Environmental Remediation Group

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SENT VIA OVERNIGHT COURIER AND FILE TRANSFER PORTAL

February 22, 2019

Mr. Brian Sadowski
Division of Environmental Remediation
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

Re: Charles Gibson Site, Niagara Falls, New York
Site No. 932063
Annual Periodic Review Report – 2018
Post Closure Operation, Maintenance, and Monitoring Activities

Dear Mr. Sadowski:

Olin hereby submits a CD containing a PDF of the 2018 Annual Periodic Review Report on the Post-Closure Operation, Maintenance, and Monitoring activities for the Charles Gibson Site. The annual certification is attached as hard copy and as part of the PDF. The full document is also available via Olin's File Transfer Portal.

Please direct any questions or comments to me at 423/336-4540 or by email at dmshare@olin.com.

Sincerely,
OLIN CORPORATION

David M. Share, P.E.
Director, Environmental Remediation

Charles Gibson Site
Site No. 932063
Periodic Review Report

February 22, 2019

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I. INTRODUCTION

Brief Summary, Nature and Extent, Remedial History:

Construction of the remedy on the Charles Gibson Site concluded in 1990. The remedy consisted of rerouting Cayuga Creek around and away from the waste, installation of a fully circumscribed soil-bentonite slurry wall barrier and installation of a double flexible membrane liner cap with a perimeter collection drain system. The first year of operations and maintenance (O&M) of the containment remedy for the site and the groundwater monitoring program began in 1993. Waters collected in the site perimeter collection drain system are managed by direct discharge to the City of Niagara Falls Wastewater Treatment Facility. The Charles Gibson site is classified as a commercial/small industrial/residential user (CSIRU) and does not require a permit.

Effectiveness of Remedial Program:

Groundwater monitoring indicates there are no increased concentrations of compounds being monitored. Evaluation of the monitor well and sediment analytical results indicate the containment remedy is effective. An evaluation of data from the piezometer pairs at the Site indicates that a materially inward hydraulic gradient has been established in the containment area of the site. The remedial program is achieving the objectives of containing groundwater flow and maintaining groundwater quality standards.

Compliance:

There are no areas of non-compliance.

Recommendations:

No recommendations. Conditions at the Site are stable.

II. SITE OVERVIEW

Site Description and Nature/Extent Prior to Remediation:

The Site as now defined incorporates approximately two acres bounded to the east and north by Cayuga Creek, to the west by Tuscarora Road and to the south by Niagara Mohawk Power Corporation right-of-way and the Auto Zone Incorporated auto parts store and parking lot. The Site cap is slightly mounded with the center of the capped area essentially flat. The capped area is enclosed by a chain link fence. A wooden privacy fence is immediately next to and outside of the chain link fence on portions of the perimeter.

Remediation Chronology:

The Agreement includes a provision in the event that after seven years following the delivery of a Release of Liability (issued December 15, 1992), Olin demonstrates that conditions at the Site are such that the stated frequency or duration of the requirements are no longer necessary to determine whether the remediation is effective, Olin may reduce the frequency and duration of such monitoring or inspections. Olin has submitted annual reports and has conducted the required monitoring for the duration of the remediation.

III. REMEDY PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

The work performed for the Site during 2018 was reviewed and found to be in accordance with the approved O&M Manual (Revised 2009) as well as the NYSDEC approved reduction in annual sampling dated April 25, 2013. Groundwater monitoring indicates there are no increased concentrations of the Site compounds being monitored. Evaluation of the groundwater data generated during the 2018 monitoring year indicates that the containment remedy is effective. Drawdown in both manholes was effectively maintained at specified levels throughout the year.

IV. IC/EC PLAN

IC/EC Requirements:

Fence is in place around the landfill, effectively restricting access

Clean soil cover is in place on the landfill, restricting infiltration and promoting runoff

A hydraulic control system is in place, effectively controlling groundwater flow direction

Certification:

Attachment A

V. MONITORING PLAN COMPLIANCE REPORT

Components of Monitoring Plan:

Operation, maintenance, and monitoring activities to be performed include:

- Performance of a groundwater monitoring program to monitor ground water quality at the site and to verify the inward hydraulic gradient within the capped area.

- The current groundwater level monitoring system for the Site consists of six piezometers (P-1 through P-6) and two manholes (A and B). Piezometers P-1, P-2 and Manhole A are located in the northeast section of the Site; P-3, P-4, and Manhole B are located in the southeast section; and P-5 and P-6 are located toward the southwest (see ***Attachment B***).

- All piezometers are constructed of Schedule 80 PVC and are 2 inches in diameter. Each piezometer has been constructed with 5 feet of screen and was screened at the water table.

- The construction of the piezometer screens at the water table allows for continued monitoring of the water table elevation inside and outside of the containment area during periods of water level fluctuations. Piezometers P-1, P-3, and P-5 are located outside of the slurry wall that runs along the perimeter of the Site. Piezometers P-2, P-4, and P-6 are inside the slurry wall and paired opposite the three piezometers outside the slurry wall.

- Water level elevations are measured quarterly at the Site in Manholes A and B and piezometers P-1 through P-6. Water level elevations are measured by means of an acoustical sounder or electronic water level probe. The sounder or probe is lowered into the manhole or piezometer until it makes contact with the free water surface. The depth

from the top of the piezometer riser pipe or manhole rim to the water surface is measured to an accuracy of 0.01 ft. Depth to water measurements are converted into mean sea level elevations by referring to the surveyed elevation of the top of the piezometer riser pipe or manhole rim provided on the Groundwater Elevation Form. The depth to water measurements for Manholes A and B are checked to see that they are not greater than 10.27 feet and 12.41 feet, respectively to ensure that the automatic sump pump is functioning.

- Consultants visited the site on 06/28/2018 to preform redevelopment of piezometer pair P-1/P-2. Fluctuations of groundwater elevations within this pair indicate that minor outward hydraulic gradients occur, but typically revert back to inward gradients by the next quarter.

Summary and Comparison to Remedial Objectives:
The isolation of groundwater within the capped area has been established and is being maintained by current operation and maintenance activities. The groundwater monitoring and sampling is performed on an annual basis in rotating quarters to help assess seasonal variability with Groundwater Sampling Field Parameters presented in **Attachment C**.

Currently two locations, immediately upstream and downstream of the Site and the adjacent remediated portion of the Cayuga Creek bed, are sampled once per year, in the Fall or 'low water' period. Beginning with the October 2000 sample event, annual creek sediment samples have been analyzed for BHC isomers only. Sample collection and analysis of creek sediments are performed annually during the second half of the calendar year. The 2018 data is non-detect and consistent with historical results **(Table 3)**.

The water elevation data collected from the piezometers and ground water wells was used to determine whether an inward hydraulic gradient exists was made by comparing water level measurements within the capped area to those measured outside the capped area. The groundwater elevation data indicates that ground water within the capped area is consistent with historical data. An evaluation of data from the piezometer pairs at the Site indicates that all the piezometer pairs exhibited inward gradients during first two quarters of the year. Third quarter data reveals outward gradients for all the piezometers, however, all the piezometer pairs returned to inward gradients during the fourth quarter except for P1/P2. We will continue to closely monitor these pairs moving forward. Drawdown in both manholes was effectively maintained at specified levels throughout the year. **Table 4** shows the most recent piezometric data.

Deficiencies:
None

Recommendations for Changes:
No recommendations. Conditions at the Site are stable.

VI. O&M PLAN COMPLIANCE REPORT

Components of the O&M Plan:
Site remediation requirements have been met by Olin through rerouting of Cayuga Creek around and away from the waste, by constructing a fully circumscribing soil-bentonite slurry

wall barrier, and through installing a double flexible membrane liner cap as part of the final cover with a perimeter collection drain system. This O&M Plan safeguards that remedy and provides for monitoring of the Gibson Site in compliance with the Settlement Agreement.

Quarterly inspections of the Gibson Site are conducted to identify any potential problems with physical deterioration of structures, possible malfunctions of the slurry wall or of the perforated CPVC drain system, and to ensure that all site remedial measures components are operating effectively, in accordance with the Settlement Agreement.

The Environmental Inspector conducts the inspections to ensure that the remedial measures at the Site will remain operative. Additionally, the inspections address the safeguards to control, minimize or eliminate threats to human health and the environment. Operation, maintenance, and monitoring activities are conducted to identify proposed changes to the O&M Manual or site procedures which would provide a safer and/or more efficient and cost-effective operation.

Recordkeeping is conducted for each site visit and inspection.

Operation & Monitoring (O&M) Summary:
The groundwater collection system is inspected for the buildup of hard or soft scale-like deposits. The inspection is performed concurrently with inspection of the capped area. If a component of the groundwater collection system is found to be damaged or malfunctioning, it is repaired or replaced.

The capped area is mowed on a regular basis to prevent establishment of woody vegetation during this reporting period. The capped area functions as designed and complies with the O&M Plan.

Inspections are conducted using the items listed on the Site Inspection Form presented in ***Attachment D***. Information to be entered on these forms includes the inspector's name, date, and time of inspection, item inspected and any comments. The inspector indicates on the forms whether the condition of each item was acceptable or unacceptable to ensure that the requirements of this O&M Plan are fulfilled. The scheduled Site monitoring inspections are performed by a qualified individual assigned to inspect the items and systems noted on the Site Inspection Form. The completed Site Inspection Forms are maintained at Olin Environmental Remediation offices in Cleveland, TN. Inspections are performed, at a minimum, on a quarterly basis.

Evaluation of Remedial Systems:
All components are performing as designed.

O&M deficiencies:
None

Conclusions:
The O&M system is being run and maintained properly and does not require additions or modifications at this time.

VII. OVERALL PRR CONCLUSIONS AND RECOMMENDATIONS

Compliance with SMP:
Based on the operations and maintenance documentation listed above, the system requirements are being met. There are no new exposure pathways. Additional plans and modifications are not necessary.

Remedy Effectiveness:
The isolation of ground water within the capped area has been established and is being maintained by current operation and maintenance activities.

Review of the groundwater elevation data indicate that inward hydraulic gradients were observed between piezometers within the capped area and piezometers outside of the capped area with previously noted exceptions. Fluctuations of groundwater elevations indicate that minor outward hydraulic gradients historically occur, but typically revert back to inward gradients by the next quarter.

Currently two locations, immediately upstream and downstream of the Site and the adjacent remediated portion of the Cayuga Creek bed, are sampled once per year, in the Fall or 'low water' period. A sample is collected downstream of the Site to monitor changes in levels of contaminants in creek sediments, if any. The other sample, immediately upstream of the Site is used to monitor potential upstream contaminant sources or potential 'backwash' effects caused by the changing level of the Niagara River. Beginning with the October 2000 sample event, annual creek sediment samples have been analyzed for BHC isomers only. Both upstream and downstream concentrations of BHC were non-detect in 2018.

Based on the data developed to date, the remedy has been effective in attaining the remedial objectives.

Future Submittals:
Future submittals of this report will continue to be submitted annually.

Attachment A

Institutional & Engineering Certification Form

Enclosure 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Site Management Periodic Review Report Notice

Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 932063

Site Name Charles Gibson Site

Site Address: N.E. Cnr. of Niagara Falls Blvd. & Tuscarora Rd. Zip Code: 14304
City/Town: Niagara Falls
County: Niagara
Site Acreage: 2.000

Reporting Period: January 31, 2018 to January 31, 2019

	YES	NO
1. Is the information above correct?	☑	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☑
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☑
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☑
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☑

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Closed Landfill	☑	☐
7. Are all ICs/ECs in place and functioning as designed?	☑	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative Date

SITE NO. 932063

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
161.05-3-7	OLIN CORPORATION	Monitoring Plan O&M Plan

Consent Judgement 3/12/85 including IC stipulations p. 23 Permits and Easements, sections 11-24.
Operation and Maintenance Manual; September 30, 2009.
- Groundwater Quality Monitoring.
- Leachate Monitoring.
- Creek Sediment Monitoring.

161.05-5-12	OLIN CORPORATION	Monitoring Plan O&M Plan

Consent Judgment 3/12/85 including IC stipulations p. 23 Permits and Easements, sections 11-24.

- Groundwater Quality Monitoring.
- Leachate Monitoring.
- Creek Sediment Monitoring.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
161.05-3-7	Cover System Groundwater Containment Leachate Collection Fencing/Access Control

- Realignment of Cayuga Creek from the waste.
- Fully circumscribed soil-bentonite slurry wall barrier.
- Double flexible membrane liner cap.
- Perimeter Leachate Collection System with discharge to NFWWTP.
- Final cover soil cap.
- Perimeter chain link and portions of wooden privacy fencing with locked gates.

