Olin™
Environmental Remediation Group

Olin Corporation

3855 North Ocoee Street, Suite 200
Cleveland, TN 37312
(423) 336-4540
FAX (423) 339-5625
dmshare@olin.com

SENT VIA OVERNIGHT COURIER AND FILE TRANSFER PORTAL

February 27, 2018

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 2017 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 27, 2018

TABLE OF CONTENTS

ATTACHMENTS

Attachment A – Institutional & Engineering Certification Form

Attachment B – Site Map

Attachment C – Field Sampling Forms

Attachment D – Site Inspection Forms

Table 1 – Analytical Summary - Groundwater

Table 2 – Analytical Summary – Manhole B

Table 3 – Analytical Summary - Sediment

Table 4 – Groundwater Evaluations Summary

Table 5 – Discharge Volumes

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 the Site compounds being monitored. Evaluation of the groundwater indicates that the containment remedy is effective. An evaluation of data from the piezometer pairs at the Site indicates that an inward hydraulic gradient has been established in the containment area of the site. Since 2000, concentrations of site compounds being monitored have been undetected or estimated at concentrations below the detection levels in all monitor wells with the exception of one parameter from MW-4 in 2011. 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:
The Operation and Maintenance program has shown that the conditions at the site are stable and consistent.

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 2017 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 2017 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 inside the slurry wall.

- Water level elevations will be measured quarterly at the Site. Manholes A and B and piezometers P-1 through P-6 will be measured. 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.

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. Since 2000, concentrations of site compounds being monitored have been undetected or estimated at concentrations below the detection levels in all monitor wells and Manhole B **(Table 1 & Table 2)** with the one exception mentioned above. 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. HCB results are undetected (U) for all sampling events since 1993. Sample collection and analysis of creek sediments are performed annually during the second half of the calendar year. The 2017 data is 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 indicate 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 in piezometer pairs P3/P4 and P5/P6 had inward gradients during the year, with the exception of P5/P6 which exhibited a slight outward gradient in the third quarter. The third piezometer pair P1/P2 showed variability between inward and slightly outward. We will continue to closely monitor this pair 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:

The Operation and Maintenance program has shown that the conditions at the site are stable and consistent.

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.

Inspections, on at least a quarterly basis, 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 in a manner that will minimize the need for extra maintenance. Additionally, the inspections address the safeguards to control, minimize or eliminate threats to human health and the environment. The potential post-remediation threats include the release of HCB, BHC, or contaminated leachate to the groundwater, and/or the creek.

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

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 one previously noted exception. Fluctuations of groundwater elevations indicate that minor outward hydraulic gradients 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. HCB results are undetected (U) for all sampling events since 1993.

Future Submittals:
Future submittals of this report will be done on an annual basis.

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: 2.0

Reporting Period: January 31, 2016 to January 31, 2017

	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.

David M. Share — Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

2/27/2018 — 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)

STATE OF NEW YORK
DAVID M. SHARE
073259
LICENSED PROFESSIONAL ENGINEER

David M. Share — 2/27/2018

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

Stamp (Required for PE)

Date

Attachment B

Site Features Map
Figure 1

Attachment A

Institutional & Engineering Certification Form

Attachment B

Site Features Map
Figure 1

Attachment C

Field Sampling Forms

Attachment D

Site Inspection Forms

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

Attachment C

Field Sampling Forms

US Environmental Rental Corporation

(888) 550-8100 www.usenvironmental.com

166 Riverview Ave, Waltham, MA 02453 (781) 899-1560
91 Prestige Park Circle, Suite 5, East Hartford, CT 06108 (860) 289-8700
5C South Gold Dr, Hamilton, NJ 08691 (609) 570-8555
1202 Tech Blvd., Suite 108, Tampa, FL 33619 (813) 628-4200

HORIBA

Company: Sevenson Environmental - Niagara Falls
Contact: Mike J Walker
Phone #: #N/A

Order No.: RO034180
Date: 5/24/2017
Technician: IS

Packing List

Item	Serial Number	Tech	QC
U-52	R09J4CNJ	✓	
Handheld Display	T1RSFRNL	✓	

Item	Tech	QC
Cable 0 '	✓	
Manual	✓	
AutoCal Solution	✓	
Extra Batteries	✓	
Flow Cell	✓	
Sensor Guard	✓	
Barb Kit	✓	
2 Cal Cups	✓	
Software		

Calibration Report

U-52	R09J4CNJ		
AutoCal Solution Lot #:	*UEAC6004-T*		
Parameter	*Before*	*After*	
Conductivity 4.49 ms/cm	4.35	4.49	
Turbidity 0 NTU	8.0	0.0	
Dissolved Oxygen	13.1	9.1	
pH 4 Buffer	4.1	4.0	#REF!
			#REF!
			#REF!

This document certifies that US Environmental Rental Corporation has provided this rental equipment and all accessories in good working order. It is the renter's responsibility to: a) review all included items upon receipt, b) verify that all items are in acceptable condition and function properly, and c) contact a US Environmental associate immediately if any item is missing, damaged, and/or not functioning properly. Any delay in notifying US Environmental will be considered as the Renter taking responsibility for such missing, damaged, and/or malfunctioning item.

Missing, damaged, and/or malfunctioning equipment and accessories will result in additional fees.

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

RECORDED BY: C Jones
SAMPLED BY: C Jones
COMPANY: Sevenson

SAMPLE ID: MH-B-053017
SAMPLING EVENT/DATE: Annual GW
MONITORING WELL: MH-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: 5/30/17

MEDIA: GROUNDWATER ____
CREEK SEDIMENT ____

SAMPLE TIME: 955

LOCATION: SE Corner of Land Fill

SAMPLE METHOD: Dedicated Tubing, Peristaltic Pump

SAMPLING OBSERVATIONS: Clear, Slight Odor

QC SAMPLES TAKEN: N/A

OTHER OBSERVATIONS/COMMENTS:

FOB Field Blank 053017 Taken at 1015

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: C. JONES
SAMPLED BY: C. JONES
COMPANY: SEVENSON

SAMPLE ID: MW 5. 053017
SAMPLING EVENT/DATE: ANNUAL GW
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: 5.80 (FT.)
WATER COLUMN: 9.48 (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= 1.51 (GALS)

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'

PURGE METHOD: PERISTALTIC PUMP
BOTTOM OF WELL/SILT BUILDUP: N/A
PURGE START TIME: 1128 STOP TIME: 1140
PURGE OBSERVATIONS: TURBID → CLEAR

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME		pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
0	1	8.10	1199	9.8	
1.5	2	7.74	1261	9.9	
3.0	3	7.68	1274	10.1	
4.5	4	7.65	1289	10.3	
	5				

TOTAL VOLUME PURGED: 5 gallons

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 5/30/17

MEDIA: GROUNDWATER X
CREEK SEDIMENT
SAMPLE TIME: 1140

LOCATION: NE AMD ZONE
SAMPLE METHOD: PERISTALTIC PUMP / DEDICATED TUBING
SAMPLING OBSERVATIONS: SL TURBID, NO ODOR
QC SAMPLES TAKEN: MS/MSD VOLUME
OTHER OBSERVATIONS/COMMENTS:

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: C JONES
SAMPLED BY: C JONES
COMPANY: SEVENSON

SAMPLE ID: MW 4 - 053017
SAMPLING EVENT/DATE: ANNUAL GW
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: 7.11 (FT.)
WATER COLUMN: 6.64 (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= 1.06 (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
BOTTOM OF WELL/SILT BUILDUP: NONE
PURGE START TIME: 1215 STOP TIME: 1225
PURGE OBSERVATIONS: TURBID → CLEAR

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME		pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
0 start	1	7.19	809	9.3	
1	2	7.05	1246	9.6	
2	3	7.12	1259	9.8	
3	4	7.23	1250	9.5	
	5				

