **Long Term Piezometers** - The long-term piezometer monitoring data are presented, but with limited analysis. Only 8 days of data were provided with the EE/CA, therefore the analysis of these data are limited to shorter-term trends. Apparently additional data will be provided for the remainder of the monitoring period. These data should be provided as soon as possible.

Several conclusions can be drawn from the data set.

1. The groundwater gradient is toward the River the majority of time. Limited short-term reversals occur very near the river (less than 50 feet).

2. The wells do not appear to respond to shorter term (daily) fluctuations in river level, although the groundwater does appear to respond to changes on the order of about 1

week. This suggests some type of buffering, which could be the result of the variable permeabilities of the soils or possibly compaction along the shoreline.

3. Two of the wells appear to be responding differently than the other wells. This difference may be the result of variability in confining conditions. In other words, piezometers 5 and 1 are confined and susceptible to variations in barometric pressure. This suggests the local conditions vary considerably from well to well and brings into question the validity of the groundwater level data.

Further analysis should be conducted once the data set are complete.

19

Discharge to the River – The EE/CA and associated data clearly indicate that:

1. Impacted groundwater is discharging to the Detroit River, but

2. The estimated volume is only known within about 1 or 2 two orders of magnitude.

The EE/CA indicates that the estimated total volume of groundwater discharge to the river from the site ranges between 5,558 and 70,089 cubic feet per year (cf/y). This includes discharge from the shallow (fill) and middle (clay) zones. These estimates are based upon assumed hydraulic conductivities, an estimated discharge area, and measured gradients. Flow from the clay till (the middle zone) is likely not significant in this area. Data from nearby sites under similar conditions suggest that groundwater flow from this clay is insignificant and likely near the minimum values estimated in the EE/CA. Therefore, the following discussion focuses on the shallow zone. As discussed previously, the effective hydraulic conductivity of the shallow zone could be significantly higher than the EE/CA report suggests. The area of discharge should be increased by about 30% to include the area of the slurry wall, and the groundwater gradient may be significantly in error because of barometric effects and because of seasonal variation and potential preferential pathways. In 1982 E&E estimated a flow volume of 56,000 cf/y for the shallow zone. The estimated rate of flow into the river from the shallow zone alone could easily be well over 100,000 cf/y. Maximum flow could reach 300,000 cf/y ($K=5.0E^{-03}$ cm/sec, depth=5 feet, length=1200 feet, gradient=0.01). Note: This does not include potential offsite lateral flow. As discussed previously, any remedial strategy will have to consider the possibility that flow levels may be significantly higher than anticipated.

20

Infiltration/Help Model – The HELP model is based upon a landfill scenario and is designed to estimate possible leachate flow from landfills. This applies only if it is assumed that groundwater is not entering the site from off-site. The groundwater data suggest some groundwater may be entering the site possibly in the vicinity of SMW-6. The potentiometric surface could be easily modified to accommodate this possibility. The clay surface data also support this possibility. In addition groundwater may be flowing laterally onto the site from the south. All of these possibilities are based upon the assumption that the flow map accurately represents groundwater flow conditions. As discussed previously, the existing potentiometric map may not be representative of flow.

Further review of the model suggests that the model may be underestimating the site infiltration. The model suggests that an average of 186 cubic feet per day of water is

entering the subsurface. This equates to less than 1-inch of infiltration per year. Considering that the typical precipitation rate is on the order of 30-inches per year in this area, this appears to be a low estimate. Typically infiltration rates of 3 to 5 times this are used for groundwater models. This suggests that the HELP model may be underestimating the infiltration volume.

The EE/CA estimated infiltration rate of 186 cubic feet per day equates to a groundwater flow of about 70,000 cf/y, which must leave the site. The estimated flow based upon the site hydrogeology, which was discussed previously, ranges up to about 70,000 cf/year. This indicates that the volume of water leaving the site is likely at least 70,000 cf/year and probably higher. If infiltration is higher than modeled and some groundwater enters the site laterally (both realistic possibilities), then the flow into the river approaches or exceeds the 100,000 cf/y discussed previously. This potential should be addressed during the feasibility study.

The EE/CA suggests that flow under the capped conditions could be decreased to about 26,000 cf/y. Although this may be representative of the potential effect of the cap, this reduction in flow will not meet the necessary objective of eliminating groundwater flow to the Trenton Channel.

Contaminants

21 Multiple contaminants have been detected on the site as a result of past disposal activities. These contaminants are present in fill material, soils and groundwater. Note: the EE/CA does not provide details regarding the levels of contaminants in the fill. Further characterization may be necessary in the event that the fill material is not presumed to be impacted.

22 **Drums** - Geophysical data indicate that it is possible that drums remain in-place. It may be necessary to understand whether these drums are intact in the event that future releases to groundwater may occur. BASF should supply information regarding this possibility and if the potential exists, then removal or contingencies may be necessary.

23 **LNAPL** – The LNAPL analysis presented in the EE/CA suggests that the LNAPL is constrained to the immediate area around the area of MW-F and MW-M. LNAPLS were apparently not detected in wells installed surrounding that well. The boring logs for DB1-3 and SB1-3 suggest that product may be present more extensively than suggested. The information also indicates that the product is highly viscous. This likely explains why the product was not detected in the nearby wells even though the borings logs suggest that it may be present. Conclusions regarding the extent of LNAPLs cannot be considered reliable until nearby newly installed wells are monitored for an extended period of time (greater than 1 month).

According to groundwater contour maps, flow in the area of MW-F and MW-M is northeasterly, from BASF property onto the former Firestone property. Therefore, investigation of LNAPL should be conducted downgradient of MW-F and MW-M.

It was stated in the report that product at MW-M was 3 feet thick. This clearly meets the definition of "free product " under Part 201 of NREPA and requires immediate abatement.

Any remedial alternative must include actions that ensure that BASF is adequately fulfilling its obligations regarding free product at this facility.

24

RipRap – The EE/CA does not provide sampling logs for the riprap sampling. These details are needed and should be provided. The riprap samples were analyzed for total mercury and TCLP mercury. The totals data indicates that mercury is present in the concrete, but that it apparently does not leach at levels of concern. This conclusion may not be valid for several reasons. First, it is unclear whether or not the sampling pattern is adequate to characterize the riprap. It is likely that the riprap came from multiple sources and may have been placed at various times. The mercury content is likely heterogeneous. It is unclear how the concrete samples were processed prior to the TCLP test. Was the concrete ground into some fine particle prior to leaching, or were the chips simply leached? This information should be provided.

The totals data can be used only to conclude that mercury is present in the riprap. Further characterization is needed before it can be concluded that the mercury in the concrete will not leach at levels of concern. The riprap should be characterized such that the vertical distribution of mercury in the riprap is understood. It may be that the riprap could present a significant risk if disturbed or moved to another location. Cores of the riprap should be collected to eliminate effects of weathering, etc.

25

Groundwater Impact, Shallow Aquifer – The groundwater sampling results (Table 4-1) indicate that the shallow zone is significantly impacted everywhere beneath or downgradient of the filled area. Contaminants include various chlorinated hydrocarbons, other hydrocarbons such as naphthalene, various metals including chromium and lead and, acetone, ammonia and cyanide. Mercury was found as high as 1,440 ug/l in well MW-E, which is very near the river edge. Mercury was also detected at 211 ug/l at the river's edge in PZ-6. Mercury appears to be ubiquitous in the site groundwater. Mercury is migrating with the groundwater and is discharging into the Trenton Channel and likely also migrating north and possibly south onto adjacent properties. **Total PCBs** were found at 309 ug/l in MW-B. These PCBs could be co-solvent with other organic compounds and migrating in groundwater. **Ammonia** was found to be ubiquitous at the site. Levels as high as **86,700 ug/l** were found.

26

Groundwater Impact, Deep and Middle Clay and Bedrock – The groundwater sampling data indicate that the deep and middle clay and bedrock have been impacted by ammonia. Levels exceed 400 ug/l in the deep and middle clay and are at 400 ug/l in the bedrock well. It is possible that the ammonia has actually migrated through the middle zones into the bedrock. It is more likely that conduits have been formed by past boring activities, allowing for migration of the ammonia, a very mobile constituent. The bedrock well should be monitored to confirm the presence of this ammonia. Note: the pH of the bedrock groundwater is near neutral. Additional investigation should be conducted to evaluate the nature and extent of contamination in the bedrock.

The EE/CA discusses the expected natural condition of the deeper or bedrock aquifer. This discussion would only be necessary if site contaminants were expected to occur naturally and at similar levels within the deeper zone. This is not the case.

27 **Sampling/Analytical** – The July 9, 1999 review letter indicated that future sampling requirements for the facility would be determined once sampling data from June 1999 was reviewed. Based on a review of that data and the October 1999 data, the DEQ would recommend that future sampling of wells at the site be sampled for the full scans for Michigan Ten metals (EPA method 6010), mercury (7000), hexavalent chromium (7196), PCB's (8082), cyanide (9010), ammonia (350.1), VOCs (8260+), and SVOCs (8270).

28 Section 7.3 refers to the detection of "target chemicals". DEQ is aware that the 1984 consent decree refers to specific chemicals that are "target chemicals", however, the DEQ is reviewing this site using all chemicals regulated under Part 201. Any exceedences of Part 201 criteria are of concern and should be addressed.

Alternatives
The EE/CA presents only two alternatives for the presumptive remedy. These are:

29 Alternative 1 – No Action

Alternative 2
Phase 1: Infiltration Barrier (or Cap) with Monitoring
Phase 2: Groundwater Cutoff with Passive Treatment (reactive wall)
Phase 3: Active Groundwater Collection and Treatment

Phases 2 and 3 are apparent contingencies based upon the results of Phase I.

The EE/CA suggests that Alternative 2; Phase 1 is the preferred alternative. This is not an acceptable alternative because it will not be effective in eliminating the discharge to the River at levels above the GSI criteria. Phases 2 and 3 have the potential of being effective, but the information provided is not sufficient to assess this. Prior to any approval:

- BASF must clarify the objective of the remedial action. As discussed previously one objective must be to eliminate the discharge of groundwater above GSI criteria to the Trenton Channel

30 - BASF must follow a more comprehensive feasibility study process. That process should include other reasonable possible alternatives (e.g., solidification, excavation and removal, on-site containment, etc.) and should provide a clear process for arriving at an effective alternative.

Following is a detailed discussion regarding the proposed alternatives. The discussion is included to provide insight into issues and to illustrate the level of detail that may be necessary.

31 **Alternative 1 – Continuation of Inspection and Monitoring**
This alternative is simply unacceptable considering the on-going impact to the river and ecosystem.

Alternative 2 – Phase 1 – Multilayer Cap and Monitoring
32 This option includes site grading, additional perimeter monitoring wells, construction of a cap over the fill areas and surface water drainage controls. This system will be designed to reduce infiltration and therefore flow to the river and to protect against contact and surface erosion. This alternative is only designed to reduce the flow the river. As discussed previously, the reduction in flow will **not be adequate** to meet BASF's Part 201 requirements. The flow will continue to be

significant (at least 26,000 cf/y at a minimum). To overcome this problem, BASF proposes to utilize poplar trees for groundwater uptake. The trees were placed along the back portion of the property and will not be effective in stopping groundwater from entering the river. If trees are placed along the river edge it is highly unlikely that they will be effective in preventing groundwater from entering the river. If BASF pursues phytoremediation as part of an alternative, then the effectiveness would have to be demonstrated via a pilot program while active groundwater removal system was operating. The EE/CA did not provide details regarding the procedures for implementing phytoremediation as part of a RAP or interim response action plan (IRAP). Before any approval can be given, a detailed plan must be submitted. A RAP or IRAP must include detailed information. This plan should include, among others, information regarding:

33

1. The hydraulic effect of the trees under proposed scenarios, with supporting literature;
2. The ability of poplar trees to survive in water with the variety and levels of site contaminants;
3. The ability of poplar trees to uptake water efficiently given site contaminant concentrations;
4. The uptake ability of the poplar trees at each stage of their life, including their present age;
5. Details regarding how the trees function during different seasons and how water uptake is affected;
6. A description of how wastes from the trees (leaves for example) will be handled since they will most likely be contaminated; and
7. Details regarding how long until the trees are established and operating at maximum efficiency.

These comments are not comprehensive. If phytoremediation is included as part of an alternative, then that document will be reviewed in detail and further comment would be provided by the DEQ.

34

Alternative 2 – Phase 2 – Groundwater Cut-off and Passive In-Situ Treatment
This alternative would apparently be implemented after 1 year of monitoring under Alternative 1. This second alternative (Phase 2) or a similar alternative should be implemented immediately if BASF intends on meeting their Part 201 requirements. This is based upon the EE/CA projection that mercury and PCB's will continue to enter the River, even after capping.
Any future submission should include details regarding the monitoring period including wells, sampling frequency, and in particular the targets or goals of the monitoring. This alternative includes a cutoff wall encompassing the riverfront and a major portion of the north and south property lines. The wall location will be evaluated based upon the post-capping flow. The wall would be used to control water for passive in-situ treatment with a reactive wall. Another alternative included a funnel and gate system. The wall (or funnel) should cover the total riverfront and sides as drawn. The site heterogeneity dictates this. Groundwater is likely entering the river via complex pathways. Pilot tests for passive treatment systems should be implemented immediately if this alternative is to be selected (and should not be delayed as part of Alternative 2 – Phase 3). Schedules and design specifications should be provided. If a passive system to be selected, then BASF should provide documentation confirming that the potential for success of this method is reasonable.

It appears wastes at the Trenton Channel's edge range in thickness from 8 feet to over 22 feet. The EE/CA suggests that an interim response preventing discharge to the river would most likely be conducted near the fence line at this site, thus leaving fill material un-addressed between the barrier and the river. This would allow for contaminated groundwater above GSI criteria to continue to discharge to the Trenton Channel. The discharge of the water in this zone must be addressed in any RAP or IRAP. BASF may wish to examine a variety of options for addressing this area, including

evaluating removing the wastes between the barrier and the river to eliminate the discharge to the river.

35 The "Modification to Existing Wells" section states "Some wells may be plugged and abandoned...". No information is provided as to which wells will be plugged and abandoned. The DEQ does NOT approve of plugging or abandoning any wells at this time

Alternative 2 – Phase 3 – Groundwater Collection and Treatment

36 This alternative is to be implemented in the event that the reactive walls cannot be designed or are not cost effective. This option should be effective in addressing the migration of contaminants into the River and is the alternative presented with the most reasonable chance of success.

Recommendations

37 We recommend that BASF be informed that they must implement an interim response action that includes immediate and complete cessation of groundwater discharging to the Trenton Channel above GSI criteria. BASF should complete a comprehensive Feasibility Study with a full array of reasonable alternatives that meet the objective, followed by an expedited IRAP implementation plan along with detailed schedules for the actions.

We recommend that the riprap be further characterized to ensure that it will not leach mercury into the river in the future. Alternately riprap may potentially be moved back into the fill area.

We recommend that the fill material to remain in place beyond a cutoff wall be characterized further to assess whether or not it will leach hazardous substance into the river above criteria.

We recommend that the groundwater on the property to the south and particularly to the north of the Riverview site be characterized to assess whether or not mercury is present and to assess whether other contaminants are migrating offsite.

cc: Jon Russell, Program Manager, SEMI
Gary Klepper, District Supervisor, SEMI

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JAN - 6 2000

REPLY TO THE ATTENTION OF
SR-6J

January 4, 2000

Beth Vens
Environmental Response Division
Michigan Department of
Environmental Quality
38980 Seven Mile Road
Livonia, MI 48152-1006

Re: Engineering Evaluation and
Cost Assessment
BASF Riverview Site
Riverview, Michigan

Dear Ms. Vens:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the report on the Engineering Evaluation and Cost Assessment (EE/CA) for the BASF Riverview Site located in Riverview Michigan. The report was submitted by BASF Corporation to the Michigan Department of Environmental Quality (Michigan DEQ) on November 2, 1999.

A

Attached to this letter are U.S. EPA's comments. U.S. EPA did not do a thorough, in-depth, review of the EE/CA document, therefore, U.S. EPA's comments are more general in nature. U.S. EPA's primary concerns involve the following:

B

- U.S. EPA is uncertain on how to respond to this document. The "EE/CA" Report was not submitted pursuant to any known agreement nor does it follow any standard format or scope of work. The report incorporates both removal (e.g. EE/CA) and remedial (e.g. remedial action) terminology even though this site is currently and likely to remain a State lead. U.S. EPA suggests any revision to this document be done pursuant to the draft Consent Decree and consistent with the scope of work for an Interim Response Activity.

- The methodology and assumptions used to reach the conclusions in Section 7 - Evaluation of Water

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(C) Infiltration and Discharge to the River need to be thoroughly evaluated and reviewed. Due to resource limitations, U.S. EPA did not verify the information in this section (there are no comments in Attachment 1). However, U.S. EPA would find it hard to accept BASF's conclusion that almost 100% of the shallow groundwater discharging to the Trenton Channel is due to infiltration within the site boundaries without an independent evaluation of this information.

- The description and analysis of alternatives in Section 9 is so lacking in details and information that it is impossible to make a decision on the appropriate response action for this site.

Thank you for the opportunity to review and respond to BASF's EE/CA Report. If you have any questions, please call me at (312) 886-4592.

Sincerely yours,

Michael Ribordy
Remedial Project Manager

Attachments

cc: Nan Leemon, Michigan DEQ
Mary Fulghum, ORC

ATTACHMENT 1

Comments on the Engineering Evaluation and Cost Assessment for the BASF Riverview Site located in Riverview, Michigan

General Comments

Comment 1: By submitting an EE/CA report, it appears that BASF is approaching the site as a non-time-critical removal action. Under a Federal lead, this approach would most likely be acceptable, however, it is anticipated the Michigan DEQ will continue taking the lead. Therefore, the revised report should follow the Michigan DEQ format and scope of work for an Interim Response Activity.

Comment 2: In Section 1.2, BASF states that the objective of this EE/CA report is to "evaluate the applicability of the presumptive remedy for the Site." U.S. EPA's 1993 Directive - Presumptive Remedy for CERCLA Municipal Landfill Sites (Attachment 2) states that "the presumptive remedy does not address exposure pathways outside the source area (landfill), nor does it include the long-term ground-water response action." It should be made clear to BASF that the presumptive remedy for landfills could be applicable to this site in the context of an Interim Response Activity. A site-wide Remedial Action Plan would still be required to investigate and remediate sediments and other contaminated media associated with site activities.

Comment 3: It is inappropriate for the responsible party to select the response action within the context of the EE/CA Report. The EE/CA should present alternatives and provide enough detail on the alternatives so that the regulatory agencies can make an informed decision on the appropriate action for the site. Throughout the EE/CA report, BASF identifies their selected alternative and appears to tailor the report to support their possition.

Specific Comments

Comment 4: Section 1.3, Page 1-2. This section should be removed or replaced with language contained in the

1993 Directive. On page 2 of the Directive, it states that: "The presumptive remedy for CERCLA municipal landfill sites relates primarily to containment of the landfill mass and collection and/or treatment of landfill gas. In addition, measures to control landfill leachate, affected ground water at the perimeter of the landfill, and/or upgradient ground-water that is causing saturation of the landfill mass may be implemented as part of the presumptive remedy."

Comment 5: Section 5.4. This section should note that a majority of the trees have been replanted and should include an update on the current condition of the planted trees.

Comment 6: Section 6, Page 6-2. Sediments should be included in the site conceptual model. In Figure 6-1, under contaminated media, Trenton Channel should show both surface water and sediments.

Comment 7: Section 9. There are several components of the presumptive remedy for source containment. These include: 1) Landfill cap; 2) Source area ground-water control to contain plume; 3) Leachage collection and treatment; 4) Landfill gas collection and treatment; and/or 5) Institutional controls to supplement engineering controls. For each applicable component there are likely several alternatives. The alternative(s) presented in the EE/CA report is inadequate. Each "Phase" presented in Alternative 2 should be treated as an alternative to address one of the above mentioned components. Some of these Phases (alternatives) could be presented as multiple alternatives incorporating different technologies or configurations. For instance, it would be interesting to see what additional benefits would be achieved by extending the cut-off wall upgradient of the waste material. These potential alternatives for one component can then be combined with other components of the presumptive remedy to develop a range of containment alternatives suitable for site-specific conditions.

Comment 8: Section 9. There is no detailed analysis of the alternatives presented in the EE/CA report. The

generic EE/CA scope of work (see Attachment 3) requires the defined alternatives to be evaluated against short- and long-term aspects of three broad criteria: effectiveness, implementability, and cost. The only criteria that was discussed in the report was Cost and this was done only for the multi-layered cap and not the other phases (alternatives).

Comment 9: Section 9. The EE/CA report failed to provide a comparative analysis of the alternatives. U.S. EPA's EE/CA Scope of Work requires that once the alternatives have been described and individually assessed against the evaluation criteria described in comment 8, above, a comparative analysis shall be conducted to evaluate the relative performance of each alternative in relation to each of the criteria. The purpose of the analysis shall be to identify advantages and disadvantages of each alternative relative to one another so that key trade offs that would affect the remedy selection can be identified.

ATTACHMENT 2

MEMORANDUM

TO: Jack Lanigan DATE: February 7, 2000

FROM: Sean Paulsen

RE: Ammonia-Nitrate Data from Riverview Land Preserve

Dear Mr. Lanigan:

As discussed during our telephone conversation last week, here are the data from the past four quarterly monitoring events for ammonia-nitrogen in the three upgradient monitoring wells at the Riverview Land Preserve. Monitoring well MW-10 was unable to be sampled during the fourth quarter 1999 monitoring period, but there are data for ammonia-nitrogen for each well during the other three quarterly monitoring periods. If you have any questions or need additional information, please call me at 734-524-9622, ext. 2008.

Sincerely,

EMCON/OWT

Sean C. Paulsen

Sean C. Paulsen
Project Manager

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54

ANALYTICAL REPORT

Client: CITY OF RIVERVIEW
Project/Site: QRTLY GROUDWATER
Sample ID: MW-10

Date Sampled	02/09/99	**ENCOTEC Project ID:**	71240
Date Received:	02/10/99	**ENCOTEC SDG ID:**	CRL-GW-99B1
Date Extracted:	N/A	**ENCOTEC QC Set ID:**	See below
Date Analyzed:	See below	**ENCOTEC Submission ID:**	100016122
Method Reference:	See below	**ENCOTEC Sample ID:**	200117679
Matrix:	WATER	**Analyte List:**	N/A
Percent Total Solids:	N/A	**Calculation Basis:**	N/A

	General Inorganics	QC Set ID	Date Analyzed	Method Ref.	Units	Quant Limit	Dil	Conc	Flag
1	Chemical Oxygen Demand	CODB2301	02/23/99	5220D	mg/L	5.0	1	U	
2	Chloride	CLSB2201	02/22/99	9251	mg/L	10	10	120	
3	Nitrogen, Ammonia	NHSB1901	02/19/99	350.1	mg/L	0.040	2	U	M
4	Nitrogen, Nitrite and Nitrate	NPNB1601	02/16/99	353.2	mg/L	0.050	5	0.17	
5	Nitrogen, Total Inorganic	TINB1901	02/19/99	4500 N	mg/L	0.090	N/A	0.17	
6	Organic Carbon, Total	TOCB2101	02/21/99	9060	mg/L	0.50	1	2.3	

Safety-Kleen (ENCOTEC), Inc.
3985 Research Park Drive ■ Ann Arbor, MI 48108
Telephone: (734) 761-1389 - Telefax: (734) 761-1034

ANALYTICAL REPORT

Client: CITY OF RIVERVIEW
Project/Site: QRTLY GROUDWATER
Sample ID: MW-11

Date Sampled	02/09/99	**ENCOTEC Project ID:**	71240
Date Received:	02/10/99	**ENCOTEC SDG ID:**	CRL-GW-99B1
Date Extracted:	N/A	**ENCOTEC QC Set ID:**	See below
Date Analyzed:	See below	**ENCOTEC Submission ID:**	100016122
Method Reference:	See below	**ENCOTEC Sample ID:**	200117677
Matrix:	WATER	**Analyte List:**	N/A
Percent Total Solids:	N/A	**Calculation Basis:**	N/A

	General Inorganics	QC Set ID	Date Analyzed	Method Ref.	Units	Quant Limit	Dil	Conc	Flag
1	Chemical Oxygen Demand	CODB1202	02/12/99	5220D	mg/L	10	1	46	
2	Chloride	CLSB2201	02/22/99	9251	mg/L	10	10	200	
3	Nitrogen, Ammonia	NHSB1901	02/19/99	350.1	mg/L	0.020	1	0.55	
4	Nitrogen, Nitrite and Nitrate	NPNB2402	02/24/99	353.2	mg/L	0.010	1	U	
5	Nitrogen, Total Inorganic	TINB2402	02/24/99	4500 N	mg/L	0.030	N/A	0.55	
6	Organic Carbon, Total	TOCB2101	02/21/99	9060	mg/L	0.50	1	1.4	

Safety-Kleen (ENCOTEC), Inc.
3985 Research Park Drive ■ Ann Arbor, MI 48108
Telephone: (734) 761-1389 - Telefax: (734) 761-1034

Report Date: 02/26/99

ANALYTICAL REPORT

Client: CITY OF RIVERVIEW
Project/Site: QRTLY GROUDWATER
Sample ID: MW-12

Date Sampled	02/09/99	**ENCOTEC Project ID:**	71240
Date Received:	02/10/99	**ENCOTEC SDG ID:**	CRL-GW-99B1
Date Extracted:	N/A	**ENCOTEC QC Set ID:**	See below
Date Analyzed:	See below	**ENCOTEC Submission ID:**	100016122
Method Reference:	See below	**ENCOTEC Sample ID:**	200117680
Matrix:	WATER	**Analyte List:**	N/A
Percent Total Solids:	N/A	**Calculation Basis:**	N/A

	General Inorganics	QC Set ID	Date Analyzed	Method Ref.	Units	Quant Limit	Dil	Conc	Flag
1	Chemical Oxygen Demand	CODB1202	02/12/99	5220D	mg/L	10	1	25	
2	Chloride	CLSB2201	02/22/99	9251	mg/L	10	10	150	
3	Nitrogen, Ammonia	NHSB1901	02/19/99	350.1	mg/L	0.020	1	0.43	
4	Nitrogen, Nitrite and Nitrate	NPNB1601	02/16/99	353.2	mg/L	0.050	5	U	M
5	Nitrogen, Total Inorganic	TINB1901	02/19/99	4500 N	mg/L	0.070	N/A	0.43	
6	Organic Carbon, Total	TOCB2101	02/21/99	9060	mg/L	0.50	1	1.7	

Safety-Kleen (ENCOTEC), Inc.
3985 Research Park Drive ■ Ann Arbor, MI 48108
Telephone: (734) 761-1389 - Telefax: (734) 761-1034

Report Date: 02/26/99

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

06/01/1999

Job No.: 99.01097
Sample No.: 240937

cc: Sean Paulson, EMCON

Quarterly
Riverview Land Preserve

Sample Description: MW-10

Date Taken: 05/12/1999

Date Received: 05/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	130	mg/L		05/20/1999	sld	EPA 325.2	
COD	<5.0	mg/L		05/21/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	<0.01	mg/L		06/01/1999	jrr	EPA 350.1	
Nitrogen, Nitrate	0.12	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	0.12	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		05/14/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.12	mg/L		06/01/1999	sks		
Total Organic Carbon	3.1	mg/L		05/24/1999	out	SM 5310B	
Potassium, Dissolved	7.85	mg/L		05/18/1999	jrw	SW 6010A	
Sodium, Dissolved	156	mg/L		05/18/1999	jrw	SW 6010A	

341 W. Walton Blvd / Pontiac, MI 48340 / 248-332-1940 / Fax: 248-332-5450

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

06/01/1999

Job No.: 99.01097
Sample No.: 240953

cc: Sean Paulson, EMCON

Quarterly
Riverview Land Preserve

Sample Description: MW-11

Date Taken: 05/12/1999

Date Received: 05/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	230	mg/L		05/20/1999	sld	EPA 325.2	
COD	38	mg/L		05/21/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	0.24	mg/L		05/18/1999	sld	EPA 350.1	
Nitrogen, Nitrate	0.01	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	0.01	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		05/14/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.25	mg/L		05/24/1999	sks		
Total Organic Carbon	2.8	mg/L		05/24/1999	out	SM 5310B	
Potassium, Dissolved	4.03	mg/L		05/18/1999	jrw	SW 6010A	
Sodium, Dissolved	107	mg/L		05/18/1999	jrw	SW 6010A	

341 W. WALTON BLVD / PONTIAC, MI 48340 / 248-332-1940 / FAX 248-332-5450

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

06/01/1999

Job No.: 99.01097
Sample No.: 240938

cc: Sean Paulson, EMCON

Quarterly
Riverview Land Preserve

Sample Description: MW-12

Date Taken: 05/12/1999

Date Received: 05/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	170	mg/L		05/20/1999	sld	EPA 325.2	
COD	22	mg/L		05/21/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	0.19	mg/L		05/18/1999	sld	EPA 350.1	
Nitrogen, Nitrate	<0.01	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	<0.01	mg/L		05/20/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		05/14/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.19	mg/L		05/24/1999	sks		
Total Organic Carbon	3.0	mg/L		05/24/1999	out	SM 5310B	
Potassium, Dissolved	3.91	mg/L		05/18/1999	jrw	SW 6010A	
Sodium, Dissolved	97.2	mg/L		05/18/1999	jrw	SW 6010A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

08/11/1999

Job No.: 99.01676
Sample No.: 242646

cc: Sean Paulson, EMCON

Project #86063005020
Riverview Land Preserve - Quarterly

Sample Description: MW-10 07/14

Date Taken: 07/14/1999

Date Received: 07/15/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	117	mg/L		07/20/1999	mas	EPA 325.2	
COD	17	mg/L		07/22/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	0.01	mg/L		07/27/1999	mas	SM 4500-NH3 B,H	
Nitrogen, Nitrate	0.03	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	0.03	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		07/15/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.04	mg/L		08/02/1999	sks		
Total Organic Carbon	2.0	mg/L		07/28/1999	kaf	SM 5310B	
Potassium, Dissolved	8.39	mg/L		08/02/1999	rrs	SW 6010A	
Sodium, Dissolved	170	mg/L		08/02/1999	rrs	SW 6010A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

08/11/1999

Job No.: 99.01676
Sample No.: 242642

cc: Sean Paulson, EMCON

Project #86063005020
Riverview Land Preserve - Quarterly

Sample Description: MW-11 07/13

Date Taken: 07/13/1999

Date Received: 07/15/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	186	mg/L		07/20/1999	mas	EPA 325.2	
COD	12	mg/L		07/22/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	0.57	mg/L		07/27/1999	mas	SM 4500-NH3 B,H	
Nitrogen, Nitrate	0.01	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	0.01	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		07/15/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.58	mg/L		08/02/1999	sks		
Total Organic Carbon	1.5	mg/L		07/28/1999	kaf	SM 5310B	
Potassium, Dissolved	4.55	mg/L		08/02/1999	rrs	SW 6010A	
Sodium, Dissolved	127	mg/L		08/02/1999	rrs	SW 6010A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

08/11/1999

Job No.: 99.01676
Sample No.: 242648

cc: Sean Paulson, EMCON

Project #86063005020
Riverview Land Preserve - Quarterly

Sample Description: MW-12 07/14

Date Taken: 07/14/1999

Date Received: 07/15/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Chloride	143	mg/L		07/20/1999	mas	EPA 325.2	
COD	23	mg/L		07/22/1999	ced	EPA 410.0-2	
Nitrogen, Ammonia	0.38	mg/L		07/27/1999	mas	SM 4500-NH3 B,H	
Nitrogen, Nitrate	0.01	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrate+Nitrite	0.01	mg/L		07/26/1999	ddm	EPA 353.2	
Nitrogen, Nitrite	<0.01	mg/L		07/16/1999	gls	SM 4500-NO2B	
Nitrogen, Inorganic (calc)	0.39	mg/L		08/02/1999	sks		
Total Organic Carbon	1.4	mg/L		07/28/1999	kaf	SM 5310B	
Potassium, Dissolved	3.71	mg/L		08/02/1999	rrs	SW 6010A	
Sodium, Dissolved	89.4	mg/L		08/02/1999	rrs	SW 6010A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566289

