March 10, 2017

Discharge Monitoring Report #161
(117-3005011.21)
Mr. Ralph Erickson, Pretreatment Coordinator
Madison Metropolitan Sewerage District
1610 Moorland Road
Madison, WI 53713-3398

RE: Monthly Discharge Monitoring Report (February 2017), Hydraulic Barrier System, Hydrite Chemical Co., Cottage Grove, Wisconsin

Dear Mr. Erickson:

Tetra Tech, on behalf of Hydrite Chemical Co., has prepared this discharge monitoring report to comply with the reporting requirements listed in Part 3 of the reissued Wastewater Discharge Permit for the Hydrite Chemical Co. Cottage Grove facility Hydraulic Barrier System (Permit No. NTO-88.06). This report provides information on the operation history and discharge monitoring results for the Hydraulic Barrier System for the month of February 2017. The following information is being provided in accordance with Section 3.01 of Part 3 (Reporting) of the reissued Wastewater Discharge Permit for the Hydrite Chemical Co. Cottage Grove facility Hydraulic Barrier System:

- Sample Type: Groundwater

- Place sample collected: Sample tap on the hydraulic barrier system effluent line located in the manhole east of the 110 Main Street lift station.

- Date and time that the sample was collected: February 7, 2017 at 1:50 PM.

- The person that collected the sample: Todd Thomson, Environmental Technician, Tetra Tech.

- The persons and laboratory performing the analyses: Pace Analytical Services Chemists, Pace Analytical Services, Inc., Green Bay, Wisconsin.

- Dates the analyses were performed and analytical techniques used:
  Analyses performed by Pace Analytical Services, Inc.:
  1. EPA Method 8260 for Volatile Organic Compounds (VOCs), , 2017.
  2. Method EPA 300.0 for Chloride, , 2017.

  Analysis performed in the field by Tetra Tech personnel:
  1. Field pH, February 7, 2017.
     The effluent sampling and analysis form containing the field pH result for the effluent sample and the equipment calibration form documenting the successful calibration of the instrument used to measure the effluent sample pH in the field are included in Attachment A.

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175 N. Corporate Drive, Suite 100, Brookfield, WI 53045
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- The laboratory analytical results for the monthly effluent sample collected from the hydraulic barrier system during this reporting period are included in Attachment A to this report and are summarized on Table 1.

- Total VOCs time series charts for the effluent samples collected from the hydraulic barrier system are provided as Chart 1 and Chart 2. Chart 1 displays the total VOCs concentrations and average pumping rates for the barrier system from 2003 to present, which is the year the barrier system was brought on-line. Chart 2 displays the total VOCs concentrations and average pumping rates for the barrier system from 2008 to present. A chart showing the total mass of VOCs and chlorinated VOCs discharged to the sanitary sewer is provided as Chart 3.

- The current month discharge and cumulative total discharge volumes are provided below:

Reporting Period	Groundwater Discharge Volume (gallons)
February 2017 Discharge Volume (January 31 through February 28, 2017)	4,348,870
Cumulative Total Discharge Volume (October 8, 2003 through February 28, 2017)	759,728,596

Hydraulic Barrier System Operation and Maintenance History for the Month of February 2017

Groundwater was pumped from extraction wells P-128, P-130, and P-164 during this reporting period. Total flow readings taken from the 3-inch Badger Magnetoflow® electromagnetic water meter (mag meter) indicate the hydraulic barrier system operated at an average pumping rate of 116 gallons per minute (gpm) in February.

Tetra Tech personnel treated extraction well P-164 with muriatic acid solution February 28th to March 1st to maintain the sustainable pumping rate of the well at the target rate of 50 to 55 gpm. Approximately 4 gallons of muriatic acid was poured into P-164 with the pump off followed by about 3 gallons of tap water. The pump was then turned on for about 15 seconds to introduce the muriatic acid solution into the discharge line of the pump. The pump was then turned off for approximately 24 hours to allow the muriatic solution to break down the slime bacteria build-up in the well and pump components. Extraction wells P-128 and P-130 were operating while P-164 was shut down for the muriatic acid solution treatment.

Based on meter readings collected from the water meters in the manholes at extraction wells P-128 and P-130 and the total barrier system flow readings from the mag meter, the extraction wells operated at the pumping rates listed below during this reporting period:

Extraction Wells Pumping Rates for February 2017

- P-128: 36.1 to 36.3 gpm
- P-130: 26.3 to 26.8 gpm

- P-164: 52.4 to 57.8 gpm (No pumping from P-164 for about 24 hours February 28th to March 1st.)

Occasions when the barrier system was shut down and re-started are listed below:

- Village of Cottage Grove Public Works Department personnel performed the weekly test of the backup generator in the 110 South Main Street lift station building on February 7th, February 14th, February 21st and February 28th. The hydraulic barrier system automatically shut down during the generator tests and was re-started the same day by Tetra Tech personnel after the generator tests were completed.

- The barrier system automatically shut down at 12:18 pm on Wednesday, February 1st due to a high lift station sump water level alarm condition caused by the failure of lift station pump #1. The pump was repaired by Village of Cottage Grove Public Works Department personnel. The barrier system was then re-started the same day by Tetra Tech personnel at 1:20 pm.

- The barrier system experienced a second automatic shut down due to the failure of lift station pump #1 on Saturday, February 5th at approximately 12:15 pm Lift station pump #1 was again repaired by Village of Cottage Grove Public Works Department personnel. The barrier system was then re-started the same day be Hydrite Chemical personnel at 1:40 pm.

- The barrier system automatically shut down at 12:10 pm on Sunday, February 19th due to a high lift station sump water level alarm condition caused by a plugged check valve on lift station pump #1. The plugged check valve was cleared by Village of Cottage Grove Public Works Department personnel. The barrier system was then re-started the same day by Hydrite Chemical personnel at 2:55 pm.