TOTAL VOLUME PURGED: 3 gallons

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 5/30/17

MEDIA: GROUNDWATER X
CREEK SEDIMENT

SAMPLE TIME: 1225

LOCATION: E OF AUTO ZONE

SAMPLE METHOD: PERISTALTIC PUMP / DEDICATED TUBING

SAMPLING OBSERVATIONS: CLEAR / LIGHT ODOR

QC SAMPLES TAKEN: DUP TAKEN HERE LABELED "MW-7" @ 1250 BLIND

OTHER OBSERVATIONS/COMMENTS:

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: C JONES
SAMPLED BY: C JONES
COMPANY: STEVENSON

SAMPLE ID: ~~MW~~ MW-A3-053017
SAMPLING EVENT/DATE: 5/30/17
MONITORING WELL: MW-A3
CONDITION: GOOD

GROUNDWATER PURGE DATA PURGE DATE:

DEPTH TO BOTTOM FROM TOP OF RISER: 11.95 (FT.)
DEPTH TO WATER FROM TOP OF RISER: 6.06 (FT.)
WATER COLUMN: 5.89 (FT.)
2" DIA. WELL CONSTANT: 0.16
ONE WELL VOLUME= 0.94 (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
BOTTOM OF WELL/SILT BUILDUP: NONE
PURGE START TIME: 1328 STOP TIME: 1350
PURGE OBSERVATIONS: CLEAR/NO ODOR

FIELD PARAMETER MEASUREMENTS:

WELL VOLUME		pH	SPECIFIC CONDUCTIVITY umhos/cm)	TEMP. (C OR F)	NOTES:
0	1	7.79	962	9.4	
1	2	7.82	1010	9.6	
2	3	7.74	1029	9.7	
3	4	7.68	1041	9.7	
	5				

TOTAL VOLUME PURGED: 3 gallons

GROUNDWATER OR SEDIMENT SAMPLING DATA: SAMPLE DATE: 5/30/17

MEDIA: GROUNDWATER X
CREEK SEDIMENT

SAMPLE TIME: 1350

LOCATION: SE OF LANDFILL
SAMPLE METHOD: PERISTALTIC PUMP/ DEDICATED TUBING
SAMPLING OBSERVATIONS: CLEAR
QC SAMPLES TAKEN: NONE
OTHER OBSERVATIONS/COMMENTS:

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

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

45064

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: 1171
Project Manager: DAVID SHARE	Report CC: DMShare@Olin.com
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: (423) 336-4987	Email: DMshare@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	PRESERVATIVE	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-5-053017		5/30/17	1140	GW	6					6				MS/MSD VOLUME
MW-4-053017			1225		2					2				
MW-A3-053017			1350		2					2				
MW-7-053017			1250		2					2				
FIELD BLANK-053017			1015		2					2				
MH-B-053017			955	↓	2					2				
TEMP BLANKS		↓			2									

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 2 COOLERS

See QAPP ☐

TURNAROUND REQUIREMENTS
RUSH (SURCHARGES APPLY)
1 day 2 day 3 day
4 day 5 day

REQUESTED REPORT DATE
STANDARD

REPORT REQUIREMENTS
I. Results Only
☑ 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 #: ERRE 9345
BILL TO: OLIN

STATE WHERE SAMPLES WERE COLLECTED

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature:	Signature:	Signature:	Signature:	Signature:	Signature:
Printed Name: CHRIS JONES	Printed Name: SCOTT SEAVY	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm: SES	Firm: ALS	Firm:	Firm:	Firm:	Firm:
Date/Time: 5/31/17 9:30	Date/Time: 5/31/17 0930	Date/Time:	Date/Time:	Date/Time:	Date/Time:

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

© 2012 by ALS Group

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: SEVENSON

SAMPLE ID: US-1-090617
SAMPLING EVENT/DATE: 9/6/17 1/4
MONITORING WELL:
CONDITION:

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: 9/6/17

MEDIA: GROUNDWATER
CREEK SEDIMENT X

SAMPLE TIME: 1200

LOCATION: UPSTREAM

SAMPLE METHOD: SEDIMENT TRAP

SAMPLING OBSERVATIONS: LIMITED VOLUME

QC SAMPLES TAKEN:

OTHER OBSERVATIONS/COMMENTS:

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: DS-1-090617
SAMPLING EVENT/DATE: 9/6/17 1/4
MONITORING WELL: —
CONDITION: —

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: 9/6/17

MEDIA: GROUNDWATER ____ CREEK SEDIMENT X

SAMPLE TIME: 1235

LOCATION: DOWN STREAM

SAMPLE METHOD: SEDIMENT TRAP

SAMPLING OBSERVATIONS: LIMITED VOLUME

QC SAMPLES TAKEN: MS (MID STREAM) TAKEN FROM DS (DOWNSTREAM) AS BLIND DUP

OTHER OBSERVATIONS/COMMENTS:

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

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

46732

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: 1171
Project Manager: DAVID SHARPE	Report CC: Dmsharpe@Olin.com
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: 423 336 4989	Email: Dmsharpe@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE: 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
US-1-090617		9/6/17	1200	SED	2				2				
MS-1-090617		↓	1215	↓	1				1				
DS-1-090617		↓	1235	↓	1				1				
TEMP BLANK		—	—	—	1	—	—	—	—	—	—	—	PROVIDED BY LAB

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

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED: NY

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day
STANDARD
REQUESTED REPORT DATE
_____

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 # REIN 0005
BILL TO: OLIN

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	UPS COURIER				
Printed Name: CHRIS JONES					
Firm: SES					
Date/Time: 9/7/17 1500					

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

© 2012 by ALS Group

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: 3/7/17 TIME: 0800

INSPECTOR: C Jones COMPANY: SEVENSON

WEATHER: 40° RAIN

REASON FOR INSPECTION (QUARTERLY OR OTHER): 1st 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	
COVER VEGETATION	A	
TREES	A	~~SEEDLINGS~~
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:

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: 5/30/17 TIME: 0800

INSPECTOR: C JONES COMPANY: SEVENSON

WEATHER: 67° SUNNY

REASON FOR INSPECTION (QUARTERLY OR OTHER): ANNUAL GW 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:

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: 9/6/17 TIME: 1200

INSPECTOR: CHRIS JONES COMPANY: SEVENSON

WEATHER: Cloudy 65°

REASON FOR INSPECTION (QUARTERLY OR OTHER): QUARTERLY (3rd)

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	SMALL BAG OF TRASH WAS COLLECTED
EROSION (CAP)	A	
EROSION (BANK)	A	
SECURITY:		
FENCE/LOCKS	A	
PIEZOMETERS/LOCKS	A	P-4 LID WAS CRACKED
MONITORING WELLS/LOCKS	A	
MANHOLES/LIDS/LOCKS	A	
ELECTRICAL PANEL	A	

ADDITIONAL COMMENTS:

UPON INSPECTION SEVENSON NOTICED P-4's LID WAS CRACKED. POSSIBLY BY LAWN MAINTENANCE. A NEW ONE WILL BE ORDERED

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: 11/21/17 TIME: 830

INSPECTOR: C JONES COMPANY: STEVENSON

WEATHER: 40° SUNNY WINDY

REASON FOR INSPECTION (QUARTERLY OR OTHER): QUARTERLY

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:

SITE WAS SECURED UPON ARRIVAL. CAP OF LANDFILL WAS VERY SOGGY.