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-11

Date Taken: 10/12/1999

Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Alkalinity, Bicarb. (HCO3)	157	mg/L		10/26/1999	gls	EPA 310.1	
Chloride	209	mg/L		10/16/1999	kaf	EPA 325.2	
COD	50	mg/L		10/27/1999	jdb	EPA 410.4	
Nitrogen, Ammonia	0.50	mg/L		10/21/1999	jrr	SM 4500-NH3 B,H	
Nitrogen, Nitrate+Nitrite	<0.01	mg/L		10/20/1999	sub	EPA 353.2	
Nitrogen, Inorganic (calc)	0.50	mg/L		11/02/1999	gls		
Phenols	0.019	mg/L	10/15/1999	10/18/1999	imp	EPA 420.1	
Sulfate	1,920	mg/L		10/18/1999	gls	EPA 375.4	
Total Organic Carbon (TOC)	2	mg/L		10/17/1999	kbh	SM 5310 B.	
VOLATILES 8260							
1,1,1,2-Tetrachloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,1-Trichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,2,2-Tetrachloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,2-Trichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1-Dichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1-Dichloroethene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2,3-Trichloropropane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dibromo-3-chloropropane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dibromoethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichloropropane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
2-Hexanone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Methylisobutylketone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Acetone	<25.0	ug/L		10/16/1999	jpf	SW 8260A	
Acrylonitrile	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Benzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromodichloromethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromochloromethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566289

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-11

Date Taken: 10/12/1999

Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Bromoform	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromomethane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Carbon disulfide	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Carbon tetrachloride	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chlorodibromomethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloroethane (Ethyl chloride)	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloroform	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloromethane (Methyl chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Dibromomethane (Methylene brom	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,4-Dichlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Methylene chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Ethylbenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Iodomethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Methyl ethyl ketone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Styrene	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Tetrachloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Toluene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Trichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Trichlorofluoromethane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Vinyl acetate	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Xylene (total)	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
cis-1,2-Dichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
cis-1,3-Dichloropropene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566289

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-11

Date Taken: 10/12/1999

Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
trans-1,2-Dichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
trans-1,3-Dichloropropene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
trans-1,4-Dichloro-2-butene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Vinyl chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Arsenic, Dissolved, ICPMS	<0.001	mg/L		10/22/1999	ekh	SW 6020	
Barium, Dissolved, ICPMS	0.005	mg/L		10/22/1999	ekh	SW 6020	
Calcium, Dissolved, ICP	424	mg/L		10/25/1999	mhr	SW 6010A	
Magnesium, Dissolved, ICP	184	mg/L		10/25/1999	mhr	SW 6010A	
Potassium, Dissolved, ICP	4.2	mg/L		10/25/1999	mhr	SW 6010A	
Sodium, Dissolved, ICP	114	mg/L		10/25/1999	mhr	SW 6010A	
Zinc, Dissolved, ICPMS	<0.020	mg/L		10/22/1999	ekh	SW 6020	ELV

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566295

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-12

Date Taken: 10/12/1999

Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Alkalinity, Bicarb. (HCO3)	185	mg/L		10/26/1999	gls	EPA 310.1	
Chloride	148	mg/L		10/16/1999	kaf	EPA 325.2	
COD	58	mg/L		10/27/1999	jdb	EPA 410.4	
Nitrogen, Ammonia	0.40	mg/L		10/21/1999	jrr	SM 4500-NH3 B,H	
Nitrogen, Nitrate+Nitrite	0.04	mg/L		10/20/1999	sub	EPA 353.2	
Nitrogen, Inorganic (calc)	0.40	mg/L		11/02/1999	gls		
Phenols	<0.010	mg/L	10/18/1999	10/20/1999	imp	EPA 420.1	
Sulfate	2350	mg/L		11/02/1999	gls	EPA 375.4	
Total Organic Carbon (TOC)	2	mg/L		10/17/1999	kbh	SM 5310 B.	
VOLATILES 8260							
1,1,1,2-Tetrachloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,1-Trichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,2,2-Tetrachloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1,2-Trichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1-Dichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,1-Dichloroethene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2,3-Trichloropropane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dibromo-3-chloropropane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dibromoethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichloroethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichloropropane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
2-Hexanone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Methylisobutylketone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Acetone	<25.0	ug/L		10/16/1999	jpf	SW 8260A	
Acrylonitrile	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Benzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromodichloromethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromochloromethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566295

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-12

Date Taken: 10/12/1999

Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
Bromoform	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Bromomethane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Carbon disulfide	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Carbon tetrachloride	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chlorodibromomethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloroethane (Ethyl chloride)	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloroform	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Chloromethane (Methyl chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Dibromomethane (Methylene brom	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,2-Dichlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
1,4-Dichlorobenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Methylene chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Ethylbenzene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Iodomethane	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Methyl ethyl ketone	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Styrene	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Tetrachloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Toluene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Trichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Trichlorofluoromethane	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Vinyl acetate	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Xylene (total)	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
cis-1,2-Dichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
cis-1,3-Dichloropropene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	

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ANALYTICAL REPORT

Donald Schroat
CITY OF RIVERVIEW
14100 Civic Park Drive
Riverview, MI 48192

11/05/1999

Job No.: 99.17739
Sample No.: 566295

cc: Sean Paulsen, EMCON

Annual Ground Water Monitoring
Riverview Land Preserve

Sample Description: MW-12

Date Taken: 10/12/1999

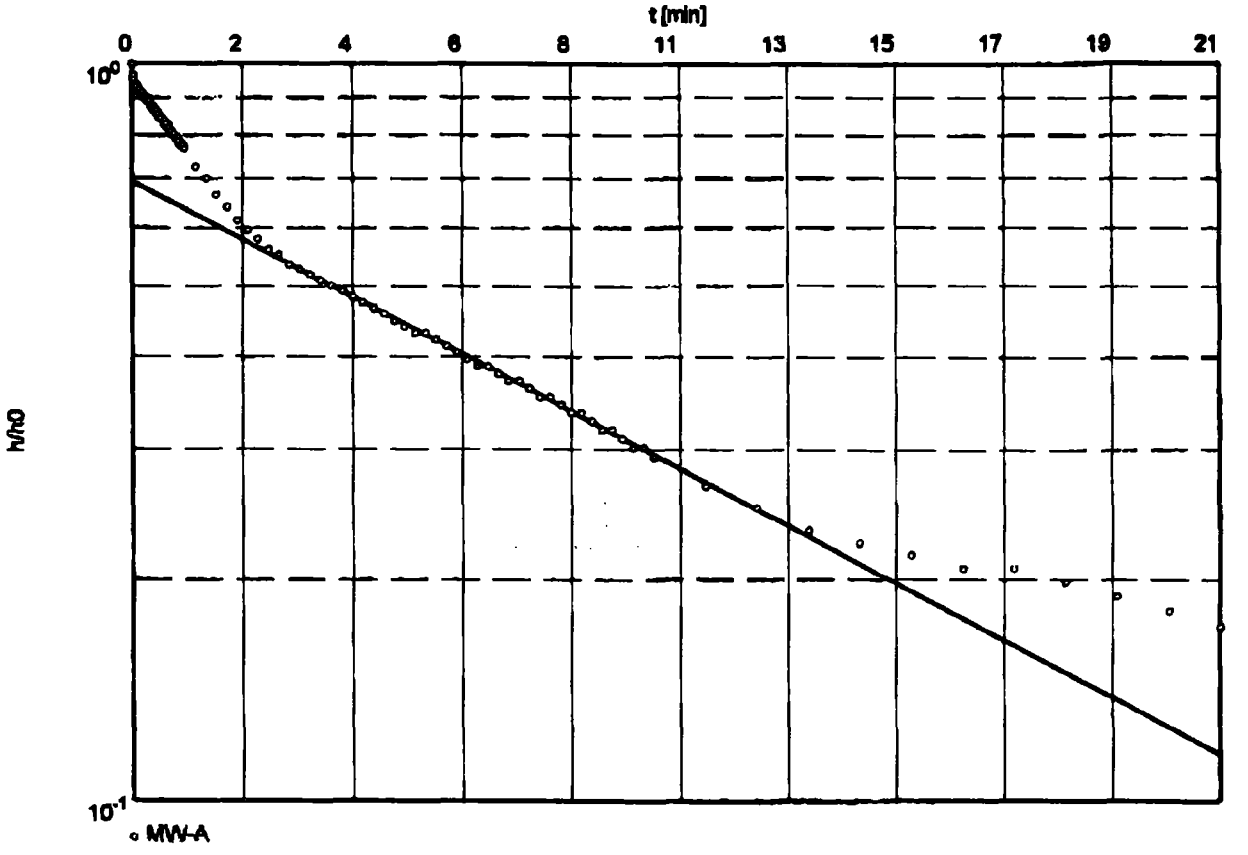
Date Received: 10/13/1999

Parameter	Result	Unit	Date Prepared	Date Analyzed	Lab Tech.	Methodology	Note
trans-1,2-Dichloroethylene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
trans-1,3-Dichloropropene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
trans-1,4-Dichloro-2-butene	<1.0	ug/L		10/16/1999	jpf	SW 8260A	
Vinyl chloride	<5.0	ug/L		10/16/1999	jpf	SW 8260A	
Arsenic, ICPMS	<0.001	mg/L	10/25/1999	10/25/1999	ekh	SW 6020	
Arsenic, Dissolved, ICPMS	<0.001	mg/L		10/22/1999	ekh	SW 6020	
Barium, ICPMS	0.01	mg/L	10/25/1999	10/25/1999	ekh	SW 6020	
Barium, Dissolved, ICPMS	0.009	mg/L		10/22/1999	ekh	SW 6020	
Calcium, ICP	487	mg/L	10/15/1999	10/18/1999	mhr	SW 6010A	
Calcium, Dissolved, ICP	453	mg/L		10/25/1999	mhr	SW 6010A	
Magnesium, ICP	188	mg/L	10/15/1999	10/18/1999	mhr	SW 6010A	
Magnesium, Dissolved, ICP	189	mg/L		10/25/1999	mhr	SW 6010A	
Potassium, ICP	4.14	mg/L	10/15/1999	10/18/1999	mhr	SW 6010A	
Potassium, Dissolved, ICP	4.25	mg/L		10/25/1999	mhr	SW 6010A	
Sodium, ICP	101	mg/L	10/15/1999	10/18/1999	mhr	SW 6010A	
Sodium, Dissolved, ICP	103	mg/L		10/25/1999	mhr	SW 6010A	
Zinc, ICPMS	<0.020	mg/L	10/25/1999	10/25/1999	ekh	SW 6020	ELV
Zinc, Dissolved, ICPMS	<0.020	mg/L		10/22/1999	ekh	SW 6020	ELV

ATTACHMENT 3

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-9767	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	
Slug Test No.		Test conducted on:	

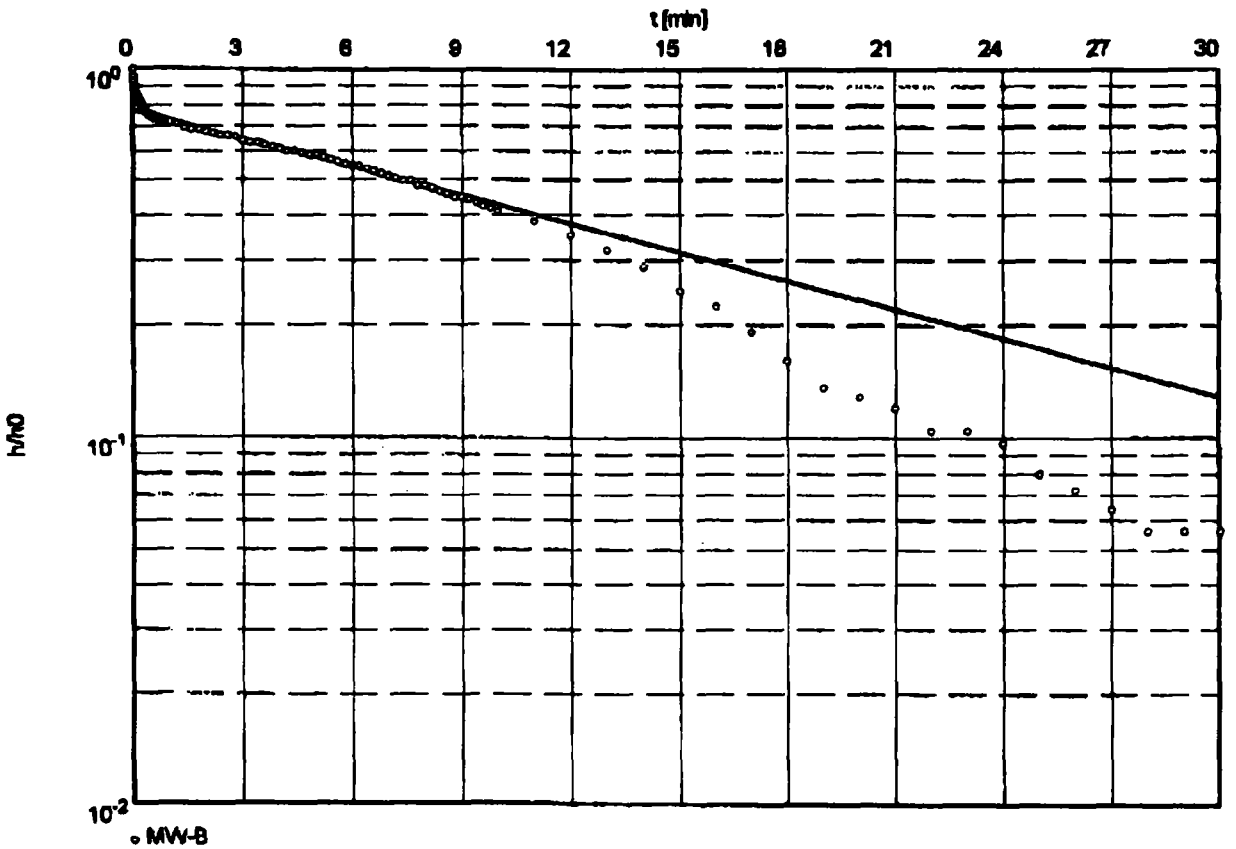
DRAFT



Hydraulic conductivity [ft/min]: 2.24×10^{-4}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-6797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:
DRAFT	

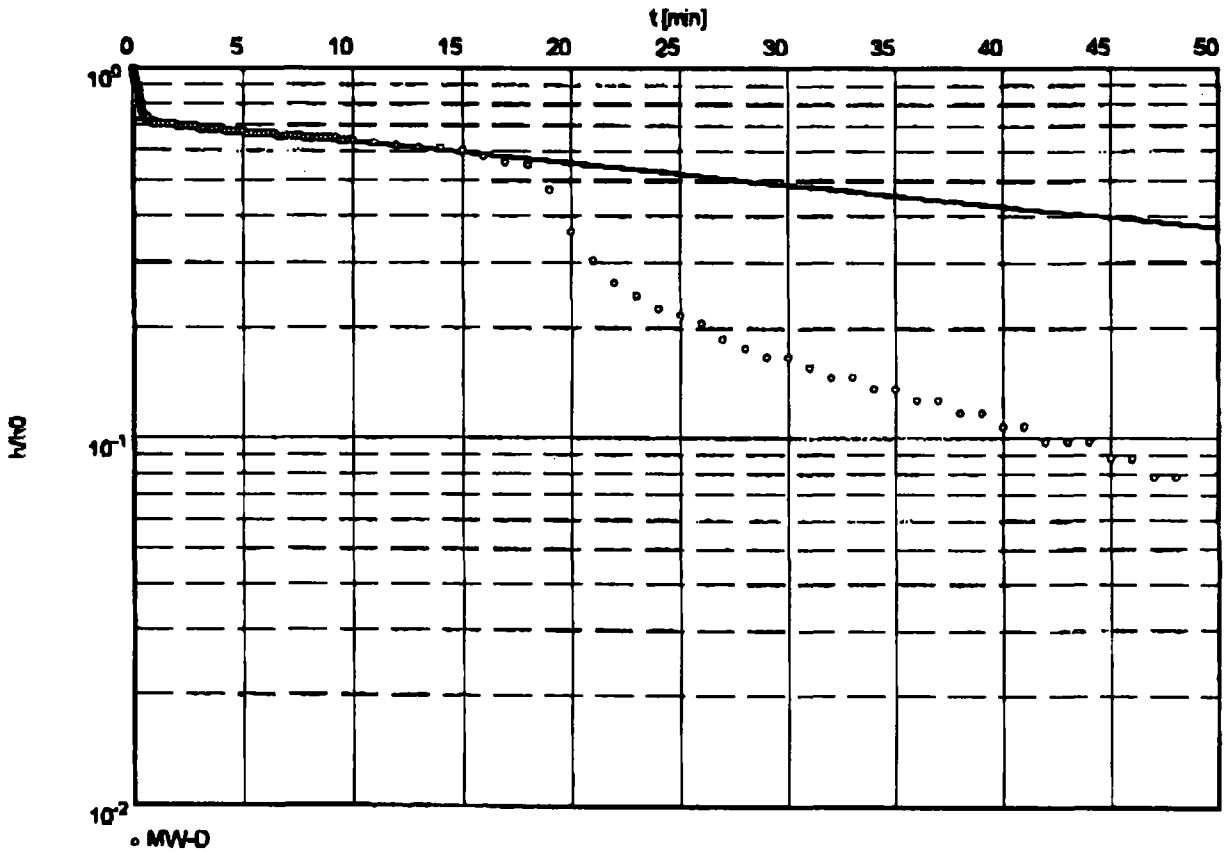


Hydraulic conductivity [ft/min]: 7.20×10^{-4}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)991-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:

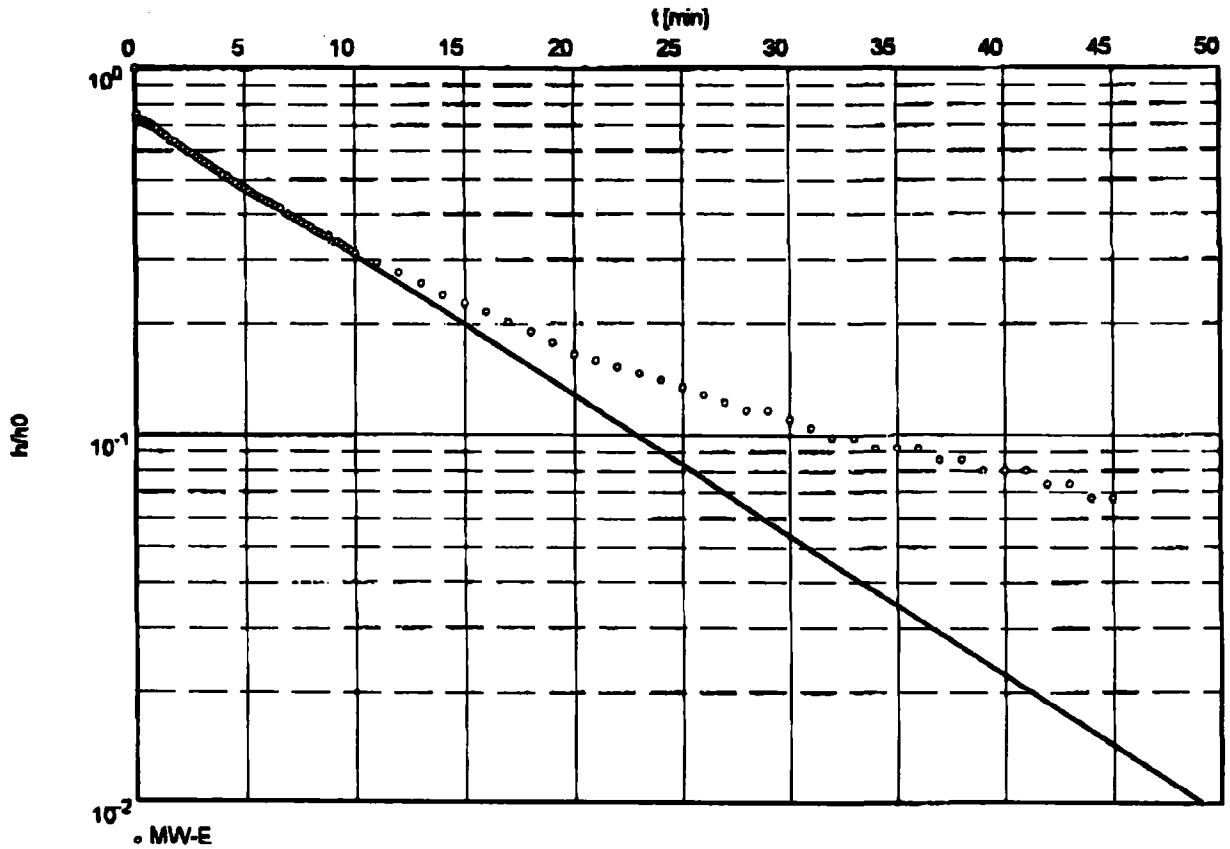
DRAFT



Hydraulic conductivity [ft/min]: 4.38×10^{-5}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph (313)961-9767	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	
Slug Test No.		Test conducted on:	

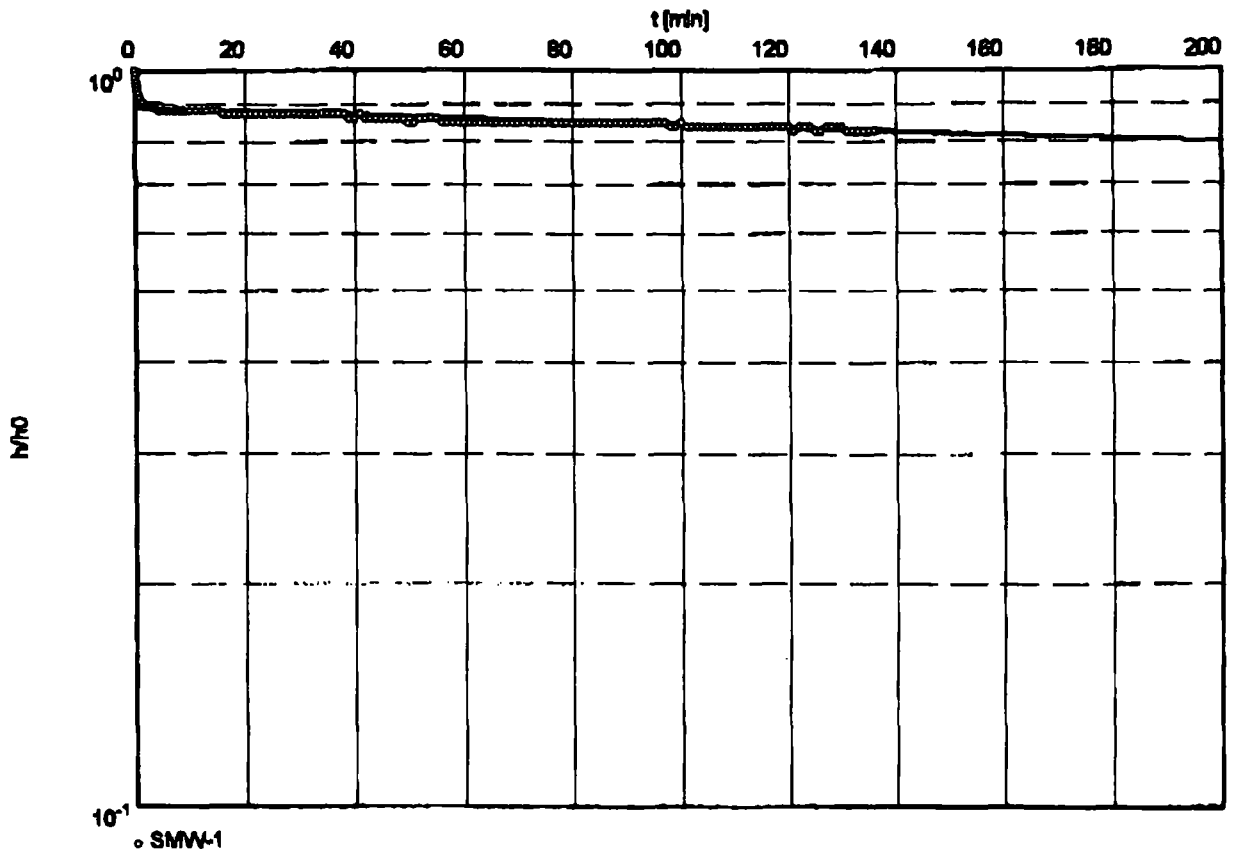
DRAFT



Hydraulic conductivity [ft/min]: 2.81×10^{-4}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:
DRAFT	

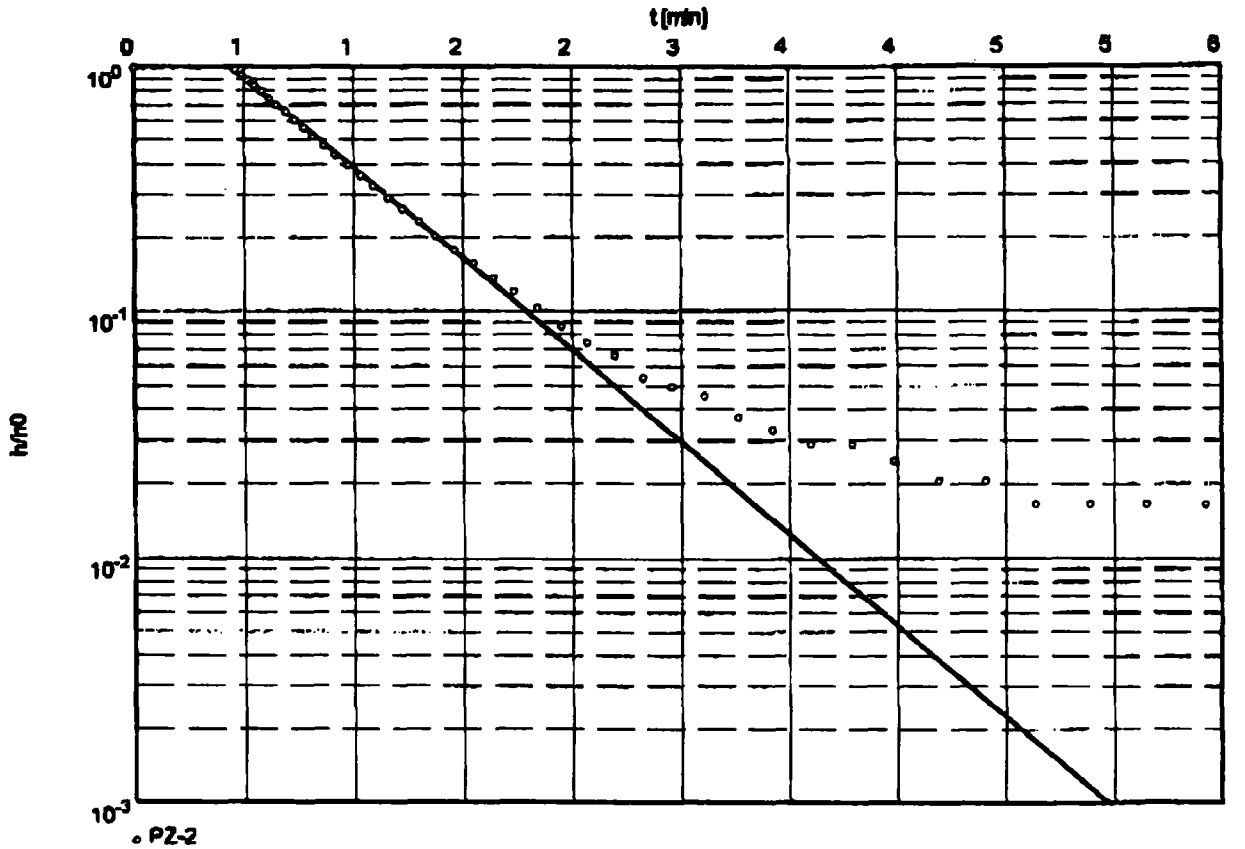


Hydraulic conductivity [ft/min]: 5.86×10^{-6}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:

DRAFT

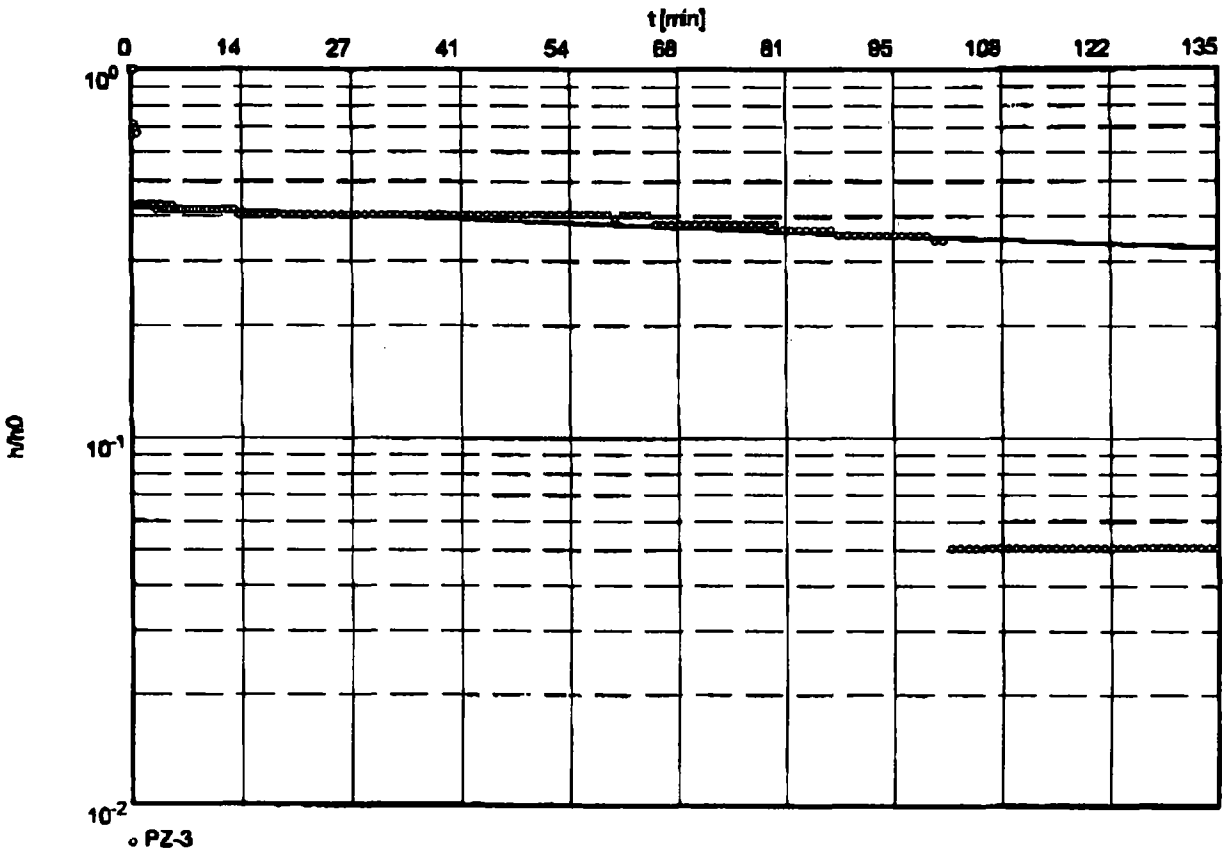


Hydraulic conductivity [ft/min]: 4.57×10^{-3}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:

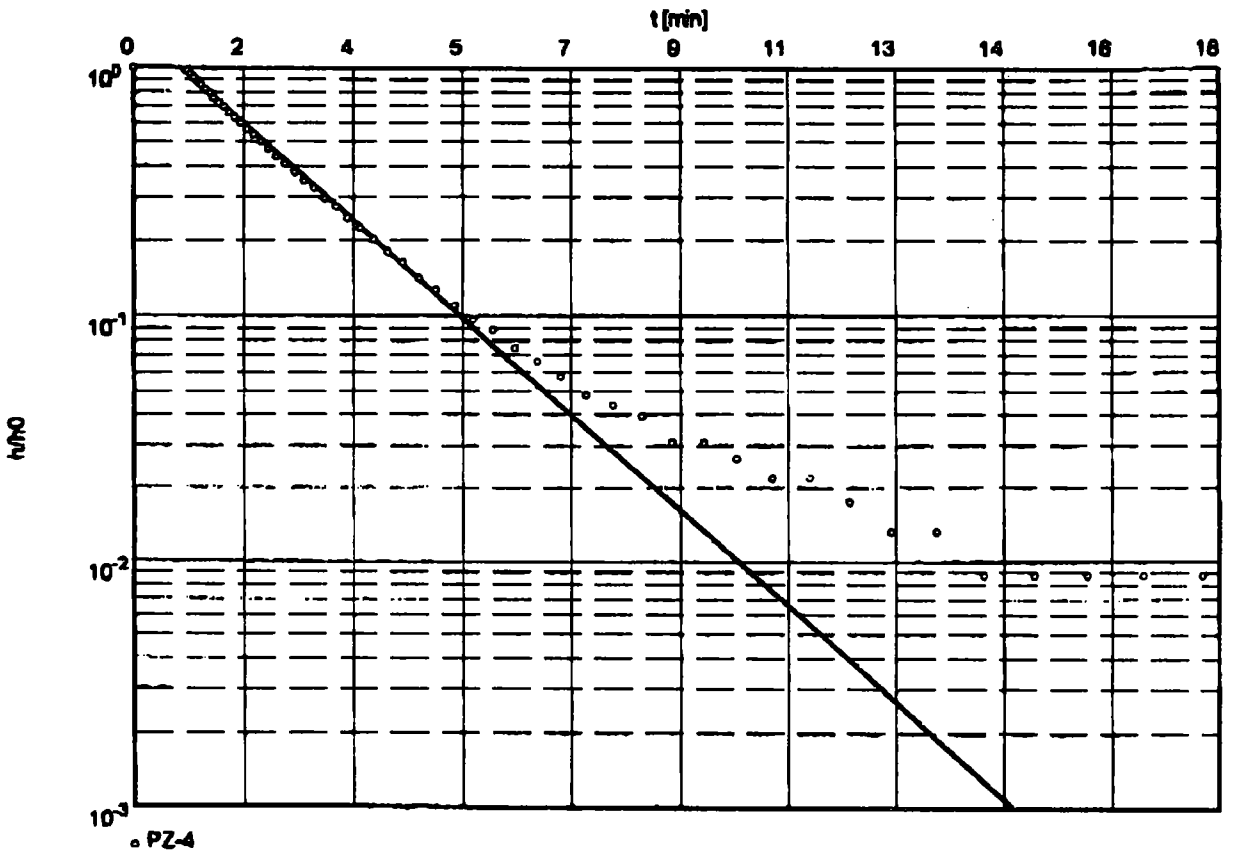
DRAFT



Hydraulic conductivity [ft/min]: 1.60×10^{-5}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph (313)961-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:
DRAFT	

