

# **Alternate Source Demonstration for Lithium**

# CCR Surface Impoundment System James DeYoung Power Plant Holland Board of Public Works

Holland, Michigan

January 28, 2021

NTH Project No. 73-160017-06





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in Samples of Coal and Bottom Ash



### 1.0 INTRODUCTION

The Holland Board of Public Works (BPW) owns and operated the James DeYoung Power Plant (JDY or the plant) located in Holland, Michigan; on the eastern end of Lake Macatawa. JDY was initially built in 1939 with a generating capacity of 15 megawatts (MW). Between 1953 and 1968, three new boilers were added. From the late 1970's to the early 2000's, the plant consisted of three coal-fired boilers capable of producing up to 62.5 MW. On May 20, 2016, BPW discontinued the use of Unit 3; and on June 1, 2017, BPW officially shut down and retired all generation units at JDY. When Units 3 - 5 were operating on coal, bottom ash from these boiler units was sluiced to the first of three surface impoundments located to the south of the plant, as shown on **Figure 1, in Appendix A**. These surface impoundments were operated in accordance with NPDES permit No. MI0001473 and became subject to 40 CFR Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments upon promulgation on April 17, 2015. In June 2016, BPW initiated removal of CCR material from the CCR units and final closure of the CCR units was completed in May 2018. The site restoration activities were concluded in June 2018.

This Alternate Source Demonstration (ASD) has been prepared for the facility to show that lithium concentrations reported at one isolated monitoring well above the groundwater protection standards (GWPS), are the result of migration unto the property from an off-site source. As such, the facility has achieved clean closure and no additional groundwater monitoring activities are merited.

### 2.0 GROUNDWATER MONITORING PROGRAM

## 2.1 Background

Prior to promulgation of 40 CFR Part 257 and during 2009 and 2010, a limited hydrogeological investigation work plan was developed for the site that established a groundwater detection monitoring program to address the requirements of Michigan Administrative Code R 323.2237(4) of Michigan's Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (Act 451). The work plan pre-dated the final federal CCR rules and had the purpose of satisfying a request by Michigan Department of Environmental Quality, now known as Department of Environment, Great Lakes and Energy (EGLE), to determine whether the presence of bottom ash lagoons (CCR units) may have affected groundwater quality in the surrounding area. The results of this investigation were inconclusive and



additional investigative activities were implemented between 2011 and 2015 according to the agency approved hydrogeologic workplans and NPDES permit requirements.

In October 2015, BPW completed a three-year investigation that included collection of groundwater elevation data and samples for the analysis of a subset of metals on a quarterly basis. The results of the investigation identified that certain metals were present in the groundwater above U.S. EPA's Safe Drinking Water Act's maximum contaminant level (MCL) established in 40 CFR §141.62 and showed that the groundwater quality in the surrounding area may have been affected by the historic use of the CCR units.

Based on the findings of the investigation, anticipated retirement of the plant, and future requirements of 40 CFR Part 257, Subpart D, BPW decided to close the CCR units through removal of CCR and decontamination of the CCR units, in accordance with 40 CFR §257.102. However, a formal detection monitoring program consistent with CCR rules was not conducted prior to closure.

BPW initiated closure of the CCR units through removal of CCR material in June 2017. During excavation of CCR materials, three of the existing monitoring wells installed in proximity to the CCR units as part of the previously conducted investigation activities were removed due to their location within the area where CCR residuals were being removed. Consequently, installation of a new monitoring network was necessary.

Removal of CCR residuals and final closure of the CCR units was completed in May 2018. The site restoration activities were completed in June 2018 in substantial conformance with 40 CFR §257.101, 40 CFR §257.103, and the written closure plan prepared by NTH Consultants, Ltd., (NTH) dated October 17, 2016.

## 2.2 CCR Groundwater Monitoring System

Consistent with the requirements contained in 40 CFR §257.93, a Groundwater Sampling and Analysis Plan (SAP) was developed in October 2017 that described the methods to be used in evaluating background and downgradient groundwater quality within the JDY plant property (Site). The SAP was developed to document the procedures to be used when collecting the necessary information to comply with detection monitoring requirements of 40 CFR §257.94, assessment monitoring requirements of 40 CFR §257.95, and clean closure verification per 40 CFR §257.102(c). To comply with the requirements



contained in 40 CFR §257.91, NTH designed the groundwater monitoring system considered representative of groundwater affected by the CCR units.

A review of information regarding the hydrogeologic conditions of the site available at the time that the SAP was developed indicated that groundwater generally flows east-to-west across the site and discharges to Lake Macatawa. Based on this information, an existing piezometer (PZ-1) was located hydraulically upgradient of the former CCR bottom ash lagoons. Monitoring well PZ-1 was previously identified and sampled as monitoring well MW-7, and groundwater samples from this well were used to represent background groundwater quality that has not been affected by the CCR units. Three additional wells, MW-1, MW-2, and MW-3 were installed downgradient of the CCR units on November 27, 2017 at the facility boundary in the direction of potential contaminant migration. **Figure 2, in Appendix A**, provides the location of the monitoring wells comprising the groundwater monitoring system. Water level data obtained from the monitoring wells during the quarterly events were used to develop groundwater contour maps. The contour maps were consistent from one sampling event to the next and confirm groundwater flow direction.

As part of the monitoring program, NTH collected groundwater samples from the monitoring system on a quarterly basis during eight quarterly events during the period from January of 2018 to March 2020. Appendix III parameters (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids [TDS]) were analyzed to satisfy the requirements of the detection monitoring program contained in 40 CFR \$257.94 given that a formal detection monitoring program was not completed at the site prior to the implementation of closure through removal of CCR. It should be noted that according to existing 40 CFR Part 257 CCR regulations, Appendix III constituents are not evaluated as part of the requirements for clean closure.

The groundwater samples were also analyzed for constituents listed in Appendix IV to 40 CFR Part 257, Subpart D. The data collected was evaluated as part of the assessment monitoring program and to verify clean closure as specified in 40 CFR §257.102(c). Specifically, data collected during these eight events was utilized to determine whether background concentrations of certain constituents were above the GWPS, as established in 40 CFR §257.95(h).

In July 2020, BPW installed two temporary wells (TW-1 and TW-2) on the plant's southern property line, in the vicinity of monitoring well MW-1, to evaluate the concentration gradient of lithium in groundwater



at the site and determine whether groundwater might be impacted by off-site sources. Additionally, BPW installed a monitoring well (identified as MW-3A) between the previous waste boundary and monitoring well MW-3, in the vicinity of the previous ash ponds. Groundwater samples collected from the temporary wells and MW-3A in July 2020 were analyzed for lithium.

Groundwater samples were also collected in August and November 2020 from the existing monitoring well network, including newly installed monitoring well MW-3A, and analyzed for the Appendix III and Appendix IV parameter list. In addition to the existing monitoring network for the site, samples were also collected from previously utilized monitoring well MW-4, located on the southeast portion of the site (bordered by a scrap metal recycling facility), during the most recent five quarterly events, and analyzed for the Appendix III and Appendix IV parameters. Data collected from this well will aid in understanding the potential source of lithium concentrations in groundwater at the site.

## 2.3 Groundwater Evaluation

To verify clean closure, the analytical data from the eight background samples were analyzed for the Appendix IV constituents and compared to the applicable GWPS. The GWPS for each constituent contained in Appendix IV was established in accordance with 40 CFR §257.95(h). For constituents for which the background level is higher than the levels identified in 40 CFR §257.95(h)(1) and (h)(2), the statistically derived background concentration effectively becomes the GWPS. For all other constituents, the GWPS is the established MCL per 40 CFR §257.95(h)(1) or the value outlined in 40 CFR §257.95(h)(2).

For those Appendix IV constituents where the statistically developed background level was higher than the MCL, the GWPS was determined to be the statistically developed background concentration utilizing the data collected from monitoring well PZ-1. Background concentrations for each constituent were calculated using an appropriate statistical method based on the distribution of the background data, consistent with 40 CFR §257.93. The result of these evaluations was presented in the October 2020 Groundwater Detection Monitoring and Assessment Report (October 2020 Report).



### 3.0 DATA REVIEW

As discussed previously, results of investigative activities conducted prior to the effective date of the CCR rules concluded that the groundwater quality in the surrounding area may have been affected by the historic use of the CCR units. Based on the findings of this investigation, BPW initiated an assessment of corrective measures, in substantial conformance with 40 CFR §257.96. Based on this assessment, BPW decided to close the CCR units through removal of CCR and decontamination of the CCR units, in accordance with 40 CFR §257.102. The data collected during the eight quarterly events for constituents listed in Appendix IV to 40 CFR §257.95 was evaluated as part of the assessment monitoring program to verify clean closure as specified in 40 CFR §257.102(c).

Pursuant to 40 CFR §257.102(c), closure is achieved when affected areas are decontaminated and groundwater monitoring concentrations do not exceed a GWPS established pursuant to 40 CFR §257.95(h) for constituents listed in Appendix IV to Part 257, Subpart D. According to 40 CFR 257(h)(3), for constituents where the background level is higher than the levels identified in 40 CFR §257.95(h)(1) and (h)(2), the statistically derived background concentration is the GWPS.

As presented in the October 2020 Report, the analytical data for Appendix IV constituents in the downgradient wells MW-1, MW-2 and MW-3 indicate that, in general, the concentrations were reported as non-detect and/or below the reporting limit for each constituent. Constituents reported above the laboratory reporting limit were compared to the GWPS established in 40 CFR §257.95 (h)(1), or the statistically developed GWPS developed in accordance with 40 CFR §257.91. As indicated in the October 2020 Report, groundwater monitoring concentrations do not exceed the established GWPS for constituents listed in Appendix IV of the rules, except for Lithium in monitoring well MW-1. The GWPS exceedance of Lithium in monitoring well MW-1 is believed to be the result of on-site migration from an adjacent property and BPW proceeded with additional investigative activities to determine whether this was the case and assist in a demonstration for clean closure. Per 40 CFR §257.95 (g)(3)(ii), if an Appendix IV constituent is detected above the GWPS, the facility may demonstrate that a source other than the CCR units caused the exceedance. Once clean closure is achieved, the facility is exempt from further groundwater monitoring and other post-closure requirements as stated in the Preamble to 40 CFR Part 257 and 40 CFR §257.104(2).



### 4.0 ALTERNATE SOURCE DEMONSTRATION

The findings of the additional investigative activities, and the additional activities conducted at the site, support BPW's conclusion of an on-site migration from an adjacent property, as demonstrated by the following lines of evidence.

## 4.1 Line of Evidence No. 1 – Concentration Gradient

As discussed in the previous section, in July 2020, two monitoring wells were installed in the vicinity of MW-1. Temporary well TW-1 was installed approximately 50 ft east of MW-1 and temporary well TW-2 was installed approximately 100 ft west of MW-1, on the plant's southern property line, which is bordered by a scrap metal recycling facility. What appear to be storm water retention ponds on the adjacent property are located on the opposite side of the fence in the southwest corner of the plant's property, (see photos 3 and 4 in the attached photo log). Monitoring well MW-3A was also installed at a location between the previous waste boundary and monitoring well MW-3, in the vicinity of the previous ash ponds. Figure 2 in Appendix A presents the well locations. Groundwater samples collected during the July 2020 well installation were analyzed for total dissolved solids (TDS), and total and dissolved lithium. The laboratory results, corresponding analytical methods, and practical quantitation limits (PQL) for each constituent are provided in the analytical report from ALS Environmental Laboratory included in Appendix B.

A review of the data collected during the July 2020 installation event indicates that lithium in TW-1 and TW-2 was reported at 0.042 mg/L and 0.059 mg/L, respectively; whereas the concentration at MW-3A was reported as non-detect and below the reporting of 0.01 mg/L. Given that MW-3A is located at the boundary of the previous CCR ponds, and upgradient of MW-1 and the temporary wells, it would be expected that the concentrations of lithium at MW-3A would be higher than that of MW-1 (0.11 mg/L to 0.16 mg/L) and the temporary wells if the CCR units were the source of lithium in groundwater, which is not the case.

Furthermore, monitoring well MW-4, located side-gradient to the CCR units, reported lithium concentrations ranging from 0.016 mg/L to 0.035 mg/L, similar to the concentrations reported in MW-1 and the temporary wells. **Figure 3, in Appendix A** shows the lithium concentrations reported at the wells monitored. Historical lithium concentrations in all the wells is provided on



the graph in Figure 3A and shows that MW-1 and MW-4, wells located on the southern property boundary, adjacent to a scrap metal facility, have significantly higher concentrations of lithium than the other wells at the site. Figure 3B is a site map that illustrates the site's lithium concentration gradient. Note that Lithium was not detected at or above the laboratory PQL at MW-3A, which is located adjacent to the previous ash ponds. If the previous CCR units were the source of Lithium concentrations, it would be expected that the well located adjacent to the previous CCR ponds would show higher concentrations than the wells located further away, which is not the case at the site.

The information presented above supports the conclusion that lithium concentrations above the GWPS in MW-1 are likely attributed to on-site migration from the adjacent property. Further documentation is provided by site photos taken during the temporary well installation that documents run-off of wastewater and/or stormwater from the recycling facility onto the site. (see photos 1 to 4 in **Appendix C**).

## 4.2 Line of Evidence No. 2 – Concentrations in Ash and Coal

In September of 2016 and during closure activities, BPW collected coal and bottom ash samples for analytical evaluation, including total concentrations and Synthetic Precipitation Leaching Procedure (SPLP) leaching extraction. The samples were analyzed for metals, chloride, fluoride, and sulfate; the table in **Appendix D** includes a summary of the total and leachable concentrations of lithium.

A review of the data collected from the four representative coal samples collected at the DeYoung Plant site indicate that total lithium concentrations from coal samples were below the reporting limits (<0.8, <7.8, <9.8 and <9.8 mg/Kg), and leachable concentrations from coal samples were non-detect and <0.01 ug/L. Total concentrations reported for lithium in the ash samples were <10, <11, 13, and 25 mg/Kg, and leachable concentrations from the four ash samples analyzed were reported as <0.01, <0.01, 0.01 and 0.038 mg/L, which is significantly lower than the concentrations reported in MW-1. The table in Appendix C includes a summary of the total and leachable concentrations of lithium. Considering the higher concentrations that would be expected from the extraction procedure and the lower concentrations reported in the ash and coal, it is unlikely that the CCR units are the source of lithium concentrations in groundwater along the southern property line of the Plant.



## 4.3 Line of Evidence No. 3 - Known Lithium Use and Potential Lithium Source

As discussed previously, monitoring well MW-1 is located in the immediate vicinity of a scrap metal recycling facility and, as shown in the attached photographs, water run-off from the neighboring property has been identified migrating onto the site.

Lithium and lithium compounds have several industrial applications, including heat-resistant glass, lithium grease lubricants, and flux additives for iron, steel and aluminum production. Also, lubricating greases are commonly formulated as mixtures of an oil and a lithium soap. Some lithium greases resist moisture and are commonly used as lubricant in household products as well as in automotive applications.

It is likely that materials accepted at the scrap metal recycling facility for recycling (as stated on their website, www.padnos.com), including appliances, auto cores, auto bodies, circuit boards, electric motors, electronics, and e-waste, could be a source of lithium in the run-off unto the site and groundwater.

## 5.0 SUMMARY AND CONCLUSION

Removal of CCR residuals and final closure of the CCR units was completed in May 2018. The site restoration activities were completed in June 2018 in substantial conformance with 40 CFR §257.101 and 40 CFR §257.103, and the written closure plan prepared by NTH Consultants, Ltd., (NTH) dated October 17, 2016.

A Groundwater Sampling and Analysis Plan (SAP) was developed in October 2017 to evaluate background and downgradient groundwater quality within the JDY plant property. Consistent with the SAP, samples collected from the monitoring well network complied with detection monitoring requirements contained in 40 CFR §257.94, assessment monitoring requirements contained in 40 CFR §257.95, and clean closure verification contained in 40 CFR §257.102(c).

The data collected from eight quarterly sampling events was used to evaluate groundwater quality at the site and assist with the development of site specific GWPS, as was the case for arsenic. A review of the data indicated that all Appendix IV constituents were below the GWPS, except for lithium in MW-1.



Additional investigative activities were conducted in July of 2020 to support an alternate source demonstration for the elevated concentration of lithium in monitoring well MW-1. Data collected from MW-3A installed in the vicinity of the CCR units, and temporary wells TW-1 and TW-2 installed in the vicinity of MW-1, along with data from existing monitoring well MW-4, was used to evaluate the lithium concentration gradient at the site. Concentrations reported for lithium in MW-3A were confirmed during a quarterly sampling event conducted in August and November of 2020.

Based on the results of the information presented in this report, we offer the following conclusions:

- CCR material, the potential source of elevated lithium in groundwater at the facility, was removed as part of the corrective measure conducted by BPW.
- The concentrations reported for lithium in MW-1 were higher than the total lithium concentrations reported for coal and the leachable concentrations from coal ash at the site.
- Monitoring wells MW-1 and MW-4, located on the southern property boundary, adjacent to the scrap metal facility, have significantly higher concentrations of lithium than the other wells at the site.
- The highest concentrations of lithium at the facility were reported at monitoring well MW-1, the well located at the property boundary, closest to the recycling facility.
- The concentration gradient of lithium illustrates higher concentrations in the location of the southern portion of the property toward the monitoring well located in the vicinity of the previous ash ponds, and at the property boundary in the direction of groundwater flow.
- The information contained herein, consistent with 40 CFR §257.95 (g)(3)(ii), and the various lines of evidence presented above, provide a successful alternate source demonstration for lithium concentrations reported above the GWPS in monitoring well MW-1, and support the site's determination of clean closure.



• Clean closure of the JDY CCR units has been achieved and the facility is exempt from further groundwater monitoring and other post-closure requirements contained in the Preamble to 40 CFR Part 257 and 40 CFR §257.104(2).



# **APPENDIX A**

## **FIGURES**



NTH PROJECT No.:	CAD FILE NAME:
62-160017	160017-JDY
DESIGNED BY:	PLOT DATE:
SLG	9/28/2016
DRAWN BY:	DRAWING SCALE:
SLG	1" = 200'
CHECKED BY: DRL	9/7/2016

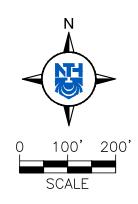


SITE LOCATION PLAN

JAMES DEYOUNG POWER PLANT HOLLAND, MI

FIGURE:

1



# LEGEND

MW-1 MONITORING WELL LOCATION

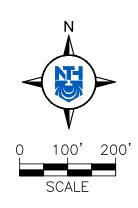
NEW MONITORING WELL LOCATION

PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)

NTH Consultants, Ltd MONITORING WELL LOCATION MAP JAMES DEYOUNG POWER PLANT HOLLAND, MICHIGAN

FIGURE:

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.



NTH Consultants, Ltd.

# **LEGEND**

MW-1 MONITORING WELL LOCATION

NEW MONITORING WELL LOCATION

™-1 TEMPORARY WELL LOCATION

PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)

APPROXIMATE LOCATION OF PREVIOUS CCR UNIT

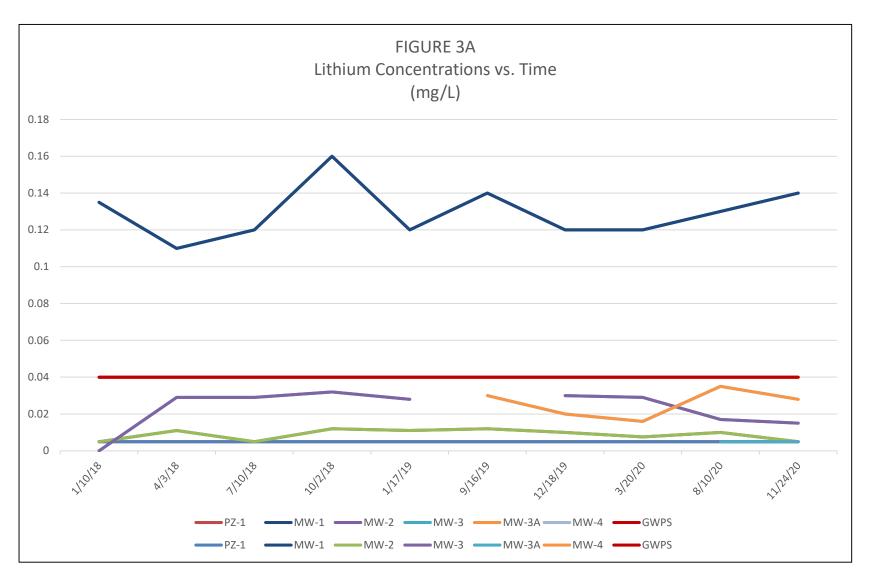
OF 0.04 MG/L

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.

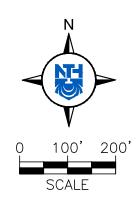
LITHIUM CONCENTRATION MAP
JAMES DEYOUNG POWER PLANT
HOLLAND, MICHIGAN

FIGURE:

3



MW-3 was not sample on September 2019 due to flooding



# **LEGEND**

MW-1 MONITORING WELL LOCATION

NEW MONITORING WELL LOCATION

PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)

[1.0] CONCENTRATION LI MG/L FROM 08/10/2020

CONTOUR OF EQUAL LI CONCENTRATION

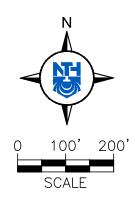
LITHIUM CONCENTRATION GRADIENT MAP 3RD QUARTER 2020 JAMES DEYOUNG POWER PLANT HOLLAND, MICHIGAN

**ЙТН Consultants, Ltd.** 

FIGURE:

3B

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.



# **LEGEND**

MW-1 MONITORING WELL LOCATION

NEW MONITORING WELL LOCATION

PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)

[1.0] CONCENTRATION LI MG/L FROM 11/24/2020

CONTOUR OF EQUAL LI CONCENTRATION

LITHIUM CONCENTRATION GRADIENT MAP 4TH QUARTER

FIGURE:

NTH Consultants, Ltd.

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.



# **APPENDIX B**

**LABORATORY ANALYTICAL RESULTS** 



## **APPENDIX B-1**

July 2020 Groundwater Data



23-Jul-2020

Karen Okonta NTH Consultants, Ltd. 41780 Six Mile Road Northville, MI 48168

Re: Holland Board of Public Works Work Order: 20070974

Dear Karen,

ALS Environmental received 3 samples on 15-Jul-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 12.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

### **Report of Laboratory Analysis**

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 23-Jul-20

Client: NTH Consultants, Ltd.

**Project:** Holland Board of Public Works

Work Order: 20070974

Lab Samp ID	Client Sample ID	<u>Matrix</u>	Tag Number	<b>Collection Date</b>	Date Received	Hold
20070974-01	TW-1	Groundwater		7/14/2020 13:28	7/15/2020 08:00	
20070974-02	TW-2	Groundwater		7/14/2020 14:29	7/15/2020 08:00	
20070974-03	MW-3A	Groundwater		7/14/2020 15:40	7/15/2020 08:00	

Date: 23-Jul-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Case Narrative

**Work Order:** 20070974

Samples for the above noted Work Order were received on 07/15/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

## Metals:

No other deviations or anomalies were noted.

## Wet Chemistry:

No other deviations or anomalies were noted.

Date: 23-Jul-20 ALS Group, USA

**Client:** NTH Consultants, Ltd. QUALIFIERS,

**Project:** Holland Board of Public Works **ACRONYMS, UNITS** 

20070974 WorkOrder:

#### Qualifier **Description** Value exceeds Regulatory Limit \*\* Estimated Value a Analyte is non-accredited B Analyte detected in the associated Method Blank above the Reporting Limit Е Value above quantitation range Н Analyzed outside of Holding Time Hr BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated. Analyte is present at an estimated concentration between the MDL and Report Limit J ND Not Detected at the Reporting Limit O Sample amount is > 4 times amount spiked Dual Column results percent difference > 40% R RPD above laboratory control limit S Spike Recovery outside laboratory control limits U Analyzed but not detected above the MDL X Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level. **Acronym** Description DUP Method Duplicate LCS Laboratory Control Sample LCSD Laboratory Control Sample Duplicate

LOD Limit of Detection (see MDL)

LOQ Limit of Quantitation (see PQL)

MBLK Method Blank

MDL Method Detection Limit

MS Matrix Spike

MSD Matrix Spike Duplicate

POL Practical Quantitation Limit

RPD Relative Percent Difference

TDL Target Detection Limit

TNTC Too Numerous To Count

APHA Standard Methods A

D **ASTM** 

Е **EPA** 

SW SW-846 Update III

#### **Units Reported** Description

Milligrams per Liter mg/L

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20070974

**Sample ID:** TW-1 **Lab ID:** 20070974-01

Collection Date: 7/14/2020 01:28 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 7/21/20 11:19	Analyst: <b>STP</b>
Lithium	0.042		0.010	mg/L	1	7/21/2020 10:13 PM
METALS BY ICP-MS (DISSOLVED)			SW602	0B		Analyst: STP
Lithium	0.039		0.010	mg/L	1	7/20/2020 08:00 PM
TOTAL SUSPENDED SOLIDS			A2540	D-11	Prep: FILTER 7/16/20 13:23	Analyst: <b>ERW</b>
Total Suspended Solids	121		4.00	mg/L	1	7/17/2020 12:24 PM

**Date:** 23-Jul-20

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20070974

**Sample ID:** TW-2 **Lab ID:** 20070974-02

Collection Date: 7/14/2020 02:29 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 7/21/20 11:19	Analyst: <b>STP</b>
Lithium	0.059		0.010	mg/L	1	7/21/2020 10:15 PM
METALS BY ICP-MS (DISSOLVED)			SW602	0B		Analyst: STP
Lithium	0.044		0.010	mg/L	1	7/20/2020 08:05 PM
TOTAL SUSPENDED SOLIDS			A2540	D-11	Prep: FILTER 7/16/20 13:23	Analyst: <b>ERW</b>
Total Suspended Solids	824		24.0	mg/L	1	7/17/2020 12:24 PM

**Date:** 23-Jul-20

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20070974

**Sample ID:** MW-3A **Lab ID:** 20070974-03

Collection Date: 7/14/2020 03:40 PM Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 7/21/20 11:19	Analyst: STP
Lithium	ND		0.010	mg/L	1	7/21/2020 10:17 PM
METALS BY ICP-MS (DISSOLVED)			SW602	0B		Analyst: STP
Lithium	ND		0.010	mg/L	1	7/20/2020 08:07 PM
TOTAL SUSPENDED SOLIDS			A2540	D-11	Prep: FILTER 7/16/20 13:23	Analyst: <b>ERW</b>
Total Suspended Solids	49.0		3.00	mg/L	1	7/17/2020 12:24 PM

**Date:** 23-Jul-20

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**Client:** 

Date: 23-Jul-20

NTH Consultants, Ltd.

QC BATCH REPORT

**Work Order:** 20070974

**Project:** Holland Board of Public Works

Batch ID: <b>159373</b>	Instrument ID ICPMS4	4		Method	: SW602	20B					
MBLK	Sample ID: MBLK-159373-	159373				Units: mg	/L	Analys	is Date: <b>7/2</b> 1	1/2020 09:	36 PM
Client ID:	F	Run ID: IC	PMS4	_200721A		SeqNo: 657	78764	Prep Date: 7/2	21/2020	DF: <b>1</b>	
Analyte	Res	sult f	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Lithium	ı	ND 0.	.010								
LCS	Sample ID: <b>LCS-159373-15</b>	9373				Units: mg	/L	Analys	is Date: <b>7/2</b> 1	1/2020 09:	37 PM
Client ID:	F	Run ID: IC	PMS4	_200721A		SeqNo: 657	SeqNo: <b>6578765</b> Prep Date: <b>7/21/2020</b>			DF: <b>1</b>	
Analyte	Res	sult f	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium	0.1	108 0.	.010	0.1		0 108	80-120		0		
MS	Sample ID: <b>20070808-02BN</b>	<b>IIS</b>				Units: mg	/L	Analys	is Date: <b>7/2</b> 1	1/2020 09:	42 PM
Client ID:	F	Run ID: IC	PMS4	_200721A		SeqNo: 657	8768	Prep Date: 7/2	21/2020	DF: <b>1</b>	
Analyte	Res	sult f	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium	0.10	0.01	.010	0.1	0.001	69 104	75-125		0		
MSD	Sample ID: <b>20070808-02BN</b>	<b>ISD</b>				Units: mg	/L	Analys	is Date: <b>7/2</b> 1	1/2020 09:	44 PM
Client ID:	F	Run ID: IC	PMS4	_200721A		SeqNo: 657	78769	Prep Date: 7/2	21/2020	DF: <b>1</b>	
Analyte	Res	sult f	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium	0.11	35 0.	.010	0.1	0.001	69 112	75-125	0.106	1 6.7	20	
The following sam	ples were analyzed in this ba	itch:	20	070974-01B	3 20	)070974-02E	20	070974-03B			

Client: NTH Consultants, Ltd.

**Work Order:** 20070974

**Project:** Holland Board of Public Works

QC BATCH REPORT

MBLK	Sample ID: MBLK-R29	3294A-R29	3294A			Units: mg/	'L	Analy	sis Date: <b>7/20</b>	)/2020 07:	59 PM
Client ID:		Run ID	: ICPMS3	_200720A		SeqNo: <b>657</b>	5834	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium		ND	0.010								
LCS	Sample ID: LCS-R2932	294A-R293	294A			Units: mg/	Ľ	Analy	sis Date: <b>7/20</b>	)/2020 07:	57 PM
Client ID:		Run ID	: ICPMS3	_200720A		SeqNo: <b>657</b>	5835	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium	(	0.09954	0.010	0.1		0 99.5	80-120		0		
MS	Sample ID: 20070974-0	)1CMS				Units: mg/	L	Analy	sis Date: <b>7/20</b>	)/2020 08:	02 PM
Client ID: TW-1		Run ID	: ICPMS3	_200720A		SeqNo: <b>657</b>	5731	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium		0.1469	0.010	0.1	0.0387	75 108	75-125		0		
MSD	Sample ID: 20070974-0	01CMSD				Units: mg/	L	Analy	sis Date: <b>7/20</b>	)/2020 08:	04 PN
Client ID: TW-1		Run ID	: ICPMS3	_200720A		SeqNo: <b>657</b>	5732	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Lithium		0.1465	0.010	0.1	0.0387	75 108	75-125	0.14	69 0.271	20	

Client: NTH Consultants, Ltd.

**Work Order:** 20070974

**Project:** Holland Board of Public Works

QC BATCH REPORT

Batch ID: <b>159187</b>	Instrument ID TSS	3		Method	d: <b>A2540</b>	D-11	l						
MBLK	Sample ID: MBLK-1591	87-159187	,			U	nits: <b>mg/</b>	L	Analysis	7/2020 12:	24 PM		
Client ID:		Run ID	TSS_20	0717B		Sec	qNo: <b>657</b> (	0530	Prep Date: 7/16	6/2020	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua	
Total Suspended So	lids	ND	0.60										
LCS	Sample ID: LCS-159187	7-159187				U	nits: <b>mg/</b>	L	Analysis	Date: <b>7/17</b>	7/2020 12:	24 PN	
Client ID:		Run ID	TSS_20	0717B		Sec	qNo: <b>657</b> (	0529	Prep Date: 7/16	6/2020	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua	
Total Suspended So	lids	101	6.0	100		0	101	70-113	0				
DUP	Sample ID: 20070066-1	3A DUP				U	nits: <b>mg/</b>	L	Analysis	Date: <b>7/17</b>	17/2020 12:24 PM		
Client ID:		Run ID	TSS_20	0717B		Sec	qNo: <b>657</b> (	0508	Prep Date: 7/16	5/2020	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua	
Total Suspended So	lids	152	4.8	0		0	0	0-0	151.2	0.528	10		
DUP	Sample ID: <b>20070974-0</b>	1A DUP				U	nits: <b>mg/</b>	L	Analysis	Date: <b>7/1</b> 7	7/2020 12:	24 PN	
Client ID: TW-1		Run ID	TSS_20	0717B		Sec	qNo: <b>657</b> (	0517	Prep Date: 7/16	5/2020	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua	
Total Suspended So	lids	118	4.0	0		0	0	0-0	121.3	2.79	10		
The following samp	oles were analyzed in this	s batch:	20	070974-01	A 20	0709	974-02A	20	070974-03A				



Preservative Key: 1-HCI

Cincinnati, OH +1 513 733 5336

Everett, WA

Fort Collins, CO +1 970 490 1511

Holland, Mi

# **Chain of Custody Form**

Page \_ of +1 281 530 5656 Middletown, PA

Houston, TX

Spring City, PA +1 610 948 4903 South Charleston, WV +1 304 356 3168

Salt Lake City, UT

York, PA

	<b>(</b> A	(LS)	*1 423 330 2	41 010 3	25 0010		(	coc ID: 27	2385	6		+1 /1	<i>,</i> 344 3	341	+1	001 200	7700	+	1 /1/ 50:	5 5280
								ALS Project						ALS	Work	Order	#: 2	00	700	97Y
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Col	mpany Name	NTH Consultant	s, t.td.	Bill To Com	pany	Hall	and Board	of Public Work	8	С	Diss	olved L	ithlum		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				**************************************	
Se	nd Report To	Karen Okonta		Invoice	Attn	Acc	ounts Paya	ble		D						**************************************				
	Address	41780 Six Mile F	Road	Ado	iress	625	hiastings	ennement græggeg frakert frakert frakert frakert fraker		E	A-8		////			A/		***************************************		
С	ity/State/Zip	Northville, MI 4	V188	City/State	e/Zip	Hall	and, Mi 49			G							and a commence of the adventure of the self-	À		
,,,	Phone	(248) 662-2668	***************************************	PI	hone	(616	) 355-1210			Н										
	Fax	(248) 324-5806	WAMAAAAAAA		Fax	,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			ı	***************************************									
e-l	Mail Address			e-Mail Add	iress				///	J		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							-//	
Vo.		Sample Descripti	on	Date	Т	ime	Matrix	Pres.	# Bottles	Α	В	С	D	E	F	G	Н	ı	J	Hold
1	TW-L			7-14-20	1:2	28	GW	<b>Ø</b> 4	3	X	X	X								
2	TW-2			7-14-20	2:		GW	84	3	X	X	X								
3	MW-3	A		7-14-20	3:4	10	GW	\$4	3	ナ	X	X								
4		110000000000000000000000000000000000000																		
5		**************************************				~//~														
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B	pler(s) Please P		Stachkuni		2-0F	<u>P</u>	Re	equired Turnard		] 5 W*	Days		ver VK Days		24 Hour	- 1	lesults l	Due Da	ite:	
.,,,,,,,,,,,,	quished by:		Date:	Time:		ved by:				Notes:										
	nquished by: led by (Laboratory	<u> </u>	Date: / J	Time:		1/2	aboratory):	14		Cod	oler ID	1.	er Temp		Love	H Std C	k One B	***************************************	TER	P CheckList P Leval IV
	<i>P</i>	271	Pate: 7(5/2)	9153	and the same	- ,		(2	ノ	<b> </b>			n I	<b>-  </b>	Lave	I IV SVVS	846/CLP	1.54 8.4 0.5.6	TI IKK	r Leveliv

4-NaOH

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

6-NaHSO<sub>4</sub> 7-Other

8-4°C

9-5035

3-H<sub>2</sub>SO<sub>4</sub>

2-HNO<sub>3</sub>

Other

DH1.

