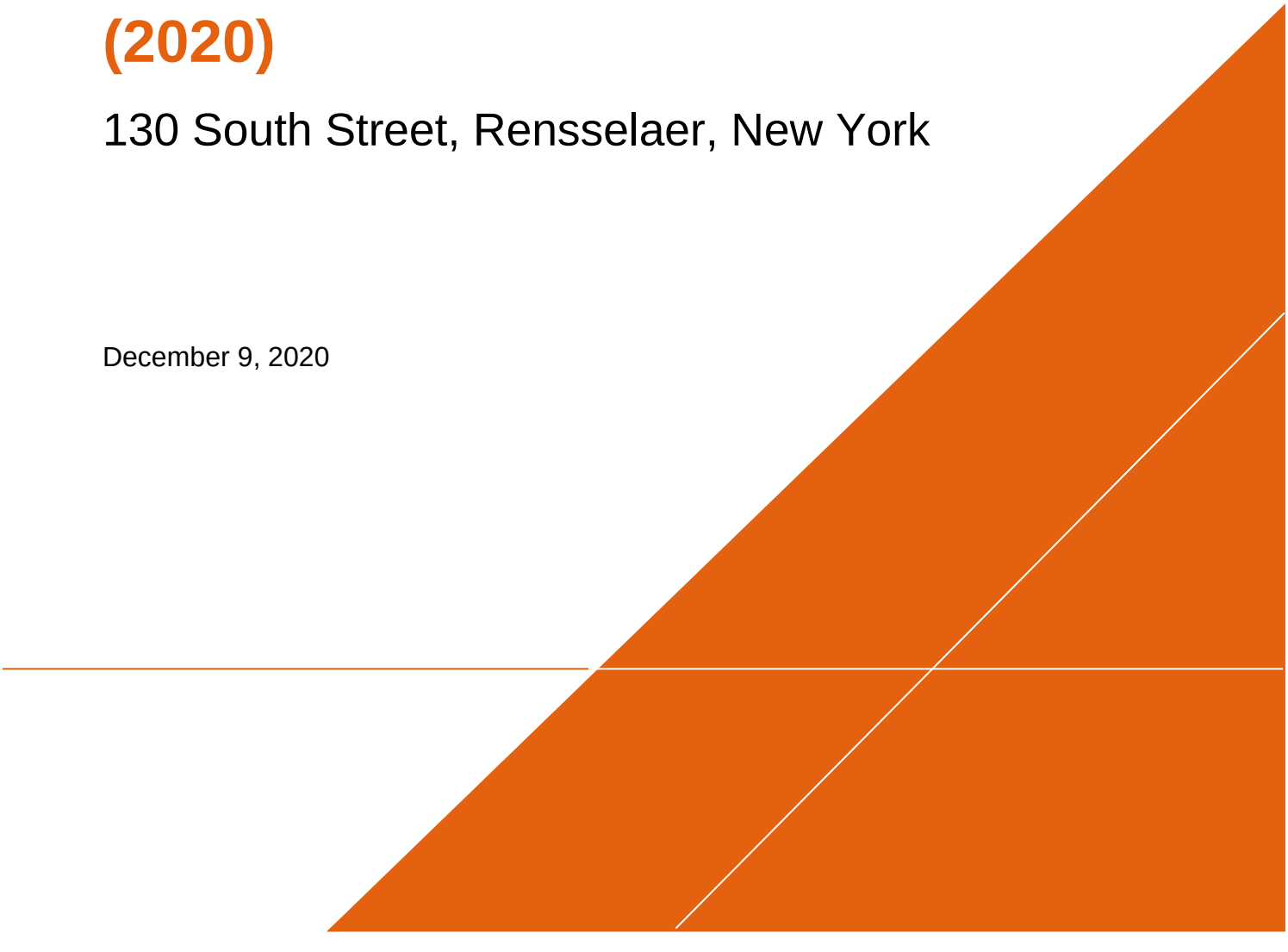
ARCADIS Design & Consultancy for natural and built assets

Ashland LLC

ERD INJECTION EVENT SUMMARY (2020)

130 South Street, Rensselaer, New York

December 9, 2020



ERD INJECTION EVENT SUMMARY (2020)

130 South Street, Rensselaer, New York

William M. Golla
Certified Project Manager

Jason Nail
Senior Geologist

Zach Wahl
Staff Environmental Engineer

Prepared for:

Ashland LLC

Prepared by:

Arcadis of New York, Inc.
855 Route 146
Suite 210
Clifton Park
New York 12065
Tel 518 250 7300
Fax 518 371 2757

Our Ref:

30039411

Date:

December 9, 2020

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INTRODUCTION

Corrective measures at the former Ashland LLC (Ashland) chemical distribution facility located at 130 South Street in Rensselaer, New York (site) currently include enhanced reductive dechlorination (ERD) of chlorinated volatile organic compounds (CVOCs) in groundwater. The ERD system, which has operated since 2010, was expanded in 2018 by installing 17 additional injection wells to target source mass and CVOC flux pathways generally deeper than historical ERD operations, which focused on shallow groundwater. This report details carbon substrate distribution into existing ERD injection infrastructure, as well as direct-push injections completed in nearby areas. The work described in this report was completed from September 16 to October 23, 2020 as outlined in the Mulch PRB Installation Work Plan (Arcadis 2020a), which the New York State Department of Environmental Conservation (NYSDEC) approved via email on September 14, 2020 (NYSDEC 2020). Installation of the proposed mulch permeable reactive barrier (PRB) to address the shallow CVOC mass flux zone along the site boundary was postponed due to site conditions (e.g., weather), and therefore is not included in this technical memorandum. A summary of monitoring data and analysis following the work described in this report will be presented in the site Annual Corrective Measure Implementation Report under separate cover.

BACKGROUND

The Corrective Measures Implementation Work Plan (Arcadis 2010) for the site was approved by the United States Environmental Protection Agency (USEPA) in a letter dated March 16, 2010 (USEPA 2010). Groundwater remediation activities commenced in 2010 by implementing an ERD program along the downgradient portion of the site to address potential off-site migration of CVOCs in shallow groundwater, including six ERD injection events. Multiple supplemental investigations were completed in 2017 to update the project conceptual site model and provide data to optimize the ERD program. Based on this data, the ERD program was optimized in 2018 by expanding the existing ERD system infrastructure into deeper CVOC source zones and mass flux pathways than were previously targeted. Following the system expansion, an injection event was completed in 2018 to deliver carbon substrate and stimulate ERD in these newly targeted deeper zones. At that time, shallow injections were not deemed necessary in 2018 based on available data. These 2018 remedial activities are further detailed in the ERD System Optimization Work Plan (Arcadis 2018), ERD System Optimization Well Installation Summary (Arcadis 2019), and 2019 Corrective Measure Implementation Annual Progress Report (Arcadis 2020b).