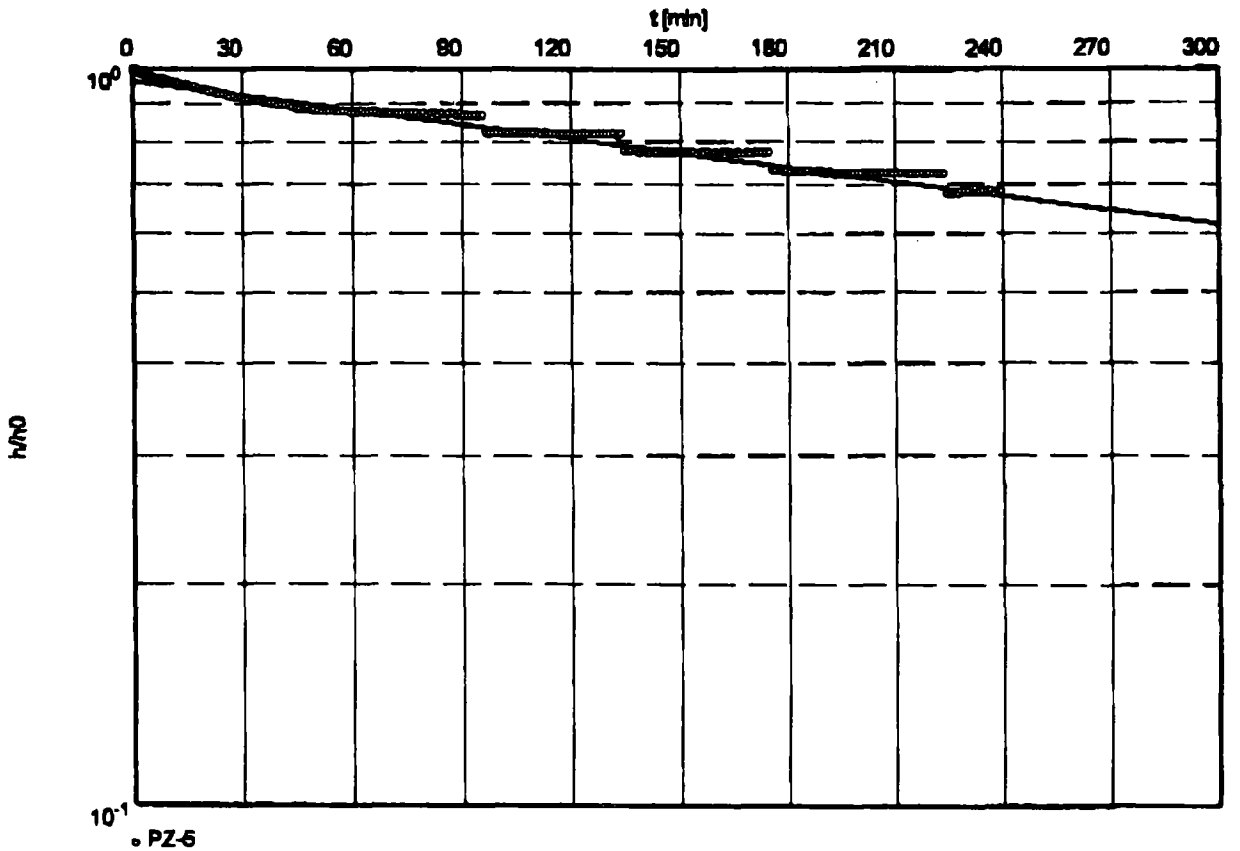


Hydraulic conductivity [ft/min]: 1.12×10^{-3}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-9797	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	

Slug Test No.	Test conducted on:

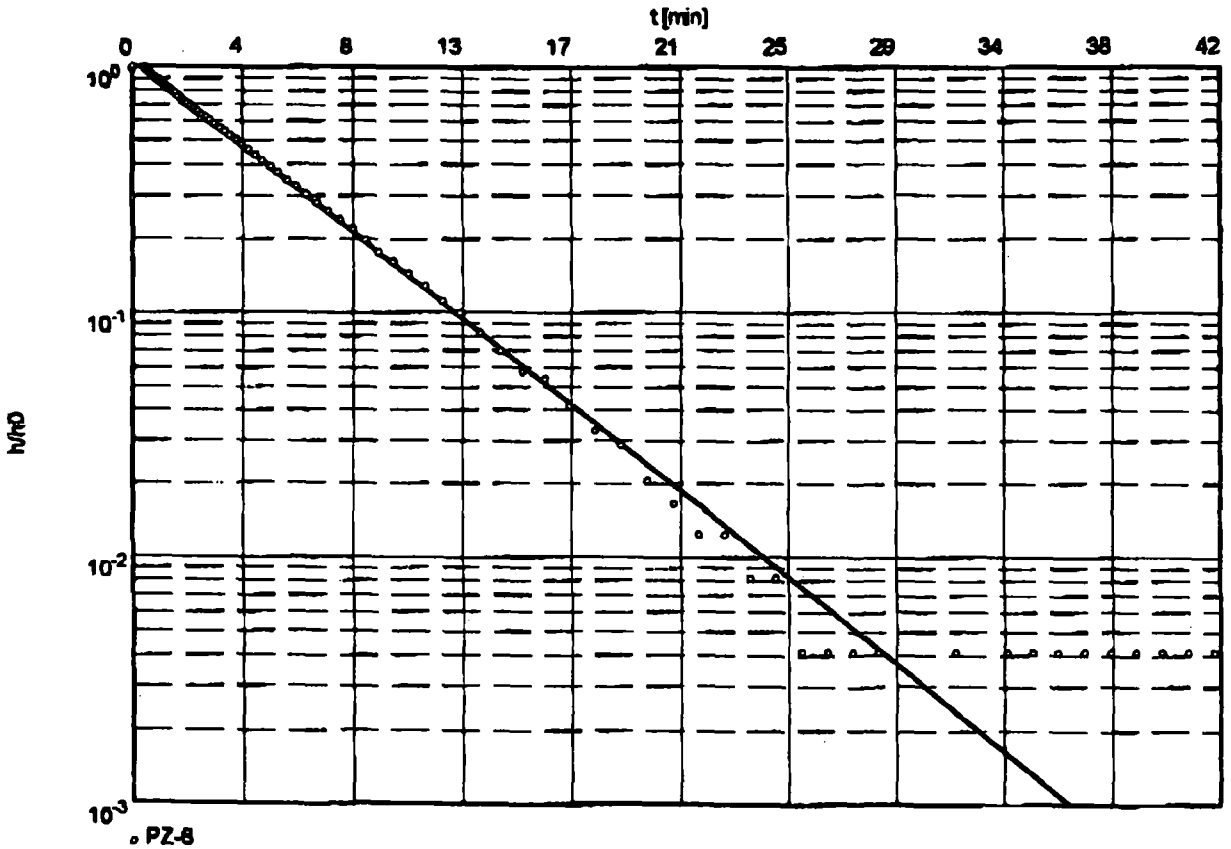
DRAFT



Hydraulic conductivity [ft/min]: 3.22×10^{-6}

URS Corporation 400 Monroe Ave., Suite 400 Detroit, MI 48226 (USA) ph.(313)961-8787	slug/bail test analysis BOUWER-RICE's method	Date: 25.02.2000	Page 1
		Project:	
		Evaluated by:	
Slug Test No.		Test conducted on:	

DRAFT



Hydraulic conductivity [ft/min]: 4.11×10^{-4}

ATTACHMENT 4

SHRADER
Analytical and Consulting
LABORATORIES INC.

REPORT OF ANALYTICAL SERVICES

SUBMITTED TO:

BASF CORPORATION
ECOLOGY SERVICES DEPARTMENT
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. JACK LANIGAN

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

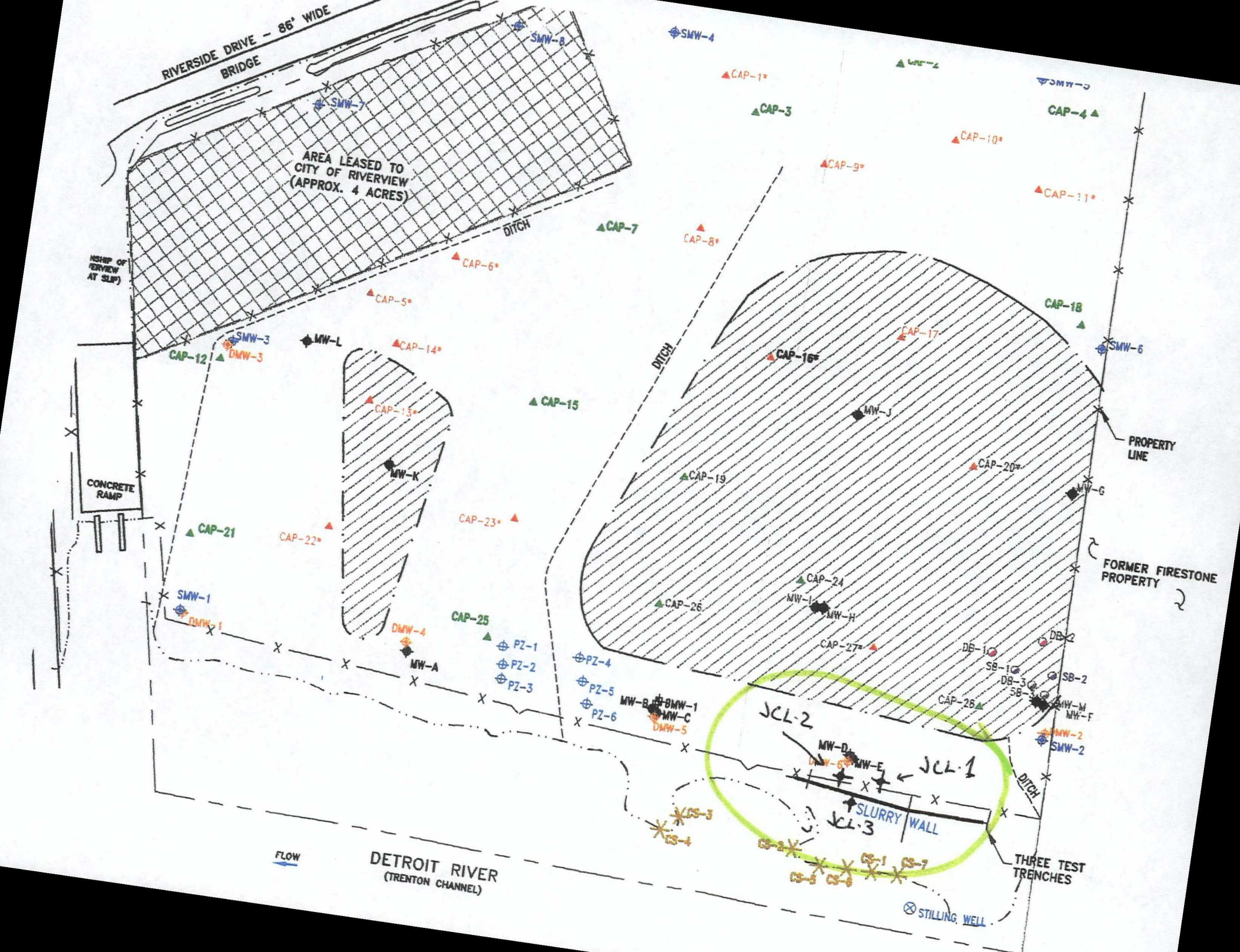
Customer sample	:	JCL-1, JCL-2 & JCL-3
Sample description	:	SOIL SAMPLES COLLECTED - 09/15/98
Project #	:	H525
Analysis performed	:	METHODS 8270B, 8080 MOD, 6010, 7470, 9045C, & SM18 2320B
Parameters analyzed	:	PNAs, PCBs, PCP, pH, As, Hg, Ca, Na, Alkalinity
Date received	:	September 16, 1998
Date completed	:	September 29, 1998
Report date	:	September 29, 1998

Verified Laura J. Stephens
Laura J. Stephens, Environmental Manager

Approved Marianne L. Shrader
Marianne L. Shrader, Acting QA/QC Officer

Enclosure(s)
LJS

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489


RIVERSIDE DRIVE - 86' WIDE
BRIDGE
AREA LEASED TO CITY OF RIVERVIEW (APPROX. 4 ACRES)
DITCH
NSHIP OF 'ERVIEW AT SLIP)
CONCRETE RAMP
SMW-8
SMW-7
SMW-4
SMW-3
SMW-6
SMW-1
SMW-2
DMW-3
DMW-1
DMW-4
DMW-5
DMW-2
MW-L
MW-K
MW-A
MW-B
MW-C
MW-D
MW-E
MW-J
MW-I
MW-H
MW-G
MW-M
MW-F
PZ-1
PZ-2
PZ-3
PZ-4
PZ-5
PZ-6
CAP-1*
CAP-2
CAP-3
CAP-4
CAP-5*
CAP-6*
CAP-7
CAP-8*
CAP-9*
CAP-10*
CAP-11*
CAP-12
CAP-13*
CAP-14*
CAP-15
CAP-16*
CAP-17
CAP-18
CAP-19
CAP-20*
CAP-21
CAP-22*
CAP-23*
CAP-24
CAP-25
CAP-26
CAP-27*
CAP-28
DB-1
DB-2
DB-3
SB-1
SB-2
SB-3
JCL-1
JCL-2
JCL-3
SLURRY WALL
CS-1
CS-2
CS-3
CS-4
CS-5
CS-6
CS-7
PROPERTY LINE
FORMER FIRESTONE PROPERTY
THREE TEST TRENCHES
STILLING WELL
FLOW
DETROIT RIVER
(TRENTON CHANNEL)

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.

QUANTITATION SUMMARY

BASF CORPORATION

SOIL SAMPLES CLLECTED 09/15/98
September 29,1998

PARAMETER	JCL-1	JCL-2	JCL-3	D.L.	UNIT	METHOD
pH at 25°C	10.9	10.5	10.4			9045C
Alkalinity as $CaCO_3$	95600	103000	96500	20	mg/dry Kg	SM18 2320B
Arsenic BG = 5.8	29.3	31.8	27.3	2	mg/dry Kg	6010
Calcium	19400	12100	30900	5	mg/dry Kg	6010
Mercury BG = 0.13	1.2	N.D.	1.1	0.5	mg/dry Kg	7470
Sodium	15000	5320	6870	5	mg/dry Kg	6010

SHRADER ANALYTICAL & CONSULTING LABORATORIES, INC.

QUANTITATION SUMMARY

BASF CORPORATION

SOIL SAMPLES CLLECTED 09/15/98
September 29,1998

Units = mg/dry Kg

SL#	ID#	1016	D.L.	1221	D.L.	1232	D.L.	1242	D.L.	1248	D.L.	1254	D.L.	1260	D.L.
01	JCL-1	N.D.	0.006	N.D.	0.006	N.D.	0.005	N.D.	0.005	N.D.	0.02	N.D.	0.02	N.D.	0.02
02	JCL-2	N.D.	0.005	N.D.	0.008	N.D.	0.005	N.D.	0.005	N.D.	0.01	N.D.	0.02	N.D.	0.02
03	JCL-3	N.D.	0.01	N.D.	0.009	N.D.	0.01	N.D.	0.008	N.D.	0.03	N.D.	0.03	N.D.	0.05

D.L.= Detection Limit
N.D. = Not Detected

SHRADER LABORATORIES, INC.

Report date : 09-25-1998 QUANTITATION SUMMARY

DATA file : H52501A Sample size : 10 g (Dry 8.5 g 15% moisture)
Description : JCL-1
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	Det.Limit
PENTACHLOROPHENOL	N.D.	0.1
ACENAPHTHENE	N.D.	0.02
ACENAPHTHYLENE	N.D.	0.01
ANTHRACENE	Detected <	0.01
BENZO(a)ANTHRACENE	0.044	0.02
BENZO(b & k)FLUORANTHENES	0.091	0.03
BENZO(a)PYRENE	0.046	0.04
BENZO(ghi)PERYLENE	N.D.	0.04
CHRYSENE	0.061	0.02
DIBENZO(a,h)ANTHRACENE	N.D.	0.04
FLUORANTHENE	0.060	0.01
FLUORENE	N.D.	0.02
INDENO(123-cd)PYRENE	N.D.	0.03
2-METHYLNAPHTHALENE	N.D.	0.02
NAPHTHALENE	0.028	0.009
PHENANTHRENE	0.046	0.01
PYRENE	0.065	0.02
TOTAL	0.449	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 09-25-1998 QUANTITATION SUMMARY

DATA file : H52502A Sample size : 10 g (Dry 8.8 g 13% moisture)
Description : JCL-2
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	Det.Limit
PENTACHLOROPHENOL	N.D.	0.1
ACENAPHTHENE	N.D.	0.02
ACENAPHTHYLENE	N.D.	0.01
ANTHRACENE	0.027	0.01
BENZO(a)ANTHRACENE	0.21	0.02
BENZO(b & k)FLUORANTHENES	0.37	0.03
BENZO(a)PYRENE	0.17	0.04
BENZO(ghi)PERYLENE	0.13	0.04
CHRYSENE	0.22	0.02
DIBENZO(a,h)ANTHRACENE	N.D.	0.04
FLUORANTHENE	0.35	0.01
FLUORENE	N.D.	0.02
INDENO(123-cd)PYRENE	0.11	0.03
2-METHYLNAPHTHALENE	0.025	0.02
NAPHTHALENE	0.020	0.010
PHENANTHRENE	0.13	0.01
PYRENE	0.28	0.01
TOTAL	2.04	

N.D. = Not detected

SHRADER LABORATORIES, INC.

Report date : 09-25-1998 QUANTITATION SUMMARY

DATA file : H52503A Sample size : 10 g (Dry 8.5 g 16% moisture)
Description : JCL-3
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	Det.Limit
PENTACHLOROPHENOL	N.D.	0.06
ACENAPHTHENE	N.D.	0.01
ACENAPHTHYLENE	N.D.	0.008
ANTHRACENE	0.023	0.008
BENZO(a)ANTHRACENE	0.19	0.01
BENZO(b & k)FLUORANTHENES	0.39	0.02
BENZO(a)PYRENE	0.16	0.03
BENZO(ghi)PERYLENE	0.15	0.03
CHRYSENE	0.23	0.01
DIBENZO(a,h)ANTHRACENE	N.D.	0.03
FLUORANTHENE	0.33	0.008
FLUORENE	Detected <	0.01
INDENO(123-cd)PYRENE	0.12	0.03
2-METHYLNAPHTHALENE	0.024	0.01
NAPHTHALENE	0.025	0.006
PHENANTHRENE	0.11	0.008
PYRENE	0.28	0.01
TOTAL	2.03	

N.D. = Not detected

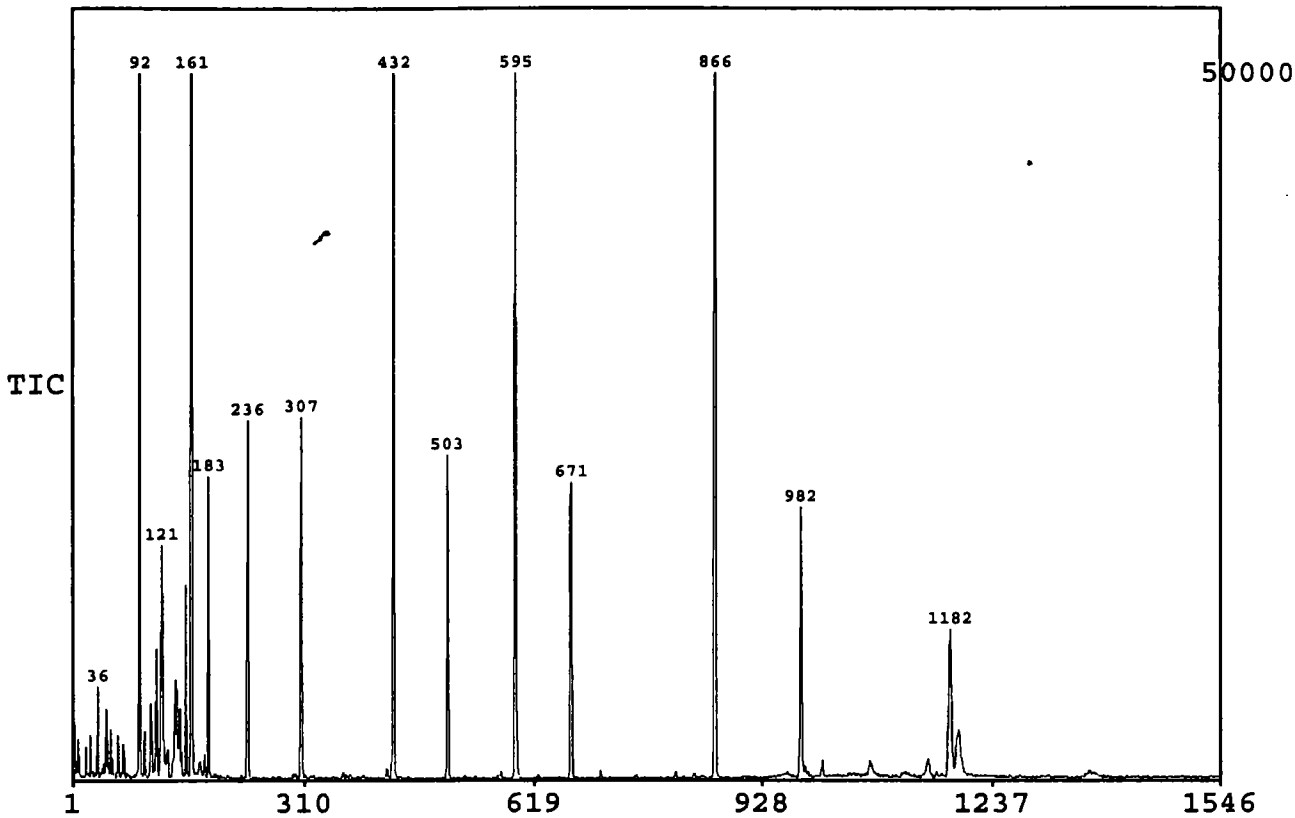
SEMI-VOLATILE CHROMATOGRAMS, SURROGATE RECOVERIES

AND

LABORATORY BLANKS

SHRADER LABORATORIES, INC.
09-24-1998

H52501A JCL-1
Date run : 09-24-1998(11:04:09) Instr. : Q1* Operator : ROBG



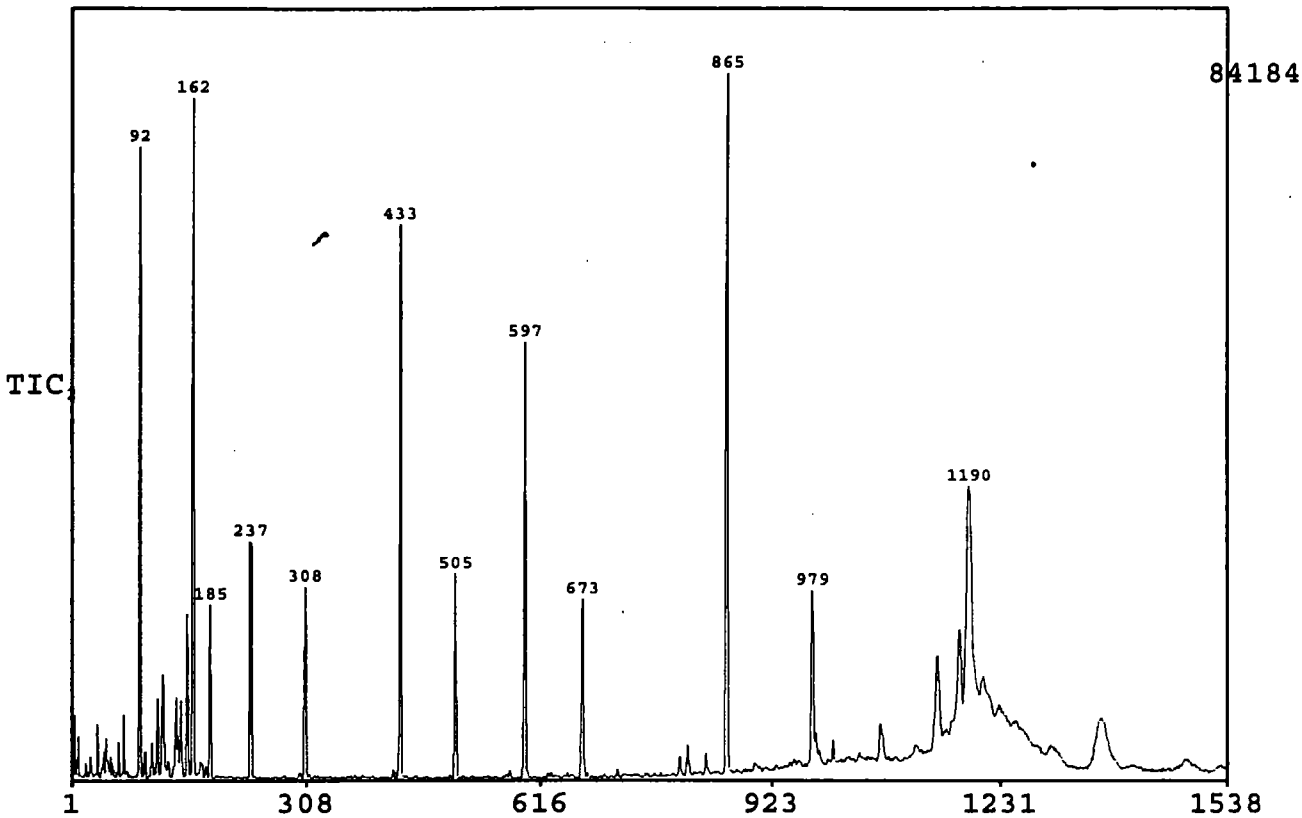
SHRADER LABORATORIES, INC.
Report date : 09-24-1998 SPIKE RECOVERY REPORT

DATA file : H52501A Sample size : 10 g (Dry 8.8 g 13% moisture)
Description : JCL-1
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	6.3	9.10	69.2% 1
NITROBENZENE-D5	3.3	9.10	36.3% 3
TERPHENYL-D14	10	9.10	109.9% 2
2-FLUOROPHENOL	8.0	18.2	44.0% 2
PHENOL-D6	9.5	18.2	52.2% 2
TRIBROMOPHENOL	15	18.2	82.4% 1

SHRADER LABORATORIES, INC.
09-24-1998

H52502A JCL-2
Date run : 09-24-1998(11:42:05) Instr. : Q1* Operator : ROBG



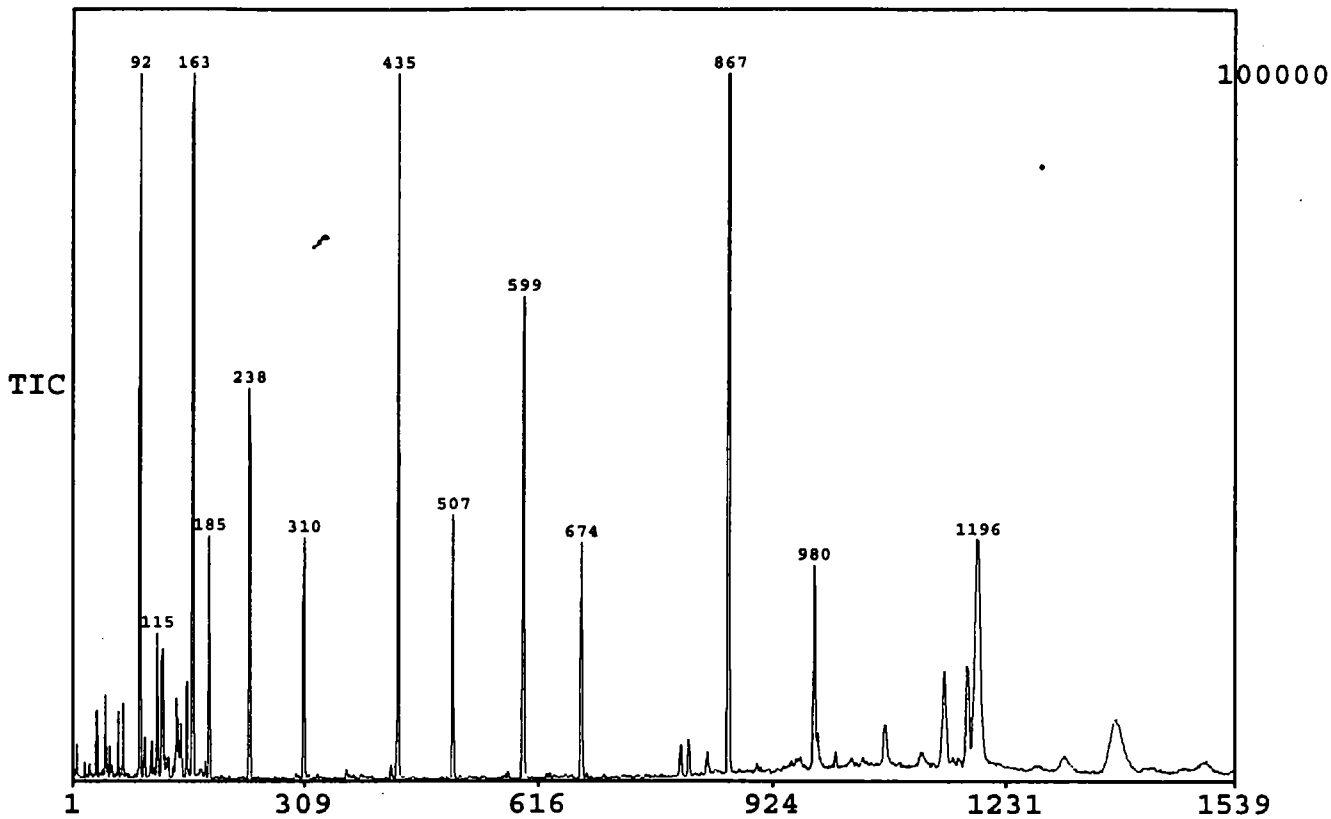
SHRADER LABORATORIES, INC.
Report date : 09-24-1998 SPIKE RECOVERY REPORT

DATA file : H52502A Sample size : 10 g (Dry 8.8 g 13% moisture)
Description : JCL-2
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	6.8	9.05	75.1% 1
NITROBENZENE-D5	4.1	9.05	45.3% 2
TERPHENYL-D14	10	9.05	110.5% 2
2-FLUOROPHENOL	7.7	18.1	42.5% 3
PHENOL-D6	9.6	18.1	53.0% 2
TRIBROMOPHENOL	13	18.1	71.8% 1

SHRADER LABORATORIES, INC.
09-24-1998

H52503A JCL-3
Date run : 09-24-1998(12:28:25) Instr. : Q1* Operator : ROBG



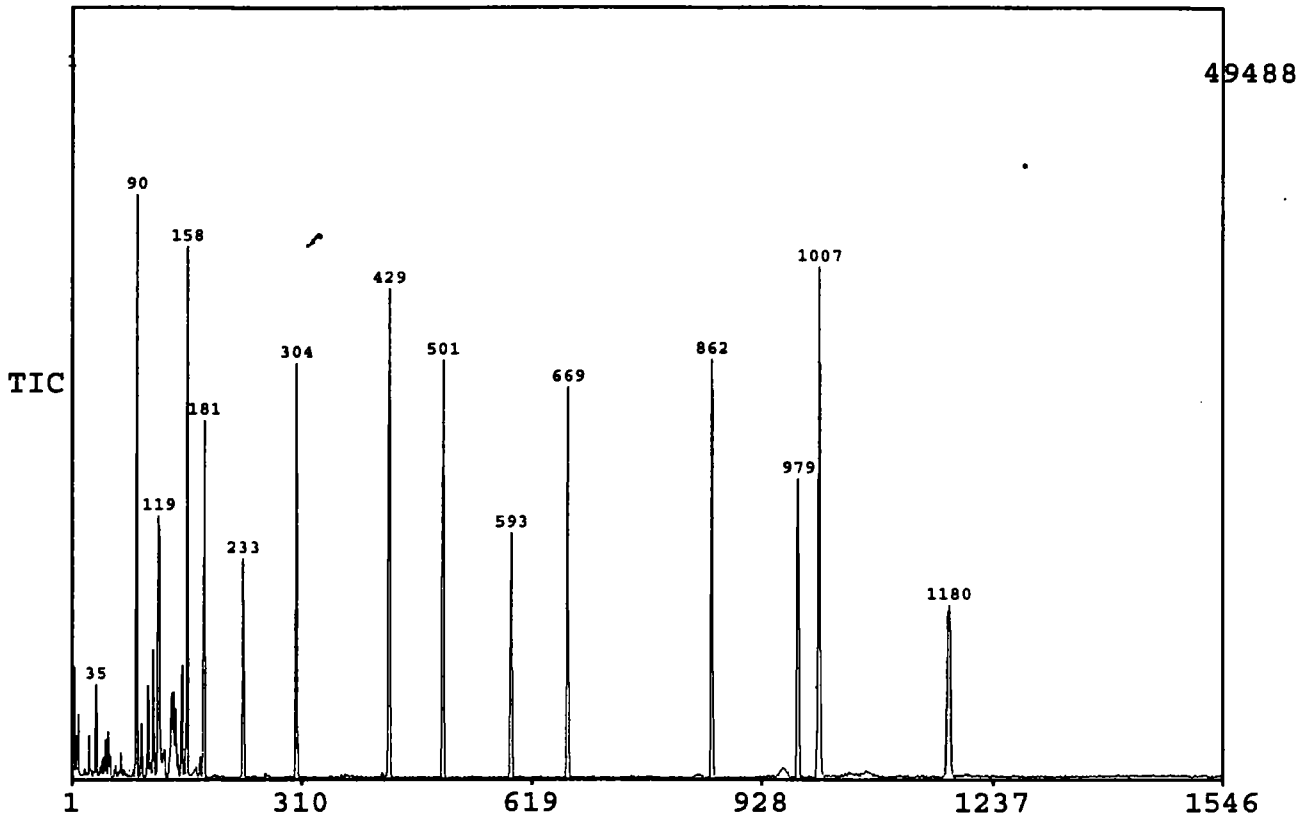
SHRADER LABORATORIES, INC.
Report date : 09-24-1998 SPIKE RECOVERY REPORT

DATA file : H52503A Sample size : 10 g (Dry 8.5 g 16% moisture)
Description : JCL-3
Sample submitted by : BASF CORPORATION
Analyzed on 09-24-1998 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	9.6	9.36	102.6% 2
NITROBENZENE-D5	5.7	9.36	60.9% 1
TERPHENYL-D14	5.5	9.36	58.8% 3
2-FLUOROPHENOL	8.7	18.7	46.5% 2
PHENOL-D6	11	18.7	58.8% 1
TRIBROMOPHENOL	14	18.7	74.9% 1

SHRADER LABORATORIES, INC.
09-24-1998

BK0918B QA/QC BLANK
Date run : 09-24-1998(10:22:22) Instr. : Q1* Operator : ROBG



SHRADER LABORATORIES, INC.
Report date : 09-24-1998 SPIKE RECOVERY REPORT

DATA file : BK0918B Sample size : 10 g
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 09-24-1998 by ROBG Report prepared by ROBG

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
2-FLUOROBIPHENYL	3.8	4.00	95.0% 1
NITROBENZENE-D5	2.3	4.00	57.5% 1
TERPHENYL-D14	4.1	4.00	102.5% 1
2-FLUOROPHENOL	4.0	8.00	50.0% 2
PHENOL-D6	4.6	8.00	57.5% 2
TRIBROMOPHENOL	4.9	8.00	61.3% 2

SHRADER LABORATORIES, INC.