Client Name: NTH - NORTHVILLE

## Sample Receipt Checklist

Date/Time Received:

15-Jul-20 08:00

Work Order: 200	<u> </u>				Received b	y: <u>MJ</u>	<u>G</u>		
Checklist completed	<sub>d by</sub> Matthew Gaylor	rd	15-Jul-20		Reviewed by:	Chad Whe	lton		15-Jul-20
	eSignature		Date			eSignature			Date
	<u>Groundwater</u> <u>Hient</u>								
Shipping container/o	cooler in good condition?		Yes	✓	No 🗌	Not Present			
Custody seals intact	t on shipping container/coole	r?	Yes		No 🗌	Not Present	<b>✓</b>		
Custody seals intact	t on sample bottles?		Yes		No 🗌	Not Present	$\checkmark$		
Chain of custody pre	esent?		Yes	<b>✓</b>	No 🗌				
Chain of custody sig	gned when relinquished and r	eceived?	Yes	<b>✓</b>	No 🗌				
Chain of custody ag	rees with sample labels?		Yes	<b>✓</b>	No 🗌				
Samples in proper c	container/bottle?		Yes	<b>✓</b>	No 🗌				
Sample containers i	intact?		Yes	<b>✓</b>	No 🗌				
Sufficient sample vo	olume for indicated test?		Yes	<b>✓</b>	No 🗌				
All samples received	d within holding time?		Yes	<b>✓</b>	No 🗌				
Container/Temp Bla	ank temperature in complianc	e?	Yes	<b>✓</b>	No 🗌				
Sample(s) received	on ice?		Yes	<b>~</b>	No 🗌				
Temperature(s)/The	ermometer(s):		4.6/4.6	<u>iC</u>		<u>SR1</u>			
Cooler(s)/Kit(s):									
Date/Time sample(s Water - VOA vials h	s) sent to storage: ave zero headspace?		7/15/20 Yes	J20 9	9:55:59 AM No	No VOA vials sub	mitted	<b>✓</b>	
Water - pH acceptat			Yes	<b>✓</b>	No 🗌	N/A			
pH adjusted?			Yes		No 🗸	N/A			
pH adjusted by:			_						
Login Notes:									
Client Contacted:		Date Contacted:			Person	Contacted:			
Contacted By:		Regarding:							
Comments:									
CorrectiveAction:									
	i e								



## **APPENDIX B-2**

**August 2020 Groundwater Data** 



04-Sep-2020

Karen Okonta NTH Consultants, Ltd. 41780 Six Mile Road Northville, MI 48168

Re: Holland Board of Public Works Work Order: 20080708

Dear Karen,

ALS Environmental received 8 samples on 11-Aug-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 40.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton Project Manager

### **Report of Laboratory Analysis**

Certificate No: MN 026-999-449

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

**Project:** Holland Board of Public Works

Work Order: 20080708

# **Work Order Sample Summary**

Lab Samp ID	Client Sample ID	<u>Matrix</u>	Tag Number	<b>Collection Date</b>	<b>Date Received</b>	Hold
20080708-01	MW-1	Groundwater		8/10/2020 15:06	8/11/2020 08:00	
20080708-02	MW-2	Groundwater		8/10/2020 13:51	8/11/2020 08:00	
20080708-03	MW-3	Groundwater		8/10/2020 12:38	8/11/2020 08:00	
20080708-04	MW-3A	Groundwater		8/10/2020 17:12	8/11/2020 08:00	
20080708-05	Field Blank	Groundwater		8/10/2020 16:07	8/11/2020 08:00	
20080708-06	Equipment Blank	Groundwater		8/10/2020 16:15	8/11/2020 08:00	
20080708-07	DUP-1 (Field DUP)	Groundwater		8/10/2020	8/11/2020 08:00	
20080708-08	PZ-1	Groundwater		8/10/2020 09:40	8/11/2020 08:00	

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Case Narrative

**Work Order:** 20080708

Samples for the above noted Work Order were received on 08/11/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

#### Metals:

Batch 162899, Method ICP\_6020\_W, Sample 20080708-02A MSD: The MSD recovery was outside of the control limit for Calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

#### Wet Chemistry:

Batch R295823, Method IC\_300.0\_WW, Sample 20080708-02B: The reporting limit for Sulfate is elevated due to dilution for high concentrations of non-target analytes.

Batch R295863, Method PH\_4500\_W, Sample LCS-R295863: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Radium analysis performed by ALS Fort Collins laboratory.

Qualifier	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
0	Sample amount is > 4 times amount spiked
Р	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U X	Analyzed but not detected above the MDL  Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or
Λ	reagent contamination at the observed level.
Acronym	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
<b>Units Reported</b>	<u>Description</u>
$^{\circ}\mathrm{C}$	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** MW-1 **Lab ID:** 20080708-01

Collection Date: 8/10/2020 03:06 PM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	<b>'0A</b>	Prep: SW7470 8/12/20 12:32	Analyst: <b>MAC</b>
Mercury	ND		0.00020	mg/L	1	8/12/2020 01:43 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Arsenic	0.024		0.0050	mg/L	1	8/20/2020 03:10 PM
Barium	0.26		0.0050	mg/L	1	8/20/2020 03:10 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:03 PM
Boron	1.6		0.020	mg/L	1	8/20/2020 03:10 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:10 PM
Calcium	86		0.50	mg/L	1	8/20/2020 03:10 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Lithium	0.13		0.010	mg/L	1	8/20/2020 03:10 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:10 PM
ANIONS BY ION CHROMATOGRAP	HY		E300.0			Analyst: <b>JDR</b>
Chloride	320		40	mg/L	40	8/11/2020 03:25 PM
Fluoride	1.1		0.10	mg/L	1	8/11/2020 01:10 PM
Sulfate	ND		1.0	mg/L	1	8/11/2020 01:10 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.96	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	930		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC as no		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** MW-2 **Lab ID:** 20080708-02

Collection Date: 8/10/2020 01:51 PM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	'0A	Prep: SW7470 8/12/20 12:32	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/12/2020 01:50 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Barium	0.21		0.0050	mg/L	1	8/20/2020 03:12 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:05 PM
Boron	0.77		0.020	mg/L	1	8/20/2020 03:12 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:12 PM
Calcium	75		0.50	mg/L	1	8/20/2020 03:12 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Lithium	0.010		0.010	mg/L	1	8/20/2020 03:12 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Thallium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
ANIONS BY ION CHROMATOGRAPI	HY		E300.0			Analyst: <b>JDR</b>
Chloride	680		80	mg/L	80	8/11/2020 04:22 PM
Fluoride	0.93		0.20	mg/L	2	8/11/2020 01:30 PM
Sulfate	ND		2.0	mg/L	2	8/11/2020 01:30 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.90	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	1,400		75	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC as no		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** MW-3 **Lab ID:** 20080708-03

Collection Date: 8/10/2020 12:38 PM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	<b>'0A</b>	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:52 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Barium	0.074		0.0050	mg/L	1	8/20/2020 03:17 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:14 PM
Boron	0.48		0.020	mg/L	1	8/20/2020 03:17 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:17 PM
Calcium	53		0.50	mg/L	1	8/20/2020 03:17 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Lithium	0.017		0.010	mg/L	1	8/20/2020 03:17 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:17 PM
ANIONS BY ION CHROMATOGRAPHY	•		E300.0			Analyst: <b>JDR</b>
Chloride	69		4.0	mg/L	4	8/11/2020 05:20 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 01:49 PM
Sulfate	41		8.0	mg/L	4	8/11/2020 05:20 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.78	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	410		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRACT as not		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** MW-3A **Lab ID:** 20080708-04

Collection Date: 8/10/2020 05:12 PM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:53 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Barium	0.25		0.0050	mg/L	1	8/20/2020 03:18 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:16 PM
Boron	0.63		0.020	mg/L	1	8/20/2020 03:18 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:18 PM
Calcium	130		0.50	mg/L	1	8/20/2020 03:18 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:18 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:18 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	110		16	mg/L	16	8/11/2020 05:58 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 02:08 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 02:08 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.87	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	610		50	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses Se	ee attached		SUBCO	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

Sample ID: Field Blank Lab ID: 20080708-05

Collection Date: 8/10/2020 04:07 PM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:55 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Barium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:17 PM
Boron	ND		0.020	mg/L	1	8/20/2020 03:20 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:20 PM
Calcium	ND		0.50	mg/L	1	8/20/2020 03:20 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:20 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:20 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	ND		1.0	mg/L	1	8/11/2020 12:32 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 12:32 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 12:32 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.51	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	ND		30	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses Section 1.1	ee attached		SUBC	ONTRAC as no		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

**Project:** Holland Board of Public Works **Work Order:** 20080708

Sample ID:Equipment BlankLab ID:20080708-06Collection Date:8/10/2020 04:15 PMMatrix:GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	'0A	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:57 PM
METALS BY ICP-MS			SW602	:0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Barium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
Boron	ND		0.020	mg/L	1	8/20/2020 03:26 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
Calcium	ND		0.50	mg/L	1	8/20/2020 03:26 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:26 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	ND		1.0	mg/L	1	8/11/2020 12:51 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 12:51 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 12:51 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.04	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.7	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	ND		30	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES			SUBC	ONTRAC	Т	Analyst: ALS
Subcontracted Analyses S	ee attached			as no		9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** DUP-1 (Field DUP) **Lab ID:** 20080708-07

Collection Date: 8/10/2020 Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	<b>'0A</b>	Prep: SW7470 8/13/20 13:00	Analyst: <b>MAC</b>
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:59 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Barium	0.25		0.0050	mg/L	1	8/20/2020 03:28 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
Boron	0.63		0.020	mg/L	1	8/20/2020 03:28 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
Calcium	130		0.50	mg/L	1	8/20/2020 03:28 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:28 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
ANIONS BY ION CHROMATOGRAP	HY		E300.0			Analyst: <b>JDR</b>
Chloride	110		16	mg/L	16	8/11/2020 06:17 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 02:27 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 02:27 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.90	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	580		50	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC as no		Analyst: <b>ALS</b> 9/4/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080708

**Sample ID:** PZ-1 **Lab ID:** 20080708-08

Collection Date: 8/10/2020 09:40 AM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 02:00 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 8/20/20 09:29	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Arsenic	0.044		0.0050	mg/L	1	8/20/2020 03:29 PM
Barium	0.057		0.0050	mg/L	1	8/20/2020 03:29 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
Boron	0.49		0.020	mg/L	1	8/20/2020 03:29 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
Calcium	33		0.50	mg/L	1	8/20/2020 03:29 PM
Chromium	0.014		0.0050	mg/L	1	8/20/2020 03:29 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Lead	0.051		0.0050	mg/L	1	8/20/2020 03:29 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:29 PM
Molybdenum	0.061		0.0050	mg/L	1	8/20/2020 03:29 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
ANIONS BY ION CHROMATOGRAP	HY		E300.0			Analyst: <b>JDR</b>
Chloride	140		16	mg/L	16	8/11/2020 06:36 PM
Fluoride	1.1		1.0	mg/L	1	8/11/2020 02:46 PM
Sulfate	2.1		2.0	mg/L	1	8/11/2020 02:46 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	8.54	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	21.0	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	1,600		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBCO	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 9/4/2020

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Date: 04-Sep-20 **QC BATCH REPORT** 

Batch ID: <b>161484</b>	Instrument ID <b>HG</b> 4	! 		Metho	d: <b>SW74</b> 7	70A					
MBLK	Sample ID: MBLK-1614	84-1614	84			Units:	mg/L	Analy	/sis Date: <b>8/1</b>	2/2020 01	:28 PN
Client ID:		Run I	D: <b>HG4_2</b>	00812A		SeqNo:	6630236	Prep Date: 8	/12/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%R	Contro EC Limit		%RPD	RPD Limit	Qua
Mercury		ND	0.00020								
LCS	Sample ID: LCS-161484	-161484	,			Units:	mg/L	Analy	2/2020 01	:30 PN	
Client ID:		Run I	D: <b>HG4_2</b>	00812A		SeqNo:	6630237	Prep Date: 8	/12/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%R	Contro EC Limit		%RPD	RPD Limit	Qua
Mercury	0.0	02115	0.00020	0.002		0 10	06 80-12	0	0		
MS	Sample ID: <b>20080708-0</b> 2	2AMS				Units:	mg/L	Analy	/sis Date: <b>8/1</b>	2/2020 01	:51 PN
Client ID: MW-2		Run I	D: <b>HG4_2</b>	00812A		SeqNo:	6630249	Prep Date: 8	/12/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%R	Contro EC Limit		%RPD	RPD Limit	Qua
Mercury	0.	00207	0.00020	0.002	0.00000	15 10	03 75-12	5	0		
MSD	Sample ID: <b>20080708-0</b> 2	2AMSD				Units:	mg/L	Analy	/sis Date: <b>8/1</b>	2/2020 01	:53 PN
Client ID: MW-2		Run I	D: <b>HG4_2</b>	00812A		SeqNo:	6630250	Prep Date: 8	/12/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%R	Contro EC Limit		%RPD	RPD Limit	Qua
		02085	0.00020	0.002	0.00000	4.5	04 75-12	5 0.002	07 0.722	20	

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: <b>161552</b>	Instrument ID <b>HG4</b>		Method	d: SW747	'0A					
MBLK	Sample ID: <b>MBLK-161552-1615</b>	552			Units: mg/	L	Analysi	s Date: <b>8/13</b>	3/2020 01:	46 PM
Client ID:	Run	ID: <b>HG4_2</b>	00813A		SeqNo: <b>663</b> 4	4238	Prep Date: 8/1	3/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								
LCS	Sample ID: <b>LCS-161552-16155</b>	2			Units: mg/	L	Analysi	s Date: <b>8/13</b>	3/2020 01:	48 PM
Client ID:	Run	ID: <b>HG4_2</b>	00813A		SeqNo: <b>663</b> 4	4239	Prep Date: 8/1	3/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00207	0.00020	0.002		0 104	80-120	C	1		
MS	Sample ID: <b>20080781-03BMS</b>				Units: mg/	L	Analysi	s Date: <b>8/13</b>	3/2020 02:	22 PM
Client ID:	Run	ID: <b>HG4_2</b>	00813A		SeqNo: <b>663</b> 4	4258	Prep Date: 8/1	3/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.003885	0.00020	0.002	0.00175	55 106	75-125	C	)		
MSD	Sample ID: <b>20080781-03BMSD</b>				Units: mg/	L	Analysi	s Date: <b>8/13</b>	3/2020 02:	23 PM
Client ID:	Run	ID: <b>HG4_2</b>	00813A		SeqNo: <b>663</b> 4	4259	Prep Date: 8/1	3/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00387	0.00020	0.002	0.00175	55 106	75-125	0.003885	0.387	20	
The following sam	ples were analyzed in this batch:		0080708-03 <i>F</i> 0080708-06 <i>F</i>		080708-04A 080708-07A		080708-05A 080708-08A			

**Work Order:** 20080708

**Project:** Holland Board of Public Works

MBLK	Sample ID: MBLK-162899-16289	9			U	nits: <b>mg</b> /l	L	Analysis Date: 8/20/2020 03:07 PM				
Client ID:	Run II	D: ICPMS	3_200820A		SeqNo: <b>6649372</b>			Prep Date: 8/2	DF: <b>1</b>			
				SPK Ref			Control	RPD Ref		RPD		
Analyte	Result	PQL	SPK Val	Value		%REC	Limit	Value	%RPD	Limit	Qua	
Antimony	ND	0.0050										
Arsenic	ND	0.0050										
Barium	ND	0.0050										
Boron	0.01528	0.020									J	
Cadmium	ND	0.0020									ŭ	
Calcium	ND	0.50										
Chromium	ND ND	0.0050										
Cobalt	ND	0.0050										
_ead	ND	0.0050										
_ithium	ND	0.010										
Molybdenum	ND	0.0050										
Selenium	ND	0.0050										
Thallium	ND	0.0050										
MBLK	Sample ID: <b>MBLK-162899-1628</b>	19			U	nits: <b>mg/</b> l	L	Analysi	s Date: <b>8/2</b>	1/2020 03	:00 PN	
Client ID:	·		3_200821A				Prep Date: 8/2	DF: 1				
olione ib.	r curri	3. 101 MO	J_200021A	ODK D. f	000	q110.000 <u>2</u>			0/2020	RPD		
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	Limit	Qua	
Beryllium	ND	0.0020										
LCS	Sample ID: <b>LCS-162899-162899</b>				U	nits: <b>mg/</b> l	L	Analysi	s Date: 8/2	0/2020 03	:08 PN	
Client ID:		D: ICPMS	3_200820A			qNo: <b>664</b> 9		Prep Date: 8/2		DF: 1		
				SPK Ref			Control	RPD Ref		RPD		
Analyte	Result	PQL	SPK Val	Value		%REC	Limit	Value	%RPD	Limit	Qua	
Antimony	0.1042	0.0050	0.1		0	104	80-120	(	)			
Arsenic	0.09688	0.0050	0.1		0	96.9	80-120	(	)			
Barium	0.09955	0.0050	0.1		0	99.6	80-120	(	)			
Boron	0.5054	0.020	0.5		0	101	80-120	(	)			
Cadmium	0.1037	0.0020	0.1		0	104	80-120	(	)			
Calcium	10.36	0.50	10		0	104	80-120	(	)			
Chromium	0.1021	0.0050	0.1		0	102	80-120		)			
Cobalt	0.1032	0.0050	0.1		0	103	80-120		)			
_ead	0.1015	0.0050	0.1		0	101	80-120		)			
_ithium	0.09334	0.010	0.1		0	93.3	80-120		)			
Molybdenum	0.09912	0.0050	0.1		0	99.1	80-120		)			
-	0.09904	0.0050	0.1		0	99	80-120		)			
Selenium							80-120	(				

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: <b>162899</b>	Instrument ID ICPMS3		Method	d: <b>SW6020</b> I	В					
MS	Sample ID: <b>20080708-02AMS</b>				Units: mg/	L	Analysi	s Date: <b>8/2</b>	0/2020 03:	13 PM
Client ID: MW-2	Run	ID: ICPMS	3_200820A	5	SeqNo: <b>664</b> 9	9376	Prep Date: 8/2	0/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Antimony	0.1086	0.0050	0.1	0.0000528	109	75-125	(	)		
Arsenic	0.107	0.0050	0.1	0.002669	104	75-125	(	)		
Barium	0.3062	0.0050	0.1	0.2095	96.8	75-125	(	)		
Boron	1.239	0.020	0.5	0.7665	94.5	75-125	(	)		
Cadmium	0.1082	0.0020	0.1	-0.000033	108	75-125	(	)		
Calcium	82.55	0.50	10	75.02	75.3	75-125	(	)		0
Chromium	0.1064	0.0050	0.1	0.001461	105	75-125	(	)		
Cobalt	0.1076	0.0050	0.1	0.0004807	107	75-125	(	)		
Lead	0.1088	0.0050	0.1	0.0001419	109	75-125	(	)		
Lithium	0.1073	0.010	0.1	0.01028	97	75-125	(	)		
Molybdenum	0.1055	0.0050	0.1	-0.0000033	106	75-125	(	)		
Selenium	0.1035	0.0050	0.1	0.0005764	103	75-125	(	)		
Thallium	0.1022	0.0050	0.1	0.0000154	102	75-125	(	)		
MS	Sample ID: <b>20080708-02AMS</b>				Units: mg/	L	Analysi	s Date: <b>8/2</b>	1/2020 03:	06 PM
Client ID: MW-2	Run	ID: ICPMS	3_200821A	5	SeqNo: <b>665</b> 2	2426	Prep Date: 8/2	0/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Beryllium	0.1078	0.0020	0.1	0.0000286	108	75-125	(	)		
MSD	Sample ID: <b>20080708-02AMSD</b>				Units: mg/	L	Analysi	s Date: <b>8/2</b>	0/2020 03:	15 PN
Client ID: MW-2	·	ID: ICPMS	3 200820A	Ş	SeqNo: <b>664</b> 9		Prep Date: 8/2		DF: <b>1</b>	
					,		,			

MSD	Sample ID: <b>20080708-02AMSD</b> Run ID: <b>ICPMS3_200820A</b>					Units: mg/	L	Analysis	Date: 8/20	/2020 03:	15 PM
Client ID: MW-2		Run ID	: ICPMS3	_200820A	:	SeqNo: <b>664</b> 9	9377	Prep Date: 8/20	/2020	DF: <b>1</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1	099	0.0050	0.1	0.0000528	3 110	75-125	0.1086	1.26	20	
Arsenic	0.1	076	0.0050	0.1	0.002669	105	75-125	0.107	0.554	20	
Barium	0.3	3077	0.0050	0.1	0.2095	98.2	75-125	0.3062	0.465	20	
Boron	1.	.236	0.020	0.5	0.7665	94	75-125	1.239	0.195	20	
Cadmium	0.1	091	0.0020	0.1	-0.000033	109	75-125	0.1082	0.835	20	
Calcium	8	1.86	0.50	10	75.02	68.4	75-125	82.55	0.84	20	so
Chromium	0.1	073	0.0050	0.1	0.001461	106	75-125	0.1064	0.903	20	
Cobalt	0.1	084	0.0050	0.1	0.0004807	108	75-125	0.1076	0.794	20	
Lead	0.1	087	0.0050	0.1	0.0001419	109	75-125	0.1088	0.0607	20	
Lithium	0.1	079	0.010	0.1	0.01028	97.6	75-125	0.1073	0.579	20	
Molybdenum	0.1	074	0.0050	0.1	-0.0000033	3 107	75-125	0.1055	1.75	20	
Selenium	0.1	016	0.0050	0.1	0.0005764	101	75-125	0.1035	1.81	20	
Thallium	0.1	032	0.0050	0.1	0.0000154	103	75-125	0.1022	0.978	20	

Note:

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: 162899 Instrument ID ICPMS3 Method: SW6020B

MSD	Sample ID: 20080708-02	AMSD				Units: mg/	L	Analysi	Date: <b>8/21</b>	/2020 03:0	08 PM
Client ID: MW-2		Run ID	: ICPMS3	_200821A		SeqNo: <b>665</b>	2427	Prep Date: 8/2	0/2020	DF: <b>1</b>	
Analyte	1	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Beryllium	C	).1112	0.0020	0.1	0.000028	36 111	75-125	0.1078	3.11	20	

The following samples were analyzed in this batch:

 20080708-01A
 20080708-02A
 20080708-03A

 20080708-04A
 20080708-05A
 20080708-06A

 20080708-07A
 20080708-08A

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: 161500	Instrument ID TDS	6		Method	: A2540	C-1	1					
MBLK	Sample ID: MBLK-1615	00-161500				U	Jnits: <b>mg/l</b>	_	Analysi	s Date: <b>8/13</b>	/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2659	Prep Date: 8/1:	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	ND	30									
LCS	Sample ID: LCS-161500	0-161500				U	Jnits: <b>mg/l</b>	-	Analysi	s Date: <b>8/13</b>	/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2658	Prep Date: 8/1	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	474	30	495		0	95.8	85-109	C	)		
DUP	Sample ID: <b>20080708-0</b>	2B DUP				U	Jnits: <b>mg/l</b>	-	Analysi	s Date: <b>8/13</b>	/2020 02:	15 PM
Client ID: MW-2		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2642	Prep Date: 8/1:	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	1410	75	0		0	0	0-0	1385	1.79	10	
DUP	Sample ID: <b>20080746-0</b>	1A DUP				U	Jnits: <b>mg/l</b>	-	Analysi	s Date: <b>8/13</b>	/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2655	Prep Date: 8/1:	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	253.3	50	0		0	0	0-0	253.3	0	10	
The following sam	ples were analyzed in thi	s batch:	20	0080708-01B 0080708-04B 0080708-07B	20	080	708-02B 708-05B 708-08B		080708-03B 080708-06B			

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: <b>R295823</b>	Instrument ID IC4			Method	E300.0	)						
MBLK	Sample ID: CCB/MBLK-R2	295823					Units: mg/L	_	Analysis	Date: <b>8/11</b>	/2020 11:	54 AM
Client ID:		Run ID: I	C4_20	0811A		S	eqNo: <b>6628</b>	065	Prep Date:		DF: <b>1</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Chloride		ND	1.0									
Fluoride		ND	0.10									
Sulfate		ND	1.0									
LCS	Sample ID: LCS-R295823						Units: mg/L	_	Analysis	Date: <b>8/11</b>	/2020 12:	13 PM
Client ID:		Run ID: I	C4_20	0811A		S	eqNo: <b>6628</b>	067	Prep Date:		DF: <b>1</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Chloride	9.	.393	1.0	10		0	93.9	90-110	0			
Fluoride	1.	.857	0.10	2		0	92.9	90-110	0			
Sulfate	9.	484	1.0	10		0	94.8	90-110	0			
MS	Sample ID: <b>20080708-02B</b>	MS					Units: mg/L	_	Analysis	Date: <b>8/11</b>	/2020 04:	41 PM
Client ID: MW-2		Run ID: I	C4_20	0811A		S	eqNo: <b>6628</b>	087	Prep Date:		DF: <b>80</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Chloride	1	457	80	800	681	.5	97	80-120	0			
Fluoride	17	70.5	8.0	160		0	107	80-120	0			
Sulfate	77	74.5	80	800		0	96.8	80-120	0			
MSD	Sample ID: 20080708-02B	MSD					Units: mg/L	-	Analysis	Date: <b>8/11</b>	/2020 05:	01 PM
Client ID: MW-2		Run ID: I	C4_20	0811A		S	eqNo: <b>6628</b>	880	Prep Date:		DF: <b>80</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Chloride	1	456	80	800	681	.5	96.8	80-120	1457	0.122	20	
Fluoride		66.5	8.0	160		0	104	80-120	170.5	2.35	20	
Sulfate	77	72.9	80	800		0	96.6	80-120	774.5	0.207	20	
The following samp	oles were analyzed in this b	atch:	20	0080708-01E 0080708-04E 0080708-07E	3 20	800	0708-02B 0708-05B 0708-08B		080708-03B 080708-06B			

**Work Order:** 20080708

**Project:** Holland Board of Public Works

Batch ID: <b>R295863</b>	Instrument ID <b>Titr</b>	ator 1		Method	: A4500-	H B	3-11					
LCS	Sample ID: LCS-R2958	63-R29586	3			ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	01 PM
Client ID:		Run ID:	TITRAT	OR 1_20081	12B	Se	qNo: <b>662</b> 9	9470	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		3.97	0.10	4		0	99.2	92-108	ı	0		
LCS	Sample ID: LCS-R2958	63-R29586	3			ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	01 PM
Client ID:		Run ID:	TITRAT	OR 1_20081	12B	Se	qNo: <b>662</b> 9	9492	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		3.97	0.10	4		0	99.2	92-108		0		
DUP	Sample ID: <b>20080708-0</b>	2B DUP				ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	01 PM
Client ID: MW-2		Run ID:	TITRAT	OR 1_20081	12B	Se	qNo: <b>662</b> 9	9473	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		6.91	0.10	0		0	0	0-0	6.9	9 0.145	5	Н
Temperature		20.89	0.10	0		0	0	0-0	20.7	8 0.528		Н
DUP	Sample ID: <b>20080735-0</b>	2A DUP				ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	01 PM
Client ID:		Run ID:	TITRAT	OR 1_20081	12B	Se	qNo: <b>662</b> 9	9484	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		8.16	0.10	0		0	0	0-0	8.	1 0.738	5	Н
Temperature		21.22	0.10	0		0	0	0-0	21.1	4 0.378		Н
The following samp	oles were analyzed in this	s batch:	20	0080708-01B 0080708-04B 0080708-07B	20	080	0708-02B 0708-05B 0708-08B		080708-03B 080708-06B			



Cincinnati, OH +1 513 733 5336

Everett, WA Holland, MI +1 425 356 2600

### **Chain of Custody Form**

Houston, TX +1 281 530 5656

Spring City, PA +1 610 948 4903

South Charleston, WV +1 304 356 3168

Middletown, PA +1 717 944 5541 Salt Lake City, UT +1 801 266 7700

York, PA +1 717 505 5280

Page \_ +1 616 399 6070 COC ID: 223285

Fort Collins, CO +1 970 490 1511

*	Customer Information					A	LS Project	Manager:					ALS V	Nork C	Order	#:	200	280	708
(	Customer Informatio	n			Projec	t Informa	tion				Par	amete	r/Met	hod R	eques	st for			
Purchase Order			Project N	lame	HPPW	James	Delyong A	PP	A	Meta	is inclu	iding Hç	3						
Work Order			Project Nur	nber	13-	160017	1-06		В	Chic	rice, Fi	upride.	Suifati	e					
Company Name	NTH Consultants, L	.td	Bill To Com	pany	/////		f Public Work	(8	С	pH			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		9-A		
Send Report To	Karen Okonta	100 mm	Invoice	Attn	Acco	unts Payab	ie.		D	TUS									reference Accommens of the first first first confirmation
Address	41730 Six Mile Ros	dd	Add	iress	625 i	lastings			E	Radi	um 1,29	3 & 178					PPPPPA	'Anna-Antrewerererena	A A A A A A A A A A A A A A A A A A A
City/State/Zip	Northwile, MI 4816	.8	City/State	/Zip	Holia	nd NI 49	1.2		G										
Phone	(248) 562-2668		Pì	none	(616)	355-1210		renveneneeseesemmeerenveenveenmeerenv	Н		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							***************************************	Probative accessibilities of Probabilities of Antonional Accessibilities
Fax	(248) 324-6305	**************************************	· · · · · · · · · · · · · · · · · · ·	Fax					ı										
e-Mail Address	A	,,,,,,,	e-Mail Add	lress					J										
No.	Sample Description		Date	T	ime	Matrix	Pres.	# Bottles	Α	В	С	D	E	F	G	Н	ı	J	Hold
1 .WW	(		8-10-2010	3:1	Olopa	GW	2											A A A A A A A A A A A A A A A A A A A	
2 MW-			8-10-2020	1:5	ol non	GW	2 2			4			,,			,.,.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		ĺ	***************************************
3 MW -			8-10-2020	12	Ron	/HM	2		<b>.</b>				.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
4 MW-		A	8+10-2020				2					***************************************							
5 MS-N		,,,	8-10-2020	1.51	10M	GW	2										***************************************		
1	MW-Z		8-10-2020	1.6	MU	GW	2	***************************************											
	blank				PPM		2												
8 901010	ment blank	<u></u>			Spm		2												
9 Dun	1 (field dup)		8-10-2020		-	GW	2	***************************************						-			.,,,,		
10 PZ-1	i (inos oup)		8-10-2020		4 ()an	o GW	2												/,-/
Sampler(s) Please P	rint & Sign	12	Shipme	nt Meth	iod	Red	uired Turnard	ound Time: (	Check	Box)	l ot	var			R	esults l	Due Da	te:	
Britany S	stachkunis c	1//	drag	- OF	F		<b>√</b> Std 10 V	VK Days [	]5W	( Days		vK. Days		24 Hour					
Relinquished by		Date:	Time:	Receiv		<i></i>			Notes:			· ·							
Relinquished by:		Date:	Time:	Recei	ea by (La	boratory):			Coc	oler ID	Cool	er Temp.	QC	Package	: (Chec	k One B	ox Belo		
Logged by (Laboratory	Keu	8/11/20 Date:	O800 Time:		ed by (Eal			)	TR	3	1.	8°. 7°.		Level	IV SWE	QC/Raw		☐ TRF	P CheckList P Level IV
Preservative Key:	1-HCl 2-HNO <sub>3</sub>	3-H <sub>2</sub> SO <sub>4</sub> 4-N	aOH 5-Na <sub>2</sub> S <sub>2</sub> C	) <sub>3</sub> 6	-NaHSO	. 7-Oth	er 8-4°C	9-5035	I.		1.1	1'		] Other				4	

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

#### Sample Receipt Checklist

Client Name: NTH - NORTHVILLE				Da	te/Time I	Received:	11-Aug-20	00:80		
Work Order:	20080708			Re	ceived b	y:	<u>KRW</u>			
Checklist comp	leted by Keith Wierenga	1	1-Aug-20 Date	Review	ved by:	Chad W	helton/		11-Aug Date	
Matrices: Carrier name:	<u>Water</u> <u>Client</u>	'							ı	
Shipping contain	ner/cooler in good condition?		Yes	/	No 🗌	Not Pres	ent			
Custody seals i	ntact on shipping container/coole	r?	Yes		No 🗌	Not Pres	ent 🗸			
Custody seals i	ntact on sample bottles?		Yes		No 🗌	Not Pres	ent 🗸			
Chain of custoo	ly present?		Yes	/	No 🗌					
Chain of custoo	ly signed when relinquished and	received?	Yes		No 🗸					
Chain of custoo	ly agrees with sample labels?		Yes	/	No 🗌					
Samples in pro	per container/bottle?		Yes		No 🗌					
Sample contain	ers intact?		Yes		No 🗌					
Sufficient samp	le volume for indicated test?		Yes	/	No 🗌					
All samples rec	eived within holding time?		Yes	/	No 🗌					
Container/Tem	p Blank temperature in complianc	e?	Yes		No $\square$					
Sample(s) rece Temperature(s)	ived on ice? /Thermometer(s):		Yes 1.8/2.8,	<b>/</b> 1.7/2.7, 1.4	No	<u>IR:</u>	<u>3</u>			
Cooler(s)/Kit(s)	:									
	ple(s) sent to storage:		8/11/202 Yes	0 9:38:31	AM No 🗆	No VOA vials	s submitted	<b>✓</b>		
	als have zero headspace?		Yes		No $\square$	N/A	s submitted			
pH adjusted? pH adjusted by	eptable upon receipt?		Yes		No 🗹	N/A				
Login Notes:	Three Coolers		-					I		
	- — — — — — — — -									
Client Contacte	d:	Date Contacted:			Person	Contacted:				
Contacted By:		Regarding:								
Comments:										
CorrectiveActio	n:							SD(	C Dogo 1 o	.f 1



Ft. Collins, Colorado LIMS Version: 7.010 Page 1 of 1

Friday, September 04, 2020

Chad Whelton ALS Environmental 3352 128th Avenue Holland, MI 49424

Re: ALS Workorder: 2008277

Project Name:

Project Number: 20080708

Dear Mr. Whelton:

Eight water samples were received from ALS Environmental, on 8/12/2020. The samples were scheduled for the following analyses:

Radium-226
Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental Jeff R. Kujawa Project Manager ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALC Environme	ntol Fort Collins
ALS Environme	ntal – Fort Collins
A care ditation Dody	License or Contification Number
Accreditation Body	<u>License or Certification Number</u>
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



### 2008277

#### Radium-228:

The samples were analyzed for the presence of <sup>228</sup>Ra by low background gas flow proportional counting of <sup>228</sup>Ac, which is the ingrown progeny of <sup>228</sup>Ra, according to the current revision of SOP 724.