Recent performance monitoring data collected following the 2018 ERD system optimization indicated that:

- Carbon substrate was recently nearing depletion in areas targeted during the 2018 injection event and that these areas would benefit from additional injections.
- Targeted source area treatment is effective; therefore, supplemental targeted treatment is necessary to continue ERD of on-site source CVOC mass that is leading to downgradient impacts.

Based on these observations, Arcadis proposed the work outlined in the Mulch PRB Installation Work Plan (Arcadis 2020a) to facilitate carbon distribution into the 2018 injection infrastructure and additional

deeper areas. The New York State Department of Environmental Conservation (NYSDEC) approved the work outlined in the plan via email on September 14, 2020 (NYSDEC 2020).

OBJECTIVES

The Mulch PRB Installation Work Plan (Arcadis 2020) established the following objectives to facilitate carbon distribution and optimize the existing ERD system:

- Replenish carbon substrate through emulsified vegetable oil (EVO) injections into in the same ERD injection infrastructure utilized in 2018 to continue promoting in-situ remediation zones (IRZs) to treat CVOC source mass and mass flux zones.
- Supplement the 2018 ERD system expansion with a single injection event into CVOC source zones using temporary direct-push technology (DPT) injection points to deliver EVO and similarly promote CVOC treatment by establishing IRZs in these areas.
- Install a mulch PRB in the shallow mass flux zone along the site boundary to provide long-term carbon delivery to the shallow subsurface to promote IRZs to treat CVOCs (implementation currently planned for 2021).

FIELD ACTIVITIES

The following sections describe field activities related to the objectives listed above.

Utility Location and Clearance

Ground Penetrating Radar Systems, LLC. (GPRS) conducted electromagnetic, ground penetrating radar, and radio frequency detection geophysical techniques on September 23, 2020. Additionally, an 811 ticket was issued for the site, a review of site historical drawings was completed, and a utility-oriented site inspection was conducted. The techniques provided clearance of subsurface utilities and located potential buried pipelines, utilities (i.e., water supply, sewer, and storm), tanks, and drums in advance of drilling activities.

Injections

EVO was delivered to target areas by injecting in the existing infrastructure and temporary DPT points. EVO content was monitored by sampling prepared injection solution at various points throughout the event; these analytical results are included in Appendix A. The injection implementation is summarized in the following sections.

Existing Infrastructure

The ERD system optimization injection wells shown on Figure 1 were used to repeat the 2018 ERD injections, except at well IW-A10 which was deemed inoperable during the 2018 injection event. The Mulch PRB Installation Work Plan (Arcadis 2020a) specified an injection target volume of 68,900 gallons. Injections were completed using a mobile injection trailer and/or dedicated injection manifolds and tanks.

Injection solution was prepared on site using potable water and EVO (approximately 2 percent by volume in the injection solution). Approximately 60,000 gallons of injection solution were injected into the existing injection network, which is approximately 87% of the target injection volume. Table 1 summarizes the injection volumes.

Direct-Push Injections

Injection solution was prepared on site using potable water and EVO at approximately 2% by volume. The target 10-foot injection radius of influence (ROI) for DPT injections was verified with field observations of increased turbidity and visual observation of oil droplets at two existing monitoring wells near DPT injection points (MW-23 and MW-24). Following ROI verification, up to approximately 588 gallons of injection solution were injected using subcontractor equipment (e.g., mobile injection trailer, dedicated injection manifolds and tanks) over 4-foot intervals at up to six injection points at a time.

Additional volume was injected in adjacent intervals and/or nearby DPT injection points to the extent practicable when field observations required ceasing injections at the following injection points and intervals:

- DPT-06 from 20 to 28 feet below ground surface (ft bgs): stopped injecting in the first interval from 20 to 24 ft bgs after injection solution was observed daylighting through a nearby monitoring well. The DPT rod was advanced to the next interval from 24 to 28 ft bgs and immediately experienced similar solution daylighting. Injections were stopped at this point and it was abandoned.
- DPT-08 from 10 to 14 ft bgs: stopped injecting in the first interval from 10 to 14 ft bgs after injection solution was observed daylighting at a nearby location. The DPT rod was advanced to the next interval from 14 to 18 ft bgs and did not experience any further issues. The remaining intervals at this location were completed without daylighting.
- DPT-09 from 14 to 18 ft bgs: stopped injecting in the first interval from 14 to 18 ft bgs after injection solution was observed daylighting at a nearby location. The DPT rod was advanced to the next interval from 18 to 22 ft bgs and did not experience any further issues. The remaining intervals at this location were completed without daylighting.
- DPT-10 from 13 to 25 ft bgs: proposed injection point DPT-10 was removed from the scope of work due to unexpected proximity to an existing monitoring well. The remaining injection points were shifted accordingly to cover the target injection area based on the injection ROI.

The Mulch PRB Installation Work Plan (Arcadis 2020a) specified an injection target volume of 20,600 gallons for DPT injections. The removal of proposed injection point DPT-10 resulted in the injection target being reduced to approximately 19,000 gallons. Injections occurred in two to five intervals at 11 injection points for a total of approximately 18,000 gallons resulting in 95% of the injection target. Table 2 summarizes the injection volumes. Appendix B includes the subcontractor DPT injection field logs.

Injection points were abandoned after completion and properly sealed. The DPT injection locations were flagged and labeled following abandonment and recorded using a Trimble® Geo7X handheld receiver.

Investigation Derived Waste Management

Investigation derived waste generated during field activities included decontamination water, purge water, personal protective equipment (PPE), and other disposable sampling materials. Wastewater from decontamination procedures and purge water were placed in properly labelled 55-gallon drums and stored on asphalt on the northern portion of the site. PPE (e.g., nitrile gloves, disposable supplies, paper, plastic) was treated as municipal waste. Arcadis will coordinate the characterization and disposal of all containerized waste from injection activities in accordance with waste hauler, waste handling facility, and state and federal requirements in December 2020.

PATH FORWARD

The 2020 ERD Injection event was successful at injecting near target volumes of EVO into the subsurface. Approximately 87% of the target volume was injected into the existing injection wells and 95% of the target volume was injecting via the DPT locations.

Post-injection performance monitoring will be accomplished through continued routine groundwater monitoring events completed as part of the current remedy. Results will be presented in future Annual Corrective Measure Implementation Reports for the site. Arcadis and Ashland will continue to review remedy effectiveness and delivery system optimization and will communicate any recommended changes to the Agencies (NYSDEC, USEPA, and NYSDOH) prior to any potential future injection events.

Currently, Arcadis plans to complete the mulch PRB installation detailed in the Mulch PRB Installation Work Plan (Arcadis 2020a) in 2021. Arcadis will summarize the mulch PRB installation and present monitoring results within future Annual Corrective Measure Implementation Reports for the site.