161.05-5-12	Cover System Groundwater Containment Leachate Collection Fencing/Access Control

- Realignment of Cayuga Creek away from the waste.
- Fully circumscribed soil-bentonite slurry barrier wall.
- Double flexible membrane liner cap.
- Perimeter leachate collection system with discharge to the NFWWTP.
- Final soil cover cap.
- Perimeter chain link with portions of wooden privacy fencing with locked gates.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☑	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☑	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative — Date

IC CERTIFICATIONS
SITE NO. 932063

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I David M. Share (print name) at 3855 N. Ocoee St., Cleveland TN 37312 (print business address)

am certifying as Olin Corporation (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

[signature] 2/22/2019

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification — Date

IC/EC CERTIFICATIONS

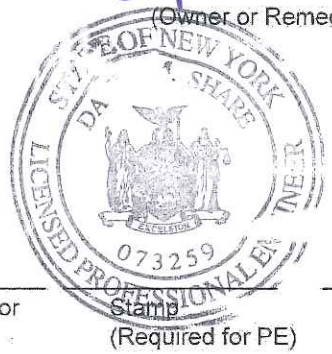
Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I David M. Share at 3855 N. Ocoee St., Cleveland TN 37312,
print name print business address

am certifying as a Professional Engineer for the Olin Corporation
(Owner or Remedial Party)



David M. Share — 2/22/19

Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

Date

Attachment B

Site Features Map
Figure 1

FIGURE 1
Charles Gibson Site
Niagara Falls, NY
with Sampling Locations

Attachment C

Field Sampling Forms

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: CLEO JONES
SAMPLED BY: CLEO JONES
COMPANY: STEVENSON

SAMPLE ID: MW-5-092518
SAMPLING EVENT/DATE: ANNUAL
MONITORING WELL: MW-5
CONDITION: GOOD

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: 15.28 (FT.)
DEPTH TO WATER FROM TOP OF RISER: 11.45 (FT.)
WATER COLUMN: 3.83 (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= .61 (GALS)

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAIN-LESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

PURGE METHOD: PERISTALTIC PUMP | DEDICATED TUBING
BOTTOM OF WELL/SILT BUILDUP: SLIGHT
PURGE START TIME: 912 STOP TIME: 930
PURGE OBSERVATIONS: TURBID → CLEAR

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
1	6.62	1.84	17.1	TURBID
2	6.85	1.80	16.4	TURBID
3	6.91	1.79	16.3	SL TURBID
4	6.93	1.77	16.2	SL TURBID
5				

TOTAL VOLUME PURGED: 3 gallons

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 9/25/18

MEDIA: GROUNDWATER X
CREEK SEDIMENT

SAMPLE TIME: 925

LOCATION: N. OF AUTO ZONE

SAMPLE METHOD: PERISTALTIC PUMP | DEDICATED TUBING

SAMPLING OBSERVATIONS: SLIGHTLY TURBID

QC SAMPLES TAKEN: BLIND DUP TAKEN HERE LABELED "MW-7" 1015

OTHER OBSERVATIONS/COMMENTS: SAMPLED AT 925 ON 9/25/18.

Note: specific conductivity formula to 25 degrees Celcius: SC(25)= SC measured / {(T-25)(0.02)}+1

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: CHRIS JONES
SAMPLED BY: CHRIS JONES
COMPANY: SEVERSON

SAMPLE ID: MW-1-092518
SAMPLING EVENT/DATE: ANNUAL
MONITORING WELL: MW-4
CONDITION: GOOD

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: 13.75 (FT.)
DEPTH TO WATER FROM TOP OF RISER: 7.98 (FT.)
WATER COLUMN: 5.77 (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= .9232 (GALS)

PURGE METHOD: PERISTALTIC PUMP / DEDICATED TUBING
BOTTOM OF WELL/SILT BUILDUP: SLIGHT
PURGE START TIME: 1009 STOP TIME:
PURGE OBSERVATIONS:

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAINLESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
1	7.40	1.11	17.24	ISP
2	7.09	.780	17.00	CLEAR
3	6.94	.777	16.94	CLEAR
4	6.92	.788	16.83	CLEAR
5				

TOTAL VOLUME PURGED:

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 9/25/18

MEDIA: GROUNDWATER X
CREEK SEDIMENT
SAMPLE TIME: 1111

LOCATION: EAST OF AUTO ZONE
SAMPLE METHOD: PERISTALTIC PUMP / DEDICATED TUBING
SAMPLING OBSERVATIONS: CLEAR
QC SAMPLES TAKEN: MS/MSD VOLUME
OTHER OBSERVATIONS/COMMENTS: SAMPLED AT 1111 ON 9/25/18

Note: specific conductivity formula to 25 degrees Celcius: SC(25)= SC measured / {(T-25)(0.02)}+1

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: CHRIS JONES
SAMPLED BY: CHRIS JONES
COMPANY: STEVENSON

SAMPLE ID: MW-B-092518
SAMPLING EVENT/DATE: ANNUAL
MONITORING WELL: MW-B
CONDITION: GOOD

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: (FT.)
DEPTH TO WATER FROM TOP OF RISER: (FT.)
WATER COLUMN: (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= (GALS)

PURGE METHOD:
BOTTOM OF WELL/SILT BUILDUP:
PURGE START TIME: STOP TIME:
PURGE OBSERVATIONS:

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAINLESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY (umhos/cm)	TEMP. (C OR F)	NOTES:
1				
2				
3				
4				
5				

TOTAL VOLUME PURGED:

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 9/25/18

MEDIA: GROUNDWATER X
CREEK SEDIMENT

SAMPLE TIME: 1205

LOCATION: ON TOP OF LANDFILL
SAMPLE METHOD: PERISTALTIC PUMP / DEDICATED TUBING
SAMPLING OBSERVATIONS: CLEAR
QC SAMPLES TAKEN: D FIELD BLANK - 092518 TAKEN AT 1222
OTHER OBSERVATIONS/COMMENTS: SAMPLED AT 1205 ON 9/25/18 FOR BHC

Note: specific conductivity formula to 25 degrees Celcius: SC(25)= $\frac{\text{SC measured}}{\{(T-25)(0.02)\}+1}$

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: CHRIS JONES
SAMPLED BY: CHRIS JONES
COMPANY: STEVENSON

SAMPLE ID: MW-A3-092618
SAMPLING EVENT/DATE: ANNUAL
MONITORING WELL: MW-A3
CONDITION: GOOD

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: (FT.)
DEPTH TO WATER FROM TOP OF RISER: (FT.)
WATER COLUMN: (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= (GALS)

PURGE METHOD:
BOTTOM OF WELL/SILT BUILDUP:
PURGE START TIME: STOP TIME:
PURGE OBSERVATIONS:

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAINLESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
1				
2				
3				
4				
5				

TOTAL VOLUME PURGED:

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE:

MEDIA: GROUNDWATER ____ SAMPLE TIME:
CREEK SEDIMENT ____

LOCATION:

SAMPLE METHOD:

SAMPLING OBSERVATIONS:

QC SAMPLES TAKEN:

OTHER OBSERVATIONS/COMMENTS: DRY NO SAMPLES TAKEN

Note: specific conductivity formula to 25 degrees Celcius: SC(25)= SC measured / {(T-25)(0.02)}+1

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 53502

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: CHARLES GIBSON - OLN	Project Number: 1186
Project Manager: DAVID SHARLE	Report CC: DAVID SHARLE
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: (423) 336-4987	Email: Onshore@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHAS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE: J O

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs ◇ 8260 ◇ 624 ◇ CLP	GC/MS SVOAs ◇ 8270 ◇ 625	GC VOAs ◇ 8021 ◇ 601/602	PESTICIDES ◇ 8081 ◇ 608	PCBs ◇ 8082 ◇ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	REMARKS/ ALTERNATE DESCRIPTION
MW-5-092518		9/25/18	925	GW	4		2		2				
MW-7-092518			1015		4		2		2				
MW-1-092518			1111		8		4		4				MS/MSD VOLUME
MW-3-092518			1205		2				2				
FIELD BLANK-092518			1222		4		2		2				
TEMP BLANKS		—	—	—	3								

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals
SHIPPED IN 3 COOLERS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)
REQUESTED REPORT DATE
STANDARD

REPORT REQUIREMENTS
_____ I. Results Only
X II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
_____ III. Results + QC and Calibration Summaries
_____ IV. Data Validation Report with Raw Data
Edata _____ Yes _____ No

INVOICE INFORMATION
PO #
BILL TO: OLIN

STATE WHERE SAMPLES WERE COLLECTED

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	VPS	Signature	Signature	Signature	Signature
Printed Name: CHAS JONES	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm: SES	Firm	Firm	Firm	Firm	Firm
Date/Time: 9/26/18 1500	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: White - Lab Copy; Yellow - Return to Originator

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: Chris Jones
SAMPLE ID: US-1-101118
SAMPLED Chris Jones
SAMPLING EVENT/DATE: annual creek
COMPANY: Sevenson
MONITORING WELL CONDITION: Upstream

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: (FT.)
DEPTH TO WATER FROM TOP OF RISER: (FT.)
WATER COLUMN: (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= (GALS)
PURGE METHOD:
BOTTOM OF WELL/SILT BUILDUP:
PURGE START TIME: STOP TIME:
PURGE OBSERVATIONS:

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAIN-LESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
1				
2				
3				
4				
5				

TOTAL VOLUME PURGED:

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 101118

MEDIA: GROUNDWATER
CREEK SEDIMENT X
SAMPLE TIME: 930

LOCATION: Upstream
SAMPLE METHOD: Sed Trap
SAMPLING OBSERVATIONS:
QC SAMPLES TAKEN: MS-1-101118 taken here as blind dup
OTHER OBSERVATIONS/COMMENTS: sampled for BHC

SC measured
Note: specific conductivity formula to 25 degrees Celcius: SC(25)= {{T-25)(0.02)}+1

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER AND SEDIMENT
SAMPLING FIELD FORM

RECORDED BY: Chris Jones
SAMPLE ID: DS-1-101118
SAMPLED Chris Jones
SAMPLING EVENT/DATE: annual creek
COMPANY: Sevenson
MONITORING WELL CONDITION: downstream

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: (FT.)
DEPTH TO WATER FROM TOP OF RISER: (FT.)
WATER COLUMN: (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= (GALS)

PURGE METHOD:
BOTTOM OF WELL/SILT BUILDUP:
PURGE START TIME: STOP TIME:
PURGE OBSERVATIONS:

NOTE: ALL GIBSON SITE MONITORING WELLS ARE 2-INCH DIAMETER STAIN-LESS STEEL. WELL DEPTHS:

MW-1R	12.10'
MW-2	12.13'
MW-A3	11.95'
MW-4	13.75'
MW-5	15.28'

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME	pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
1				
2				
3				
4				
5				

TOTAL VOLUME PURGED:

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 101118

MEDIA: GROUNDWATER
CREEK SEDIMENT X
SAMPLE TIME: 1030

LOCATION: downstream

SAMPLE METHOD: Sed Trap

SAMPLING OBSERVATIONS:

QC SAMPLES TAKEN: 0

OTHER OBSERVATIONS/COMMENTS: sampled for BHC

SC measured

Note: specific conductivity formula to 25 degrees Celcius: SC(25)= {{T-25)(0.02)}+1

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 53536

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: CHARLES GIBSON - OLIN	Project Number: 1186
Project Manager: DAVID SHARLE	Report CC: DAVID SHARLE
Company/Address: OLIN CORP	
3855 NORTH OCOEE ST SUITE 200	
CLEVELAND TN 37312	
Phone #: 423 336 4989	Email: DMSharle@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE: 0

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs ◦ 8260 ◦ 624 ◦ CLP	GC/MS SVOAs ◦ 8270 ◦ 625	GC VOAs ◦ 8021 ◦ 601/602	PESTICIDES ◦ 8081 ◦ 608	PCBs ◦ 8082 ◦ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	REMARKS/ ALTERNATE DESCRIPTION
US-1-101118		10/11/18	930	SED	1				1				
MS-1-101118		↓	1000	↓	1				1				
DS-1-101118		↓	1030	↓	1				1				
TEMP BLANK		—	—	—	1								

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals
CHARLES GIBSON ANNUAL CREEK BED SEDIMENT

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED NY

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)
REQUESTED REPORT DATE: STANDARD

REPORT REQUIREMENTS
_____ I. Results Only
X II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
_____ III. Results + QC and Calibration Summaries
_____ IV. Data Validation Report with Raw Data
Edata _____ Yes _____ No

INVOICE INFORMATION
PO #
BILL TO: OLIN

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: CHRIS JONES	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm: SES	Firm	Firm	Firm	Firm	Firm
Date/Time: 10/11/18 1500	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: White - Lab Copy; Yellow - Return to Originator

Attachment D

Site Inspection Forms

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 3/13/18 TIME: 1230

INSPECTOR: C. GWES COMPANY: SEVENSON

WEATHER: 33° CLEAR

REASON FOR INSPECTION (QUARTERLY OR OTHER):

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	3-4" SNOW
COVER VEGETATION	A	SNOW COVER
TREES	A	
LITTER	A	
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS: All locks secured on arrival. About 3-4" snowfall on landfill.

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 5/24/18 TIME: 0830

INSPECTOR: Chris Jones COMPANY: Stevenson

WEATHER: 65° Sunny

REASON FOR INSPECTION (QUARTERLY OR OTHER): 2nd quarter inspection

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	REMOVED TREE LIMBS
COVER VEGETATION	A	
TREES	A	
LITTER	A	REMOVED MINIMUM TRASH
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	REPLACED LOCK ON PS
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS: SITE SECURED UPON ARRIVAL.

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 6/28/18 TIME: 1200

INSPECTOR: CHRIS JONES COMPANY: SEVENSON

WEATHER: 80° SUNNY, HUMID

REASON FOR INSPECTION (QUARTERLY OR OTHER): WELL REDEVELOPMENT

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	
COVER VEGETATION	A	
TREES	A	
LITTER	A	
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS:

SEVENSON AND NOTHNAGLE WERE ON SITE TO REDEVELOPE PIEZOMETERS P1 and P2. SEVENSON WILL RETURN TO SITE TO DOCUMENT RESULTS.