CREEK LEVEL WAS LOW

TABLE 1
CHARLES GIBSON SITE
NIAGARA FALLS, NEW YORK

ANALYTICAL SUMMARY
GROUND WATER SAMPLING 2011-2017

MONITOR WELL: MW-A3

	2011		2012		2013		2014		2015		2016		2017	
Parameter	April	September	April	September	May	September	April	September	May	September	May	September	May	September
Alpha-BHC	.053U	NR	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR
Beta-BHC	.053U	NR	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR
Gamma-BHC	.053U	NR	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR
Delta-BHC	.053U	NR	NR	0.050U	0.047U	NR	NR	0.047U	0.047U	NR	NR	-	0.047U	NR
Hexachlorobenzene	NR	NR	NR	20U	NR	NR	NR	9.4U	NR	NR	NR	-	NR	NR

MONITOR WELL: MW-4

	2011		2012		2013		2014		2015		2016		2017	
Parameter	April	September	April	September	May	September	April	September	May	September	May	September	May	September
Alpha-BHC	0.076	NR	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR
Beta-BHC	.048U	NR	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR
Gamma-BHC	.0247J	NR	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR
Delta-BHC	.048U	NR	NR	0.047U	0.047U	NR	NR	0.047U	0.047U	NR	NR	0.056U	0.047U	NR
Hexachlorobenzene	NR	NR	NR	9.4U	NR	NR	NR	9.4U	NR	NR	NR	10U	NR	NR

MONITOR WELL: MW-5

	2011		2012		2013		2014		2015		2016		2017	
Parameter	April	September	April	September	May	September	April	September	May	September	May	September	May	September
Alpha-BHC	.047U	NR	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR
Beta-BHC	.047U	NR	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR
Gamma-BHC	.017J	NR	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR
Delta-BHC	.047U	NR	NR	0.047U	0.047U	NR	NR	0.050U	0.047U	NR	NR	0.056U	0.047U	NR
Hexachlorobenzene	NR	NR	NR	9.4U	NR	NR	NR	9.4U	NR	NR	NR	10U	NR	NR

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

May 30, 2017

	MANHOLE B (MHB)
PARAMETER	
alpha-BHC	0.047U
beta-BHC	0.047U
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 2007 - 2017

UPSTREAM

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Parameter	September	September	September	September	September	September	September	September	September	September	September
Alpha- BHC	40	77	240	94	200J	17	170J	120	NS	9.7	200
Beta- BHC	4.8	69	260	97	120J	48	190J	280	NS	25	190
Gamma- BHC	4.6	17J	18J	33J	190U	5.5U	28U	49U	NS	5.6U	51U
Delta- BHC	3.7	26U	39J	52J	140J	23	28U	49U	NS	19	51U

DOWNSTREAM

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Parameter	September	September	September	September	September	September	September	September	September	September	September
Alpha- BHC	NS	5200	210	53J	230J	9.8	29U	55	52U	7	69U
Beta- BHC	NS	1000	73	62J	130J	37	89	100	76	18	87
Gamma- BHC	NS	66J	60U	63U	220U	5.9U	29U	52U	52U	4.9U	69U
Delta- BHC	NS	82J	32	56J	170J	18	29U	52U	52U	15	69U

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

Table 4

2017 Quarterly Groundwater Elevations Summary

Piezometer Pair	3/07/2017	Inward gradient	5/30/2017	Inward gradient	9/6/2017	Inward gradient	11/21/2017	Inward gradient
P1 outside **P2 inside**	565.22 565.58	Outward	566.00 566.31	Outward	566.12 565.48	Inward	565.01 565.51	Outward
P3 outside **P4 inside**	570.75 565.37	Inward	568.71 565.43	Inward	565.88 565.49	Inward	569.92 565.43	Inward
P5 outside **P6 inside**	568.68 567.07	Inward	569.03 567.63	Inward	566.60 567.33	Outward	569.24 567.60	Inward
		Below 565 ft msl		Below 565 ft msl		Below 565 ft msl		Below 565 ft msl
Manhole A **Manhole B**	563.64 563.74	Yes Yes	563.57 563.63	Yes Yes	563.40 563.49	Yes Yes	563.52 563.60	Yes 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)
2007	22,958
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**
TOTALS	**364,265**

Monthly Discharge Volumes
2017

Month	Volume (gallons)
Jan	0
Feb	1,405
Mar	2,457
Apr	14,231
May	4,584
Jun	5,520
Jul	1
Aug	2,281
Sep	2,449
Oct	0
Nov	973
Dec	1,591
Total	**35,492**

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: 3/7/17 TIME: 0800

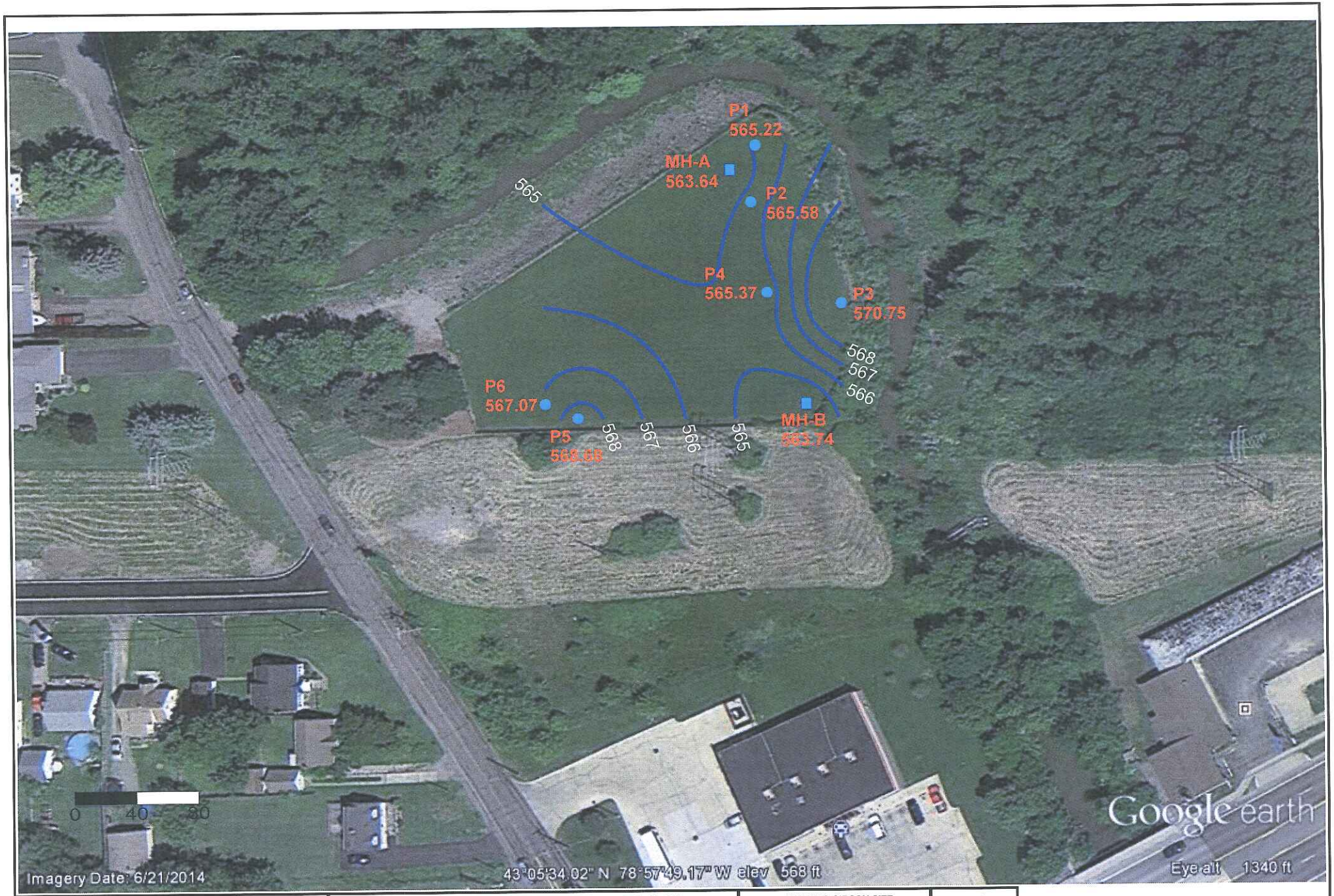
INSPECTOR: C JONES COMPANY: STEVENSON

WEATHER: 40° RAIN

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	7.50	565.22	
P-2	574.89	9.31	565.58	
P-3	574.16	3.41	570.75	
P-4	576.14	10.77	565.37	
P-5	575.05	6.37	568.68	
P-6	578.28	11.21	567.07	
MANHOLE A	575.22	11.58	563.64	
MANHOLE B	577.34	13.60	563.74	