REFERENCES

Arcadis. 2010. Corrective Measure Implementation Work Plan. March.

Arcadis. 2011. Letter from Katherine Potter (Arcadis) to Michael Infurna (USEPA) re: Notification of Switch to emulsified vegetable oil (EVO). September 23.

Arcadis. 2018. ERD System Optimization Work Plan. Optimization of Enhanced Reductive Dechlorination Program. September.

Arcadis. 2019. ERD System Optimization Well Installation Summary. 130 South Street, Rensselaer, New York. January 25.

Arcadis. 2020a. Mulch Permeable Reactive Barrier Installation Work Plan. August 25.

Arcadis. 2020b. ERD INJECTION EVENT SUMMARY (2020): 130 South Street, Rensselaer, New York. USEPA RCRA Administrative Order on Consent Docket No. II, RCRA-92-3008(h)-0201. April 24.

NYSDEC. 2020. Email from Michael D. MacCabe (NYSDEC) to Katie Bidwell (Arcadis) re: Ashland Chemical 442038 - Rensselaer- Mulch PRB Installation Work Plan - Schedule update. September 14.

USEPA. 2010. Letter from Michael Infurna (USEPA) to James Vondracek (Ashland) re: Draft Corrective Measure Implementation Work Plan. March 16.

USEPA. 2011b. Email from USEPA to Ashland re: Approval of switch to EVO. October 5.

TABLES

Table 1
Existing Infrastructure Injection Summary
ERD Injection Event Summary (2020)
Ashland LLC
130 South Street, Rensselaer, New York

Location ID	Injected Volume (gallons)	Average Injection Rate* (gpm)
Southern Source Zone		
IW-A08	3,605.4	0.44
IW-A09	4,605.1	0.57
IW-A11	5,646.9	3.06
IW-A12	5,938.3	1.18
IW-A13	3,747.9	0.97
IW-A14	2,039.7	0.37
Northern Source Zone		
IW-B06	1,815.0	0.23
IW-B07	806.6	0.13
IW-B08	2,063.0	0.25
IW-B09	2,024.7	0.25
IW-B10	3,480.1	0.48
IW-B11	3,658.5	0.32
IW-B12	2,349.4	0.41
IW-B13	5,069.0	--
IW-B14	5,480.0	--
IW-B15	5,069.0	--
MW-22	1,632.0	0.39
Total:	**59,031**	

Notes:
* - average injection rate listed only for flow from injection trailer. Flow rate during injection via gravity was not measured. Wells that do not have a flow rate listed were only injected via gravity.

-- = not applicable
gpm = gallons per minute

Table 2
DPT Injection Summary
ERD Injection Event Summary (2020)
Ashland LLC
130 South Street, Rensselaer, New York

Location ID	Interval (ft bgs)	Injected Volume (gallons)	Average Injection Rate (gpm)
Southern Source Zone			
DPT-01	12 - 16	588	0.54
DPT-01	16 - 20	678	1.17
DPT-02	12 - 16	600	0.58
DPT-02	16 - 20	490	1.13
DPT-03	17 - 21	573	0.58
DPT-03	21 - 25	456	1.13
DPT-04	17 - 21	587	1.19
DPT-04	21 - 25	601	1.17
DPT-05	18 - 22	612	0.50
DPT-05	22 - 26	580	1.13
Northern Source Zone			
DPT-06	20 - 24	90	0.56
DPT-06	24 - 28	1	0.20
DPT-07	14 - 18	588	1.70
DPT-07	18 - 22	588	0.72
DPT-07	22 - 26	603	0.72
DPT-08	10 - 14	341	0.64
DPT-08	14 - 18	588	1.50
DPT-08	18 - 22	588	1.50
DPT-08	22 - 26	582	1.13
DPT-08	26 - 30	791	0.63
DPT-09	14 - 18	72	1.67
DPT-09	18 - 22	869	1.46
DPT-09	22 - 26	844	1.20
DPT-09	26 - 30	762	2.60
DPT-10[a]	13 - 17	--	--

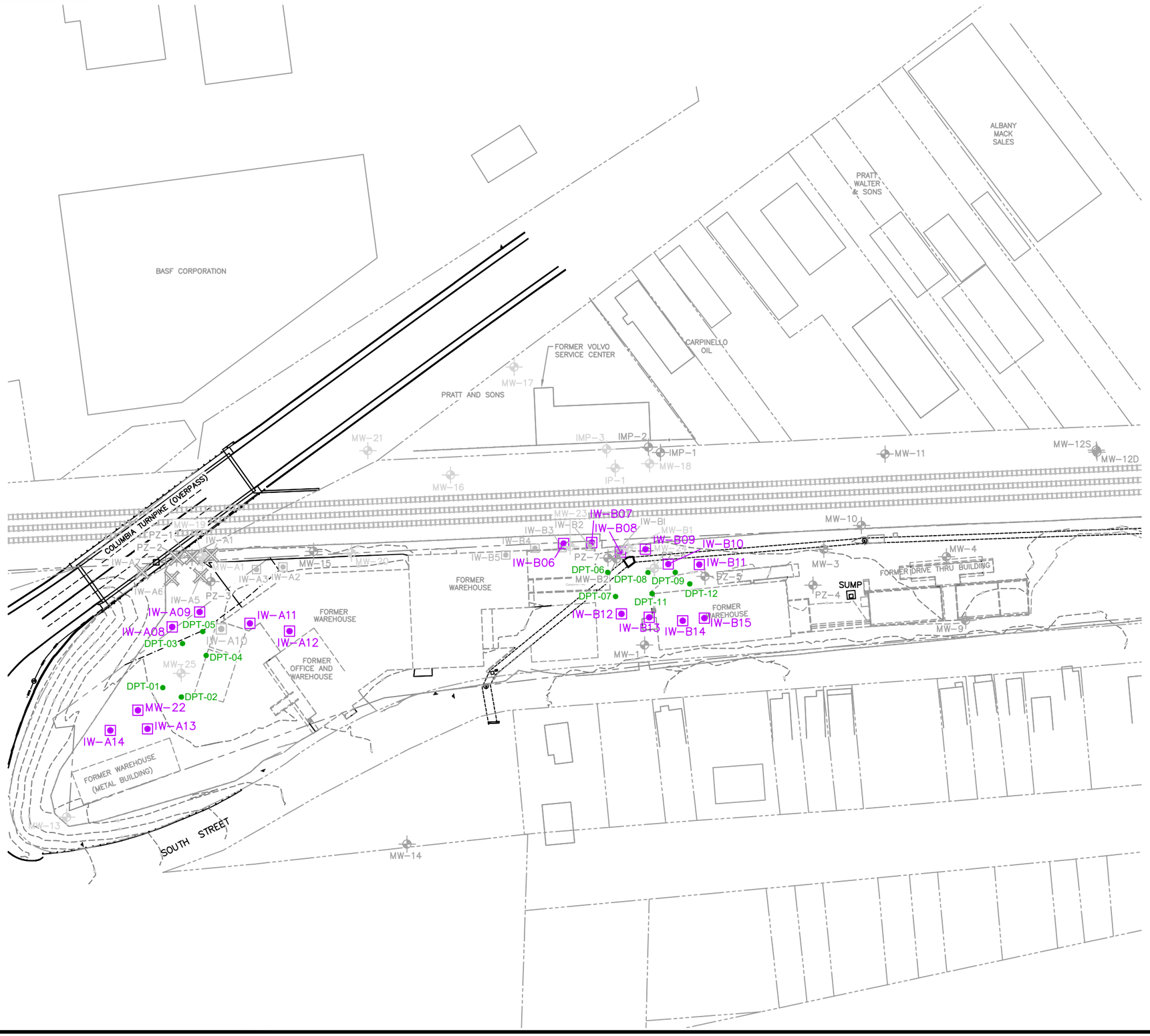
Table 2
DPT Injection Summary
ERD Injection Event Summary (2020)
Ashland LLC
130 South Street, Rensselaer, New York