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 9/25/18 TIME: 0830

INSPECTOR: CHRIS JONES COMPANY: STEVENSON

WEATHER: 65° SUNNY

REASON FOR INSPECTION (QUARTERLY OR OTHER): ANNUAL

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	
COVER VEGETATION	A	
TREES	A	
LITTER	A	
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS:

PERFORMED ANNUAL SAMPLING EVENT

MW-A3 WAS DRY NO SAMPLE TAKEN

DUE TO HEAVY RAINS THE CREEK WASN'T SAMPLED. WILL SAMPLE LATER IN WEEK.

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 10/11/2018 TIME: 900

INSPECTOR: C Jones COMPANY: Sevenson

WEATHER: 70 P/C

REASON FOR INSPECTION (QUARTERLY OR OTHER): annual creek sed sampling

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	
COVER VEGETATION	A	
TREES	A	
LITTER	A	
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS:

Sevenson sampled the creek sed for BHCs (PEST) A blind duplicate was taken upstream and labled MS-1-101118

Jones 4hrs
Wright 2hrs

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
SITE INSPECTION FORM

THIS FORM TO BE USED FOR QUARTERLY AND ALL OTHER SITE INSPECTIONS

DATE: 9 11/8/18 TIME: 900

INSPECTOR: CURTIS JONES COMPANY: SEVENSON

WEATHER:

REASON FOR INSPECTION (QUARTERLY OR OTHER): Gibson Site 4th Quarter inspection 2018

GENERAL SITE CONDITIONS: U=UNACCEPTABLE A=ACCEPTABLE

(Note: For general site conditions note existence of bare areas (number,size), cracks, subsidence (sinking), ponded water, stressed vegetation, soil discoloration or seeps, and rodent burrows. For site security, note absence of locks, gates open or damaged, missing signs or evidence of vandalism. Note any other unusual occurences.)

		COMMENTS
ACCESS ROAD	A	
COVER VEGETATION	A	
TREES	A	
LITTER	A	
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS:

A SMALL AMOUNT OF TRASH WAS COLLECTED.

TABLE 1
CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK

ANALYTICAL SUMMARY
GROUND WATER SAMPLING 2012-2018

MONITOR WELL: MW-A3

	2012		2013		2014		2015		2016		2017		2018	
Parameter	April	September	May	September	April	September	May	September	May	September	May	September	May	September
Alpha-BHC	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR	NR	-
Beta-BHC	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR	NR	-
Gamma-BHC	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR	NR	-
Delta-BHC	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR	NR	-
Hexachlorobenzene	NR	20U	NR	NR	NR	9.4U	NR	NR	NR	-	NR	NR	NR	-

MONITOR WELL: MW-4

	2012		2013		2014		2015		2016		2017		2018	
Parameter	April	September	May	September	April	September	May	September	May	September	May	September	May	September
Alpha-BHC	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Beta-BHC	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Gamma-BHC	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Delta-BHC	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Hexachlorobenzene	NR	9.4U	NR	NR	NR	9.4U	NR	NR	NR	10U	NR	NR	NR	9.4U

MONITOR WELL: MW-5

	2012		2013		2014		2015		2016		2017		2018	
Parameter	April	September	May	September	April	September	May	September	May	September	May	September	May	September
Alpha-BHC	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Beta-BHC	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Gamma-BHC	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Delta-BHC	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR	NR	0.047U
Hexachlorobenzene	NR	9.4U	NR	NR	NR	9.4U	NR	NR	NR	10U	NR	NR	NR	9.4U

Notes: Concentration in ug/l
- \- insufficient sample
- U Undetected
- J Estimated value
- NR Not required

Table 2
Annual Manhole B Sampling

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK

ANALYTICAL RESULTS SUMMARY
ANNUAL LEACHATE SAMPLING

September 25, 2018

	MANHOLE B (MHB)
PARAMETER	
alpha-BHC	0.047U
beta-BHC	0.062
delta-BHC	0.047U
gamma-BHC	0.047U
Hexachlorobenzene	NR

Notes:
U Undetected
J Estimated value
NR Not Required
Concentration in ug/l
Field blank was non-detect for all parameters of interest.
Data has been validated and judged acceptable as qualified.
Next hexachlorobenzene (HCB) sampling scheduled for fall 2020

TABLE 3
Charles Gibson Site
Niagara Falls, New York

ANALYTICAL SUMMARY

Annual Cayuga Creek Sediment Sampling 2008 - 2018

UPSTREAM

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Parameter	September	September	September	September	September	September	September	September	September	September	September
Alpha- BHC	77	240	94	200J	17	170J	120	NS	9.7	200	57U
Beta- BHC	69	260	97	120J	48	190J	280	NS	25	190	57U
Gamma- BHC	17J	18J	33J	190U	5.5U	28U	49U	NS	5.6U	51U	57U
Delta- BHC	26U	39J	52J	140J	23	28U	49U	NS	19	51U	57U

DOWNSTREAM

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Parameter	September	September	September	September	September	September	September	September	September	September	September
Alpha- BHC	5200	210	53J	230J	9.8	29U	55	52U	7	69U	63U
Beta- BHC	1000	73	62J	130J	37	89	100	76	18	87	63U
Gamma- BHC	66J	60U	63U	220U	5.9U	29U	52U	52U	4.9U	69U	63U
Delta- BHC	82J	32	56J	170J	18	29U	52U	52U	15	69U	63U

Notes:
Concentration in microgram per kilogram (ug/kg)
U Not Detected
J Estimated value
NS No sample in trap

Table 4

2018 Quarterly Groundwater Elevations Summary

Piezometer Pair	3/13/2018	Inward gradient	5/24/2018	Inward gradient	9/25/2018	Inward gradient	11/8/2018	Inward gradient
P1 outside **P2 inside**	565.64 565.54	Inward	565.90 565.53	Inward	564.33 565.34	Outward	563.33 565.19	Outward
P3 outside **P4 inside**	568.64 565.49	Inward	567.21 565.35	Inward	563.86 569.13	Outward	568.91 568.16	Inward
P5 outside **P6 inside**	568.26 567.77	Inward	568.70 567.57	Inward	566.20 567.12	Outward	568.85 566.57	Inward
		Below 565 ft msl		Below 565 ft msl		Below 565 ft msl		Below 565 ft msl
Manhole A	563.77	Yes	563.24	Yes	563.10	Yes	563.21	Yes
Manhole B	563.79	Yes	563.31	Yes	563.14	Yes	563.25	Yes

Notes: Measurement units are in feet above MSL.
Piezometers P1, P3, P5 are outside the slurry wall.
Piezometers P2, P4, P6 are located within the containment area.
NA – Not Available

Manhole monitoring:

- Maintain water level below 565 feet to prevent hydrostatic pressure buildup under concrete slab.
- Pump Manhole B as required to maintain an inward gradient.

Table 5
Olin Corp. Gibson Site
Discharge Volumes

Summary of Yearly Discharge Volumes

Date	Volume (gallons)
2008	40,223
2009	40,187
2010	28,118
2011	40,625
2012	29,623
2013	46,766
2014	33,564
2015	18,537
2016	28,172
2017	35,492
2018	**33,837**
TOTALS	**375,144**

Monthly Discharge Volumes 2018

Month	Volume (gallons)
Jan	2,446
Feb	6,082
Mar	4,138
Apr	7161
May	7,312
Jun	0
Jul	3,020
Aug	2,884
Sep	0
Oct	0
Nov	0
Dec	794
Total	**33,837**

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER ELEVATION FORM

THIS FORM TO BE USED FOR ALL QUARTERLY PIEZOMETER AND MANHOLE GROUND-WATER ELEVATION MEASURING EVENTS

DATE: 3/13/18 TIME: 1230

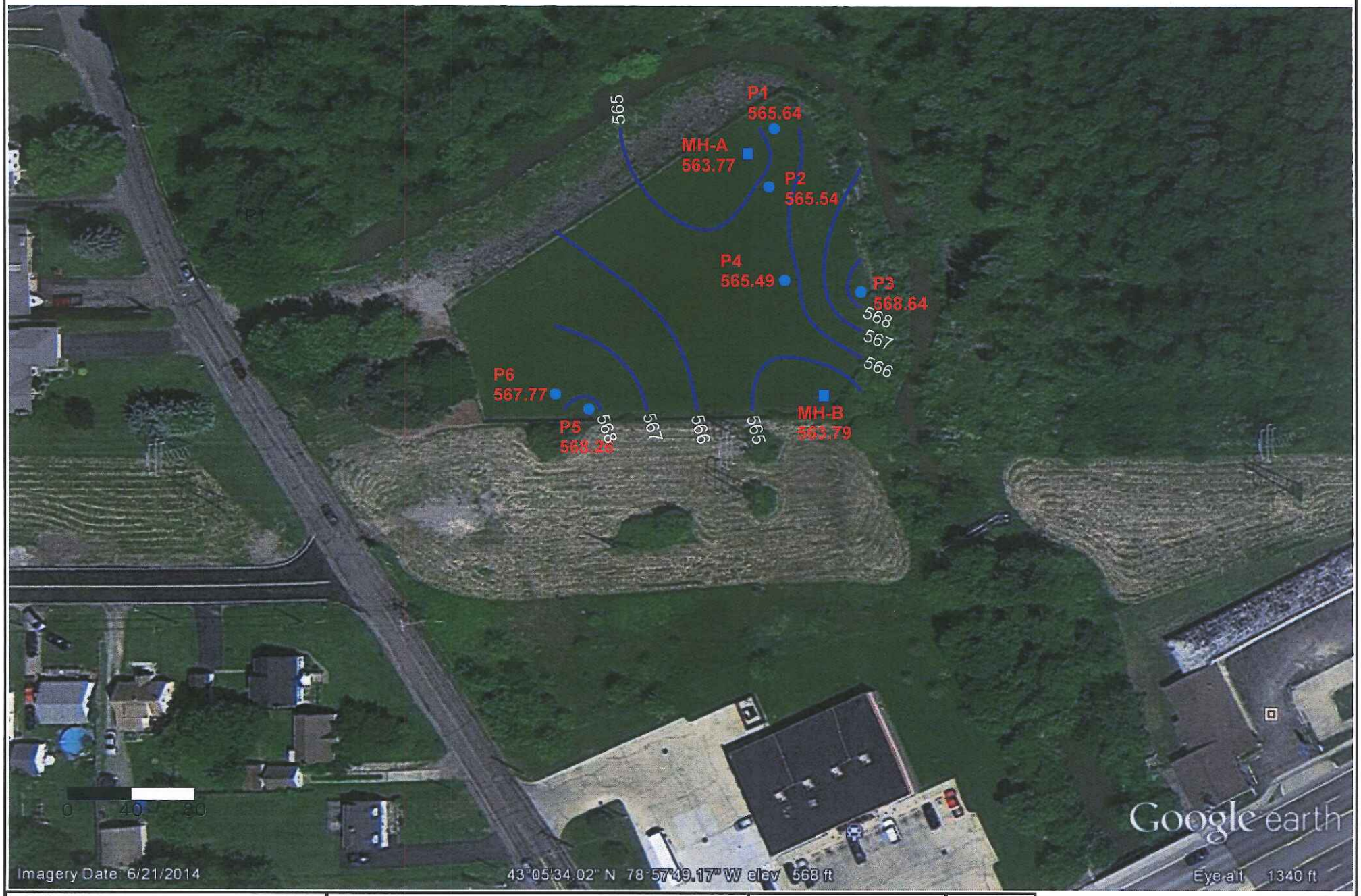
INSPECTOR: C JONES COMPANY: SEVENSON

WEATHER: 33° CLEAR

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	7.08	565.64	
P-2	574.89	9.35	565.54	
P-3	574.16	5.52	568.64	
P-4	576.14	10.65	565.49	
P-5	575.05	6.79	568.26	
P-6	578.28	10.51	567.77	
MANHOLE A	575.22	11.45	563.77	
MANHOLE B	577.34	13.55	563.79	

(Note: Manhole A empties into Manhole B by gravity feed and Manhole B is pumped automatically to the Town of Niagara Tuscarora Road sanitary sewer line by a float controlled sump pump which maintains groundwater elevations in Manhole B (and by extension Manhole A) below an elevation of 565 ft. above mean sea level. Therefore, Depth to water distance from the manhole rim should not be less than 12.41 ft. at Manhole B and 10.22 ft. at Manhole A.
(Note: riser elevations (re)surveyed September, 1999 by Wendel Surveyors)

ADDITIONAL COMMENTS/OBSERVATIONS:



OLIN CORPORATION

OLIN CORPORATION

Environmental Remediation Group
3855 N. Ocoee St., Ste. 200
Cleveland, Tennessee 37312
423/336-4000

SCALE:	DRAWN BY: JRH	DATE: 2-5-2019
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-11-2019

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
MARCH 13, 2018

FIG. NO.
1

- MANHOLE
- PIEZOMETER

MANHOLES ARE TO MAINTAIN A WATER LEVEL BELOW 565 FT (AMSL)