Report date : 09-25-1998 QUANTITATION SUMMARY

DATA file : BK0918B Sample size : 10 g
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 09-24-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	Det.Limit
PENTACHLOROPHENOL	N.D.	0.1
ACENAPHTHENE	N.D.	0.02
ACENAPHTHYLENE	N.D.	0.01
ANTHRACENE	N.D.	0.01
BENZO(a)ANTHRACENE	N.D.	0.02
BENZO(b & k)FLUORANTHENES	N.D.	0.04
BENZO(a)PYRENE	N.D.	0.04
BENZO(ghi)PERYLENE	N.D.	0.04
CHRYSENE	N.D.	0.02
DIBENZO(a,h)ANTHRACENE	N.D.	0.05
FLUORANTHENE	N.D.	0.01
FLUORENE	N.D.	0.02
INDENO(123-cd)PYRENE	N.D.	0.04
2-METHYLNAPHTHALENE	N.D.	0.02
NAPHTHALENE	N.D.	0.010
PHENANTHRENE	N.D.	0.01
PYRENE	N.D.	0.02

N.D. = Not detected TOTAL 0

PCB SURROGATE RECOVERIES AND LABORATORY BLANK RESULTS

SHRADER LABORATORIES, INC.

Report date : 09-18-1998 SPIKE RECOVERY REPORT

Data file : H52501B.QMM Amount extracted : 10.06 g (Dry 8.53 g 15% m

Description : JCL-1

Sample submitted by : BASF CORPORATION

Analyzed on 09-18-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
BIPHENYL-D10	0.57	0.938	61.3% 2
TETRACHLORO-M-XYLENE	0.76	0.938	80.7% 1

SHRADER LABORATORIES, INC.

Report date : 09-18-1998 SPIKE RECOVERY REPORT

Data file : H52502B.QMM Amount extracted : 10.01 g (Dry 8.73 g 13% m
Description : JCL-2
Sample submitted by : BASF CORPORATION
Analyzed on 09-18-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
BIPHENYL-D10	0.47	0.916	51.4% 2
TETRACHLORO-M-XYLENE	0.70	0.916	76.8% 1

SHRADER LABORATORIES, INC.

Report date : 09-18-1998 SPIKE RECOVERY REPORT

Data file : H52503B.QMM Amount extracted : 10.04 g (Dry 8.456 g 16%

Description : JCL-3

Sample submitted by : BASF CORPORATION

Analyzed on 09-18-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
BIPHENYL-D10	0.57	0.946	60.7% 2
TETRACHLORO-M-XYLENE	0.81	0.946	85.2% 1

SHRADER LABORATORIES, INC.

Report date : 09-18-1998 SPIKE RECOVERY REPORT

Data file : BK0918A.QMM Amount extracted : 10 g
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 09-18-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	SPIKE	Percent Recovery
BIPHENYL-D10	0.45	0.500	90.5% 1
TETRACHLORO-M-XYLENE	0.40	0.500	80.6% 1

SHRADER LABORATORIES, INC.

Report date : 09-18-1998 QUANTITATION SUMMARY

Data file : BK0918A.QMM Amount extracted : 10 g
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 09-18-1998 by ROBG Report prepared by STEL

COMPOUND	CONCENTRATION Milligrams/Kilogram	Det.Limit
Arochlor-1016 A	N.D.	0.002
Arochlor-1016 B	N.D.	0.002
Arochlor-1016 C	N.D.	0.004
Arochlor-1221 A	N.D.	0.003
Arochlor-1221 B	N.D.	0.0009
Arochlor-1221 C	N.D.	0.002
Arochlor-1232 A	N.D.	0.001
Arochlor-1232 B	N.D.	0.002
Arochlor-1232 C	N.D.	0.006
Arochlor-1242 A	N.D.	0.002
Arochlor-1242 B	N.D.	0.002
Arochlor-1242 C	N.D.	0.003
Arochlor-1248 A	N.D.	0.006
Arochlor-1248 B	N.D.	0.003
Arochlor-1248 C	N.D.	0.01
Arochlor-1254 A	N.D.	0.006
Arochlor-1254 B	N.D.	0.003
Arochlor-1254 C	N.D.	0.02
Arochlor-1260 A	N.D.	0.02
Arochlor-1260 B	N.D.	0.003
Arochlor-1260 C	N.D.	0.009

N.D. = Not detected

...ICAL & CONSULTING LABORATORIES, INC.
3814 Vinewood Detroit, MI 48208-2319 313/894-4440 FAX: 313/894-4489

H525

CHAIN OF CUSTODY RECORD

Customer: BASF

Project #: H525

Sampling Site: FMT

By: Jack Langan

BL #	Preservative	Added by & Date	Customer ID	Sample Type / Matrix	Sampling Date/Time	Parameters	Comments
	NONE		JCL-1	Soil	9-15-98	Hg; As; PCBs; PNAs;	
	↓		JCL-2	↓	↓	PCP; Na; Ca;	
	↓		JCL-3	↓	↓	Carbonate; pH	

Method of shipment:	Date:	Time:	Relinquished by:	Date:	Time:
Pick up.	9-16-98	1200	[signature]	9/16/98	12 pm
Received by: [signature]	Date: 9-16-98	Time: 1205 pm.	Relinquished by: [signature]	Date: 9-16-98.	Time: 1235 pm
Received by: [signature]	Date: 9.16.98	Time: 12:30	Relinquished by:	Date:	Time:

Time cooler opened:_____ Temperature of blank:_____ Time temperature taken:_____ By:_____

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

SE MICHIGAN DISTRICT OFFICE
38980 SEVEN MILE RD
LIVONIA MI 48152-1006

June 26, 2000

Mr. Thomas F. McGourty
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Dear Mr. McGourty:

SUBJECT: BASF-Riverview site, Wayne County, MI.

The Department of Environmental Quality (DEQ), Environmental Response Division (ERD), corresponded with BASF-Corporation (BASF) on June 9, 2000, indicating that standard operating procedures for the implementation of the work plan would be provided to BASF by June 26, 2000. Enclosed please find the work plan for the site which includes those standard operating procedures.

If you have any questions please feel free to contact me at 734-953-1404.

Sincerely,

Beth Vens

Beth Vens, Project Manager
Environmental Response Division

cc: Ms. Mary Fulgham, USEPA
Mr. Michael Ribordy, USEPA
Ms. Kathy Cavanaugh, DAG
Ms. Nan Leemon, DEQ
Mr. Oyinsan Oladipo, DEQ
Ms. Patricia Brandt, DEQ
Mr. Greg Foote, Malcolm Pirnie

MALCOLM PIRNIE

SITE INVESTIGATION WORK PLAN

FOR THE
BASF RIVERVIEW SITE
RIVERVIEW, MICHIGAN

Mike Bibordy

MICHIGAN DE ONMENTAL QUALITY
ENVI SE DIVISION

JUNE 26, 2000

PREPARED BY
MALCOLM PIRNIE, INC.
1500 ABBOTT ROAD, SUITE 210
EAST LANSING, MICHIGAN 48823

SITE INVESTIGATION WORK PLAN
BASF RIVERVIEW SITE

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LIST OF APPENDICES

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A	Field Procedures

1.0 INTRODUCTION

As directed by the Michigan Department of Environmental Quality (MDEQ) evaluation of the groundwater surface water interface (GSI) pathway is the primary interim response objective for the BASF Riverview site (Figure 1-1) at this time. However, based on Malcolm Pirnie's review of available MDEQ file documents, it is not possible to fully evaluate potential interim response alternatives for eliminating the GSI pathway using only data from the previous investigations. Therefore, we have developed a Scope of Work to conduct preliminary investigations to address the data gaps for this pathway. The Scope of Work is organized as follows:

- Chapter 2.0 provides a description of site setting and a brief overview of site hydrogeology
- Chapter 3.0 provides an overview of data gaps identified
- Chapter 4.0 describes the scope of investigation activities that will be performed to address identified data gaps.

2.0 SITE DESCRIPTION AND HYDROGEOLOGY

The BASF Riverview site is a thirty-acre (i.e., 27 acres of land and 3 acres of water) parcel located in Riverview, Michigan. The site is situated along the western bank of the Trenton Channel of the Detroit River. The following discussion of site geology, hydrogeology, and contaminant characterization is based upon reports of previous investigations by URS Greiner Woodward Clyde (URSGWC) in 1999, Applied Environmental Research (AER) in 1980, and Neyer, Tiseo, & Hindo (NTH) in 1979.

2.1 SITE GEOLOGY

Approximately 50 test boring and 40 monitoring well drilling logs provide a basis for interpreting site stratigraphy. However, because several different consultants performed work at the site and prepared boring logs, there are discrepancies in the stratigraphic descriptions. Two geologic cross-sections, depicted on Figures 1-3 and 1-4, were prepared to illustrate site geology based on our interpretation of the available boring logs. As shown on the cross-sections, the following generalized stratigraphy is present at the site.

2.1.1 Fill Unit

The fill unit is comprised of soils with varying amounts of slag, brick, concrete blocks, wood, glass, and unidentified organic debris. URSGWC describes the fill as "concrete rubble, scrap metal, glassware, soda ash, caustics, cardboard and steel drums, coke, cinders, bricks, carbon anode and cell parts, surfactants, and miscellaneous trash from all Wyandotte sites." During excavation activities performed by AER in 1979, metal containers ranging in size from five-gallon cans to fifty-five gallon drums were uncovered. These containers were reported to be mostly intact and filled with solid and/or liquid substances. It is unclear based on available file documents how many containers are present and in which areas of the site these containers are present. In some areas of the site, a strong chemical odor and staining is reported in the boring logs. The fill appears to range in thickness from 1 to 3 feet at the western edge of the property and 8 to 14 feet thick near the river's edge. A maximum fill thickness of 23 feet was reported by URSGWC near the eastern margin of the site. There appear to be some conflicting reports pertaining to the description of this unit in the various documents in the MDEQ file.

2.1.2 Peat Unit

The peat unit is comprised of peat and/or black organic rich silt and ranges from 1 to 3 feet thick. In general, this unit appears to only be present within approximately 200 feet of the Trenton Channel shoreline. Boring logs indicate the peat unit has a strong chemical like odor.

2.1.3 Sand Unit

The sand unit is comprised of gray to black fine to medium grained sand with traces of clay. This unit appears to be a large sand lens present only near the shoreline and is likely a paleochannel fluvial deposit or more recent bank deposit from the Trenton Channel. Boring logs indicate that the sand unit ranges from 0 to 5 feet thick, is stained, and has a chemical like odor.

2.1.4 Upper Clay Unit

The upper clay unit is comprised of very soft, gray silty clay with some black staining. It is continuous over most of the site and appears to thin toward the shoreline of the Trenton Channel until it is no longer present (see cross-section A-A', Figure 1-3). The upper clay unit is likely lacustrine and ranges from about 10 to 15 feet thick where present.

2.1.5 Lower Clay Unit

The lower clay unit is comprised of brown silty clay with little fine to coarse-grained sand and gravel fingers. It overlies bedrock and is approximately 20 feet thick. Heterogeneities in this unit may provide contaminant migration pathways.

2.1.6 Dundee Limestone (Bedrock)

The Dundee Limestone consists of a medium to hard grayish brown limestone, with soft seams, and fractures. Boring logs indicate the upper 8 feet of the bedrock is weathered and fractured and that it is first encountered at a depth of approximately 40 feet below ground surface (bgs).

2.2 HYDROGEOLOGY

URSGWC describes three distinct water-bearing zones at the site as follows:

- Upper Water-Bearing Zone - The upper water-bearing zone consists of the saturated portion of the fill and some naturally occurring sediments (i.e. the sand and peat units). Groundwater flow in this unit appears to be towards the Trenton Channel in most areas of the site. Hydraulic conductivity is estimated to range from 2.98×10^{-8} to 3.69×10^{-4} cm/s based on slug tests performed in wells screened in this unit. Although, the 2.98×10^{-8} cm/s value from well SMW-1 appears anomalously low in comparison with testing results from other wells screened in the upper water-bearing zone.

- Middle Water-Bearing Zone - The middle water-bearing zone consists of the lower clay unit. Slug tests performed by URSGWC yielded hydraulic conductivity estimates ranging from 5.4×10^{-3} to 3.7×10^{-4} feet/day. Boring logs indicate that highly conductive lenses and heterogeneities (i.e., coarse zones) may be present in this unit.

- Lower Water-Bearing Unit - The lower water-bearing unit consists of the Dundee Limestone. URSGWC reported hydraulic conductivities from the limestone unit ranging from 7.4×10^{-3} to 6.3×10^{-3} feet/day. Typically in limestone, secondary porosity, such as fractures will likely provide the predominant pathway for groundwater migration. Therefore, hydraulic conductivity estimates from slug tests performed in wells screened in this unit may not be accurate assessments of the "bulk" conductivity of this unit.

Based on review of MDEQ files, river level elevations range from 572.39 to 576.96 ft above mean sea level. The variation in river levels may greatly influence the water level elevation in the uppermost water-bearing zone.

2.3 CONTAMINANT CHARACTERIZATION

Table 1-1 summarizes the highest contaminant concentrations detected in groundwater above applicable criteria during quarterly sampling of wells MW-A through MW-M, PZ-1 through PZ-6, SMW-1, SMW-2, SMW-6, and SMW-8 performed from March 1999 through January 2000. As shown on this table, numerous contaminants are present in groundwater at concentrations exceeding the Part 201 GSI criteria (and in some cases the GSI criterion is

exceeded by a number of orders of magnitude). Non-aqueous phase liquids (NAPLs) have been observed in some of these wells (MW-M, and MW-F).

3.0 DATA GAPS

The following is a discussion of data gaps identified thus far. Additional data gaps may be identified as further field investigations are performed.

3.1 PHYSICAL WELL DATA

There is some uncertainty with respect to well construction because of poor documentation and conflicting information. The soil boring and well construction logs for wells MW-K, MW-L, MW-M are of poor quality which creates uncertainty concerning the well completion depths. Because of this uncertainty, some of the data obtained from these wells is questionable.

Also, well design problems affect the data obtained from some of the wells. The screened length and completion depth of wells MW-A through MW-M is inadequate in most instances for monitoring potential NAPL and contaminants present near the top of the water table or the bottom of the fill unit.

3.2 TYPE AND EXTENT OF FILL

Historical documentation is vague as to the extent and nature of the fill material. Because this layer is the most likely contaminant source, it is necessary to determine its composition and lateral limits. In addition, previous investigations did not provide sufficient information to determine the extent of the fill present beneath the water in Trenton Channel.

3.3 GROUNDWATER FLOW

Based on available file information, groundwater flow direction at the site is unclear for several of the stratigraphic units. The existing network of monitoring wells is insufficient to assess the groundwater flow direction in most of the stratigraphic units present at the site. Figure 1-2 shows the locations of the existing wells and indicates the stratigraphic unit each well is screened in. Screen depths are also shown on Figure 1-2 based upon data provided by BASF.

Based on the well coverage for each unit, only the upper water-bearing zone has enough wells to construct a potentiometric surface map. The limited available data suggests that groundwater flow in the upper water-bearing zone is towards the Trenton Channel. However, additional wells in the upper water-bearing zone would be useful to further evaluate groundwater flow direction. Additional characterization of the stratigraphic units at the site will provide useful information to further assess the groundwater flow direction and the GSI pathway.

3.4 EXTENT AND NATURE OF CONTAMINATION

The following are data gaps pertaining to the extent and nature of site contamination:

- An insufficient network of monitoring wells is present at the site to evaluate potential remedial technologies.
- Insufficient soil sampling analytical data are available to assess potential remedial technologies.

3.5 AQUIFER PROPERTIES

Previous investigations included limited analyses of aquifer properties. Rising head slug tests and variable head permeability tests were performed on a number of wells screened in the upper, middle, and lower water-bearing zones. However, because hydraulic conductivity is a key parameter in assessing potential remedial technologies, additional aquifer testing is necessary. Furthermore, if a treatment technology involving groundwater collection is selected, a pumping test should be performed to further evaluate aquifer parameters.

3.6 RIPRAP LEACHING POTENTIAL

Additional riprap sampling is necessary because the procedure used by URSGWC to determine the leachability of the riprap at this site was not documented and the sampling method is not reported.

4.0 SCOPE OF WORK

To address the above data gaps, and to gather additional information needed to evaluate an appropriate interim response alternative, the following investigation tasks will be performed.

All procedures listed in the following sections must follow the field procedures presented in Appendix A and MDEQ procedures and guidance. Alternative procedures can be followed, but they must be presented to the MDEQ in writing for MDEQ review and approval prior to implementation, and they must follow a "standardized" industry acceptable procedure detailed by the ASTM or other organization.

4.1 SITE SURVEY

The base map provided as part of this Scope of Work (Figure 1-2) was prepared by digitizing maps prepared by Neyer, Tisco, and Hindo, LTD (1979) and URS Geiner Woodward Clyde (1999). During a meeting between BASF, MDEQ, and Malcolm Pirnie on May 25, 2000, a map showing a number of additional "hand drawn" site features was provided to MDEQ by BASF. Additional site features identified on this map include a steel sheeting sea wall, a gravel drive, new capped areas, and poplar tree areas. A survey will be performed because an accurately surveyed base map showing the location of significant site features is not available. Site features, well top-of-casing elevations and locations, and topography will be surveyed by a licensed surveyor. Locations will be surveyed relative to state plane coordinates and elevations will be surveyed to a U.S.G.S. vertical datum. In addition, an inventory of existing monitoring wells, an inspection of each well for damage or vandalism, measurement of water level, measurement of the total depth in each well, and an identification of surficial structures that may affect runoff/discharge and/or infiltration will be performed.

4.2 GEOPHYSICAL SURVEY AND TEST PITS

A magnetic and electromagnetic geophysical survey will be conducted to help delineate the horizontal extent of the fill (not including fill extending into the Trenton Channel) and to provide vital information about the nature and depths of materials buried at the site. The procedure for performing the geophysical survey is presented in Appendix A.

Up to six test pits will be excavated to evaluate and describe fill materials where geophysical anomalies are identified. Fill will not be removed for disposal during the test pitting activities. Up to four samples of soil, chemical waste, or other materials may be collected from each of the pits for laboratory analysis (up to 24 total samples). The analysis will include a library search and analysis for the following:

- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Phenols
- Total Cyanide (CN^-)
- Michigan 10 Metals + new mercury method (if available)
- Polychlorinated biphynols (PCBs)
- Ammonia (NH_3)

Soil samples collected for VOC analysis will be preserved in the field using the procedure referenced under Methanol Preservation Soil Sampling (Appendix A).

Analytical methods for the above listed analyses must meet target detection limits (TDLs) established by the MDEQ in Operational Memorandum No. 6, dated November 5, 1998. The procedures for the geophysical survey, test pitting, and methanol preservation soil sampling, and sample handling and management are presented in Appendix A.

4.3 MONITORING WELLS

Monitoring wells will be drilled using 4¼-inch inner diameter (ID) hollow stem augers (HSA) at the 31 proposed locations shown on Figure 1-2 to develop additional data needed to assess potential interim response technologies. In conjunction with existing monitoring wells, these wells will be used to monitor contaminant concentrations in each stratigraphic unit, evaluate aquifer properties, and determine groundwater flow in each stratigraphic unit. Stratigraphic data collected during drilling will aid in the development of more detailed cross-sections, provide data about the physical soil properties of each stratigraphic unit, and provide information necessary to evaluate potential contaminant migration pathways.

Nested wells consisting of one shallow and one or more deeper wells will be installed at several locations. Five deep wells will be installed using a double-cased well installation method, to eliminate potential migration of site contaminants from the upper to the lower water-bearing units. The proposed drilling program including drilling depths, well-screen intervals,

sampling intervals, and notes pertaining to well installation is summarized in Table 1-2. Soil and/or interstitial water samples will be collected according to the protocol outlined in Table 1-2. Each sample will be submitted to the MDEQ laboratory and analyzed for:

- VOCs
- SVOCs
- Phenols
- CN^-
- Michigan 10 Metals + Mercury
- PCBs
- NH_3

Soil samples collected for VOC analysis will be preserved in the field using the procedure referenced under Methanol Preservation Soil Sampling (Appendix A).

Analytical methods for the above listed analyses must meet target detection limits (TDLs) established by the MDEQ in Operational Memorandum No. 6, dated November 5, 1998. In addition, soil samples will be collected for stratigraphic description purposes according to the protocol outlined in Table 1-2.

If solid wastes are encountered during drilling, samples of the wastes will be collected and submitted to the MDEQ laboratory for a library search to identify unknown compounds in the waste. Groundwater level and free product measurements will be made in the monitoring wells to determine groundwater flow direction in each water-bearing zone and to evaluate the occurrence and thickness of NAPL.

Drilling and well construction, split spoon sampling, well development, water level measurement, and free product level measurement, are presented in Appendix A.

4.4 OFF-SHORE SOIL BORINGS

Off-shore borings will be drilled along four transects shown on Figure 1-2 using a barge mounted drill rig. Each transect will consist of four borings oriented perpendicular to shore, spaced approximately 25 ft apart. The borings will be drilled using 4¼-inch HSA into the river bottom until 2 ft of native clay is encountered. At each boring in which fill material is encountered, one sample will be collected from the fill material, using a split-spoon sampling device. The fill sampling depth will be determined in the field and approved by MDEQ. The fill

samples will be submitted to the MDEQ laboratory for analysis of the analytes described in Section 4.3. These borings will provide information about the extent and nature of fill material extending into the Trenton Channel. The off-shore soil boring drilling and split spoon sampling protocol is summarized in Table 1-2. The split spoon sample method is presented in Appendix A.

4.5 GROUNDWATER AND NAPL SAMPLING

The new and existing monitoring wells will be sampled to assess groundwater contamination and presence of NAPL, and to provide additional data needed to evaluate potential treatment technologies. The groundwater samples will be submitted to the MDEQ laboratory for: VOCs, SVOCs, phenols, total CN^-, Michigan 10 Metals plus mercury, PCBs, and NH_3.

Additionally, six groundwater samples selected by MDEQ will be submitted to the MDEQ laboratory for analysis of parameters that influence the effectiveness and cost of treatment technologies. These analytical parameters are as follows:

- pH
- Eh
- Dissolved oxygen (DO)
- Conductivity
- Total dissolved solids (TDS)
- Reduced Iron (Fe^{2+})
- Total iron
- Dissolved iron
- Manganese
- Hardness
- Alkalinity (as CO_3^{2-} and HCO_3^-)
- Chemical oxygen demand (COD)
- Total organic carbon (TOC)
- Sulfate (SO_4^{2-})
- Chloride (Cl^-)
- Nitrate (NO_3^-)
- Phosphate (PO_4^{3-})
- Total Suspended Solids (TSS)
- Biochemical Oxygen Demand (BODs)

Analytical methods for the above listed analyses must meet target detection limits (TDLs) established by the MDEQ in Operational Memorandum No. 6, dated November 5, 1998. The procedure for groundwater sampling is presented in Appendix A.

4.6 AQUIFER PROPERTIES

Slug tests will be performed in each of the new monitoring wells (total of 31 wells) to estimate hydraulic conductivity. A total of three slug tests per well will be performed. The estimated hydraulic conductivity data will be used to assess flow velocities, contaminant migration pathways, and potential remedial technologies. Slug testing procedures are presented in Appendix A.

4.7 RIPRAP LEACHING POTENTIAL

Five samples of the concrete riprap will be collected and submitted to the MDEQ laboratory for analysis of PCBs and mercury using methods outlined in the Michigan Department of Natural Resources interoffice communication MERA Operational Memorandum #12, Revision #2 dated January 5, 1995. Samples will be collected with an appropriate rock coring device. The coring procedure is presented in Appendix A.

4.8 BENCH SCALE TESTING

Bench scale tests will be performed to provide data needed to assess treatment technologies. Bench scale testing should be performed to 1) assess solidification technologies, 2) assess treatment of potential extracted water, and 3) assess compatibility of potential wall materials (sheeting piling, bentonite slurry, vinyl walls, etc.) with site specific contaminants. After completion of the field activities described in Sections 4.1 through 4.7 modifications to the bench scale testing may be made. In addition, the specific methodologies for bench scale testing will be specified at that time.

TABLES

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported (ug/L)
March 1999 through January 2000

Compound Name	Mixing Zone[1] or GSI[2] Criteria	Maximum Concentration	Well ID									
			MW-A	MW-B	MW-C	MW-D	MW-E	MW-F	MW-G	MW-H	MW-I	MW-J
1,2-Dichlorobenzene	16[2]	20	20									
1,2-Dichloroethane	6[2]	150		18		150	54J					
1,2-Dichloropropane	9.1[2]	46	37	46	35	24J						
2,4,6-Trichlorophenol	5[3]	97	14	97	69						9.5T	
2,4-Dichlorophenol	19[2]	2,400		2,400	75		200					55T
2,4-Dimethylphenol	160[1]	840		840	320	400	210					
2-Chlorophenol	22[2]	58		58	52							
Acenaphthene	19[2]	50		50	22							
Ammonia	12,000[1]	86,700	12,200	21,000	19,300	33,600						31,600
Arsenic	680[1]	14,290DL		1,200	1,060	14,290DL	11,400			290	1,300	
Barium	190[2]	480			480					270		440
Carbazole	10[3]	360		360		51						20
Chloride	50,000[4]	2,250,000	833,000	2,120,000	1,310,000	756,000	248,000		191,000	2,250,000		237,000
Cyanide (total)	20[3]	110,000	1,300	5,510	4,470	11,100	8,140	180		3,840	560	1,800
Ethylbenzene	18[2]	52		52		23						
Fluoranthene	1.6[2]	640		640	220	140	44					47
Fluorene	12[2]	360		360	120	44						36
Lead	820[1]	1,130					1,130					
Mercury	0.0013[1]	1,440	7.7	126	35.3	1,100	1,440		0.4	4	3.5	133
Naphthalene	200[1]	1,500		1,500	980	390						440
PCBs (total)	0.00012[1]	309J	0.075T	309J	40J	17.1J	5.7J				0.97	0.25J,T
Pentachlorophenol	17[1]	320	34	300	240	220	110T					
Phenanthrene	43[1]	120,000T *		1,200	320	180	57					100
Selenium	5[2]	28		14	7.9DM	7.3	5.5		9.6	28		5.2DM
Silver	0.2[2]	2.5							2.5			
Sodium	160,000[5]	15,900,000	2,550,000	8,580,000	3,590,000	10,200,000	912,000		1,300,000	6,070,000	1,390,000	6,990,000
Vinyl chloride	15[2]	96				96	24T					
Xylenes	35[2]	111		50								

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported (ug/L)
March 1999 through January 2000

Compound Name	Mixing Zone[1] or GSI[2] Criteria	Maximum Concentration	Well ID												
			MW-K	MW-L	MW-M	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5	PZ-6	SMW-1	SMW-2	SMW-6	SMW-8
1,2-Dichlorobenzene	16[2]	20													
1,2-Dichloroethane	6[2]	150													
1,2-Dichloropropane	9.1[2]	46													
2,4,6-Trichlorophenol	5[3]	97													
2,4-Dichlorophenol	19[2]	2,400													
2,4-Dimethylphenol	160[1]	840							240		300				
2-Chlorophenol	22[2]	58													
Acenaphthene	19[2]	50													
Ammonia	12,000[1]	86,700	51,000								12,700		19,000	86,700	
Arsenic	680[1]	14,290DL													
Barium	190[2]	480													
Carbazole	10[3]	360													
Chloride	50,000[4]	2,250,000	1,520,000	261,000											
Cyanide (total)	20[3]	110,000	110,000	360		1,520	1,510	114	1,930	7,760	2,690	1,290	651	4,400	
Ethylbenzene	18[2]	52													
Fluoranthene	1.6[2]	640	13												
Fluorene	12[2]	360							15	13	21				
Lead	820[1]	1,130													
Mercury	0.0013[1]	1,440	72.8	2.1		15.5	11.4	0.2	57.5	41.6	211	2.2	1.4	1.2	0.4
Naphthalene	200[1]	1,500	11			56	99		46	14	210		3.5		
PCBs (total)	0.00012[1]	309J	0.66T												
Pentachlorophenol	17[1]	320	38			110	80		210	20	320				
Phenanthrene	43[1]	120,000T *			120,000T *				69	43	55				
Selenium	5[2]	28	10												
Silver	0.2[2]	2.5													
Sodium	160,000[5]	15,900,000	15,900,000	694,000											
Vinyl chloride	15[2]	96													
Xylenes	35[2]	111					39				111				

Table 1-1
BASF Riverview Site
Analytes Detected in Groundwater Above GSI or Applicable Criteria
Maximum Concentrations Reported in (ug/L)
March 1999 through January 2000

Notes:

1- Mixing zone concentrations based on values calculated using Rule 57 of the Part 4 Water Quality Standards.
Source: Tables 1 and 2 from MDEQ interoffice communication from Sara Bonnette to Daniel Schultz dated June 15, 1999.