Location ID	Interval (ft bgs)	Injected Volume (gallons)	Average Injection Rate (gpm)
DPT-10[a]	17 - 21	--	--
DPT-10[a]	21 - 25	--	--
DPT-11	06 - 10	585	1.05
DPT-11	10 - 14	588	2.88
DPT-11	14 - 18	588	4.00
DPT-11	18 - 22	588	4.00
DPT-11	22 - 26	588	3.50
DPT-12	13 - 17	588	2.00
DPT-12	17 - 21	618	2.50
DPT-12	21 - 25	608	3.00
Total:		**17,822**	

Notes:
a - proposed injection point DPT-10 was removed from the scope of work due to field conditions.

-- = not applicable
gpm = gallons per minute

FIGURES



LEGEND:

- IMP-1/MW-1/PZ-1 — GROUNDWATER GAUGING WELL
- IP-1/IMP-3/MW-16 — PERFORMANCE MONITORING GROUNDWATER SAMPLING LOCATIONS
- IW-B1 — SHALLOW INJECTION WELL LOCATION (2010)
- SURFACE CONTOUR
- RAILROAD TRACK
- CULVERTED STREAM PIPE
- PROPERTY LINE
- FORMER BUILDINGS AND STRUCTURES
- IW-A14 — ERD SYSTEM OPTIMIZATION INJECTION WELL (2020)
- IW-A5 — INJECTION WELLS/PIEZOMETERS ABANDONED IN 2018
- DPT-09 — DPT INJECTION POINT

NOTES:

1. LOCATIONS AND TOPOGRAPHY EAST OF CSX RAILROAD PROPERTY AND WEST OF AND INCLUDING SOUTH STREET, SURVEYED BY THEW ASSOCIATES PE-LS, PLLC (OCTOBER 2008). TWO NEW MONITORING WELLS, MW-20 & MW-21, AND TEN NEW INJECTION WELLS, IW-A2 THRU IW-A7 & IW-B2 THRU IW-B5, WERE SURVEYED ON JULY 2, 2010 BY THEW ASSOCIATES. ONE NEW MONITORING WELL (MW-25) AND 17 NEW INJECTION WELLS (IW-A08 THROUGH IW-A14; IW-B06 THROUGH IW-B15) WERE SURVEYED ON DECEMBER 5, 2018 BY THEW ASSOCIATES, ALONG WITH THREE DUAL-PURPOSE MONITORING AND INJECTION WELLS INSTALLED IN 2017 (MW-22 THROUGH MW-24).
2. REFERENCED HORIZONTALLY TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) AND PROJECTED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM (EAST ZONE). VERTICAL REFERENCE TO NGVD 1929.
3. ASHLAND PROPERTY BOUNDARY ESTABLISHED BY THEW ASSOCIATES SURVEY AND DEED RESEARCH (OCTOBER 2008). OTHER PROPERTY LINES AND MAP FEATURES ARE FROM RENSSELAER COUNTY TAX MAPPING AND NEW YORK STATE CLEARING-HOUSE AERIAL PHOTOGRAPHY.

0 100' 200'

GRAPHIC SCALE

ASHLAND INC.
RENSSELAER, NEW YORK

ERD INJECTION EVENT SUMMARY (2020)

INJECTION LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

APPENDIX A

Analytical Results

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-175359-1
Client Project/Site: Ashland Rensselaer

For:
Ashland LLC
1313 N. Market Street
Wilmington, Delaware 19894

Attn: Ian McCary

Authorized for release by:
9/25/2020 1:48:25 PM

Eddie Barnett, Project Manager I
(912)250-0280
Eddie.Barnett@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: Ashland LLC
Job ID: 480-175359-1
Project/Site: Ashland Rensselaer

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-175359-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

CASE NARRATIVE
Client: Ashland LLC
Project: Ashland Rensselaer

Report Number: 480-175359-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 09/19/2020; the sample arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.2º C.

TOTAL ORGANIC CARBON

Sample Injection_Solution-20200918 (480-175359-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060A. The sample was analyzed on 09/23/2020.

Sample Injection_Solution-20200918 (480-175359-1)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Client Sample ID: Injection_Solution-20200918 — Lab Sample ID: 480-175359-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	2200		100	43	mg/L	100		9060A	Total/NA
TOC Result 2	2200		100	43	mg/L	100		9060A	Total/NA
Total Organic Carbon	2300		100	43	mg/L	100		9060A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Client Sample ID: Injection_Solution-20200918

Date Collected: 09/18/20 10:05
Date Received: 09/19/20 08:00

Lab Sample ID: 480-175359-1

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	2200		100	43	mg/L			09/23/20 22:52	100
TOC Result 2	2200		100	43	mg/L			09/23/20 22:52	100
Total Organic Carbon	2300		100	43	mg/L			09/23/20 22:52	100

QC Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 480-551154/4
Matrix: Water
Analysis Batch: 551154

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1.0	U	1.0	0.43	mg/L			09/23/20 18:49	1
TOC Result 2	1.0	U	1.0	0.43	mg/L			09/23/20 18:49	1
Total Organic Carbon	1.0	U	1.0	0.43	mg/L			09/23/20 18:49	1

Lab Sample ID: LCS 480-551154/5
Matrix: Water
Analysis Batch: 551154

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	60.0	59.8		mg/L		100	90 - 110
TOC Result 2	60.0	61.4		mg/L		102	90 - 110
Total Organic Carbon	60.0	60.4		mg/L		101	90 - 110