(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: 2-7-2018
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-7-2018

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
MARCH 7, 2017

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: 5/30/17 TIME: 0800

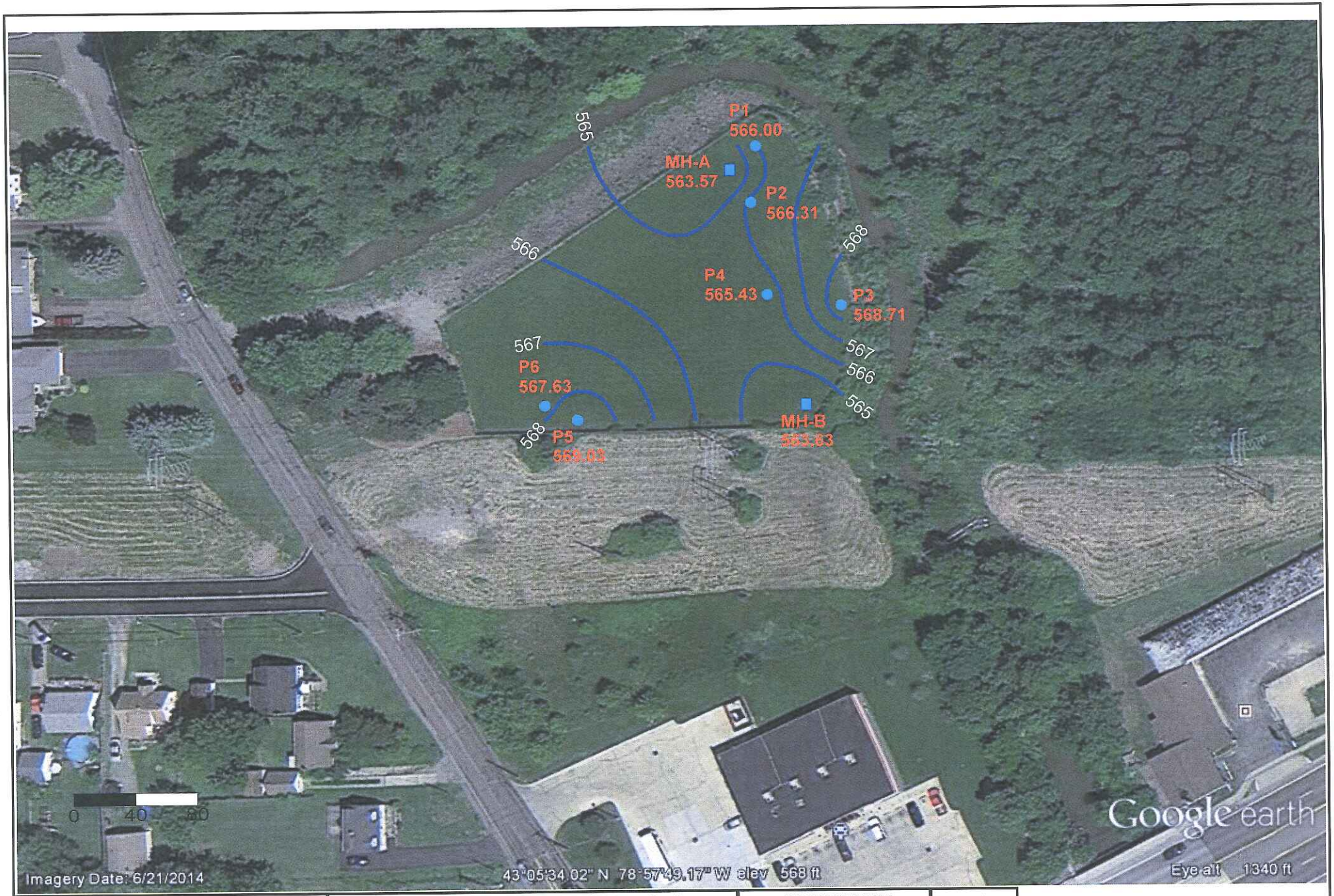
INSPECTOR: C JONES COMPANY: SEVENSON

WEATHER: 67° SUNNY

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	6.72	566.00	
P-2	574.89	8.58	566.31	
P-3	574.16	5.45	568.71	
P-4	576.14	10.71	565.43	
P-5	575.05	6.02	569.03	
P-6	578.28	10.65	567.63	
MANHOLE A	575.22	11.65	563.57	
MANHOLE B	577.34	13.71	563.63	

(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: 2-8-2018
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-8-2018

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
MAY 30, 2017

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: 9/6/17 TIME: 1200

INSPECTOR: Chris Jones COMPANY: Stevenson

WEATHER: Cloudy 65°

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	6.60	566.12	
P-2	574.89	9.41	565.48	
P-3	574.16	8.28	565.88	
P-4	576.14	10.65	565.49	
P-5	575.05	8.45	566.60	
P-6	578.28	10.95	567.33	
MANHOLE A	575.22	11.82	563.40	
MANHOLE B	577.34	13.85	563.49	

(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: 2-8-2018
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-8-2018

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
SEPTEMBER 6, 2017

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: 11/21/17 TIME: 830

INSPECTOR: C Jones COMPANY: Stevenson

WEATHER: 40° Sunny, Windy

PIEZOMETER	RISER ELEVATION (INSIDE CASING)	DEPTH TO WATER (FT.)	WATER ELEVATION	COMMENTS
P-1	572.72	7.71	565.01	
P-2	574.89	9.38	565.51	
P-3	574.16	4.24	569.92	
P-4	576.14	10.71	565.43	
P-5	575.05	5.81	569.24	
P-6	578.28	10.68	567.60	
MANHOLE A	575.22	11.70	563.52	
MANHOLE B	577.34	13.74	563.60	

(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: 2-7-2018
0.5 IN = 40 FT.	CHKD. BY: ABC	DATE: 2-7-2018

CHARLES GIBSON SITE
NIAGRA FALLS, NY

GROUNDWATER CONTOUR MAP
PIEZOMETER/MANHOLE LEVELS
SAMPLING EVENT
NOVEMBER 21, 2017

FIG. NO. 4

- MANHOLE
- PIEZOMETER

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

June 13, 2017

Service Request No:R1704880

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 May 31, 2017
For your reference, these analyses have been assigned our service request number **R1704880.**

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
ALS Group USA, Corp
1565 Jefferson Road, Building 300, Suite 360
Rochester, NY 14623
T : +1 585 288 5380
F : +1 585 288 8475
www.alsglobal.com

Table of Contents

Table of Contents (continued)

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

Client: Olin Corporation
Project: Charles Gibson - Olin/1171
Sample Matrix: Water

Service Request:R1704880
Date Received:5/31/17

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

Six water samples were received for analysis at ALS Environmental on 05/31/2017. 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.

Semi-Volatile Organic Analyses:

No significant anomalies were noted with this analysis.