All acceptance criteria were met.

#### Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

# Sample Number(s) Cross-Reference Table

**OrderNum:** 2008277

Client Name: ALS Environmental

**Client Project Name:** 

Client Project Number: 20080708
Client PO Number: 20-122019844

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-1	2008277-1		WATER	10-Aug-20	15:06
MW-3	2008277-2		WATER	10-Aug-20	12:38
MW-3A	2008277-3		WATER	10-Aug-20	17:12
Field Blank	2008277-4		WATER	10-Aug-20	16:07
Equipment Blank	2008277-5		WATER	10-Aug-20	16:15
DUP-1 (Field Dup)	2008277-6		WATER	10-Aug-20	
PZ-1	2008277-7		WATER	10-Aug-20	9:40
MW-2	2008277-8		WATER	10-Aug-20	13:51

Date Printed: Friday, September 04, 2020



Subcontractor:

ALS Environmental, Fort Collins

225 Commerce Dr.

TEL: (800) 443-1511

FAX:

Fort Collins, CO 80524 Acct #: **CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

Date: COC ID: <u>14448</u>

11-Aug-20

Due Date: <u>01-Sep-20</u>

#2008277 #

(	Customer Information			Project	Informa	ition	-		Pa	rameter/	Method	Request	for Analys	is		
Purchase Order		Р	Project	Name 200	80708		A S	ubcontra	cted Ana	lyses (S	UBCON	TRACT)	Radiu	<u> </u>	226/	228
Work Order		Р	roject	Number			В	MSW	150	-			7,			<i>y-y-</i> u
Company Name	ALS Group USA, Corp	В	Bill To C	Company ALS	Group U	USA, Corp	С									
Send Report To	Chad Whelton	Ir	nv Attn	Acc	ounts P	ayable	D						·			
Address	3352 128th Ave	Α	\ddress	3352	2 128th A	Ave	E									
							F									
City/State/Zip	Holland, Michigan 49424	С	City/Sta	te/Zip Holl	and, Mic	chigan 49424	G									
Phone	(616) 399-6070	Р	hone	(616	) 399-60	070	Н								***************************************	
Fax	(616) 399-6185	F	ax	(616	399-61	85	1									
eMail Address	chad.whelton@alsglobal.com	m e	Mail C	С			J									
ALS Sample ID	Client Sample ID	Matri	ix	<b>Collection Date</b>	24hr	Bottle	Α	В	С	D	E	F	G	Н	1	$\Box$
20080708-01C	MW-1	Groundy	water	10/Aug/2020 1	5:06	(2) 1LPHNO3	X		<del>-1</del>	,					!	
20080708-03C	MW-3	Groundy	water	10/Aug/2020 1	2:38	(2) 1LPHNO3	X									
20080708-04C	MW-3A	Groundy	water	10/Aug/2020 1	7:12	(2) 1LPHNO3	X									
20080708-05C	Field Blank	Groundy	water	10/Aug/2020 10	6:07	(2) 1LPHNO3	X					i	:			
20080708-06C	Equipment Blank	Groundy	water	10/Aug/2020 10	6:15	(2) 1LPHNO3	X			:			(			
20080708-07C	DUP-1 (Field DUP)	Groundy	water	10/Aug/2020	0	(2) 1LPHNO3	X			•	-		<u> </u>		.,	
20080708-08C	PZ-1	Groundy	water	10/Aug/2020 9	:40	(2) 1LPHNO3	X	1, 22,121,122			1		†			
20080708-02C	MW-2	Groundy	vater	10/Aug/2020 13	3.51	(6) 1LPHNO3	X	Y			1	-0				

-	$\mathbf{C}$	_		-	_	-	4-	
	U	u	1111	ш	c	•	LS	3

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Betipquished by:	Date/Time <b>8-11-20</b> 1430	Received by: EMILY LYONS al	\UGDa <b>]</b> @ <b>20</b> 20 \000	Cooler IDs	Report/QC Level Std
Relinquished by:	Date/Time	Received by:	Date/Time		

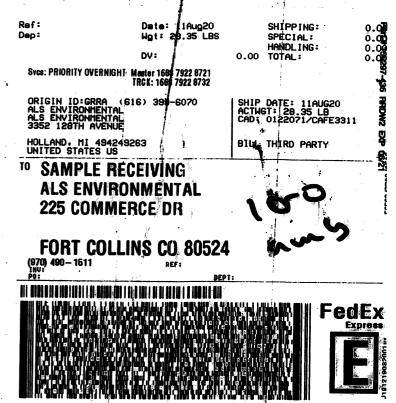


# ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:		ALS_MI		٧	Vorkorder No:		20	00827	7
Project Manager:	JRK		Initials:	ERI	-		Date:	08.1	3.20
1. Are airbills / shipping	g documents pres	sent and/or remo	ovable?				Drop Off	<b>✓</b> YES	☐ NO
2. Are custody seals on	shipping contair	ers intact?	AT ALLESSE - L'ITOLIS AN TIPOLOGIA MARIAMENT PER - NE - ALLES AND	mentioned to be been the designation of the second	The second section of the section of	V	NONE	YES	☐ NO•
3. Are custody seals on	sample containe	ers intact?	Nullin hMasters		Product Medical Colonia   Coloni	V	NONE	YES	☐ NO•
4. Is there a COC (chair	n-of-custody) pres	ent?				a conference of the	E	YES	☐ NO•
5. Is the COC in agreem	ent with samples	received? (IDs, da	tes, times, # of sam	oles, # of contain	ers, matrix, requested an	alyses, (	tc.)	<b>✓</b> YES	☐ NO•
6. Are short-hold samp	les present?			Mariana and American		***************************************		YES	✓ NO
7. Are all samples withi	in holding times f	or the requested	l analyses?		t		E	<b>✓</b> YES	☐ NO•
8. Were all sample con	tainers received i	ntact? (not broken or	leaking)	************************************			Ē	<b>✓</b> YES	☐ NO•
9. Is there sufficient sa	mple for the requ	ested analyses?		7.4000000000000000000000000000000000000	HARROCCCC C - ACC ALLACEMENTE C TT C C CC - AZ ZIMAZ REPPROPEZ / / S-	A. (12.15) KEMMY	E	YES	☐ NO•
10. Are samples in prop	er containers for	requested analy	/ses? (form 250,	Sample Handling	Guidelines )		E	<b>✓</b> YES	∏ NO•
11. Are all aqueous sam	iples preserved co	orrectly, if requir	red?	(1904) T7001118888888888 (F. Frankline se	entroper/inter w symbolscope . s		N/A	<b>✓</b> YES	∏ NO•
12. Were unpreserved s	samples pH check	ed, if required?			A STATE OF THE STA	V	N/A	YES	NO
13. Are all samples requir	ing no headspace (\	/OC, GRO, RSK/MEE, radon)	free of bubb	les > 6 mm	in diameter?	V	N/A	YES	NO
14. Were the samples s	hipped on ice?	Cafe familia anno anno anno anno anno anno anno an						YES	VON √
15. Were cooler tempe	ratures measured	at 0.1 - 6.0°C?	IR gun used*:	<b>#</b> 3	<b>#</b> 5	✓	Rad Only	YES	☐ NO
Cooler #:	1 2	F 1111	man	adda. woon	AND THE PROPERTY OF THE PROPER	unior *			
Temperature (°C):	Amb Amb	7 ***********************************				**************************************	TO ALTONOMOUS MOSTINGS ( TO F. O.		
# of custody seals on cooler:	0 0		SECRET IN A CASA STATE OF THE AREA						Maria de la compansión de
External mR/hr reading:	9 10	e, <u>j</u> este eje		philipping to the enderstrangery (1).	anni anni anni anni anni anni anni anni				Try on a surround
Background mR/hr reading:	11 Were e	xternal mR/hr readii acceptance o	ngs ≤ two time: criteria? (If no, :	-		V	N/A [	YES	☐ NO
* Please provide	e details below for 'NO	)' responses in gray l	ooxes above - f	or 2 thru 5 &	7 thru 12, notify P	М&с	ontinue v	w/ login.	
TO THE RESERVE THE PROPERTY OF		The second		Tal Mandaman and a street of the street of	WITTEN 10-12-17-100-1-1-1-1-1-1-100-10-10-1-1-1-1-1				
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		······································	Market Control of the	All client bo	ttle ID's vs ALS lab I	ID's de	vible-che	cked by:	ERL
If applicable, was the c	lient contacted?	YES PN	A Contact		- I I I I I I I I I I I I I I I I I I I			Date:	LIVE
Project Manager Sig					13-20			<del></del>	
Jose manager 318		<del>////</del>	<del>-                                    </del>	0	13-00				
orm 201r30.xls		6 1 C				4	IR Gun #	3, VWR S	N 1706475

Form 201r30.xls (06/04/2020) +iR Gun #3, VWR SN 170647571 +iR Gun #5, VWR SN 192272629





2 of 2 MPS# 1668 7922 8732 Mstr# 1668 7922 8721\* WED - 12 AUG 10:30A PRIORITY OVERNIGHT

0201

NA FTCA

80524 co-us DEN



### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 MW-1
 Lab ID:
 2008277-1

 Legal Location:
 Matrix:
 WATER

Collection Date: 8/10/2020 15:06 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	- Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	0.33 (+/- 0.21)		0.19	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	90.9		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC		SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.44)	U	0.92	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	73.1		40-110	%REC	DL = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

Project:20080708Work Order:2008277Sample ID:MW-3Lab ID:2008277-2Legal Location:Matrix:WATER

Collection Date: 8/10/2020 12:38 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emana	tion - Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.14)	U	0.26	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.1		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFP0	C	SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.33)	U	0.72	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	96.7		40-110	%REC	DL = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Matrix: WATER

**Date:** 04-Sep-20 **Client: ALS** Environmental

20080708 **Project:** Work Order: 2008277 Sample ID: MW-3A **Lab ID:** 2008277-3 **Legal Location:** 

**Percent Moisture: Collection Date:** 8/10/2020 17:12

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	n - Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.18)	U	0.31	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.4		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC		SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.35)	U	0.68	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	95.9		40-110	%REC	DI = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

Project:20080708Work Order:2008277Sample ID:Field BlankLab ID:2008277-4Legal Location:Matrix:WATER

Collection Date: 8/10/2020 16:07 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emana	ation - Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.29)	U	0.48	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	95.3		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFP	С	SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.42)	U	0.98	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97.7		40-110	%REC	DL = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 Equipment Blank
 Lab ID:
 2008277-5

Legal Location: Matrix: WATER

Collection Date: 8/10/2020 16:15 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	on - Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.17)	U	0.38	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.1		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC		SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.52)	U,M	1.18	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97		40-110	%REC	DL = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 DUP-1 (Field Dup)
 Lab ID:
 2008277-6

Legal Location:

Matrix: WATER

Collection Date: 8/10/2020 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanatio	n - Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.28)	Y1,U	0.39	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC		SOI	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	0.93 (+/- 0.43)		0.73	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97.1		40-110	%REC	DI = NA	9/3/2020 08:16

AR Page 6 of 9 13 of 18

**Client:** 

**Legal Location:** 

### SAMPLE SUMMARY REPORT

Matrix: WATER

ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 PZ-1
 Lab ID:
 2008277-7

Collection Date: 8/10/2020 09:40 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanati	on - Method 903.1	SOI	783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.22)	U	0.33	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	95.2		40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC		SOI	724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	0.83 (+/- 0.45)		0.8	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	85		40-110	%REC	DL = NA	9/3/2020 08:16

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### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 MW-2
 Lab ID:
 2008277-8

 Legal Location:
 Matrix:
 WATER

Collection Date: 8/10/2020 13:51 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	0.46 (+/- 0.27)	Y1	0.28	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	101	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFP	С	SO	P 724	Prep	Date: 8/27/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.39)	U	0.72	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	96.6		40-110	%REC	DI = NA	9/3/2020 08:16

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#### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 04-Sep-20

 Project:
 20080708
 Work Order:
 2008277

 Sample ID:
 MW-2
 Lab ID:
 2008277-8

Legal Location:

Matrix: WATER

Collection Date: 8/10/2020 13:51 Percent Moisture:

Report Dilution
Analyses Result Qual Limit Units Factor Date Analyzed

#### **Explanation of Qualifiers**

#### Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

\* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested

MDC.

#### **Inorganics:**

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

\* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

#### Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

\* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:

- gasoline

- JP-8

dieselmineral spirits

- motor oil

- Stoddard solvent

- bunker C

Client: ALS Environmental

**Work Order:** 2008277 **Project:** 20080708

**Date:** 9/4/2020 9:54:4

DUP	Sample ID:	2008277-8				Uı	nits: <b>pCi/l</b>		Analys	is Date: 8	3/31/202	0 11:50	
Client ID: M	IW-2		Run II	D: <b>RE200819</b> -2	2A			Pı	Prep Date: 8/19/2020			NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qua
Ra-226			0.3 (+/- 0.22)	0.28						0.46	0.4	2.1	Y1
Carr: BARIL	JM		15790		15750		100	40-110		15850			Y1
LCS	Sample ID:	RE200819-2				Uı	nits: <b>pCi/l</b>		Analys	is Date: 8	3/31/202	0 11:50	
Client ID:			Run II	D: <b>RE200819-</b>	2A			Pi	rep Date: <b>8/19</b>	/2020	DF:	NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qua
Ra-226			44 (+/- 11)	1	46.46		94.9	67-120					P,Y
Carr: BARIL	JM		15900		15530		102	40-110					Y1
МВ	Sample ID:	RE200819-2				Uı	nits: <b>pCi/l</b>		Analys	is Date: 8	3/31/202	0 12:05	
Client ID:			Run II	D: <b>RE200819</b> -2	2A			Pı	rep Date: <b>8/19</b>	/2020	DF:	NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qua
Ra-226			ND	0.24									Y1,l
Carr: BARIL	JM		15910		15530		102	40-110					Y1
The follow	ving samples	were analyzed	in this batch:	20082 20082 20082	277-4	200827 200827 200827	7-5	2008: 2008:	277-3 277-6				

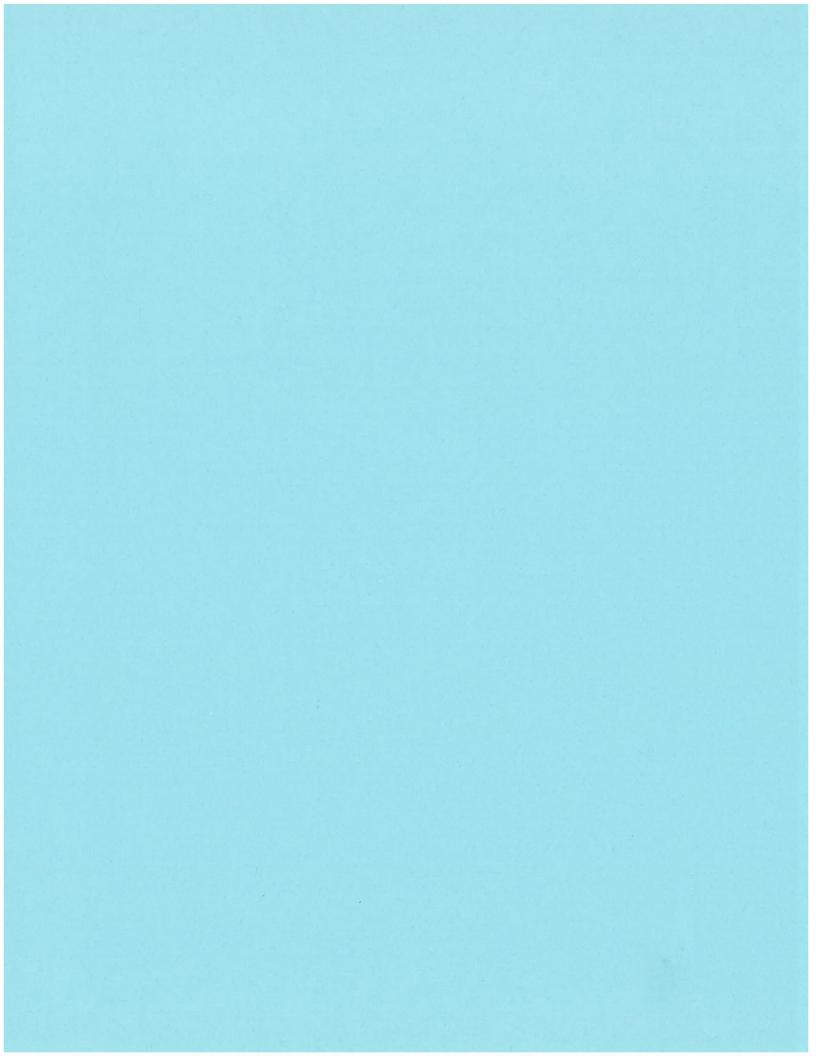
Client: ALS Environmental

**Work Order:** 2008277 **Project:** 20080708

## QC BATCH REPORT

Batch ID:	RA200827-1-3	nstrument ID LB	4100-C		Method: R	adium-228	3 Analysis	s by GFPC					
DUP	Sample ID: 2008277-8				U	nits: <b>pCi/l</b>		Analys	is Date:	9/3/2020	08:16		
Client ID:	MW-2	Run II	D: <b>RA200827</b> -	1A				Prep Date: 8/27/2020			DF: NA		
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-228		1.17 (+/- 0.46)	0.71						0.63	3 0.9	2.1		
Carr: BAI	RIUM	32830		33700		97.4	40-110		32520	)			
LCS	Sample ID: <b>RA200827-1</b>				U	nits: <b>pCi/l</b>		Analys	is Date:	9/3/2020	08:16		
Client ID:		Run II	D: <b>RA200827-</b>	1A			F	Prep Date: <b>8/27</b>	/2020	DF:	NA		
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-228		24.3 (+/- 5.7)	0.7	23.9		102	70-130					Р	
Carr: BAI	RIUM	32160		33430		96.2	40-110						
МВ	Sample ID: <b>RA200827-1</b>				U	nits: <b>pCi/l</b>		Analys	is Date:	9/3/2020	08:16		
Client ID:		Run II	D: <b>RA200827</b> -	1A			F	Prep Date: <b>8/27</b>	/2020	DF:	: NA		
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-228		ND	0.7									U	
Carr: BAI	RIUM	32030		33430		95.8	40-110						
The follo	owing samples were analyze	d in this batch:	20082 20082 20082	277-4	20082 20082 20082	77-5		3277-3 3277-6					

QC Page: 2 of 2





04-Sep-2020

Karen Okonta NTH Consultants, Ltd. 41780 Six Mile Road Northville, MI 48168

Re: Holland Board of Public Works Work Order: 20080710

Dear Karen,

ALS Environmental received 1 sample on 11-Aug-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 24.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton Project Manager

#### **Report of Laboratory Analysis**

Certificate No: MN 026-999-449

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order Sample Summary

Work Order: 20080710

<u>Lab Samp ID Client Sample ID Matrix Tag Number Collection Date Date Received Hold</u>

20080710-01 MW-4 Groundwater 8/10/2020 11:07 8/11/2020 08:00

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Case Narrative

**Work Order:** 20080710

Samples for the above noted Work Order were received on 08/11/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

#### Metals:

Batch 162826, Method ICP\_6020\_W, Sample 20080710-01A MS: The MS recoveries were outside of the control limits for Barium and Calcium; however, the results in the parent sample are greater than 4x the spike amount. No qualification is required.

#### Wet Chemistry:

Batch R295823, Method IC\_300.0\_WW, Sample 20080710-01B: The reporting limit for Sulfate is elevated due to dilution for high concentrations of non-target analytes.

Batch R295863, Method PH\_4500\_W, Sample LCS-R295863: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Radium analysis performed by ALS Fort Collins laboratory.

Qualifier	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
0	Sample amount is > 4 times amount spiked
Р	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U X	Analyzed but not detected above the MDL  Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or
Λ	reagent contamination at the observed level.
Acronym	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
<b>Units Reported</b>	<u>Description</u>
$^{\circ}\mathrm{C}$	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Date: 04-Sep-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20080710

**Sample ID:** MW-4 **Lab ID:** 20080710-01

Collection Date: 8/10/2020 11:07 AM Matrix: GROUNDWATER

**Date:** 04-Sep-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	<b>'0A</b>	Prep: SW7470 8/13/20 13:00	Analyst: MAC
Mercury	ND		0.00020	mg/L	1	8/13/2020 02:02 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3005A 8/19/20 10:35	Analyst: STP
Antimony	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Arsenic	0.0055		0.0050	mg/L	1	8/19/2020 06:55 PM
Barium	0.96		0.0050	mg/L	1	8/19/2020 06:55 PM
Beryllium	ND		0.0020	mg/L	1	8/19/2020 06:55 PM
Boron	0.98		0.020	mg/L	1	8/19/2020 06:55 PM
Cadmium	ND		0.0020	mg/L	1	8/19/2020 06:55 PM
Calcium	150		0.50	mg/L	1	8/19/2020 06:55 PM
Chromium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Cobalt	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Lead	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Lithium	0.035		0.010	mg/L	1	8/19/2020 06:55 PM
Molybdenum	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Selenium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Thallium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
ANIONS BY ION CHROMATOGRAPH	ΗY		E300.0			Analyst: <b>JDR</b>
Chloride	650		80	mg/L	80	8/11/2020 06:56 PM
Fluoride	0.52		0.20	mg/L	2	8/11/2020 03:05 PM
Sulfate	ND		2.0	mg/L	2	8/11/2020 03:05 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: QTN
pH (laboratory)	6.91	Н	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.9	Н	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 8/12/20 13:12	Analyst: <b>ERW</b>
Total Dissolved Solids	1,700		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 9/2/2020

Date: 04-Sep-20

NTH Consultants, Ltd. **Client:** 

20080710 Work Order:

**Project:** Holland Board of Public Works

Batch ID: 161552	Instrument ID <b>HG4</b>			Metho	d: <b>SW7470</b>	)A					
MBLK	Sample ID: MBLK-161552	-16155	2			Units: mg/l	L	Analysis	Date: <b>8/13</b>	3/2020 01:	46 PM
Client ID:		Run I	): <b>HG4_2</b> (	00813A		SeqNo: <b>663</b> 4	1238	Prep Date: 8/13	/2020	DF: <b>1</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury		ND	0.00020								
LCS	Sample ID: <b>LCS-161552-1</b>	61552				Units: mg/l	L	Analysis	Date: 8/13	3/2020 01:	48 PM
Client ID:		Run I	: <b>HG4_2</b> 0	00813A		SeqNo: <b>663</b> 4	1239	Prep Date: 8/13	/2020	DF: <b>1</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.00	207	0.00020	0.002		0 104	80-120	0			
MS	Sample ID: 20080781-03B	MS				Units: mg/l	L	Analysis	Date: 8/13	3/2020 02:	22 PM
Client ID:		Run I	: <b>HG4_2</b> 0	00813A		SeqNo: <b>663</b> 4	1258	Prep Date: 8/13	DF: <b>1</b>		
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.003	885	0.00020	0.002	0.00175	5 106	75-125	0			
MSD	Sample ID: <b>20080781-03B</b>	MSD				Units: mg/l	L	Analysis	Date: 8/13	3/2020 02:	23 PM
Client ID:		Run IE	): <b>HG4_2</b> (	00813A		SeqNo: <b>663</b> 4	1259	Prep Date: 8/13	/2020	DF: <b>1</b>	
	Pa	esult	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Analyte	Re										

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20080710

**Project:** Holland Board of Public Works

Batch ID: 162826	Instrument ID ICPMS3	Method:	SW6020B
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MBLK	Sample ID: MBLK-162826-16282	26			Units: mg/	L	Analys	s Date: <b>8/1</b>	9/2020 06:	49 PM
Client ID:	Run I	D: ICPMS	3_200819A		SeqNo: <b>6646898</b>		Prep Date: 8/1	9/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

LCS	Sample ID: LCS-162826-162			ι	Jnits: <b>mg/</b>	L	Analysis Date: 8/19/2020 06:50 P				
Client ID:	R	un ID: ICPMS	3_200819A		Se	qNo: <b>664</b> 0	6899	Prep Date: 8/1	9/2020	DF: <b>1</b>	
Analyte	Resu	lt PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.100	9 0.0050	0.1		0	101	80-120	(	0		
Arsenic	0.104	2 0.0050	0.1		0	104	80-120		0		
Barium	0.10	5 0.0050	0.1		0	105	80-120		0		
Beryllium	0.106	7 0.0020	0.1		0	107	80-120		0		
Boron	0.493	3 0.020	0.5		0	98.7	80-120	(	0		
Cadmium	0.105	2 0.0020	0.1		0	105	80-120		0		
Calcium	10.5	8 0.50	10		0	106	80-120		0		
Chromium	0.103	9 0.0050	0.1		0	104	80-120		0		
Cobalt	0.106	3 0.0050	0.1		0	106	80-120		0		
Lead	0.104	8 0.0050	0.1		0	105	80-120		0		
Lithium	0.106	3 0.010	0.1		0	106	80-120		0		
Molybdenum	0.102	5 0.0050	0.1		0	102	80-120		0		
Selenium	0.107	8 0.0050	0.1		0	108	80-120		0		
Thallium	0.100	7 0.0050	0.1		0	101	80-120	(	0		

**Work Order:** 20080710

**Project:** Holland Board of Public Works

Batch ID: 162826 Instrument ID ICPMS3 Method: SW6020B

MS	Sample ID: 20080710-01AMS				Units: mg/	L	Analysis	Date: 8/19	9/2020 06:	57 PM
Client ID: MW-4	Run	ID: ICPMS	3_200819A	S	SeqNo: <b>6646</b>	6903	Prep Date: 8/19/	2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1021	0.0050	0.1	0.000189	102	75-125	0			
Arsenic	0.1127	0.0050	0.1	0.005451	107	75-125	0			
Barium	1.085	0.0050	0.1	0.9585	127	75-125	0			SO
Beryllium	0.1081	0.0020	0.1	0.000052	108	75-125	0			
Boron	1.434	0.020	0.5	0.9815	90.5	75-125	0			
Cadmium	0.1004	0.0020	0.1	0.000017	100	75-125	0			
Calcium	166.6	0.50	10	154	126	75-125	0			SO
Chromium	0.1069	0.0050	0.1	0.000691	106	75-125	0			
Cobalt	0.1059	0.0050	0.1	0.001226	105	75-125	0			
Lead	0.108	0.0050	0.1	0.00048	108	75-125	0			
Lithium	0.1441	0.010	0.1	0.03516	109	75-125	0			
Molybdenum	0.1051	0.0050	0.1	0.000705	104	75-125	0			
Selenium	0.1068	0.0050	0.1	0.000366	106	75-125	0			
Thallium	0.1038	0.0050	0.1	0.000062	104	75-125	0			

MSD	Sample ID: 20080710-01			Units: mg/	L	Analysis Date: 8/19/2020 06:58					
Client ID: MW-4		Run ID	: ICPMS3	_200819A	5	eqNo: <b>664</b> 6	6904	Prep Date: 8/19	/2020	DF: <b>1</b>	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0	.1013	0.0050	0.1	0.000189	101	75-125	0.1021	0.833	20	
Arsenic	0	.1135	0.0050	0.1	0.005451	108	75-125	0.1127	0.762	20	
Barium		1.069	0.0050	0.1	0.9585	111	75-125	1.085	1.45	20	0
Beryllium	0	.1066	0.0020	0.1	0.000052	107	75-125	0.1081	1.37	20	
Boron		1.409	0.020	0.5	0.9815	85.6	75-125	1.434	1.73	20	
Cadmium	0	.0997	0.0020	0.1	0.000017	99.7	75-125	0.1004	0.719	20	
Calcium		164.9	0.50	10	154	110	75-125	166.6	1.02	20	0
Chromium		0.106	0.0050	0.1	0.000691	105	75-125	0.1069	0.89	20	
Cobalt	0	.1053	0.0050	0.1	0.001226	104	75-125	0.1059	0.587	20	
Lead	0	.1067	0.0050	0.1	0.00048	106	75-125	0.108	1.21	20	
Lithium	0	.1422	0.010	0.1	0.03516	107	75-125	0.1441	1.36	20	
Molybdenum	0	.1053	0.0050	0.1	0.000705	105	75-125	0.1051	0.137	20	
Selenium	0	.1134	0.0050	0.1	0.000366	113	75-125	0.1068	5.97	20	
Thallium	0	.1034	0.0050	0.1	0.000062	103	75-125	0.1038	0.424	20	

The following samples were analyzed in this batch:

20080710-01A

**Work Order:** 20080710

**Project:** Holland Board of Public Works

MBLK	Sample ID: MBLK-16150	00-161500				L	Jnits: mg/l	L	Analysis	Date: <b>8/13</b>	3/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		SeqNo: <b>6632659</b>			Prep Date: 8/12	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	;	ND	30									
LCS	Sample ID: LCS-161500	-161500				L	Jnits: <b>mg/l</b>	L	Analysis	s Date: <b>8/13</b>	3/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2658	Prep Date: 8/12	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	<b>;</b>	474	30	495		0	95.8	85-109	0			
DUP	Sample ID: 20080708-02	2B DUP				L	Jnits: <b>mg/l</b>	L	Analysis	Date: 8/13	3/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2642	Prep Date: 8/12	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	3	1410	75	0		0	0	0-0	1385	1.79	10	
DUP	Sample ID: <b>20080746-0</b> 1	1A DUP				L	Jnits: <b>mg/l</b>	L	Analysis	s Date: <b>8/13</b>	3/2020 02:	15 PM
Client ID:		Run ID:	TDS_20	00813B		Se	qNo: <b>6632</b>	2655	Prep Date: 8/12	2/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids		253.3	50	0		0	0	0-0	253.3	0	10	

**Work Order:** 20080710

**Project:** Holland Board of Public Works

Batch ID: R295823 Instrument ID IC4 Method: E300.0

Batch ID: <b>R295823</b>	Instrument ID IC4			Metho	d: <b>E300.0</b>	1					
MBLK	Sample ID: CCB/MBLK-	R295823				Units: mg/	L	Analys	sis Date: <b>8/1</b>	1/2020 11:	54 AM
Client ID:		Run ID	: IC4_20	0811A		SeqNo: <b>662</b>	8065	Prep Date:	DF: <b>1</b>		
Analyte	1	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		ND	1.0								
Fluoride		ND	0.10								
Sulfate		ND	1.0								
LCS	Sample ID: LCS-R29582	:3				Units: mg/	L	Analys	sis Date: <b>8/1</b>	1/2020 12:	13 PM
Client ID:		Run ID	: IC4 20	0811A		SeqNo: <b>662</b>	8067	Prep Date:		DF: <b>1</b>	

LCS	Sample ID: LCS-R29582	3				Į	Jnits: <b>mg/L</b>		Analys	sis Date: <b>8/1</b>	1/2020 12:1	I3 PM
Client ID:		Run ID: I	C4_200	811A		Se	eqNo: <b>6628</b>	067	Prep Date:		DF: <b>1</b>	
Analyte	F	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	!	9.393	1.0	10		0	93.9	90-110		0		
Fluoride		1.857	0.10	2		0	92.9	90-110		0		
Sulfate		9.484	1.0	10		0	94.8	90-110		0		

MS	Sample ID: 20080708-02	2B MS				Į	Units: <b>mg/L</b>	-	Analy	sis Date: <b>8/1</b>	1/2020 04:	41 PM
Client ID:		Run ID:	IC4_200	)811A		Se	eqNo: <b>6628</b>	087	Prep Date:		DF: <b>80</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		1457	80	800	68	1.5	97	80-120		0		
Fluoride		170.5	8.0	160		0	107	80-120		0		
Sulfate		774.5	80	800		0	96.8	80-120		0		

MSD	Sample ID: 20080708-02	2B MSD					Units: <b>mg/L</b>	-	Analysi	lysis Date: 8/11/2020 05:01 PM			
Client ID:		Run ID:	IC4_200	)811A		S	eqNo: <b>6628</b>	880	Prep Date:		DF: <b>80</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride		1456	80	800	68	1.5	96.8	80-120	1457	0.122	20		
Fluoride		166.5	8.0	160		0	104	80-120	170.5	2.35	20		
Sulfate		772.9	80	800		0	96.6	80-120	774.5	0.207	20		

The following samples were analyzed in this batch:

20080710-01B

**Work Order:** 20080710

**Project:** Holland Board of Public Works

Batch ID: <b>R295863</b>	Instrument ID Titra	ator 1		Metho	d: <b>A4500</b> -	Н В	-11					
LCS	Sample ID: LCS-R2958	63-R29586	63			L	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	:01 PM
Client ID:		Run ID	TITRAT	OR 1_2008	12B	Se	qNo: <b>662</b> 9	9470	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		3.97	0.10	4		0	99.2	92-108	(	0		
LCS	Sample ID: LCS-R2958	63-R29586	33			ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	:01 PM
Client ID:		Run ID	: TITRAT	OR 1_2008	12B	Se	qNo: <b>662</b> 9	9492	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		3.97	0.10	4		0	99.2	92-108	(	0		
DUP	Sample ID: <b>20080708-0</b>	2B DUP				ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	:01 PM
Client ID:		Run ID	: TITRAT	OR 1_2008	12B	Se	qNo: <b>662</b> 9	9473	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		6.91	0.10	0		0	0	0-0	6.9	9 0.145	5	Н
Temperature		20.89	0.10	0		0	0	0-0	20.78	8 0.528		Н
DUP	Sample ID: <b>20080735-0</b>	2A DUP				ι	Jnits: <b>s.u.</b>		Analys	is Date: <b>8/12</b>	2/2020 02:	:01 PM
Client ID:		Run ID	: TITRAT	OR 1_2008	12B	Se	qNo: <b>662</b> 9	9484	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		8.16	0.10	0		0	0	0-0	8.	1 0.738	5	Н
Temperature		21.22	0.10	0		0	0	0-0	21.14	4 0.378		Н



Preservative Key: 1-HCI

Cincinnati, OH +1 513 733 5336

Everett, WA +1 425 356 2600 Fort Collins, CO +1 970 490 1511 +1 616 399 6070

Holland, MI

### **Chain of Custody Form**

Page \_ \_of \_ COC ID: 333333 Houston, TX +1 281 530 5656 Middletown, PA

+1 717 944 5541

Spring City, PA +1 610 948 4903 South Charleston, WV +1 304 356 3168

Salt Lake City, UT

York, PA +1 717 505 5280 +1 801 266 7700

	•	**							<u> </u>	<u> </u>										
							А	LS Projec	Manager:					ALS	Work C	Order	#:	20	080	760
		Sustomer Information	n			Proje	ct Informat	ion				Pai	ramete	er/Me	thod R	eque:				
Ρú	urchase Order			Project N	Name	HBPY	V. James	Reyana	PP	Α	Met	als incl	uding H	g						
	Work Order			Project Nu	mber	300	-160017-	06		В	Chlo	aide, F	luoride,	Suifa	te					,,,,,
Со	mpany Name	NTH Consultants, I	.td.	Bill To Com	pany	-Hol	land Board of	Public Wor	ies	С	ρH	•••						***************************************		
Se	end Report To	Karen Okonta		Invoice	Attn	Asc	ounts Payabl	e		D	TOS		***************************************							
	Address	41780 Six Mile Roa	ed	Add	dress	625	Hastings	1994 Palet Para I Amerika aran manaka Palet Palet Pa	**************************************	E	Rad	ium 22	0 8 328	ż,						AA.
(	City/State/Zip	Nonhville, Mr. 4816	58	City/State	e/Zip	Hal	land, Mi 494	23		G				meneeeenememenenemenee	***************************************					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	Phone	(248) 662-2668	A STATEMENT AND	P	hone	(61)	8) <b>35</b> 5-12 <b>1</b> 0			Н	***************************************	1 P + 1 1 + 1 h + 1 + h								////-fund-unadou//-/-allenadou
	Fax	(248) 324-5305			Fax					I		***************************************			***************************************					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
e-	Mail Address			e-Mail Add	dress				P	J							***************************************			
Vo.		Sample Description		Date	1	l'ime	Matrix	Pres.	# Bottles	Α	В	С	D	E	F	G	Н	I	J	Hold
1	MW-4	P-147=54-1		310-2020	11:1	07	GN	a a	4	X	X	X	X	X		Annual Control				
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	npler(s) Please P			Shipme		thod	Req		ound Time: (	Check	Box)	r ot	her	<del></del>	<del></del>	R	esults	Due D	ate:	
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Reli	nquished by:		Date:	Time:	Recei	ived by:	//	,		Notes	:									
Reli	nquished by:	,,,,,,,	Date:   11/20	Time: 080 o	Recei	wed by	aboratory):			Cod	oier ID	Cool	er Temp	. QC	Package:			ox Bel	er story	wan waa
Log	ged by (Laboratory)	Kes	Date:	Time:	Chéc	ked by (L	aboratory):	<del>/</del> (	$\mathcal{Q}$		23 H21		.8 ° ( 7 ° L		Lavel Lavel	II Std ( III Std IV SWA	GCIRa	≠ Data p	LI IRI	RP CheckList RP Leval IV

8-4°C

7-Other

9-5035

4-NaOH

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

6-NaHSO<sub>4</sub>

3-H<sub>2</sub>SO<sub>4</sub>

2-HNO<sub>3</sub>

Client Name: NTH - NORTHVILLE

### Sample Receipt Checklist

Date/Time Received:

11-Aug-20 08:00

Work Order:	20080710				Received b	y: <u>k</u>	<u>(RW</u>		
Checklist comp	leted by Keith Wierenga		11-Aug-20	=	Reviewed by:	Chad Wh	elton		11-Aug-20
Matrices: Carrier name:	Water Client					g			
Shipping contai	ner/cooler in good condition?		Yes	<b>✓</b>	No 🗌	Not Presen	t 🗌		
Custody seals in	ntact on shipping container/coole	r?	Yes		No 🗌	Not Presen	t 🗸		
Custody seals i	ntact on sample bottles?		Yes		No 🗌	Not Presen	t 🗸		
Chain of custod	ly present?		Yes	<b>✓</b>	No 🗌				
Chain of custod	ly signed when relinquished and r	eceived?	Yes		No 🗸				
Chain of custod	ly agrees with sample labels?		Yes	<b>✓</b>	No 🗌				
Samples in prop	per container/bottle?		Yes	<b>✓</b>	No 🗌				
Sample contain	ers intact?		Yes	<b>✓</b>	No 🗌				
Sufficient samp	le volume for indicated test?		Yes	<b>✓</b>	No 🗌				
All samples rec	eived within holding time?		Yes	<b>✓</b>	No 🗌				
Container/Temp	o Blank temperature in complianc	e?	Yes	<b>✓</b>	No 🗌				
Sample(s) received Temperature(s)	ived on ice? /Thermometer(s):		_	<b>√</b>	No	IR3			
Cooler(s)/Kit(s):	:								
Date/Time sam	ple(s) sent to storage:			20 1	0:06:54 AM				
	als have zero headspace?		Yes		No 🗔	No VOA vials s	ubmitted	✓	
	eptable upon receipt?			<b>✓</b>	No L	N/A $\square$			
pH adjusted? pH adjusted by:			Yes		No 🗸	N/A 📙			
Login Notes:			<u>-</u>						
Logiii Notes.									
				_					
Client Contacte	d:	Date Contacted:			Person	Contacted:			
	u.				reison	Contacted.			
Contacted By:		Regarding:							
Comments:									
CorrectiveAction	n:							0000	



Ft. Collins, Colorado LIMS Version: 7.010 Page 1 of 1

Monday, August 31, 2020

Chad Whelton ALS Environmental 3352 128th Avenue Holland, MI 49424

Re: ALS Workorder: 2008278

Project Name:

Project Number: 20080710

Dear Mr. Whelton:

One water sample was received from ALS Environmental, on 8/12/2020. The sample was scheduled for the following analyses:

Radium-226
Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental Jeff R. Kujawa Project Manager ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environme	ntal – Fort Collins
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



### 2008278

#### Radium-228:

The sample was analyzed for the presence of <sup>228</sup>Ra by low background gas flow proportional counting of <sup>228</sup>Ac, which is the ingrown progeny of <sup>228</sup>Ra, according to the current revision of SOP 724.

All acceptance criteria were met.

#### Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

## Sample Number(s) Cross-Reference Table

**OrderNum:** 2008278

Client Name: ALS Environmental

**Client Project Name:** 

Client Project Number: 20080710
Client PO Number: 20-122019844

	Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-4		2008278-1	•	WATER	10-Aug-20	11:07



Subcontractor:

ALS Environmental, Fort Collins

225 Commerce Dr.

(800) 443-1511

**CHAIN-OF-CUSTODY RECORD** 

Date:

11-Aug-20

COC ID: 14447

Page 1 of 1

Due Date: 01-Sep-20

FAX:

Fort Collins, CO 80524

Acct #:

TEL:

#2008278 # Salesperson ALSHN Account

C	ustomer Information	ition			Pa	rameter	/Method F	Request	for Analysi	is				
Purchase Order		Proj	ect Name	20080710		A Su	bcontrac	cted Ana	lyses (S	SUBCONT	RACT)	Radius	1 6	226/228
Work Order		Proj	ect Number			В								· • • • • • •
Company Name	ALS Group USA, Corp	Bill	To Company	ALS Group	USA, Corp	С								
Send Report To	Chad Whelton	Inv A	Attn	Accounts P	ayable	D								
Address	3352 128th Ave	Add	ress	3352 128th	Ave	E								
						F			-					
City/State/Zip	Holland, Michigan 49424	City/	/State/Zip	Holland, Mic	chigan 49424	G								
Phone	(616) 399-6070	Pho	ne	(616) 399-60	70	Н								
Fax	(616) 399-6185	Fax		(616) 399-61	85	1								
eMail Address	chad.whelton@alsglobal.com	еМа	il CC			J								
ALS Sample ID	Client Sample ID	Matrix	Collection	Date 24hr	Bottle	Α	В	С	D	E	F	G	Н	1
20080710-01C	MW-4	Groundwat	er 10/Aug/2	020 11:07	(2) 1LPHNO3	X		,	1	<del> </del>				

	(	С	0	m	m	en	ts	•
--	---	---	---	---	---	----	----	---

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Reingartshed by:	Date/Time 8-11-20 1430	Received by:  EMILY LYONS   Q	Date/Time . AUG 1 2 2020 \ \( \text{VOO} \)	Cooler IDs	Report/QC Level Std
Relinquished by:	Date/Time	Received by:	Date/Time		

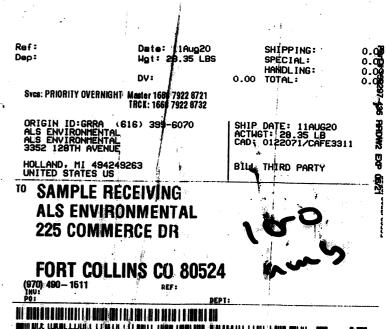


# ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:		Al	_S_MI		٧	Vorkorder No:		2	200	8278	3	
Project Manager:		JRK		Initials:	ER	L		Date:		08.1	3.20	)
1. Are airbills / shippin	g docum	ents presen	nt and/or rer	novable?			1	Drop Off	<b>√</b>	YES		NO
2. Are custody seals on	shippin	g container	s intact?			TO SERVICE STREET, STR	V	NONE		YES		NO:
3. Are custody seals on	sample	containers	intact?	and the second s		u i demokratik di vi di modalah per mulukah papa ng guanten aw	V	NONE		YES		NO.
4. Is there a COC (chair	n-of-cust	ody) presen	it?			A CONTROL OF A CON			V	YES		NO.
s. Is the COC in agreen	nent witl	n samples re	eceived? (IDs,	dates, times, # of sam	oles, # of contain	ers, matrix, requested ar	alyses, e	tc.)	V	YES		NO:
6. Are short-hold samp	les pres	ent?	7,000	00 to 2 t t 100 to 100	TTT000000000 1 1 TTT00000 1	and the same of th		-		YES	V	NO
7. Are all samples with	in holdir	g times for	the request	ed analyses?		out technology agent? property 1 1 1967	. · · · · · · COLLAND	The state of the s	V	YES		NO:
8. Were all sample con	tainers r	eceived inta	act? (not broken	or leaking)		, , , , , , , , , , , , , , , , , , , ,			V	YES		NO•
9. Is there sufficient sa	mple for	the reques	ted analyses	?	- 311 - 111 - 2 -		N. J. SIMMAPPE	***************************************	V	YES		NO:
10. Are samples in prop	er conta	ainers for re	quested ana	lyses? (form 250,	Sample Handling	Guidelines )	***************************************	10.17	V	YES		NO•
11. Are all aqueous sam	nples pre	served corr	ectly, if requ	iired?		CONTRACTOR OF THE PROPERTY OF		N/A	V	YES		NO•
12. Were unpreserved	samples	pH checked	l, if required	?			V	N/A		YES		NO
13. Are all samples requir	ing no he	adspace (voc,	GRO, RSK/MEE, rade	on) free of bubb	les > 6 mm	in diameter?	V	N/A		YES		NO
14. Were the samples s	hipped o	on ice?	a warmen to the same and the sa							YES	V	NO
15. Were cooler tempe	ratures r	measured at	t 0.1 - 6.0°C?	IR gun used*:	#3	#5	<b>√</b>	Rad Only		YES		NO
Cooler #:	1	2	NASA 17-A-MINANE II MANAGE OF A STREET MANAGE	D. Jan 1984 Salah An mark Salah Sanggaran Januaran (1970).	A** B**							
Temperature (°C):	Amb	Amb	ellebon - delegatore en commercia i conseque	STREETSPRINE. STREET	A			daanin eessa saa	T & TANSPORTMAN TO THE	# 1405@ <b>#49***</b> ******	A-18	was a state
# of custody seals on cooler:	0	0	STEEN STATE OF STATE STATE OF THE STATE OF T	anne semme Metale,				ner major men removimente a	n vo rendeblani.		I MANAGE . 11 POOR	~ C.19
External mR/hr reading:	9	10	Milder of Section 1985	The distance consists a constitution		Salaman Tanaharan Salaman Sala	er i knoromejer i rii i	FRINGS HAR CONTRACTOR	14/73\ <b>XXX</b>	r colleged at a c	***************************************	
Background mR/hr reading:	11	Were exte		dings ≤ two times e criteria? (If no, :		l and within DOT 8)	<b>√</b>	N/A		YES		NO
* Please provide	e details be	elow for 'NO' re				7 thru 12, notify P	М&с	ontinue	w/I	ogin.		
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If applicable, was the c	lient cor	ntacted?	ا <b>لال</b> ا کالا	NA Contact	Name:				Da	ite:		
Project Manager Sig	nature	/ Date:	(///	130	8	-13- N						
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Form 201r30.xls (06/04/2020) +IR Gun #3, VWR SN 170647571 +IR Gun #5, VWR SN 192272629





FedEx Express

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WED - 12 AUG 10:30A PRIORITY OVERNIGHT

0201

NA FTCA

2 of 2

80524 co-us DEN



### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 31-Aug-20

 Project:
 20080710
 Work Order:
 2008278

 Sample ID:
 MW-4
 Lab ID:
 2008278-1

 Legal Location:
 Matrix:
 WATER

Collection Date: 8/10/2020 11:07 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	- Method 903.1	SOI	P 783	Prep	Date: 8/19/2020	PrepBy: <b>TRW</b>
Ra-226	ND (+/- 0.3)	Y1,U	0.43	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC		SOI	P 724	Prep	Date: 8/19/2020	PrepBy: <b>RGS</b>
Ra-228	1.24 (+/- 0.51)		0.79	pCi/l	NA	8/28/2020 10:43
Carr: BARIUM	86.7		40-110	%REC	DI = NA	8/28/2020 10:43

AR Page 1 of 2 **8 of 11** 

#### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 31-Aug-20

 Project:
 20080710

 Sample ID:
 MW-4

 Lab ID:
 2008278-1

Legal Location: Matrix: WATER

Collection Date: 8/10/2020 11:07 Percent Moisture:

Report Dilution
Analyses Result Qual Limit Units Factor Date Analyzed

#### **Explanation of Qualifiers**

#### Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

\* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested

MDC.

#### **Inorganics:**

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

\* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

#### Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

\* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:

- gasoline

- JP-8

diesel
mineral spirits

mineral spirits
 motor oil

- Stoddard solvent

- bunker C

ALS -- Fort Collins
LIMS Version: 7.010

Client: ALS Environmental

**Work Order:** 2008278 **Project:** 20080710 **Date:** 8/31/2020 2:04:

Batch ID: R	RE200819-2-2	Instru	ument ID Alp	oha Scin		Method: R	adium-226	by Radon	Emanation				
LCS	Sample ID:	RE200819-2				U	nits: <b>pCi/l</b>		Analys	s Date:	8/31/202	0 11:50	
Client ID:			Run II	D: <b>RE200819-</b> 2	2A			Pr	ep Date: <b>8/19</b>	/2020	DF:	NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226			44 (+/- 11)	1	46.46		94.9	67-120					P,Y1
Carr: BARI	IUM		15900		15530		102	40-110					Y1
МВ	Sample ID:	RE200819-2				U	nits: <b>pCi/l</b>		Analys	s Date:	8/31/202	0 12:05	
			Run ID: <b>RE200819-2A</b>										
Client ID:			Run II	D: RE200819-2	2A			Pr	ep Date: <b>8/19</b>	/2020	DF:	NA	
Client ID: Analyte			Run II Result	D: <b>RE200819-2</b> ReportLimit	SPK Val	SPK Ref Value	%REC	Processing Control Limit	ep Date: 8/19  Decision  Level	/2020 DER Ref	DF: DER	DER Limit	Qual
						_	%REC	Control	Decision	DER		DER	Qual Y1,U

**Client:** ALS Environmental

**Work Order:** 2008278 **Project:** 20080710

## QC BATCH REPORT

Batch ID: F	R <b>A200819-1-4</b> Ir	strument ID LB	4100-C		Method: F	Radium-228	Analys	is by GFPC				
LCS	Sample ID: <b>RA200819-1</b>				L	Inits: <b>pCi/I</b>		Analys	is Date: 8	3/28/202	0 10:43	
Client ID:		Run II	D: <b>RA200819</b> -	1A				Prep Date: 8/19	/2020	DF:	NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228		24.1 (+/- 5.6)	0.8	23.94		101	70-130	)				Р
Carr: BARI	UM	27430		32570		84.2	40-110	)				
LCSD	Sample ID: <b>RA200819-1</b>				L	Inits: <b>pCi/l</b>		Analys	is Date: 8	3/28/202	0 10:43	
Client ID:		Run II	D: <b>RA200819</b> -	1A				Prep Date: <b>8/19/2020</b> DF: <b>NA</b>				
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228		30.3 (+/- 7.1)	0.9	23.94		126	70-130	)	24.1	0.7	2.1	Р
Carr: BARI	UM	26360		32570		80.9	40-110	)	27430			
МВ	Sample ID: <b>RA200819-1</b>				L	Inits: <b>pCi/l</b>		Analys	is Date: 8	3/28/202	0 10:43	
Client ID:		Run II	D: <b>RA200819</b> -	1A				Prep Date: 8/19	/2020	DF:	NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228		ND	0.66									Y1,U
Carr: BARI	UM	32590		32570		100	40-110	)				Y1

The following samples were analyzed in this batch: 200

2008278-1

QC Page: 2 of 2



## **APPENDIX B-3**

**November 2020 Groundwater Data** 



29-Dec-2020

Karen Okonta NTH Consultants, Ltd. 41780 Six Mile Road Northville, MI 48168

Re: Holland Board of Public Works Work Order: 20112217

Dear Karen,

ALS Environmental received 9 samples on 24-Nov-2020 06:00 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 42.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton Project Manager

#### **Report of Laboratory Analysis**

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 29-Dec-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order Sample Summary

Work Order: 20112217

Lah Samn ID	Client Sample ID	Matrix	Tag Number	<b>Collection Date</b>	Date Received	Hold
	<u> </u>					
20112217-01	PZ-1	Groundwater		11/24/2020 10:30	11/24/2020 18:0	0 🗆
20112217-02	MW-1	Groundwater		11/24/2020 13:15	11/24/2020 18:0	$\Box$
20112217-03	MW-2	Groundwater		11/24/2020 14:50	11/24/2020 18:0	$\Box$
20112217-04	MW-3	Groundwater		11/24/2020 16:35	11/24/2020 18:0	$\Box$
20112217-05	MW-3A	Groundwater		11/24/2020 17:55	11/24/2020 18:0	$\Box$
20112217-06	Field Duplicate	Groundwater		11/24/2020	11/24/2020 18:0	$\Box$
20112217-07	Field Blank	Water		11/24/2020 17:30	11/24/2020 18:0	$\Box$
20112217-08	Equipment Blank	Water		11/24/2020 17:30	11/24/2020 18:0	$\Box$

Date: 29-Dec-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Case Narrative

**Work Order:** 20112217

Samples for the above noted Work Order were received on 11/24/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

#### Metals:

Batch 168869, Method SW6020B, Sample 20112217-04A MS/MSD: The MS/MSD recovery was outside of the control limit for calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

#### Wet Chemistry:

Batch R305153, Method A4500-H B-11: pH is considered a "field test" and, as such, the recommended sample holding time expired prior to sample receipt. Results should be considered estimated.

Batch R305326, Method E300.0, Sample MW-2 (20112217-03B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample MW-4 (20112217-09B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample 20112217-04B MS/MSD: The MS/MSD recovery was below the lower control limit for fluoride. The corresponding result in the parent sample may be biased low for this analyte.

Radium analysis performed by ALS Fort Collins laboratory.

Qualifier	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U X	Analyzed but not detected above the MDL  Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.
Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
<b>Units Reported</b>	Description
$^{\circ}\mathrm{C}$	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Date: 29-Dec-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** PZ-1 **Lab ID:** 20112217-01

Collection Date: 11/24/2020 10:30 AM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: MAC
Mercury	0.00033		0.00020	mg/L	1	12/8/2020 02:24 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Arsenic	0.043		0.0050	mg/L	1	12/8/2020 03:56 PM
Barium	0.043		0.0050	mg/L	1	12/8/2020 03:56 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
Boron	0.47		0.020	mg/L	1	12/8/2020 03:56 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
Calcium	27		0.50	mg/L	1	12/8/2020 03:56 PM
Chromium	0.013		0.0050	mg/L	1	12/8/2020 03:56 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Lead	0.040		0.0050	mg/L	1	12/8/2020 03:56 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 03:56 PM
Molybdenum	0.036		0.0050	mg/L	1	12/8/2020 03:56 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
ANIONS BY ION CHROMATOGRAP	HY		E300.0			Analyst: <b>JDR</b>
Chloride	140		16	mg/L	16	12/8/2020 04:03 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:44 PM
Sulfate	6.3		2.0	mg/L	1	12/8/2020 03:44 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	8.20	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 11/30/20 18:59	Analyst: <b>ERW</b>
Total Dissolved Solids	1,200		300	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBCO	ONTRAC as no		Analyst: <b>ALS</b> 12/29/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** MW-1 **Lab ID:** 20112217-02

Collection Date: 11/24/2020 01:15 PM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: <b>MAC</b>
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:25 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Arsenic	0.029		0.0050	mg/L	1	12/8/2020 03:58 PM
Barium	0.30		0.0050	mg/L	1	12/8/2020 03:58 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
Boron	1.6		0.020	mg/L	1	12/8/2020 03:58 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
Calcium	100		0.50	mg/L	1	12/8/2020 03:58 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Lithium	0.14		0.010	mg/L	1	12/8/2020 03:58 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
ANIONS BY ION CHROMATOGRAPHY	<b>′</b>		E300.0			Analyst: <b>JDR</b>
Chloride	300		40	mg/L	40	12/8/2020 04:42 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 04:22 PM
Sulfate	11		2.0	mg/L	1	12/8/2020 04:22 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.88	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 11/30/20 18:59	Analyst: <b>ERW</b>
Total Dissolved Solids	1,100		300	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBCO	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 12/29/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** MW-2 **Lab ID:** 20112217-03

Collection Date: 11/24/2020 02:50 PM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: <b>MAC</b>
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:27 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Barium	0.23		0.0050	mg/L	1	12/8/2020 03:59 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
Boron	0.82		0.020	mg/L	1	12/8/2020 03:59 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
Calcium	80		0.50	mg/L	1	12/8/2020 03:59 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 03:59 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	660		80	mg/L	80	12/8/2020 05:20 PM
Fluoride	ND		2.0	mg/L	2	12/8/2020 05:01 PM
Sulfate	ND		4.0	mg/L	2	12/8/2020 05:01 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.88	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 11/30/20 18:59	Analyst: <b>ERW</b>
Total Dissolved Solids	1,500		500	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES			SUBC	ONTRAC	Т	Analyst: ALS
Subcontracted Analyses S	ee attached			as not	ted 1	12/29/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** MW-3 **Lab ID:** 20112217-04

Collection Date: 11/24/2020 04:35 PM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: <b>MAC</b>
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:29 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Barium	0.11		0.0050	mg/L	1	12/8/2020 04:01 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
Boron	0.47		0.020	mg/L	1	12/8/2020 04:01 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
Calcium	95		0.50	mg/L	1	12/8/2020 04:01 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Lithium	0.015		0.010	mg/L	1	12/8/2020 04:01 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
ANIONS BY ION CHROMATOGRAPHY	•		E300.0			Analyst: <b>JDR</b>
Chloride	73		8.0	mg/L	8	12/8/2020 06:37 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 06:18 PM
Sulfate	100		16	mg/L	8	12/8/2020 06:37 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.70	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	20.9	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 11/30/20 18:59	Analyst: <b>ERW</b>
Total Dissolved Solids	530		50	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 12/29/2020

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** MW-3A **Lab ID:** 20112217-05

Collection Date: 11/24/2020 05:55 PM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: MAC
Mercury	0.00024		0.00020	mg/L	1	12/8/2020 02:34 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Barium	0.28		0.0050	mg/L	1	12/8/2020 04:06 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
Boron	0.68		0.020	mg/L	1	12/8/2020 04:06 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
Calcium	140		0.50	mg/L	1	12/8/2020 04:06 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:06 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	120		8.0	mg/L	8	12/8/2020 08:14 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 07:55 PM
Sulfate	2.8		2.0	mg/L	1	12/8/2020 07:55 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.77	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	20.7	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 12/1/20 17:59	Analyst: <b>ERW</b>
Total Dissolved Solids	560		100	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBCO	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 12/29/2020

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

Sample ID: Field Duplicate Lab ID: 20112217-06

Collection Date: 11/24/2020 Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: MAC
Mercury	0.00025		0.00020	mg/L	1	12/8/2020 02:36 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Arsenic	0.029		0.0050	mg/L	1	12/8/2020 04:08 PM
Barium	0.29		0.0050	mg/L	1	12/8/2020 04:08 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
Boron	1.6		0.020	mg/L	1	12/8/2020 04:08 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
Calcium	100		0.50	mg/L	1	12/8/2020 04:08 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Lithium	0.14		0.010	mg/L	1	12/8/2020 04:08 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
ANIONS BY ION CHROMATOGRAPH	Υ		E300.0			Analyst: <b>JDR</b>
Chloride	290		40	mg/L	40	12/8/2020 08:52 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 08:33 PM
Sulfate	9.7		2.0	mg/L	1	12/8/2020 08:33 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.87	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 12/1/20 17:59	Analyst: <b>ERW</b>
Total Dissolved Solids	1,000		300	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC <sup>*</sup> as not		Analyst: <b>ALS</b> 12/29/2020

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**Client:** NTH Consultants, Ltd.

**Project:** Holland Board of Public Works Work Order: 20112217

Field Blank **Lab ID:** 20112217-07 Sample ID: Collection Date: 11/24/2020 05:30 PM Matrix: WATER

Report Limit Dilution Analyses Result Onal Unite Date Analyzed

**Date:** 29-Dec-20

Analyses	Result	Qual	Limit	Units	Factor	Date Analyzed
MERCURY BY CVAA			SW747	'0A	Prep: SW7470 12/8/20 12:13	Analyst: MAC
Mercury	0.00023		0.00020	mg/L	1	12/8/2020 02:38 PM
METALS BY ICP-MS			SW602	20B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Barium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
Boron	ND		0.020	mg/L	1	12/8/2020 04:16 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
Calcium	ND		0.50	mg/L	1	12/8/2020 04:16 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:16 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
ANIONS BY ION CHROMATOGRAP	PHY		E300.0			Analyst: <b>JDR</b>
Chloride	ND		1.0	mg/L	1	12/8/2020 03:05 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:05 PM
Sulfate	ND		2.0	mg/L	1	12/8/2020 03:05 PM
PH (LABORATORY)			A4500	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.37	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 12/1/20 17:59	Analyst: <b>ERW</b>
Total Dissolved Solids	ND		30	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES			SUBC	ONTRAC	Т	Analyst: ALS
Subcontracted Analyses	See attached			as no	ted 1	12/29/2020

See Qualifiers page for a list of qualifiers and their definitions. Note:

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Date:** 29-Dec-20

Sample ID:Equipment BlankLab ID:20112217-08Collection Date:11/24/2020 05:30 PMMatrix:WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 12/8/20 12:13	Analyst: <b>MAC</b>
Mercury	0.00022		0.00020	mg/L	1	12/8/2020 02:40 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Barium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
Boron	ND		0.020	mg/L	1	12/8/2020 04:18 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
Calcium	ND		0.50	mg/L	1	12/8/2020 04:18 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:18 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
ANIONS BY ION CHROMATOGRAPHY			E300.0			Analyst: <b>JDR</b>
Chloride	ND		1.0	mg/L	1	12/8/2020 03:25 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:25 PM
Sulfate	ND		2.0	mg/L	1	12/8/2020 03:25 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	5.85	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 12/1/20 17:59	Analyst: <b>ERW</b>
Total Dissolved Solids	ND		30	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES			SUBC	ONTRAC	Т	Analyst: ALS
Subcontracted Analyses S	ee attached			as no	ted 1	12/29/2020

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

Date: 29-Dec-20

# QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: 168861	Instrument ID <b>HG4</b>		Metho	d: <b>SW74</b> 7	70A					
MBLK	Sample ID: MBLK-168861-168	861			Units: mg/	L	Analysis	Date: 12/9	9/2020 08:	40 AM
Client ID:	Run	ID: HG4_	201209A		SeqNo: <b>697</b>	1362	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	ND	0.00020	)							
LCS	Sample ID: <b>LCS-168861-16886</b>	i1			Units: mg/	L	Analysis	Date: 12/8	3/2020 01:	57 PN
Client ID:	Run	ID: HG4_	201208A		SeqNo: <b>696</b> 9	9850	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.002055	0.00020	0.002		0 103	80-120	0			
MS	Sample ID: 20112217-04AMS				Units: mg/	L	Analysis	Date: 12/8	3/2020 02:	31 PN
Client ID: MW-3	Run	ID: HG4_	201208A		SeqNo: <b>696</b> 9	9864	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.00192	0.00020	0.002	-0.00004	35 98.2	75-125	0			
MSD	Sample ID: <b>20112217-04AMSD</b>	)			Units: mg/	L	Analysis	Date: 12/8	3/2020 02:	32 PN
Client ID: MW-3	Run	ID: HG4_	201208A		SeqNo: <b>696</b> 9	9865	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.001845	0.00020	0.002	-0.00004	35 94.4	75-125	0.00192	3.98	20	
The following sam	ples were analyzed in this batch	:	20112217-01, 20112217-04, 20112217-07,	A 20	0112217-02A 0112217-05A 0112217-08A		0112217-03A 0112217-06A			_

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: 168869	Instrument ID ICPMS3		Method	SW60	20B					
MBLK	Sample ID: MBLK-168869-1688	69			Units: mg/	L	Analys	is Date: <b>12</b> /	8/2020 03	:44 PM
Client ID:	Run I	D: ICPMS	3_201208A		SeqNo: <b>696</b> 9	9146	Prep Date: 12	/8/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050			·				·	
Thallium	ND	0.0050								

LCS	Sample ID: <b>LCS-168869-168869</b>	)			ι	Jnits: <b>mg/</b> l	L	Analysis Date: 12	2/8/2020 03:	46 PM
Client ID:	Run	ID: ICPMS	3_201208A		Se	eqNo: <b>696</b> 9	9147	Prep Date: <b>12/8/2020</b>	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value %RPD	RPD Limit	Qual
Antimony	0.09792	0.0050	0.1		0	97.9	80-120	0		
Arsenic	0.1003	0.0050	0.1		0	100	80-120	0		
Barium	0.1008	0.0050	0.1		0	101	80-120	0		
Beryllium	0.1047	0.0020	0.1		0	105	80-120	0		
Boron	0.5338	0.020	0.5		0	107	80-120	0		
Cadmium	0.1028	0.0020	0.1		0	103	80-120	0		
Calcium	10.29	0.50	10		0	103	80-120	0		
Chromium	0.1038	0.0050	0.1		0	104	80-120	0		
Cobalt	0.1047	0.0050	0.1		0	105	80-120	0		
Lead	0.1015	0.0050	0.1		0	101	80-120	0		
Lithium	0.09842	0.010	0.1		0	98.4	80-120	0		
Molybdenum	0.1027	0.0050	0.1		0	103	80-120	0		
Selenium	0.1006	0.0050	0.1		0	101	80-120	0		
Thallium	0.09517	0.0050	0.1		0	95.2	80-120	0		

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: 168869	Instrument ID ICPMS3	Method:	SW6020B
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MS	Sample ID: 20112217-04AMS				Units: mg/	L	Analysi	s Date: <b>12</b> /	8/2020 04:	03 PM
Client ID: MW-3	Run	D: ICPMS	3_201208A		SeqNo: <b>696</b> 9	9433	Prep Date: 12/	8/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09679	0.0050	0.1	0.000119	9 96.7	75-125	(	)		
Arsenic	0.09873	0.0050	0.1	0.000667	7 98.1	75-125	(	)		
Barium	0.2085	0.0050	0.1	0.110	4 98.1	75-125	(	)		
Beryllium	0.103	0.0020	0.1	0.000052	8 103	75-125	(	)		
Boron	0.9917	0.020	0.5	0.469	7 104	75-125	(	)		
Cadmium	0.1006	0.0020	0.1		0 101	75-125	(	)		
Calcium	101.4	0.50	10	95.2	6 61.2	75-125	(	)		SO
Chromium	0.1024	0.0050	0.1	0.000705	1 102	75-125	(	)		
Cobalt	0.1024	0.0050	0.1	0.000262	9 102	75-125	(	)		
Lead	0.1014	0.0050	0.1	0.000215	6 101	75-125	(	)		
Lithium	0.112	0.010	0.1	0.0153	5 96.7	75-125	(	)		
Molybdenum	0.1028	0.0050	0.1	0.000735	9 102	75-125	(	)		
Selenium	0.09924	0.0050	0.1	-0.000324	5 99.6	75-125	(	)		
Thallium	0.09504	0.0050	0.1	-0.000023	1 95.1	75-125	(	)		