QC Association Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

General Chemistry

Analysis Batch: 551154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-175359-1	Injection_Solution-20200918	Total/NA	Water	9060A	
MB 480-551154/4	Method Blank	Total/NA	Water	9060A	
LCS 480-551154/5	Lab Control Sample	Total/NA	Water	9060A	

Lab Chronicle

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Client Sample ID: Injection_Solution-20200918

Date Collected: 09/18/20 10:05
Date Received: 09/19/20 08:00

Lab Sample ID: 480-175359-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		100	551154	09/23/20 22:52	CLA	TAL BUF

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ashland LLC
Job ID: 480-175359-1
Project/Site: Ashland Rensselaer

Laboratory: Eurofins TestAmerica, Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	04-01-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9060A		Water	TOC Result 1
9060A		Water	TOC Result 2

Method Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Method	Method Description	Protocol	Laboratory
9060A	Organic Carbon, Total (TOC)	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175359-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
480-175359-1	Injection_Solution-20200918	Water	09/18/20 10:05	09/19/20 08:00	

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Albany #224

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Mike Redmar	Lab PM: Barnett, Eddie T	Carrier Tracking No(s):	COC No: 680-118193-45120.1
Client Contact: Joe Zaso	Phone:	E-Mail: Eddie.Barnett@Eurofinset.com		Page: Page 1 of 1
Company: ARCADIS U.S. Inc		Analysis Requested		Job #: PWS 30059651
Address: 6041 Wallace Road Extension Suite 300	Due Date Requested:			Preservation Codes:
City: Wexford	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: PA, 15090				
Phone: 860.485.5295	PO #: PO813031			Other:
Email: joseph.zaso@arcadis.com	WO #: Task 400			
Project Name: Ashland Rensselaer	Project #: 68016621			
Site: Ashland-Rensselaer, NY PWS 30059651	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9060A - (MOD) Local Method	Number of containers	Instructions/Note:
			Preservation Code:				A		
Injection_Solution-20200918	9/18/20	1005	Grab	Water			X		
				Water					
				Water					
				Water					
				Water					
				Water					

480-175359 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		9/18/20 1320	Arcadis		9/18/20 1320	
2	Relinquished by:	Date/Time: 9/18/20 1700	Company Eurofins	Received by:	Date/Time: 9/19/20 0800	Company TAB
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: #1 2.2.

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Ashland LLC

Job Number: 480-175359-1

Login Number: 175359
List Number: 2
Creator: Yeager, Brian A

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-175594-1
Client Project/Site: Ashland Rensselaer

For:
Ashland LLC
1313 N. Market Street
Wilmington, Delaware 19894

Attn: Ian McCary

Authorized for release by:
10/2/2020 6:49:48 AM

Eddie Barnett, Project Manager I
(912)250-0280
Eddie.Barnett@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-175594-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

CASE NARRATIVE
Client: Ashland LLC
Project: Ashland Rensselaer

Report Number: 480-175594-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 09/25/2020; the sample arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.5º C.

TOTAL ORGANIC CARBON

Sample Injection Solution - 20200924 (480-175594-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060A. The sample was analyzed on 09/30/2020.

Sample Injection Solution - 20200924 (480-175594-1)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Client Sample ID: Injection Solution - 20200924

Lab Sample ID: 480-175594-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	2000		100	43	mg/L	100		9060A	Total/NA
TOC Result 2	2000		100	43	mg/L	100		9060A	Total/NA
Total Organic Carbon	2100		100	43	mg/L	100		9060A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Client Sample ID: Injection Solution - 20200924

Lab Sample ID: 480-175594-1

Date Collected: 09/24/20 09:00
Date Received: 09/25/20 08:00

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	2000		100	43	mg/L			09/30/20 18:22	100
TOC Result 2	2000		100	43	mg/L			09/30/20 18:22	100
Total Organic Carbon	2100		100	43	mg/L			09/30/20 18:22	100

QC Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 480-552111/4
Matrix: Water
Analysis Batch: 552111

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1.0	U	1.0	0.43	mg/L			09/30/20 17:26	1
TOC Result 2	1.0	U	1.0	0.43	mg/L			09/30/20 17:26	1
Total Organic Carbon	1.0	U	1.0	0.43	mg/L			09/30/20 17:26	1

Lab Sample ID: LCS 480-552111/5
Matrix: Water
Analysis Batch: 552111

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	60.0	59.3		mg/L		99	90 - 110
TOC Result 2	60.0	57.4		mg/L		96	90 - 110
Total Organic Carbon	60.0	58.6		mg/L		98	90 - 110

QC Association Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

General Chemistry

Analysis Batch: 552111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-175594-1	Injection Solution - 20200924	Total/NA	Water	9060A	
MB 480-552111/4	Method Blank	Total/NA	Water	9060A	
LCS 480-552111/5	Lab Control Sample	Total/NA	Water	9060A	

Lab Chronicle

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Client Sample ID: Injection Solution - 20200924

Date Collected: 09/24/20 09:00
Date Received: 09/25/20 08:00

Lab Sample ID: 480-175594-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		100	552111	09/30/20 18:22	CLA	TAL BUF

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ashland LLC
Job ID: 480-175594-1
Project/Site: Ashland Rensselaer

Laboratory: Eurofins TestAmerica, Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	04-01-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9060A		Water	TOC Result 1
9060A		Water	TOC Result 2

Method Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Method	Method Description	Protocol	Laboratory
9060A	Organic Carbon, Total (TOC)	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-175594-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
480-175594-1	Injection Solution - 20200924	Water	09/24/20 09:00	09/25/20 08:00	

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Albany #224

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Mike Redman	Lab PM: Barnett, Eddie T	Carrier Tracking No(s):	COC No: 680-118193-45120.1
Client Contact: Joe Zaso	Phone: 860485.5295	E-Mail: Eddie.Barnett@Eurofinset.com		Page: Page 1 of 1
Company: ARCADIS U.S. Inc				Job #:
Address: 6041 Wallace Road Extension Suite 300	Due Date Requested:			
City: Wexford	TAT Requested (days): Standard			
State, Zip: PA, 15090				
Phone:	PO #: PO813031			
Email: joseph.zaso@arcadis.com	WO #: Task 400			
Project Name: Ashland Rensselaer	Project #: 68016621			
Site:	SSOW#:			

480-175594 Chain of Custody

Preservation Codes:
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
EDTA
L - EDA
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9060A - (MOD) Local Method	Total Number of containe	Special Instructions/Note:
			Preservation Code:				A		
Injection-Solution-20200924	9/24/20	0900	G	Water	N	X			
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Mike Redman	1400 9/24/20		Karl Ziegler	9/24/20 1400	Eurofins
Karl Ziegler	9/24/20 1700	Eurofins	C Walker	9/25/20 0800	TAL

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: #1 2.5

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Ashland LLC

Job Number: 480-175594-1

Login Number: 175594
List Number: 2
Creator: Yeager, Brian A

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-176243-1
Client Project/Site: Ashland Rensselaer

For:
Ashland LLC
1313 N. Market Street
Wilmington, Delaware 19894

Attn: Ian McCary

Authorized for release by:
10/19/2020 2:36:39 PM

Eddie Barnett, Project Manager I
(912)250-0280
Eddie.Barnett@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-176243-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

CASE NARRATIVE
Client: Ashland LLC
Project: Ashland Rensselaer

Report Number: 480-176243-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 10/09/2020; the sample arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.1º C.