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER ELEVATION FORM

THIS FORM TO BE USED FOR ALL QUARTERLY PIEZOMETER AND MANHOLE GROUND-WATER ELEVATION MEASURING EVENTS

DATE: 5/24/18 TIME: 0830

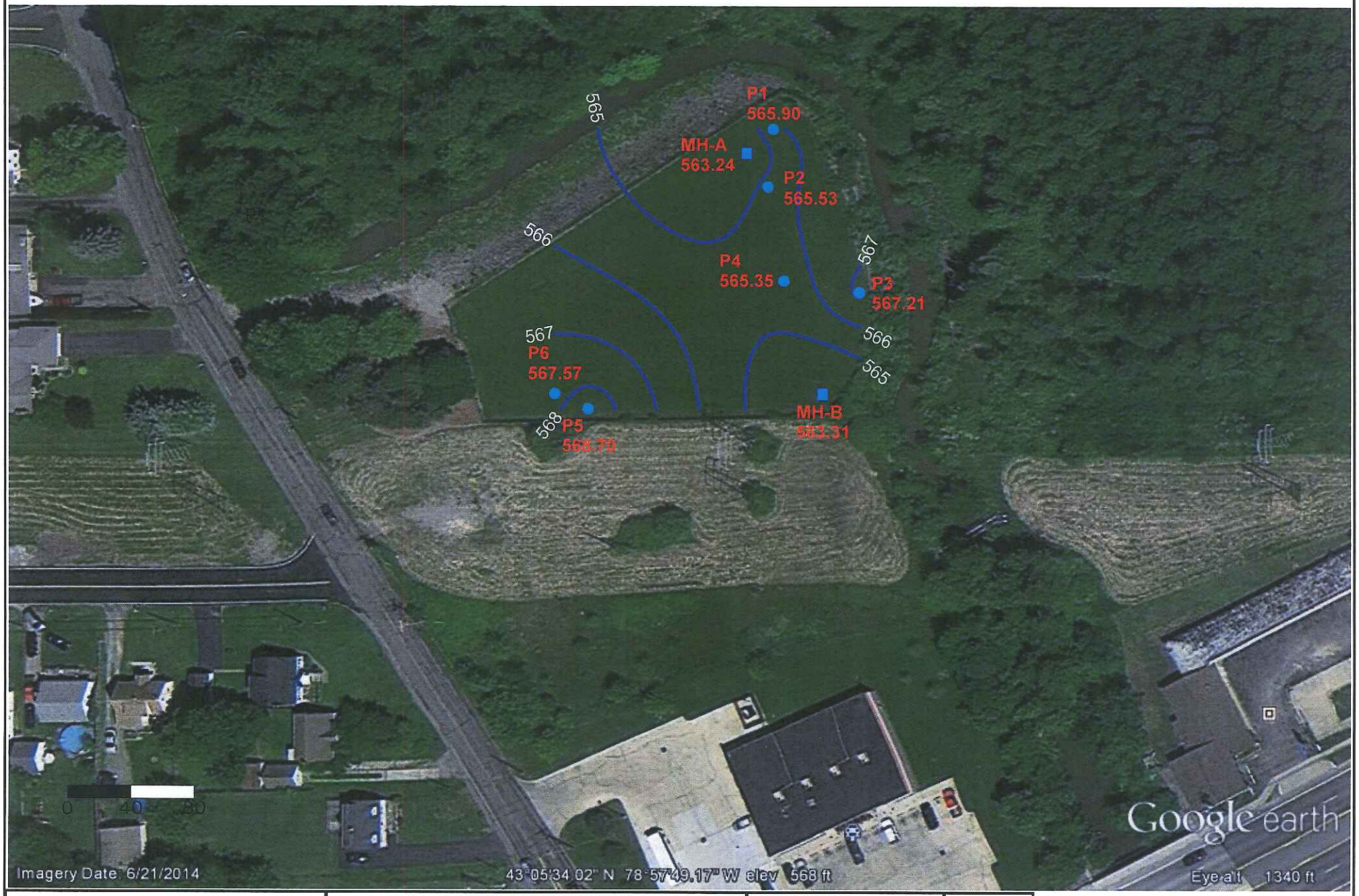
INSPECTOR: CHRIS JONES COMPANY: SEVENSON

WEATHER: 65° SUNNY

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	6.82	565.90	
P-2	574.89	9.36	565.53	
P-3	574.16	6.95	567.21	
P-4	576.14	10.79	565.35	
P-5	575.05	6.35	568.70	
P-6	578.28	10.71	567.57	
MANHOLE A	575.22	11.98	563.24	
MANHOLE B	577.34	14.03	563.31	

(Note: Manhole A empties into Manhole B by gravity feed and Manhole B is pumped automatically to the Town of Niagara Tuscarora Road sanitary sewer line by a float controlled sump pump which maintains groundwater elevations in Manhole B (and by extension Manhole A) below an elevation of 565 ft. above mean sea level. Therefore, Depth to water distance from the manhole rim should not be less than 12.41 ft. at Manhole B and 10.22 ft. at Manhole A.
(Note: riser elevations (re)surveyed September, 1999 by Wendel Surveyors)

ADDITIONAL COMMENTS/OBSERVATIONS: SITE WAS SECURED UPON ARRIVAL. LIMITED TRASH WAS COLLECTED. LOCK WAS CHANGED AT P-5. TREE LIMBS WERE CLEARED ON ACCESS ROAD



Olin

OLIN CORPORATION

OLIN CORPORATION

Environmental Remediation Group
3855 N. Ocoee St., Ste. 200
Cleveland, Tennessee 37312
423/336-4000

SCALE:	DRAWN BY: JRH	DATE: 2-5-2019
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-11-2019

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
MAY 24, 2018

FIG. NO.
2

- MANHOLE
- PIEZOMETER

MANHOLES ARE TO MAINTAIN A WATER LEVEL BELOW 565 FT (AMSL)

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER ELEVATION FORM

THIS FORM TO BE USED FOR ALL QUARTERLY PIEZOMETER AND MANHOLE GROUND-WATER ELEVATION MEASURING EVENTS

DATE: 7/10/18 TIME: 1245

INSPECTOR: CHRIS JONES COMPANY: SEVENSON

WEATHER: 80° SUNNY

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	10.25	562.47	
P-2	574.89	9.42	565.47	
P-3	574.16			
P-4	576.14			
P-5	575.05			
P-6	578.28			
MANHOLE A	575.22			
MANHOLE B	577.34			

(Note: Manhole A empties into Manhole B by gravity feed and Manhole B is pumped automatically to the Town of Niagara Tuscarora Road sanitary sewer line by a float controlled sump pump which maintains groundwater elevations in Manhole B (and by extension Manhole A) below an elevation of 565 ft. above mean sea level. Therefore, Depth to water distance from the manhole rim should not be less than 12.41 ft. at Manhole B and 10.22 ft. at Manhole A.
(Note: riser elevations (re)surveyed September, 1999 by Wendel Surveyors)

ADDITIONAL COMMENTS/OBSERVATIONS:

SEVENSON WAS ON SITE TO CHECK WATER LEVELS FOR PIEZOMETERS 1 AND 2

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER ELEVATION FORM

THIS FORM TO BE USED FOR ALL QUARTERLY PIEZOMETER AND MANHOLE GROUND-WATER ELEVATION MEASURING EVENTS

DATE: 9/25/18 TIME: 0830

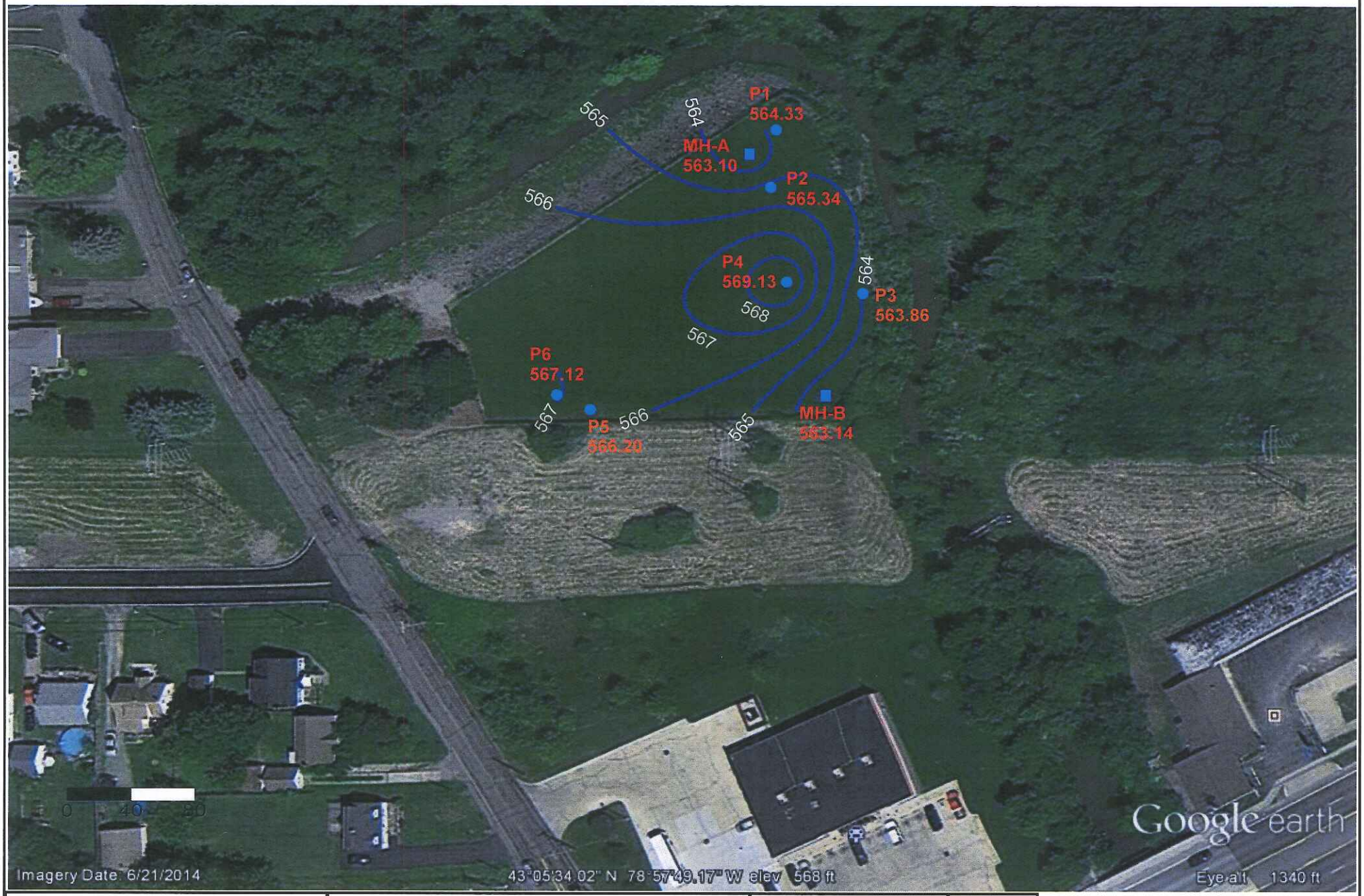
INSPECTOR: CHRIS JONES COMPANY: SEVERSON

WEATHER: 65° SUNNY

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	8.39	564.33	
P-2	574.89	9.55	565.34	
P-3	574.16	10.30	563.86	
P-4	576.14	7.01	569.13	
P-5	575.05	8.85	566.20	
P-6	578.28	11.61	~~568~~ 567.12	
MANHOLE A	575.22	12.12	563.10	
MANHOLE B	577.34	14.20	563.14	

(Note: Manhole A empties into Manhole B by gravity feed and Manhole B is pumped automatically to the Town of Niagara Tuscarora Road sanitary sewer line by a float controlled sump pump which maintains groundwater elevations in Manhole B (and by extension Manhole A) below an elevation of 565 ft. above mean sea level. Therefore, Depth to water distance from the manhole rim should not be less than 12.41 ft. at Manhole B and 10.22 ft. at Manhole A.
(Note: riser elevations (re)surveyed September, 1999 by Wendel Surveyors)

ADDITIONAL COMMENTS/OBSERVATIONS:



Olin

OLIN CORPORATION

OLIN CORPORATION

Environmental Remediation Group
3855 N. Ocoee St., Ste. 200
Cleveland, Tennessee 37312
423/336-4000

SCALE:	DRAWN BY: JRH	DATE: 2-5-2019
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-11-2019

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
SEPTEMBER 25, 2018

FIG. NO.
3

- MANHOLE
- PIEZOMETER

MANHOLES ARE TO MAINTAIN A WATER LEVEL BELOW 565 FT (AMSL)

CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK
NYSDEC REGISTRY NO. 9-32-063
GROUNDWATER ELEVATION FORM

THIS FORM TO BE USED FOR ALL QUARTERLY PIEZOMETER AND MANHOLE GROUND-WATER ELEVATION MEASURING EVENTS

DATE: 11/8/18 TIME: 900

INSPECTOR: CHRIS JONES COMPANY: SEVENSON

WEATHER: 39° PARTLY CLOUDY

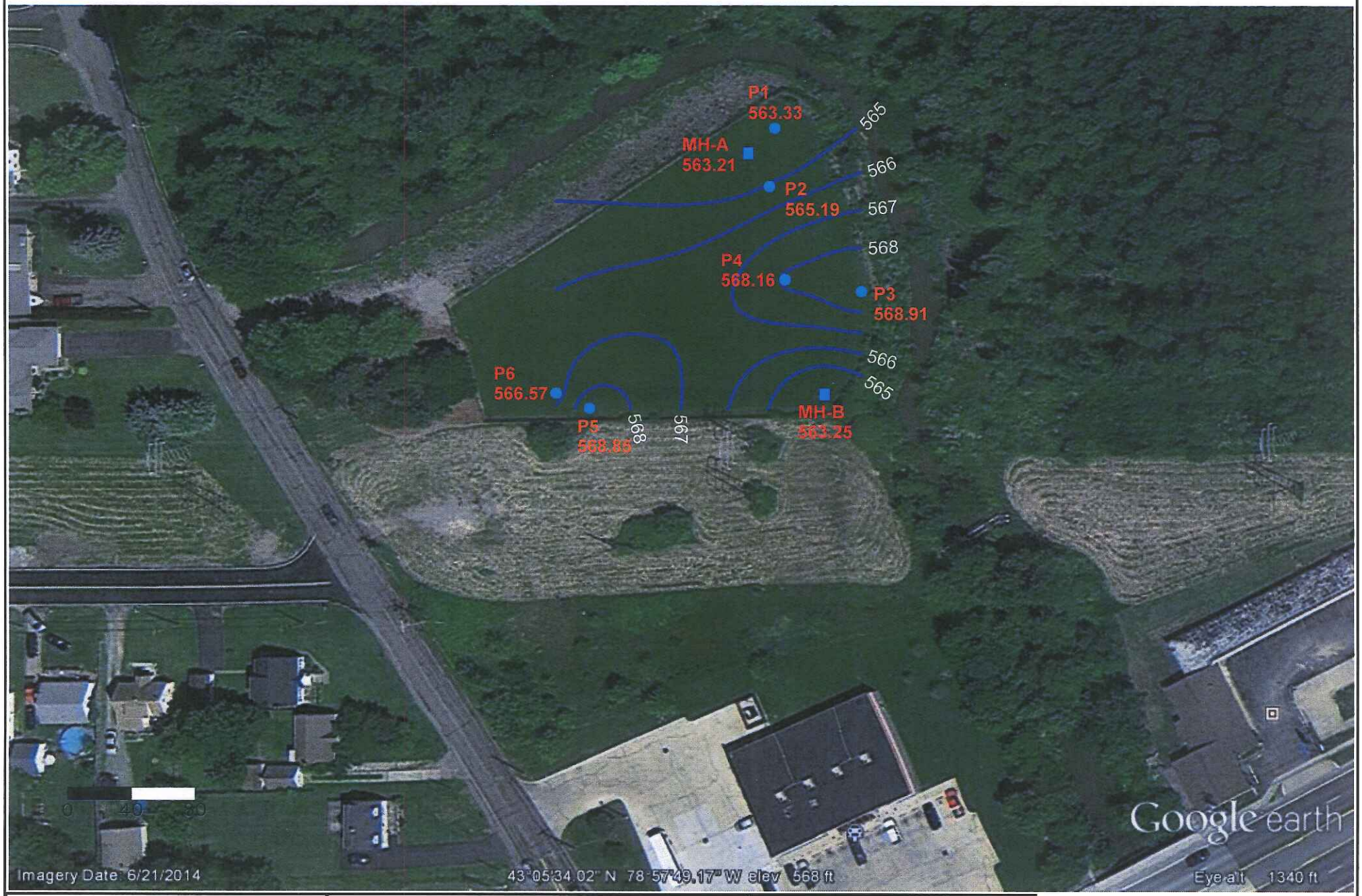
PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	9.39	563.33	
P-2	574.89	9.70	565.19	
P-3	574.16	5.25	568.91	
P-4	576.14	7.98	568.16	
P-5	575.05	6.20	568.85	
P-6	578.28	11.71	566.57	
MANHOLE A	575.22	12.01	563.21	
MANHOLE B	577.34	14.09	563.25	

(Note: Manhole A empties into Manhole B by gravity feed and Manhole B is pumped automatically to the Town of Niagara Tuscarora Road sanitary sewer line by a float controlled sump pump which maintains groundwater elevations in Manhole B (and by extension Manhole A) below an elevation of 565 ft. above mean sea level. Therefore, Depth to water distance from the manhole rim should not be less than 12.41 ft. at Manhole B and 10.22 ft. at Manhole A.
(Note: riser elevations (re)surveyed September, 1999 by Wendel Surveyors)

ADDITIONAL COMMENTS/OBSERVATIONS:

SITE SECURED UPON ARRIVAL

CHECKED MW-A3 FOR POSSIBLE PFA SAMPLING. THE WELL WAS DRY



Olin OLIN CORPORATION	**OLIN CORPORATION** Environmental Remediation Group 3855 N. Ocoee St., Ste. 200 Cleveland, Tennessee 37312 423/336-4000	CHARLES GIBSON SITE NIAGRA FALLS, NY	■ MANHOLE ● PIEZOMETER MANHOLES ARE TO MAINTAIN A WATER LEVEL BELOW 565 FT (AMSL)
	SCALE: 0.5 IN = 40 FT. / DRAWN BY: JRH / DATE: 2-6-2019 CHKD. BY: ABC / DATE: 2-11-2019	GROUNDWATER CONTOUR MAP PIEZOMETER/MANHOLE LEVELS SAMPLING EVENT NOVEMBER 8, 2018	FIG. NO. 4

October 16, 2018

Service Request No:R1809336

Mr. Dave Share
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312

Laboratory Results for: Charles Gibson - Olin

Dear Mr.Share,

Enclosed are the results of the sample(s) submitted to our laboratory September 27, 2018
For your reference, these analyses have been assigned our service request number **R1809336.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

CC: Adam Carringer

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

ALS Environmental
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F : +1 585 288 8475
www.alsglobal.com

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Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

1565 Jefferson Rd, Building 300, Rochester, NY 14623 | 585-288-5380 | www.alsglobal.com

ALS Environmental

Client: Olin Corporation
Project: Charles Gibson - Olin
Sample Matrix: Water

Service Request: R1809336
Date Received: 09/27/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV, validation deliverables including all summary forms and associated raw data. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Any parameters that are not included in the lab's NELAC accreditation are identified on a "Non-Certified Analytes" report in the Miscellaneous Forms Section of this report. Individual analytical results requiring further explanation are flagged with qualifiers and/or discussed below. The flags are explained in the Report Qualifiers and Definitions page in the Miscellaneous Forms section of this report.

Sample Receipt:

Five water samples were received for analysis at ALS Environmental on 09/27/2018. Any discrepancies noted upon initial sample inspection are noted on the cooler receipt and preservation form included in this data package. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at 6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature.

Semivolatiles by GC/MS:

Method 8270D, 10/01/2018: The control limit was exceeded for one or more surrogates in the Continuing Calibration Verification (CCV). The surrogates were within acceptance limits for the associated field samples. The data quality was not significantly affected and no further corrective action was taken.

Semivoa GC:

No significant anomalies were noted with this analysis.

Please note: This report has been revised to not report the HCB analysis for MHB-092518 as it was not requested on the COC.

Approved by _____ Date 10/16/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: MHB-092518			Lab ID: R1809336-004			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
beta-BHC	0.062		0.020	0.047	ug/L	8081B

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Olin Corporation **Service Request:**R1809336
Project: Charles Gibson - Olin/1186

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1809336-001	MW-5-092518	9/25/2018	0925
R1809336-002	MW-7-092518	9/25/2018	1015
R1809336-003	MW-4-092518	9/25/2018	1111
R1809336-004	MHB-092518	9/25/2018	1205
R1809336-005	Field Blank-092518	9/25/2018	1222

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 53502

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: CHARLES GIBSON - OLIN	Project Number: 1186
Project Manager: DAVID SHARLE	Report CC: DAVID SHARLE
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: (423) 336-4987	Email: DMSharle@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHAS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE: 0 | 0

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs • 8260 • 624 • CLP	GC/MS SVOAs • 8270 • 625	GC VOAs • 8021 • 8011/8021	PESTICIDES • 8081 • 608	PCBs • 8082 • 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	REMARKS/ ALTERNATE DESCRIPTION
MW-5 - 092518		9/25/18	925	GW	4		2		2				
MW-7 - 092518			1015		4		2		2				
MW-4 - 092518			1111		8		4		4				MS/MSD VOLUME
MW3 - 092518			1205		2				2				
FIELD BLANK - 092518			1222		4		2		2				
TEMP BLANKS		—	—	—	3								

Preservative Key: 0. NONE; 1. HCL; 2. HNO_3; 3. H_2SO_4; 4. NaOH; 5. Zn. Acetate; 6. MeOH; 7. $NaHSO_4$; 8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals
SHIPPED IN 3 COOLERS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)
REQUESTED REPORT DATE
STANDARD

REPORT REQUIREMENTS
_____ I. Results Only
X II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
_____ III. Results + QC and Calibration Summaries
_____ IV. Data Validation Report with Raw Data
Edata _____ Yes _____ No

INVOICE INFORMATION
PO #
BILL TO: OLIN

STATE WHERE SAMPLES WERE COLLECTED

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	UPS	Signature	Signature	Signature	Signature
Printed Name: CHAS JONES	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm: SES	Firm	Firm	Firm: ALS	Firm	Firm
Date/Time: 9/26/18 1500	Date/Time	Date/Time	Date/Time: 9/27/18 0950	Date/Time	Date/Time

R1809336 5
Olin Corporation
Charles Gibson - Olin

Distribution: White - Lab Copy; Yellow - Return to Originator

Cooler Receipt and Preservation Check Form

R1809336 5
Olin Corporation
Charles Gibson - Olin

Project/Client Olin Folder Number

Cooler received on 9/27/18 by: @ COURIER: ALS (UPS) FEDEX VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y) N	5a	**Perchlorate** samples have required headspace?	Y N (NA)
2	**Custody papers** properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk, or Sulfide have sig* **bubbles**?	Y N (NA)
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N	6	Where did the bottles originate?	(ALS/ROC) CLIENT
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y) N	7	Soil VOA received as: Bulk Encore 5035set (NA)	

8. Temperature Readings Date: 9/27/18 Time: 0940 ID: IR#7 (IR#10) From: (Temp Blank) Sample Bottle

Observed Temp (°C)	1.8	1.7	1.4				
Correction Factor (°C)	+0.4	→	→				
Corrected Temp (°C)	2.2	2.1	1.8				
Temp from: Type of bottle	Cent tube	→	→				
Within 0-6°C?	(Y) N	(Y) N	(Y) N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by @ on 9/27/18 at 0945
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 9/27/18 Time: 1924 by: DM

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (N/A)
13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-			**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).			
		HCl	**	**						

Bottle lot numbers: 083118-1DK

Explain all Discrepancies/ Other Comments:

CLRES	BULK
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	SUB
SO3	MARRS
ALS	REV

Labels secondary reviewed by: DM

PC Secondary Review: HMS 9/28/18 *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

ALS Group USA, Corp.
dba ALS Environmental

Internal Chain of Custody Report

Client: Olin Corporation **Service Request:** R1809336
Project: Charles Gibson - Olin/1186

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
R1809336-001.05					
	8081B				
		9/27/2018	1925	SMO / DWARD	
		9/28/2018	0810	In Lab / CHARRINGTON	
R1809336-001.06					
		9/27/2018	1926	SMO / DWARD	
R1809336-001.07					
	8270D				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0813	In Lab / CHARRINGTON	
R1809336-001.08					
		9/27/2018	1926	SMO / DWARD	
R1809336-002.05					
		9/27/2018	1925	SMO / DWARD	
R1809336-002.06					
		9/27/2018	1926	SMO / DWARD	
R1809336-002.07					
	8270D				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0813	In Lab / CHARRINGTON	
R1809336-002.08					
	8081B				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-003.09					
	8270D				
		9/27/2018	1925	SMO / DWARD	
		9/28/2018	0813	In Lab / CHARRINGTON	
R1809336-003.10					
		9/27/2018	1926	SMO / DWARD	
R1809336-003.11					
		9/27/2018	1926	SMO / DWARD	
R1809336-003.12					

Client: Olin Corporation **Service Request:** R1809336

Project: Charles Gibson - Olin/1186

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
	8081B				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-003.13					
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0813	In Lab / CHARRINGTON	
R1809336-003.14					
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0813	In Lab / CHARRINGTON	
R1809336-003.15					
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-003.16					
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-004.05					
	8081B				
		9/27/2018	1925	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-004.06					
	8270D				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0814	In Lab / CHARRINGTON	
R1809336-005.05					
		9/27/2018	1925	SMO / DWARD	
R1809336-005.06					
		9/27/2018	1926	SMO / DWARD	
R1809336-005.07					
	8081B				
		9/27/2018	1926	SMO / DWARD	
		9/28/2018	0811	In Lab / CHARRINGTON	
R1809336-005.08					
	8270D				
		9/27/2018	1926	SMO / DWARD	

ALS Group USA, Corp.
dba ALS Environmental

Internal Chain of Custody Report

Client: Olin Corporation **Service Request:** R1809336
Project: Charles Gibson - Olin/1186

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
	8270D				
		9/28/2018	0814	In Lab / CHARRINGTON	