2- GSI criteria obtained from Revised Part 201 Operational Memorandum #18 Cleanup Criteria Tables, dated May 28, 1999.

3- TDL = target detection limit. GSI criteria defaults to TDL because GSI is less than the target detection limit.

4- The GSI criteria for Chloride (50,000 ug/l) was obtained from the MDEQ Toxicology Department on April 10, 2000. This value is not currently listed on the Part 201 Operational Memorandum #18 Tables. However, according to the MDEQ, the value will be listed in the next revision of the memorandum.

5- The criteria listed for Sodium is the Residential and Commercial I Drinking Water Value obtained from the Part 201 Operational Memorandum #18 Cleanup Criteria Tables, dated May 28, 1999. According to the MDEQ Toxicology Department, GSI criteria is not expected to be established for Sodium. This value is listed for general reference only.

* Only analytes with concentrations exceeding GSI or Mixing Zone criteria are reported. Other detected analytes (except for sodium) are not reported on this table.

* Values reported are the highest encountered concentrations during the sampling period (March 1999 - January 2000) using results from MDEQ analysis and BASF analysis.

* Blank cells indicate the analyte has not been detected over GSI or Mixing Zone criteria

* Laboratory data qualifiers are as follows:

  NA = not available
  * = reported concentration is from a sample of NAPL
  DM = indicates that a dilution was required due to matrix interference
  DL = indicates that the sample was analyzed using a dilution
  J = indicates an estimated value
  T = indicates that the value reported is less than the criteria of detection

Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

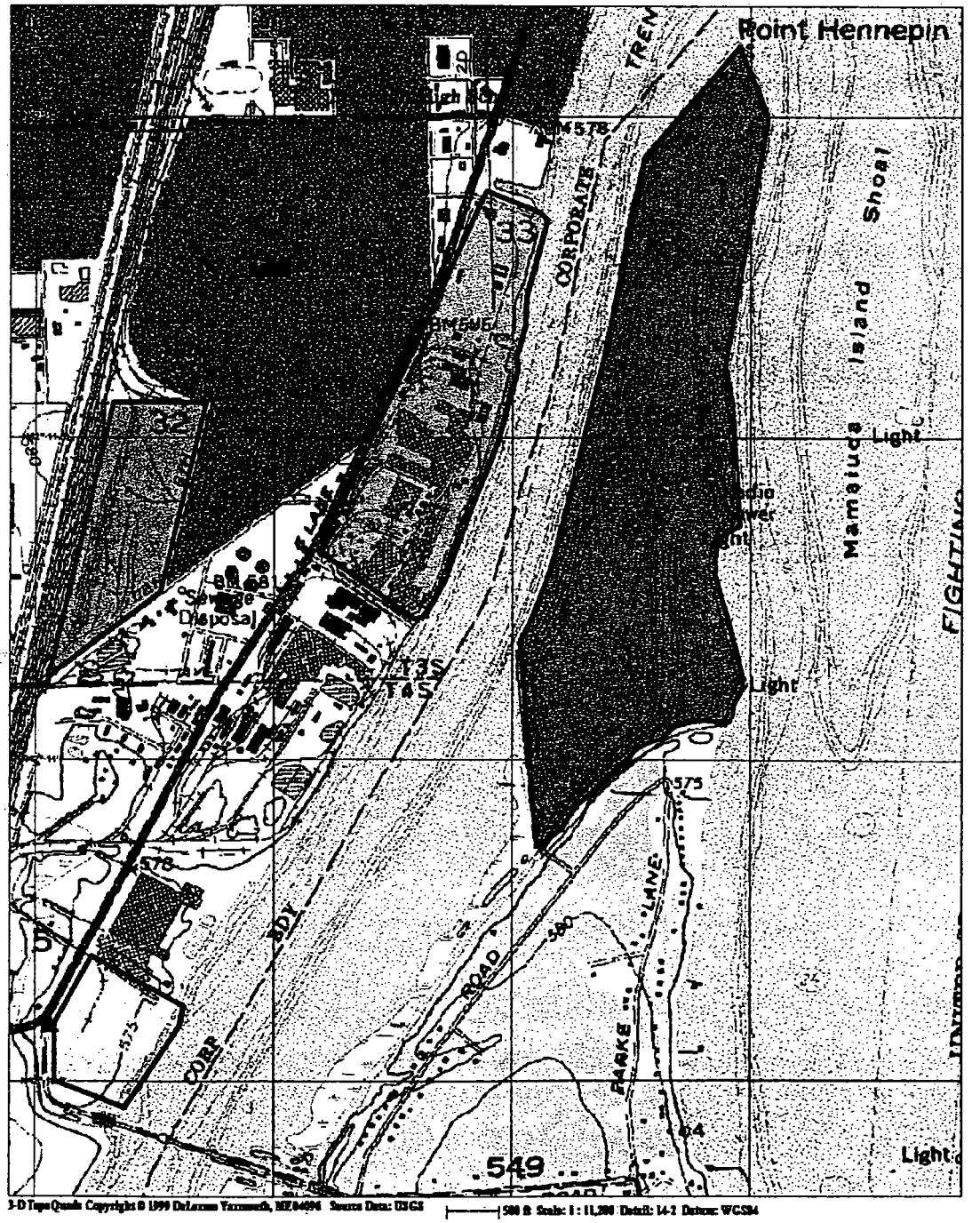
Proposed Well ID	Location of Monitoring Well Screen[A]	Screen Length	Stratigraphic Sampling	Analytical Sampling[B]	Notes
MW-1s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-2s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-2i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-2d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-3s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-3i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-4s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-4i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-4d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-5s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-5i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-6s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-6i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-6d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-7s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-8s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-8i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-8d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-9s	Saturated thickness of fill	5-7 feet	None[C]	-	
MW-9i	Approximately 12-17 feet below grade	5 feet	None[C]	-	
MW-9d	Approximately 20-25 feet below grade	5 feet	Continuous split spoon sampling	6 soil/interstitial water samples	Double cased 3 ft into competent clay
MW-10s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-11s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-12s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-13i	Approximately 12-17 feet below grade	5 feet	Continuous split spoon sampling	3 soil/interstitial water samples	
MW-14s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-15s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-16s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-17s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-18s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
MW-19s	Saturated thickness of fill	5-7 feet	Continuous split spoon sampling	1 soil sample	
SB-1	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-2	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-3	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-4	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-5	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay

Table 1-2
BASF Riverview Site
Proposed Drilling and Well Installation Program

Proposed Well ID	Location of Monitoring Well Screen[A]	Screen Length	Stratigraphic Sampling	Analytical Sampling[B]	Notes
SB-6	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-7	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-8	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-9	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-10	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-11	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-12	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-13	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay
SB-14	NA	NA	Continuous split spoon sampling	1 sediment sample	Drill 2 feet into native clay

Notes:
[A] = All final well completion depths and screen lengths are subject to MDEQ approval prior to completion.
[B] = Soil samples will be collected in the vadose zone and interstitial water samples will be collected below the water table.
[C] = Stratigraphic samples will not be collected at this location because continuous sampling will be completed at an adjacent deeper well in the cluster.
NA = Not Applicable

FIGURES



N

- ☐ = Riverview
- ▒ = Central Avenue
- ▒ = Southworks
- ■ = Point Hennepin

MALCOLM PIRNIE

MALCOLM PIRNIE ENGINEERS, LLP
EAST LANSING, MICHIGAN

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Site Location Map

BASF MULTI-SITES | Figure 1-1

FIG 1-2 ①

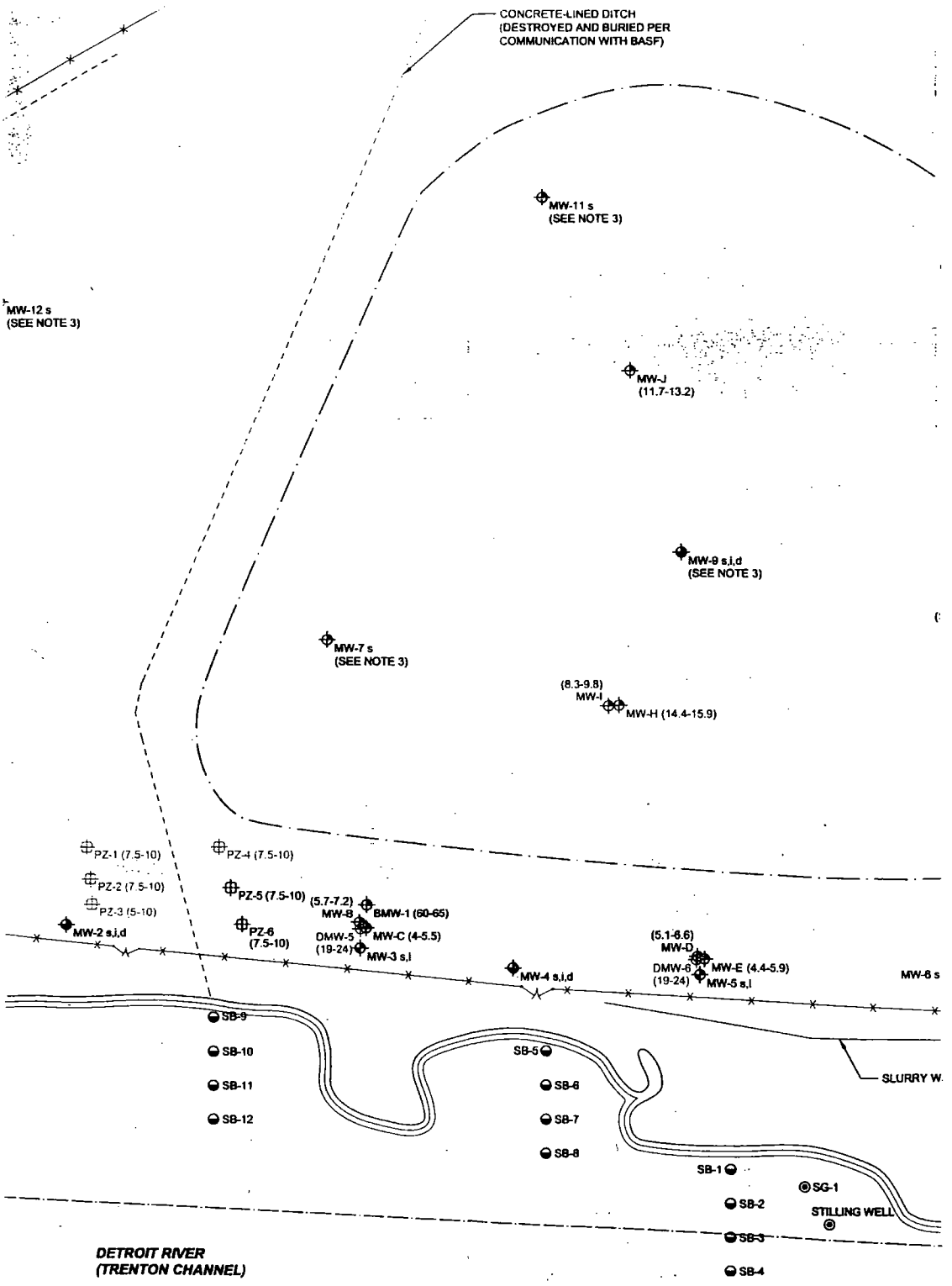

CONCRETE-LINED DITCH
(DESTROYED AND BURIED PER
COMMUNICATION WITH BASF)
MW-11 s
(SEE NOTE 3)
MW-12 s
(SEE NOTE 3)
MW-J
(11.7-13.2)
MW-9 s,i,d
(SEE NOTE 3)
MW-7 s
(SEE NOTE 3)
(8.3-9.8)
MW-I
MW-H (14.4-15.9)
PZ-1 (7.5-10)
PZ-4 (7.5-10)
PZ-2 (7.5-10)
PZ-5 (7.5-10)
PZ-3 (5-10)
(5.7-7.2)
MW-8
BMW-1 (60-65)
MW-2 s,i,d
PZ-6
(7.5-10)
DMW-5
(19-24)
MW-C (4-5.5)
MW-3 s,i
(5.1-6.6)
MW-D
DMW-6
(19-24)
MW-E (4.4-5.9)
MW-5 s,i
MW-4 s,i,d
MW-6 s
SB-9
SB-10
SB-11
SB-12
SB-5
SB-6
SB-7
SB-8
SLURRY W
SB-1
SG-1
SB-2
STILLING WELL
SB-3
SB-4
DETROIT RIVER
(TRENTON CHANNEL)

FIG 1-2

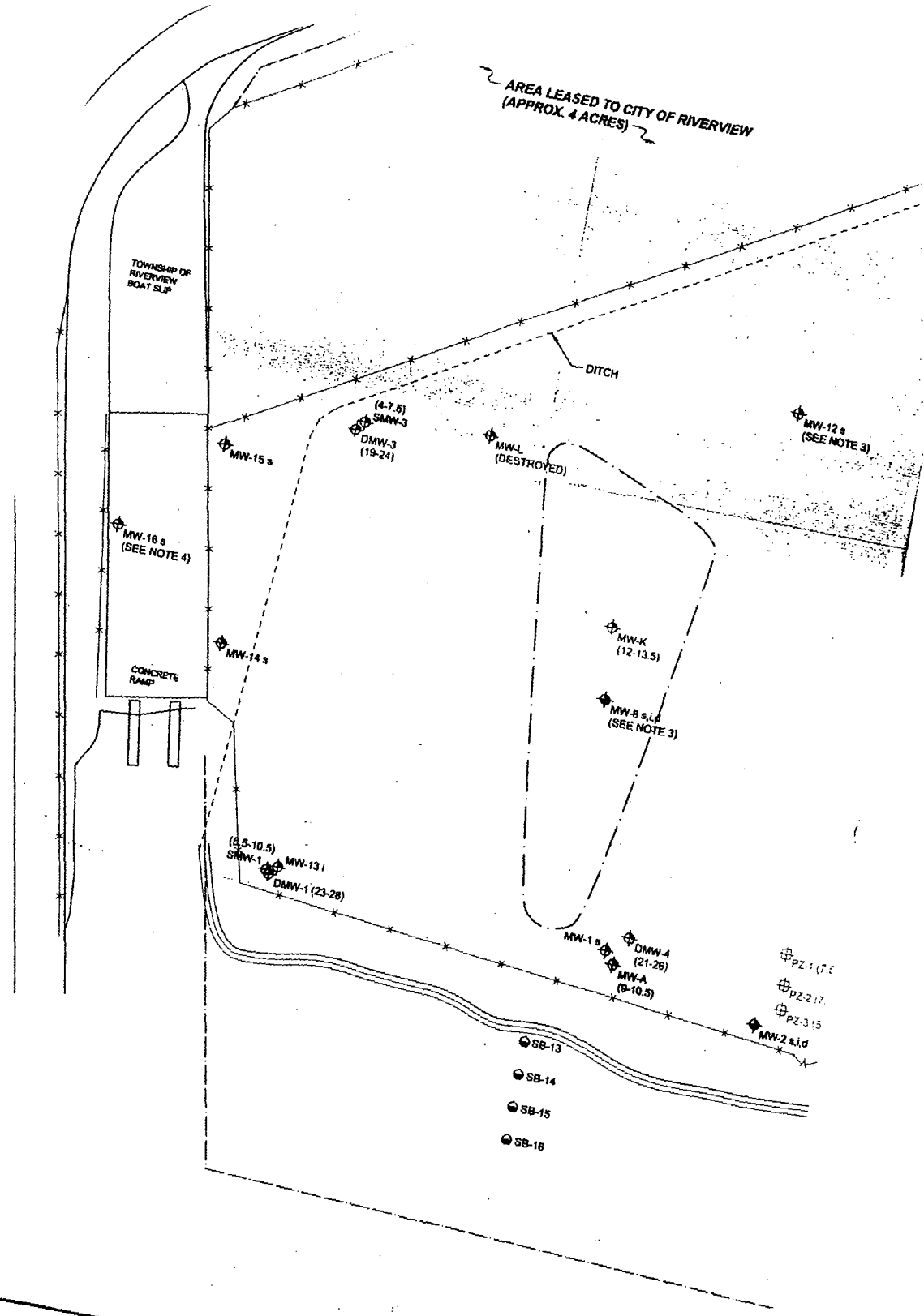
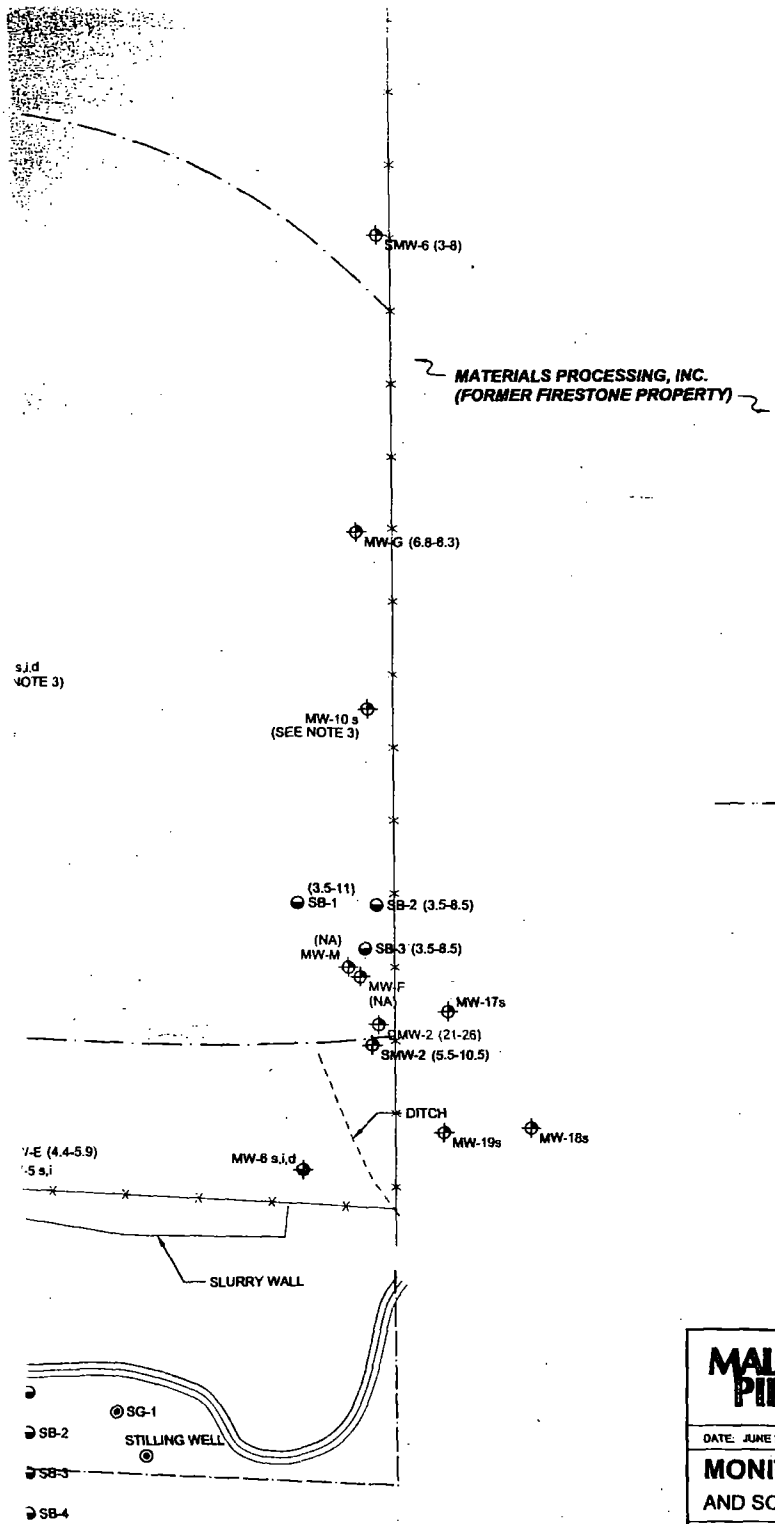

AREA LEASED TO CITY OF RIVERVIEW
(APPROX. 4 ACRES)
TOWNSHIP OF RIVERVIEW BOAT SLIP
DITCH
(4-7.5)
SMW-3
DMW-3
(19-24)
MW-15 s
MW-L
(DESTROYED)
MW-12 s
(SEE NOTE 3)
MW-16 s
(SEE NOTE 4)
MW-14 s
CONCRETE RAMP
MW-K
(12-13.5)
MW-8 s,i,d
(SEE NOTE 3)
(5.5-10.5)
SMW-1
MW-13 i
DMW-1 (23-28)
MW-1 s
DMW-4
(21-26)
MW-A
(9-10.5)
MW-2 s,i,d
SB-13
SB-14
SB-15
SB-16

Fig 1-2 (3)



LEGEND

- MONITORING WELL - SINGLE - PROPOSE
- MONITORING WELL - CLUSTER OF THRE
- MONITORING WELL - CLUSTER OF FOUR
  - s=SCREENED IN FILL UNIT
  - i=SCREENED IN SAND, PEAT, OR UPPI
  - d=SCREENED IN LOWER CLAY UNIT
- SOIL BORING - PROPOSED
- MONITORING WELL SCREENED IN LOWE
- MONITORING WELL SCREENED IN UPPEI
- MONITORING WELL SCREENED IN LIMES
- MONITORING WELL SCREEN STRADDLIN
- MONITORING WELL SCREEN IN UNKNOW
- SHALLOW SOIL BORING/MONITORING WE
- SHALLOW SOIL BORING/TEMPORARY WE
- SHALLOW SOIL BORING/TEMPORARY WE MULTIPLE UNITS (SEE NOTE 1)
- PIEZOMETER SCREENED IN SAND UNIT
- PIEZOMETER SCREENED IN PEAT UNIT
- PIEZOMETER STRADDLING MULTIPLE UN
- STILLING WELL/STAFF GAUGE
- LIMITS OF 24" THICK COMPACTED CLAY C

(10-15) SCREENED INTERVAL IN FEET BELOW GF IN BORING LOGS AND INFORMATION PRO

(NA) SCREENED INTERVAL NOT AVAILABLE (SE

NOTES

1. SMW-2 SCREENED IN SAND AND UPF
   PZ-5 SCREENED IN SAND, CLAY, A
   PZ-5 SCREENED IN CLAY AND PEA
   DMW-1 SCREENED IN LOWER CLAY A
   SB-1 SCREENED IN FILL AND CLAY

2. UNIT(S) WELL IS SCREENED IN IS/ARE U WELL CONSTRUCTION LOGS AND LACK O

3. PROPOSED LOCATIONS MAY CHANGE AND TEST PIT INVESTIGATIONS.

4. WELL WILL BE COMPLETED WITH A FLU PROTECTIVE CASING.

5. BASE MAP SOURCE: DRAWINGS FROM (1979) AND URS GREINER WOODWARD CL

6. THIS DRAWING MAY BE REPRODUCED MICHIGAN OR ITS AUTHORIZED REPRESEN

MALCOLM PIRNIE

DATE: JUNE 2000 PATH/FILENAME: \3940014\DWG\BACOMP DW

MONITORING WELL LOCATIONS
AND SCREENED INTERVALS

BASF RIVERVIEW SITE
RIVERVIEW, MICHIGAN

APPENDICES

APPENDIX A
FIELD PROCEDURES

TECHNICAL MEMORANDUM GUIDANCE

At the conclusion of field activities, a Technical Memorandum should be prepared to summarize the scope of the investigation activities, and to document the findings of the investigation. At a minimum, the Technical Memorandum should include the following information:

1. Text describing the work performed.

2. Tables which summarize the following:
   - Northing and easting coordinates, and ground surface elevations, for site features created or installed during this phase of the investigation, including, but not limited to, test pits, monitoring wells, off-shore boring transects, and rip-rap sample locations. In addition, the surveyed elevation of the PVC riser casing will also be included for all monitoring wells installed during this phase of investigation.

   - Northing and easting coordinates, and ground surface elevations at all previously existing site features specified in Section 4.1, including, but not limited to existing monitoring wells, the steel sheeting sea wall, the gravel drive, the capped areas, the poplar tree areas, the rip-rap, and the Trenton Channel. In addition, the surveyed elevation of the PVC riser casing will also be included for all previously existing monitoring wells.

   - The identification, date and time of excavation, and dimensions of each test pit, plus a thorough description of the contents of each test pit, including, but not limited to, PID readings, soil descriptions, observed staining, drums, and detected odors. If any samples are collected from the test pits for laboratory analysis, the sample identification, a physical description of sample, and a description of the sample collection location will be included on the table.

   - The physical properties of previously installed monitoring wells, including, but not limited to, the material used in construction of the well (PVC, stainless steel, or galvanized steel) the inner diameter of well, and the total depth.

   - The physical properties of newly installed monitoring wells, including, but not limited to the following: date of installation, name of drilling subcontractor, diameter and type of auger used for drilling, total depth of boring, depth of screened interval, length of well screen, screen slot size, the material used in construction of the well (PVC, stainless steel, or galvanized steel) and inner diameter of well.

- Analytical results of all soil, groundwater, fill, and rip-rap samples submitted for laboratory analysis. Any data qualifiers noted by the analytical laboratory must be presented, and the tables must include definitions of all data qualifiers.

- Calculated hydraulic conductivity values from each of the slug tests at each of the wells (a minimum of three slug test trials per monitoring well).

- Water and free product level measurements, and potentiometric surface elevations.

3. Figures which summarize the following:
   - A base map illustrating site features located during the site surveys. The base map will include test pits, transect locations, all previously existing and newly installed monitoring wells, rip-rap, the Trenton Channel and other site features specified in Section 4.1.

   - Two stratigraphic cross-sections of the site, based on surveyed ground surface elevations, and illustrating the depths and thicknesses of the fill, sand, clay, and limestone units.

   - A potentiometric surface figure illustrating the elevation of the upper water table in the fill and sand units.

4. Appendices should include the following:

   - All boring logs and well construction logs prepared during drilling and monitoring well installation.

   - All water level data recorded by the pressure transducers during slug testing.

   - All graphs used for calculating hydraulic conductivities at each newly installed monitoring well.

   - Photographs of the test pit excavation, including photographs of buried materials, as specified in the procedure for Test Pitting (Appendix A).

INTRODUCTION

The following geophysical survey methods will be followed to locate subsurface anomalies that may represent buried bulk wastes, buried steel containers and metallic objects.

METHODOLOGY

Two geophysical survey methods are available for subsurface examination; Electromagnetics (EM) and Magnetometry (MAG). The following paragraphs describe the methods:

Electromagnetics
EM is utilized to identify conductivity and inphase (metal) anomalies that may indicate buried bulk wastes and subsurface metallic objects. Buried metallic materials may signify steel drums, tanks, paint cans or other containers that may contain hazardous wastes. Based on the distribution of these anomalies, compared to natural soil conditions, the boundary of the landfill can be mapped.

Several electromagnetic instruments are available for EM surveys. For the purpose of this study, a portable EM unit such as a Geonics EM-31 should be used. The EM-31 allows for an investigation depth of 20+ feet, can be operated by one man, and can easily be outputted to a recorder for near-continuous profile coverage.

The EM induction method measures the electrical properties of materials in the subsurface including soil, rock, groundwater and buried objects. An alternating current in the EM transmitter coil creates a primary magnetic field that induces electrical current loops in the ground. The current loops, in turn, create a secondary magnetic field (produced by currents in the earth). The primary and secondary magnetic fields induce a corresponding alternating current in the EM receiver coil where the magnitude and relative phase of the secondary field can be measured. These measurements are then converted to components of inphase and 90 degrees out-of-phase with the transmitted field. The out-of-phase (or quadrature-phase) component is then converted to a measure of apparent ground conductivity. This apparent conductivity is an estimate of the average conductivity of the ground in the proximity of the instrument. The inphase output of the EM-31 is a semi-quantitative signal representing the metallic nature of nearby targets (small targets are effectively filtered out of the signal). For this reason, the inphase signal can be a good measure of large targets such as steel drums and tanks.

Both the quadrature and inphase data can be recorded in analog or digital form on two channel, battery powered recorders. Conductivity is typically recorded in milliSiemens/meter (mS/m) and inphase data in parts per thousand (ppt).

Data quality of the quadrature signal may be degraded by the presence of structures such as steel fences, utility lines or other large metallic objects. EM surveys in the presence of these types of objects may cause negative values in the quadrature data.

Magnetometry

A magnetometer is designed to measure the intensity of the earth's magnetic field. Variations or disturbances in this relatively uniform field may be caused by the natural distribution of iron oxides within the underlying soil and rock or caused by the presence of buried iron or steel objects. Distortions of the earth's magnetic field cause higher and lower readings on different sides of the buried object. The larger the mass of the buried object or the combined mass of many objects in contact with one another, the greater the distortion (magnetic anomaly).

Factors that may influence the response of the magnetometer include the size, shape, orientation and the state of deterioration of the object(s). Accordingly, the magnetic responses of buried objects may vary over a wide range, making quantitative analysis of the data difficult. However, semi-quantitative information may be used to assess the general nature of any buried ferrous materials (a magnetometer does not respond to non-ferrous metals such as aluminum, copper, tin and brass).

The earth's magnetic field intensity changes hourly and daily with sunspots and ionospheric conditions (diurnal effects). These variations produce unwanted noise and can affect local magnetic measurements. Older field techniques used a base station, to which changes in the instruments readings were frequently compared and used in correcting the data. A more efficient way to minimize these effects is to use two sensors mounted vertically with one another, measuring changes in the magnetic field simultaneously. This technique records the gradient field, completely canceling out any large uniform, diurnal variations. This instrument is called a gradiometer magnetometer and may be used in discrete station or continuous profile measurement modes. The continuous profile mode provides more data and greater flexibility.

Magnetic data signals can be recorded using either analog or digital methods. Analog methods provide real-time evaluation of the data as it is collected; digital methods provide the advantage of recording large data sets for ease in entering the data into a computer for processing. Gradient magnetic data are typically recorded in units of nanoteslas per foot.

DATA ACQUISITION

To begin data collection, a reference survey grid must be set up in the area of concern. Initially a grid origin (000E/000N) is established (typically in the southwest corner of the area to be investigated) and grid lines are then spaced at 20 foot intervals from that point. Areas where more detailed data is desired may be divided into 10 foot sections. Colored pin flags can be placed or spray paint can be used to mark interval lines. Once the grid is established, electromagnetic and magnetic readings can begin. The following paragraphs identify the process by which data is recorded for both methods:

Electromagnetics
EM readings should be collected on east-west survey lines (20 feet apart) over the entire gridded area. Along each line, both quadrature and inphase information should be collected at sampling intervals of 2.5 feet and logged on a digital recorder for future data processing. Data should be collected in a manner such that large metal containing objects are avoided (such as fences, machinery, or monitoring wells). EM data should be periodically downloaded to a portable field computer to ensure data integrity.

Magnetometry
MAG readings should be collected just as EM readings – along east-west lines (spaced 20 feet apart) at 2.5 foot sampling intervals. During the MAG survey, gradient and total magnetic field measurements should be recorded and the magnetic sensors should be kept at least 2 feet above ground to minimize unwanted effects from surface objects. As with the EM survey, MAG data should be periodically downloaded to a portable field computer to ensure data integrity.

RESULTS AND INTERPRETATION

Following site surveys, results should be processed, gridded, contoured and plotted using software such as Surfer and combined with a site map to present the data. Figures presenting conductivity and inphase contour results, magnetic gradient and total magnetic field results should be provided for interpretation of subsurface anomalies.

TEST PITTING

INTRODUCTION

This procedure will be performed to evaluate areas of geophysical anomalies and buried wastes.

METHODOLOGY

Test pits will be excavated in the vicinity of anomalies identified during the geophysical survey. Initial test pit dimensions will not exceed six feet wide by 10 feet deep by 100 feet long. If necessary, however, test pit volumes may be expanded up to 50%, as needed to define the extent of drum caches. The procedures for test pit installation will be as follows:

a. Locate and stake the test pit relative to the identified EM anomaly.

b. Using a backhoe, remove the landfill cover soils and fill material along the staked transect to an estimated depth of 6-10 feet below ground level (bgl) or until native materials are encountered. The excavated soil shall be piled along the side of the test pit on plastic sheeting to preclude the risk of contaminating surface soils. An attempt will be made to segregate the landfill cover and fill into separate piles.

c. During performance of each test pit, monitor the breathing zone for volatile organic vapors using a photoionization detector (PID). PID readings should be compared to action levels established in a site specific health and safety plan to determine the level of personal protection required.

d. Following investigation of the fill by the procedure described below, backfill the test pit with first the fill and then the cover material.