- A temporary power interruption at the 110 South Main Street lift station caused a shut-down of the barrier system at 4:30 pm on Friday, February 24th. Hydrite Chemical personnel re-started the barrier system at 12:04 pm on Saturday, November 25th.

This report was prepared by,

Tetra Tech

Mark A. Manthey, P.G.
Associate Hydrogeologist
encl.

cc: Mr. JJ Larson - Village of Cottage Grove (Electronic copy via email.)
Mr. Chris Hampton – Town of Cottage Grove
Mr. Thomas J. Miazga - Hydrite Chemical Co.
Mr. Raymond R. Krueger - Michael, Best & Friedrich, LLP
Mr. Michael R. Schmoller – Wisconsin Department of Natural Resources (Electronic copy via email.)

TABLE
AND CHARTS

Table 1. Summary of Hydraulic Barrier System Effluent Monitoring VOCs and Chloride Analytical Results, Hydrite Chemical Co., Cottage Grove Facility

Sample Identification					EFFLUENT	
Lab Sample Identification					40145461001	
Date Sample Collected					02/07/17	
Dilution Factor for VOCs					10	
COMPOUND	Units	Detection Limits	NR140 ES	NR140 PAL		
1,1,1-Trichloroethane	ug/L	0.50	200	40	154	
2-Butanone (MEK)	ug/L	3.0	460	90		U
4-Methyl-2-Pentanone (MIBK)	ug/L	2.1	500	50		U
Acetone	ug/L	3.0	1000	200		U
cis-1,2-Dichloroethene	ug/L	0.26	70	7	1180	
Methylene chloride	ug/L	0.23	5.0	0.5	18.4	
Tetrachloroethene	ug/L	0.50	5.0	0.5	5.9	J
Toluene	ug/L	0.50	1000	200	242	
Trichloroethene	ug/L	0.33	5.0	0.5	30.9	
Vinyl chloride	ug/L	0.18	0.2	0.02	77.1	
Xylenes (total)	ug/L	1.5	10000	1000	116	
TOTAL VOCs	ug/L				1824.3	
Total Chlorinated VOCs	ug/L				1466.3	
Chloride	mg/L	2.5	250	125	38.3	

Notes:
VOCs - Volatile organic compounds.
Blank spaces indicate the compound was analyzed but not detected. The detection limits for the VOCs are equal to the target detection limits multiplied by the corresponding dilution factor for each sample.
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
MO - Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1 - Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
U - Indicates the compound was analyzed but not detected.
X - Analyte was above the QC limits for the continuing calibration check.
ug/L - micrograms per liter which is equivalent to parts per billion (ppb)
NR140 ES - The compound's Enforcement Standard as listed in Chapter NR140 of the Wisconsin Administrative Code.
NR140 PAL - The compound's Preventive Action Limit as listed in Chapter NR140 of the Wisconsin Administrative Code.
Madison Metropolitan Sewerage District Total VOCs discharge limit for hydraulic barrier system = 10,000 ug/L or 10 mg/L (as of 12/13/2016).
The Madison Metroplitan Sewerage District set no discharge limit for chloride, but it is a parameter of concern.
"Effluent" samples are collected from the sample spigot on the combined effluent discharge line for the barrier system located in the manhole by the Village of Cottage Grove lift station.

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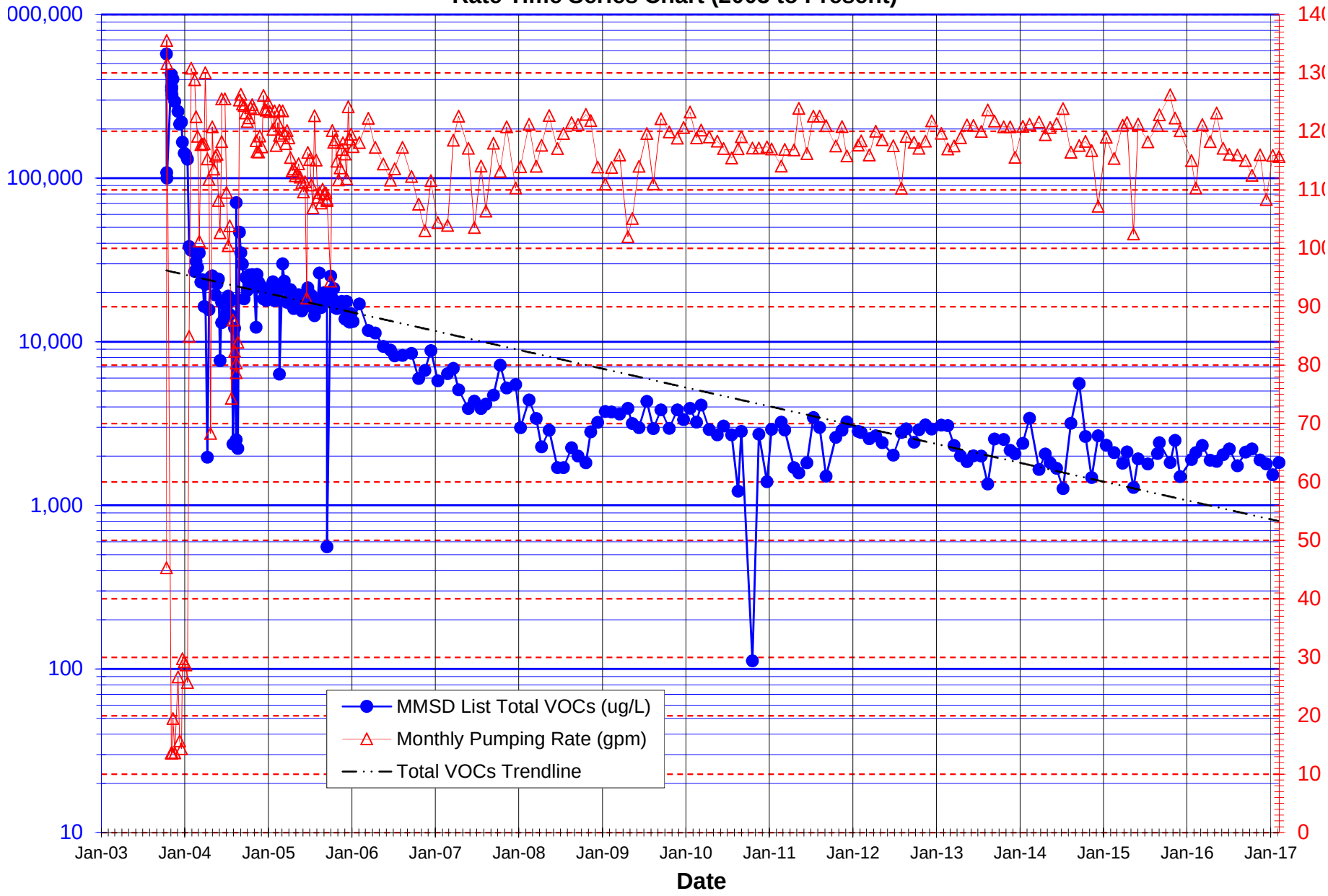
Chart 1. Hydrite Chemical Co. Hydraulic Barrier System MMSD List Total VOCs and Average Pumping Rate Time Series Chart (2003 to Present)