Approved by _____ Date 6/13/2017

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:**R1704880
Project: Charles Gibson - Olin/1171

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1704880-001	MW-5-053017	5/30/2017	1140
R1704880-002	MW-4-053017	5/30/2017	1225
R1704880-003	MW-A3-053017	5/30/2017	1350
R1704880-004	MW-7-053017	5/30/2017	1250
R1704880-005	Field Blank-053017	5/30/2017	1015
R1704880-006	MH-B-053017	5/30/2017	0955

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 45064

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

Project Name: CHARLES GIBSON - OLIN	Project Number: 1171
Project Manager: DAVID SHARE	Report CC: DMshare@Olin.com
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: (423) 336-4987	Email: DMshare@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE

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-5-053017		5/30/17	1140	GW	6				6				MS/MSD VOLUME
MW-4-053017			1225		2				2				
MW-A3-053017			1350		2				2				
MW-7-053017			1250		2				2				
FIELD BLANK-053017			1015		2				2				
MH-B-053017			955		2				2				
TEMP BLANKS					2								

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 2 COOLERS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day _____ 2 day _____ 3 day
_____ 4 day _____ 5 day

REQUESTED REPORT DATE
STANDARD

REPORT REQUIREMENTS
_____ I. Results Only
☒ 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 # ERRE 9845
BILL TO: OLIN

STATE WHERE SAMPLES WERE COLLECTED

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature: Scott Seany	Signature: Scott Seany	Signature	Signature	Signature
Printed Name: CHRIS JONES	Printed Name: SCOTT SEANY	Printed Name: SCOTT SEANY	Printed Name	Printed	5
Firm: SES	Firm: ALS	Firm: ALS	Firm	Firm	
Date/Time: 5/31/17 0930	Date/Time: 5/31/17 0930	Date/Time: 5/31/17 1230	Date/Time	Date/T.	

R1704880
Olin Corporation
Charles Gibson - Olin

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

© 2012 by ALS Group

R1704880 5
Olin Corporation
Charles Gibson - Olin

Cooler Receipt and Preservation Check Form

Project/Client Sevenson Folder Number 217-4880

Cooler received on 5-31-17 by: KZ

COURIER: (ALS) UPS FEDEX VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y)	N
2	**Custody papers** properly completed (ink, signed)?	(Y)	N
3	Did all bottles arrive in good **condition** (unbroken)?	Y	N
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y)	N

5a	**Perchlorate** samples have required headspace?	Y	N	(NA)
5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y	N	(NA)
6	Where did the bottles originate?	(ALS/ROC)	CLIENT	
7	Soil VOA received as: Bulk Encore 5035set	(NA)		

8. Temperature Readings Date: 5-31-17 Time: 12:35 ID: (IR#7) IR#8 From: (Temp Blank) Sample Bottle

Observed Temp (°C)	3.3	1.3					
Correction Factor (°C)	+0.8	0					
Corrected Temp (°C)	4.1	1.3					
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 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 KZ on 5-31-17 at 12:42
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 5/31/17 Time: 1515 by: DW

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	Canisters Pressurized	Tedlar® Bags Inflated (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
Residual Chlorine (-)		For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
		$Na_2S_2O_3$	-	-						
		ZnAcetate	-	-						
		HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

5/31/17

Bottle lot numbers: 041517-HB-10K

Explain all Discrepancies/ Other Comments:

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

Labels secondary reviewed by: DW

PC Secondary Review: JM 6/1/17

*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:** R1704880
Project: Charles Gibson - Olin/1171

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
R1704880-001.01					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-001.02					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	
R1704880-001.03					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0732	In Lab / DMURPHY	
R1704880-001.04					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-001.05					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0732	In Lab / DMURPHY	
R1704880-001.06					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-002.01					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	
R1704880-002.02					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-003.01					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	

ALS Group USA, Corp.
dba ALS Environmental

Internal Chain of Custody Report

Client: Olin Corporation **Service Request:** R1704880
Project: Charles Gibson - Olin/1171

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
R1704880-003.02					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	
R1704880-004.01					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-004.02					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	
R1704880-005.01					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-005.02					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	
R1704880-006.01					
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
R1704880-006.02					
	8081B				
		5/31/2017	1514	SMO / DWARD	
		5/31/2017	1515	R-002 / DWARD	
		6/1/2017	0733	In Lab / DMURPHY	

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

ALS Environmental

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% (25% for CLP) 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	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[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 http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

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:**	R1704880
Project:	Charles Gibson - Olin/1171		

Sample Name:	MW-5-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-001	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MPEDRO

Sample Name:	MW-4-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-002	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MPEDRO

Sample Name:	MW-A3-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-003	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MPEDRO

Sample Name:	MW-7-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-004	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MPEDRO

Sample Name:	Field Blank-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-005	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	**Extracted/Digested By**	**Analyzed By**
8081B	DMURPHY	MPEDRO

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171		

Sample Name:	MH-B-053017	**Date Collected:**	05/30/17
Lab Code:	R1704880-006	**Date Received:**	05/31/17
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
8081B	DMURPHY	MPEDRO

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.

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

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:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 11:40
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	MW-5-053017	**Units:**	ug/L
Lab Code:	R1704880-001	**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	06/02/17 12:34	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 12:34	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 12:34	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 12:34	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	44	10 - 164	06/02/17 12:34	
Tetrachloro-m-xylene	56	10 - 147	06/02/17 12:34	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 12:25
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	MW-4-053017	**Units:**	ug/L
Lab Code:	R1704880-002	**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	06/02/17 13:29	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 13:29	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 13:29	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 13:29	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	49	10 - 164	06/02/17 13:29	
Tetrachloro-m-xylene	63	10 - 147	06/02/17 13:29	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 13:50
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	MW-A3-053017	**Units:**	ug/L
Lab Code:	R1704880-003	**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	06/02/17 13:47	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 13:47	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 13:47	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 13:47	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	66	10 - 164	06/02/17 13:47	
Tetrachloro-m-xylene	62	10 - 147	06/02/17 13:47	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 12:50
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	MW-7-053017	**Units:**	ug/L
Lab Code:	R1704880-004	**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	06/02/17 14:05	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 14:05	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 14:05	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 14:05	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	49	10 - 164	06/02/17 14:05	
Tetrachloro-m-xylene	62	10 - 147	06/02/17 14:05	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 10:15
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	Field Blank-053017	**Units:**	ug/L
Lab Code:	R1704880-005	**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	06/02/17 14:23	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 14:23	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 14:23	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 14:23	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	39	10 - 164	06/02/17 14:23	
Tetrachloro-m-xylene	62	10 - 147	06/02/17 14:23	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 09:55
Sample Matrix:	Water	**Date Received:**	05/31/17 12:30
Sample Name:	MH-B-053017	**Units:**	ug/L
Lab Code:	R1704880-006	**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	06/02/17 14:41	6/1/17	
beta-BHC	ND U	0.047	1	06/02/17 14:41	6/1/17	
delta-BHC	ND U	0.047	1	06/02/17 14:41	6/1/17	
gamma-BHC (Lindane)	ND U	0.047	1	06/02/17 14:41	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	74	10 - 164	06/02/17 14:41	
Tetrachloro-m-xylene	65	10 - 147	06/02/17 14:41	

QC Summary 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

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:** R1704880
Project: Charles Gibson - Olin/1171
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-5-053017	R1704880-001	44	56
MW-4-053017	R1704880-002	49	63
MW-A3-053017	R1704880-003	66	62
MW-7-053017	R1704880-004	49	62
Field Blank-053017	R1704880-005	39	62
MH-B-053017	R1704880-006	74	65
Method Blank	RQ1704996-01	73	69
Lab Control Sample	RQ1704996-02	71	71
Duplicate Lab Control Sample	RQ1704996-03	70	68
MW-5-053017 MS	RQ1704996-04	41	54
MW-5-053017 DMS	RQ1704996-05	44	54

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17
Sample Matrix:	Water	**Date Received:**	05/31/17
		Date Analyzed:	06/2/17
		Date Extracted:	06/1/17