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186		

Sample Name:	Field Blank-092518	**Date Collected:**	09/25/18
Lab Code:	R1809336-005	**Date Received:**	09/27/18
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8081B	CHARRINGTON	BALLGEIER
8270D	CHARRINGTON	JMISIUREWICZ

INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

ALS Environmental

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Semivolatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 09:25
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-5-092518	**Units:**	ug/L
Lab Code:	R1809336-001	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Hexachlorobenzene	ND U	9.4	1	10/01/18 16:15	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	70	35 - 141	10/01/18 16:15	
2-Fluorobiphenyl	74	31 - 118	10/01/18 16:15	
2-Fluorophenol	34	10 - 105	10/01/18 16:15	
Nitrobenzene-d5	68	31 - 110	10/01/18 16:15	
Phenol-d6	26	10 - 107	10/01/18 16:15	
p-Terphenyl-d14	45	10 - 165	10/01/18 16:15	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 10:15
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-7-092518	**Units:**	ug/L
Lab Code:	R1809336-002	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Hexachlorobenzene	ND U	9.4	1	10/01/18 16:43	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	72	35 - 141	10/01/18 16:43	
2-Fluorobiphenyl	76	31 - 118	10/01/18 16:43	
2-Fluorophenol	38	10 - 105	10/01/18 16:43	
Nitrobenzene-d5	73	31 - 110	10/01/18 16:43	
Phenol-d6	28	10 - 107	10/01/18 16:43	
p-Terphenyl-d14	48	10 - 165	10/01/18 16:43	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 11:11
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-4-092518	**Units:**	ug/L
Lab Code:	R1809336-003	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Hexachlorobenzene	ND U	9.4	1	10/01/18 17:11	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	76	35 - 141	10/01/18 17:11	
2-Fluorobiphenyl	78	31 - 118	10/01/18 17:11	
2-Fluorophenol	38	10 - 105	10/01/18 17:11	
Nitrobenzene-d5	72	31 - 110	10/01/18 17:11	
Phenol-d6	29	10 - 107	10/01/18 17:11	
p-Terphenyl-d14	55	10 - 165	10/01/18 17:11	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 12:22
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	Field Blank-092518	**Units:**	ug/L
Lab Code:	R1809336-005	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Hexachlorobenzene	ND U	9.4	1	10/01/18 19:03	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	70	35 - 141	10/01/18 19:03	
2-Fluorobiphenyl	82	31 - 118	10/01/18 19:03	
2-Fluorophenol	46	10 - 105	10/01/18 19:03	
Nitrobenzene-d5	79	31 - 110	10/01/18 19:03	
Phenol-d6	31	10 - 107	10/01/18 19:03	
p-Terphenyl-d14	86	10 - 165	10/01/18 19:03	

Semivolatile Organic Compounds by GC

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Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 09:25
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-5-092518	**Units:**	ug/L
Lab Code:	R1809336-001	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.047	1	10/02/18 17:21	9/28/18	
beta-BHC	ND U	0.047	1	10/02/18 17:21	9/28/18	
delta-BHC	ND U	0.047	1	10/02/18 17:21	9/28/18	
gamma-BHC (Lindane)	ND U	0.047	1	10/02/18 17:21	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	20	10 - 164	10/02/18 17:21	
Tetrachloro-m-xylene	60	10 - 147	10/02/18 17:21	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 10:15
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-7-092518	**Units:**	ug/L
Lab Code:	R1809336-002	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.047	1	10/02/18 18:15	9/28/18	
beta-BHC	ND U	0.047	1	10/02/18 18:15	9/28/18	
delta-BHC	ND U	0.047	1	10/02/18 18:15	9/28/18	
gamma-BHC (Lindane)	ND U	0.047	1	10/02/18 18:15	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	15	10 - 164	10/02/18 18:15	
Tetrachloro-m-xylene	52	10 - 147	10/02/18 18:15	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 11:11
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MW-4-092518	**Units:**	ug/L
Lab Code:	R1809336-003	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.047	1	10/02/18 18:33	9/28/18	
beta-BHC	ND U	0.047	1	10/02/18 18:33	9/28/18	
delta-BHC	ND U	0.047	1	10/02/18 18:33	9/28/18	
gamma-BHC (Lindane)	ND U	0.047	1	10/02/18 18:33	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	13	10 - 164	10/02/18 18:33	
Tetrachloro-m-xylene	56	10 - 147	10/02/18 18:33	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 12:05
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	MHB-092518	**Units:**	ug/L
Lab Code:	R1809336-004	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.047	1	10/02/18 19:46	9/28/18	
beta-BHC	**0.062**	0.047	1	10/02/18 19:46	9/28/18	
delta-BHC	ND U	0.047	1	10/02/18 19:46	9/28/18	
gamma-BHC (Lindane)	ND U	0.047	1	10/02/18 19:46	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	36	10 - 164	10/02/18 19:46	
Tetrachloro-m-xylene	61	10 - 147	10/02/18 19:46	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 12:22
Sample Matrix:	Water	**Date Received:**	09/27/18 09:50
Sample Name:	Field Blank-092518	**Units:**	ug/L
Lab Code:	R1809336-005	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.047	1	10/02/18 20:04	9/28/18	
beta-BHC	ND U	0.047	1	10/02/18 20:04	9/28/18	
delta-BHC	ND U	0.047	1	10/02/18 20:04	9/28/18	
gamma-BHC (Lindane)	ND U	0.047	1	10/02/18 20:04	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	40	10 - 164	10/02/18 20:04	
Tetrachloro-m-xylene	56	10 - 147	10/02/18 20:04	

QC Summary Forms

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Semivolatile Organic Compounds by GC/MS

ALS Environmental—Rochester Laboratory
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Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Olin Corporation **Service Request:** R1809336

Project: Charles Gibson - Olin/1186

Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D

Extraction Method: EPA 3510C

Sample Name	Lab Code	2,4,6-Tribromophenol 35-141	2-Fluorobiphenyl 31-118	2-Fluorophenol 10-105
MW-5-092518	R1809336-001	70	74	34
MW-7-092518	R1809336-002	72	76	38
MW-4-092518	R1809336-003	76	78	38
Field Blank-092518	R1809336-005	70	82	46
Method Blank	RQ1810347-01	76	72	44
Lab Control Sample	RQ1810347-02	66	75	44
Duplicate Lab Control Sample	RQ1810347-03	61	71	43
MW-4-092518 MS	RQ1810347-06	71	79	42
MW-4-092518 DMS	RQ1810347-07	66	73	34

Client: Olin Corporation **Service Request:** R1809336
Project: Charles Gibson - Olin/1186
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Extraction Method: EPA 3510C

Sample Name	Lab Code	Nitrobenzene-d5 31-110	Phenol-d6 10-107	p-Terphenyl-d14 10-165
MW-5-092518	R1809336-001	68	26	45
MW-7-092518	R1809336-002	73	28	48
MW-4-092518	R1809336-003	72	29	55
Field Blank-092518	R1809336-005	79	31	86
Method Blank	RQ1810347-01	74	32	92
Lab Control Sample	RQ1810347-02	77	34	82
Duplicate Lab Control Sample	RQ1810347-03	74	31	74
MW-4-092518 MS	RQ1810347-06	76	31	64
MW-4-092518 DMS	RQ1810347-07	70	27	59

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18
Sample Matrix:	Water	**Date Received:**	09/27/18
		Date Analyzed:	10/1/18
		Date Extracted:	09/28/18

Duplicate Matrix Spike Summary
Semivolatile Organic Compounds by GC/MS

Sample Name:	MW-4-092518	**Units:**	ug/L
Lab Code:	R1809336-003	**Basis:**	NA
Analysis Method:	8270D		
Prep Method:	EPA 3510C		

		Matrix Spike RQ1810347-06			Duplicate Matrix Spike RQ1810347-07					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Hexachlorobenzene	ND U	37.9	47.2	80	37.0	47.2	79	42-125	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Analyzed:**	10/01/18 12:00
Sample Matrix:	Water	**Date Extracted:**	09/28/18

Method Blank Summary
Semivolatile Organic Compounds by GC/MS

Sample Name:	Method Blank	**Instrument ID:**	R-MS-51
Lab Code:	RQ1810347-01	**File ID:**	I:\ACQUDATA\5973A\DATA\100118\DP421.D\
Analysis Method:	8270D	**Analysis Lot:**	608974
Prep Method:	EPA 3510C	**Extraction Lot:**	322901

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	RQ1810347-02	I:\ACQUDATA\5973A\DATA\100118\DP422.D\	10/01/18 12:29
Duplicate Lab Control Sample	RQ1810347-03	I:\ACQUDATA\5973A\DATA\100118\DP423.D\	10/01/18 12:57
MW-5-092518	R1809336-001	I:\ACQUDATA\5973A\DATA\100118\DP430.D\	10/01/18 16:15
MW-7-092518	R1809336-002	I:\ACQUDATA\5973A\DATA\100118\DP431.D\	10/01/18 16:43
MW-4-092518	R1809336-003	I:\ACQUDATA\5973A\DATA\100118\DP432.D\	10/01/18 17:11
MW-4-092518MS	RQ1810347-06	I:\ACQUDATA\5973A\DATA\100118\DP433.D\	10/01/18 17:39
MW-4-092518DMS	RQ1810347-07	I:\ACQUDATA\5973A\DATA\100118\DP434.D\	10/01/18 18:07
Field Blank-092518	R1809336-005	I:\ACQUDATA\5973A\DATA\100118\DP436.D\	10/01/18 19:03

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1810347-01	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Hexachlorobenzene	ND U	10	1	10/01/18 12:00	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2,4,6-Tribromophenol	76	35 - 141	10/01/18 12:00	
2-Fluorobiphenyl	72	31 - 118	10/01/18 12:00	
2-Fluorophenol	44	10 - 105	10/01/18 12:00	
Nitrobenzene-d5	74	31 - 110	10/01/18 12:00	
Phenol-d6	32	10 - 107	10/01/18 12:00	
p-Terphenyl-d14	92	10 - 165	10/01/18 12:00	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Analyzed:**	10/01/18 12:29
Sample Matrix:	Water	**Date Extracted:**	09/28/18

Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Sample Name:	Lab Control Sample	**Instrument ID:**	R-MS-51
Lab Code:	RQ1810347-02	**File ID:**	I:\ACQUDATA\5973A\DATA\100118\DP422.D\
Analysis Method:	8270D	**Analysis Lot:**	608974
Prep Method:	EPA 3510C	**Extraction Lot:**	322901

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	RQ1810347-01	I:\ACQUDATA\5973A\DATA\100118\DP421.D\	10/01/18 12:00
Duplicate Lab Control Sample	RQ1810347-03	I:\ACQUDATA\5973A\DATA\100118\DP423.D\	10/01/18 12:57
MW-5-092518	R1809336-001	I:\ACQUDATA\5973A\DATA\100118\DP430.D\	10/01/18 16:15
MW-7-092518	R1809336-002	I:\ACQUDATA\5973A\DATA\100118\DP431.D\	10/01/18 16:43
MW-4-092518	R1809336-003	I:\ACQUDATA\5973A\DATA\100118\DP432.D\	10/01/18 17:11
MW-4-092518MS	RQ1810347-06	I:\ACQUDATA\5973A\DATA\100118\DP433.D\	10/01/18 17:39
MW-4-092518DMS	RQ1810347-07	I:\ACQUDATA\5973A\DATA\100118\DP434.D\	10/01/18 18:07
Field Blank-092518	R1809336-005	I:\ACQUDATA\5973A\DATA\100118\DP436.D\	10/01/18 19:03

Client: Olin Corporation
Project: Charles Gibson - Olin/1186
Sample Matrix: Water

Service Request: R1809336
Date Analyzed: 10/01/18

Duplicate Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

			Lab Control Sample RQ1810347-02			Duplicate Lab Control Sample RQ1810347-03				
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Hexachlorobenzene	8270D	42.2	50.0	84	39.4	50.0	79	53-123	6	30

Client: Olin Corporation
Project: Charles Gibson - Olin/1186

Service Request:R1809336
Date Analyzed:10/01/18 10:18

Tune Summary
Semivolatile Organic Compounds by GC/MS

File ID: I:\ACQUDATA\5973A\DATA\100118\DP417.D\
Instrument ID: R-MS-51

Analytical Method: 8270D
Analysis Lot: 608974

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	30.44	32577	Pass
68	69	0.00	2	1.43	591	Pass
69	198	0.00	100	38.62	41332	Pass
70	69	0.00	2	0.76	316	Pass
127	198	10	80	49.08	52520	Pass
197	198	0.00	2	0.00	0	Pass
198	198	100	100	100.00	107019	Pass
199	198	5	9	7.58	8114	Pass
275	198	10	60	22.27	23829	Pass
365	198	1	100	2.71	2899	Pass
441	442	0.01	24	18.39	17921	Pass
442	442	100	100	100.00	97429	Pass
443	442	15	24	19.65	19141	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	RQ1810427-02	I:\ACQUDATA\5973A\DATA\100118\DP419.D\	10/01/18 11:04	
Continuing Calibration Verification	RQ1810427-03	I:\ACQUDATA\5973A\DATA\100118\DP420.D\	10/01/18 11:32	
Method Blank	RQ1810347-01	I:\ACQUDATA\5973A\DATA\100118\DP421.D\	10/01/18 12:00	
Lab Control Sample	RQ1810347-02	I:\ACQUDATA\5973A\DATA\100118\DP422.D\	10/01/18 12:29	
Duplicate Lab Control Sample	RQ1810347-03	I:\ACQUDATA\5973A\DATA\100118\DP423.D\	10/01/18 12:57	
MW-5-092518	R1809336-001	I:\ACQUDATA\5973A\DATA\100118\DP430.D\	10/01/18 16:15	
MW-7-092518	R1809336-002	I:\ACQUDATA\5973A\DATA\100118\DP431.D\	10/01/18 16:43	
MW-4-092518	R1809336-003	I:\ACQUDATA\5973A\DATA\100118\DP432.D\	10/01/18 17:11	
MW-4-092518	RQ1810347-06	I:\ACQUDATA\5973A\DATA\100118\DP433.D\	10/01/18 17:39	
MW-4-092518	RQ1810347-07	I:\ACQUDATA\5973A\DATA\100118\DP434.D\	10/01/18 18:07	
Field Blank-092518	R1809336-005	I:\ACQUDATA\5973A\DATA\100118\DP436.D\	10/01/18 19:03	