MSD	Sample ID: <b>20112217-04AMSD</b>				Units: <b>mg/</b>	L	Analysis	Date: 12/8	3/2020 04:	05 PM
Client ID: MW-3	Run	ID: ICPMS	3_201208A	Se	eqNo: <b>696</b> 9	9434	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09862	0.0050	0.1	0.0001199	98.5	75-125	0.09679	1.87	20	
Arsenic	0.1015	0.0050	0.1	0.0006677	101	75-125	0.09873	2.8	20	
Barium	0.208	0.0050	0.1	0.1104	97.6	75-125	0.2085	0.248	20	
Beryllium	0.1051	0.0020	0.1	0.0000528	105	75-125	0.103	2.01	20	
Boron	1.011	0.020	0.5	0.4697	108	75-125	0.9917	1.98	20	
Cadmium	0.1037	0.0020	0.1	0	104	75-125	0.1006	3.01	20	
Calcium	101	0.50	10	95.26	57.2	75-125	101.4	0.394	20	SO
Chromium	0.1025	0.0050	0.1	0.0007051	102	75-125	0.1024	0.129	20	
Cobalt	0.1041	0.0050	0.1	0.0002629	104	75-125	0.1024	1.63	20	
Lead	0.1049	0.0050	0.1	0.0002156	105	75-125	0.1014	3.34	20	
Lithium	0.1132	0.010	0.1	0.01535	97.8	75-125	0.112	0.983	20	
Molybdenum	0.1071	0.0050	0.1	0.0007359	106	75-125	0.1028	4.11	20	
Selenium	0.1027	0.0050	0.1	-0.0003245	103	75-125	0.09924	3.38	20	
Thallium	0.09767	0.0050	0.1	-0.0000231	97.7	75-125	0.09504	2.72	20	

The following samples were analyzed in this batch:

20112217-01A	20112217-02A	20112217-03A	
20112217-04A	20112217-05A	20112217-06A	
20112217-07A	20112217-08A		

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: <b>168457</b>	Instrument ID TDS	<b> </b>		Method	: <b>A2540</b>	<b>C</b> -1	11					
MBLK	Sample ID: MBLK-1684	57-168457					Units: <b>mg/l</b>	_	Analysis	Date: <b>12/2</b>	2/2020 03:	48 PM
Client ID:		Run ID:	TDS_20	1202C		Se	eqNo: <b>6952</b>	2481	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solid	s	ND	30									
LCS	Sample ID: LCS-168457	-168457					Units: <b>mg/l</b>	-	Analysis	Date: <b>12/2</b>	2/2020 03:	48 PN
Client ID:		Run ID:	TDS_20	1202C		Se	eqNo: <b>6952</b>	2480	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solid	s	486	30	495		0	98.2	85-109	0			
DUP	Sample ID: <b>20112115-0</b> 2	IC DUP					Units: <b>mg/l</b>	_	Analysis	Date: <b>12/2</b>	2/2020 03:	48 PN
Client ID:		Run ID:	TDS_20	1202C		Se	eqNo: <b>6952</b>	2459	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solid	s	366.7	50	0		0	0	0-0	383.3	4.44	10	
DUP	Sample ID: 20112217-04	4B DUP					Units: <b>mg/l</b>	=	Analysis	Date: <b>12/2</b>	2/2020 03:	48 PN
Client ID: MW-3		Run ID:	TDS_20	1202C		Se	eqNo: <b>6952</b>	2477	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solid	s	566.7	50	0		0	0	0-0	530	6.69	10	
The following samp	les were analyzed in this	batch:		112217-01E 112217-04E		0112	2217-02B	20	112217-03B			

**Work Order:** 20112217

**Project:** Holland Board of Public Works

MBLK	Sample ID: MBLK-1685	53-168553				П	Jnits: <b>mg/L</b>		Analys	is Date: <b>12/3</b>	1/2020 02·	30 PM
Client ID:	Cumple IB. MBER-1000	Run ID:	TDS 20	112030			gNo: <b>6956</b>		Prep Date: 12		DF: 1	JU 1 141
Ollerit ID.		Rull ID.	103_20	712030	00110		q1 <b>1</b> 0. <b>6936</b>			1/2020		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	S	ND	30									
LCS	Sample ID: LCS-168553	3-168553				U	Jnits: <b>mg/l</b>	-	Analys	is Date: <b>12</b> /3	3/2020 02:	30 PM
Client ID:		Run ID:	TDS_20	01203D		Se	qNo: <b>6956</b>	230	Prep Date: 12	1/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	S	490	30	495		0	99	85-109	(	)		
DUP	Sample ID: <b>20112217-0</b>	5B DUP				U	Jnits: <b>mg/L</b>	-	Analys	is Date: <b>12/3</b>	3/2020 02:	30 PM
Client ID: MW-3A		Run ID:	TDS_20	01203D		Se	qNo: <b>6956</b>	225	Prep Date: 12	1/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Total Dissolved Solids	s	566.7	100	0		0	0	0-0	56	1.18	10	
The following sampl	les were analyzed in this	s batch:	_	)112217-05E )112217-08E		)112:	217-06B	20	112217-07B			

**Work Order:** 20112217

**Project:** Holland Board of Public Works

LCS	Sample ID: LCS-R30515	3-R30515	3			L	Jnits: <b>s.u.</b>		Analysis	Date: 12/7	/2020 12:	54 PM
Client ID:		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3900	Prep Date:		DF: <b>1</b>	
Analyte	ı	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)		3.95	0.10	4		0	98.8	92-108	0			
DUP	Sample ID: <b>20112217-0</b> 1	IB DUP				L	Jnits: <b>s.u.</b>		Analysis	Date: <b>12/7</b>	//2020 12:	54 PM
Client ID: PZ-1		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3902	Prep Date:		DF: <b>1</b>	
Analyte	I	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)		8.46	0.10	0		0	0	0-0	8.2	3.12	5	Н
Temperature		21.03	0.10	0		0	0	0-0	21.08	0.237		Н
DUP	Sample ID: <b>20112328-0</b> 1	IA DUP				L	Jnits: <b>s.u.</b>		Analysis	Date: <b>12/7</b>	//2020 12:	54 PM
Client ID:		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3913	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)		7.53	0.10	0		0	0	0-0	7.39	1.88	5	Н
Temperature		21.08	0.10	0		0	0	0-0	21.15	0.332		Н
The following sam	ples were analyzed in this	batch:	20	)112217-01E )112217-04E )112217-07E	3 20	0112	217-02B 217-05B 217-08B		112217-03B 112217-06B			

NTH Consultants, Ltd.

Work Order:

20112217

**Project:** 

**Client:** 

Holland Board of Public Works

Batch ID: R305326 Instrument ID IC3 Method: E300.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/8/2020 01:29 PM Client ID: Run ID: IC3 201208A SeqNo: 6971195 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Limit Value Limit Value SPK Val %REC %RPD Qual Analyte Result **PQL** ND Chloride 1.0 ND Fluoride 0.10 ND Sulfate 1.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/8/2020 09:12 PM Prep Date: Client ID: Run ID: IC3 201208A SeqNo: 6971219 DF: 1 SPK Ref Control RPD Ref RPD Value Limit Value Limit SPK Val %REC Qual Analyte Result **PQL** %RPD ND Chloride 1.0 ND Fluoride 0.10 Sulfate ND 1.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/9/2020 02:39 AM Client ID: Run ID: IC3 201208A SeqNo: 6971236 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Value Limit Value Limit Result SPK Val %REC %RPD Qual **PQL** Analyte ND Chloride 1.0 Fluoride ND 0.10 ND Sulfate 1.0 LCS Sample ID: LCS-R305326 Units: mg/L Analysis Date: 12/8/2020 01:48 PM Client ID: Run ID: IC3 201208A SeqNo: 6971196 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Value Limit Value Limit SPK Val %REC %RPD Qual Result PQL Analyte 9.372 0 93.7 Chloride 1.0 10 90-110 0 Fluoride 1.808 2 0 90.4 90-110 0 0.10 9.738 Sulfate 1.0 10 0 97.4 90-110 0 LCS Sample ID: LCS-R305326 Units: mg/L Analysis Date: 12/8/2020 09:31 PM Client ID: Prep Date: Run ID: IC3\_201208A SeqNo: 6971220 DF: 1 SPK Ref Control RPD Ref RPD Value Value Limit Limit %RPD Analyte Result **PQL** SPK Val %REC Qual 9.405 Chloride 1.0 10 0 94 90-110 0 1.915 0 Fluoride 0.10 2 95.7 90-110 0 Sulfate 9.659 1.0 10 0 96.6 90-110 0

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: <b>R305326</b>	Instrument ID IC3			Metho	d: <b>E300.0</b>								
LCS	Sample ID: LCS-R3053	26				U	Jnits: <b>mg</b> /l	L	Analy	sis D	ate: <b>12/9</b>	0/2020 02	:58 AM
Client ID:		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1237	Prep Date:			DF: <b>1</b>	
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		9.418	1.0	10		0	94.2	90-110		0			
Fluoride		1.96	0.10	2		0	98	90-110		0			
Sulfate		9.756	1.0	10		0	97.6	90-110		0			
MS	Sample ID: <b>20112217-0</b>	4B MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/8</b>	3/2020 07	:16 PM
Client ID: MW-3		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1213	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		263	20	200	71.9	93	95.6	80-120		0			
Fluoride		31.67	2.0	40		0	79.2	80-120		0			S
Sulfate		285.7	20	200	98.9	95	93.4	80-120		0			
MS	Sample ID: <b>20120200-0</b>	8D MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/9</b>	/2020 02	:00 AM
Client ID:		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1234	Prep Date:			DF: <b>40</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		615.3	40	400	245.	.7	92.4	80-120		0			
Fluoride		72.29	4.0	80		0	90.4	80-120		0			
Sulfate		377.7	40	400	7.80	)4	92.5	80-120		0			
MS	Sample ID: <b>20120200-1</b>	3D MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/9</b>	0/2020 04	:54 AM
Client ID:		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1243	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		441.2	20	200	239.	.1	101	80-120		0			Ε
Fluoride		36.21	2.0	40		0	90.5	80-120		0			
Sulfate		244.3	20	200	57.5	51	93.4	80-120		0			
MSD	Sample ID: <b>20112217-0</b>	4B MSD				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/8</b>	3/2020 07	:35 PM
Client ID: MW-3		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1214	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		262.6	20	200	71.9	93	95.4	80-120	2	63	0.15	20	
Fluoride		31.48	2.0	40		0	78.7	80-120	31.0	67	0.621	20	S
Sulfate		285.4	20	200	98.9	95	93.2	80-120	285	5.7	0.114	20	

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: <b>R305326</b>	Instrument ID IC3			Method	: E300.0							
MSD	Sample ID: <b>20120200-0</b>	8D MSD				U	nits: <b>mg/</b>	L	Analysis	Date: <b>12/9</b>	/2020 02:	20 AM
Client ID:		Run ID:	IC3_20	1208A		Sec	qNo: <b>697</b> ′	1235	Prep Date:		DF: <b>40</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		613.3	40	400	245	.7	91.9	80-120	615.3	0.325	20	
Fluoride		73.46	4.0	80		0	91.8	80-120	72.29	1.6	20	
Sulfate		374.6	40	400	7.80	)4	91.7	80-120	377.7	0.824	20	
MSD	Sample ID: <b>20120200-1</b>	3D MSD				U	nits: <b>mg/</b>	L	Analysis	Date: <b>12/9</b>	/2020 05:	13 AM
Client ID:		Run ID:	IC3_20	1208A		Sec	qNo: <b>697</b> ′	1244	Prep Date:		DF: <b>20</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		441.1	20	200	239	.1	101	80-120	441.2	0.019	20	E
Fluoride		36.47	2.0	40		0	91.2	80-120	36.21	0.737	20	
Sulfate		243.8	20	200	57.5	51	93.1	80-120	244.3	0.204	20	
The following samp	oles were analyzed in thi	s batch:	20	)112217-01B )112217-04B )112217-07B	20	1122	217-02B 217-05B 217-08B		112217-03B 112217-06B			



Cincinnati, OH +1 513 733 5336

Everett, WA +1 425 356 2600 Fort Collins, CO +1 970 490 1511

## **Chain of Custody Form**

Houston, TX +1 281 530 5656 Spring City, PA +1 610 948 4903 South Charleston, WV +1 304 356 3168

Holland, MI +1 616 399 6070

Middletown, PA +1 717 944 5541 Salt Lake City, UT +1 801 266 7700

York, PA +1 717 505 5280

COC ID: 189585

						ALS Project	Manager:					ALS	Nork (	Order	#:	20	1/2:	217
Ç	Customer Informatio	n		Proj	ect Informa	ition	peyor	4		Par	amete	er/Met	hod F	eques	it for /	Analys		
Purchase Order			Project Na	ame H	iolland	Bpw Jo			Meta	als inclu	ding H	ÿ						
Work Order			Project Nurr	nber 7	3-1400	117		В	Chlo	ride, Flu	Joride,	Sulfate	3				W	
Company Name	NTH Consultants, Lt	td.	Bill To Comp			of Public Work	₿	С	ρH	***************************************								
Send Report To	Karen Okonta		Invoice	Attn A	counts Payab	ole	,,,,,,,	D	TDS							***************************************		
Address	41780 Six Mile Road	d	Addr	1	5 Hastings			E	Radi	um 22 <del>0</del>	& 128							
City/State/Zip	Northwile, MI 48166	3	City/State/	/Zip Ho	illand, Mi 494	423		G		/AA/4A			,,,,,,,	***************************************				
Phone	(248) 862-2668		Ph	one (6°	16) 355-1210	***************************************		н						***************************************				
Fax	(248) 324-5305	A/#//// 48/- AA AAAA		Fax	1. A A A A A A A A A A A A A A A A A A A			ı			·/·			······································	*//////////////////////////////////////			
e-Mail Address		,,,,,,	e-Mail Addr	ess		^^		J										
No.	Sample Description		Date	Time	Matrix	Pres.	# Bottles	A	В	C	D	E	F	G	Н	Ĭ.	J	Hold
1 PZ-1			11-24-20	10:30	a GW	a	4	X	V	Χ	X	Х		N. S	Addition	- Parket mande		
2 MV -1			11-24-20	1:15P	GW	<b>2</b> 00	4	χ	X	X	Χ	χ				22.00		
3 MW-2			· · · · · · · · · · · · · · · · · · ·	2:50f		a	ú	χ	Х	X	χ̈́	γ		-		- Panalana varia		
4 MW-3				4:35		à	4	Χ	X	X	X	Ŷ				***************************************		
5 MW-3F	}			<b>Windows</b>		Ā	4	χ	X	X	ΧÌ	Ý				and the second second		
6 MW-3.	-Ms					à	Ц	Χ	Х	X	X	χ̈́				100		
7 MW-3	-MSD		irayao	4:35		a	Ý	Χ	χ	ΪŻ	X	χ				-		
8 Field	Oplicate		11-24-20	NA	GW	a	4	χ	X	Ϋ́	X	Ý				The same of the same of		
9 Field E	Blank	/*************************************	11-24-20	5:30	P GW	a	4	χ	X	Ϋ́	X	X						
10 Equipm	us Plank		11-24-26	5:30	PGW	a	Ý	Χ	Χ	X	X	χ						
Sampler(s) Please Pr	rint & Sign	D	Shipmen Drop	t Method	Red	quired Turnard			-	Othe	· M ( // minut manus / M /	~~~	~-*:	Re	sults C	Due Dat	e:	
Relinquished by:	rachons.	Date:	Time:	Received by:		<b>)</b> Std 10 W	K Days [	5 WK Notes:	Days		K Days		4 Hour					
Relinquished by:		Date: ,	Time;	Received by	/				ler ID	Coole	er Temp.	Tool	)aakaaa	. /Ohnal	. O D	22 -1		
		11/24/20	1900		5/2	<i>&gt;</i> _	_	000	ner iD	Coole	ar rennp.	Tuc:	^-:	i (Cneci II Std Qr		ox Belov	-03	CheckList
Logged by (Laboratory)	· Kev	Date: (1/25/20	Time: /035	Checked by	(Laboratory)	10	)	/L		2.4%			Level	ili Std Q IV <b>S</b> VV84	IO/Raw I	74A		Level IV
Preservative Key:			aOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	6-NaH	SO <sub>4</sub> 7-Oth	er 84°C	<b>9-</b> 5035		123	399		****						

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Client Name: NTH - NORTHVILLE

#### Sample Receipt Checklist

Date/Time Received:

24-Nov-20 18:00

Work Order: 2011	12217				Received b	y: <u><b>K</b>l</u>	<u>RW</u>		
Checklist completed l	by Keith Wierenga	:	25-Nov-20	)	Reviewed by:	Chad Whe	elton		30-Nov-20
·	ater dEx	l				J			
Shipping container/co	poler in good condition?		Yes	<b>~</b>	No 🗌	Not Present			
Custody seals intact o	on shipping container/cooler?	•	Yes		No 🗌	Not Present	<b>✓</b>		
Custody seals intact o	on sample bottles?		Yes		No 🗌	Not Present	<b>~</b>		
Chain of custody pres	sent?		Yes	<b>~</b>	No 🗌				
Chain of custody sigr	ned when relinquished and re	ceived?	Yes		No 🗸				
Chain of custody agre	ees with sample labels?		Yes	<b>✓</b>	No 🗌				
Samples in proper co	ontainer/bottle?		Yes	<b>✓</b>	No 🗌				
Sample containers in	tact?		Yes	<b>✓</b>	No 🗌				
Sufficient sample volu	ume for indicated test?		Yes	<b>✓</b>	No 🗌				
All samples received	within holding time?		Yes	<b>✓</b>	No 🗌				
Container/Temp Blan	nk temperature in compliance	?	Yes	<b>✓</b>	No 🗌				
Sample(s) received o			Yes		No 🗆	IDO		1	
Temperature(s)/Theri Cooler(s)/Kit(s):	mometer(s).		2.4, 3.	0, 4.0	3, 4.9, 3.7 C	IR3		]	
Date/Time sample(s)	sent to storage:		11/25/	2020	10:42:39 AM				
Water - VOA vials ha	-		Yes		No _	No VOA vials su	bmitted	<b>✓</b>	
Water - pH acceptabl	le upon receipt?		Yes	<b>✓</b>	No 🗌	N/A			
pH adjusted?			Yes		No 🗸	N/A		1	
pH adjusted by:			-						
Login Notes:									
======	=======								
Client Contacted:	С	Date Contacted:			Person	Contacted:			
Contacted By:	F	Regarding:							
Comments:								]	
Confinence.									
CorrectiveAction:								]	
Correction.								000	D 4 - 5 - 4



Ft. Collins, Colorado LIMS Version: 7.012 Page 1 of 1

Monday, December 28, 2020

Chad Whelton ALS Environmental 3352 128th Avenue Holland, MI 49424

Re: ALS Workorder: 2012004

**Project Name:** 

Project Number: 20112217

ulin Elliza

Dear Mr. Whelton:

Eight water samples were received from ALS Environmental, on 12/1/2020. The samples were scheduled for the following analyses:

Radium-226
Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental Julie Ellingson Project Manager ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environme	ental – Fort Collins
7 LO LITVII OTITILO	Tott Gomino
Accreditation Body	License or Certification Number
Alaska (AK)	17-003
Arizona (AZ)	AZ0742
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



## 2012004

#### Radium-228:

The samples were analyzed for the presence of <sup>228</sup>Ra by low background gas flow proportional counting of <sup>228</sup>Ac, which is the ingrown progeny of <sup>228</sup>Ra, according to the current revision of SOP 724.

All acceptance criteria were met.

#### Radium-226:

The samples were analyzed for the presence of <sup>226</sup>Ra according to the current revision of SOP 724.

All acceptance criteria were met.

# Sample Number(s) Cross-Reference Table

**OrderNum:** 2012004

Client Name: ALS Environmental

**Client Project Name:** 

Client Project Number: 20112217
Client PO Number: 20-122020059

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
PZ-1	2012004-1		WATER	24-Nov-20	10:30
MW-1	2012004-2		WATER	24-Nov-20	13:15
MW-2	2012004-3		WATER	24-Nov-20	14:50
MW-3A	2012004-4		WATER	24-Nov-20	17:55
Field Duplicate	2012004-5		WATER	24-Nov-20	
Fieild Blank	2012004-6		WATER	24-Nov-20	17:30
Equipment Blank	2012004-7		WATER	24-Nov-20	17:30
MW-3	2012004-8		WATER	24-Nov-20	16:35

Date Printed: Monday, December 28, 2020



Subcontractor:

ALS Environmental, Fort Collins

225 Commerce Dr.

Fort Collins, CO 80524

(800) 443-1511

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

Date:

30-Nov-20

COC ID:

<u>15283</u> Due Date: <u>15-Dec-20</u>

TEL: FAX:

Acct #:

	Salesperson	ALS	SHN Acc	ount												
	Customer Information			Pro	ject Inform	nation			Par	ameter/l	Method	Request	for Anal	ysis		
Purchase Order			Project	Name	20112217	,	A Sut	contrac	ted Anal	yses (Sl	JBCON'	TRACT)				
Work Order			Project	Number			B M	SIMSL	)							
Company Name	ALS Group USA, Corp		Bill To (	Company	ALS Group	p USA, Corp	С									
Send Report To	Chad Whelton		Inv Attn		Accounts	Payable	D									
Address	3352 128th Ave		Address	3	3352 128th	ı Ave	E									
			•				F									
City/State/Zip	Holland, Michigan 49424		City/Sta	te/Zip	Holland, M	lichigan 49424	G									
Phone	(616) 399-6070		Phone		(616) 399-	6070	Н									
Fax	(616) 399-6185		Fax		(616) 399-	6185	ı									
eMail Address	chad.whelton@alsglobal.com	1	eMail C	С			J									
ALS Sample ID	Client Sample ID	Ma	trix	Collection	Date 24hr	Bottle	Α	В	С	D	E	F	G	Н	I	J
20112217-01C	PZ-1	Ground	dwater	24/Nov/20	20 10:30	(2) 1LPHNO3	X								!	
20112217-02C	MW-1	Ground	dwater	24/Nov/20	20 13:15	(2) 1LPHNO3	X									
20112217-03C	MW-2	Ground	dwater	24/Nov/20	20 14:50	(2) 1LPHNO3	X									
20112217-05C	MW-3A	Ground	dwater	24/Nov/20	20 17:55	(2) 1LPHNO3	X									
20112217-06C	Field Duplicate	Ground	dwater	24/Nov	/2020	(2) 1LPHNO3	X									
20112217-07C	Field Blank	Wa	ater	24/Nov/20	20 17:30	(2) 1LPHNO3	X									
20112217-08C	Equipment Blank	Wa	ater	24/Nov/20	20 17:30	(2) 1LPHNO3	X									
20112217-09C	MW-4	Ground	dwater	24/Nov/20	20 12:16	(2) 1LPHNO3	X									
20112217-04C	MW-3	Ground	dwater	24/Nov/20	20 16:35	(6) 1LPHNO3	X	X								

Comments:	 	our instructions and indicasposed after 30 days. Repo	ated turnaround requirements. ort MW-4 separately.	Please incl	lude all QC with data.	The samples do not
Relinquished by:	Date/Time //-30~20 /2	Received by:	Date/Time	1030	Cooler IDs	Report/QC Level Std
Relinquished by:	Date/Time	Received by:	Date/Time	1030_		



# ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:		Holla	and		Workorder No:	2	012004	
Project Manager:		JME		Initials:	RGA	Date:	12/01/2020	0
1. Are airbills / shipping	g docume	nts present a	nd/or removal	ole?		Drop Off	✓ YES 🗌	NO
2. Are custody seals on	shipping	containers in	itact?			NONE	YES N	10+
3. Are custody seals on	sample o	ontainers int	act?	CANNESS OF PREFERENCE AND RESERVED AND	TITMETS TITEMEN TITEM TO THE TOTAL TO THE TITEMENT TO THE TITE	NONE	YES N	10+
4. Is there a COC (chain	-of-custo	dy) present?					YES N	10*
5. Is the COC in agreem	ent with	samples rece	ived? (IDs, dates, tin	nes, # of samples	# of containers, matrix, requested an	alyses, etc.)	YES 🔲 N	10+
6. Are short-hold samp	les preser	nt?					YES 🗸	NO
7. Are all samples withi	n holding	times for the	requested an	alyses?			YES N	10+
8. Were all sample con	tainers re	ceived intact	? (not broken or leakin	g)			YES N	10+
9. Is there sufficient sai	mple for t	he requested	l analyses?				YES 🔲 N	10*
10. Are samples in prop	er contai	ners for requ	ested analyses	? (form 250, <i>Sam</i>	ple Handling Guidelines )		YES 🔲 N	10+
11. Are all aqueous sam	ples pres	erved correct	lly, if required?		194		YES N	10+
12. Were unpreserved s	samples p	H checked, if	required?		THE THE THE PARTY OF STERVEN AND ASSESSED.	₩ N/A	☐ YES ☐	NO
13. Are all samples requir	ing no head	dspace (voc, gro	, RSK/MEE, radon) free	of bubbles	> 6 mm in diameter?	✓ N/A	YES _	NO
14. Were the samples s	hipped or	ice?			equate to the control of the control		YES 🗸	ΝО
15. Were cooler temper	ratures m	easured at 0.	1 - 6.0°C? IR	gun used*:	#3 #5	Rad Only	YES 🗸	ΝО
Cooler #:	1	2	PANATAL STATE OF THE STATE OF T	Annual managing 11177				.vr. 1 L.112
Temperature (°C):	amb	amb				erini si especiali izanigani izanigan	No. Normal State	
# of custody seals on cooler:	0	0	******** ******		ANY and AN ambore making making missing a selection of the constitution of the constit	breedy suddensyyee Ist by the comp		
External mR/hr reading:	11	11			WITH THE THE THE THE THE THE THE THE THE T	***************************************		
Background mR/hr reading:	9	Were externa	I mR/hr readings ≤ acceptance criter		ackground and within DOT Form 008)	☐ N/A	✓ YES 🗌	NO
* Please provide	details belo	ow for 'NO' respo	onses in gray boxe	s above - for	2 thru 5 & 7 thru 12, notify P	M & continue	w/ login.	
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If applicable, was the c	lient cont	acted?	YES   N/A	Contact I	Name /		Date:	
Project Manager Sig	nature /	Date:	40	/ 13	2/1/20			
					7 (*			

Ref: Date: 30Nov20 SHIPPING: 0.09
Dep: Wgt: 21.05 LBS SPECIAL: 0.00
Dv: 0.00 TOTAL: 0.09
Svcs PRIORITY OVERNIGHT Moster 1668 7926 2290
TRCK: 1668 7926 2290
TRCK: 1668 7926 2304

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE
HOLLAND, MI 494249263
UNITED STATES US

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1611
REF:
DEPT:

D

2 of 2 MPS# 1668 7926-2304 Mstr# 1668 7926 2290 TUE - 01 DEC 10:30A PRIORITY OVERNIGHT

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Ref: Dep:

Date: 30Nov20 Wgt: 43.60 LBS

SHIPPING:

Svcs: PRIORITY OVERNIGHT Mæter 1668 7926 2290 TRCK: 1668 7926 2290

BILL THIRD PARTY

SAMPLE RECEIVING **ALS ENVIRONMENTAL** 

FORT COLLINS CO 805



1 of 2 TRK# | 1668 7926 2290 ## MASTER ##

TUE - 01 DEC 10:30A

80524



## SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 PZ-1
 Lab ID:
 2012004-1

 Legal Location:
 Matrix:
 WATER

Collection Date: 11/24/2020 10:30 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanatio	n - Method 903.1	SOF	P 783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.28)	U	0.54	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	61.8		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.49)	U	0.93	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	72.8		40-110	%REC	DI = NA	12/22/2020 10:43

AR Page 1 of 9 9 of 19

#### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 MW-1
 Lab ID:
 2012004-2

 Legal Location:
 Matrix:
 WATER

Collection Date: 11/24/2020 13:15 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanatio	on - Method 903.1	SOF	783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	0.8 (+/- 0.6)		0.72	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	95.3		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	1.73 (+/- 0.64)		0.92	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	78		40-110	%REC	DI = NA	12/22/2020 10:43

#### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 MW-2
 Lab ID:
 2012004-3

Legal Location: Matrix: WATER

Collection Date: 11/24/2020 14:50 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	- Method 903.1	SOF	783	Prep	Date: 12/9/2020	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.23)	U	0.32	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	95.1		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	1.33 (+/- 0.51)		0.78	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	91.5		40-110	%REC	DL = NA	12/22/2020 10:43

AR Page 3 of 9 11 of 19

**Legal Location:** 

#### **SAMPLE SUMMARY REPORT**

Matrix: WATER

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 MW-3A
 Lab ID:
 2012004-4

Collection Date: 11/24/2020 17:55 Percent Moisture:

Analyses	Result		Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	- Method 903.1	SOF	783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.23)	U	0.35	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	94.8		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	0.79 (+/- 0.4)		0.71	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	93.6		40-110	%REC	DI = NA	12/22/2020 10:43

AR Page 4 of 9 12 of 19

**Legal Location:** 

## SAMPLE SUMMARY REPORT

Matrix: WATER

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 Field Duplicate
 Lab ID:
 2012004-5

Collection Date: 11/24/2020 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	- Method 903.1	SOF	783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.28)	U	0.37	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	98.8		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	1.42 (+/- 0.58)		0.9	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	79.6		40-110	%REC	DI = NA	12/22/2020 10:43

AR Page 5 of 9 13 of 19

#### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 Fieild Blank
 Lab ID:
 2012004-6

Legal Location: Matrix: WATER

Collection Date: 11/24/2020 17:30 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emana	tion - Method 903.1	SOF	P 783	Prep	Date: 12/9/2020	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.23)	U	0.37	pCi/I	NA	12/19/2020 11:55
Carr: BARIUM	97.9		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFP0		SOF	724	Prep	Date: 12/15/2020	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.5)	U	0.96	pCi/I	NA	12/22/2020 10:43
Carr: BARIUM	94.4		40-110	%REC	DL = NA	12/22/2020 10:43

AR Page 6 of 9 **14 of 19** 

#### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 Equipment Blank
 Lab ID:
 2012004-7

Legal Location: Matrix: WATER

Collection Date: 11/24/2020 17:30 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation	on - Method 903.1	SOF	P 783	Prep	Date: 12/9/2020	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.37)	U	0.82	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	89.3		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	ND (+/- 0.47)	U	0.9	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	96.3		40-110	%REC	DL = NA	12/22/2020 10:43

#### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 MW-3
 Lab ID:
 2012004-8

 Legal Location:
 Matrix:
 WATER

Collection Date: 11/24/2020 16:35 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanat	ion - Method 903.1	SOF	783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	ND (+/- 0.18)	U	0.32	pCi/I	NA	12/19/2020 11:55
Carr: BARIUM	94.1		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC		SOF	724	Prep	Date: <b>12/15/2020</b>	PrepBy: <b>RGS</b>
Ra-228	0.8 (+/- 0.42)		0.76	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	94.8		40-110	%REC	DL = NA	12/22/2020 10:43

AR Page 8 of 9 16 of 19

#### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 28-Dec-20

 Project:
 20112217
 Work Order:
 2012004

 Sample ID:
 MW-3
 Lab ID:
 2012004-8

Legal Location: Matrix: WATER

Collection Date: 11/24/2020 16:35 Percent Moisture:

Report Dilution
Analyses Result Qual Limit Units Factor Date Analyzed

#### **Explanation of Qualifiers**

#### Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

\* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested

MDC.