Duplicate Matrix Spike Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	MW-5-053017	**Units:**	ug/L
Lab Code:	R1704880-001	**Basis:**	NA
Analysis Method:	8081B		
Prep Method:	EPA 3510C		

		Matrix Spike RQ1704996-04			Duplicate Matrix Spike RQ1704996-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
alpha-BHC	ND U	0.159	0.189	85	0.163	0.189	87	40-147	<1	30
beta-BHC	ND U	0.154	0.189	82	0.151	0.189	80	49-136	2	30
delta-BHC	ND U	0.147	0.189	78	0.142	0.189	75	32-147	3	30
gamma-BHC (Lindane)	ND U	0.154	0.189	82	0.156	0.189	83	44-142	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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Analyzed:**	06/02/17 11:40
Sample Matrix:	Water	**Date Extracted:**	06/01/17

Method Blank Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Method Blank	**Instrument ID:**	R-GC-62
Lab Code:	RQ1704996-01	**File ID:**	I:\ACQUDATA\7890m\DATA\060217\ar795.D\
Analysis Method:	8081B	**Analysis Lot:**	548282
Prep Method:	EPA 3510C	**Extraction Lot:**	289342

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	RQ1704996-02	I:\ACQUDATA\7890m\DATA\060217\ar796.D\	06/02/17 11:58
Duplicate Lab Control Sample	RQ1704996-03	I:\ACQUDATA\7890m\DATA\060217\ar797.D\	06/02/17 12:16
MW-5-053017	R1704880-001	I:\ACQUDATA\7890m\DATA\060217\ar798.D\	06/02/17 12:34
MW-5-053017	RQ1704996-04	I:\ACQUDATA\7890m\DATA\060217\ar799.D\	06/02/17 12:52
MW-5-053017	RQ1704996-05	I:\ACQUDATA\7890m\DATA\060217\ar800.D\	06/02/17 13:11
MW-4-053017	R1704880-002	I:\ACQUDATA\7890m\DATA\060217\ar801.D\	06/02/17 13:29
MW-A3-053017	R1704880-003	I:\ACQUDATA\7890m\DATA\060217\ar802.D\	06/02/17 13:47
MW-7-053017	R1704880-004	I:\ACQUDATA\7890m\DATA\060217\ar803.D\	06/02/17 14:05
Field Blank-053017	R1704880-005	I:\ACQUDATA\7890m\DATA\060217\ar804.D\	06/02/17 14:23
MH-B-053017	R1704880-006	I:\ACQUDATA\7890m\DATA\060217\ar805.D\	06/02/17 14:41

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1704996-01	**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	06/02/17 11:40	6/1/17	
beta-BHC	ND U	0.050	1	06/02/17 11:40	6/1/17	
delta-BHC	ND U	0.050	1	06/02/17 11:40	6/1/17	
gamma-BHC (Lindane)	ND U	0.050	1	06/02/17 11:40	6/1/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	73	10 - 164	06/02/17 11:40	
Tetrachloro-m-xylene	69	10 - 147	06/02/17 11:40	

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Analyzed:**	06/02/17 11:58
Sample Matrix:	Water	**Date Extracted:**	06/01/17

Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Lab Control Sample	**Instrument ID:**	R-GC-62
Lab Code:	RQ1704996-02	**File ID:**	I:\ACQUDATA\7890m\DATA\060217\ar796.D\
Analysis Method:	8081B	**Analysis Lot:**	548282
Prep Method:	EPA 3510C	**Extraction Lot:**	289342

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	RQ1704996-01	I:\ACQUDATA\7890m\DATA\060217\ar795.D\	06/02/17 11:40
Duplicate Lab Control Sample	RQ1704996-03	I:\ACQUDATA\7890m\DATA\060217\ar797.D\	06/02/17 12:16
MW-5-053017	R1704880-001	I:\ACQUDATA\7890m\DATA\060217\ar798.D\	06/02/17 12:34
MW-5-053017	RQ1704996-04	I:\ACQUDATA\7890m\DATA\060217\ar799.D\	06/02/17 12:52
MW-5-053017	RQ1704996-05	I:\ACQUDATA\7890m\DATA\060217\ar800.D\	06/02/17 13:11
MW-4-053017	R1704880-002	I:\ACQUDATA\7890m\DATA\060217\ar801.D\	06/02/17 13:29
MW-A3-053017	R1704880-003	I:\ACQUDATA\7890m\DATA\060217\ar802.D\	06/02/17 13:47
MW-7-053017	R1704880-004	I:\ACQUDATA\7890m\DATA\060217\ar803.D\	06/02/17 14:05
Field Blank-053017	R1704880-005	I:\ACQUDATA\7890m\DATA\060217\ar804.D\	06/02/17 14:23
MH-B-053017	R1704880-006	I:\ACQUDATA\7890m\DATA\060217\ar805.D\	06/02/17 14:41

Client: Olin Corporation
Project: Charles Gibson - Olin/1171
Sample Matrix: Water

Service Request: R1704880
Date Analyzed: 06/02/17

Duplicate Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Units:ug/L
Basis:NA

		Lab Control Sample RQ1704996-02			Duplicate Lab Control Sample RQ1704996-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
alpha-BHC	8081B	0.152	0.200	76	0.149	0.200	74	40-147	2	30
beta-BHC	8081B	0.154	0.200	77	0.154	0.200	77	49-136	<1	30
delta-BHC	8081B	0.146	0.200	73	0.145	0.200	73	32-147	<1	30
gamma-BHC (Lindane)	8081B	0.163	0.200	82	0.151	0.200	75	44-142	8	30

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	NA
SRM Matrix:	Water		
Sample Name:	Lab Control Sample		
Lab Code:	RQ1704996-02	**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	0.152	0.166	9		1	06/02/17 11:58
beta-BHC	0.050	0.154	0.161	4		1	06/02/17 11:58
delta-BHC	0.050	0.146	0.156	7		1	06/02/17 11:58
gamma-BHC (Lindane)	0.050	0.163	0.165	1		1	06/02/17 11:58

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client: Olin Corporation
Project: Charles Gibson - Olin/1171
SRM Matrix: Water

Service Request: R1704880
Date Collected: NA

Sample Name: Duplicate Lab Control Sample
Lab Code: RQ1704996-03

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	0.149	0.158	6		1	06/02/17 12:16
beta-BHC	0.050	0.154	0.194	23		1	06/02/17 12:16
delta-BHC	0.050	0.145	0.151	4		1	06/02/17 12:16
gamma-BHC (Lindane)	0.050	0.151	0.160	6		1	06/02/17 12:16

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 11:40
SRM Matrix:	Water	**Date Received:**	5/31/17
Sample Name:	MW-5-053017		
Lab Code:	RQ1704996-04	**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	0.159	0.161	1		1	06/02/17 12:52
beta-BHC	0.047	0.154	0.159	3		1	06/02/17 12:52
delta-BHC	0.047	0.147	0.162	10		1	06/02/17 12:52
gamma-BHC (Lindane)	0.047	0.154	0.163	6		1	06/02/17 12:52

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1704880
Project:	Charles Gibson - Olin/1171	**Date Collected:**	05/30/17 11:40
SRM Matrix:	Water	**Date Received:**	5/31/17
Sample Name:	MW-5-053017		
Lab Code:	RQ1704996-05	**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	0.160	0.163	2		1	06/02/17 13:11
beta-BHC	0.047	0.151	0.157	4		1	06/02/17 13:11
delta-BHC	0.047	0.142	0.158	11		1	06/02/17 13:11
gamma-BHC (Lindane)	0.047	0.156	0.162	4		1	06/02/17 13:11

November 17, 2017

Service Request No:R1708446

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

Laboratory Results for: Charles Gibson - Olin -REVISED

Dear Mr.Share,

Enclosed are the results of the sample(s) submitted to our laboratory September 08, 2017
For your reference, these analyses have been assigned our service request number **R1708446.**

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

Lisa Reyes for **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
ALS Group USA, Corp
1565 Jefferson Road, Building 300, Suite 360
Rochester, NY 14623
T : +1 585 288 5380
F : +1 585 288 8475
www.alsglobal.com

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

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/1171
Sample Matrix: Soil

Service Request:R1708446
Date Received:9/8/17

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 09/08/2017. 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.