The procedure for investigating the test pit and associated fill will be as follows:

a. Visually inspect the bottom of the test pit and the soil/fill removed. Measure and record organic vapors in the test pit and in the material removed with a PID. Note any drums, metal debris, or evidence of contamination (i.e., vapors or soil staining). Take photographs to document the nature of the fill material.

b. If drums are present (i.e., visible in test pit or associated fill), note the location of the drums and how many are present. Determine if the test pit needs to be expanded in any direction to uncover additional drums. Attempt to define the dimensions of the drum cache by expanding the test pit until additional drums are not uncovered. Photograph the drums and the test pits. Note how many drums are present, the approximate dimension of the drum cache, and if there is evidence of leakage or contamination associated with the drums. Following completion of the test pit investigation, backfill the test pit as described above. Mark the approximate outline of the drum cache at the surface using stakes and/or flags.

c. If no drums are visible but metal debris is, note the location and describe the type of debris, and photograph. Backfill the test pit as described above.

d. If neither drums nor metal debris are encountered, note the type of fill, photograph, and backfill the test pit as described above.

Soil samples will be collected from up to four locations from each test pit. Up to a total of 24 soil samples will be collected. Soil samples will be collected from the backhoe bucket or from the pile of fill and soil adjacent to the excavation using a stainless steel scoopula or trowel. An attempt will be made to collect soils with the backhoe immediately adjacent to stained soils or to drums (if present). The sample handling and management procedure in Appendix A will be followed.

If drums are encountered during this investigation, the location of the drum cache(s) will be staked immediately after backfilling the test pit(s). These staked locations will be surveyed by a licensed surveyor. This data will be used to construct a map of the drum cache location(s).

METHANOL PRESERVATION SOIL SAMPLING

Soil samples submitted for VOC analysis will be preserved with methanol in accordance with the procedures outlined in the MDEQ inter-office communication dated May 1, 2000 (attached).

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

RECEIVED

MAY 0 5 2000

MALCOLM PIRNIE, INC.
EAST LANSING, MI

May 1, 2000

TO: All Environmental Response Division (ERD) District Supervisors
All ERD Section Supervisors
All ERD Unit Supervisors

FROM: Patricia Brandt, Acting Field Operations Section Chief, ERD

SUBJECT: Procedure for the Collection and Preservation of Soil Samples for Volatile Organic Analysis

The attached ERD procedure specifies procedures for sampling and preservation of soil samples collected for laboratory analysis of volatile organic contaminants. The procedure is written for use by ERD staff, or ERD contractors, collecting and submitting samples to the Department of Environmental Quality (DEQ) Lab, or ERD lab contractors. This procedure is consistent with the methanol preservation requirements of Operational Memorandum #6, Revision 5, and is appropriate for all regulatory purposes under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 Act 451, as amended.

These procedures should be identified in work plans, and sampling plans wherever sampling and analysis of volatile organic contaminants from soils will be conducted. By copy of this memorandum, these procedures are also being transmitted to all ERD Level-Of-Effort, Project Management, and Laboratory Contractors, in addition to the Michigan Environmental Laboratory Association (MELA) to assure that these contractors and laboratories are aware of these procedures.

A commercial laboratory implementing this procedure is permitted minor modifications to the procedure including sample size, procedures for addition of methanol, procedures for weighing the sample, selection of sample containers, supplies and equipment, and similar minor changes. If other procedures or modifications of the attached procedures are proposed, or if there are questions about this procedure, please feel free to contact Mr. Arvine R. Curtis, Support Services Unit, Field Operations Section, at 517-373-8389, or Ms. Carol Smith, DEQ, at 517-335-9800.

Attachment

Patty Brandt

cc: Mr. Michael Jaeger, MELA
Level-Of-Effort Contractors
Project Management Contractors
Laboratory Contractors
Mr. Bob Avery, DWRPD
Mr. Dennis Drake, AQD
Mr. Harold Fitch, GSD
Mr. David Hamilton, SWQD
Mr. Alan J. Howard, ERD
Mr. Roger Pryzbysz, STD
Mr. Jim Sygo, WMD

- Wear appropriate goggles and gloves.
- Remove a methanol tube from the wide mouth jar.
- Use scissors to cut off the top, and place the methanol into one of the pre-weighed sample vials.
- Place the cap on the vial and tighten it. Avoid over tightening.
- Place a green sticker on the top of the cap.
- Record the identification of the vial as "Methanol Field Blank", on the vial label and in the field notebook, for the appropriate cooler and sampling event.

3.5. Prior to collecting samples for a specific type of soil it may be necessary to calibrate one syringe to approximate the amount of soil needed to meet the target weight, and use that syringe as a comparison for how much sample is needed.

3.6. Place the wide mouth glass jar, used for preventing balance contamination, on the balance.

3.7. Identify the location, date, and time of sampling on the vial label. Record this information in the field log book. Other than the warning label, do not place any labels/stickers/tape and etc., on the pre-weighed sample vials.

3.8. If a methanol field blank is being used at the collection site to measure possible contamination, remove the cap from a methanol field blank prepared in 3.4 above, place the opened vial in the collection area for the approximate time it takes to collect a sample, and then cap the methanol field blank for storage and transport to the laboratory.

3.9. Place a pre-weighed VOC vial and syringe in the jar.

3.10. Record the weight in the field log book. If the balance features re-zeroing, zero the balance.

3.11. Remove the syringe. If a cap is provided, remove the cap and place it in the jar.

3.12. Insert the open end of the syringe into a fresh face of undisturbed soil and fill it as appropriate according to the calibration of the syringe (Step 3.5).

3.13. If necessary, use your gloved finger (decontaminate before next sample) or other appropriate instrument and push the soil deeper into the syringe sampler.

3.14. If a cap was provided, immediately cap the end of the syringe.

3.15. Place the syringe in the jar on the balance. Read the weight, and if necessary, subtract the weight of the syringe, vial, and jar, as appropriate, to determine the weight of the soil.

3.16. If the weight is more than the maximum amount allowed, extrude enough soil to obtain the target amount within the specified tolerance, and re-weigh. See Section 4 of this document, "Specifications for the Collection of Samples Using Methanol Preservation", for the applicable target sample size and tolerance.

3.17. Repeat steps 3.6 - 3.15 above if the weight is less than the minimum amount allowed.

3.18. Record the soil weight in the field notebook. DO NOT RECORD the weight on the sample vial label.

3.19. Remove the cap from the sample vial and place it in the jar on the balance, with the septum upwards.

3.20. Immediately remove a methanol tube from the wide mouth glass storage jar, and holding the tube upright, use scissors to cut (plastic) off one end.

3.21. Perform one of the following steps. Step a. is preferable as it minimizes the chance of spillage.

a. Insert the open end of the syringe sampler into the vial, push the plunger and extrude the soil. Immediately pour the methanol into the sample vial, being careful to avoid spillage.

b. Pour the methanol into the sample vial, taking care to avoid spillage. Insert the open end of the syringe sampler into the vial, and carefully extrude the soil, taking care to avoid spillage. Loss of several drops will not make a significant difference in the results. If a significant amount is spilled, a new sample must be collected, or the sample must be appropriately flagged to indicate estimated results.

3.22. Using a clean brush, paper towel, or other suitable material, thoroughly wipe excess soil particles from the threads and vial body. Particles left on the threads will prevent a good seal.

3.23. Place the VOC cap on the sample vial. The cap must be tight; however, over-tightening should be avoided.

3.24. Gently swirl the sample and methanol for about 10 seconds to break up the soil. DO NOT SHAKE.

3.25. Attach a green sticker on the sample vial cap to indicate a hazardous waste.

3.26. Place the sample in a plastic bag on ice in a cooler.

3.27. Using the syringe sampler, take another sample from the soil.

3.28. Cap and label the syringe with the sample identification.

3.29. Place the syringe with the sample in the plastic bag. This sample is for dry weight determination.

3.30. Decontaminate the jar/balance using standard decontamination procedures.

3.31. Unuseable methanol must be returned to the laboratory for disposal.

4. Specifications for the Collection of Samples Using Methanol Preservation

Target Soil Weight	10	- grams.
Maximum Allowed Weight	11	- grams.
Minimum Allowed Weight	9	- grams.
Methanol Volume (provided in tubes)	10	- ml.
Wide Mouth Jars (to prevent balance contamination)	4	- oz.
Wide Mouth Jars (for storing Methanol tubes)	8	- oz.
Green Sticker to Warn of Hazardous Waste:	To fit VOC Cap	
Size of VOC Sampling Vials	40	- ml.
Sub Coring Device (Syringe Sampler)	10	- ml.

5. **Health and Safety**: Methanol (Chemical Abstract Number 67-56-1) ampoules, tubes, and vials must be provided to field staff inside protective containers to hold any spillage. Methanol is a toxic and flammable liquid. Handle with proper safety precautions. Wear protective gloves. Nitrile Rubber or Viton are recommended. Avoid inhalation. Store and handle in a ventilated area, away from sources of ignition and extreme heat. Store methanol in a cool place, preferably in sample coolers on ice. This is especially important for methanol in tubes, where pressure buildup due to extreme heat may result in rupture. Vials should be opened and closed quickly during collection. In the event of eye contact, immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

6. **Shipping:** The shipping of methanol is regulated by the U.S. Department of Transportation, Title 49 of the Code of Federal Regulations. The DOT number is UN 1230. The amount of methanol used for sample preservation falls under the exemption for small quantities. Requirements for shipment of samples by common carrier are as follows:
   - Maximum volume of methanol in a sample container cannot exceed 30 ml.
   - The sample container cannot be full of methanol.
   - Sufficient absorbent material must be used to completely absorb sample content.
   - Each cooler must have less than 500 ml of methanol.
   - The cooler or package weight must not exceed 64 pounds.
   - Each cooler must be identified as containing less than 5000 ml methanol.

7. **Apparatus and Materials:**

   The following supplies are routinely provided by the MDEQ laboratory.

   - Methanol Sampling Kit/Method 5035 Sampling Kit: The MDEQ laboratory provides the necessary supplies as a kit. The specific sizes of containers, and quantities of methanol and samples, are provided in Section 4 of this document, "Specification for the Collection of Samples Using Methanol Preservation". Supplies for the collection of soil samples for VOC analysis should be provided by the laboratory performing the analysis. When this is not possible, the collection personnel must coordinate with the laboratory to ensure the necessary quality control checks are performed.

   - Certified Methanol – Methanol certified for purge and trap GC, is verified analytically prior to sampling (by lot). Preferably the methanol is provided in sealed containers, such as ampoules, tubes, or VOC sampling vials.

- Sub-Coring Device - A contaminant free syringe type device, of suitable size, to allow sub-sampling of the targeted amount of soil.
- VOC Syringe Labels - Methanol resistant labels.
- Hazardous Waste Warning Label - Suitable vial labels to warn personnel of the presence of methanol as a preservative.
- Wide Mouth Jar (for holding methanol tubes) - Of suitable size to allow temporary storage and shipment of the methanol tubes.
- Wide Mouth Jar (for preventing balance contamination) - Of suitable size to allow temporary storage of the syringe type sampler and VOC sample vial.
- VOC Vials - Vials with Teflon TFE lined septa, pre-weighed, with methanol resistant labels.

The following apparatus/materials need to be provided by field staff:

- Field Balance - Capable of holding sampling vial and syringe, on the wide mouth jar used to prevent balance contamination, and measurement within $\pm$0.2 grams.
- Calibration Weight - Near or equal to the target sample weight.
- Absorbent Material – If the samples are to be shipped by common carrier, vermiculite or similar material, sufficient to completely absorb the methanol for each sample.
- Protective Wear - Nitrile rubber or Viton gloves. Splash proof safety goggles.
- Plastic Bags - Air tight seals, capable of holding three sample VOC vials, and sub-coring device.
- SOP - Procedure for Collection and Methanol Preservation of soil samples for Volatile Organics.

8. Sample Containers, Preservation, and Holding Times

- Sample Containers: Use VOC Vials with Teflon TFE lined septa of suitable size to hold the soil plus methanol. The vials are supplied with methanol resistant labels.
- Preservation: Use an approximate one to one ratio of soil weight to methanol volume for proper preservation. Because field sampling cannot ensure the exact amount of soil and methanol, maximum and minimum limits are specified for the weight of soil and amount of methanol. The minimum and maximum weights of soil applicable to this procedure are provided in the section of this document, "Specifications for the Collection of Samples Using Methanol Preservation". If these are exceeded, the sample must be appropriately identified and the laboratory results interpreted as estimates.

- Holding Time: The maximum allowable holding time applicable for samples preserved in the field with methanol is 14 days from sample collection to analysis. The laboratory is required to identify results that are generated outside holding times. If the maximum allowable holding time is exceeded, interpret the results as minimum concentrations of the measured compounds. Staff should make appropriate plans to ensure prompt delivery of the samples to the laboratory such that analysis can be conducted within the holding time. A good rule of thumb is to deliver samples to the laboratory within four days of collection.

9. Quality Control

9.1 Sample contamination is the inadvertent addition of substances to the sample container that are not present in the sample. This may occur during the storage, transportation, sampling, and analysis of samples. Methanol field blanks are used to measure contamination during the storage, transport, and collection of samples for volatile parameters. A methanol field blank is a sample vial containing a pre-measured quantity of methanol preservative. The blank is prepared in a contaminant free area, carried into the field and exposed to the sample location by removing the cap for approximately the amount of time needed to collect a soil sample. The following outlines sources of VOC contamination and procedures for their control, measurement, and corrective actions.

- Methanol Contamination: VOCs can originate in the reagent methanol used for preservation. The MDEQ Laboratory provides only purge and trap grade methanol, verifies suitability before shipping to the field, and documents the suitability. If other methanol sources are used, e.g., from other laboratories, the source of the methanol should be purge and trap grade, analyzed to measure possible contamination, and documented. In addition, field staff should maintain documentation of the methanol lot numbers for all associated samples. If consistently high levels of compounds are measured in methanol field blanks associated with a specific lot number, request the laboratory to verify the quality of the methanol lot used to preserve the samples. If the methanol is found to be contaminated, the laboratory can subtract the methanol contamination from the sample results.
- Airborne Contamination: VOCs in the air may enter the sample container by diffusion through the vial septum during shipment, storage, collection, and analysis. To control such contamination use appropriate VOC sample vials; avoid sources that generate VOCs, such as petroleum products, especially auto exhaust fumes; keep sample containers in coolers as much as possible; collect samples quickly; and use methanol provided in sealed ampoules, tubes, or VOC vials. When positive results are measured in methanol field blanks and field sources of airborne contaminants are suspected, data must be carefully evaluated in view of the positive field blanks. Sample results that are similar to the methanol field blank results should be disregarded. Attempt to isolate the source of contamination and incorporate appropriate procedures to avoid similar circumstances.

9.2 Field Balance Calibration Check: Check the calibration for the balance used for weighing the sample in the field prior to each sampling event. Record this check in the field notebook. Use manufacturer's instructions to perform this check. If none are available, a weight of known value equal, or near the target sample weight, may be used to check the performance of the balance. The check must be within specifications provided by the manufacturer. Follow the manufacturer's instructions for corrective actions if provided.

9.3 Corrections for Samples with High Water Content: Concentrations of volatile compounds in soils must be reported on a dry weight basis. The water from the sample is miscible with the methanol and increases the total volume from which a sub-sample is taken for analysis. If this increased volume is not taken into consideration and results adjusted accordingly, the reported concentrations of volatile compounds will be lower than the actual concentrations. The ERD does not consider this difference to be significant for soils less than 25 percent moisture, those normally encountered in the environment, and an adjustment is not needed. If the project objectives are stringent or samples of higher moisture content are expected, contact the DEQ Lab to discuss options.

10. **Method 5035 Requirements:** U.S. Environmental Protection Agency Method 5035 provides several procedures for the collection and analysis of soils for VOCs. These procedures include bulk sampling, methanol preservation, sealed samplers, and containers designed to be attached directly to the laboratory's analytical instrumentation. Because bulk sampling is susceptible to volatilization and biodegradation loses, bulk sampling is not an acceptable option. The MDEQ will accept data generated using the other procedures in Method 5035.

Method 5035 specifies separate procedures for high and low concentration samples. The high concentration procedure in Method 5035, using methanol preservation in the field, is the most cost effective, dependable, and easiest procedure to implement with existing equipment. Additionally, the methanol preservation procedure represents the standard by which other soil sampling procedures are compared. For these reasons, the MDEQ, ERD has adopted the high concentration procedure using methanol preservation in the field as provided in this document. Target detection limit guidance for VOCs using methanol preservation is provided in Operational Memorandum #6. Other MDEQ divisions may specify other procedures and requirements for implementation of Method 5035. Contact the appropriate division within MDEQ for guidance.

11. Modifications to Methanol Preservation Procedures

This methanol procedure is specific to ERD field staff and the MDEQ lab. A lab implementing this procedure may make minor modifications to the sample size, procedures for addition of methanol to the sample, and procedures for weighing the sample according to the following.

- A variety of sample sizes and methanol volumes are acceptable, as long as the ratio of the weight of the soil to the volume of methanol is one to one, and meets the requirements and tolerances of the laboratory performing the analysis. Typically ten to twenty-five grams of soil is necessary with not more than ± ten percent error.
- In order of preference, methanol can be provided to field staff in: a) sealed tubes, b) VOC vials pre-weighed with a specified amount of methanol, or c) reagent dispensing bottles. Methanol in tubes has distinct advantages and must be used when possible. While using methanol in VOC vials is convenient, it requires the soil sample to be extruded into the methanol, which increases the chance of spillage. A disadvantage of using methanol from reagent bottles is that the entire lot of methanol may be contaminated by ambient air.
- Weighing the methanol preserved sample in the field or laboratory is acceptable. If performed in the field, the weights must be provided to the laboratory with the samples.

References

1. Method 5035, "Closed-System Purge-and-Trap and Extraction for Volatiles Organics in Soil and Waste Samples", Test Method for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, USEPA, Office of Solid Waste and Emergency Response, Dec 1996, Third Edition
2. Environmental Response Division Operational Memorandum #6, Revision 5, Analytical Method Detection Level Guidance for Environmental Contamination Response Activities under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended.
3. Method 8260B, "Volatile Organic Compounds by GC/MS", Test Method for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, USEPA, Office of Solid Waste and Emergency Response, Dec 1996, Third Edition

Approved by:

George Jackson (acting)
Acting Chief, Field Operations Section
Environmental Response Division

5/2/00
Date

DRILLING AND WELL CONSTRUCTION

INTRODUCTION

This guideline presents details of the method and materials to be followed and used for construction of monitoring wells and piezometers in overburden using hollow stem augers. ASTM 5092-90 details the minimum standards to be followed for the design and installation of groundwater monitoring wells.

HOLLOW STEM AUGER DRILLING

ASTM Standard practices for using hollow stem augers for geoenvironmental exploration (ASTM D5784-95) will be followed.

DOUBLE-CASED WELL INSTALLATION

1. Advance a pilot borehole using 4¼-inch ID HSA. Conduct continuous split-spoon sampling to evaluate stratigraphy, and to determine the depth of the top of the upper most confining unit. Drill the pilot borehole to a maximum of 3 feet into the confining unit.

2. Remove the 4¼-inch ID HSA from the borehole, and stage augers for decontamination.

3. Ream the borehole using 12¼-inch ID HSA to the same depth as the pilot hole (a maximum of 3 feet into the confining unit). Through the 12¼-inch HSA, install an appropriate length of 10-inch ID, solid steel casing from a depth of 3 feet into the confining unit, to the ground surface.

4. Cement the 10-inch casing in place using tremmie rods to fill the annular space between the casing and augers. Remove the 12¼-inch ID HSA during cementing and stage the augers for decontamination. Allow cement to cure a minimum of 24 hours before proceeding with drilling, sampling, or well installation activities.

5. Continue the subsurface investigation through the 10-inch steel casing to the target depth using 4¼-inch ID HSA.

WELL CONSTRUCTION METHODOLOGY

1. Each monitoring well will be installed in its own borehole.

2. Advance borehole to the desired depth using a 4¼-inch ID HSA. Remove drill rods and center plug from augers and verify borehole depth using weighted measuring tape.

3. Insert well screen and riser pipe equipped with centralizers (if required) into borehole through the HSA.

4. Add sand pack materials to the screen section of the well while slowly backing augers or casing out of the borehole with careful measurement of the sand pack thickness. The filter pack, when complete, should extend two to three feet above the well screen within the borehole. Measure the depth of the sand pack frequently with weighted tape while adding sand.

5. Add bentonite pellet seal above the sand pack (if required) and again remove the augers slowly. The bentonite seal should extend at least 6" above the top of the filter pack section. (Note: If bentonite seal is placed above the ground water level within the borehole, potable water should be added to hydrate the bentonite pellets.)

6. Grout the remaining annular space by pouring or tremmie (as required), to about 2 to 3 feet below surface. Allow grout to set up, install protective casing, cap and lock; and cement in place. The well number should be affixed to the protective casing or placed on a marker post. Under circumstances where the borehole is deep and the formation has a low hydraulic conductivity it may be desirable to add potable water to the well prior to grouting to offset the pressure (weight) of the grout thereby minimizing the potential for the grout to penetrate the sand pack.

7. Document construction details on a Well Construction Log form (example attached).

CONSTRUCTION MATERIALS

Well Screen and Riser - Flush threaded screen and riser materials will be used. Screen will be 3 or 5 feet long, constructed of PVC wire wound, 7 or 10 slot, 2" diameter. Casing will be of 2" ID PVC. A vent hole will be drilled one inch below the rim of each riser pipe of all monitoring wells. The wells will then be capped with a J-plug to prevent the entry of foreign objects into the well.

Bentonite Well Seal - The bentonite should be from a commercial source free of chemical additives (granular or powdered for grout and pelletized for seal).

Grout - Mixture of bentonite, cement and water in accordance with the following specifications or as specified by on-site geologist. Premix bentonite and water prior to adding cement.

Grout Slurry Composition (% Weight)	
1.5 to 5.0%	-Bentonite
40 to 60%	-Cement (Portland Type I)
40 to 60%	-Water
5 to 20%	-Sand

Sand Pack - The sand pack should consist of clean, inert, siliceous, rounded to subrounded particles. Sand pack particle size will depend on the formation and the slot size of the screen.

Protective Casing, Locking Cap and Lock - Protective casing with a lockable cap will be cemented in place around the riser at least 3' below ground level. The inside diameter of the protective casing should be a minimum of 2-inches larger than the outside diameter of the riser. All locks will be keyed alike. After the protective casing is installed, a drain hole will be drilled into the protective casing just above the ground surface.

A sample of cement, bentonite, and sand used in well construction will be saved in a labeled, glass jar.

DECONTAMINATION

Well Casing - Prior to well installation, well casings will be decontaminated in the field to remove any residue that may exist in the well casing pipe as a result of manufacturing or shipping. The well casings will be first scrubbed inside with a brush, water, and TSP to remove any oils and debris, then steamed cleaned and wrapped or placed in plastic until installation. During the installation process, clean surgical gloves will be used in handling the well casings, screens, and other materials that will be going into the borehole.

Drill Rigs - Upon completion of the monitoring well installation at each location, the augers will be steamed cleaned, and the back of the drilling rig power washed at the designated staging area, prior to mobilization to the next boring location.

WELL CONSTRUCTION LOG

DATE:

BORING #: | WELL #: | SITE NAME:

CONSTRUCTION DETAILS	INTERVAL 1	INTERVAL 2	INTERVAL 3	DEPTH	VAS	WELL PROFILE	MATERIALS/ REMARKS
TOP OF PROTECTIVE PIPE							
STICKUP							
FLUSH MOUNT							
CONCRETE							GROUND SURFACE
GROUT/CUTTINGS/BENTONITE							
BENTONITE SEAL							
CUTTINGS/NATURAL COLLAPSE							
ARTIFICIAL SANDPACK							
PERMANENT SCREENED INTERVAL				10			
WELL BOTTOM							
BOTTOM OF BORING (EOB)							

SCREEN — CONSTRUCTION MATERIALS

MATERIAL ☐ SS ☐ OTHER PVC _____
NOM. DIA. ☐ 2" ☐ OTHER _____ 20
PERF. TYPE ☐ SLOTTED ☐ OTHER _____
SLOT SIZE ☐ 7 ☐ 10 ☐ OTHER _____
LENGTH _____

CASING

MATERIAL ☐ GS ☐ PVC OTHER _____ 30
NOM. DIA. ☐ 2" ☐ 4" ☐ 6" OTHER _____
SCHEDULE ☐ 40 OTHER _____
JOINT TYPE ☐ COUPLINGS ☐ THREADED
SECT. LENGTH

PROTECTION 40

PROTECTOR INSTALLED? ☐ YES ☐ NO
NOM. DIA./TYPE _____
LENGTH OVERALL _____
LENGTH IN GROUND _____
LOCKING CAP (J-PLUG)? ☐ YES ☐ NO 50
KEY NO. ☐ 3374 OTHER _____
PROTECTIVE POSTS? ☐ YES ☐ NO

CASING RECORD (including double casing)

SIZE (DIA.) _____ FROM _____ TO _____
SIZE (DIA.) _____ FROM _____ TO _____ 60
SIZE (DIA.) _____ FROM _____ TO _____
SIZE (DIA.) FROM TO

DRILLING RECORD

METHOD ☐ 4 1/4" ID HSA OTHER _____
FLUID ☐ YES ☐ NO 70

TEMPORARY SCREEN INTERVALS

1.) FROM _____ TO _____
2.) FROM _____ TO _____
3.) FROM _____ TO _____
4.) FROM _____ TO _____ 80
5.) FROM _____ TO _____
6.) FROM _____ TO _____

NOTES:

AGL - ABOVE GROUND LEVEL BGL - BELOW GROUND LEVEL

SPLIT-SPOON SAMPLING

INTRODUCTION

A split-spoon sampling device will be used to collect representative soil samples for description, laboratory testing and as a measure of resistance of soil to sampler penetration.

METHODOLOGY

1. Place plastic sheeting on a sturdy workbench or other appropriate work surface to prevent the split-spoon and its contents from coming in contact with the workbench (several layers of sheeting may be placed on the workbench so that they may be removed between each sample or as needed).

2. Mark four 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the sampler resting on the bottom of the hole, drive the sampler with the 140 lb. hammer falling freely over the 30-inch fall until 24 inches have been penetrated or 100 blows applied.

3. Record the number of blows per 6 inches. Determine the Standard Penetration Test N value by adding the blows for the 6 to 12 inches and 12 to 18-inch interval of each sample attempt. (ASTM Method D 1586).

4. Open sampler, split the sample in half with stainless steel knife, and immediately check for organic vapors with a PID. Next transfer samples into appropriate sample bottle as necessary for any required analyses. If VOCs analysis is required, collect sampling using the methanol preservation method (see procedure for Methanol Preservation Soil Sampling). Standard sample management procedures will be followed (see Sample Handling and Management Procedure in Appendix A).

5. Document all soil properties and sample depths in a Boring Log (example attached). Soil types should be described in accordance with ASTM 2488-93.

EQUIPMENT REQUIREMENTS

- Personal protective garment and gear (if applicable)
- Photoionization Detector
- Sampling knife (stainless steel)
- Trowel or scoopulas (stainless steel)
- Engineer's rule/measuring tape
- Boring Log form
- Suitable pre-labeled sample container(s)

- Gloves (latex)

DECONTAMINATION

1. Wash equipment thoroughly with TSP or Liquinox and tap water using a brush to remove any particulate matter or surface film;

2. Rinse with tap water twice.

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WELL / BORING LOG

RING #:	WELL #:	SITE NAME:	PROJECT #:
OUND ELEV.:	TOC ELEV.:	LOGGED BY:	
UNTY:	TWP:	SECTION: T: R: 1/4: 1/4:	
LL CO.:	DRILLER:	DRILLING RIG CME	DRILL TYPE:
RING START:	END:	LOCATION SKETCH (not to scale)	
LL START:	END:		
ATER FIRST:	AT COMPLETION:		
REEN FROM:	TO:		
PE: PVC	SIZE:		
SING TYPE:	DIAMETER:		
EATHER:			

SAMPLE NUMBER	SAMP TYPE	BLOW COUNT	DEPTH (bgl)	STRATIGRAPHIC DESCRIPTION	USCS	STRAT. SYMBOL	VAS	REMARKS ODOR, FLUID LOSS, ...

Notes:

PAGE ___ OF ___

WELL DEVELOPMENT

INTRODUCTION

This guideline presents a method for developing monitoring wells following completion of drilling and well installation.

METHODOLOGY

1. Select an appropriate well development method based upon water level depth, well productivity and sediment content of water. Well development options include:

   - Bailing
   - Manual pumping using a Waterra™ pump.
   - Powered suction-lift pumping.
   - Air-lift development.

2. Assemble and decontaminate equipment if necessary, and install it in the monitoring well. Care should be taken not to introduce sediment or contaminants with the equipment during installation.

3. Develop the well by repeatedly removing water from the well until the discharge water is relatively sediment free. Monitor development effectiveness at regular intervals. Record both volume of water removed and groundwater clarity measurements on the well construction log.

4. Initiate well development gently, then slowly increase the degree of agitation to remove fines from the well bottom and sand pack. Gentle well development is critical in silty and clayey formations, as these fines may be continuously pulled into the under vigorous development conditions.

5. Discontinue well development, either when the turbidity of the discharged water reaches a predetermined value, or when the turbidity/clarity of the groundwater being removed stabilizes, indicating that additional development will be ineffective.

REFERENCES

New York State Department of Environmental Conservation, July 1988, Drilling and Monitoring Guidance Manual.

Gass T.E. Monitoring Well Filter Pack and Screen Slot Selection: A reassessment of Design Parameters. Water Well Journal, June 1988, pp. 30-32.

ASTM 5521-94 – Standard Guide for Development of Groundwater Monitoring Wells in Granular Aquifers.

SLUG TESTING

INTRODUCTION

A guide for selection of slug testing methods can be found in ASTM D 4043 – Guide for Selection of Aquifer-Test Method in Determining Hydraulic Properties by Well Techniques. This guideline summarizes procedures for performing slug tests on monitoring wells using the solid-slug method and the air-slug method.

AIR-SLUG METHOD

1. Set a pressure transducer near the bottom of the well and connect transducer to Hermit® data logger.

2. Program logger to record changes in hydraulic head (i.e. water level) versus time (logarithmic sampling interval).

3. Connect air slug testing tool to the top of the monitoring well. At the wellhead, the testing tool will be fitted with valves for applying and releasing the air pressure, and with a compression fitting to allow a transducer to pass through the tool.

4. Induce an "instantaneous" head change in the well by means of an air slug (Prosser, 1981). When air pressure is applied, an air bubble will form that displaces water in the well. The displaced water initially raises the water level in the well, but this water will be absorbed rapidly by the aquifer and the well will return to static (i.e., starting) conditions.

5. Initiate the test by simultaneously starting the data logger and opening a pressure release valve at the top of the tool, which will result in a nearly instantaneous change (i.e. drop) of the hydraulic head in the well.

6. Monitor recovery in the well using the data logger. Once the well has completely recovered, as demonstrated by stabilized hydraulic head readings, end the test by stopping the data logger.

7. Repeat test 2-3 times on each well.

8. Repeat steps 1 through 7 for each well. The logger data will be downloaded to a computer for subsequent analysis. The slug testing data will be analyzed using the Bouwer and Rice (1976) analytical procedure.

SOLID-SLUG METHOD

The solid slug is constructed of copper or PVC copper piping, completely filled with sand and securely capped on both ends. The solid slug should have a length of approximately 4 feet, with as large a diameter as possible as to displace the maximum amount of water inside the well casing. The outer diameter of the capped ends of the solid slug must be smaller than the inner diameter of the well casing. An eyelet must be attached to the top of the slug, and bailer cord attached for lowering and raising the slug inside the well casing.

The solid-slug test method consists of a "falling head" test, and a "rising head" test.

1. Set a pressure transducer near the bottom of the well and connect transducer to Hermit® data logger.

2. Program logger to record changes in hydraulic head (i.e. water level) versus time (logarithmic sampling interval).

3. Perform the "falling head" test. Induce an "instantaneous" rise in potentiometric head in the well by quickly lowering the slug into the well, and initiate the test by simultaneously starting the data logger.

4. Monitor the water level in the well as it returns to pre-test conditions. Once the well has completely returned to pre-test conditions, as demonstrated by stabilized head readings, end the test by stopping the data logger.

5. Perform the "rising head" test. Induce an "instantaneous" drop in potentiometric head in the well by quickly removing the slug from the well, and initiate the test by simultaneously starting the data logger.

6. Monitor the water level in the well as it returns to pre-test conditions. Once the well has completely returned to pre-test conditions, as demonstrated by stabilized head readings, end the test by stopping the data logger.

7. Repeat the test to obtain two sets of "rising head" data and two sets of "falling head" data for each well.

8. Repeat steps 1 through 7 for each well. The logger data will be downloaded to a computer for subsequent analysis. The slug testing data will be analyzed using the Bouwer and Rice (1976) analytical procedure.

Slug test data presentation should include: tables of data collected; data plots used in the analysis of the data; and calculation of hydraulic conductivity.

WATER LEVEL MEASUREMENT

INTRODUCTION

This procedure describes the method for measuring water levels in monitoring wells/piezometers. Any wells which are capped with an unvented cap will be uncapped to allow the water level to equilibrate with the atmospheric pressure for approximately two hours. Slowly recharging wells will be allowed to equalize for a longer time as needed.