P:\Hydrite\Cottage Grove\Barrier system\Monitoring\Spreadsheets\Effluent_Chemistry.xlsx

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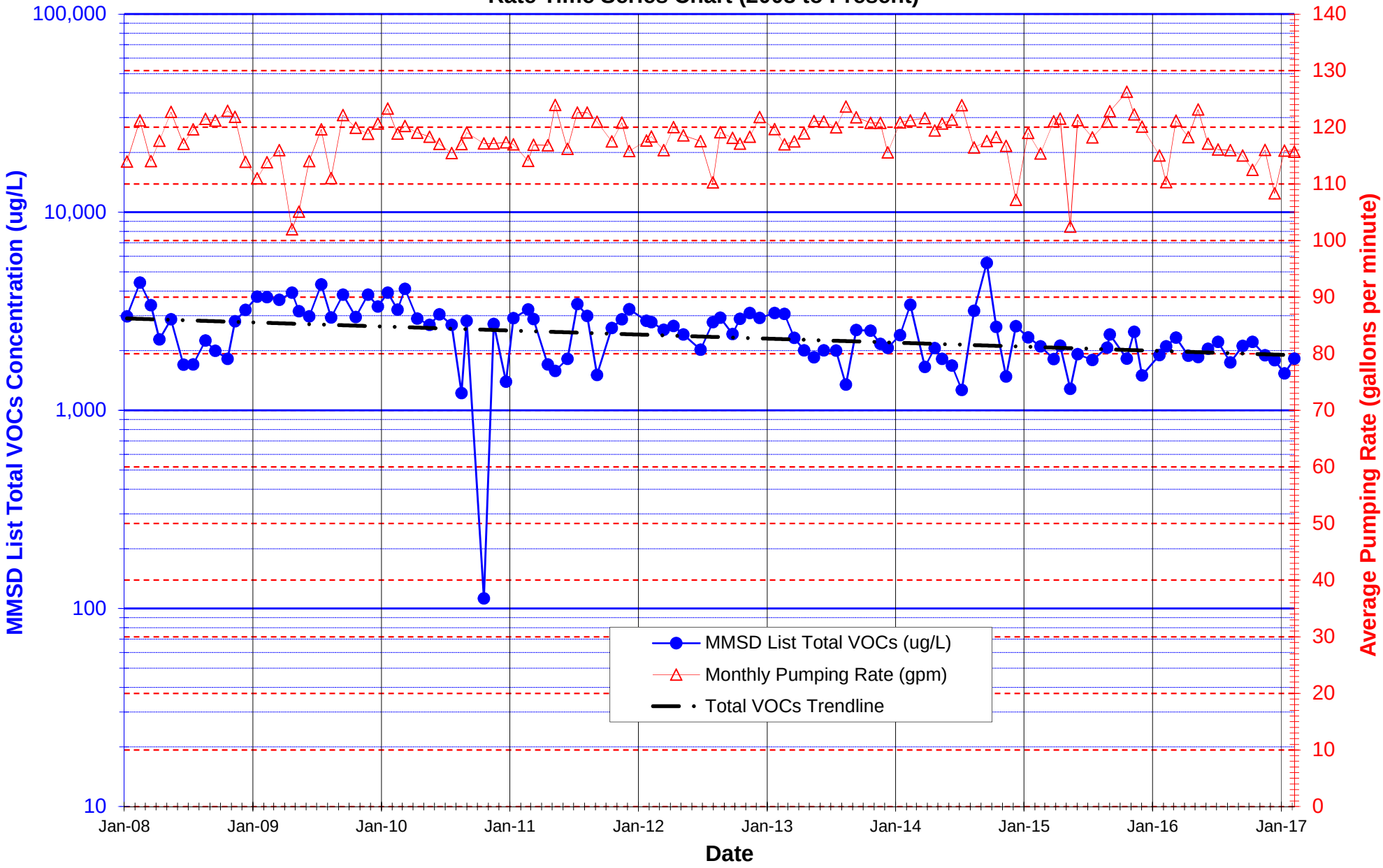
Chart 2. Hydrite Chemical Co. Hydraulic Barrier System MMSD List Total VOCs and Average Pumping Rate Time Series Chart (2008 to Present)