#### **Inorganics:**

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

\* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

#### Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

- B Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E Analyte concentration exceeds the upper level of the calibration range.
- J Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A A tentatively identified compound is a suspected aldol-condensation product.
- X The analyte was diluted below an accurate quantitation level.
- \* The spike recovery is equal to or outside the control criteria used.
- + The relative percent difference (RPD) equals or exceeds the control criteria.
- G A pattern resembling gasoline was detected in this sample.
- D A pattern resembling diesel was detected in this sample
- M A pattern resembling motor oil was detected in this sample.
- C A pattern resembling crude oil was detected in this sample.
- $\mbox{\bf 4}$  A pattern resembling JP-4 was detected in this sample.
- 5 A pattern resembling JP-5 was detected in this sample.
- H Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8 - diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Client: ALS Environmental

**Work Order:** 2012004 **Project:** 20112217

**Date:** 12/28/2020 9:09:

# QC BATCH REPORT

Batch ID: R	RE201209-1-1	trument ID: Alp	ha Scin		Method: I	Radium-226	by Rado	n Emanation	l				
DUP	Sample ID:	2012004-8			Units: <b>pCi/I</b>			Analysis Date: 12/19/2020 11:55					
Client ID: M	1W-3		Run II	D: <b>RE201209</b> -1	1B			I	Prep Date: <b>12</b> /	9/2020	DF	: NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226			ND	0.46						0.09	0.41	2.13	U
Carr: BARIL	UM		15700		15880		98.9	40-110		14930			
LCS	Sample ID:	RE201209-1				l	Units: <b>pCi/I</b>		Analy	sis Date: 1	2/19/20	20 12:13	}
Client ID:			Run II	D: <b>RE201209</b> -	1B			I	Prep Date: <b>12</b> /	9/2020	DF: <b>NA</b>		
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226			55 (+/- 14)	0	46.8		117	67-120					Р
Carr: BARIL	UM		12770		15760		81	40-110					
LCSD	Sample ID:	RE201209-1				Units: <b>pCi/I</b>			Analysis Date: 12/19/2020 12:13				
Client ID:			Run II	D: <b>RE201209-</b> 1	1B			1	Prep Date: <b>12/9/2020</b> DF: <b>NA</b>				
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226			36.4 (+/- 9.1)	0.2	46.8		77.9	67-120		55	1.11	2.13	Р
Carr: BARIL	UM		15250		15760		96.7	40-110		12770			
МВ	Sample ID:	RE201209-1				ı	Units: <b>pCi/I</b>		Analy	sis Date: 1	2/19/20	20 12:13	}
Client ID:			Run II	D: <b>RE201209</b> -	1B			I	Prep Date: <b>12</b> /	9/2020	DF	: NA	
Analyte			Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226			ND	0.3									Y1,U
Carr: BARIL	UM		16820		15760		107	40-110					Y1
The follow	ving samples v	vere analyzed i	n this batch:	20120 20120 20120	004-4	20120 20120 20120	004-5		2004-3 2004-6				

QC Page: 1 of 2

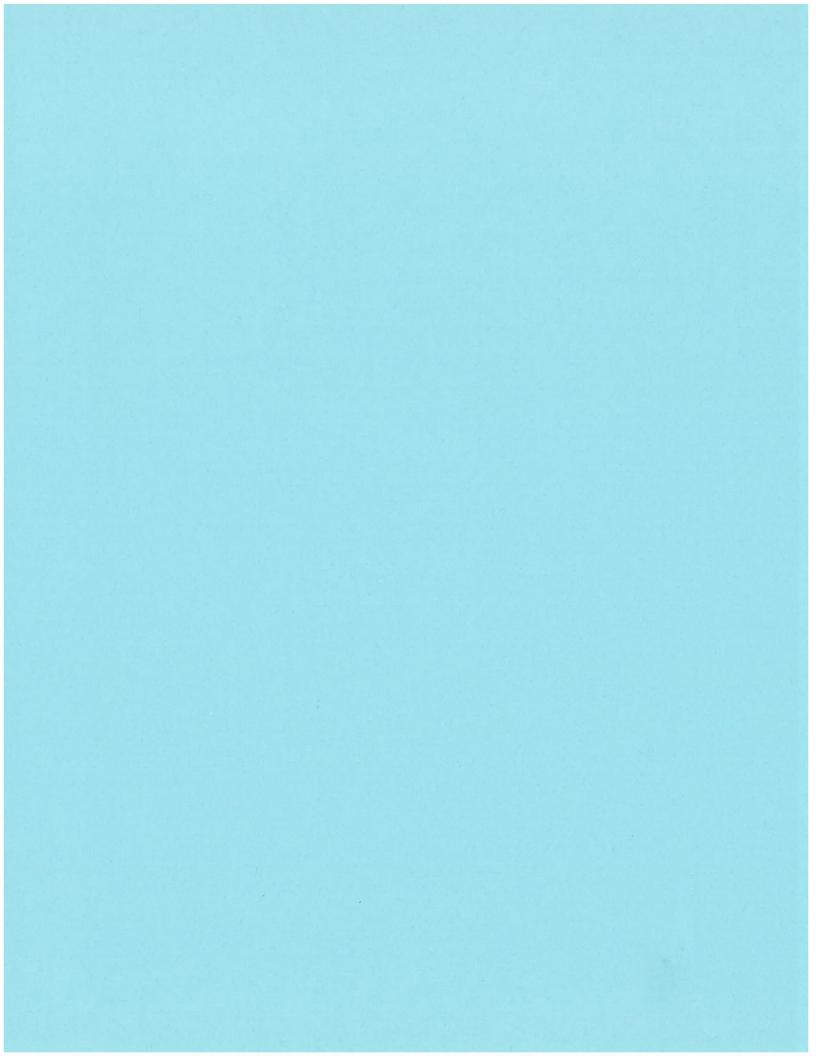
Client: ALS Environmental

**Work Order:** 2012004 **Project:** 20112217

# QC BATCH REPORT

Batch ID: R	RA201215-3-2 In	strument ID: LB4	4100-C		Method: R	adium-228	Analysi	s by GFPC				
DUP	Sample ID: 2012004-8				U	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/22/20	20 10:43	
Client ID: N	1W-3	Run II	D: <b>RA201215-</b> 3	BA				Prep Date: 12/	15/2020	DF:	: NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-228		ND	0.79						0.8	0.46	2.13	U
Carr: BARII	UM	30640		33760		90.8	40-110		31990			
LCS	Sample ID: <b>RA201215-3</b>				U	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/22/20	20 10:43	
Client ID:		Run II	Run ID: <b>RA201215-3A</b>			F			Prep Date: <b>12/15/2020</b> DF: <b>NA</b>			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-228		19.9 (+/- 4.7)	0.7	23.04		86.5	70-130					Р
Carr: BARII	UM	32190		33650		95.7	40-110					
МВ	Sample ID: <b>RA201215-3</b>				U	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/22/20	20 10:43	
Client ID:		Run II	D: <b>RA201215</b> -3	BA				Prep Date: 12/15/2020		DF:	: NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-228		ND	0.76									U
Carr: BARII	UM	32510		33650		96.6	40-110					
The follow	wing samples were analyzed	l in this batch:	20120 20120 20120	04-4	201200 201200 201200	)4-5		2004-3 2004-6				

QC Page: 2 of 2





29-Dec-2020

Karen Okonta NTH Consultants, Ltd. 41780 Six Mile Road Northville, MI 48168

Re: Holland Board of Public Works Work Order: 20112217

Dear Karen,

ALS Environmental received 9 samples on 24-Nov-2020 06:00 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 28.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton Project Manager

#### **Report of Laboratory Analysis**

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 29-Dec-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order Sample Summary

Work Order: 20112217

<u>Lab Samp ID Client Sample ID Matrix Tag Number Collection Date Date Received Hold</u>

20112217-09 MW-4 Groundwater 11/24/2020 12:16 11/24/2020 18:00

Date: 29-Dec-20

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Case Narrative

**Work Order:** 20112217

Samples for the above noted Work Order were received on 11/24/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

#### Metals:

Batch 168869, Method SW6020B, Sample 20112217-04A MS/MSD: The MS/MSD recovery was outside of the control limit for calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

### Wet Chemistry:

Batch R305153, Method A4500-H B-11: pH is considered a "field test" and, as such, the recommended sample holding time expired prior to sample receipt. Results should be considered estimated.

Batch R305326, Method E300.0, Sample MW-2 (20112217-03B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample MW-4 (20112217-09B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample 20112217-04B MS/MSD: The MS/MSD recovery was below the lower control limit for fluoride. The corresponding result in the parent sample may be biased low for this analyte.

Radium analysis performed by ALS Fort Collins laboratory.

Qualifier	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U X	Analyzed but not detected above the MDL  Analyzed but not detected in the Mathed Blank between the MDL and Benerting Limit, cample results may exhibit beakground or
A	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.
Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III
<b>Units Reported</b>	<b>Description</b>
$^{\circ}\mathrm{C}$	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Date: 29-Dec-20

### **ALS Group, USA**

Client: NTH Consultants, Ltd.

Project: Holland Board of Public Works Work Order: 20112217

**Sample ID:** MW-4 **Lab ID:** 20112217-09

Collection Date: 11/24/2020 12:16 PM Matrix: GROUNDWATER

**Date:** 29-Dec-20

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	<b>'0A</b>	Prep: SW7470 12/8/20 12:13	Analyst: <b>MAC</b>
Mercury	0.00023		0.00020	mg/L	1	12/8/2020 02:47 PM
METALS BY ICP-MS			SW602	0B	Prep: SW3015A 12/8/20 14:23	Analyst: STP
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Arsenic	0.0071		0.0050	mg/L	1	12/8/2020 04:19 PM
Barium	1.2		0.0050	mg/L	1	12/8/2020 04:19 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
Boron	0.94		0.020	mg/L	1	12/8/2020 04:19 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
Calcium	180		0.50	mg/L	1	12/8/2020 04:19 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Lithium	0.028		0.010	mg/L	1	12/8/2020 04:19 PM
Molybdenum	0.0069		0.0050	mg/L	1	12/8/2020 04:19 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
ANIONS BY ION CHROMATOGRAPHY	Y		E300.0			Analyst: <b>JDR</b>
Chloride	890		80	mg/L	80	12/8/2020 10:09 PM
Fluoride	ND		2.0	mg/L	2	12/8/2020 09:50 PM
Sulfate	ND		4.0	mg/L	2	12/8/2020 09:50 PM
PH (LABORATORY)			A4500-	H B-11		Analyst: <b>JB</b>
pH (laboratory)	6.89	Н	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	Н	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS			A2540	C-11	Prep: FILTER 12/1/20 17:59	Analyst: <b>ERW</b>
Total Dissolved Solids	3,000		1,500	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES Subcontracted Analyses	See attached		SUBC	ONTRAC as not	-	Analyst: <b>ALS</b> 12/29/2020

Date: 29-Dec-20 NTH Consultants, Ltd.

**Client:** Work Order: 20112217

Holland Board of Public Works **Project:** 

QC BATCH REPORT

Batch ID: 168861	Instrument ID <b>HG4</b>		Metho	d: <b>SW74</b> 7	70A					
MBLK	Sample ID: <b>MBLK-168861-1</b>	68861			Units: mg/	'L	Analysis	Date: <b>12</b> /9	9/2020 08	:40 AM
Client ID:	R	un ID: HG4_2	201209A		SeqNo: <b>697</b>	1362	Prep Date: 12/8	3/2020	DF: <b>1</b>	
Analyte	Resu	ılt PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	N	ID 0.00020								
LCS	Sample ID: <b>LCS-168861-168</b>	861			Units: mg/	'L	Analysis	Date: <b>12</b> /8	3/2020 01	:57 PM
Client ID:	R	un ID: <b>HG4_2</b>	01208A		SeqNo: 696	9850	Prep Date: 12/8	3/2020	DF: <b>1</b>	
Analyte	Resu	ult PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.00205	55 0.00020	0.002		0 103	80-120	0			
MS	Sample ID: <b>20112217-04AM</b>	S			Units: mg/	'L	Analysis	Date: <b>12</b> /8	3/2020 02	:31 PM
Client ID: MW-3	R	un ID: <b>HG4_2</b>	01208A		SeqNo: 696	9864	Prep Date: 12/8	3/2020	DF: <b>1</b>	
Analyte	Resu	ult PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.0019	0.00020	0.002	-0.000043	35 98.2	75-125	0			
MSD	Sample ID: <b>20112217-04AM</b>	SD			Units: mg/	'L	Analysis	Date: <b>12</b> /8	3/2020 02	:32 PM
Client ID: MW-3	R	un ID: <b>HG4_2</b>	201208A		SeqNo: 696	9865	Prep Date: 12/8	3/2020	DF: <b>1</b>	
Analyte	Resi	ılt PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
Mercury	0.00184	15 0.00020	0.002	-0.000043	35 94.4	75-125	0.00192	3.98	20	

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: 168869	Instrument ID ICPMS3		Method	SW60	20B					
MBLK	Sample ID: <b>MBLK-168869-1688</b>	69			Units: mg/	L	Analys	is Date: <b>12</b> /	8/2020 03	:44 PM
Client ID:	Run I	D: ICPMS	3_201208A		SeqNo: <b>696</b> 9	9146	Prep Date: 12	/8/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050			·				·	
Thallium	ND	0.0050								

LCS	Sample ID: <b>LCS-168869-168869</b>	)			ι	Jnits: <b>mg/</b> l	L	Analysis Date: 12	2/8/2020 03:	46 PM
Client ID:	Run	ID: ICPMS	3_201208A		Se	eqNo: <b>696</b> 9	9147	Prep Date: <b>12/8/2020</b>	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value %RPD	RPD Limit	Qual
Antimony	0.09792	0.0050	0.1		0	97.9	80-120	0		
Arsenic	0.1003	0.0050	0.1		0	100	80-120	0		
Barium	0.1008	0.0050	0.1		0	101	80-120	0		
Beryllium	0.1047	0.0020	0.1		0	105	80-120	0		
Boron	0.5338	0.020	0.5		0	107	80-120	0		
Cadmium	0.1028	0.0020	0.1		0	103	80-120	0		
Calcium	10.29	0.50	10		0	103	80-120	0		
Chromium	0.1038	0.0050	0.1		0	104	80-120	0		
Cobalt	0.1047	0.0050	0.1		0	105	80-120	0		
Lead	0.1015	0.0050	0.1		0	101	80-120	0		
Lithium	0.09842	0.010	0.1		0	98.4	80-120	0		
Molybdenum	0.1027	0.0050	0.1		0	103	80-120	0		
Selenium	0.1006	0.0050	0.1		0	101	80-120	0		
Thallium	0.09517	0.0050	0.1		0	95.2	80-120	0		

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: 168869	Instrument ID ICPMS3	Method:	SW6020B
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MS	Sample ID: 20112217-04AMS				Units: mg/l	L	Analysi	s Date: <b>12</b> /	8/2020 04:	03 PM
Client ID: MW-3	Run I	D: ICPMS	3_201208A	5	SeqNo: <b>696</b> 9	9433	Prep Date: 12/	8/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09679	0.0050	0.1	0.0001199	96.7	75-125	(	)		
Arsenic	0.09873	0.0050	0.1	0.0006677	98.1	75-125	C	)		
Barium	0.2085	0.0050	0.1	0.1104	98.1	75-125	C	)		
Beryllium	0.103	0.0020	0.1	0.0000528	103	75-125	C	)		
Boron	0.9917	0.020	0.5	0.4697	104	75-125	C	)		
Cadmium	0.1006	0.0020	0.1	0	101	75-125	C	)		
Calcium	101.4	0.50	10	95.26	61.2	75-125	C	)		SO
Chromium	0.1024	0.0050	0.1	0.0007051	102	75-125	C	)		
Cobalt	0.1024	0.0050	0.1	0.0002629	102	75-125	C	)		
Lead	0.1014	0.0050	0.1	0.0002156	101	75-125	C	)		
Lithium	0.112	0.010	0.1	0.01535	96.7	75-125	(	)		
Molybdenum	0.1028	0.0050	0.1	0.0007359	102	75-125	C	)		
Selenium	0.09924	0.0050	0.1	-0.0003245	99.6	75-125	C	)		
Thallium	0.09504	0.0050	0.1	-0.0000231	95.1	75-125	C	)		

MSD	Sample ID: <b>20112217-04AMSD</b>				Units: mg/	L	Analysis	Date: 12/8	3/2020 04:	05 PM
Client ID: MW-3	Run	ID: ICPMS	3_201208A		SeqNo: <b>696</b>	9434	Prep Date: 12/8	/2020	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09862	0.0050	0.1	0.0001199	9 98.5	75-125	0.09679	1.87	20	
Arsenic	0.1015	0.0050	0.1	0.000667	7 101	75-125	0.09873	2.8	20	
Barium	0.208	0.0050	0.1	0.110	4 97.6	75-125	0.2085	0.248	20	
Beryllium	0.1051	0.0020	0.1	0.000052	8 105	75-125	0.103	2.01	20	
Boron	1.011	0.020	0.5	0.469	7 108	75-125	0.9917	1.98	20	
Cadmium	0.1037	0.0020	0.1		0 104	75-125	0.1006	3.01	20	
Calcium	101	0.50	10	95.2	6 57.2	75-125	101.4	0.394	20	SO
Chromium	0.1025	0.0050	0.1	0.000705	1 102	75-125	0.1024	0.129	20	
Cobalt	0.1041	0.0050	0.1	0.0002629	9 104	75-125	0.1024	1.63	20	
Lead	0.1049	0.0050	0.1	0.000215	6 105	75-125	0.1014	3.34	20	
Lithium	0.1132	0.010	0.1	0.0153	5 97.8	75-125	0.112	0.983	20	
Molybdenum	0.1071	0.0050	0.1	0.000735	9 106	75-125	0.1028	4.11	20	
Selenium	0.1027	0.0050	0.1	-0.000324	5 103	75-125	0.09924	3.38	20	
Thallium	0.09767	0.0050	0.1	-0.000023	1 97.7	75-125	0.09504	2.72	20	

**Work Order:** 20112217

**Project:** Holland Board of Public Works

QC BATCH REPORT

Batch ID: 168457	Instrument ID TD\$	3		Metho	d: <b>A2540</b>	C-11					
MBLK	Sample ID: MBLK-1684	157-168457	•			Units: mg	/L	Analysis	Date: 12/2	2/2020 03	:48 PM
Client ID:		Run ID	TDS_20	1202C		SeqNo: 69	52481	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solid	ds	ND	30								
LCS	Sample ID: LCS-16845	7-168457				Units: mg	/L	Analysis	Date: <b>12</b> /2	2/2020 03	:48 PM
Client ID:		Run ID	TDS_20	1202C		SeqNo: 69	52480	Prep Date: 11/3	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solid	ds	486	30	495		0 98.2	85-109	0			
DUP	Sample ID: <b>20112115-0</b>	1C DUP				Units: mg	/L	Analysis	Date: 12/2	2/2020 03	:48 PM
Client ID:		Run ID	TDS_20	1202C		SeqNo: 69	52459	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solid	ds	366.7	50	0		0 0	0-0	383.3	4.44	10	
DUP	Sample ID: <b>20112217-0</b>	4B DUP				Units: mg	/L	Analysis	Date: 12/2	2/2020 03	:48 PM
Client ID: MW-3		Run ID	TDS_20	1202C		SeqNo: 69	52477	Prep Date: 11/3	0/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solid	ds	566.7	50	0		0 0	0-0	530	6.69	10	

**Work Order:** 20112217

**Project:** Holland Board of Public Works

QC BATCH REPORT

Batch ID: 168553	Instrument ID TDS	}		Metho	d: <b>A2540</b>	C-1	1					
MBLK	Sample ID: MBLK-1685	53-168553	}			ι	Jnits: <b>mg/</b> l	L	Analysis	s Date: <b>12/</b> 3	3/2020 02:	30 PM
Client ID:		Run ID:	TDS_20	1203D		Se	qNo: <b>695</b> 6	6231	Prep Date: 12/1/2020		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	ND	30									
LCS	Sample ID: LCS-168553	3-168553				ι	Jnits: <b>mg</b> /	L	Analysis	s Date: <b>12</b> /3	3/2020 02:	30 PM
Client ID:		Run ID: TDS_201203D				SeqNo: <b>6956230</b>			Prep Date: 12/	DF: <b>1</b>		
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	490	30	495		0	99	85-109	0			
DUP	Sample ID: <b>20112217-0</b>	5B DUP				ι	Jnits: <b>mg/</b> l	L	Analysis	s Date: <b>12/</b>	3/2020 02:	30 PM
Client ID: MW-3A		Run ID:	TDS_20	1203D		Se	qNo: <b>695</b> 6	6225	Prep Date: 12/	1/2020	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Soli	ds	566.7	100	0		0	0	0-0	560	1.18	10	

**Work Order:** 20112217

**Project:** Holland Board of Public Works

QC BATCH REPORT

Batch ID: <b>R305153</b>	Instrument ID <b>Titra</b>	ator 1		Method	d: <b>A4500</b>	-НВ	-11					
LCS	Sample ID: LCS-R30518	53-R30515	3			L	Jnits: <b>s.u.</b>		Analysis	s Date: <b>12/7</b>	//2020 12:	54 PM
Client ID:		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3900	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		3.95	0.10	4		0	98.8	92-108	0			
DUP	Sample ID: <b>20112217-0</b> 2	1B DUP				L	Jnits: <b>s.u.</b>		Analysis	s Date: <b>12/7</b>	//2020 12:	54 PM
Client ID: PZ-1		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3902	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		8.46	0.10	0		0	0	0-0	8.2	3.12	5	Н
Temperature		21.03	0.10	0		0	0	0-0	21.08	0.237		Н
DUP	Sample ID: <b>20112328-0</b>	1A DUP				L	Jnits: <b>s.u.</b>		Analysis	s Date: <b>12/7</b>	7/2020 12:	54 PM
Client ID:		Run ID:	TITRAT	OR 1_2012	07B	Se	qNo: <b>696</b> 3	3913	Prep Date:		DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua
pH (laboratory)		7.53	0.10	0		0	0	0-0	7.39	1.88	5	Н
Temperature		21.08	0.10	0		0	0	0-0	21.15	0.332		Н

NTH Consultants, Ltd.

Work Order:

20112217

**Project:** 

**Client:** 

Holland Board of Public Works

Batch ID: R305326 Instrument ID IC3 Method: E300.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/8/2020 01:29 PM Client ID: Run ID: IC3 201208A SeqNo: 6971195 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Limit Value Limit Value SPK Val %REC %RPD Qual Analyte Result **PQL** ND Chloride 1.0 ND Fluoride 0.10 ND Sulfate 1.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/8/2020 09:12 PM Prep Date: Client ID: Run ID: IC3 201208A SeqNo: 6971219 DF: 1 SPK Ref Control RPD Ref RPD Value Limit Value Limit SPK Val %REC Qual Analyte Result **PQL** %RPD ND Chloride 1.0 ND Fluoride 0.10 Sulfate ND 1.0 **MBLK** Sample ID: MBLK-R305326 Units: mg/L Analysis Date: 12/9/2020 02:39 AM Client ID: Run ID: IC3 201208A SeqNo: 6971236 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Value Limit Value Limit Result SPK Val %REC %RPD Qual **PQL** Analyte ND Chloride 1.0 Fluoride ND 0.10 ND Sulfate 1.0 LCS Sample ID: LCS-R305326 Units: mg/L Analysis Date: 12/8/2020 01:48 PM Client ID: Run ID: IC3 201208A SeqNo: 6971196 Prep Date: DF: 1 RPD SPK Ref Control RPD Ref Value Limit Value Limit SPK Val %REC %RPD Qual Result PQL Analyte 9.372 0 93.7 Chloride 1.0 10 90-110 0 Fluoride 1.808 2 0 90.4 90-110 0 0.10 9.738 Sulfate 1.0 10 0 97.4 90-110 0 LCS Sample ID: LCS-R305326 Units: mg/L Analysis Date: 12/8/2020 09:31 PM Client ID: Prep Date: Run ID: IC3\_201208A SeqNo: 6971220 DF: 1 SPK Ref Control RPD Ref RPD Value Value Limit Limit %RPD Analyte Result **PQL** SPK Val %REC Qual 9.405 Chloride 1.0 10 0 94 90-110 0 1.915 0 Fluoride 0.10 2 95.7 90-110 0 Sulfate 9.659 1.0 10 0 96.6 90-110 0

**OC BATCH REPORT** 

QC BATCH REPORT

Client: NTH Consultants, Ltd.

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: <b>R305326</b>	Instrument ID IC3			Metho	d: <b>E300.0</b>								
LCS	Sample ID: LCS-R3053	26				U	Jnits: <b>mg</b> /l	L	Analy	sis D	ate: <b>12/9</b>	0/2020 02	:58 AM
Client ID:		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1237	Prep Date:			DF: <b>1</b>	
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		9.418	1.0	10		0	94.2	90-110		0			
Fluoride		1.96	0.10	2		0	98	90-110		0			
Sulfate		9.756	1.0	10		0	97.6	90-110		0			
MS	Sample ID: <b>20112217-0</b>	4B MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/8</b>	3/2020 07	:16 PM
Client ID: MW-3		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1213	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		263	20	200	71.9	93	95.6	80-120		0			
Fluoride		31.67	2.0	40		0	79.2	80-120		0			S
Sulfate		285.7	20	200	98.9	95	93.4	80-120		0			
MS	Sample ID: <b>20120200-0</b>	8D MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/9</b>	/2020 02	:00 AM
Client ID:		Run ID: IC3_201208A				Se	qNo: <b>697</b> 1	1234	Prep Date:			DF: <b>40</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		615.3	40	400	245.	.7	92.4	80-120		0			
Fluoride		72.29	4.0	80		0	90.4	80-120		0			
Sulfate		377.7	40	400	7.80	)4	92.5	80-120		0			
MS	Sample ID: <b>20120200-1</b>	3D MS				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/9</b>	0/2020 04	:54 AM
Client ID:		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1243	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		441.2	20	200	239.	.1	101	80-120		0			Ε
Fluoride		36.21	2.0	40		0	90.5	80-120		0			
Sulfate		244.3	20	200	57.5	51	93.4	80-120		0			
MSD	Sample ID: <b>20112217-0</b>	4B MSD				U	Jnits: <b>mg/</b> l	L	Analy	sis D	ate: <b>12/8</b>	3/2020 07	:35 PM
Client ID: MW-3		Run ID	: IC3_20	1208A		Se	qNo: <b>697</b> 1	1214	Prep Date:			DF: <b>20</b>	)
					SPK Ref			Control	RPD Ref			RPD	
Analyte		Result	PQL	SPK Val	Value		%REC	Limit	Value	9	%RPD	Limit	Qua
Chloride		262.6	20	200	71.9	93	95.4	80-120	2	63	0.15	20	
Fluoride		31.48	2.0	40		0	78.7	80-120	31.0	67	0.621	20	S
Sulfate		285.4	20	200	98.9	95	93.2	80-120	285	5.7	0.114	20	

**Work Order:** 20112217

**Project:** Holland Board of Public Works

Batch ID: R305326 Instrument ID IC3 Method: E300.0

MSD	Sample ID: 20120200-08D M	SD			Units: mg	ı/L	Analysis Date: 12/9/2020 02:20 AM				
Client ID:	Ru	ın ID: IC3_2	01208A		SeqNo: 69	71235	Prep Date:		DF: <b>40</b>		
Analyte	Resu	lt PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	613.	3 40	400	245	.7 91.9	80-120	615.3	0.325	20		
Fluoride	73.4	6 4.0	80		0 91.8	80-120	72.29	1.6	20		
Sulfate	374.	6 40	400	7.80	91.7	80-120	377.7	0.824	20		

MSD	Sample ID: <b>20120200-13D</b>	MSD				U	nits: <b>mg/L</b>		Analysis	Date: 12/9	/2020 05:1	3 AM
Client ID:		Run ID: IC	C3_201	208A		Sec	No: <b>6971</b>	244	Prep Date:		DF: <b>20</b>	
Analyte	Re	esult	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	44	41.1	20	200	239	).1	101	80-120	441.2	0.019	20	Е
Fluoride	36	6.47	2.0	40		0	91.2	80-120	36.21	0.737	20	
Sulfate	24	43.8	20	200	57.5	51	93.1	80-120	244.3	0.204	20	

The following samples were analyzed in this batch:

QC BATCH REPORT



Cincinnati, OH +1 513 733 5336

Everett, WA +1 425 356 2600 Fort Collins, CO +1 970 490 1511

+1 616 399 6070

Holland, MI

### **Chain of Custody Form**

Page

+1 281 530 5656

+1 610 948 4903 Salt Lake City, UT

Spring City, PA

South Charleston, WV +1 304 356 3168 York, PA

Middletown, PA +1 717 944 5541 +1 801 266 7700 +1 717 505 5280 coc ID: 189586

Houston, TX

**ALS Project Manager:** 70112217 ALS Work Order #: **Customer Information Project Information** Parameter/Method Request for Analysis **Purchase Order Project Name** Metals including Hg Work Order Chlonde, Fluoride, Sulfare **Project Number** В Holland Board of Public Works Company Name NTH Consultants, Ltd. **Bill To Company** C 71-TU6 Send Report To Karen Okonta Accounts Payable D Invoice Attn 41780 Six Mile Road 636 Hastings E Radium 226 & 228 Address **Address** F G City/State/Zip Northville, MI 48168 City/State/Zip Holland, MI 49423 Н Phone 7248) 662-2668 Phone (616) 355-1210 1 12481 324-5305 Fax Fax e-Mail Address e-Mail Address No. Sample Description Date Time Matrix Pres. # Bottles Н F G Hold Q 2 3 4 5 6 7 8 9 10 Sampler(s) Please Print & Sign Shipment Method Required Turnaround Time: (Check Box) **Results Due Date:** Other 10 WK Days 5 WK Davs 2 WK Days 1 24 Hour Relinquished by Time: Received by: Notes: Received by (Laboratory) Relinquished by: Time: Cooler ID Cooler Temp. QC Package: (Check One Box Below) 1800 Level ii Std QC TPRP ChackList Logged by (Laboratory): Checked by Laboratory Time: Level III Std QC/Raw Data TRRP Level IV 1035 Levelly SW846/CLP Preservative Key: 1-HCl 2-HNO<sub>3</sub> 5-Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> 6-NaHSO 4-NaOH 7-Other 8-4°C 9-5035 Cther

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Client Name: NTH - NORTHVILLE

### Sample Receipt Checklist

Date/Time Received:

24-Nov-20 18:00

Work Order: 2011	12217				Received b	y: <u>Kl</u>	<u>RW</u>		
Checklist completed l	by Keith Wierenga	:	25-Nov-20	)	Reviewed by:	Chad Whe	elton		30-Nov-20
·	ater dEx	l				J			
Shipping container/co	poler in good condition?		Yes	<b>✓</b>	No 🗌	Not Present			
Custody seals intact o	on shipping container/cooler?	•	Yes		No 🗌	Not Present	<b>✓</b>		
Custody seals intact o	on sample bottles?		Yes		No 🗌	Not Present	<b>~</b>		
Chain of custody pres	sent?		Yes	<b>~</b>	No 🗌				
Chain of custody sigr	ned when relinquished and re	ceived?	Yes		No 🗸				
Chain of custody agre	ees with sample labels?		Yes	<b>✓</b>	No 🗌				
Samples in proper co	ontainer/bottle?		Yes	<b>✓</b>	No 🗌				
Sample containers in	tact?		Yes	<b>✓</b>	No 🗌				
Sufficient sample volu	ume for indicated test?		Yes	<b>✓</b>	No 🗌				
All samples received	within holding time?		Yes	<b>✓</b>	No 🗌				
Container/Temp Blan	nk temperature in compliance	?	Yes	<b>✓</b>	No 🗌				
Sample(s) received o			Yes		No 🗆	IDO		1	
Temperature(s)/Theri Cooler(s)/Kit(s):	mometer(s).		2.4, 3.	0, 4.0	3, 4.9, 3.7 C	IR3		]	
Date/Time sample(s)	sent to storage:		11/25/	2020	10:42:39 AM				
Water - VOA vials ha	-		Yes		No _	No VOA vials su	bmitted	<b>✓</b>	
Water - pH acceptabl	le upon receipt?		Yes	<b>✓</b>	No 🗌	N/A			
pH adjusted?			Yes		No 🗸	N/A		1	
pH adjusted by:			-						
Login Notes:									
======	=======								
Client Contacted:	С	Date Contacted:			Person	Contacted:			
Contacted By:	F	Regarding:							
Comments:								]	
Confinence.									
CorrectiveAction:								]	
Concouveraction.								000	D4 : 6 4



Ft. Collins, Colorado LIMS Version: 7.012 Page 1 of 1

Wednesday, December 23, 2020

Chad Whelton ALS Environmental 3352 128th Avenue Holland, MI 49424

Re: ALS Workorder: 2012005

Project Name:

Project Number: 20112217

Dear Mr. Whelton:

One water sample was received from ALS Environmental, on 12/1/2020. The sample was scheduled for the following analyses:

Radium-226
Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Julie Ellingson
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environme	ental – Fort Collins
7 LO LITVII OTITILO	Total Soliinis
Accreditation Body	License or Certification Number
Alaska (AK)	17-003
Arizona (AZ)	AZ0742
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



### 2012005

### Radium-228:

The sample was analyzed for the presence of <sup>228</sup>Ra by low background gas flow proportional counting of <sup>228</sup>Ac, which is the ingrown progeny of <sup>228</sup>Ra, according to the current revision of SOP 724.

**Ra-228** activity is reported in the associated method blank above the minimum detectable concentration value. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715, and are submitted without further qualification.

All remaining acceptance criteria were met.

### Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

# Sample Number(s) Cross-Reference Table

**OrderNum: 2012005** 

Client Name: ALS Environmental

**Client Project Name:** 

Client Project Number: 20112217 Client PO Number: 20-122020059

Client S Num	•	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-4		2012005-1		WATER	24-Nov-20	12:16



Subcontractor:

ALS Environmental, Fort Collins

225 Commerce Dr.

(800) 443-1511 TEL:

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

30-Nov-20

COC ID:

Date:

15283 Due Date: <u>15-Dec-20</u>

FAX:

Fort Collins, CO 80524

Acct #:

وَ مَنْ مُنْ الْمُعْ الْحِيْدِ مِنْ الْمُعْ الْحِيْدِ مِنْ اللَّهِ اللَّهِ اللَّهِ اللَّهِ اللَّهِ اللَّهِ	Salesperson	ALS	SHN Acc	ount												
, , , , , , , , C	customer Information	a ny		. Pro	ject Inform	nation	T		Pa	rameter/	Method	Request	for Anal	ysis		
Purchase Order			Project	Name	20112217		A Sut	contra	cted Ana	lyses (S	UBCON'	TRACT)				
Vork Order			Project	Number				SIMS				<u>-</u>				
Company Name	ALS Group USA, Corp		Bill To (	Company	ALS Group	USA, Corp	С	17 10								
Send Report To	Chad Whelton		Inv Attn		Accounts	Payable	D									
Address	3352 128th Ave		Address	3	3352 128th	Ave	E.									
		•					F									
City/State/Zip	Holland, Michigan 49424		€ity/Sta	te/Zip	Holland, M	lichigan 49424	G									
Phone	(616) 399-6070		Phone		(616) 399-	5070	H							,		
Fax	(616) 399-6185		Fax		(616) 399-	5185	T									
eMail Address	chad.whelton@alsglobal.com	1	eMail C	С			J									
ALS Sample ID	Client Sample ID	Mat	rix	Collection	Date 24hr	Bottle	A.A.	. В	# C	D	E	F	G	Н	. 1∌	J
20112217-01C	PZ-1	Ground	lwater	24/Nov/20	20 10:30	(2) 1LPHNO3	X						_15-11-11-11-11-11-11-11-11-11-11-11-11-1			
20112217-02C	MW-1	Ground	lwater	24/Nov/20	20 13:15	(2) 1LPHNO3	Х									
20112217-03C	MW-2	Ground	lwater	24/Nov/20	20 14:50	(2) 1LPHNO3	Х									
20112217-05C	MW-3A	Ground	lwater	24/Nov/20	20 17:55	(2) 1LPHNO3	Х									
20112217-06C	Field Duplicate	Ground	lwater	24/Nov	2020	(2) 1LPHNO3	X									
20112217-07C	Field Blank	Wa	ter	24/Nov/20	20 17:30	(2) 1LPHNO3	X		1							
20112217-08C	Equipment Blank	Wa	ter	24/Nov/20	20 17:30	(2) 1LPHNO3	X			1						
20112217-09C	MW-4	Ground	lwater	24/Nov/20	20 12:16	(2) 1LPHNO3	X			1						
20112217-04C	MW-3	Ground	lwater	24/Nov/20	20 16:35	(6) 1LPHNO3	X	X								

-	^	_	 m	_	_	4.	