TOTAL ORGANIC CARBON

Sample INJECTION_SOLUTION-20201008 (480-176243-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060A. The sample was analyzed on 10/16/2020.

Sample INJECTION_SOLUTION-20201008 (480-176243-1)[200X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Client Sample ID: INJECTION_SOLUTION-20201008 — Lab Sample ID: 480-176243-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	2100		200	87	mg/L	200		9060A	Total/NA
TOC Result 2	2000		200	87	mg/L	200		9060A	Total/NA
Total Organic Carbon	2300		200	87	mg/L	200		9060A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Client Sample ID: INJECTION_SOLUTION-20201008
Date Collected: 10/08/20 08:15
Date Received: 10/09/20 08:00

Lab Sample ID: 480-176243-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	2100		200	87	mg/L			10/16/20 23:06	200
TOC Result 2	2000		200	87	mg/L			10/16/20 23:06	200
Total Organic Carbon	2300		200	87	mg/L			10/16/20 23:06	200

QC Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 480-554425/51
Matrix: Water
Analysis Batch: 554425

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1.0	U	1.0	0.43	mg/L			10/16/20 14:21	1
TOC Result 2	1.0	U	1.0	0.43	mg/L			10/16/20 14:21	1
Total Organic Carbon	1.0	U	1.0	0.43	mg/L			10/16/20 14:21	1

Lab Sample ID: LCS 480-554425/52
Matrix: Water
Analysis Batch: 554425

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	60.0	59.8		mg/L		100	90 - 110
TOC Result 2	60.0	61.3		mg/L		102	90 - 110
Total Organic Carbon	60.0	60.9		mg/L		101	90 - 110

QC Association Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

General Chemistry

Analysis Batch: 554425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-176243-1	INJECTION_SOLUTION-20201008	Total/NA	Water	9060A	
MB 480-554425/51	Method Blank	Total/NA	Water	9060A	
LCS 480-554425/52	Lab Control Sample	Total/NA	Water	9060A	

Lab Chronicle

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Client Sample ID: INJECTION_SOLUTION-20201008

Lab Sample ID: 480-176243-1

Date Collected: 10/08/20 08:15

Matrix: Water

Date Received: 10/09/20 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		200	554425	10/16/20 23:06	CLA	TAL BUF

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ashland LLC
Job ID: 480-176243-1
Project/Site: Ashland Rensselaer

Laboratory: Eurofins TestAmerica, Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	04-01-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9060A		Water	TOC Result 1
9060A		Water	TOC Result 2

Method Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Method	Method Description	Protocol	Laboratory
9060A	Organic Carbon, Total (TOC)	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-176243-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
480-176243-1	INJECTION_SOLUTION-20201008	Water	10/08/20 08:15	10/09/20 08:00	

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Matt Wiener	Lab PM: Barnett, Eddie T	Carrier Tracking No(s):	COC No: 680-118193-45120.1
Client Contact: Joe Zaso, Ian McCoy (Ashland)	Phone: 513-884-3148	E-Mail: Eddie.Barnett@Eurofinset.com		Page: Page 1 of 1
Company: ARCADIS U.S. Inc				Job #:
Address: 6041 Wallace Road Extension Suite 300	Due Date Requested:			
City: Wexford	TAT Requested (days): Standard			
State, Zip: PA, 15090	PO #: PO813031			
Phone:	WO #: Task 400			
Email: joseph.zaso@arcadis.com	Project #: ~~60016021~~ 30057651			
Project Name: Ashland Rensselaer	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9060A - (MOD) Local Method	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		
INJECTION_SOLUTION-20201006	10/8/20	0815	G	Water	N	N	X		TOC, collected from DPT tote
				Water					
				Water					
				Water					
				Water					
				Water					

480-176243 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Matt Wiener D. Mason	10/8/20 1020	Arcadis	Karl Jacha	10/8/20 1020	Eurofins
2	Karl Jacha	10/8/20 1700	Eurofins			
3					10/9/20 0802	

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.1 #1

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Ashland LLC

Job Number: 480-176243-1

Login Number: 176243
List Number: 1
Creator: Sabuda, Brendan D

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.1 #1 ICE
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-177008-1
Client Project/Site: Ashland Rensselaer

For:
Ashland LLC
1313 N. Market Street
Wilmington, Delaware 19894

Attn: Ian McCary

Authorized for release by:
10/29/2020 11:52:42 AM

Eddie Barnett, Project Manager I
(912)250-0280
Eddie.Barnett@Eurofinset.com

Table of Contents

Definitions/Glossary

Client: Ashland LLC
Job ID: 480-177008-1
Project/Site: Ashland Rensselaer

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-177008-1

Laboratory: Eurofins TestAmerica, Buffalo

Narrative

CASE NARRATIVE
Client: Ashland LLC
Project: Ashland Rensselaer

Report Number: 480-177008-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 10/23/2020; the sample arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.4º C.

TOTAL ORGANIC CARBON

Sample INJECTION_SOLUTION-20201022 (480-177008-1) was analyzed for total organic carbon in accordance with EPA SW-846 Method 9060A. The sample was analyzed on 10/28/2020.