Semi-Volatile Organic Analyses:

Method 8081b,R1708446-001,-002,-003 The reporting limit is elevated for one or more analytes. The sample extract was diluted prior to instrumental analysis due to relatively high levels of non-target background components. The extract was highly colored and viscous, which indicated the need to perform a dilution prior to injection into the instrument. Clean-up of the extract was performed within the scope of the method, but did not eliminate enough of the background components to prevent dilution. The result(s) are flagged to indicate the matrix interference.

General Chemistry Analyses:

No significant anomalies were noted with this analysis.

Report Revision: Revised to remove page 7 of the initial report due duplicate reporting for some analytes. No data has been changed. All results are summarized in the Sample Results Section of this report.

Approved by _____ Date 11/17/17

This page has been Intentionally Left Blank

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:**R1708446

Project: Charles Gibson - Olin/1171

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1708446-001	US-1-090617	9/6/2017	1200
R1708446-002	MS-1-090617	9/6/2017	1215
R1708446-003	DS-1-090617	9/6/2017	1235

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM 46732

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: 1171
Project Manager: DAVID SHARPE	Report CC: Dmshare@Olin.com
Company/Address: OLIN CORP 3855 NORTH OCOEE ST SUITE 200 CLEVELAND TN 37312	
Phone #: 423 336 4989	Email: Dmshare@Olin.com
Sampler's Signature:	Sampler's Printed Name: CHRIS JONES

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE: 0

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 _____

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-1-090617		9/6/17	1200	SED	2				2				
MS-1-090617		↓	1215	↓	1				1				
DS-1-090617		↓	1235	↓	1				1				
TEMP BLANK		—	—	—	1	—	—	—	—	—	—	—	PROVIDED BY LAB

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED: NY

TURNAROUND REQUIREMENTS
___ RUSH (SURCHARGES APPLY)
___ 1 day ___ 2 day ___ 3 day
___ 4 day ___ 5 day
STANDARD
REQUESTED REPORT DATE: _____

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 # REIW 0005
BILL TO: OLIN

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
	UPS COURIER				
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: CHRIS JONES	Printed Name	Printed Name	Printed Name: Gregory O. Emerton	Printed Name	
Firm: SES	Firm	Firm	Firm: ALS	Firm	
Date/Time: 9/7/17 1500	Date/Time	Date/Time	Date/Time: 9-8-17 09:50	Date/Time	

R1708446 5
Olin Corporation
Charles Gibson - Olin

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

© 2012 by ALS Group

Cooler Receipt and Preservation Check Form

R1708446 5
Olin Corporation
Charles Gibson - Olin

Project/Client _____ Folder Number _____

Cooler received on 9-8-17 by: KE 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: 9-8-17 Time: 10:03 ID: IR#7 (IR#8) From: (Temp Blank) Sample Bottle

Observed Temp (°C)	3.4						
Correction Factor (°C)	+0.9						
Corrected Temp (°C)	4.3						
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 Same Day Rule

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

All samples held in storage location: R002 by KE on 9-8-17 at 16:09
5035 samples placed in storage location: _____ by _____ on _____ at _____

Cooler Breakdown: Date: 9/9/17 Time: 0945 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 Canisters Pressurized Tedlar® Bags Inflated (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
Residual Chlorine (-)		For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
		$Na_2S_2O_3$	-	-						
		ZnAcetate	-	-						
		HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Bottle lot numbers: 061017-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: JMJ 9/11/17 *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:** R1708446
Project: Charles Gibson - Olin/1171

Bottle ID	Methods	Date	Time	Sample Location / User	Disposed On
R1708446-001.01					
	8081B,ALS SOP				
		9/9/2017	0949	R-002 / DWARD	
		9/9/2017	0949	SMO / DWARD	
R1708446-001.02					
		9/9/2017	0949	R-002 / DWARD	
		9/9/2017	0949	SMO / DWARD	
		9/14/2017	0640	In Lab / DMURPHY	
		9/14/2017	0925	R-002 / NBRADY	
		9/19/2017	1245	In Lab / KWONG	
		9/19/2017	1408	R-002 / KWONG	
R1708446-002.01					
	ALS SOP,8081B				
		9/9/2017	0949	R-002 / DWARD	
		9/9/2017	0949	SMO / DWARD	
		9/14/2017	0640	In Lab / DMURPHY	
		9/14/2017	0925	R-002 / NBRADY	
		9/14/2017	1135	In Lab / KMENGS	
		9/14/2017	1327	R-002 / NBRADY	
		9/19/2017	1245	In Lab / KWONG	
		9/19/2017	1408	R-002 / KWONG	
R1708446-003.01					
	ALS SOP,8081B				
		9/9/2017	0949	R-002 / DWARD	
		9/9/2017	0949	SMO / DWARD	
		9/14/2017	0640	In Lab / DMURPHY	
		9/14/2017	0925	R-002 / NBRADY	
		9/14/2017	1135	In Lab / KMENGS	
		9/14/2017	1327	R-002 / NBRADY	
		9/19/2017	1245	In Lab / KWONG	
		9/19/2017	1408	R-002 / KWONG	

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

ALS Environmental

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% (25% for CLP) 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	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[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 http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

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:** R1708446
Project: Charles Gibson - Olin/1171

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
ALS SOP	Soil	Total Solids

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171		

Sample Name:	US-1-090617	**Date Collected:**	09/6/17
Lab Code:	R1708446-001	**Date Received:**	09/8/17
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8081B	NBRADY	MPEDRO
ALS SOP		KWONG

Sample Name:	MS-1-090617	**Date Collected:**	09/6/17
Lab Code:	R1708446-002	**Date Received:**	09/8/17
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8081B	NBRADY	MPEDRO
ALS SOP		KWONG

Sample Name:	DS-1-090617	**Date Collected:**	09/6/17
Lab Code:	R1708446-003	**Date Received:**	09/8/17
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
8081B	NBRADY	MPEDRO
ALS SOP		KWONG

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.

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

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:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:00
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	US-1-090617	**Units:**	ug/Kg
Lab Code:	R1708446-001	**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	**200**	51	5	09/18/17 12:02	9/14/17	
beta-BHC	**190**	51	5	09/18/17 12:02	9/14/17	
delta-BHC	ND U	51	5	09/18/17 12:02	9/14/17	
gamma-BHC (Lindane)	ND U	51	5	09/18/17 12:02	9/14/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	64	10 - 122	09/18/17 12:02	
Tetrachloro-m-xylene	70	10 - 123	09/18/17 12:02	

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:15
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	MS-1-090617	**Units:**	ug/Kg
Lab Code:	R1708446-002	**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	97	5	09/18/17 12:19	9/14/17	
beta-BHC	**190**	97	5	09/18/17 12:19	9/14/17	
delta-BHC	ND U	97	5	09/18/17 12:19	9/14/17	
gamma-BHC (Lindane)	ND U	97	5	09/18/17 12:19	9/14/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	78	10 - 122	09/18/17 12:19	
Tetrachloro-m-xylene	88	10 - 123	09/18/17 12:19	

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:35
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	DS-1-090617	**Units:**	ug/Kg
Lab Code:	R1708446-003	**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	69	5	09/18/17 12:37	9/14/17	
beta-BHC	87	69	5	09/18/17 12:37	9/14/17	
delta-BHC	ND U	69	5	09/18/17 12:37	9/14/17	
gamma-BHC (Lindane)	ND U	69	5	09/18/17 12:37	9/14/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	60	10 - 122	09/18/17 12:37	
Tetrachloro-m-xylene	62	10 - 123	09/18/17 12:37	