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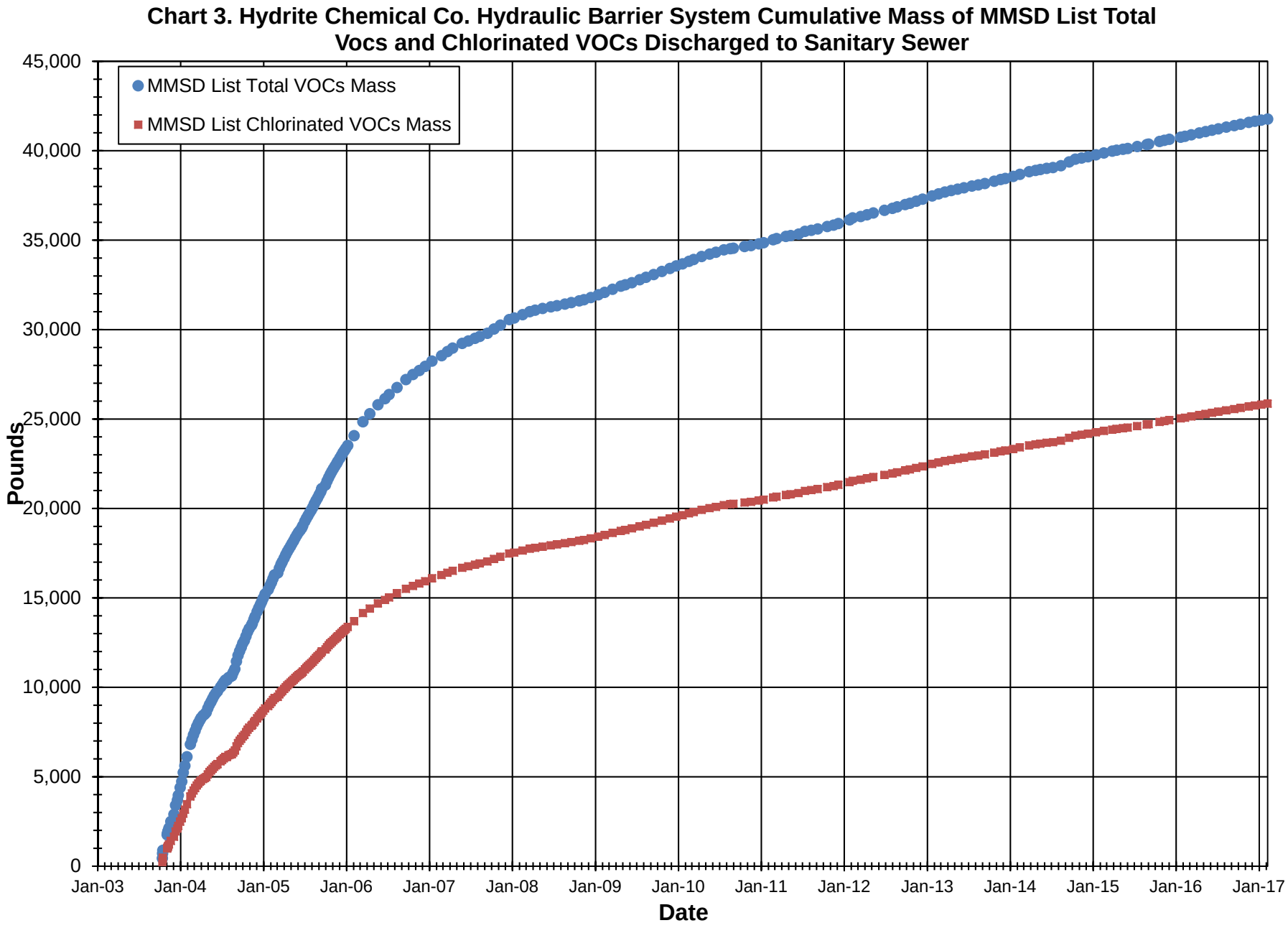
Chart 3. Hydrite Chemical Co. Hydraulic Barrier System Cumulative Mass of MMSD List Total Vocs and Chlorinated VOCs Discharged to Sanitary Sewer
MMSD List Total VOCs Mass
MMSD List Chlorinated VOCs Mass
Pounds
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Date

ATTACHMENT A
HYDRAULIC BARRIER SYSTEM
EFFLUENT SAMPLE FIELD FORMS AND
LABORATORY ANALYTICAL REPORT

TETRA TECH REMEDIATION SYSTEM EFFLUENT WATER QUALITY SAMPLING AND ANALYSIS FORM

PROJECT INFORMATION		INSTRUMENTS	
PROJECT	Hydrite Chemical Co., Cottage Grove Facility Layer 5 Hydraulic Barrier System Monitoring	Temp. & pH	Hanna Combo
PROJECT NO.	117-3005011.18	Conductivity	Hanna Combo
LOCATION	Cottage Grove, WI	ORP	NA
PERSONNEL	Todd M Thomson	DO	NA

SAMPLE ID	Effluent			
WATER TYPE	Groundwater			
DATE (month/day/year)	2-7-17			
CLOCK TIME (Military)	13:50			
FLOW METER READING (gallons)	27026528			
FLOW RATE (gpm)	121			
SAMPLING DEVICE	Sample Spigot on 6-inch discharge line			
FIELD TEMPERATURE (°C)	12.4			
pH	7.49			
ELECTRICAL CONDUCTIVITY at 25° C (uS/cm)	704			
ORP (mV)	NM			
DISSOLVED OXYGEN (ppm)	NM			
DISSOLVED OXYGEN (% Sat.)	NM			
COLOR	CLEAR			
ODOR	NONE			
CLARITY	CLEAR			
SAMPLING PARAMETERS	# OF CONTAINERS & VOLUME; CONTAINER TYPE (A = AMBER GLASS; G = GLASS; P = PLASTIC); PRESERVATIVE TYPE (L = LAB ADDED; F = FIELD ADDED) OR NEUTRAL; FILTERED (YES or NO)			
TCL VOCs (Method SW846 8260B)	3-40 ml; G; HCL-L; No			
NAME OF LABORATORY	Pace Analytical	Pace Analytical	Pace Analytical	Pace Analytical
DATE SENT TO LAB	2-8-17			
SAMPLER'S NAME	Todd M Thomson			