Sample INJECTION_SOLUTION-20201022 (480-177008-1)[200X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

Client Sample ID: INJECTION_SOLUTION-20201022 Lab Sample ID: 480-177008-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	1900		200	87	mg/L	200		9060A	Total/NA
TOC Result 2	2000		200	87	mg/L	200		9060A	Total/NA
Total Organic Carbon	2100		200	87	mg/L	200		9060A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

Client Sample ID: INJECTION_SOLUTION-20201022
Date Collected: 10/22/20 07:30
Date Received: 10/23/20 08:00

Lab Sample ID: 480-177008-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1900		200	87	mg/L			10/28/20 02:38	200
TOC Result 2	2000		200	87	mg/L			10/28/20 02:38	200
Total Organic Carbon	2100		200	87	mg/L			10/28/20 02:38	200

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 480-556257/27
Matrix: Water
Analysis Batch: 556257

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1.0	U	1.0	0.43	mg/L			10/28/20 07:16	1
TOC Result 2	1.0	U	1.0	0.43	mg/L			10/28/20 07:16	1
Total Organic Carbon	1.0	U	1.0	0.43	mg/L			10/28/20 07:16	1

Lab Sample ID: MB 480-556257/4
Matrix: Water
Analysis Batch: 556257

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	1.0	U	1.0	0.43	mg/L			10/27/20 20:10	1
TOC Result 2	1.0	U	1.0	0.43	mg/L			10/27/20 20:10	1
Total Organic Carbon	1.0	U	1.0	0.43	mg/L			10/27/20 20:10	1

Lab Sample ID: LCS 480-556257/28
Matrix: Water
Analysis Batch: 556257

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	60.0	55.6		mg/L		93	90 - 110
TOC Result 2	60.0	57.0		mg/L		95	90 - 110
Total Organic Carbon	60.0	56.5		mg/L		94	90 - 110

Lab Sample ID: LCS 480-556257/5
Matrix: Water
Analysis Batch: 556257

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	60.0	56.3		mg/L		94	90 - 110
TOC Result 2	60.0	58.3		mg/L		97	90 - 110
Total Organic Carbon	60.0	57.6		mg/L		96	90 - 110

QC Association Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

General Chemistry

Analysis Batch: 556257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-177008-1	INJECTION_SOLUTION-20201022	Total/NA	Water	9060A	
MB 480-556257/27	Method Blank	Total/NA	Water	9060A	
MB 480-556257/4	Method Blank	Total/NA	Water	9060A	
LCS 480-556257/28	Lab Control Sample	Total/NA	Water	9060A	
LCS 480-556257/5	Lab Control Sample	Total/NA	Water	9060A	

Lab Chronicle

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

Client Sample ID: INJECTION_SOLUTION-20201022

Lab Sample ID: 480-177008-1

Date Collected: 10/22/20 07:30

Matrix: Water

Date Received: 10/23/20 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060A		200	556257	10/28/20 02:38	CLA	TAL BUF

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ashland LLC
Job ID: 480-177008-1
Project/Site: Ashland Rensselaer

Laboratory: Eurofins TestAmerica, Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	04-01-21

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9060A		Water	TOC Result 1
9060A		Water	TOC Result 2

Method Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

Method	Method Description	Protocol	Laboratory
9060A	Organic Carbon, Total (TOC)	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins TestAmerica, Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ashland LLC
Project/Site: Ashland Rensselaer

Job ID: 480-177008-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
480-177008-1	INJECTION_SOLUTION-20201022	Water	10/22/20 07:30	10/23/20 08:00	

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Albany #224

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Matt Wiener	Lab PM: Barnett, Eddie T	Carrier Tracking No(s):	COC No: 680-118481-45216.2
Client Contact: Ian McCary	Phone: 513-884-3148	E-Mail: Eddie.Barnett@Eurofinset.com		Page: Page ~~2 of 2~~ 1 of 1
Company: Ashland LLC				Job #:

Address: 1313 N. Market Street	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Wilmington	TAT Requested (days): Standard		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: DE, 19894			
Phone:	PO #: PO813031		
Email: Ian.Mccary@ashland.com	WO #: Task 400		
Project Name: Ashland Rensselaer	Project #: ~~60046621~~ 30097651		
Site:	SSOW#:		Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260C - TCL VOCs	1010A, 9045D	6010C, 7471B	8260C - TCLP Volatiles	6010C, 7470A, 8270D	8082A - Total PCBs	8260C - TCL VOCs	Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N	N	N	A	A		
INJECTION-SOLUTION-20201022	10/22/20	0730	G	W ~~Solid~~ ~~Solid~~ ~~Water~~										1		

480-177008 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Matt Wiener / D. Matthew	10/22/20 / 1030	Arcadis	Karl Zachow	10/22/20 1030	Eurofins
2	Karl Zachow	10/22/20 1700	Eurofins			
3					10/23/20 800	TAT

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.4 #1

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Ashland LLC

Job Number: 480-177008-1

Login Number: 177008
List Number: 2
Creator: Stopa, Erik S

List Source: Eurofins TestAmerica, Buffalo

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX B

DPT Injection Logs

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-1	10/07/2020	1:45pm	10/07/2020	4:00pm	12'-16'	10'-12'	.25-.5	26		
	10/08/2020	8:00am	10/08/2020	4:45pm	12'-16'	10-20	0.5	345		
	10/09/2020	7:50am	10/09/2020	1:23pm	12'-16'	10-20	.5-1	217		
		1:31pm		4:10pm	16'-20'	10-20	.5-1	90		
	10/12/2020	8:00am	10/12/2020	4:31pm	16'-20'	10-20	1-2	376	x	
	10/13/2020	8:28am	10/13/2020	10:32am	16'-20'	10-20	1-1.5	212		Point complete

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-2	10/07/2020	1:45pm	10/07/2020	4:00pm	12'-16'	10-12	0.5	76		
	10/08/2020	8:00am	10/08/2020	4:45pm	12'-16'	10-20	0.5	464		
	10/09/2020	7:50am	10/09/2020	10:59am	12'-16'	10-20	.5-1	60		
		11:03am		4:10pm	16'-20'	10-20	.5-1	140		
	10/12/2020	8:00am	10/12/2020	2:59pm	16'-20'	10-20	1-2	350		Point complete

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-3	10/07/2020	1:45pm	10/07/2020	4:00pm	17'-21'	10-12	0.5	87.6		
	10/08/2020	8:00am	10/08/2020	4:45pm	17'-21'	10-20	0.5	310		
	10/09/2020	7:50am	10/09/2020	12:07pm	17'-21'	10-20	.5-1	175		
		12:09pm		4:10pm	21'-25'	10-20	.5-1	160.7		
	10/12/2020	8:00am	10/12/2020	1:54pm	21'-25'	10-20	1-2	295		Point complete

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-4	10/07/2020	11:41am	10/07/2020	11:48am	17'-21'	10-12	3	22		
		1:45pm		4:00pm	17'-21'	10-12	0.5	86		
	10/08/2020	8:00am	10/08/2020	4:45pm	17'-21'	10-20	0.5	259		
	10/09/2020	7:50am	10/09/2020	12:52pm	17'-21'	10-20	.5-1	220		
		12:57pm		4:10pm	21'-25'	10-20	.5-1	100		
	10/12/2020	8:00am	10/12/2020	4:31pm	21'-25'	10-20	1-2	458		
	10/13/2020	8:28am	10/13/2020	9:00am	21'-25'	10-20	1-1.5	43		Point complete