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days. Report MW-4 separately.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Led Me	11-30-20 1200	You for	1201.20 1030	_	Std
Relinquished by:	Date/Time	Received by:	Date/Time		



# ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:		Hollan	d		W	/orkorder No:	2	2012005	5
Project Manager:		JME		Initials:	RGA	<b>\</b>	Date:	12/01	/2020
1. Are airbills / shippin	g docum	ents present and	d/or remo	ovable?			Drop Off	<b>✓</b> YES	☐ NO
2. Are custody seals or	shippin	g containers inta	ict?				NONE	YES	□ NO*
з. Are custody seals or	sample	containers intac	t?	CTROCERSHOOOGIC Adexa-2.5.271.		the same of the sa	NONE	YES	☐ NO*
4. Is there a COC (chair	n-of-cust	ody) present?						<b>✓</b> YES	☐ NO*
5. Is the COC in agreen	nent with	samples receive	ed? (IDs, dat	tes, times, # of samp	les, # of containe	ers, matrix, requested and	alyses, etc.)	<b>✓</b> YES	☐ NO*
6. Are short-hold samp	oles prese	ent?						YES	<b>₽</b> NO
7. Are all samples with	in holdin	g times for the r	equested	analyses?				<b>✓</b> YES	☐ NO*
8. Were all sample con	ntainers r	eceived intact?	(not broken or	leaking)		Promise		<b>✓</b> YES	☐ NO*
9. Is there sufficient sa	mple for	the requested a	nalyses?	7. / / / / / / / / / / / / / / / / / / /				<b>✓</b> YES	□ NO*
10. Are samples in prop	per conta	iners for reques	ted analy	ses? (form 250, 5	ample Handling	Guidelines )	e e e e e e e e e e e e e e e e e e e	<b>✓</b> YES	□ NO*
11. Are all aqueous san	nples pre	served correctly	, if requir	ed?	1		☐ N/A	<b>✓</b> YES	□ NO*
12. Were unpreserved	samples	pH checked, if re	equired?				✓ N/A	YES	☐ NO
13. Are all samples requir	ring no he	adspace (voc, gro, rs	K/MEE, radon)	free of bubbl	es > 6 mm	in diameter?	<b>✓</b> N/A	YES	☐ NO
14. Were the samples s	shipped o	on ice?			Weithlesser			YES	<b>№</b> NO
15. Were cooler tempe	ratures r	neasured at 0.1	- 6.0°C?	IR gun used*:	#3	#5	Rad Only	YES	NO NO
Cooler #:	1	2							The second secon
Temperature (°C):	amb	amb	**************************************	***************************************					
# of custody seals on cooler:	0	0	,		annimien at		SI LIBRESTULISSALINGSBAAAI HAAAY -	· · · · · · · · · · · · · · · · · · ·	
External mR/hr reading:	11	11							
Background mR/hr reading:	9	Were external m	-	ngs ≤ two times :riteria? (If no, s	_		☐ N/A	✓ YES	☐ NO
* Please provid	e details be	low for 'NO' respons	ses in gray b	ooxes above - fo	or 2 thru 5 &	7 thru 12, notify P	M & continue	w/ login.	
AND				4/17946874				mar	Wana ana a
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			**************************************	····	All client bo	ttle ID's vs ALS lab	D's double-cl	necked by:	RGA
If applicable, was the	client co	ntacted? YE	s N		t Name			Date:	
Project Manager Sig	gnature	/ Date:	4	AC	1211	120			
				·	· / ·/				

Ref: Date: 30Nov20 SHIPPING: 0.00 Dep: Hgt: 21.05 LBS SPECIAL: 0.00 SPEC

2 of 2 MPS# 1668 7926-2304 Mstr# 1668 7926 2290 TUE - 01 DEC 10:30A PRIORITY OVERNIGHT

**80524** co - us **DEN** 

0201

Ref: Dep: Date: 30Nov20 Wgt: 43.60 LBS SHIPPING: SPECIAL: HANDLING: 0.00 TOTAL:

0.08 0.08 0.08

Svcs: PRIORITY OVERNIGHT Master 1668 7926 2290 TRCK: 1668 7926 2290

URIGIN 1D:GRRA (616) 399-6070 ALS ENVIRONMENTAL ALS ENVIRONMENTAL 3552 1987H AUGUNE

HULLAND, MI 494249263

SHIP DATE: 30NOV20 ACTWGT: 43.60 LB CAD: 0122071/CAFE3311

BILL THIRD PARTY

O SAMPLE RECEIVING ALS ENVIRONMENTAL 225 COMMERCE DR

11-0

FORT COLLINS CO 80324



FedEx Express

TUE - 01 DEC 10:30A

TRK# 1668 7926 2290 ## MASTER ##

1 of 2

80524



### **SAMPLE SUMMARY REPORT**

Client: ALS Environmental Date: 23-Dec-20

 Project:
 20112217
 Work Order:
 2012005

 Sample ID:
 MW-4
 Lab ID:
 2012005-1

 Legal Location:
 Matrix:
 WATER

Collection Date: 11/24/2020 12:16 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanati	on - Method 903.1	SOP	783	Prep	Date: <b>12/9/2020</b>	PrepBy: <b>TRB</b>
Ra-226	0.82 (+/- 0.39)		0.28	pCi/l	NA	12/19/2020 12:13
Carr: BARIUM	93.4		40-110	%REC	DL = NA	12/19/2020 12:13
Radium-228 Analysis by GFPC		SOP	724	Prep	Date: <b>12/11/2020</b>	PrepBy: <b>RGS</b>
Ra-228	4.4 (+/- 1.2)		0.9	pCi/l	NA	12/21/2020 07:37
Carr: BARIUM	93.9		40-110	%REC	DL = NA	12/21/2020 07:37

AR Page 1 of 2 9 of 12

### SAMPLE SUMMARY REPORT

Client: ALS Environmental Date: 23-Dec-20

 Project:
 20112217
 Work Order:
 2012005

 Sample ID:
 MW-4
 Lab ID:
 2012005-1

Legal Location: Matrix: WATER

Collection Date: 11/24/2020 12:16 Percent Moisture:

Report Dilution
Analyses Result Qual Limit Units Factor Date Analyzed

### **Explanation of Qualifiers**

#### Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

\* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested

MDC.

#### **Inorganics:**

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

\* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

#### Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

- B Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E Analyte concentration exceeds the upper level of the calibration range.
- J Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A A tentatively identified compound is a suspected aldol-condensation product.
- X The analyte was diluted below an accurate quantitation level.
- \* The spike recovery is equal to or outside the control criteria used.
- + The relative percent difference (RPD) equals or exceeds the control criteria.
- G A pattern resembling gasoline was detected in this sample.
- D A pattern resembling diesel was detected in this sample
- M A pattern resembling motor oil was detected in this sample.
- C A pattern resembling crude oil was detected in this sample.
- 4 A pattern resembling JP-4 was detected in this sample.
- 5 A pattern resembling JP-5 was detected in this sample.
- H Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8 - diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Client: ALS Environmental

**Work Order:** 2012005 **Project:** 20112217 **Date:** 12/23/2020 11:5

# QC BATCH REPORT

Batch ID: R	RE201209-1-1	Instrument ID:	Alpha Scin		Method: F	tadium-226	by Rado	n Emanation				
LCS	Sample ID: R	E201209-1			l	Jnits: <b>pCi/l</b>		Analy	sis Date: 1	2/19/20	20 12:13	3
Client ID:		Ru	ın ID: <b>RE20120</b> 9	9-1B			F	Prep Date: <b>12/</b> 9	9/2020	DF:	: NA	
Analyte		Resu	ult ReportLimi	t SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qua
Ra-226		55 (+/-	14) (	0 46.8		117	67-120					Р
Carr: BARII	IUM	127	770	15760		81	40-110					
LCSD	Sample ID: R	E201209-1			Į	Jnits: <b>pCi/l</b>		Analy	sis Date: 1	2/19/20	20 12:13	3
Client ID:		Ru	'					DF:	: NA			
Analyte		Resu	ult ReportLimi	t SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qua
Ra-226		36.4 (+/- 9	9.1) 0.2	2 46.8		77.9	67-120		55	1.11	2.13	Р
Carr: BARII	IUM	152	250	15760		96.7	40-110		12770			
MB	Sample ID: R	E201209-1			Ų	Jnits: <b>pCi/l</b>		Analy	sis Date: 1	2/19/20	20 12:13	3
Client ID:		Ru	ın ID: <b>RE20120</b> 9	<b>∋</b> -1B			F	Prep Date: <b>12/</b> 9	9/2020	DF:	: NA	
Analyte		Resu	ult ReportLimi	t SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qua
Ra-226		1	ND 0.3	3								Y1,L
Carr: BARII	IUM	168	320	15760		107	40-110					Y1

The following samples were analyzed in this batch:

2012005-1

QC Page: 1 of 2

Client: ALS Environmental

**Work Order:** 2012005 **Project:** 20112217

# QC BATCH REPORT

2001112. 1	RA201211-1-1 Ins	trument ID: <b>LB</b>		'	Method: Ra	u <b>22</b> 0	u.y 01	, o				
LCS	Sample ID: RA201211-1				Uı	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/21/20	20 07:37	7
Client ID:		Run II	D: <b>RA201211-</b>	1A				Prep Date: <b>12/</b>	11/2020	DF:	: NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qua
Ra-228		21 (+/- 4.9)	0.7	23.05		91.3	70-130					Р
Carr: BARII	UM	32330		33380		96.9	40-110					
LCSD	Sample ID: <b>RA201211-1</b>				Uı	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/21/20	20 07:37	7
Client ID:		Run II	Run ID: <b>RA201211-1A</b> Prep Date: <b>12/11/2020</b> DF: <b>NA</b>						NA			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-228		24.6 (+/- 5.7)	0.7	23.05		107	70-130		21	0.48	2.13	Р
Carr: BARII	UM	32690		33390		97.9	40-110		32330			
МВ	Sample ID: <b>RA201211-1</b>				Uı	nits: <b>pCi/l</b>		Analy	sis Date: 1	2/21/20	20 07:37	7
Client ID:		Run II	D: <b>RA201211-</b>	1A				Prep Date: 12/	11/2020	DF:	: NA	
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-228		0.8 (+/- 0.42)	0.74									В3
Carr: BARII	UM	32480		33380		97.3	40-110					

The following samples were analyzed in this batch:

2012005-1

QC Page: 2 of 2



# **APPENDIX B-4**

September 2016 Coal and Ash Data



12-Oct-2016

Judy Visscher Holland Board of Public Works 625 Hastings Holland, MI 49423

Re: HBPW Coal Yard Work Order: 16091814

Dear Judy,

ALS Environmental received 16 samples on 30-Sep-2016 03:30 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 39.

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

Sincerely,

Electronically approved by: Bill Carey

Bill Carey

Project Manager



Certificate No: MN 998501

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399-6070 | FAX (616) 399-6185

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Date: 12-Oct-16

**Client:** Holland Board of Public Works **QUALIFIERS,** 

HBPW Coal Yard **Project:** ACRONYMS, UNITS

WorkOrder: 16091814

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
В	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
Н	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
0	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R S	RPD above laboratory control limit
U	Spike Recovery outside laboratory control limits  Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.
Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

#### **Units Reported** Description

% of sample Percent of Sample

Micrograms per Kilogram Dry Weight μg/Kg-dry

 $\mu g/L$ Micrograms per Liter Standard Units s.u.

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order: 16091814

 **Sample ID:** Ash #1
 **Lab ID:** 16091814-01

Date: 12-Oct-16

Collection Date: 9/30/2016 01:45 PM Matrix: ASH

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	1B	Prep: SW7471 / 10/6/16	Analyst: <b>LR</b>
Mercury	160		19	ug/Kg-dry	1	10/7/2016 11:51 AM
METALS ANALYSIS BY ICP			SW846	6010C	Prep: SW3050B / 10/4/16	Analyst: <b>JEC</b>
Aluminum	8,200,000		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Antimony	ND		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Arsenic	38,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Barium	410,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Beryllium	3,000		2,100	μg/Kg-dry	10	10/5/2016 06:28 PM
Boron	ND		21,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Cadmium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Calcium	5,100,000		530,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Chromium	16,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Cobalt	12,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Copper	51,000		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Iron	13,000,000		84,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Lead	17,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Lithium	13,000		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Manganese	130,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Molybdenum	ND		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Nickel	25,000		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Selenium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Silver	ND		5,300	μg/Kg-dry	10	10/5/2016 06:28 PM
Thallium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
Zinc	32,000		11,000	μg/Kg-dry	10	10/5/2016 06:28 PM
ANIONS BY ION CHROMATOGRAP	PHY		SW905	6A	Prep: EXTRACT / 10/6/16	Analyst: EE
Chloride	ND		13,000	ug/Kg-dry	1	10/11/2016 12:46 AM
Fluoride	1,800		1,300	ug/Kg-dry	1	10/11/2016 12:46 AM
Sulfate	21,000		13,000	ug/Kg-dry	1	10/11/2016 12:46 AM
MOISTURE			SW355	0C		Analyst: <b>EDL</b>
Moisture	22		0.050	% of samp	ole 1	10/3/2016 12:10 PM
РН			SW904	5D	Prep: EXTRACT / 10/4/16	Analyst: <b>JB</b>
рН	7.8		-	s.u.	1	10/4/2016 03:30 PM
TOTAL SOLIDS			A2540	G		Analyst: <b>EDL</b>
Total Solids	78		0.050	% of samp	ole 1	10/3/2016 12:10 PM

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order:
 16091814

 **Sample ID:** Ash #2
 Lab ID:
 16091814-02

Date: 12-Oct-16

Collection Date: 9/30/2016 01:55 PM Matrix: ASH

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	1B	Prep: SW7471 / 10/6/16	Analyst: <b>LR</b>
Mercury	76		20	ug/Kg-dry	1	10/7/2016 11:53 AM
METALS ANALYSIS BY ICP			SW846	6010C	Prep: SW3050B / 10/4/16	Analyst: <b>JEC</b>
Aluminum	4,600,000		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Antimony	ND		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Arsenic	22,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Barium	290,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Beryllium	ND		2,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Boron	ND		20,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Cadmium	ND		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Calcium	3,000,000		510,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Chromium	11,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Cobalt	7,700		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Copper	34,000		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Iron	9,800,000		82,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Lead	10,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Lithium	ND		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Manganese	110,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Molybdenum	ND		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Nickel	16,000		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Selenium	ND		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Silver	ND		5,100	μg/Kg-dry	10	10/5/2016 06:33 PM
Thallium	ND		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
Zinc	23,000		10,000	μg/Kg-dry	10	10/5/2016 06:33 PM
ANIONS BY ION CHROMATOGRA	PHY		SW905	6A	Prep: EXTRACT / 10/6/16	Analyst: <b>EE</b>
Chloride	ND		13,000	ug/Kg-dry	1	10/11/2016 01:47 AM
Fluoride	3,400		1,300	ug/Kg-dry	1	10/11/2016 01:47 AM
Sulfate	61,000		13,000	ug/Kg-dry	1	10/11/2016 01:47 AM
MOISTURE			SW355	0C		Analyst: <b>EDL</b>
Moisture	22		0.050	% of samp	ole 1	10/3/2016 12:10 PM
PH			SW904	5D	Prep: EXTRACT / 10/4/16	Analyst: <b>JB</b>
рН	7.3			s.u.	1	10/4/2016 03:30 PM
TOTAL SOLIDS			A2540	G		Analyst: <b>EDL</b>
Total Solids	78		0.050	% of samp	ole 1	10/3/2016 12:10 PM

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order:
 16091814

 **Sample ID:** Ash #3
 **Lab ID:** 16091814-03

Date: 12-Oct-16

Collection Date: 9/30/2016 02:10 PM Matrix: ASH

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	1B	Prep: SW7471 / 10/6/16	Analyst: <b>LR</b>
Mercury	51		19	ug/Kg-dry	1	10/7/2016 11:56 AM
METALS ANALYSIS BY ICP			SW846	6010C	Prep: SW3050B / 10/4/16	Analyst: <b>JEC</b>
Aluminum	5,700,000		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Antimony	ND		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Arsenic	15,000		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Barium	220,000		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Beryllium	ND		2,100	μg/Kg-dry	10	10/5/2016 06:38 PM
Boron	ND		21,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Cadmium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Calcium	5,800,000		530,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Chromium	10,000		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Cobalt	ND		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Copper	19,000		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Iron	8,100,000		85,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Lead	6,300		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Lithium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Manganese	76,000		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Molybdenum	ND		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Nickel	13,000		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Selenium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Silver	ND		5,300	μg/Kg-dry	10	10/5/2016 06:38 PM
Thallium	ND		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
Zinc	19,000		11,000	μg/Kg-dry	10	10/5/2016 06:38 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A	Prep: EXTRACT / 10/6/16	Analyst: <b>EE</b>
Chloride	45,000		13,000	ug/Kg-dry	1	10/11/2016 02:07 AM
Fluoride	1,400		1,300	ug/Kg-dry	1	10/11/2016 02:07 AM
Sulfate	140,000		13,000	ug/Kg-dry	1	10/11/2016 02:07 AM
MOISTURE			SW355	0C		Analyst: <b>EDL</b>
Moisture	28		0.050	% of samp	ole 1	10/3/2016 12:10 PM
PH			SW904	5D	Prep: EXTRACT / 10/4/16	Analyst: <b>JB</b>
рH	8.0			s.u.	1	10/4/2016 03:30 PM
TOTAL SOLIDS			A2540	G		Analyst: <b>EDL</b>
Total Solids	72		0.050	% of samp	ole 1	10/3/2016 12:10 PM

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order:
 16091814

 **Sample ID:** Ash #4
 **Lab ID:** 16091814-04

Date: 12-Oct-16

Collection Date: 9/30/2016 02:30 PM Matrix: ASH

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	1B	Prep: SW7471 / 10/6/16	Analyst: <b>LR</b>
Mercury	400		44	ug/Kg-dry	2	10/7/2016 01:48 PM
METALS ANALYSIS BY ICP			SW846	6010C	Prep: SW3050B / 10/4/16	Analyst: <b>JEC</b>
Aluminum	24,000,000		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Antimony	ND		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Arsenic	11,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Barium	1,300,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Beryllium	ND		2,500	μg/Kg-dry	10	10/5/2016 06:44 PM
Boron	280,000		25,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Cadmium	ND		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Calcium	43,000,000		630,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Chromium	14,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Cobalt	6,900		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Copper	29,000		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Iron	21,000,000		100,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Lead	13,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Lithium	25,000		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Manganese	160,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Molybdenum	ND		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Nickel	14,000		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Selenium	ND		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Silver	ND		6,300	μg/Kg-dry	10	10/5/2016 06:44 PM
Thallium	ND		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
Zinc	22,000		13,000	μg/Kg-dry	10	10/5/2016 06:44 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A	Prep: EXTRACT / 10/6/16	Analyst: <b>EE</b>
Chloride	63,000		17,000	ug/Kg-dry	1	10/11/2016 02:27 AM
Fluoride	14,000		1,700	ug/Kg-dry	1	10/11/2016 02:27 AM
Sulfate	890,000		85,000	ug/Kg-dry	5	10/11/2016 09:47 AM
MOISTURE			SW355	0C		Analyst: <b>EDL</b>
Moisture	41		0.050	% of samp	ole 1	10/3/2016 12:10 PM
PH			SW904	5D	Prep: EXTRACT / 10/4/16	Analyst: <b>JB</b>
рН	7.7			s.u.	1	10/4/2016 03:30 PM
TOTAL SOLIDS			A2540	G		Analyst: <b>EDL</b>
Total Solids	59		0.050	% of samp	ole 1	10/3/2016 12:10 PM

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order: 16091814

 **Sample ID:** Ash #1
 **Lab ID:** 16091814-09

Collection Date: 9/30/2016 01:45 PM Matrix: SPLP EXTRACT

Date: 12-Oct-16

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 / 10/4/16	Analyst: LR
Mercury	ND		0.20	μg/L	1	10/5/2016 06:25 PM
METALS BY ICP-MS			SW602	0A	Prep: SW3005A / 10/5/16	Analyst: RH
Aluminum	2,000		10	μg/L	1	10/6/2016 02:23 PM
Antimony	ND		2.0	μg/L	1	10/6/2016 02:23 PM
Arsenic	30		5.0	μg/L	1	10/6/2016 02:23 PM
Barium	71		5.0	μg/L	1	10/6/2016 02:23 PM
Beryllium	ND		1.0	μg/L	1	10/6/2016 02:23 PM
Boron	93		20	μg/L	1	10/6/2016 02:23 PM
Cadmium	ND		2.0	μg/L	1	10/6/2016 02:23 PM
Calcium	4,900		500	μg/L	1	10/6/2016 02:23 PM
Chromium	ND		5.0	μg/L	1	10/6/2016 02:23 PM
Cobalt	ND		5.0	μg/L	1	10/6/2016 02:23 PM
Copper	11		5.0	μg/L	1	10/6/2016 02:23 PM
Iron	1,100		80	μg/L	1	10/6/2016 02:23 PM
Lead	5.2		5.0	μg/L	1	10/6/2016 02:23 PM
Lithium	ND		10	μg/L	1	10/6/2016 02:23 PM
Manganese	12		5.0	μg/L	1	10/6/2016 02:23 PM
Molybdenum	ND		5.0	μg/L	1	10/6/2016 02:23 PM
Nickel	5.5		5.0	μg/L	1	10/6/2016 02:23 PM
Selenium	ND		5.0	μg/L	1	10/6/2016 02:23 PM
Silver	ND		5.0	μg/L	1	10/6/2016 02:23 PM
Thallium	ND		2.0	μg/L	1	10/6/2016 02:23 PM
Zinc	12		10	μg/L	1	10/6/2016 02:23 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A		Analyst: <b>EE</b>
Chloride	ND		1,000	μg/L	1	10/7/2016 10:01 AM
Fluoride	400		100	μg/L	1	10/7/2016 10:01 AM
Sulfate	3,800		1,000	μg/L	1	10/7/2016 10:01 AM

Client: Holland Board of Public Works

 Project:
 HBPW Coal Yard
 Work Order:
 16091814

 Sample ID:
 Ash #2
 Lab ID:
 16091814-10

Collection Date: 9/30/2016 01:55 PM Matrix: SPLP EXTRACT

Date: 12-Oct-16

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 / 10/4/16	Analyst: <b>LR</b>
Mercury	ND		0.20	μg/L	1	10/5/2016 06:28 PM
METALS BY ICP-MS			SW602	0A	Prep: SW3005A / 10/5/16	Analyst: RH
Aluminum	390		10	μg/L	1	10/6/2016 02:29 PM
Antimony	ND		2.0	μg/L	1	10/6/2016 02:29 PM
Arsenic	5.1		5.0	μg/L	1	10/6/2016 02:29 PM
Barium	29		5.0	μg/L	1	10/6/2016 02:29 PM
Beryllium	ND		1.0	μg/L	1	10/6/2016 02:29 PM
Boron	91		20	μg/L	1	10/6/2016 02:29 PM
Cadmium	ND		2.0	μg/L	1	10/6/2016 02:29 PM
Calcium	5,100		500	μg/L	1	10/6/2016 02:29 PM
Chromium	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Cobalt	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Copper	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Iron	410		80	μg/L	1	10/6/2016 02:29 PM
Lead	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Lithium	ND		10	μg/L	1	10/6/2016 02:29 PM
Manganese	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Molybdenum	6.0		5.0	μg/L	1	10/6/2016 02:29 PM
Nickel	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Selenium	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Silver	ND		5.0	μg/L	1	10/6/2016 02:29 PM
Thallium	ND		2.0	μg/L	1	10/6/2016 02:29 PM
Zinc	ND		10	μg/L	1	10/6/2016 02:29 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A		Analyst: <b>EE</b>
Chloride	ND		1,000	μg/L	1	10/7/2016 10:21 AM
Fluoride	760		100	μg/L	1	10/7/2016 10:21 AM
Sulfate	8,700		1,000	μg/L	1	10/7/2016 10:21 AM

### ALS Group USA, Corp

Client: Holland Board of Public Works

 Project:
 HBPW Coal Yard
 Work Order:
 16091814

 Sample ID:
 Ash #3
 Lab ID:
 16091814-11

Collection Date: 9/30/2016 02:10 PM Matrix: SPLP EXTRACT

**Date:** 12-Oct-16

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 / 10/4/16	Analyst: <b>LR</b>
Mercury	ND		0.20	μg/L	1	10/5/2016 06:38 PM
METALS BY ICP-MS			SW602	0A	Prep: SW3005A / 10/5/16	Analyst: RH
Aluminum	640		10	μg/L	1	10/6/2016 02:50 PM
Antimony	ND		2.0	μg/L	1	10/6/2016 02:50 PM
Arsenic	17		5.0	μg/L	1	10/6/2016 02:50 PM
Barium	25		5.0	μg/L	1	10/6/2016 02:50 PM
Beryllium	ND		1.0	μg/L	1	10/6/2016 02:50 PM
Boron	240		20	μg/L	1	10/6/2016 02:50 PM
Cadmium	ND		2.0	μg/L	1	10/6/2016 02:50 PM
Calcium	8,500		500	μg/L	1	10/6/2016 02:50 PM
Chromium	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Cobalt	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Copper	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Iron	300		80	μg/L	1	10/6/2016 02:50 PM
Lead	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Lithium	10		10	μg/L	1	10/6/2016 02:50 PM
Manganese	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Molybdenum	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Nickel	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Selenium	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Silver	ND		5.0	μg/L	1	10/6/2016 02:50 PM
Thallium	ND		2.0	μg/L	1	10/6/2016 02:50 PM
Zinc	ND		10	μg/L	1	10/6/2016 02:50 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A		Analyst: <b>EE</b>
Chloride	1,700		1,000	μg/L	1	10/7/2016 10:41 AM
Fluoride	460		100	μg/L	1	10/7/2016 10:41 AM
Sulfate	11,000		1,000	μg/L	1	10/7/2016 10:41 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

## ALS Group USA, Corp

Client: Holland Board of Public Works

**Project:** HBPW Coal Yard
 Work Order: 16091814

 **Sample ID:** Ash #4
 **Lab ID:** 16091814-12

Collection Date: 9/30/2016 02:30 PM Matrix: SPLP EXTRACT

**Date:** 12-Oct-16

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			SW747	0A	Prep: SW7470 / 10/4/16	Analyst: <b>LR</b>
Mercury	ND		0.20	μg/L	1	10/5/2016 06:41 PM
METALS BY ICP-MS			SW602	0A	Prep: SW3005A / 10/5/16	Analyst: RH
Aluminum	120		10	μg/L	1	10/6/2016 02:55 PM
Antimony	ND		2.0	μg/L	1	10/6/2016 02:55 PM
Arsenic	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Barium	250		5.0	μg/L	1	10/6/2016 02:55 PM
Beryllium	ND		1.0	μg/L	1	10/6/2016 02:55 PM
Boron	1,400		20	μg/L	1	10/6/2016 02:55 PM
Cadmium	ND		2.0	μg/L	1	10/6/2016 02:55 PM
Calcium	20,000		500	μg/L	1	10/6/2016 02:55 PM
Chromium	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Cobalt	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Copper	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Iron	ND		80	μg/L	1	10/6/2016 02:55 PM
Lead	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Lithium	38		10	μg/L	1	10/6/2016 02:55 PM
Manganese	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Molybdenum	8.5		5.0	μg/L	1	10/6/2016 02:55 PM
Nickel	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Selenium	20		5.0	μg/L	1	10/6/2016 02:55 PM
Silver	ND		5.0	μg/L	1	10/6/2016 02:55 PM
Thallium	ND		2.0	μg/L	1	10/6/2016 02:55 PM
Zinc	ND		10	μg/L	1	10/6/2016 02:55 PM
ANIONS BY ION CHROMATOGRAPHY			SW905	6A		Analyst: <b>EE</b>
Chloride	1,700		1,000	μg/L	1	10/7/2016 11:07 AM
Fluoride	1,400		100	μg/L	1	10/7/2016 11:07 AM
Sulfate	34,000		5,000	μg/L	5	10/7/2016 03:30 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

Holland Board of Public Works

Work Order: 16091814

**Client:** 

Date: 12-Oct-16 QC BATCH REPORT

Project:	HBPW Coal Yard												
Batch ID: <b>92389</b>	Instrument ID HG1			Metho	d: <b>SW74</b> 7	70A							
MBLK	Sample ID: MBLK-92389-923	389				Uni	ts: <b>mg/</b> l	L		Analys	sis Date:	10/5/2016	06:10 PM
Client ID:	Ri	un ID: <b>H</b>	G1_1	61005B		SeqN	lo: <b>406</b> 9	9431	Prep Da	te: <b>10/</b>	4/2016	DF: '	i
Analyte	Resu	ult l	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Val		%RPD	RPD Limit	Qual
Mercury	N	D 0.00	020										
LCS	Sample ID: <b>LCS-92389-9238</b>	9				Uni	its: <b>mg/</b> l	L		Analys	sis Date:	10/5/2016	06:13 PM
Client ID:	Ri	un ID: <b>H</b>	G1_1	61005B		SeqN	lo: <b>406</b> 9	9432	Prep Da	te: <b>10/</b>	4/2016	DF:	i
Analyte	Resu	ult l	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Val		%RPD	RPD Limit	Qual
Mercury	0.0020	0.00	020	0.002		0	104	80-120		C	)		
MS	Sample ID: 1610041-01DMS					Uni	its: <b>mg/</b> l	L		Analys	sis Date:	10/5/2016	07:01 PM
Client ID:	R	un ID: <b>H</b>	G1_1	61005B		SeqN	lo: <b>406</b> 9	9453	Prep Da	te: <b>10/</b>	4/2016	DF:	ı
Analyte	Resu	ult l	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Val		%RPD	RPD Limit	Qual
Mercury	0.0022	23 0.00	020	0.002	0.0000	31	110	75-125		C	)		
MSD	Sample ID: <b>1610041-01DMS</b>	D				Uni	its: <b>mg/</b> l	L		Analys	sis Date:	10/5/2016	07:11 PM
Client ID:	Ri	un ID: <b>H</b>	G1_1	61005B		SeqN	lo: <b>406</b> 9	9459	Prep Da	te: <b>10/</b>	4/2016	DF: '	i
Analyte	Resu	ult l	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Val		%RPD	RPD Limit	Qual
Mercury	0.0022	23 0.00	020	0.002	0.0000	31	110	75-125	0	.00223	3	0 20	
The following san	nples were analyzed in this bate	ch:	0: 1: 1:	6091814- 9A 6091814- 2A 6091814-	10 16 13 16	609181 0A 609181 3A 609181	14-	11	091814-				

16A

15A

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92516	Instrument ID HG	i <b>1</b>		Metho	d: <b>SW747</b>	'1B							
MBLK	Sample ID: MBLK-925	16-92516				ι	Jnits: <b>mg/</b> l	Kg	Anal	ysis Date	e: 10	0/7/2016 1	1:46 AM
Client ID:		Run ID	HG1_1	61007A		Se	eqNo: <b>407</b> 2	2772	Prep Date: 1	0/6/2016	<b>;</b>	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RF	PD	RPD Limit	Qual
Mercury		ND	0.020										
LCS	Sample ID: LCS-92516	-92516				ι	Jnits: <b>mg/</b> l	Kg	Anal	ysis Date	e: 10	0/7/2016 1	1:48 AM
Client ID:		Run ID	HG1_1	61007A		Se	eqNo: <b>407</b> 2	2773	Prep Date: 1	)/6/2016	;	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RF	PD	RPD Limit	Qual
Mercury		0.1808	0.020	0.1665		0	109	80-120		0			
MS	Sample ID: 1610046-01	ICMS				ι	Jnits: <b>mg/</b> l	Kg	Anal	ysis Date	e: 10	0/7/2016 1	2:24 PM
Client ID:		Run ID	HG1_1	61007A		Se	eqNo: <b>407</b> 2	2787	Prep Date: 1	0/6/2016	;	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RF	PD	RPD Limit	Qual
Mercury		0.1326	0.014	0.1152	0.0108	33	106	75-125		0			
MSD	Sample ID: <b>1610046-0</b> 1	ICMSD				ι	Jnits: <b>mg/</b> l	Kg	Anal	ysis Date	e: 10	0/7/2016 1	2:27 PM
Client ID:		Run ID	HG1_1	61007A		Se	eqNo: <b>407</b> 2	2788	Prep Date: 1	0/6/2016	;	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RF	PD	RPD Limit	Qual
Mercury		0.1385	0.014	0.1182	0.0108	33	108	75-125	0.132	26	4.29	35	
The following sam	nples were analyzed in th	s batch:	01 16 04	6091814- IA 6091814- IA 6091814- 7A	02 16 05	2A 8091 5A 8091	1814- 1814- 1814-	03	091814-				

Holland Board of Public Works

QC BATCH REPORT

Work Order: 16091814

**Client:** 

Lead

Lithium

Nickel

Silver

Zinc

Selenium

Thallium

Manganese

Molybdenum

Batch ID: 92364

**Project:** HBPW Coal Yard

Instrument ID ICP2

ND

ND

ND

ND

ND

ND

ND

ND

0.08663

0.25

0.50

0.25

0.25

0.25

0.50

0.25

0.50

0.50

MBLK Sample ID: MBLK-92364-92364 Units: mg/Kg Analysis Date: 10/5/2016 06:11 PM Client ID: SeqNo: 4068784 Prep Date: 10/4/2016 DF: 1 Run ID: ICP2\_161005B SPK Ref RPD Ref **RPD** Control Value Limit Value Limit %REC Analyte Result **PQL** SPK Val %RPD Qual 0.2251 Aluminum 0.50 J 0.1585 0.25 Antimony J ND Arsenic 0.25 ND Barium 0.25 ND Beryllium 0.10 ND Boron 1.0 0.02855 Cadmium 0.50 ND 25 Calcium 0.02788 J Chromium 0.25 Cobalt ND 0.25 ND 0.50 Copper Iron 0.668 4.0 J