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TETRA TECH EQUIPMENT CALIBRATION FORM

Equipment Make	HANNA Instruments
Equipment Model	HI 98129 pH/EC/TDC/Temperature Meter
Tetra Tech GEO ID Number	1

DATE	TIME	CALIBRATION MEDIA	RESULTS	COMMENTS
1-9-17	16:00	pH 4.0 and pH 7.0 buffer solutions	Calibration successful	
1-9-17	16:00	1,413 µs conductivity calibration solution	Calibration successful	
2-7-17	13:20	pH 4.0 and pH 7.0 buffer solutions	Calibration successful	
2-7-17	13:20	1,413 µs conductivity calibration solution	Calibration successful	
		pH 4.0 and pH 7.0 buffer solutions	Calibration successful	
		1,413 µs conductivity calibration solution	Calibration successful	
		pH 4.0 and pH 7.0 buffer solutions	Calibration successful	
		1,413 µs conductivity calibration solution	Calibration successful	
		pH 4.0 and pH 7.0 buffer solutions	Calibration successful	
		1,413 µs conductivity calibration solution	Calibration successful	

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Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

February 22, 2017

Mark Manthey
Tetra Tech Geo
175 North Corporate Drive
Suite 100
Brookfield, WI 53045

RE: Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Dear Mark Manthey:
Enclosed are the analytical results for sample(s) received by the laboratory on February 09, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Brian Basten
brian.basten@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

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SAMPLE SUMMARY

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40145461001	**EFFLUENT**	Water	02/07/17 13:50	02/09/17 10:15
40145461002	**TRIP BLANK**	Water	02/07/17 00:00	02/09/17 10:15

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SAMPLE ANALYTE COUNT

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40145461001	**EFFLUENT**	EPA 8260	LAP	38	PASI-G
		EPA 300.0	HMB	1	PASI-G
40145461002	**TRIP BLANK**	EPA 8260	LAP	38	PASI-G

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PROJECT NARRATIVE

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Method: **EPA 8260**
Description: 8260 MSV
Client: Tetra Tech GEO - Brookfield
Date: February 22, 2017

General Information:
2 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248039

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145462001

R1: RPD value was outside control limits.

- MSD (Lab ID: 1466331)
  - Carbon disulfide

Additional Comments:

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PROJECT NARRATIVE

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: Tetra Tech GEO - Brookfield
Date: February 22, 2017

General Information:
1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 248583

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 40145420004,40145461001

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 1468899)
  - Chloride
- MSD (Lab ID: 1468900)
  - Chloride

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Sample: EFFLUENT **Lab ID: 40145461001** Collected: 02/07/17 13:50 Received: 02/09/17 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260								
Acetone	**<29.5**	ug/L	200	29.5	10		02/10/17 11:11	67-64-1	
Benzene	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	71-43-2	
Bromodichloromethane	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	75-27-4	
Bromoform	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	75-25-2	
Bromomethane	**<24.3**	ug/L	50.0	24.3	10		02/10/17 11:11	74-83-9	
2-Butanone (MEK)	**<29.8**	ug/L	200	29.8	10		02/10/17 11:11	78-93-3	
Carbon disulfide	**<6.1**	ug/L	50.0	6.1	10		02/10/17 11:11	75-15-0	
Carbon tetrachloride	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	56-23-5	
Chlorobenzene	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	108-90-7	
Chloroethane	**148**	ug/L	10.0	3.7	10		02/10/17 11:11	75-00-3	
Chloroform	**<25.0**	ug/L	50.0	25.0	10		02/10/17 11:11	67-66-3	
Chloromethane	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	74-87-3	
Dibromochloromethane	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	124-48-1	
1,1-Dichloroethane	**391**	ug/L	10.0	2.4	10		02/10/17 11:11	75-34-3	
1,2-Dichloroethane	**4.2J**	ug/L	10.0	1.7	10		02/10/17 11:11	107-06-2	
1,1-Dichloroethene	**74.0**	ug/L	10.0	4.1	10		02/10/17 11:11	75-35-4	
cis-1,2-Dichloroethene	**1180**	ug/L	10.0	2.6	10		02/10/17 11:11	156-59-2	
trans-1,2-Dichloroethene	**3.9J**	ug/L	10.0	2.6	10		02/10/17 11:11	156-60-5	
1,2-Dichloropropane	**<2.3**	ug/L	10.0	2.3	10		02/10/17 11:11	78-87-5	
cis-1,3-Dichloropropene	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	10061-01-5	
trans-1,3-Dichloropropene	**<2.3**	ug/L	10.0	2.3	10		02/10/17 11:11	10061-02-6	
Ethylbenzene	**26.4**	ug/L	10.0	5.0	10		02/10/17 11:11	100-41-4	
2-Hexanone	**<11.1**	ug/L	50.0	11.1	10		02/10/17 11:11	591-78-6	
Methylene Chloride	**18.4**	ug/L	10.0	2.3	10		02/10/17 11:11	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<21.4**	ug/L	50.0	21.4	10		02/10/17 11:11	108-10-1	
Styrene	**<5.0**	ug/L	10.0	5.0	10		02/10/17 11:11	100-42-5	
1,1,2,2-Tetrachloroethane	**<2.5**	ug/L	10.0	2.5	10		02/10/17 11:11	79-34-5	
Tetrachloroethene	**5.9J**	ug/L	10.0	5.0	10		02/10/17 11:11	127-18-4	
Toluene	**242**	ug/L	10.0	5.0	10		02/10/17 11:11	108-88-3	
1,1,1-Trichloroethane	**154**	ug/L	10.0	5.0	10		02/10/17 11:11	71-55-6	
1,1,2-Trichloroethane	**<2.0**	ug/L	10.0	2.0	10		02/10/17 11:11	79-00-5	
Trichloroethene	**30.9**	ug/L	10.0	3.3	10		02/10/17 11:11	79-01-6	
Vinyl acetate	**<9.2**	ug/L	50.0	9.2	10		02/10/17 11:11	108-05-4	
Vinyl chloride	**77.1**	ug/L	10.0	1.8	10		02/10/17 11:11	75-01-4	
Xylene (Total)	**116**	ug/L	30.0	15.0	10		02/10/17 11:11	1330-20-7	
Surrogates									
4-Bromofluorobenzene (S)	87	%	70-130		10		02/10/17 11:11	460-00-4	
Dibromofluoromethane (S)	110	%	70-130		10		02/10/17 11:11	1868-53-7	
Toluene-d8 (S)	90	%	70-130		10		02/10/17 11:11	2037-26-5	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**38.3**	mg/L	10.0	2.5	5		02/21/17 17:02	16887-00-6	