METHODOLOGY

1. Pre-clean water level probe and lower portion of cable following the decontamination procedures described below.

2. Lower probe slowly into the monitoring well until the audible alarm, which indicates water, sounds.

3. Read depth from the graduated cable, to the nearest 100th (0.01) of a foot using either the V-notched reference point on the well riser or the highest point on the well riser as a reference. Repeat the measurement for confirmation, and record the water level on a Water Level Record form (attached).

4. Remove the probe from the well slowly, drying the cable and probe with a clean paper towel.

5. Replace well cap and lock protective cap in place.

6. Present water level data in accordance with ASTM D 6000-96 – Standard Guide for Presentation of Water-Level Information from Ground-Water Sites.

EQUIPMENT REQUIREMENTS

- Personal protective garment and gear (if applicable)
- Water level indicator
- Engineers measuring tape
- Water Level Record form
- Decontamination supplies

DECONTAMINATION

1. Wash with Liquinox or TSP and water solution.
2. Rinse with tap water twice

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WATER LEVEL RECORD

PROJECT NAME: _____ DATE: _____

PROJECT LOCATION: _____ FIELD CREW: _____

INSTRUMENT/METHOD: _____

WELL NO.	TOTAL DEPTH	TOP OF CASING	DEPTH TO PRODUCT (FT.)	PRODUCT THICKNESS (FT.)	DEPTH TO WATER (FT.)	STATIC WATER LEVELS	TIME	REMARKS

J:\PROJ\FORMS\WATERLEV.FRM

Page ____ Of ____

Jun-22-00 01:41pm From-MALCOLM PIRNIE LANSING +5173370417 T-888 P.54/73 F-517

FREE PRODUCT LEVEL MONITORING

INTRODUCTION

This procedure presents a method for obtaining product and water levels from product monitoring wells/piezometers. Any wells which are capped with an unvented cap will be uncapped to allow the water level to equilibrate with the atmospheric pressure for approximately two hours. Slowly recharging wells will be allowed to equalize for longer time.

METHODOLOGY

1. Pre-clean oil/water interface probe and lower portion of cable following the decontamination procedures described below.

2. Lower probe slowly into the monitoring well until the audible alarm, which indicates NAPL, sounds.

3. If NAPL is encountered above the water level, read depth from the graduated cable, to the nearest 100th (0.01) of a foot using either the V-notched reference point on the well riser or the highest point on the well riser as a reference. Repeat the measurement for confirmation, and record the product level on a Water Level Record form (see form attached to the Water Level Measurement guideline).

4. Continue lowering probe slowly into the monitoring well until a second alarm sounds. This second alarm indicates water is present.

5. Read depth from the graduated cable, to the nearest 100th (0.01) of a foot using either the V-notched reference point on the well riser or the highest point on the well riser as a reference. Repeat the measurement for confirmation, and record the water level on a Water Level Form (see form attached to the Water Level Measurement guideline).

6. Continue to lower probe slowly into the monitoring well until the audible alarm, indicating NAPL, sounds or until the probe contacts the bottom of the well.

7. If NAPL is encountered at the bottom of the well, read depth from the graduated cable, to the nearest 100th (0.01) of a foot using either the V-notched reference point on the well riser or the highest point on the well riser as a reference. Repeat the measurement for confirmation, and record the water level on a Water Level Form (see form attached to the Water Level Measurement guideline). Also record the depth of the bottom of the well, to evaluate the thickness of the NAPL.

8. Remove the probe from the well slowly, drying the cable and probe with a clean paper towel.

9. Replace well cap and lock protective cap in place.

FREE PRODUCT LEVEL MONITORING

EQUIPMENT REQUIREMENTS

- Personal protective garment and gear (if applicable)
- Oil/water interface indicator.
- Engineers measuring tape
- Water Level Record form (see the form attached to the Water Level Measurement guideline)
- Decontamination supplies

DECONTAMINATION

1. Wash with Liquinox or TSP and water solution.
2. Rinse with tap water twice.

GROUNDWATER SAMPLING

Prior to groundwater sampling, water levels in monitoring wells will be measured as outlined in the Water Level Measurement procedure (Appendix A). In addition, prior to groundwater sampling, the presence or absence of free product in monitoring wells will be evaluated as outlined in the Free Product Measurement procedure (Appendix A).

Low flow groundwater sampling will be performed in accordance with EPA Document EPA/540/S-95/504, April 1996 (attached).

United States Environmental Protection Agency | Office of Research and Development | Office of Solid Waste and Emergency Response | EPA/540/S-95/504 April 1996

EPA Ground Water Issue

RECEIVED JUN 25 1996 ERD-GEOL. SERVICES

LOW-FLOW (MINIMAL DRAWDOWN) GROUND-WATER SAMPLING PROCEDURES

RECEIVED ERD S.E. MICH. JUL 10 1998 FILE COUNTY

by Robert W. Puls[1] and Michael J. Barcelona[2]

Background

The Regional Superfund Ground Water Forum is a group of ground-water scientists, representing EPA's Regional Superfund Offices, organized to exchange information related to ground-water remediation at Superfund sites. One of the major concerns of the Forum is the sampling of ground water to support site assessment and remedial performance monitoring objectives. This paper is intended to provide background information on the development of low-flow sampling procedures and its application under a variety of hydrogeologic settings. It is hoped that the paper will support the production of standard operating procedures for use by EPA Regional personnel and other environmental professionals engaged in ground-water sampling.

For further information contact: Robert Puls, 405-436-8543, Subsurface Remediation and Protection Division, NRMRL, Ada, Oklahoma.

I. Introduction

The methods and objectives of ground-water sampling to assess water quality have evolved over time. Initially the emphasis was on the assessment of water quality of aquifers as sources of drinking water. Large water-bearing units were identified and sampled in keeping with that objective. These were highly productive aquifers that supplied drinking water via private wells or through public water supply systems. Gradually, with the increasing awareness of subsurface pollution of these water resources, the understanding of complex hydrogeochemical processes which govern the fate and transport of contaminants in the subsurface increased. This increase in understanding was also due to advances in a number of scientific disciplines and improvements in tools used for site characterization and ground-water sampling. Ground-water quality investigations where pollution was detected initially borrowed ideas, methods, and materials for site characterization from the water supply field and water analysis from public health practices. This included the materials and manner in which monitoring wells were installed and the way in which water was brought to the surface, treated, preserved and analyzed. The prevailing conceptual ideas included convenient generalizations of ground-water resources in terms of large and relatively homogeneous hydrologic *units*. With time it became apparent that conventional water supply *generalizations of homogeneity* did not adequately represent field data regarding pollution of these subsurface resources. The important role of *heterogeneity* became increasingly clear not only in geologic terms, but also in terms of complex physical,

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chemical and biological subsurface processes. With greater appreciation of the role of heterogeneity, it became evident that subsurface pollution was ubiquitous and encompassed the unsaturated zone to the deep subsurface and included unconsolidated sediments, fractured rock, and aquitards or low-yielding or impermeable formations. Small-scale processes and heterogeneities were shown to be important in identifying contaminant distributions and in controlling water and contaminant flow paths.

It is beyond the scope of this paper to summarize all the advances in the field of ground-water quality investigations and remediation, but two particular issues have bearing on ground-water sampling today: aquifer heterogeneity and colloidal transport. Aquifer heterogeneities affect contaminant flow paths and include variations in geology, geochemistry, hydrology and microbiology. As methods and the tools available for subsurface investigations have become increasingly sophisticated and understanding of the subsurface environment has advanced, there is an awareness that in most cases a primary concern for site investigations is characterization of contaminant flow paths rather than entire aquifers. In fact, in many cases, plume thickness can be less than well screen lengths (e.g., 3-6 m) typically installed at hazardous waste sites to detect and monitor plume movement over time. Small-scale differences have increasingly been shown to be important and there is a general trend toward smaller diameter wells and shorter screens.

The hydrogeochemical significance of colloidal-size particles in subsurface systems has been realized during the past several years (Gschwend and Reynolds, 1987; McCarthy and Zachara, 1989; Puls, 1990; Ryan and Gschwend, 1990). This realization resulted from both field and laboratory studies that showed faster contaminant migration over greater distances and at higher concentrations than flow and transport model predictions would suggest (Buddemeier and Hunt, 1988; Enfield and Bengtsson, 1988; Penrose et al., 1990). Such models typically account for interaction between the mobile aqueous and immobile solid phases, but do not allow for a mobile, reactive solid phase. It is recognition of this third phase as a possible means of contaminant transport that has brought increasing attention to the manner in which samples are collected and processed for analysis (Puls et al., 1990; McCarthy and Degueldre, 1993; Backhus et al., 1993; U. S. EPA, 1995). If such a phase is present in sufficient mass, possesses high sorption reactivity, large surface area, and remains stable in suspension, it can serve as an important mechanism to facilitate contaminant transport in many types of subsurface systems.

Colloids are particles that are sufficiently small so that the surface free energy of the particle dominates the bulk free energy. Typically, in ground water, this includes particles with diameters between 1 and 1000 nm. The most commonly observed mobile particles include: secondary clay minerals; hydrous iron, aluminum, and manganese oxides; dissolved and particulate organic materials, and viruses and bacteria. These reactive particles have been shown to be mobile under a variety of conditions in both field studies and laboratory column experiments, and as such need to be included in monitoring programs where identification of the total mobile contaminant loading (dissolved + naturally suspended particles) at a site is an objective. To that end, sampling methodologies must be used which do not artificially bias naturally suspended particle concentrations.

Currently the most common ground-water purging and sampling methodology is to purge a well using bailers or high speed pumps to remove 3 to 5 casing volumes followed by sample collection. This method can cause adverse impacts on sample quality through collection of samples with high levels of turbidity. This results in the inclusion of otherwise immobile artifactual particles which produce an overestimation of certain analytes of interest (e.g., metals or hydrophobic organic compounds). Numerous documented problems associated with filtration (Danielsson, 1982; Laxen and Chandler, 1982; Horowitz et al., 1992) make this an undesirable method of rectifying the turbidity problem, and include the removal of potentially mobile (contaminant-associated) particles during filtration, thus artificially biasing contaminant concentrations low. Sampling-induced turbidity problems can often be mitigated by using low-flow purging and sampling techniques.

Current subsurface conceptual models have undergone considerable refinement due to the recent development and increased use of field screening tools. So-called hydraulic push technologies (e.g., cone penetrometer, Geoprobe®, QED HydroPunch®) enable relatively fast screening site characterization which can then be used to design and install a monitoring well network. Indeed, alternatives to conventional monitoring wells are now being considered for some hydrogeologic settings. The ultimate design of any monitoring system should however be based upon adequate site characterization and be consistent with established monitoring objectives.

If the sampling program objectives include accurate assessment of the magnitude and extent of subsurface contamination over time and/or accurate assessment of subsequent remedial performance, then some information regarding plume delineation in three-dimensional space is necessary prior to monitoring well network design and installation. This can be accomplished with a variety of different tools and equipment ranging from hand-operated augers to screening tools mentioned above and large drilling rigs. Detailed information on ground-water flow velocity, direction, and horizontal and vertical variability are essential baseline data requirements. Detailed soil and geologic data are required prior to and during the installation of sampling points. This includes historical as well as detailed soil and geologic logs which accumulate during the site investigation. The use of borehole geophysical techniques is also recommended. With this information (together with other site characterization data) and a clear understanding of sampling

objectives, then appropriate location, screen length, well diameter, slot size, etc. for the monitoring well network can be decided. This is especially critical for new in situ remedial approaches or natural attenuation assessments at hazardous waste sites.

In general, the overall goal of any ground-water sampling program is to collect water samples with no alteration in water chemistry; analytical data thus obtained may be used for a variety of specific monitoring programs depending on the regulatory requirements. The sampling methodology described in this paper assumes that the monitoring goal is to sample monitoring wells for the presence of contaminants and it is applicable whether mobile colloids are a concern or not and whether the analytes of concern are metals (and metalloids) or organic compounds.

II. Monitoring Objectives and Design Considerations

The following issues are important to consider prior to the design and implementation of any ground-water monitoring program, including those which anticipate using low-flow purging and sampling procedures.

A. Data Quality Objectives (DQOs)

Monitoring objectives include four main types: detection, assessment, corrective-action evaluation and resource evaluation, along with *hybrid* variations such as site-assessments for property transfers and water availability investigations. Monitoring objectives may change as contamination or water quality problems are discovered. However, there are a number of common components of monitoring programs which should be recognized as important regardless of initial objectives. These components include:

1) Development of a conceptual model that incorporates elements of the regional geology to the local geologic framework. The conceptual model development also includes initial site characterization efforts to identify hydrostratigraphic units and likely flow-paths using a minimum number of borings and well completions;

2) Cost-effective and well documented collection of high quality data utilizing simple, accurate, and reproducible techniques; and

3) Refinement of the conceptual model based on supplementary data collection and analysis.

These fundamental components serve many types of monitoring programs and provide a basis for future efforts that evolve in complexity and level of spatial detail as purposes and objectives expand. High quality, reproducible data collection is a common goal regardless of program objectives.

High quality data collection implies data of sufficient accuracy, precision, and completeness (i.e., ratio of valid analytical results to the minimum sample number called for by the program design) to meet the program objectives. Accuracy depends on the correct choice of monitoring tools and procedures to minimize sample and subsurface disturbance from collection to analysis. Precision depends on the repeatability of sampling and analytical protocols. It can be assured or improved by replication of sample analyses including blanks, field/lab standards and reference standards

B. Sample Representativeness

An important goal of any monitoring program is collection of data that is truly representative of conditions at the site. The term *representativeness* applies to chemical and hydrogeologic data collected via wells, borings, piezometers, geophysical and soil gas measurements, lysimeters, and temporary sampling points. It involves a recognition of the statistical variability of individual subsurface physical properties, and contaminant or major ion concentration levels, while explaining extreme values. Subsurface temporal and spatial variability are facts. Good professional practice seeks to maximize representativeness by using proven accurate and reproducible techniques to define limits on the distribution of measurements collected at a site. However, measures of representativeness are dynamic and are controlled by evolving site characterization and monitoring objectives. An evolutionary site characterization model, as shown in Figure 1, provides a systematic approach to the goal of consistent data collection.

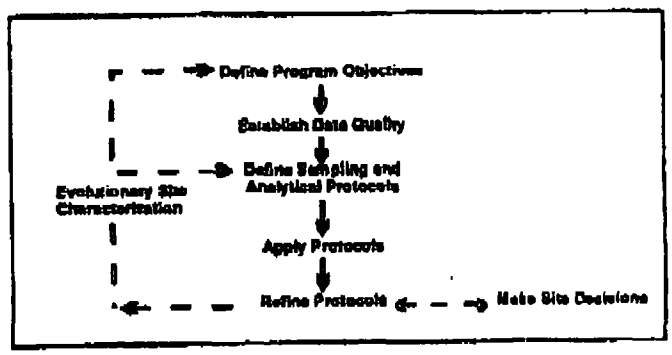

Figure 1. Evolutionary Site Characterization Model

The model emphasizes a recognition of the causes of the variability (e.g., use of inappropriate technology such as using bailers to purge wells; imprecise or operator-dependent methods) and the need to control avoidable errors.

1) Questions of Scale

A sampling plan designed to collect representative samples must take into account the potential scale of changes in site conditions through space and time as well as the chemical associations and behavior of the parameters that are targeted for investigation. In subsurface systems, physical (i.e., aquifer) and chemical properties over time or space *are not statistically independent*. In fact, samples taken in close proximity (i.e., within distances of a few meters) or within short time periods (i.e., more frequently than monthly) are highly auto-correlated. This means that designs employing high-sampling frequency (e.g., monthly) or dense spatial monitoring designs run the risk of redundant data collection and misleading inferences regarding trends in values that aren't statistically valid. In practice, contaminant detection and assessment monitoring programs rarely suffer these *over-sampling* concerns. In corrective-action evaluation programs, it is also possible that too little data may be collected over space or time. In these cases, false interpretation of the spatial extent of contamination or underestimation of temporal concentration variability may result.

2) Target Parameters

Parameter selection in monitoring program design is most often dictated by the regulatory status of the site. However, background water quality constituents, purging indicator parameters, and contaminants, all represent targets for data collection programs. The tools and procedures used in these programs should be equally rigorous and applicable to all categories of data, since all may be needed to determine or support regulatory action.

C. Sampling Point Design and Construction

Detailed site characterization is central to all decision-making purposes and the basis for this characterization resides in identification of the geologic framework and major hydro-stratigraphic units. Fundamental data for sample point location include: subsurface lithology, head-differences and background geochemical conditions. Each sampling point has a proper use or uses which should be documented at a level which is appropriate for the program's data quality objectives. Individual sampling points may not always be able to fulfill multiple monitoring objectives (e.g., detection, assessment, corrective action).

1) Compatibility with Monitoring Program and Data Quality Objectives

Specifics of sampling point location and design will be dictated by the complexity of subsurface lithology and variability in contaminant and/or geochemical conditions. It should be noted that, regardless of the ground-water sampling approach, few sampling points (e.g., wells, drive-points, screened augers) have zones of influence in excess of a few feet. Therefore, the spatial frequency of sampling points should be carefully selected and designed.

2) Flexibility of Sampling Point Design

In most cases *well-point* diameters in excess of 1 7/8 inches will permit the use of most types of submersible pumping devices for low-flow (minimal drawdown) sampling. It is suggested that *short* (e.g., less than 1.6 m) screens be incorporated into the monitoring design where possible so that comparable results from one device to another might be expected. *Short*, of course, is relative to the degree of vertical water quality variability expected at a site.

3) Equilibration of Sampling Point

Time should be allowed for equilibration of the well *or sampling point with the formation after installation*. Placement of well or sampling points in the subsurface produces some disturbance of ambient conditions. Drilling techniques (e.g., auger, rotary, etc.) are generally considered to cause more disturbance than *direct-push* technologies. In either case, there may be a period (i.e., days to months) during which water quality near the point may be distinctly *different* from that in the formation. Proper development of the sampling point and adjacent formation to remove fines created during emplacement will shorten this water quality *recovery* period.

III. Definition of Low-Flow Purging and Sampling

It is generally accepted that water in the well casing is non-representative of the formation water and needs to be purged prior to collection of ground-water samples. However, the water in the screened interval may indeed be representative of the formation, depending upon well construction and site hydrogeology. Wells are purged to some extent for the following reasons: the presence of the air interface at the top of the water column resulting in an oxygen concentration gradient with depth, loss of volatiles up the water column, leaching from or sorption to the casing or filter pack, chemical changes due to clay seals or backfill, and surface infiltration.

Low-flow purging, whether using portable or dedicated systems, should be done using pump-intake located in the middle or slightly above the middle of the screened interval. Placement of the pump too close to the bottom of the well will cause increased entrainment of solids which have collected in the well over time. These particles are present as a result of well development, prior purging and sampling events, and natural colloidal transport and deposition. Therefore, placement of the pump in the middle or toward the top of the screened interval is suggested. Placement of the pump at the top of the water column for sampling is only recommended in unconfined aquifers, screened across the water table, where this is the desired sampling point. Low

flow purging has the advantage of minimizing mixing between the overlying stagnant casing water and water within the screened interval.

A. Low-Flow Purging and Sampling

Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface which can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. The objective is to pump in a manner that minimizes stress (drawdown) to the system to the extent practical taking into account established site sampling objectives. Typically, flow rates on the order of 0.1 - 0.5 L/min are used, however this is dependent on site-specific hydrogeology. Some extremely coarse-textured formations have been successfully sampled in this manner at flow rates to 1 L/min. The effectiveness of using low-flow purging is intimately linked with proper screen location, screen length, and well construction and development techniques. The reestablishment of natural flow paths in both the vertical and horizontal directions is important for correct interpretation of the data. For high resolution sampling needs, screens less than 1 m should be used. Most of the need for purging has been found to be due to passing the sampling device through the overlying casing water which causes mixing of these stagnant waters and the dynamic waters within the screened interval. Additionally, there is disturbance to suspended sediment collected in the bottom of the casing and the displacement of water out into the formation immediately adjacent to the well screen. These disturbances and impacts can be avoided using dedicated sampling equipment, which precludes the need to insert the sampling device prior to purging and sampling.

Isolation of the screened interval water from the overlying stagnant casing water may be accomplished using low-flow minimal drawdown techniques. If the pump intake is located within the screened interval, most of the water pumped will be drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone. However, if the wells are not constructed and developed properly, zones other than those intended may be sampled. At some sites where geologic heterogeneities are sufficiently different within the screened interval, higher conductivity zones may be preferentially sampled. This is another reason to use shorter screened intervals, especially where high spatial resolution is a sampling objective.

B. Water Quality Indicator Parameters

It is recommended that water quality indicator parameters be used to determine purging needs prior to sample collection in each well. Stabilization of parameters such as pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature and turbidity should be used to determine when formation water is accessed during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by oxidation-reduction potential, dissolved oxygen and turbidity. Temperature and pH, while commonly used as purging indicators, are actually quite insensitive in distinguishing between formation water and stagnant casing water; nevertheless, these are important parameters for data interpretation purposes and should also be measured. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator parameters. Instruments are available which utilize in-line flow cells to continuously measure the above parameters.

It is important to establish specific well stabilization criteria and then consistently follow the same methods thereafter, particularly with respect to drawdown, flow rate and sampling device. Generally, the time or purge volume required for parameter stabilization is independent of well depth or well volumes. Dependent variables are well diameter, sampling device, hydrogeochemistry, pump flow rate, and whether the devices are used in a portable or dedicated manner. If the sampling device is already in place (i.e., dedicated sampling systems), then the time and purge volume needed for stabilization is much shorter. Other advantages of dedicated equipment include less purge water for waste disposal, much less decontamination of equipment, less time spent in preparation of sampling as well as time in the field, and more consistency in the sampling approach which probably will translate into less variability in sampling results. The use of dedicated equipment is strongly recommended at wells which will undergo routine sampling over time.

If parameter stabilization criteria are too stringent, then minor oscillations in indicator parameters may cause purging operations to become unnecessarily protracted. It should also be noted that turbidity is a very conservative parameter in terms of stabilization. Turbidity is always the last parameter to stabilize. Excessive purge times are invariably related to the establishment of too stringent turbidity stabilization criteria. It should be noted that natural turbidity levels in ground water may exceed 10 nephelometric turbidity units (NTU).

C. Advantages and Disadvantages of Low-Flow (Minimum Drawdown) Purging

In general, the advantages of low-flow purging include:

- samples which are representative of the *mobile* load of contaminants present (dissolved and colloid-associated);
- minimal disturbance of the sampling point thereby minimizing sampling artifacts;
- less operator variability, greater operator control;

- reduced stress on the formation (minimal drawdown);
- less mixing of stagnant casing water with formation water;
- reduced need for filtration and, therefore, less time required for sampling;
- smaller purging volume which decreases waste disposal costs and sampling time;
- better sample consistency; reduced artificial sample variability.

Some disadvantages of low-flow purging are:

- higher initial capital costs,
- greater set-up time in the field,
- need to transport additional equipment to and from the site,
- increased training needs,
- resistance to change on the part of sampling practitioners,
- concern that new data will indicate a *change in conditions* and trigger an *action*.

IV. Low-Flow (Minimal Drawdown) Sampling Protocols

The following ground-water sampling procedure has evolved over many years of experience in ground-water sampling for organic and inorganic compound determinations and as such summarizes the authors' (and others) experiences to date (Barcelona et al., 1984, 1994; Barcelona and Helfrich, 1986; Puls and Barcelona, 1989; Puls et. al. 1990, 1992; Puls and Powell, 1992; Puls and Paul, 1995). High-quality chemical data collection is essential in ground-water monitoring and site characterization. The primary limitations to the collection of *representative* ground-water samples include: mixing of the stagnant casing and fresh screen waters during insertion of the sampling device or ground-water level measurement device; disturbance and resuspension of settled solids at the bottom of the well when using high pumping rates or raising and lowering a pump or bailer; introduction of atmospheric gases or degassing from the water during sample handling and transfer, or inappropriate use of vacuum sampling device, etc.

A. Sampling Recommendations

Water samples should not be taken immediately following well development. Sufficient time should be allowed for the ground-water flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well construction materials. This lag time will depend on site conditions and methods of installation but often exceeds one week.

Well purging is nearly always necessary to obtain samples of water flowing through the geologic formations in the screened interval. Rather than using a general but arbitrary guideline of purging three casing volumes prior to sampling, it is recommended that an in-line water quality measurement device (e.g., flow-through cell) be used to establish the stabilization time for several parameters (e.g. , pH, specific conductance, redox, dissolved oxygen, turbidity) on a well-specific basis. Data on pumping rate, drawdown, and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

The following are recommendations to be considered before, during and after sampling:

- use low-flow rates (<0.5 L/min), during both purging and sampling to maintain minimal drawdown in the well;
- maximize tubing wall thickness, minimize tubing length;
- place the sampling device intake at the desired sampling point;
- minimize disturbances of the stagnant water column above the screened interval during water level measurement and sampling device insertion;
- make proper adjustments to stabilize the flow rate as soon as possible;
- monitor water quality indicators during purging;
- collect unfiltered samples to estimate contaminant loading and transport potential in the subsurface system.

B. Equipment Calibration

Prior to sampling, all sampling device and monitoring equipment should be calibrated according to manufacturer's recommendations and the site Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP). Calibration of pH should be performed with at least two buffers which bracket the expected range. Dissolved oxygen calibration must be corrected for local barometric pressure readings and elevation.

C. Water Level Measurement and Monitoring

It is recommended that a device be used which will least disturb the water surface in the casing. Well depth should be obtained from the well logs. Measuring to the bottom of the well casing will only cause resuspension of settled solids from the formation and require longer purging times for turbidity equilibration. Measure well depth after sampling is completed. The water level measurement should be taken from a permanent reference point which is surveyed relative to ground elevation.

D. Pump Type

The use of low-flow (e.g., 0.1-0.5 L/min) pumps is suggested for purging and sampling all types of analytes. All pumps have some limitation and these should be investigated with respect to application at a particular site. Bailers are inappropriate devices for low-flow sampling.

1) General Considerations

There are no unusual requirements for ground-water sampling devices when using low-flow, minimal drawdown techniques. The major concern is that the device give consistent results and minimal disturbance of the sample across a range of *low* flow rates (i.e., < 0.5 L/min). Clearly, pumping rates that cause minimal to no drawdown in one well could easily cause *significant* drawdown in another well finished in a less transmissive formation. In this sense, the pump should not cause undue pressure or temperature changes or physical disturbance on the water sample over a reasonable sampling range. Consistency in operation is critical to meet accuracy and precision goals.

2) Advantages and Disadvantages of Sampling Devices

A variety of sampling devices are available for low-flow (minimal drawdown) purging and sampling and include peristaltic pumps, bladder pumps, electrical submersible pumps, and gas-driven pumps. Devices which lend themselves to both dedication and consistent operation at definable low-flow rates are preferred. It is desirable that the pump be easily adjustable and operate reliably at these lower flow rates. The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and some volatiles loss. Gas-driven pumps should be of a type that does not allow the gas to be in direct contact with the sampled fluid.

Clearly, bailers and other *grab* type samplers are ill-suited for low-flow sampling since they will cause repeated disturbance and mixing of *stagnant* water in the casing and the *dynamic* water in the screened interval. Similarly, the use of inertial lift foot-valve type samplers may cause too much disturbance at the point of sampling. Use of these devices also tends to introduce uncontrolled and unacceptable operator variability.

Summaries of advantages and disadvantages of various sampling devices are listed in Herzog et al. (1991), U. S. EPA (1992), Parker (1994) and Thumblad (1994).

E. *Pump Installation*

Dedicated sampling devices (left in the well) capable of pumping and sampling are preferred over <u>any</u> other type of device. Any portable sampling device should be slowly and carefully lowered to the middle of the screened interval or slightly above the middle (e.g., 1-1.5 m below the top of a 3 m screen). This is to minimize excessive mixing of the stagnant water in the casing above the screen with the screened interval zone water, and to minimize resuspension of solids which will have collected at the bottom of the well. These two disturbance effects have been shown to directly affect the time required for purging. There also appears to be a direct correlation between size of portable sampling devices relative to the well bore and resulting purge volumes and times. The key is to minimize disturbance of water and solids in the well casing.

F. *Filtration*

Decisions to filter samples should be dictated by sampling objectives rather than as a *fix* for poor sampling practices, and field-filtering of certain constituents should not be the default. Consideration should be given as to what the application of field-filtration is trying to accomplish. For assessment of truly dissolved (as opposed to operationally *dissolved* [i.e., samples filtered with 0.45 µm filters]) concentrations of major ions and trace metals, 0.1 µm filters are recommended although 0.45 µm filters are normally used for most regulatory programs. Alkalinity samples must also be filtered if significant particulate calcium carbonate is suspected, since this material is likely to impact alkalinity titration results (although filtration itself may alter the CO_2 composition of the sample and, therefore, affect the results).

Although filtration may be appropriate, filtration of a sample may cause a number of unintended changes to occur (e.g. oxidation, aeration) possibly leading to filtration-induced artifacts during sample analysis and uncertainty in the results. Some of these unintended changes may be unavoidable but the factors leading to them must be recognized. Deleterious effects can be minimized by consistent application of certain filtration guidelines. Guidelines should address selection of filter type, media, pore size, etc. in order to identify and minimize potential sources of uncertainty when filtering samples.

In-line filtration is recommended because it provides better consistency through less sample handling, and minimizes sample exposure to the atmosphere. In-line filters are available in both disposable (barrel filters) and non-disposable (in-line filter holder, flat membrane filters) formats and various filter pore sizes (0.1-5.0 µm). Disposable filter cartridges have the advantage of greater sediment handling capacity when compared to traditional membrane filters. Filters must be pre-rinsed following manufacturer's recommendations. If there are no recommendations for rinsing, pass through a minimum of 1 L of ground water following purging and prior to sampling. Once filtration has begun, a filter cake may develop as particles larger than the pore size accumulate on the filter membrane. The result is that the effective pore diameter of the membrane is reduced and particles smaller than the stated pore size are excluded from the filtrate. Possible corrective measures include prefiltering (with larger pore size filters), minimizing particle loads to begin with, and reducing sample volume.

G. *Monitoring of Water Level and Water Quality Indicator Parameters*

Check water level periodically to monitor drawdown in the well as a guide to flow rate adjustment. The goal is minimal drawdown (<0.1 m) during purging. This goal may be difficult to achieve under some circumstances due to geologic heterogeneities within the screened interval, and may require adjustment based on site-specific conditions and personal experience. In-line water quality indicator parameters should be continuously monitored during purging. The water quality

indicator parameters monitored can include pH, redox potential, conductivity, dissolved oxygen (DO) and turbidity. The last three parameters are often most sensitive. Pumping rate, drawdown, and the time or volume required to obtain stabilization of parameter readings can be used as a future guide to purge the well. Measurements should be taken every three to five minutes if the above suggested rates are used. Stabilization is achieved after all parameters have stabilized for three successive readings. In lieu of measuring all five parameters, a minimum subset would include pH, conductivity, and turbidity or DO. Three successive readings should be within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for redox potential, and ± 10% for turbidity and DO. Stabilized purge indicator parameter trends are generally obvious and follow either an exponential or asymptotic change to stable values during purging. Dissolved oxygen and turbidity usually require the longest time for stabilization. The above stabilization guidelines are provided for rough estimates based on experience.

H. Sampling, Sample Containers, Preservation and Decontamination

Upon parameter stabilization, sampling can be initiated. If an in-line device is used to monitor water quality parameters, it should be disconnected or bypassed during sample collection. Sampling flow rate may remain at established purge rate or may be adjusted slightly to minimize aeration, bubble formation, turbulent filling of sample bottles, or loss of volatiles due to extended residence time in tubing. Typically, flow rates less than 0.5 L/min are appropriate. The same device should be used for sampling as was used for purging. Sampling should occur in a progression from least to most contaminated well, if this is known. Generally, volatile (e.g., solvents and fuel constituents) and gas sensitive (e.g., Fe^{2+}, CH_4, H_2S/HS^-, alkalinity) parameters should be sampled first. The sequence in which samples for most inorganic parameters are collected is immaterial unless filtered (dissolved) samples are desired. Filtering should be done last and in-line filters should be used as discussed above. During both well purging and sampling, proper protective clothing and equipment must be used based upon the type and level of contaminants present.

The appropriate sample container will be prepared in advance of actual sample collection for the analytes of interest and include sample preservative where necessary. Water samples should be collected directly into this container from the pump tubing.

Immediately after a sample bottle has been filled, it must be preserved as specified in the site (QAPP). Sample preservation requirements are based on the analyses being performed (use site QAPP, FSP, RCRA guidance document [U. S. EPA, 1992] or EPA SW-846 [U. S. EPA, 1982]). It may be advisable to add preservatives to sample bottles in a controlled setting prior to entering the field in order to reduce the chances of improperly preserving sample bottles or introducing field contaminants into a sample bottle while adding the preservatives.