ALS Environmental

General Chemistry

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

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:00
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	US-1-090617	**Basis:**	As Received
Lab Code:	R1708446-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**16.7**	Percent	-	1	09/19/17 11:26	

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:15
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	MS-1-090617	**Basis:**	As Received
Lab Code:	R1708446-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**8.73**	Percent	-	1	09/19/17 11:26	

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:35
Sample Matrix:	Soil	**Date Received:**	09/08/17 09:50
Sample Name:	DS-1-090617	**Basis:**	As Received
Lab Code:	R1708446-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**12.3**	Percent	-	1	09/19/17 11:26	

QC Summary 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

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:** R1708446
Project: Charles Gibson - Olin/1171
Sample Matrix: Soil

SURROGATE RECOVERY SUMMARY
Organochlorine Pesticides by Gas Chromatography

Analysis Method: 8081B
Extraction Method: EPA 3541

Sample Name	Lab Code	Decachlorobiphenyl 10 - 122	Tetrachloro-m-xylene 10 - 123
US-1-090617	R1708446-001	64	70
MS-1-090617	R1708446-002	78	88
DS-1-090617	R1708446-003	60	62
Method Blank	RQ1709068-01	77	70
Lab Control Sample	RQ1709068-02	66	63
Duplicate Lab Control Sample	RQ1709068-03	74	74

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Analyzed:**	09/18/17 12:54
Sample Matrix:	Soil	**Date Extracted:**	09/14/17

Method Blank Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Method Blank	**Instrument ID:**	R-GC-63
Lab Code:	RQ1709068-01	**File ID:**	I:\ACQUDATA\7890N.net\data\091817\ab928.D\
Analysis Method:	8081B	**Analysis Lot:**	562146
Prep Method:	EPA 3541	**Extraction Lot:**	297645

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
US-1-090617	R1708446-001	I:\ACQUDATA\7890N.net\data\091817\ab925.D\	09/18/17 12:02
MS-1-090617	R1708446-002	I:\ACQUDATA\7890N.net\data\091817\ab926.D\	09/18/17 12:19
DS-1-090617	R1708446-003	I:\ACQUDATA\7890N.net\data\091817\ab927.D\	09/18/17 12:37
Lab Control Sample	RQ1709068-02	I:\ACQUDATA\7890N.net\data\091817\ab929.D\	09/18/17 13:12
Duplicate Lab Control Sample	RQ1709068-03	I:\ACQUDATA\7890N.net\data\091817\ab930.D\	09/18/17 13:29

Analytical Report

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1709068-01	**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	1.7	1	09/18/17 12:54	9/14/17	
beta-BHC	ND U	1.7	1	09/18/17 12:54	9/14/17	
delta-BHC	ND U	1.7	1	09/18/17 12:54	9/14/17	
gamma-BHC (Lindane)	ND U	1.7	1	09/18/17 12:54	9/14/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	77	10 - 122	09/18/17 12:54	
Tetrachloro-m-xylene	70	10 - 123	09/18/17 12:54	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Analyzed:**	09/18/17 13:12
Sample Matrix:	Soil	**Date Extracted:**	09/14/17

Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name:	Lab Control Sample	**Instrument ID:**	R-GC-63
Lab Code:	RQ1709068-02	**File ID:**	I:\ACQUDATA\7890N.net\data\091817\ab929.D\
Analysis Method:	8081B	**Analysis Lot:**	562146
Prep Method:	EPA 3541	**Extraction Lot:**	297645

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
US-1-090617	R1708446-001	I:\ACQUDATA\7890N.net\data\091817\ab925.D\	09/18/17 12:02
MS-1-090617	R1708446-002	I:\ACQUDATA\7890N.net\data\091817\ab926.D\	09/18/17 12:19
DS-1-090617	R1708446-003	I:\ACQUDATA\7890N.net\data\091817\ab927.D\	09/18/17 12:37
Method Blank	RQ1709068-01	I:\ACQUDATA\7890N.net\data\091817\ab928.D\	09/18/17 12:54
Duplicate Lab Control Sample	RQ1709068-03	I:\ACQUDATA\7890N.net\data\091817\ab930.D\	09/18/17 13:29

Client: Olin Corporation
Project: Charles Gibson - Olin/1171
Sample Matrix: Soil

Service Request: R1708446
Date Analyzed: 09/18/17

Duplicate Lab Control Sample Summary
Organochlorine Pesticides by Gas Chromatography

Units:ug/Kg
Basis: Dry

		Lab Control Sample RQ1709068-02			Duplicate Lab Control Sample RQ1709068-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
alpha-BHC	8081B	4.95	6.66	74	5.66	6.66	85	19-126	14	30
beta-BHC	8081B	5.05	6.66	76	5.47	6.66	82	28-123	8	30
delta-BHC	8081B	5.10	6.66	77	5.64	6.66	85	17-126	10	30
gamma-BHC (Lindane)	8081B	5.16	6.66	78	5.94	6.66	89	23-125	14	30

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:00
SRM Matrix:	Soil	**Date Received:**	9/8/17
Sample Name:	US-1-090617		
Lab Code:	R1708446-001	**Units:**	ug/Kg
		Basis:	Dry
		Percent Solids:	16.7

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3541

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	51	200	210	5		5	09/18/17 12:02
beta-BHC	51	190	220	15		5	09/18/17 12:02

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:15
SRM Matrix:	Soil	**Date Received:**	9/8/17
Sample Name:	MS-1-090617		
Lab Code:	R1708446-002	**Units:**	ug/Kg
		Basis:	Dry
		Percent Solids:	8.73

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3541

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
beta-BHC	97	190	220	15		5	09/18/17 12:19

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	09/06/17 12:35
SRM Matrix:	Soil	**Date Received:**	9/8/17
Sample Name:	DS-1-090617		
Lab Code:	R1708446-003	**Units:**	ug/Kg
		Basis:	Dry
		Percent Solids:	12.3

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3541

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
beta-BHC	69	87	100	14		5	09/18/17 12:37

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client: Olin Corporation
Project: Charles Gibson - Olin/1171
SRM Matrix: Soil

Service Request: R1708446
Date Collected: NA

Sample Name: Lab Control Sample
Lab Code: RQ1709068-02

Units: ug/Kg
Basis: Dry

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3541

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	1.7	4.95	5.25	6		1	09/18/17 13:12
beta-BHC	1.7	5.05	5.62	11		1	09/18/17 13:12
delta-BHC	1.7	5.10	5.76	12		1	09/18/17 13:12
gamma-BHC (Lindane)	1.7	5.16	5.29	2		1	09/18/17 13:12

ALS Group USA, Corp.
dba ALS Environmental

Confirmation Results

Client:	Olin Corporation	**Service Request:**	R1708446
Project:	Charles Gibson - Olin/1171	**Date Collected:**	NA
SRM Matrix:	Soil		
Sample Name:	Duplicate Lab Control Sample		
Lab Code:	RQ1709068-03	**Units:**	ug/Kg
		Basis:	Dry

Organochlorine Pesticides by Gas Chromatography

Analytical Method: 8081B
Prep Method: EPA 3541

Analyte Name	MRL	Primary Result	Confirmation Result	RPD	Q	Dilution Factor	Date Analyzed
alpha-BHC	1.7	5.66	6.01	6		1	09/18/17 13:29
beta-BHC	1.7	5.47	6.26	13		1	09/18/17 13:29
delta-BHC	1.7	5.64	6.38	12		1	09/18/17 13:29
gamma-BHC (Lindane)	1.7	5.94	5.98	<1		1	09/18/17 13:29