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ANALYTICAL RESULTS

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Sample: TRIP BLANK **Lab ID: 40145461002** Collected: 02/07/17 00:00 Received: 02/09/17 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260								
Acetone	**<3.0**	ug/L	20.0	3.0	1		02/10/17 11:56	67-64-1	
Benzene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	71-43-2	
Bromodichloromethane	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	75-27-4	
Bromoform	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	75-25-2	
Bromomethane	**<2.4**	ug/L	5.0	2.4	1		02/10/17 11:56	74-83-9	
2-Butanone (MEK)	**<3.0**	ug/L	20.0	3.0	1		02/10/17 11:56	78-93-3	
Carbon disulfide	**<0.61**	ug/L	5.0	0.61	1		02/10/17 11:56	75-15-0	
Carbon tetrachloride	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	56-23-5	
Chlorobenzene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	108-90-7	
Chloroethane	**<0.37**	ug/L	1.0	0.37	1		02/10/17 11:56	75-00-3	
Chloroform	**<2.5**	ug/L	5.0	2.5	1		02/10/17 11:56	67-66-3	
Chloromethane	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	74-87-3	
Dibromochloromethane	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	124-48-1	
1,1-Dichloroethane	**<0.24**	ug/L	1.0	0.24	1		02/10/17 11:56	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		02/10/17 11:56	107-06-2	
1,1-Dichloroethene	**<0.41**	ug/L	1.0	0.41	1		02/10/17 11:56	75-35-4	
cis-1,2-Dichloroethene	**<0.26**	ug/L	1.0	0.26	1		02/10/17 11:56	156-59-2	
trans-1,2-Dichloroethene	**<0.26**	ug/L	1.0	0.26	1		02/10/17 11:56	156-60-5	
1,2-Dichloropropane	**<0.23**	ug/L	1.0	0.23	1		02/10/17 11:56	78-87-5	
cis-1,3-Dichloropropene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	10061-01-5	
trans-1,3-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		02/10/17 11:56	10061-02-6	
Ethylbenzene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	100-41-4	
2-Hexanone	**<1.1**	ug/L	5.0	1.1	1		02/10/17 11:56	591-78-6	
Methylene Chloride	**<0.23**	ug/L	1.0	0.23	1		02/10/17 11:56	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.1**	ug/L	5.0	2.1	1		02/10/17 11:56	108-10-1	
Styrene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	100-42-5	
1,1,2,2-Tetrachloroethane	**<0.25**	ug/L	1.0	0.25	1		02/10/17 11:56	79-34-5	
Tetrachloroethene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	127-18-4	
Toluene	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	108-88-3	
1,1,1-Trichloroethane	**<0.50**	ug/L	1.0	0.50	1		02/10/17 11:56	71-55-6	
1,1,2-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		02/10/17 11:56	79-00-5	
Trichloroethene	**<0.33**	ug/L	1.0	0.33	1		02/10/17 11:56	79-01-6	
Vinyl acetate	**<0.92**	ug/L	5.0	0.92	1		02/10/17 11:56	108-05-4	
Vinyl chloride	**<0.18**	ug/L	1.0	0.18	1		02/10/17 11:56	75-01-4	
Xylene (Total)	**<1.5**	ug/L	3.0	1.5	1		02/10/17 11:56	1330-20-7	
Surrogates									
4-Bromofluorobenzene (S)	85	%	70-130		1		02/10/17 11:56	460-00-4	
Dibromofluoromethane (S)	120	%	70-130		1		02/10/17 11:56	1868-53-7	
Toluene-d8 (S)	89	%	70-130		1		02/10/17 11:56	2037-26-5	

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Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

QC Batch: 248039 | Analysis Method: EPA 8260
QC Batch Method: EPA 8260 | Analysis Description: 8260 MSV
Associated Lab Samples: 40145461001, 40145461002