The preservatives should be transferred from the chemical bottle to the sample container using a disposable polyethylene pipet and the disposable pipet should be used only once and then discarded.

After a sample container has been filled with ground water, a Teflon™ (or tin)-lined cap is screwed on tightly to prevent the container from leaking. A sample label is filled out as specified in the FSP. The samples should be stored inverted at 4°C.

Specific decontamination protocols for sampling devices are dependent to some extent on the type of device used and the type of contaminants encountered. Refer to the site QAPP and FSP for specific requirements.

I. Blanks

The following blanks should be collected:

(1) field blank: one field blank should be collected from each source water (distilled/deionized water) used for sampling equipment decontamination or for initiating well development procedures.

(2) equipment blank: one equipment blank should be taken prior to the commencement of field work, from each set of sampling equipment to be used for that day. Refer to site QAPP or FSP for specific requirements.

(3) trip blank: a trip blank is required to accompany each volatile sample shipment. These blanks are prepared in the laboratory by filling a 40-mL volatile organic analysis (VOA) bottle with distilled/deionized water.

V. Low-Permeability Formations and Fractured Rock

The overall sampling program goals or sampling objectives will drive how the sampling points are located, installed, and choice of sampling device. Likewise, site-specific hydrogeologic factors will affect these decisions. Sites with very low permeability formations or fractures causing discrete flow channels may require a unique monitoring approach. Unlike water supply wells, wells installed for ground-water quality assessment and restoration programs are often installed in low water-yielding settings (e.g., clays, silts). Alternative types of sampling points and sampling methods are often needed in these types of environments, because low-permeability settings may require extremely low-flow purging (<0.1 L/min) and may be technology-limited. Where devices are not readily available to pump at such low flow rates, the primary consideration is to avoid dewatering of

the well screen. This may require repeated recovery of the water during purging while leaving the pump in place within the well screen.

Use of low-flow techniques may be impractical in these settings, depending upon the water recharge rates. The sampler and the end-user of data collected from such wells need to understand the limitations of the data collected; i.e., a strong potential for underestimation of actual contaminant concentrations for volatile organics, potential false negatives for filtered metals and potential false positives for unfiltered metals. It is suggested that comparisons be made between samples recovered using low-flow purging techniques and samples recovered using passive sampling techniques (i.e., two sets of samples). Passive sample collection would essentially entail acquisition of the sample with no or very little purging using a dedicated sampling system installed within the screened interval or a passive sample collection device.

A. Low-Permeability Formations (<0.1 L/min recharge)

1. Low-Flow Purging and Sampling with Pumps

a. "portable or non-dedicated mode" - Lower the pump (one capable of pumping at <0.1 L/min) to mid-screen or slightly above and set in place for minimum of 48 hours (to lessen purge volume requirements). After 48 hours, use procedures listed in Part IV above regarding monitoring water quality parameters for stabilization, etc., but do not dewater the screen. If excessive drawdown and slow recovery is a problem, then alternate approaches such as those listed below may be better.

b. "dedicated mode" - Set the pump as above at least a week prior to sampling; that is, operate in a dedicated pump mode. With this approach significant reductions in purge volume should be realized. Water quality parameters should stabilize quite rapidly due to less disturbance of the sampling zone.

2. Passive Sample Collection

Passive sampling collection requires insertion of the device into the screened interval for a sufficient time period to allow flow and sample equilibration before extraction for analysis. Conceptually, the extraction of water from low yielding formations seems more akin to the collection of water from the unsaturated zone and passive sampling techniques may be more appropriate in terms of obtaining "representative" samples. Satisfying usual sample volume requirements is typically a problem with this approach and some latitude will be needed on the part of regulatory entities to achieve sampling objectives.

B. Fractured Rock

In fractured rock formations, a low-flow to zero purging approach using pumps in conjunction with packers to isolate the sampling zone in the borehole is suggested. Passive multi-layer sampling devices may also provide the most "representative" samples. It is imperative in these settings to identify flow paths or water-producing fractures prior to sampling using tools such as borehole flowmeters and/or other geophysical tools.

After identification of water-bearing fractures, install packer(s) and pump assembly for sample collection using low-flow sampling in "dedicated mode" or use a passive sampling device which can isolate the identified water-bearing fractures.

VI. Documentation

The usual practices for documenting the sampling event should be used for low-flow purging and sampling techniques. This should include, at a minimum: information on the conduct of purging operations (flow-rate, drawdown, water-quality parameter values, volumes extracted and times for measurements), field instrument calibration data, water sampling forms and chain of custody forms. See Figures 2 and 3 and "Ground Water Sampling Workshop -- A Workshop Summary" (U. S. EPA. 1995) for example forms and other documentation suggestions and information. This information coupled with laboratory analytical data and validation data are needed to judge the "useability" of the sampling data.

VII. Notice

The U.S. Environmental Protection Agency through its Office of Research and Development funded and managed the research described herein as part of its in-house research program and under Contract No. 68-C4-0031 to Dynamac Corporation. It has been subjected to the Agency's peer and administrative review and has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

VIII. References

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Figure 2. Ground Water Sampling Log

Project _____ Site _____ Well No. _____ Date _____

Well Depth _____ Screen Length _____ Well Diameter _____ Casing Type _____

Sampling Device _____ Tubing type _____ Water Level _____

Measuring Point _____ Other Infor _____

Sampling Personnel _____

Time	pH	Temp	Cond.	Dis.O_2	Turb.	[ ]Conc			Notes

Type of Samples Collected

_____

Information: 2 in = 517 ml/ft, 4 in = 2470 ml/ft: Vol_{cyl} = m^2h, Vol_{sphere} = $4/3\pi r^3$

Figure 3. **Ground Water Sampling Log** (with automatic data logging for most water quality parameters)

Project _____ **Site** _____ **Well No.** _____ **Date** _____

Well Depth _____ **Screen Length** _____ **Well Diameter** _____ **Casing Type** _____

Sampling Device _____ **Tubing type** _____ **Water Level** _____

Measuring Point _____ **Other Infor** _____

Sampling Personnel _____

Time	Pump Rate	Turbidity	Alkalinity	[ ] Conc	Notes

Type of Samples Collected _____

Information: 2 in = 617 ml/ft, 4 in = 2470 ml/ft: $Vol_{cyl} = \pi r^2 h$, $Vol_{sphere} = 4/3\pi r^3$

SAMPLE HANDLING

Samples will be collected into appropriate precleaned containers, and preserved in an appropriate manner. Samples will be placed on ice and cooled to 4^0 C, and will be shipped or delivered to lab, within 48 hours of collection. A detailed sample collection log will be completed for each sample.

SAMPLE CUSTODY

Immediately following sample collection, each sample container will be marked with the following information.

- sample ID number
- project name/number
- date/time collected
- analytical parameter(s)
- sampler's name
- preservatives, if any

After the sample identification information has been recorded, each sample label will be covered with waterproof clear plastic tape to secure the sample container label and preserve its integrity. All samples will be recorded and tracked under strict chain-of-custody protocols. In the field, each sample will be sealed and checked for proper labeling. The samples will then be packed into coolers with blue ice packs (or ice) and shipped or transported to the laboratory. A chain-of-custody form will be completed for each cooler. The form will be signed and dated by the person who collected the samples, the person the samples were relinquished to for transport to the laboratory, and the laboratory sample controller/custodian who receives the samples.

CONCRETE CORING/SAMPLING

INTRODUCTION

A concrete coring machine will be used to collect representative concrete samples from the rip-rap along the shoreline.

METHODOLOGY

1. An electrical source (i.e., an electrical outlet or generator) and a water source is needed to power the concrete coring machine and to cool the diamond tipped core barrel, respectively. The electrical source should have a GSI breaker due to the proximity to surface water.

2. The hand held coring machine (WEKA or equivalent brand) should be used.

3. Connect water source and core barrel to coring machine. Use a 2-inch diameter core barrel with the hand held coring machine. Begin coring concrete.

4. After core is completed though the concrete or to the desired depth, turn off water source and disconnect the electric source. The concrete core can then be removed from the core barrel.

5. To the extent feasible, the concrete core sample should be separated into three sections (top 1/3, middle 1/3 and bottom 1/3). This separation will help define the vertical distribution of impact. Once separated, the concrete should placed into a laboratory provided sample container.

6. Label sample container and preserve as directed by the laboratory.

7. Document sample location and depth sample was collected in the Log book.

EQUIPMENT REQUIREMENTS

- Personal protective garment and gear (if applicable)
- Plastic sheeting - work bench/table
- Engineer's rule/measuring tape
- Log book
- Suitable pre-labeled sample container(s)
- Gloves (latex)
- Hammer to break concrete into the laboratory desired size.

DECONTAMINATION

1. Wash core barrel and hammer thoroughly with TSP or Liquinox™ and tap water using a brush to remove any particulate matter or surface film;

2. Rinse with tap water twice.

INVESTIGATION DERIVED WASTES

Wastes generated during the testing pitting and the drilling of borings, installation of monitoring wells, decontamination activities, and other related field activities will be properly characterized and disposed in accordance with all applicable state and federal laws and regulations.

BASF Corporation

BASF

December 18, 2000

Ms. Beth Vens
Environmental Quality Analyst
Environmental Response Division
Department of Environmental Quality
38980 Seven Mile Road
Livonia, Michigan 48152

Subject: Feasibility of Stabilizing Landfill Materials
BASF Corporation, Riverview Property

Dear Ms. Vens:

This letter summarizes the feasibility of stabilizing the materials at BASF Corporation's Riverview property, in Riverview, Michigan. The goal of a stabilization effort would be to eliminate the discharge of chemicals into the Detroit River at concentrations above Michigan Department of Environmental Quality criteria via solidification. The wastes present at the Riverview property contain materials that are not amenable to stabilization. Additionally, the in-situ stabilization processes would be difficult to implement because the heterogeneous and non-soil-like materials inhibit the intimate mixing of additives to ensure a successful remedy.

BACKGROUND

BASF has worked with the DEQ since September 1998 to develop a remedial strategy for the Riverview property. As a step to reach our goal, BASF agreed to perform a Feasibility Study and evaluate technologies that attain the goal of stopping the discharge or venting of chemicals to the Trenton Channel at concentrations above the applicable groundwater-surface water interface criteria. The DEQ suggested that BASF consider stabilization as a potential technology, and BASF agreed. To evaluate the applicability of stabilization, BASF performed a field investigation in August 2000 in accordance with Malcolm Pirnie's "Site Investigation Work Plan" (June 26, 2000).

FIELD INVESTIGATION

BASF retained URS Corporation to perform the field investigation as presented in Malcolm Pirnie's work plan. URS conducted magnetic and electromagnetic geophysical surveys over the BASF Riverview property to evaluate the presence of buried metallic objects and to measure the conductivity of the subsurface materials. Based on the results of the geophysical surveys Malcolm Pirnie and the DEQ identified six anomalies to be explored by digging test pits.

BASF completed test-pit excavations at ten locations. Six of the locations (TP-1, 2, 3, 4, 5, and 6) were selected by the DEQ and Malcolm Pirnie. The remaining

1609 Biddle Avenue, Wyandotte, Michigan 48192 Telephone (734) 324-6000

four test pits were completed to identify subsurface geotechnical conditions. BASF and URS selected these four locations, and they were not associated with magnetic or electromagnetic anomalies. Descriptive logs and photographs were prepared for each test pit by URS and are attached to this letter. The DEQ conducted oversight activities. Both URS and DEQ representatives collected composite samples of the excavated materials for laboratory analysis. Following completion, the test pits were backfilled to grade with excavated materials.

As shown in the attached logs and photographs, the material within the landfill is heterogeneous. Materials unearthed include gravel and sand fill, metal bands, bricks, rubber hoses, steel pipe, boulders, metal building siding, chunks of concrete, reinforcing steel, and lumber. This is especially evident near areas TP-4, -5, and -6.

STABILIZATION TECHNOLOGIES

Stabilization technologies involve mixing absorptive or solidification agents with the waste materials to produce a soil-like mixture that inhibits leaching of contaminants. Eliminating the discharge of heavy metals into the Trenton Channel would involve the addition of pozzolanic and Portland cement-based materials. Containment is produced by physically or chemically trapping the waste in the pozzolan/concrete matrix.

The stabilization process is accomplished by mixing the additive with the waste materials either in-situ or ex-situ. Successful stabilization requires intimate contact between the additive and the materials requiring encapsulating. Therefore, the smaller the particle size of the waste, the more successful the stabilization.

The in-situ process is more desirable because it is safer, faster, and less expensive. Typically, the additive is delivered pneumatically. Alternatively, the additive may be pumped in a slurry form from a container to an excavator with a specially fitted mixing head. The additive is mixed with the excavator in a repetitive process over the predetermined area.

The ex-situ process involves excavating the waste material and placing the waste along with the reagent additive in a pug mill. After mixing, the mixture is placed back into the ground.

Ex-situ stabilization requires excavating the materials from the landfill. Materials not amenable to stabilization (the larger-sized materials described above) would be separated, removed, decontaminated, and disposed off site. A large amount of the waste in the landfill is located beneath the water table. The liquids associated with the waste deposits would require some control system to prevent spills and uncontrolled discharges to the land and surface water. The high moisture content of the materials would require larger volumes of the stabilization

agent when compared to materials located above the water table. The balance of the more soil-like materials would then be combined with the stabilization additive in a pug mill, mixed, and returned to the landfill. Employees working on the sorting and ex-situ stabilization process will require Level B or Level C personal protective equipment. Also, an emission monitoring and control system potentially would be required because of the volatile organics present in the landfill. The stabilization process would take several months to accomplish, and would require significant stockpile areas to accommodate classification, storage, sorting, decontamination, disposal, and pre- and post-stabilization quality control testing. Quite likely, these stockpiles would need to be covered; otherwise rainfall collection, storage, and treatment systems would be needed to prevent uncontrolled leachate discharges from the operation.

APPLICABILTY OF THE STABILZATION PROCESS

URS contacted Rocky Mountain Remediation Services LLC (RMRS) of Golden, Colorado, to evaluate the applicability of cement-based processes to stabilize metals. RMRS successfully stabilized metal-containing waste materials, including mining wastes and military firing range wastes (lead contaminated soils), using their Envirobond™ process. The Envirobond™ additive includes a phosphate chain that binds with metallic ions to form an insoluble complex. The additive also binds the waste particles together. Mr. Frank Mangold (303-215-6682) of RMRS described the RMRS successes stabilizing wastes containing arsenic, cadmium, chromium, lead, zinc, and selenium; however, he said that stabilization of mercury-containing wastes met with limited success. The stabilization of mercury-containing wastes has not been implemented in a full-scale effort.

CONCLUSION

Based on the information collected during the assessments at the Riverview property, URS believes the addition of absorptive and/or stabilizing additives is inadequate to reduce the ability of the waste materials to leach.

Due to the proximity of the Trenton Channel and the water table, continued wetting of the wastes will decrease the effectiveness of absorptive agents. Consequently, the volume of absorptive material required to dewater the waste deposits effectively would be extremely large.

The diverse size and composition of the waste materials will inhibit the performance of stabilizing agents. The material in the landfill includes gravel, sand, clay, metal bands, bricks, rubber hoses, steel pipe, boulders, metal building siding, chunks of concrete, reinforcing steel, and lumber. The mixing process would be slowed or halted when the mixing device encounters materials that could damage the equipment.

Finally, the cement-based, phosphorus-based, and/or pozzolanic stabilization processes have not been proven to encapsulate all the site-related chemicals effectively.

BASF personnel concur with URS's conclusions.

We hope this letter effectively portrays our reservations with the stabilization technologies. Please call Mr. Jack Lanigan at 734-324-6219 with questions, or you may call me at 734-324-6209.

Sincerely,

Thomas F. McGourty
Manager, Safety, Health, and the Environment

Attachments

cc: Mike Ribordy, EPA
Keith Mast, URS (w/out attachments)
Paul Alessio, URS (w/out attachments)
Jack Lanigan (w/out attachments)

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PHOTO JOURNAL
TEST PIT PHOTOGRAPHS – BASF RIVERVIEW, MI SITE
MDEQ ASSESSMENT - AUGUST 2000

Photo 1 Test Pit 1 – August 31, 2000.

Photo 2: Test Pit 1 – August 31, 2000

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Photo 3: Test Pit 1 – August 31, 2000

Photo 4: Test Pit 2 – August 30, 2000

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Photo 5: Test Pit 2 – August 30, 2000

Photo 6: Test Pit 2 – August 30, 2000

Photo 7: Test Pit 3 – August 31, 2000.

Photo 8: Test Pit 3 – August 31, 2000

Photo 9: Test Pit 4 – August 31, 2000

Photo 10: Test Pit 4 – August 31, 2000

Photo 13: Test Pit 5 – August 30, 2000

Photo 14: Test Pit 5 – August 30, 2000

Photo 11 Test Pit 5 – August 30, 2000.

Photo 12: Test Pit 5 – August 30, 2000

Photo 15: Test Pit 6 – August 30, 2000

Photo 16: Test Pit 6 – August 31, 2000

Photo 17: Test Pit 6 – August 31, 2000

Photo 18: Test Pit 6 – August 31, 2000

Photo 19: Test Pit 7 – August 30, 2000

Photo 20: Test Pit 7 – August 30, 2000

Photo 21: Test Pit 8 – August 30, 2000

Photo 22: Test Pit 8 – August 30, 2000

Photo 23: Test Pit 9 – August 30, 2000

Photo 24: Test Pit 9 – August 30, 2000

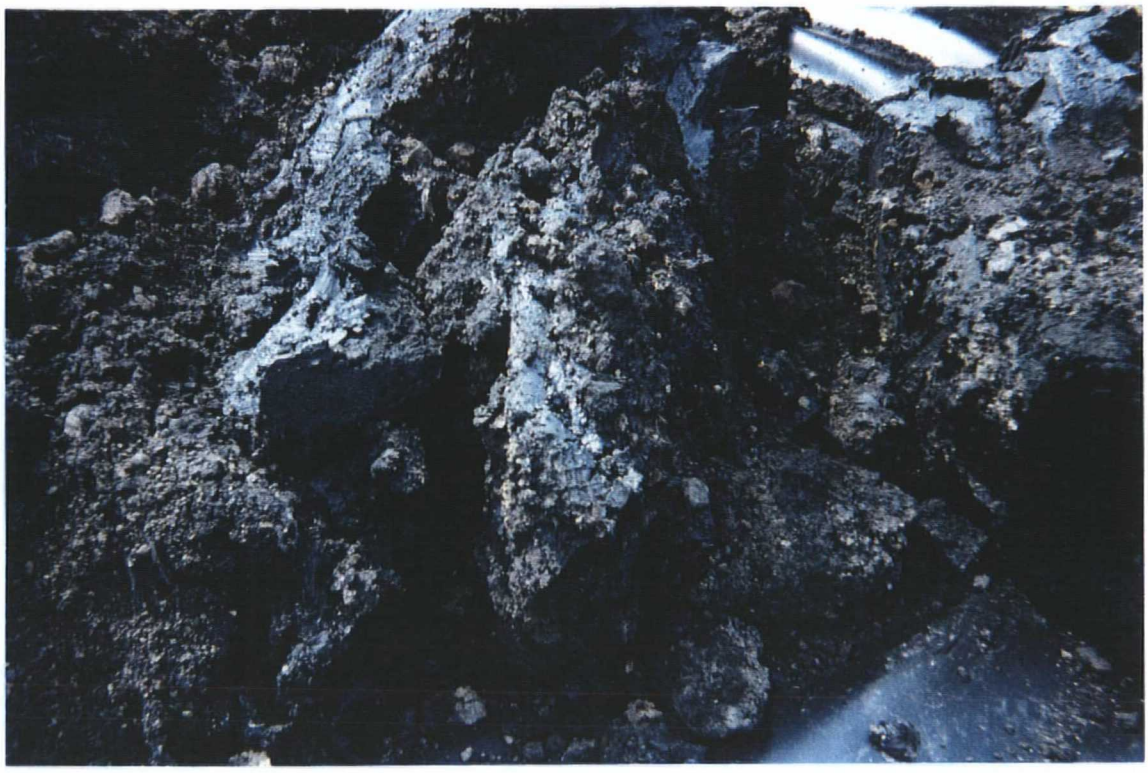

Photo 25: Test Pit 10 – August 30, 2000

Photo 26: Test Pit 10 – August 30, 2000

Photo 27: Test Pit 10 –August 30, 2000

Photo 28: Test Pit 10 – August 30, 2000

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-1 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	11'
Groundwater Level(s)	8.7'	Sampling Method	NA	Ground Suface Elevation(IGLD)	581.74
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 905,E 735

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN CLAY CAP MATERIAL	
	2					
	4				(FILL) AGGREGATE 3-4" DIAMETER	
	6					
	8				(FILL,) BRICKS, DEBRI, PARTIAL DRUM, METAL STRIPPING WOOD, NEWSPAPER, PLASTIC.	
	10					
	12				PEAT ENCOUNTERED @ 11' FEET BELOW GRADE,	
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-2 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8'
Groundwater Level(s)	5.7'	Sampling Method	NA	Ground Suface Elevation(IGLD)	577.37
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 1115, E 635

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, SANDY CLAY.	
	2					
					(FILL) BRICK, STEEL BANDING, BOTTLES.	
	4					
	6					
					PEAT, MOIST DRY BLACK W/WOOD FRAGMENTS.	
	8				COMPOSITE 1 COLLECTED FROM TP-2 1- 8oz. JAR & 1- ENCORE SAMPLE @2:46p.m.	
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-3 Sheet 1 of 1

Date(s) Excavated	6-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	8.6	Sampling Method	NA	Ground Suface Elevation(IGLD)	579.98
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 500, E 520

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, SILTY CLAY.	
	2					
					LIMESTONE AGGREGATE 2-3" IN DIAMETER (FILL)	
	4				(FILL) MOIST BLACK FILL, WOOD, METAL SPRINGS	
	6				(FILL) DBO	H2S 6-8 ppm
					BLACK ORGANIC CLAY - PEAT	
	8					
	10					
					MOIST BROWN CLAY	
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-4 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	7.0'	Sampling Method	NA	Ground Suface Elevation(IGLD)	581.42
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 180, E 500

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, CLAY.	
	2					
	4				(FILL) MOIST BROWN COMPACTED CLAY	
	6					
	8				(FILL) MOIST, WET, BLACK, DBO, BRICKS, CABLE, HOSE, RUBBER GASKETS, 5 GALLON STEEL PAIL.	
	10					
	12					
	14				11:16 COMPOSITE SAMPLE COLLECTED NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-5 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	3'
Groundwater Level(s)	3'	Sampling Method	NA	Ground Suface Elevation(IGLD)	575.77
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 380, E 880

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				6" - TOP SOIL (FILL) WOOD, STEEL, PLASTIC, BRICK, GLASS, CONCRETE	
	2					
	4				BACKEHOE REFUSED @ 3.8' ft 10:14 COLLECTED COMPOSITE SAMPLE FROM STOCKPILE (TP-5 COMP) 1- 8oz. JAR & 1 ENCORE SAMPLE	
	6					
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-6 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	11'	Sampling Method	NA	Ground Suface Elevation(IGLD)	583.65
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 360, E 625

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOSIT BROWN CLAY	
	2				(FILL) MOIST BROWN COMPACTED CLAY	
	4					
	6				(FILL) MOIST GRAY CLAY	
	8					
			1-3		(FILL) WHITE LIGHT GRAY DBO	
	10					
					PEAT, MOIST, WET, BLACK SILTY SAND W/ WOOD FRAGMENTS	
	12				PID - 1-3 ppm	
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-7 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8.5'
Groundwater Level(s)	6.5'	Sampling Method	NA	Ground Suface Elevation(IGLD)	577.42
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 1098, E 885

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) SAND, GRAVEL W/ SOME CLAY	
	2					
	4					
	6				COBBLES & BOULDERS 18-24" IN DIAMETER	
	8				BLACK ORGANIC CLAY - PEAT	
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-8 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	7'
Groundwater Level(s)	5'	Sampling Method	NA	Ground Suface Elevation(IGLD)	576.70
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 852, E 908

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) TOP SOIL, PIECES OF HOSE CLAY	
					(FILL) SAND & GRAVEL	
	2				(FILL) SAND, GRAVEL, SMALL PIECES OF CONCRETE, PLASTIC HOSE, WOOD SOME DBO	
	4					
					BLACK TO GRAY ORGANIC CLAY – PEAT	
	6					
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-9 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8'
Groundwater Level(s)	4'	Sampling Method	NA	Ground Suface Elevation(IGLD)	576.52
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 606, E 927

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) SAND & GRAVEL	
	2				(FILL) WOOD, CERAMIC PIECIES, PLASTIC CABLE, DBO TO 3'	
	4					
	6					
					BLACK ORGANINC CLAY – PEAT	
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-10 Sheet 1 of 1

Date(s) Excavated	8-30-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	NA	Sampling Method	NA	Ground Suface Elevation(IGLD)	578.71
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 28, E 806

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) CLAY W/TOP SOIL	
	2					
	4				(FILL) SAND, GRAVEL (FROM FILTER PACK OF WELL M)	
	6				OILY LIQUID IN WELL SAND PACK	
	8				BLACK FIBROUS MATERIAL	
					PEAT, BLACK ORGANIC CLAY AND SILT	
	10				BLACK ORGANIC CLAY AND SILT SOME PEAT	
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-1 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	11'
Groundwater Level(s)	8.7'	Sampling Method	NA	Ground Suface Elevation(IGLD)	581.74
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 905,E 735

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN CLAY CAP MATERIAL	
	2					
	4				(FILL) AGGREGATE 3-4" DIAMETER	
	6					
	8				(FILL,) BRICKS, DEBRI, PARTIAL DRUM, METAL STRIPPING WOOD, NEWSPAPER, PLASTIC.	
	10					
	12				PEAT ENCOUNTERED @ 11' FEET BELOW GRADE,	
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-2 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8'
Groundwater Level(s)	5.7'	Sampling Method	NA	Ground Suface Elevation(IGLD)	577.37
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 1115, E 635

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, SANDY CLAY.	
	2				(FILL) BRICK, STEEL BANDING, BOTTLES.	
	4					
	6				PEAT, MOIST DRY BLACK W/WOOD FRAGMENTS.	
	8				COMPOSITE 1 COLLECTED FROM TP-2 1- 8oz. JAR & 1- ENCORE SAMPLE @2:46p.m.	
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-3 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	8.6	Sampling Method	NA	Ground Suface Elevation(IGLD)	579.98
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 500, E 520

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, SILTY CLAY.	
	2					
					LIMESTONE AGGREGATE 2-3" IN DIAMETER (FILL)	
	4				(FILL) MOIST BLACK FILL, WOOD, METAL SPRINGS	
	6				(FILL) DBO	H2S 6-8 ppm
					BLACK ORGANIC CLAY - PEAT	
	8					
	10					
					MOIST BROWN CLAY	
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-4 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	7.0'	Sampling Method	NA	Ground Suface Elevation(IGLD)	581.42
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 180, E 500

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOIST, BROWN, CLAY.	
	2					
	4				(FILL) MOIST BROWN COMPACTED CLAY	
	6					
	8				(FILL) MOIST, WET, BLACK, DBO, BRICKS, CABLE, HOSE, RUBBER GASKETS, 5 GALLON STEEL PAIL.	
	10					
	12				11:16 COMPOSITE SAMPLE COLLECTED	
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-5 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	3'
Groundwater Level(s)	3'	Sampling Method	NA	Ground Suface Elevation(IGLD)	575.77
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 380, E 880

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				6" – TOP SOIL (FILL) WOOD, STEEL, PLASTIC, BRICK, GLASS, CONCRETE	
	2					
	4				BACKEHOE REFUSED @ 3.8' ft 10:14 COLLECTED COMPOSITE SAMPLE FROM STOCKPILE (TP-5 COMP) 1- 8oz. JAR & 1 ENCORE SAMPLE	
	6					
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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URS

Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-6 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	11'	Sampling Method	NA	Ground Suface Elevation(IGLD)	583.65
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 360, E 625

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) MOSIT BROWN CLAY	
	2				(FILL) MOIST BROWN COMPACTED CLAY	
	4					
	6				(FILL) MOIST GRAY CLAY	
	8					
			1-3		(FILL) WHITE LIGHT GRAY DBO	
	10					
					PEAT, MOIST, WET, BLACK SILTY SAND W/ WOOD FRAGMENTS	
	12				PID - 1-3 ppm	
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-7 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	WILLIAM CLAYTON	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8.5'
Groundwater Level(s)	6.5'	Sampling Method	NA	Ground Suface Elevation(IGLD)	577.42
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 1098, E 885

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) SAND, GRAVEL W/ SOME CLAY	
	2					
	4					
	6				COBBLES & BOULDERS 18-24" IN DIAMETER	
	8				BLACK ORGANIC CLAY - PEAT	
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-8 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	7'
Groundwater Level(s)	5'	Sampling Method	NA	Ground Suface Elevation(IGLD)	576.70
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 852, E 908

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) TOP SOIL, PIECES OF HOSE CLAY	
					(FILL) SAND & GRAVEL	
	2				(FILL) SAND, GRAVEL, SMALL PIECES OF CONCRETE, PLASTIC HOSE, WOOD SOME DBO	
	4					
					BLACK TO GRAY ORGANIC CLAY - PEAT	
	6					
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-9 Sheet 1 of 1

Date(s) Excavated	8-31-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	8'
Groundwater Level(s)	4'	Sampling Method	NA	Ground Suface Elevation(IGLD)	576.52
Excavation Backfill	MATERIAL PLACED BACK	Comments		Coordinates	S 606, E 927

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) SAND & GRAVEL	
	2				(FILL) WOOD, CERAMIC PIECIES, PLASTIC CABLE, DBO TO 3'	
	4					
	6					
					BLACK ORGANINC CLAY – PEAT	
	8					
	10					
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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Project: BASF - Riverview Project Location: Riverview, Michigan Project Number: 38-08E06216.04	Log of Test Pit TP-10 Sheet 1 of 1

Date(s) Excavated	8-30-00	Logged By	KEITH MAST	Reviewed By	TIM WHIPPLE
Excavation Method	BACKHOE	Excavation Contractor		Total Depth (ft)	12'
Groundwater Level(s)	NA	Sampling Method	NA	Ground Suface Elevation(IGLD)	578.71
Excavation Backfill	MATERIAL PLACED BACK IN EXCAVATION	Comments		Coordinates	S 28, E 806

Elevation feet	Depth feet	SAMPLES Type Number	Headspace PID,ppm	Graphic Log	MATERIAL DISCRIPTION	FIELD NOTES
	0				(FILL) CLAY W/TOP SOIL	
	2					
	4				(FILL) SAND, GRAVEL (FROM FILTER PACK OF WELL M)	
	6				OILY LIQUID IN WELL SAND PACK	
					BLACK FIBROUS MATERIAL	
	8				PEAT, BLACK ORGANIC CLAY AND SILT	
	10				BLACK ORGANIC CLAY AND SILT SOME PEAT	
	12					
	14				NOTE: BACKGROUND PID READINGS CONTINUOUSLY MONITORED ONLY EXCEEDANCE OF BACKGROUND RECORDABLE ON TEST PIT LOGS.	

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PHOTO JOURNAL
TEST PIT PHOTOGRAPHS – BASF RIVERVIEW, MI SITE
MDEQ ASSESSMENT - AUGUST 2000

Photo 1 Test Pit 1 – August 31, 2000.

Photo 2: Test Pit 1 – August 31, 2000

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Photo 3: Test Pit 1 – August 31, 2000

Photo 4: Test Pit 2 – August 30, 2000

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Photo 5: Test Pit 2 – August 30, 2000

Photo 6: Test Pit 2 – August 30, 2000

Photo 7: Test Pit 3 – August 31, 2000.

Photo 8: Test Pit 3 – August 31, 2000

Photo 9: Test Pit 4 – August 31, 2000

Photo 10: Test Pit 4 – August 31, 2000

Photo 13: Test Pit 5 – August 30, 2000

Photo 14: Test Pit 5 – August 30, 2000

Photo 11 Test Pit 5 – August 30, 2000.

Photo 12: Test Pit 5 – August 30, 2000

Photo 15: Test Pit 6 – August 30, 2000

Photo 16: Test Pit 6 – August 31, 2000

Photo 17: Test Pit 6 – August 31, 2000

Photo 18: Test Pit 6 – August 31, 2000

Photo 19: Test Pit 7 – August 30, 2000

Photo 20: Test Pit 7 – August 30, 2000

Photo 21: Test Pit 8 – August 30, 2000

Photo 22: Test Pit 8 – August 30, 2000

Photo 23: Test Pit 9 – August 30, 2000

Photo 24: Test Pit 9 – August 30, 2000

Photo 25: Test Pit 10 – August 30, 2000

Photo 26: Test Pit 10 – August 30, 2000

Photo 27: Test Pit 10 –August 30, 2000

Photo 28: Test Pit 10 – August 30, 2000