Client: Olin Corporation **Service Request:**R1809336
Project: Charles Gibson - Olin/1186 **Date Analyzed:**10/01/18 11:04

Internal Standard Area and RT SUMMARY
Semivolatile Organic Compounds by GC/MS

File ID: I:\ACQUDATA\5973A\DATA\100118\DP419.D\ **Lab Code:**RQ1810427-02
Instrument ID: R-MS-51 **Analysis Lot:**608974
Analysis Method: 8270D **Signal ID:**1

		1,4-Dichlorobenzene-d4		Acenaphthene-d10		Chrysene-d12	
		Area	**RT**	**Area**	**RT**	**Area**	**RT**
	Result ==>	160,049	4.69	317,410	7.56	473,372	12.27
	Upper Limit ==>	320,098	5.19	634,820	8.06	946,744	12.77
	Lower Limit ==>	80,025	4.19	158,705	7.06	236,686	11.77
Associated Analyses							
Continuing Calibration Verification	RQ1810427-02	160049	4.69	317410	7.56	473372	12.27

Client: Olin Corporation
Project: Charles Gibson - Olin/1186

Service Request:R1809336
Date Analyzed:10/01/18 11:04

Internal Standard Area and RT SUMMARY
Semivolatile Organic Compounds by GC/MS

File ID: I:\ACQUDATA\5973A\DATA\100118\DP419.D\
Instrument ID: R-MS-51
Analysis Method: 8270D

Lab Code:RQ1810427-02
Analysis Lot:608974
Signal ID:1

		Naphthalene-d8		Perylene-d12		Phenanthrene-d10	
		Area	**RT**	**Area**	**RT**	**Area**	**RT**
	Result ==>	595,934	5.86	443,460	15.20	456,091	9.03
	Upper Limit ==>	1,191,868	6.36	886,920	15.70	912,182	9.53
	Lower Limit ==>	297,967	5.36	221,730	14.70	228,046	8.53
Associated Analyses							
Continuing Calibration Verification	RQ1810427-02	595934	5.86	443460	15.20	456091	9.03

Client: Olin Corporation
Project: Charles Gibson - Olin/1186

Service Request:R1809336
Date Analyzed:10/01/18 11:32

Internal Standard Area and RT SUMMARY
Semivolatile Organic Compounds by GC/MS

File ID: I:\ACQUDATA\5973A\DATA\100118\DP420.D\
Instrument ID: R-MS-51
Analysis Method: 8270D

Lab Code:RQ1810427-03
Analysis Lot:608974
Signal ID:1

		1,4-Dichlorobenzene-d4		Acenaphthene-d10		Chrysene-d12	
		Area	**RT**	**Area**	**RT**	**Area**	**RT**
	Result ==>	171,080	4.69	349,653	7.57	500,509	12.28
	Upper Limit ==>	342,160	5.19	699,306	8.07	1,001,018	12.78
	Lower Limit ==>	85,540	4.19	174,827	7.07	250,255	11.78
Associated Analyses							
Method Blank	RQ1810347-01	141923	4.70	278027	7.56	389100	12.27
Lab Control Sample	RQ1810347-02	138041	4.69	278969	7.57	421106	12.28
Duplicate Lab Control Sample	RQ1810347-03	144351	4.69	294737	7.57	422597	12.28
MW-5-092518	R1809336-001	134206	4.69	270484	7.56	416979	12.27
MW-7-092518	R1809336-002	143205	4.69	290932	7.56	434685	12.27
MW-4-092518	R1809336-003	141838	4.69	287337	7.57	443273	12.27
MW-4-092518MS	RQ1810347-06	140578	4.69	279574	7.56	420949	12.27
MW-4-092518DMS	RQ1810347-07	142534	4.69	282369	7.56	411973	12.27
Field Blank-092518	R1809336-005	135702	4.69	265517	7.57	393712	12.27

Client: Olin Corporation
Project: Charles Gibson - Olin/1186

Service Request:R1809336
Date Analyzed:10/01/18 11:32

Internal Standard Area and RT SUMMARY
Semivolatile Organic Compounds by GC/MS

File ID: I:\ACQUDATA\5973A\DATA\100118\DP420.D\
Instrument ID: R-MS-51
Analysis Method: 8270D

Lab Code:RQ1810427-03
Analysis Lot:608974
Signal ID:1

		Naphthalene-d8		Perylene-d12		Phenanthrene-d10	
		Area	**RT**	**Area**	**RT**	**Area**	**RT**
	Result ==>	654,308	5.86	499,477	15.20	529,917	9.04
	Upper Limit ==>	1,308,616	6.36	998,954	15.70	1,059,834	9.54
	Lower Limit ==>	327,154	5.36	249,739	14.70	264,959	8.54
Associated Analyses							
Method Blank	RQ1810347-01	532457	5.86	417879	15.19	445852	9.04
Lab Control Sample	RQ1810347-02	522764	5.86	416441	15.19	393036	9.03
Duplicate Lab Control Sample	RQ1810347-03	542010	5.86	427616	15.19	407438	9.03
MW-5-092518	R1809336-001	505418	5.86	410833	15.19	445233	9.03
MW-7-092518	R1809336-002	540225	5.86	433830	15.19	466889	9.03
MW-4-092518	R1809336-003	537991	5.86	438627	15.19	465337	9.04
MW-4-092518MS	RQ1810347-06	528144	5.86	422493	15.19	410494	9.03
MW-4-092518DMS	RQ1810347-07	536572	5.86	414148	15.19	419065	9.04
Field Blank-092518	R1809336-005	508251	5.86	416064	15.19	433267	9.04

ALS Environmental

Semivolatile Organic Compounds by GC

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Olin Corporation **Service Request:** R1809336

Project: Charles Gibson - Olin/1186

Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B

Extraction Method: EPA 3510C

Sample Name	Lab Code	Decachlorobiphenyl 10-164	Tetrachloro-m-xylene 10-147
MW-5-092518	R1809336-001	20	60
MW-7-092518	R1809336-002	15	52
MW-4-092518	R1809336-003	13	56
MHB-092518	R1809336-004	36	61
Field Blank-092518	R1809336-005	40	56
Method Blank	RQ1810348-01	37	57
Lab Control Sample	RQ1810348-02	36	56
Duplicate Lab Control Sample	RQ1810348-03	37	55
MW-4-092518 MS	RQ1810348-06	13	53
MW-4-092518 DMS	RQ1810348-07	14	56

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18
Sample Matrix:	Water	**Date Received:**	09/27/18
		Date Analyzed:	10/2/18
		Date Extracted:	09/28/18

Duplicate Matrix Spike Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	MW-4-092518	**Units:**	ug/L
Lab Code:	R1809336-003	**Basis:**	NA
Analysis Method:	8081B		
Prep Method:	EPA 3510C		

		Matrix Spike RQ1810348-06			Duplicate Matrix Spike RQ1810348-07					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
alpha-BHC	ND U	0.145	0.189	77	0.169	0.189	90	27-154	15	30
beta-BHC	ND U	0.155	0.189	82	0.162	0.189	86	32-184	4	30
delta-BHC	ND U	0.120	0.189	64	0.124	0.189	66	10-182	3	30
gamma-BHC (Lindane)	ND U	0.145	0.189	77	0.150	0.189	80	43-164	4	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Analyzed:**	10/02/18 16:09
Sample Matrix:	Water	**Date Extracted:**	09/28/18

Method Blank Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Method Blank	**Instrument ID:**	R-GC-62
Lab Code:	RQ1810348-01	**File ID:**	I:\ACQUDATA\7890m\DATA\100218\ax026.D\
Analysis Method:	8081B	**Analysis Lot:**	609406
Prep Method:	EPA 3510C	**Extraction Lot:**	322902

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	RQ1810348-02	I:\ACQUDATA\7890m\DATA\100218\ax027.D\	10/02/18 16:27
Duplicate Lab Control Sample	RQ1810348-03	I:\ACQUDATA\7890m\DATA\100218\ax028.D\	10/02/18 16:45
MW-5-092518	R1809336-001	I:\ACQUDATA\7890m\DATA\100218\ax030.D\	10/02/18 17:21
MW-7-092518	R1809336-002	I:\ACQUDATA\7890m\DATA\100218\ax033.D\	10/02/18 18:15
MW-4-092518	R1809336-003	I:\ACQUDATA\7890m\DATA\100218\ax034.D\	10/02/18 18:33
MW-4-092518MS	RQ1810348-06	I:\ACQUDATA\7890m\DATA\100218\ax035.D\	10/02/18 18:51
MW-4-092518DMS	RQ1810348-07	I:\ACQUDATA\7890m\DATA\100218\ax037.D\	10/02/18 19:28
MHB-092518	R1809336-004	I:\ACQUDATA\7890m\DATA\100218\ax038.D\	10/02/18 19:46
Field Blank-092518	R1809336-005	I:\ACQUDATA\7890m\DATA\100218\ax039.D\	10/02/18 20:04

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1810348-01	**Basis:**	NA

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3510C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	0.050	1	10/02/18 16:09	9/28/18	
beta-BHC	ND U	0.050	1	10/02/18 16:09	9/28/18	
delta-BHC	ND U	0.050	1	10/02/18 16:09	9/28/18	
gamma-BHC (Lindane)	ND U	0.050	1	10/02/18 16:09	9/28/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	37	10 - 164	10/02/18 16:09	
Tetrachloro-m-xylene	57	10 - 147	10/02/18 16:09	

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Analyzed:**	10/02/18 16:27
Sample Matrix:	Water	**Date Extracted:**	09/28/18

Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Lab Control Sample	**Instrument ID:**	R-GC-62
Lab Code:	RQ1810348-02	**File ID:**	I:\ACQUDATA\7890m\DATA\100218\ax027.D\
Analysis Method:	8081B	**Analysis Lot:**	609406
Prep Method:	EPA 3510C	**Extraction Lot:**	322902

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	RQ1810348-01	I:\ACQUDATA\7890m\DATA\100218\ax026.D\	10/02/18 16:09
Duplicate Lab Control Sample	RQ1810348-03	I:\ACQUDATA\7890m\DATA\100218\ax028.D\	10/02/18 16:45
MW-5-092518	R1809336-001	I:\ACQUDATA\7890m\DATA\100218\ax030.D\	10/02/18 17:21
MW-7-092518	R1809336-002	I:\ACQUDATA\7890m\DATA\100218\ax033.D\	10/02/18 18:15
MW-4-092518	R1809336-003	I:\ACQUDATA\7890m\DATA\100218\ax034.D\	10/02/18 18:33
MW-4-092518MS	RQ1810348-06	I:\ACQUDATA\7890m\DATA\100218\ax035.D\	10/02/18 18:51
MW-4-092518DMS	RQ1810348-07	I:\ACQUDATA\7890m\DATA\100218\ax037.D\	10/02/18 19:28
MHB-092518	R1809336-004	I:\ACQUDATA\7890m\DATA\100218\ax038.D\	10/02/18 19:46
Field Blank-092518	R1809336-005	I:\ACQUDATA\7890m\DATA\100218\ax039.D\	10/02/18 20:04

Client: Olin Corporation
Project: Charles Gibson - Olin/1186
Sample Matrix: Water

Service Request: R1809336
Date Analyzed: 10/02/18

Duplicate Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Units:ug/L
Basis:NA

		Lab Control Sample RQ1810348-02			Duplicate Lab Control Sample RQ1810348-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
alpha-BHC	8081B	0.151	0.200	76	0.154	0.200	77	36-151	2	30
beta-BHC	8081B	0.163	0.200	81	0.153	0.200	76	55-149	6	30
delta-BHC	8081B	0.147	0.200	73	0.157	0.200	78	29-159	7	30
gamma-BHC (Lindane)	8081B	0.155	0.200	77	0.155	0.200	78	41-149	<1	30

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 12:05
SRM Matrix:	Water	**Date Received:**	9/27/18
Sample Name:	MHB-092518		
Lab Code:	R1809336-004	**Units:**	ug/L
		Basis:	NA

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3510C

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
beta-BHC	0.047	0.062	0.069	11		1	10/02/18 19:46

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	NA
SRM Matrix:	Water	**Date Received:**	
Sample Name:	Lab Control Sample		
Lab Code:	RQ1810348-02	**Units:**	ug/L
		Basis:	NA