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-5	10/07/2020	11:29am	10/07/2020	11:48am	18'-22'	10-12	0.25	7		
		1:45pm		4:00pm	18'-22'	10-12	0.5	89		
	10/08/2020	8:00am	10/08/2020	4:45pm	18'-22'	10-20	0.5	366		
	10/09/2020	7:50am	10/09/2020	10:21am	18'-22'	10-20	.5-1	150		
		10:32am		4:17pm	22'-26'	10-20	.5-1	240		
	10/12/2020	8:00am	10/12/2020	2:10pm	22'-26'	10-20	1-2	340		

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-6	#########	1:30pm	#########	1:31pm	20'-24'	10-15	1	1		Stopped at 1:31pm to drill more injection points
		2:24pm		3:15pm	20'-24'	10	0.5	16.18		
	#########	12:33pm	#########	2:55pm	20'-24'	10	.5-1	71	x	
		3:14pm		3:16pm	20'-24'	10	0.4	0.2	x	
	#########	8:08am	#########	8:11am	20'-24'	10-12	0.5	1.5	x	Daylighting in nearby well
		8:16am		8:17am	20'-24'	10-12	0.2	0.2	x	Daylighting in nearby well
		8:50am		8:55am	24'-28'	10-12	0.2	1	x	Daylighting in nearby well

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-7	#########	10:52am	#########	11:35am	14'-18'	20-25	5	275	x	Stopped because of water level rise in nearby well
		1:20pm		1:22pm	14'-18'	10-15	1	2	x	
		1:30pm		1:31pm	14'-18'	10-15	1	1		Stopped at 1:31pm to drill more injection points
		2:24pm		3:15pm	14'-18'	10	0.5	69.46		
	#########	7:54am	#########	12:06pm	14'-18'	10	1	240.5		
		12:33pm		3:25pm	18'-22'	15	.5-1	164.7		
	#########	8:08am	#########	9:20am	18'-22'	10-12		62.5		Flow meter not working properly, unsure of exact total
		10:07am		1:35pm	18'-22'	10-12	.5-.8	150		Flow meter stopped working
	#########	8:06am	#########	1:07pm	18'-22'	8	0.75	211		
		1:15pm		1:32pm	22'-26'	8	0.75	12	x	Daylighting at nearby well
		2:40pm		4:12pm	22'-26'	8	0.75	69	x	Daylighting at nearby well
	10/6/2020	7:33am		11:11am	22'-26'	10-12	<1.0	60	x	Daylighting at nearby well
		12:24pm	10/6/2020	4:45pm	22'-26'	10-12	.75-1	319		

	#########	1:33pm	#########	4:15pm	22'-26'	20-Oct	0.5	143		Point finished	

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-8	10/01/2020	9:55am	10/01/2020	1:56pm	10'-14'	10-12	0.2	0.2	x	Daylighting in nearby well
	10/05/2020	8:04am	10/05/2020	12:38pm	10'-14'	8	0.75	213	x	Daylighting in nearby well
		2:55pm		3:50pm	10'-14'	8	0.75	23	x	Daylighting in nearby well
	10/6/2020	7:33am	10/6/2020	10:38am	10'-14'	10-12	0.75-1	105		
		11:03am		11:11am	26'-30'	20	0.75-1	4	x	Daylighting in nearby well
		11:49am		4:45pm	26'-30'	20	.75-1	199		
	10/07/2020	11:15am	10/07/2020	11:48am	26'-30'	10-12	0.5	12		
		1:45pm		4:00pm	26'-30'	10-12	.3-.5	45		
	10/08/2020	8:00am	10/08/2020	1:33pm	26'-30'	10-20	0.5	531		
	10/09/2020	7:50am	10/09/2020	4:10pm	22'-26'	10-20	.5-1	525		
	10/12/2020	8:00am	10/12/2020	8:31am	22'-26'	10-20	1-2	57		

		9:03am		4:27pm	18'-22'	10-20	1-2	588			
	10/13/2020	8:28am	10/13/2020	3:29pm	14'-18'	10-20	1-2	588		Point complete	

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
Injection Operator:	Joe Hutchins

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INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-9	#########	12:35pm	#########	12:51pm	14'-18'	18	3.5	52	x	
		1:20pm		1:22pm	14'-18'	10-15	1	2	x	
		2:24pm		3:15pm	14'-18'	10	0.5	17.5		
	#########	12:33pm	#########	3:25pm	18'-22'	20	.25-.5	58.3		
	#########	8:08am	#########	9:20am	18'-22'	10-12		50		Stopped due to flow meter issues
		2:01pm		3:32pm	18'-22'	60	2-2.5	174		
	#########	7:53am	#########	1:07pm	18'-22'	10-20	1.5-2	587		
		1:15pm		4:12pm	22'-26'	10-20	<1	172	x	
	#########	8:02am	#########	4:33pm	22'-26'	20	0.9	452		
	10/6/2020	7:21am		10:37am	22'-26'	20	1.5	220		
		10:44am	10/6/2020	4:45pm	26'-30'	20	2.5-2.7	762		

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INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes

Project Name:	Arcadis - 130 South Street, Rensselaer, NY - EVO Injection
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CASCADE DRILLING | TECHNICAL SERVICES EXCELLENCE ON EVERY LEVEL™

INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-11	#########	2:24pm	#########	3:15pm	6'-10'	10	0.5	24.34		
	#########	12:33pm	#########	3:25pm	6'-10'	10	.5-1	132.6		
	#########	8:08am	#########	9:20am	6'-10'	10-15		62.5		Flow meter not working properly, unsure of exact total
		9:55am		1:49pm	6'-10'	10-15	1.8-2	365.5		
		2:15pm		3:32pm	10'-14'	20	2.5-3	232		
	#########	7:53am	#########	9:42am	10'-14'	10-20	3	356		
		9:48am		12:10pm	14'-18'	10-20	4	588		
		12:17pm		2:43pm	18'-22'	10-20	4	588		
		2:48pm		4:12pm	22'-26'	10-20	3.5-4	301		
	#########	8:02am	#########	9:32am	22'-26'	16-18	3-3.5	287		

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INJECTION FIELD LOG

Boring ID	Start Date	Start Time	End Date	End Time	Injection Interval	Pressure (PSI)	Flow Rate (GPM)	2% EVO Injected (Gallons)	Daylighting (Mark X)	Field Notes
DPT-12	#########	9:33am	#########	2:25pm	13'-17'	10-12	1.5-2.5	588		
		2:32pm		4:33pm	17'-21'	10-12	1.5-2.5	218		
	10/6/2020	7:20am		9:50am	17'-21'	10	3.0	400		
		9:58am		11:20am	21'-25'	20	3.0	188		
		11:25am	10/6/2020	2:06pm	21'-25'	20	3.0	420		

Arcadis Canada Inc.

855 Route 146

Suite 210

Clifton Park, New York 12065

Tel 518 250 7300

Fax 518 371 2757

www.arcadis.com