METHOD BLANK: 1466303 | Matrix: Water
Associated Lab Samples: 40145461001, 40145461002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/L	<0.50	1.0	02/10/17 08:55	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	1.0	02/10/17 08:55	
1,1,2-Trichloroethane	ug/L	<0.20	1.0	02/10/17 08:55	
1,1-Dichloroethane	ug/L	<0.24	1.0	02/10/17 08:55	
1,1-Dichloroethene	ug/L	<0.41	1.0	02/10/17 08:55	
1,2-Dichloroethane	ug/L	<0.17	1.0	02/10/17 08:55	
1,2-Dichloropropane	ug/L	<0.23	1.0	02/10/17 08:55	
2-Butanone (MEK)	ug/L	<3.0	20.0	02/10/17 08:55	
2-Hexanone	ug/L	<1.1	5.0	02/10/17 08:55	
4-Methyl-2-pentanone (MIBK)	ug/L	<2.1	5.0	02/10/17 08:55	
Acetone	ug/L	<3.0	20.0	02/10/17 08:55	
Benzene	ug/L	<0.50	1.0	02/10/17 08:55	
Bromodichloromethane	ug/L	<0.50	1.0	02/10/17 08:55	
Bromoform	ug/L	<0.50	1.0	02/10/17 08:55	
Bromomethane	ug/L	<2.4	5.0	02/10/17 08:55	
Carbon disulfide	ug/L	<0.61	5.0	02/10/17 08:55	
Carbon tetrachloride	ug/L	<0.50	1.0	02/10/17 08:55	
Chlorobenzene	ug/L	<0.50	1.0	02/10/17 08:55	
Chloroethane	ug/L	<0.37	1.0	02/10/17 08:55	
Chloroform	ug/L	<2.5	5.0	02/10/17 08:55	
Chloromethane	ug/L	<0.50	1.0	02/10/17 08:55	
cis-1,2-Dichloroethene	ug/L	<0.26	1.0	02/10/17 08:55	
cis-1,3-Dichloropropene	ug/L	<0.50	1.0	02/10/17 08:55	
Dibromochloromethane	ug/L	<0.50	1.0	02/10/17 08:55	
Ethylbenzene	ug/L	<0.50	1.0	02/10/17 08:55	
Methylene Chloride	ug/L	<0.23	1.0	02/10/17 08:55	
Styrene	ug/L	<0.50	1.0	02/10/17 08:55	
Tetrachloroethene	ug/L	<0.50	1.0	02/10/17 08:55	
Toluene	ug/L	<0.50	1.0	02/10/17 08:55	
trans-1,2-Dichloroethene	ug/L	<0.26	1.0	02/10/17 08:55	
trans-1,3-Dichloropropene	ug/L	<0.23	1.0	02/10/17 08:55	
Trichloroethene	ug/L	<0.33	1.0	02/10/17 08:55	
Vinyl acetate	ug/L	<0.92	5.0	02/10/17 08:55	
Vinyl chloride	ug/L	<0.18	1.0	02/10/17 08:55	
Xylene (Total)	ug/L	<1.5	3.0	02/10/17 08:55	
4-Bromofluorobenzene (S)	%	85	70-130	02/10/17 08:55	
Dibromofluoromethane (S)	%	121	70-130	02/10/17 08:55	
Toluene-d8 (S)	%	88	70-130	02/10/17 08:55	

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REPORT OF LABORATORY ANALYSIS

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1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

LABORATORY CONTROL SAMPLE: 1466304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/L	50	51.6	103	70-131	
1,1,2,2-Tetrachloroethane	ug/L	50	47.5	95	67-130	
1,1,2-Trichloroethane	ug/L	50	49.3	99	70-130	
1,1-Dichloroethane	ug/L	50	52.0	104	70-133	
1,1-Dichloroethene	ug/L	50	51.4	103	70-130	
1,2-Dichloroethane	ug/L	50	52.7	105	70-130	
1,2-Dichloropropane	ug/L	50	56.3	113	70-130	
Benzene	ug/L	50	53.6	107	60-135	
Bromodichloromethane	ug/L	50	52.8	106	70-130	
Bromoform	ug/L	50	52.4	105	70-130	
Bromomethane	ug/L	50	46.0	92	33-130	
Carbon disulfide	ug/L	50	62.9	126	70-139	
Carbon tetrachloride	ug/L	50	57.6	115	70-138	
Chlorobenzene	ug/L	50	53.0	106	70-130	
Chloroethane	ug/L	50	47.9	96	51-130	
Chloroform	ug/L	50	52.0	104	70-130	
Chloromethane	ug/L	50	41.0	82	25-132	
cis-1,2-Dichloroethene	ug/L	50	45.0	90	69-130	
cis-1,3-Dichloropropene	ug/L	50	51.1	102	70-130	
Dibromochloromethane	ug/L	50	50.5	101	70-130	
Ethylbenzene	ug/L	50	54.3	109	70-136	
Methylene Chloride	ug/L	50	52.1	104	70-130	
Styrene	ug/L	50	54.0	108	70-133	
Tetrachloroethene	ug/L	50	55.1	110	70-138	
Toluene	ug/L	50	54.3	109	70-130	
trans-1,2-Dichloroethene	ug/L	50	54.0	108	70-131	
trans-1,3-Dichloropropene	ug/L	50	43.8	88	69-130	
Trichloroethene	ug/L	50	56.8	114	70-130	
Vinyl chloride	ug/L	50	49.7	99	49-130	
Xylene (Total)	ug/L	150	169	113	70-135	
4-Bromofluorobenzene (S)	%			104	70-130	
Dibromofluoromethane (S)	%			99	70-130	
Toluene-d8 (S)	%			94	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1466330 1466331

Parameter	Units	40145462001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/L	<1.0	50	50	54.8	51.4	110	103	70-134	6	20	
1,1,2,2-Tetrachloroethane	ug/L	<1.0	50	50	47.6	48.1	95	96	67-130	1	20	
1,1,2-Trichloroethane	ug/L	<1.0	50	50	47.1	48.1	94	96	70-130	2	20	
1,1-Dichloroethane	ug/L	<1.0	50	50	50.4	49.6	101	99	70-134	2	20	
1,1-Dichloroethene	ug/L	<1.0	50	50	49.9	47.3	100	95	68-136	5	20	
1,2-Dichloroethane	ug/L	<1.0	50	50	53.2	53.1	106	106	70-130	0	20	
1,2-Dichloropropane	ug/L	<1.0	50	50	54.1	53.5	108	107	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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(920)469-2436