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3510C

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	0.050	0.151	0.165	9		1	10/02/18 16:27
beta-BHC	0.050	0.163	0.167	2		1	10/02/18 16:27
delta-BHC	0.050	0.147	0.159	8		1	10/02/18 16:27
gamma-BHC (Lindane)	0.050	0.155	0.167	7		1	10/02/18 16:27

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	NA
SRM Matrix:	Water	**Date Received:**	
Sample Name:	Duplicate Lab Control Sample		
Lab Code:	RQ1810348-03	**Units:**	ug/L
		Basis:	NA

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3510C

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	0.050	0.154	0.166	8		1	10/02/18 16:45
beta-BHC	0.050	0.153	0.166	8		1	10/02/18 16:45
delta-BHC	0.050	0.157	0.162	3		1	10/02/18 16:45
gamma-BHC (Lindane)	0.050	0.155	0.167	7		1	10/02/18 16:45

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 11:11
SRM Matrix:	Water	**Date Received:**	9/27/18
Sample Name:	MW-4-092518		
Lab Code:	RQ1810348-06	**Units:**	ug/L
		Basis:	NA

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3510C

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	0.047	0.145	0.167	14		1	10/02/18 18:51
beta-BHC	0.047	0.155	0.170	9		1	10/02/18 18:51
delta-BHC	0.047	0.120	0.133	10		1	10/02/18 18:51
gamma-BHC (Lindane)	0.047	0.145	0.175	19		1	10/02/18 18:51

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1809336
Project:	Charles Gibson - Olin/1186	**Date Collected:**	09/25/18 11:11
SRM Matrix:	Water	**Date Received:**	9/27/18
Sample Name:	MW-4-092518		
Lab Code:	RQ1810348-07	**Units:**	ug/L
		Basis:	NA

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3510C

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	0.047	0.169	0.173	2		1	10/02/18 19:28
beta-BHC	0.047	0.162	0.187	14		1	10/02/18 19:28
delta-BHC	0.047	0.124	0.139	11		1	10/02/18 19:28
gamma-BHC (Lindane)	0.047	0.150	0.188	22		1	10/02/18 19:28

October 31, 2018

Service Request No:R1809911

Mr. Dave Share
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312

Laboratory Results for: Charles Gibson - Olin

Dear Mr.Share,

Enclosed are the results of the sample(s) submitted to our laboratory October 12, 2018
For your reference, these analyses have been assigned our service request number **R1809911.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Janice Jaeger
Project Manager

CC: Adam Carringer

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
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dba ALS Environmental

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Narrative Documents

ALS Environmental—Rochester Laboratory
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www.alsglobal.com

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ALS Environmental

Client: Olin Corporation
Project: Charles Gibson - Olin
Sample Matrix: Soil

Service Request: R1809911
Date Received: 10/12/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV, validation deliverables including all summary forms and associated raw data. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Any parameters that are not included in the lab's NELAC accreditation are identified on a "Non-Certified Analytes" report in the Miscellaneous Forms Section of this report. Individual analytical results requiring further explanation are flagged with qualifiers and/or discussed below. The flags are explained in the Report Qualifiers and Definitions page in the Miscellaneous Forms section of this report.

Sample Receipt:

Three soil samples were received for analysis at ALS Environmental on 10/12/2018. Any discrepancies noted upon initial sample inspection are noted on the cooler receipt and preservation form included in this data package. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at 0 to 6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature. If any samples were received for the analysis of pH, chlorine residual, sulfite, dissolved oxygen, or ferrous iron, the samples were analyzed past their holding time expiration since these analyses are required to be analyzed within 15 minutes of sampling.

Semivoa GC:

Method 8081B, 10/29/2018: The upper control limit was exceeded for one or more analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte(s) in question above the Method Reporting Limit (MRL). Since the exceedance equates to a potential high bias, the data quality was not significantly affected and no further corrective action was taken.
Method 8081B, : The samples were diluted to elevate the reporting limit above the presence of non-target background components indicated on the chromatogram. The matrix interference prevented adequate resolution of one or more target compound(s) at the reporting limit.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by _____ Date 10/31/2018

SAMPLE DETECTION SUMMARY

CLIENT ID: US-1-101118	Lab ID: R1809911-001					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	29.6				Percent	ALS SOP

CLIENT ID: MS-1-101118	Lab ID: R1809911-002					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	28.4				Percent	ALS SOP

CLIENT ID: DS-1-101118	Lab ID: R1809911-003					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Total Solids	27.2				Percent	ALS SOP

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Olin Corporation **Service Request:**R1809911
Project: Charles Gibson - Olin/1186

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1809911-001	US-1-101118	10/11/2018	0930
R1809911-002	MS-1-101118	10/11/2018	1000
R1809911-003	DS-1-101118	10/11/2018	1030

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 53536

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: CHARLES GIBSON - OLIN	Project Number: 1186
Project Manager: DAVID SHARLE	Report CC: DAVID SHARLE
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: 423 336 4989	Email: DMSharle@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE: 0

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs • 8260 • 624 • CLP	GC/MS SVOAs • 8270 • 625	GC VOAs • 8021 • 601/602	PESTICIDES • 8081 • 608	PCBs • 8082 • 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	REMARKS/ ALTERNATE DESCRIPTION
US-1-101118		10/11/18	930	SED	1				1				
MS-1-101118		↓	1000		1				1				
DS-1-101118		↓	1030	↓	1				1				
TEMP BLANK		—	—	—	1								

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
~~Metals~~
CHARLES GIBSON ANNUAL CREEK BED SEDIMENT

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)
REQUESTED REPORT DATE
STANDARD

REPORT REQUIREMENTS
_____ I. Results Only
X II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
_____ III. Results + QC and Calibration Summaries
_____ IV. Data Validation Report with Raw Data
Edata _____ Yes _____ No

INVOICE INFORMATION
PO #
BILL TO: OLIN

STATE WHERE SAMPLES WERE COLLECTED NJ

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature: UPS / Veronica Stanfill	Signature	Signature	Signature	Signature
Printed Name: Chris Jones	Printed Name: Veronica Stanfill	Printed Name	Printed Name	Printed Name	
Firm: SEJ	Firm: ALS	Firm	Firm	Firm	
Date/Time: 10/11/18 1500	Date/Time: 10/12/2018 7:30	Date/Time	Date/Time	Date/Time	

R1809911 5
Olin Corporation
Charles Gibson - Olin

Distribution: White - Lab Copy; Yellow - Return to Originator

Cooler Receipt and Preservation Check Form

R1809911 5
Olin Corporation
Charles Gibson - Olin

Project/Client Sevenson Environmental Svcs Folder Number _____

Cooler received on 10/12/2018 by: VS COURIER: ALS (UPS) FEDEX VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y) N	5a	**Perchlorate** samples have required headspace?	Y N (NA)
2	**Custody papers** properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk, or Sulfide have sig* **bubbles**?	Y N (NA)
3	Did all bottles arrive in good **condition** (unbroken)?	Y N	6	Where did the bottles originate?	(ALS/ROC) CLIENT
4	Circle: **Wet Ice Dry Ice Gel packs** present?	Y N	7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 10/12/18 Time: 9045 ID: IR#7 IR#10 From: (Temp Blank) Sample Bottle

Observed Temp (°C)	3.8						
Correction Factor (°C)	—						
Corrected Temp (°C)	3.8						
Temp from: Type of bottle	cent. tube						
Within 0-6°C?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by VS on 10/12/18 at 11
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown/Preservation Check**: Date: 10/15/18 Time: 1310 by: @

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (N/A)
13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-			**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).			
		HCl	**	**						

Bottle lot numbers: 112017-ISR
Explain all Discrepancies/ Other Comments:

CLRES	BULK
DO	FLDT
HPROD	HGFB
HTR	LL3541
PH	SUB
SO3	MARRS
ALS	REV

Labels secondary reviewed by: @
PC Secondary Review: JM 10/15/18 *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

ALS Group USA, Corp.
dba ALS Environmental

Internal Chain of Custody Report

Client: Olin Corporation **Service Request:** R1809911
Project: Charles Gibson - Olin/1186

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
R1809911-001.01					
	8081B,ALS SOP				
		10/15/2018	1315	SMO / GLAFORCE	
		10/15/2018	1315	R-002 / GLAFORCE	
		10/16/2018	0650	In Lab / DMURPHY	
		10/16/2018	0754	R-002 / DMURPHY	
R1809911-002.01					
	ALS SOP,8081B				
		10/15/2018	1315	SMO / GLAFORCE	
		10/15/2018	1315	R-002 / GLAFORCE	
		10/16/2018	0650	In Lab / DMURPHY	
		10/16/2018	0754	R-002 / DMURPHY	
R1809911-003.01					
	ALS SOP,8081B				
		10/15/2018	1315	SMO / GLAFORCE	
		10/15/2018	1315	R-002 / GLAFORCE	
		10/16/2018	0650	In Lab / DMURPHY	
		10/16/2018	0754	R-002 / DMURPHY	

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Miscellaneous Forms

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REPORT QUALIFIERS AND DEFINITIONS

U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.

J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.

E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.

E Organics- Concentration has exceeded the calibration range for that specific analysis.

D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.

* Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.

H Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.

Spike was diluted out.

+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.

S Concentration has been determined using Method of Standard Additions (MSA).

W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.

P Concentration >40% difference between the two GC columns.

C Confirmed by GC/MS

Q DoD reports: indicates a pesticide/Aroclor is not confirmed (≥100% Difference between two GC columns).

X See Case Narrative for discussion.

MRL Method Reporting Limit. Also known as:
LOQ Limit of Quantitation (LOQ)
The lowest concentration at which the method analyte may be reliably quantified under the method conditions.

MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).

LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.

ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

ACCREDITED IN ACCORDANCE WITH nelac

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

[1] Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186		

Sample Name:	US-1-101118	**Date Collected:**	10/11/18
Lab Code:	R1809911-001	**Date Received:**	10/12/18
Sample Matrix:	Soil		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MCYMBAL
ALS SOP		KAWONG

Sample Name:	MS-1-101118	**Date Collected:**	10/11/18
Lab Code:	R1809911-002	**Date Received:**	10/12/18
Sample Matrix:	Soil		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MCYMBAL
ALS SOP		KAWONG

Sample Name:	DS-1-101118	**Date Collected:**	10/11/18
Lab Code:	R1809911-003	**Date Received:**	10/12/18
Sample Matrix:	Soil		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MCYMBAL
ALS SOP		KAWONG

INORGANIC PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9014 Cyanide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Reactivity	SW846 Ch7, 7.3.4.2
9034 Sulfide Acid Soluble	9030B
9056A Bomb (Halogens)	5050A
9066 Manual Distillation	9065
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7196A	3060A
7199	3060A
9056A Halogens/Halides	5050
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction

For analytical methods not listed, the preparation method is the same as the analytical method reference.

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Sample Results

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Semivolatile Organic Compounds by GC

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Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 09:30
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	US-1-101118	**Units:**	ug/Kg
Lab Code:	R1809911-001	**Basis:**	Dry

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3541

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	57	10	10/29/18 17:17	10/25/18	
beta-BHC	ND U	57	10	10/29/18 17:17	10/25/18	
delta-BHC	ND U	57	10	10/29/18 17:17	10/25/18	
gamma-BHC (Lindane)	ND U	57	10	10/29/18 17:17	10/25/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	88	10 - 145	10/29/18 17:17	
Tetrachloro-m-xylene	75	10 - 123	10/29/18 17:17	

Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 10:00
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	MS-1-101118	**Units:**	ug/Kg
Lab Code:	R1809911-002	**Basis:**	Dry

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3541

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	60	10	10/29/18 17:35	10/25/18	
beta-BHC	ND U	60	10	10/29/18 17:35	10/25/18	
delta-BHC	ND U	60	10	10/29/18 17:35	10/25/18	
gamma-BHC (Lindane)	ND U	60	10	10/29/18 17:35	10/25/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	35	10 - 145	10/29/18 17:35	
Tetrachloro-m-xylene	22	10 - 123	10/29/18 17:35	

Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 10:30
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	DS-1-101118	**Units:**	ug/Kg
Lab Code:	R1809911-003	**Basis:**	Dry

Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Prep Method: EPA 3541

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
alpha-BHC	ND U	63	10	10/29/18 17:52	10/25/18	
beta-BHC	ND U	63	10	10/29/18 17:52	10/25/18	
delta-BHC	ND U	63	10	10/29/18 17:52	10/25/18	
gamma-BHC (Lindane)	ND U	63	10	10/29/18 17:52	10/25/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	82	10 - 145	10/29/18 17:52	
Tetrachloro-m-xylene	75	10 - 123	10/29/18 17:52	

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General Chemistry

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Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 09:30
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	US-1-101118	**Basis:**	As Received
Lab Code:	R1809911-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**29.6**	Percent	-	1	10/18/18 10:10	

Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 10:00
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	MS-1-101118	**Basis:**	As Received
Lab Code:	R1809911-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**28.4**	Percent	-	1	10/18/18 10:10	

Client:	Olin Corporation	**Service Request:**	R1809911
Project:	Charles Gibson - Olin/1186	**Date Collected:**	10/11/18 10:30
Sample Matrix:	Soil	**Date Received:**	10/12/18 09:30
Sample Name:	DS-1-101118	**Basis:**	As Received
Lab Code:	R1809911-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	27.2	Percent	-	1	10/18/18 10:10	

QC Summary Forms

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