QUALITY CONTROL DATA

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1466330 1466331

Parameter	Units	40145462001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	<1.0	50	50	54.3	52.8	109	106	57-138	3	20	
Bromodichloromethane	ug/L	<1.0	50	50	53.0	52.3	106	105	70-130	1	20	
Bromoform	ug/L	<1.0	50	50	50.4	47.2	101	94	70-130	7	20	
Bromomethane	ug/L	<5.0	50	50	52.0	47.9	104	96	33-130	8	27	
Carbon disulfide	ug/L	<5.0	50	50	62.9	47.5	126	95	70-153	28	20	R1
Carbon tetrachloride	ug/L	<1.0	50	50	58.1	52.7	116	105	70-138	10	20	
Chlorobenzene	ug/L	<1.0	50	50	51.9	51.0	104	102	70-130	2	20	
Chloroethane	ug/L	<1.0	50	50	53.3	51.7	107	103	51-130	3	20	
Chloroform	ug/L	<5.0	50	50	51.9	51.0	104	102	70-130	2	20	
Chloromethane	ug/L	<1.0	50	50	43.1	40.8	86	82	25-132	6	20	
cis-1,2-Dichloroethene	ug/L	11.7	50	50	58.8	59.9	94	96	61-140	2	20	
cis-1,3-Dichloropropene	ug/L	<1.0	50	50	51.7	44.0	103	88	70-130	16	20	
Dibromochloromethane	ug/L	<1.0	50	50	48.6	47.6	97	95	70-130	2	20	
Ethylbenzene	ug/L	<1.0	50	50	52.7	53.1	105	106	70-138	1	20	
Methylene Chloride	ug/L	<1.0	50	50	53.5	54.2	107	108	70-130	1	20	
Styrene	ug/L	<1.0	50	50	41.9	40.9	84	82	70-138	2	20	
Tetrachloroethene	ug/L	<1.0	50	50	55.2	55.2	110	110	70-148	0	20	
Toluene	ug/L	<1.0	50	50	52.8	52.7	106	105	70-130	0	20	
trans-1,2-Dichloroethene	ug/L	<1.0	50	50	53.9	54.7	107	108	70-133	1	20	
trans-1,3-Dichloropropene	ug/L	<1.0	50	50	43.0	37.8	86	76	69-130	13	20	
Trichloroethene	ug/L	<1.0	50	50	54.8	56.0	110	112	70-131	2	20	
Vinyl chloride	ug/L	2.2	50	50	50.1	48.7	96	93	49-133	3	20	
Xylene (Total)	ug/L	<3.0	150	150	160	161	107	108	70-135	1	20	
4-Bromofluorobenzene (S)	%						101	104	70-130			
Dibromofluoromethane (S)	%						103	100	70-130			
Toluene-d8 (S)	%						92	95	70-130			

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QUALITY CONTROL DATA

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

QC Batch: 248583 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 40145461001

METHOD BLANK: 1468897 | Matrix: Water
Associated Lab Samples: 40145461001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	2.0	02/21/17 10:54	

LABORATORY CONTROL SAMPLE: 1468898

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	20.7	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468899 1468900

Parameter	Units	40145420004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	18.4	20	20	40.6	40.8	111	112	90-110	0	15	M0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468901 1468902

Parameter	Units	40145461001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	38.3	100	100	146	147	107	108	90-110	1	15	

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QUALIFIERS

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay

ANALYTE QUALIFIERS

M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R1	RPD value was outside control limits.

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(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 117-3005011.18 HYDRITE BARRIER
Pace Project No.: 40145461

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40145461001	**EFFLUENT**	EPA 8260	248039		
40145461002	**TRIP BLANK**	EPA 8260	248039		
40145461001	**EFFLUENT**	EPA 300.0	248583		

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UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

Page 1 of 1

MV

CHAIN OF CUSTODY

(Please Print Clearly)	
Company Name:	TETRA TECH
Branch/Location:	BROOKFIELD
Project Contact:	MARK MANTHEY
Phone:	(262) 792-1282
Project Number:	117-3005011.18
Project Name:	HYDRTIE BARRIER SYSTEM
Project State:	WI.
Sampled By (Print):	TODD MATHENSON
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	40145461
Mail To Contact:	MARK MANTHEY
Mail To Company:	TETRA TECH
Mail To Address:	175 N. CORPORATE DR. SUITE 100 BROOKFIELD, WI. 53045
Invoice To Contact:	SAME AS ABOVE
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Data Package Options (billable)
- ☐ EPA Level III
- ☐ EPA Level IV

MS/MSD
- ☐ On your sample (billable)
- ☐ NOT needed on your sample

Matrix Codes
A = Air, B = Biota, C = Charcoal, O = Oil, S = Soil, Sl = Sludge, W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE (20 17)	COLLECTION TIME	MATRIX	Analyses Requested: VOC TCL 8260	Analyses Requested: CHLORIDE	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
FILTERED? (YES/NO)					N	N			
PRESERVATION (CODE)*									
001	EFFLUENT	2-7	13:50	GW	3	1		3-40mlVB 1-250mlp	A
002	TRIP BLANK	—	—	DI	1		LAB PREPARED	1-40mlVB	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed STANDARD

Transmit Prelim Rush Results by (complete what you want):
- Email #1:
- Email #2:
- Telephone:
- Fax:

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
	2-8-17 0800	Mary Fanini	2/8/17 11:20
Mary Fanini	2/8/17 1445		
CS Logistics	2/9/17 1015	Pace	2/9/17 1015

PACE Project No. 40145461

Receipt Temp = 2 °C

Sample Receipt pH ~~OK / Adjusted~~

Cooler Custody Seal: Present / Not Present; Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2008)

ORIGINAL

Pace Analytical™

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #:

WO#: 40145461

40145461

Client Name: Tetra Tech

Courier: ☐ Fed Ex ☐ UPS ☐ Client ☐ Pace Other: CS Logistics

Tracking #:

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer Used BH 2/9/17 NA SR-53 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 2 /Corr: 2 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Temp Blank Present:
Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received <-0°C.

Person examining contents:
Date: 2/9/17
Initials: BH

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☑Yes ☐No ☐N/A	12.
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 <2; NaOH+ZnAct >9; NaOH >12) exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes ☐No ☑N/A	Initial when completed / Lab Sample # of preservative / Date/Time:
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	14.
Trip Blank Present:	☑Yes ☐No ☐N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased): 372	Checked w/ Client label	

Client Notification/ Resolution: BH 2/9/17 ☐ If checked, see attached form for additional comments

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Date: 2-9-17

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