Method: SW846 6010C

J

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92364 Instrument ID ICP2 Method: SW846 6010C

LCS	Sample ID: <b>LCS-92364-9236</b> 4				L	Jnits: <b>mg/</b> l	Kg	Analysis Date	10/5/2016 0	6:17 PM
Client ID:	Ru	n ID: <b>ICP2</b> _1	I61005B		Se	qNo: <b>406</b> 8	3785	Prep Date: 10/4/2016	DF: 1	
Analyte	Resul	t PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value %RP	RPD Limit	Qual
Aluminum	5.18	0.50	5		0	104	80-120	0		
Antimony	5.34	0.25	5		0	107	80-120	0		
Arsenic	5.332	0.25	5		0	107	80-120	0		
Barium	5.12°	0.25	5		0	102	80-120	0		
Beryllium	4.969	0.10	5		0	99.4	80-120	0		
Boron	24.4	1.0	25		0	97.6	80-120	0		
Cadmium	5.206	0.50	5		0	104	80-120	0		
Calcium	504	1 25	500		0	101	80-120	0		
Chromium	5.359	0.25	5		0	107	80-120	0		
Cobalt	5.452	0.25	5		0	109	80-120	0		
Copper	5.29	0.50	5		0	106	80-120	0		
Iron	513.8	3 4.0	500		0	103	80-120	0		
Lead	5.12	0.25	5		0	102	80-120	0		
Lithium	5.103	0.50	5		0	102	80-120	0		
Manganese	5.097	0.25	5		0	102	80-120	0		
Molybdenum	5.538	0.25	5		0	111	80-120	0		
Nickel	5.22	0.25	5		0	104	80-120	0		
Selenium	5.066	0.50	5		0	101	80-120	0		
Silver	4.363	0.25	5		0	87.3	80-120	0		
Thallium	5.262	0.50	5		0	105	80-120	0		
Zinc	5.329	0.50	5		0	107	80-120	0		

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92364 Instrument ID ICP2 Method: SW846 6010C

LCS	Sample ID: <b>LCS-92364-92364</b>				ι	Jnits: <b>mg/</b>	Kg	Analysis Date:	10/6/2016 1	1:24 AM
Client ID:	Run	ID: ICP2_1	61006A		Se	qNo: <b>407</b> (	0606	Prep Date: 10/4/2016	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value %RPI	RPD Limit	Qual
Aluminum	5.496	0.50	5		0	110	80-120	0		
Antimony	5.361	0.25	5		0	107	80-120	0		
Arsenic	5.254	0.25	5		0	105	80-120	0		
Barium	5.044	0.25	5		0	101	80-120	0		
Beryllium	4.867	0.10	5		0	97.3	80-120	0		
Boron	24.07	1.0	25		0	96.3	80-120	0		
Cadmium	5.208	0.50	5		0	104	80-120	0		
Calcium	503.3	25	500		0	101	80-120	0		
Chromium	5.291	0.25	5		0	106	80-120	0		
Cobalt	5.456	0.25	5		0	109	80-120	0		
Copper	5.288	0.50	5		0	106	80-120	0		
Iron	502.1	4.0	500		0	100	80-120	0		
Lead	5.043	0.25	5		0	101	80-120	0		
Lithium	5.228	0.50	5		0	105	80-120	0		
Manganese	5.051	0.25	5		0	101	80-120	0		
Molybdenum	5.455	0.25	5		0	109	80-120	0		
Nickel	5.161	0.25	5		0	103	80-120	0		
Selenium	5.017	0.50	5		0	100	80-120	0		
Silver	4.055	0.25	5		0	81.1	80-120	0		
Thallium	5.256	0.50	5		0	105	80-120	0		
Zinc	5.351	0.50	5		0	107	80-120	0		

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92364 Instrument ID ICP2 Method: SW846 6010C

MS	Sample ID: <b>1610098-01E</b>	вмѕ				Units: mg/	/Kg	Analys	sis Date:	10/5/2016 0	7:39 PM
Client ID:		Run ID:	ICP2_1	61005B	5	eqNo: <b>406</b>	8800	Prep Date: 10/	4/2016	DF: 1	
Analyte	1	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	:	20450	0.66	6.605	14560	89300	75-125	C	)		so
Antimony		2.529	0.33	6.605	-2.211	71.8	75-125	C	)		S
Arsenic		14.25	0.33	6.605	6.581	116	75-125	C	)		
Barium		447	0.33	6.605	405	635	75-125	C	)		so
Beryllium		6.758	0.13	6.605	0.2357	98.7	75-125	C	)		
Boron		ND	1.3	33.03	-29.92	90.6	75-125	C	)		
Cadmium		6.985	0.66	6.605	-0.03791	106	75-125	C	)		
Calcium		3735	33	660.5	3284	68.2	75-125	C	)		so
Chromium		39.97	0.33	6.605	28.9	168	75-125	C	)		so
Cobalt		15.73	0.33	6.605	10.67	76.6	75-125	C	)		
Copper		17.22	0.66	6.605	9.462	117	75-125	C	)		
Iron		19110	5.3	660.5	15950	479	75-125	C	)		SEO
Lead		17.4	0.33	6.605	10.82	99.6	75-125	C	)		
Lithium		31.2	0.66	6.605	19.45	178	75-125	C	)		S
Manganese		387.8	0.33	6.605	455.9	-1030	75-125	C	)		so
Molybdenum		7.4	0.33	6.605	0.3442	107	75-125	C	)		
Nickel		27.77	0.33	6.605	19.46	126	75-125	C	)		S
Selenium		5.964	0.66	6.605	-0.2409	93.9	75-125	C	)		
Thallium		6.059	0.66	6.605	-0.06077	92.6	75-125	C	)		
Zinc		49.96	0.66	6.605	37.31	192	75-125	C	)		SO

MS	Sample ID: 1610098-01	BMS				U	Inits: <b>mg/</b> I	Kg	An	alysis Date:	10/6/2016 1	1:57 AM
Client ID:		Run ID:	ICP2_1	61006A		Sec	qNo: <b>407</b> (	0613	Prep Date:	10/4/2016	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Re Value	f %RPD	RPD Limit	Qual
Silver		5.082	0.33	6.605		0	76.9	75-125		0		

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92364 Instrument ID ICP2 Method: SW846 6010C

MSD	Sample ID: 1610098-01BM	SD					Units: mg/	Kg	Analysi	is Date: 10	)/5/2016 0	7:45 PM
Client ID:	I	Run ID: ICP	2_16	1005B		Se	eqNo: <b>406</b>	8801	Prep Date: 10/4	/2016	DF: <b>1</b>	
Analyte	Res	sult Po	QL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	180	0.030	67	6.658	1456	60	52200	75-125	20450	12.6	20	SO
Antimony	2.8	348 0.	33	6.658	-2.21	11	76	75-125	2.529	11.9	20	
Arsenic	13	.52 0.	33	6.658	6.58	81	104	75-125	14.25	5.29	20	
Barium	43	4.8 0.	.33	6.658	40	05	448	75-125	447	2.76	20	SO
Beryllium	6.5	31 0.	13	6.658	0.235	57	94.6	75-125	6.758	3.42	20	
Boron		ND ^	1.3	33.29	-29.9	92	89.9	75-125	-2.857	0	20	
Cadmium	6.7	'94 0.	67	6.658	-0.0379	91	103	75-125	6.985	2.77	20	
Calcium	53	861	33	665.8	328	84	312	75-125	3735	35.8	20	SRO
Chromium	37	.26 0.	33	6.658	28	3.9	126	75-125	39.97	7.01	20	so
Cobalt	14	.59 0.	.33	6.658	10.6	67	59	75-125	15.73	7.47	20	S
Copper	16	.12 0.	67	6.658	9.46	62	100	75-125	17.22	6.59	20	
Iron	173	860	5.3	665.8	1595	50	213	75-125	19110	9.59	20	SEO
Lead	15	.84 0.	.33	6.658	10.8	82	75.3	75-125	17.4	9.39	20	
Lithium	29	.27 0.	67	6.658	19.4	45	148	75-125	31.2	6.36	20	S
Manganese	30	7.6 0.	33	6.658	455	5.9	-2230	75-125	387.8	23.1	20	SRO
Molybdenum	7.1	58 0.	.33	6.658	0.344	42	102	75-125	7.4	3.32	20	
Nickel	24	.97 0.	33	6.658	19.4	46	82.8	75-125	27.77	10.6	20	
Selenium	6	.11 0.	67	6.658	-0.240	09	95.4	75-125	5.964	2.43	20	
Thallium	5.8	398 0.	67	6.658	-0.0607	77	89.5	75-125	6.059	2.69	20	
Zinc	47	.14 0.	67	6.658	37.3	31	148	75-125	49.96	5.81	20	SO

MSD	Sample ID: 1610098-018	610098-01BMSD					Kg	Ana	Analysis Date: 10/6/2		
Client ID:		Run ID:	CP2_16	61006A		SeqNo: <b>407</b>	0614	Prep Date: 1	10/4/2016	DF: <b>1</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Silver		5.139	0.33	6.658	5.08	32 0.849	75-125		0		S

The following samples were analyzed in this batch:

16091814-	16091814-	16091814-	
01A	02A	03A	
16091814-	16091814-	16091814-	
04A	05A	06A	
16091814- 07A	16091814- 08A		

Holland Board of Public Works

QC BATCH REPORT

**Work Order:** 16091814

Client:

**Project:** HBPW Coal Yard

Batch ID: 92416 Instrument ID ICPMS2 Method: SW6020A

MBLK	Sample ID: MBLK-92416	-92416				Units: mg/	L	Ana	alvsis Date:	10/6/2016 0	1:01 PM
Client ID:	Campio is. MBER 32410		ICDMS2	_161006A		SeqNo: <b>407</b> (		Prep Date:	-	DF: 1	
Client ID.		Rull ID.	ICFIVI32	_101000A		3eq110. 4070	J20 I	Fiep Date.	10/3/2016		
					SPK Ref Value		Control Limit	RPD Ref Value		RPD Limit	
Analyte	F	Result	PQL	SPK Val	value	%REC	LIIIII	value	%RPD	LIIIIIL	Qual
Aluminum		ND	0.010								
Antimony		ND	0.0050								
Arsenic		ND	0.0050								
Barium		ND	0.0050								
Beryllium		ND	0.0020								
Boron		ND	0.020								
Cadmium		ND	0.0020								
Calcium		ND	0.50								
Chromium		ND	0.0050								
Cobalt		ND	0.0050								
Copper		ND	0.0050								
Iron		ND	0.080								
Lead		ND	0.0050								
Lithium		ND	0.010								
Manganese		ND	0.0050								
Molybdenum		ND	0.0050								
Nickel		ND	0.0050								
Selenium		ND	0.0050								
Silver		ND	0.0050								
Thallium		ND	0.0050								
		ND	0.010								

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92416 Instrument ID ICPMS2 Method: SW6020A

LCS	Sample ID: <b>LCS-92416-92416</b>				L	Jnits: mg/	L	Anal	vsis Date:	10/6/2016 0	1:06 PM
Client ID:		D. ICPMS	2 161006A			qNo: <b>407</b>		Prep Date: 10	•	DF: 1	
Oliciti IB.	Kairi	D. 101 14102	L_101000A		00	.q. <b>10</b> .			0/3/2010		
A b - d	Describ	DOL	ODK V-I	SPK Ref Value		0/ DEO	Control Limit	RPD Ref Value	0/ DDD	RPD Limit	Qual
Analyte	Result	PQL	SPK Val	Value		%REC	Liiiit	Value	%RPD	,	Quai
Aluminum	0.0976	0.010	0.1		0	97.6	80-120		0		
Antimony	0.09717	0.0050	0.1		0	97.2	80-120		0		
Arsenic	0.09791	0.0050	0.1		0	97.9	80-120		0		
Barium	0.09531	0.0050	0.1		0	95.3	80-120		0		
Beryllium	0.09643	0.0020	0.1		0	96.4	80-120		0		
Boron	0.4829	0.020	0.5		0	96.6	80-120		0		
Cadmium	0.09666	0.0020	0.1		0	96.7	80-120		0		
Calcium	9.989	0.50	10		0	99.9	80-120		0		
Chromium	0.09433	0.0050	0.1		0	94.3	80-120		0		
Cobalt	0.09622	0.0050	0.1		0	96.2	80-120		0		
Copper	0.09842	0.0050	0.1		0	98.4	80-120		0		
Iron	9.68	0.080	10		0	96.8	80-120		0		
Lead	0.09541	0.0050	0.1		0	95.4	80-120		0		
Lithium	0.0998	0.010	0.1		0	99.8	80-120		0		
Manganese	0.09093	0.0050	0.1		0	90.9	80-120		0		
Molybdenum	0.09649	0.0050	0.1		0	96.5	80-120		0		
Nickel	0.09696	0.0050	0.1		0	97	80-120		0		
Selenium	0.09308	0.0050	0.1		0	93.1	80-120		0		
Silver	0.09622	0.0050	0.1		0	96.2	80-120		0		
Thallium	0.0967	0.0050	0.1		0	96.7	80-120		0		
Zinc	0.09662	0.010	0.1		0	96.6	80-120		0		

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92416 Instrument ID ICPMS2 Method: SW6020A

MS	Sample ID: <b>16091398-03AMS</b>				Units: mg/	L	Analysis Da	ate: 1	0/6/2016 0 <sup>-</sup>	1:16 PM
Client ID:	Run I	D: ICPMS	2_161006A		SeqNo: <b>407</b> (	0264	Prep Date: 10/5/201	16	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value %F	RPD	RPD Limit	Qual
Aluminum	6.01	0.010	0.1	3.93	8 2070	75-125	0			so
Antimony	0.09765	0.0050	0.1	0.000994	7 96.7	75-125	0			
Arsenic	0.1018	0.0050	0.1	0.00187	1 99.9	75-125	0			
Barium	0.1429	0.0050	0.1	0.0421	1 101	75-125	0			
Beryllium	0.0868	0.0020	0.1	0.0002270	6.88	75-125	0			
Boron	0.5398	0.020	0.5	0.09004	4 90	75-125	0			
Cadmium	0.09769	0.0020	0.1	-4.249E-0	6 97.7	75-125	0			
Calcium	19.08	0.50	10	9.23	8 98.4	75-125	0			
Chromium	0.1019	0.0050	0.1	0.0053	96.5	75-125	0			
Cobalt	0.09619	0.0050	0.1	0.00125	3 94.9	75-125	0			
Copper	0.1064	0.0050	0.1	0.00968	7 96.7	75-125	0			
Iron	12.58	0.080	10	2.53	4 100	75-125	0			
Lead	0.09902	0.0050	0.1	0.00380	95.2	75-125	0			
Lithium	0.1005	0.010	0.1	0.005579	9 94.9	75-125	0			
Manganese	0.1024	0.0050	0.1	0.01149	90.9	75-125	0			
Molybdenum	0.122	0.0050	0.1	0.0261	3 95.9	75-125	0			
Nickel	0.1013	0.0050	0.1	0.0056	4 95.7	75-125	0			
Selenium	0.09415	0.0050	0.1	0.000947	5 93.2	75-125	0			
Silver	0.09509	0.0050	0.1	0.0000127	7 95.1	75-125	0			
Thallium	0.0977	0.0050	0.1	0.000288	97.4	75-125	0			
Zinc	0.1088	0.010	0.1	0.01059	98.2	75-125	0			<u> </u>

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92416 Instrument ID ICPMS2 Method: SW6020A

MSD	Sample ID: 16091398-03AMSD				Units: mg/	L	Analysi	is Date: 1	10/6/2016 0	1:37 PM
Client ID:	Run I	D: ICPMS	2_161006A		SeqNo: <b>407</b>	0268	Prep Date: 10/5	/2016	DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	5.747	0.010	0.1	3.93	8 1810	75-125	6.01	4.47	7 20	SO
Antimony	0.09539	0.0050	0.1	0.000994	7 94.4	75-125	0.09765	2.34	4 20	
Arsenic	0.09957	0.0050	0.1	0.00187	1 97.7	75-125	0.1018	2.2	1 20	
Barium	0.1464	0.0050	0.1	0.0421	1 104	75-125	0.1429	2.42	2 20	
Beryllium	0.08707	0.0020	0.1	0.000227	6 86.8	75-125	0.0868	0.31	1 20	
Boron	0.5232	0.020	0.5	0.0900	4 86.6	75-125	0.5398	3.12	2 20	
Cadmium	0.09608	0.0020	0.1	-4.249E-0	6 96.1	75-125	0.09769	1.66	6 20	
Calcium	19.97	0.50	10	9.23	8 107	75-125	19.08	4.56	6 20	
Chromium	0.09946	0.0050	0.1	0.0053	8 94.1	75-125	0.1019	2.42	2 20	
Cobalt	0.09595	0.0050	0.1	0.00125	3 94.7	75-125	0.09619	0.25	5 20	
Copper	0.1077	0.0050	0.1	0.00968	7 98	75-125	0.1064	1.2	1 20	
Iron	12.04	0.080	10	2.53	4 95.1	75-125	12.58	4.39	9 20	
Lead	0.09861	0.0050	0.1	0.00380	6 94.8	75-125	0.09902	0.415	5 20	
Lithium	0.1	0.010	0.1	0.00557	9 94.4	75-125	0.1005	0.499	9 20	
Manganese	0.09975	0.0050	0.1	0.0114	9 88.3	75-125	0.1024	2.62	2 20	
Molybdenum	0.1225	0.0050	0.1	0.0261	3 96.4	75-125	0.122	0.409	9 20	
Nickel	0.1008	0.0050	0.1	0.0056	4 95.2	75-125	0.1013	0.49	5 20	
Selenium	0.09448	0.0050	0.1	0.000947	5 93.5	75-125	0.09415	0.3	5 20	
Silver	0.09243	0.0050	0.1	0.0000127	7 92.4	75-125	0.09509	2.84	4 20	
Thallium	0.09688	0.0050	0.1	0.000288	8 96.6	75-125	0.0977	0.843	3 20	
Zinc	0.107	0.010	0.1	0.0105	9 96.4	75-125	0.1088	1.67	7 20	

The following samples were analyzed in this batch:

16091814-	16091814-	16091814-	
09A	10A	11A	
16091814-	16091814-	16091814-	
12A	13A	14A	
16091814-	16091814-		
15A	16A		

Work Order: 16091814

Project: HBPW Coal Yard

Batch ID: 92371 Instrument ID WETCHEM Method: SW9045D LCS Sample ID: LCS-92371-92371 Units: s.u. Analysis Date: 10/4/2016 03:30 PM Client ID: Prep Date: 10/4/2016 DF: 1 SeqNo: 4064916 Run ID: WETCHEM\_161004N RPD Ref **RPD** SPK Ref Control Value Limit Value Limit Analyte Result **PQL** SPK Val %REC %RPD Qual 4.05 рΗ 0 101 90-110 0 DUP Units: s.u. Analysis Date: 10/4/2016 03:30 PM Sample ID: 16091773-01B DUP Prep Date: 10/4/2016 Client ID: SeqNo: 4064918 DF: 1 Run ID: WETCHEM\_161004N RPD Ref SPK Ref Control **RPD** Value Limit Value Limit %REC %RPD Analyte Result **PQL** SPK Val Qual 8.05 рΗ 0 0 0 0-0 8.1 0.619 20 DUP Sample ID: 16091814-01A DUP Units: s.u. Analysis Date: 10/4/2016 03:30 PM Client ID: Ash #1 SeqNo: 4064920 Prep Date: 10/4/2016 DF: 1 Run ID: WETCHEM\_161004N RPD SPK Ref Control RPD Ref Value Limit Value Limit Analyte Result **PQL** SPK Val %REC %RPD Qual

The following samples were analyzed in this batch:

7.84

0

16091814-	16091814-	16091814-
01A	02A	03A
16091814-	16091814-	16091814-
04A	05A	06A
16091814-	16091814-	
07A	08A	

0

0-0

7.82

0.255

20

рΗ

Client: Holland Board of Public Works

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: 92720	Instrument ID IC4			Metho	d: <b>SW90</b> 5	66A								
MBLK	Sample ID: MBLK-9272	20-92720					Units: mg/l	Kg	Ana	alysis Date: 1	0/11/2016	12:06		
Client ID:		Run ID	: IC4_16	1010B		Se	eqNo: <b>407</b> 8	3176	Prep Date:	10/6/2016	DF: <b>1</b>			
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual		
Allalyte				SFR Vai			/0NLC			/0KFD		Quai		
Chloride		ND	10											
Fluoride		ND	1.0											
Sulfate		ND	10											
LCS	Sample ID: LCS-92720	-92720					Units: mg/l	Kg	Ana	alysis Date: 1	0/11/2016	12:26		
Client ID:		Run ID	: IC4_16	1010B		Se	eqNo: <b>407</b> 8	3177	Prep Date:	10/6/2016	DF: <b>1</b>			
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qua		
Chloride		99.14	10	100		0	99.1	80-120		0				
Fluoride		19.22	1.0	20		0	96.1	80-120		0				
Sulfate		96.82	10	100		0	96.8	80-120		0				
MS	Sample ID: <b>16091814-0</b>					Units: mg/l	Kg	Ana	alysis Date: 1	0/11/2016	01:06			
Client ID: Ash #1		Run ID	: IC4_16	1010B		Se	eqNo: <b>407</b> 8	3179	Prep Date:	10/6/2016	DF: <b>1</b>			
					SPK Ref Value			Control	RPD Ref		RPD Limit			
Analyte		Result	PQL	SPK Val	value		%REC	Limit	Value	%RPD	Liiiit	Qua		
Chloride		98.08	9.8	97.66		0	100	75-125		0				
Fluoride		17.86	0.98	19.53		0	91.4	75-125		0				
Sulfate		108.4	9.8	97.66		0	111	75-125		0				
MSD	Sample ID: 16091814-0	1A MSD					Units: <b>mg/</b> l	Kg	Ana	alysis Date: 1	0/11/2016	01:26		
Client ID: Ash #1		Run ID	: IC4_16	1010B		Se	eqNo: <b>407</b> 8	3180	Prep Date:	10/6/2016	DF: <b>1</b>			
Analyte		Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual		
Chloride		99.6	9.8	98.23	5.79	97	95.5	75-125		0				
Fluoride		18.54	0.98	19.65	1.4		93.3 87	75-125		0				
Sulfate		110.9	9.8	98.23	16.4		96.2	75-125		0				
The following sam	ples were analyzed in thi	s batch:	01	6091814- IA	16	609 2A	1814-	03						
			04	6091814- IA 6091814-	05	δA	1814- 1814-	16 06	091814- A					
				7A		3A								

Holland Board of Public Works

Work Order: 16091814

Client:

HBPW Coal Yard

**Project:** 

Batch ID: <b>R197180</b>	Instrument ID WET	CHEM		Metho	d: <b>E160.3</b>	<b>;</b>					
MBLK	Sample ID: MB-R197180	-R197180				Units: % o	f sample	Analys	sis Date: 10	0/3/2016 1	2:10 PM
Client ID:		Run ID:	WETCH	IEM_16100	1D	SeqNo: <b>406</b>	1918	Prep Date:		DF: <b>1</b>	
					SPK Ref		Control	RPD Ref		RPD	
Analyte	1	Result	PQL	SPK Val	Value	%REC	Limit	Value	%RPD	Limit	Qual
Total Solids		ND	0.050								
MBLK	Sample ID: MB-R197180	-R197180				Units: % o	f sample	Analys	sis Date: 10	0/3/2016 1	2:10 PI
Client ID:		Run ID:	WETCH	IEM_16100	1D	SeqNo: <b>406</b>	1921	Prep Date:		DF: <b>1</b>	
Analyte	Ī	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Solids		ND	0.050								
MBLK	Sample ID: MB-R197180	-R197180				Units: % o	f sample	Analys	sis Date: 10	0/3/2016 1	2:10 PN
Client ID:		Run ID:	WETCH	IEM_16100	1D	SeqNo: <b>406</b>	1948	Prep Date:		DF: <b>1</b>	
Analyte	1	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture		ND	0.050								
LCS	Sample ID: LCS-R19718	0-R19718	)			Units: % o	f sample	Analys	sis Date: 10	0/3/2016 1	2:10 PI
Client ID:	Run ID: WETCHEM_161001D				1D	SeqNo: <b>406</b>	1949	Prep Date:		DF: <b>1</b>	
Analyte	1	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture		100	0.050	100		0 100	99.5-100	.5 (	)		
DUP	Sample ID: <b>16091725-02</b>	A DUP				Units: % o	f sample	Analys	sis Date: 10	0/3/2016 1	2:10 PI
Client ID:		Run ID:	WETCH	IEM_16100	1D	SeqNo: <b>406</b>	1920	Prep Date:		DF: 1	
						•					
Analyte	ı	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
•	I	Result 31.1	PQL 0.050	SPK Val						Limit	Qual
Total Solids	Sample ID: <b>16091807-01</b>	31.1				%REC	Limit 0-0	Value 31.42		Limit 20	
Total Solids  DUP		31.1 <b>A DUP</b>	0.050		Value	%REC 0 0	Limit 0-0 f sample	Value 31.42	1.02	Limit 20	
Total Solids  DUP  Client ID:	Sample ID: <b>16091807-01</b>	31.1 <b>A DUP</b>	0.050	0	Value	%REC 0 0 Units: % o	Limit 0-0 f sample	Value 31.42 Analys	1.02	20 0/3/2016 1	2:10 PI
Total Solids  DUP  Client ID:  Analyte	Sample ID: <b>16091807-01</b>	31.1  A DUP  Run ID:	0.050 <b>WETCH</b>	0 HEM_16100	Value  1D  SPK Ref	%REC 0 0 Units: % o SeqNo: 406	Limit  0-0  f sample 1924  Control	Value 31.42 Analys Prep Date: RPD Ref	1.02 sis Date: 10 %RPD	20 0/3/2016 1 DF: 1 RPD	
Total Solids  DUP  Client ID:  Analyte  Total Solids	Sample ID: <b>16091807-01</b>	31.1  A DUP  Run ID:  Result  8.14	0.050  WETCH	0 HEM_16100 SPK Val	Value  1D  SPK Ref	%REC  0 0  Units: % o  SeqNo: 406	Limit  0-0  f sample  1924  Control Limit  0-0	Value 31.42 Analys Prep Date:  RPD Ref Value 8.15	1.02 sis Date: 10 %RPD 5 0.123	20 0/3/2016 1 DF: 1 RPD Limit	<b>2:10 Pl</b> Qual
Total Solids  DUP  Client ID:  Analyte  Total Solids  DUP	Sample ID: <b>16091807-01</b>	31.1  A DUP Run ID: Result 8.14  A DUP	0.050  WETCH PQL 0.050	0 HEM_16100 SPK Val	Value  1D  SPK Ref Value	%REC  0 0  Units: % o  SeqNo: 406  %REC  0 0	Limit  0-0  f sample 1924  Control Limit  0-0  f sample	Value 31.42 Analys Prep Date:  RPD Ref Value 8.15	1.02 sis Date: 10 %RPD	20 0/3/2016 1 DF: 1 RPD Limit	<b>2:10 Pl</b> Qual
Analyte Total Solids  DUP Client ID: Analyte Total Solids  DUP Client ID: Analyte Analyte	Sample ID: 16091807-01	31.1  A DUP Run ID: Result 8.14  A DUP	0.050  WETCH PQL 0.050	0 HEM_16100 SPK Val 0	Value  1D  SPK Ref Value	%REC 0 0 Units: % o SeqNo: 406  %REC 0 0 Units: % o	Limit  0-0  f sample 1924  Control Limit  0-0  f sample	Value 31.42 Analys Prep Date:  RPD Ref Value  8.15 Analys	1.02 sis Date: 10 %RPD 5 0.123	20 0/3/2016 1 DF: 1 RPD Limit 20 0/3/2016 1	<b>2:10 PI</b> Qual

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: <b>R197180</b>	Instrument ID WETCHEM	Method:	E160.3	
The following samples w	ere analyzed in this batch:	16091814- 01A	16091814- 02A	16091814- 03A
		16091814- 04A	16091814- 05A	16091814- 06A
		16091814- 07A	16091814- 08A	

Holland Board of Public Works

Work Order: 16091814

Client:

**Project:** HBPW Coal Yard

Batch ID: <b>R197703</b>	Instrument ID IC4 Method: SV					56	A					
MBLK	Sample ID: CCB/MBLK-	R197703					Units: mg/l	_	Anal	sis Date:	10/7/2016 (	7:45 AM
Client ID:		Run ID:	IC4_16	1007A		S	SeqNo: <b>407</b> 4	1927	Prep Date:		DF: <b>1</b>	
					SPK Ref			Control	RPD Ref		RPD	
Analyte	ı	Result	PQL	SPK Val	Value		%REC	Limit	Value	%RPD	Limit	Qual
Chloride		ND	1.0									
Fluoride		ND	0.10									
Sulfate		ND	1.0									
LCS	Sample ID: MLCCV/LCS	-R197703					Units: mg/l	_	Analy	sis Date:	10/7/2016 (	1:49 PM
Client ID:		Run ID:	IC4_16	1007A		S	SeqNo: <b>407</b> 4	1940	Prep Date:		DF: <b>1</b>	
Analyte	I	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		9.382	1.0	10		0	93.8	88-110		0		
Fluoride		2.186	0.10	2		0	109	86-111		0		
Sulfate		10.28	1.0	10		0	103	85-110		0		
MS	Sample ID: <b>16091814-09A MS</b>					Units: mg/L Analysis Date: 10/7/2016 12:4						12:48 PM
Client ID: Ash #1		Run ID:	IC4_16	1007A		S	SeqNo: <b>407</b> 4	1937	Prep Date:		DF: <b>2</b>	
					SPK Ref			Control	RPD Ref		RPD	
Analyte	ı	Result	PQL	SPK Val	Value		%REC	Limit	Value	%RPD	Limit	Qual
Chloride		19.29	2.0	20	0.44	24	94.2	75-125		0		
Fluoride		4.609	0.20	4	0.39	65	105	75-125		0		
Sulfate		23.77	2.0	20	3.8	15	99.8	75-125		0		
MS	Sample ID: <b>1610032-10E</b>	3 MS					Units: mg/l	_	Analy	sis Date: '	10/7/2016 (	5:11 PM
Client ID:		Run ID:	IC4_16	1007A		S	SeqNo: <b>407</b> 4	1950	Prep Date:		DF: 10	
Analyte	į	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		117	10	100	21.0	64	95.4	75-125		0		
Sulfate		140.8	10	100	40.	98	99.8	75-125		0		
MSD	Sample ID: <b>16091814-0</b> 9	A MSD					Units: mg/L	_	Analy	sis Date:	10/7/2016 (	1:08 PM
Client ID: Ash #1		Run ID:	IC4_16	1007A		S	SeqNo: <b>407</b> 4	1938	Prep Date:		DF: <b>2</b>	
Analyte	ı	Result	PQL	SPK Val	SPK Ref Value		%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		21.17	2.0	20	0.44	24	104	75-125	19.2	9 9.	3 20	
Fluoride		5.006	0.20	4	0.39			75-125	4.60			
Sulfate		26.2	2.0	20	3.8			75-125	23.7			

**Work Order:** 16091814

**Project:** HBPW Coal Yard

Batch ID: R197703 Instrument ID IC4 Method: SW9056A

MSD	Sample ID: 1610032-10	mple ID: <b>1610032-10B MSD</b>				Units: mg/L			Analysis Date: 10/7/2016 05:31		
Client ID:		Run ID	IC4_16	1007A	(	SeqNo: <b>407</b>	4951	Prep Date:		DF: <b>10</b>	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride		115.8	10	100	21.64	94.2	75-125	117	0.9	9 20	
Sulfate		138.7	10	100	40.98	97.7	75-125	140.8	1.4	7 20	

The following samples were analyzed in this batch:

16091814-	16091814-	16091814-
09A	10A	11A
16091814-	16091814-	16091814-
12A	13A	14A
16091814-	16091814-	
15A	16A	



Cincinnati, OH +1 513 733 5336

+1 425 356 2600

Everett, WA

Holland, MI +1 616 399 6070

Fort Collins, CO

+1 970 490 1511

### **Chain of Custody Form**

Houston, TX +1 281 530 5656 Spring City, PA +1 610 948 4903

South Charleston, WV +1 304 356 3168

Page

Middletown, PA +1 717 944 5541 coc in: 40547

Salt Lake City, UT +1 801 266 7700

York, PA +1 717 505 5280

Enviro	nmental	ALS Project Manager:	4			ALS Wo	rk Order #:	િત્રિપ્રાજ્રા		
	Customer Information	English to the Telephone	Project Information		Water not would be	Parame	ter/Metho	d Request	for Analysis	
Purchase Order		Project Name	HBPW Coal Yard	А	See		ched	1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		*
Work Order		Project Number		В						Ç.
Company Name	Holland Board of Public Works	Bill To Company	Holland Board of Public Works	C						
Send Report To	Jug N Visscher	Invoice Attn	Accounts Payable	D				N. F.		
Address	625 Haetinge	Address	625 Hastings	E	* * * * * * * * * * * * * * * * * * *					- 4
City/State/Zip	Holland, MI 49423	City/State/Zip	Holland, Mt. 49423	G		7.1. V.		2-3-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2		
Phone	(816) 355-1255	Phone	(616) 355-1520	H		e de la companya de l				- <u>*</u>
Fax		Fax			**					
e-Mail Address	jvisscher@hollandbow.com	e-Mail Address	jvisscher@wilandbonv.com	J				e v gári		1,4
No.	Sample Description	30.0	Time Matrix Pres. # Bottles	Α	В	C D	E	G	H 1 J	Hold
1 /1sh =	= 9	-30-16 1	45 Ash 1	1	-	* "\				
	2	1.	<b>53</b>	3			1.4 7	ng ta		, j.
	<b>13</b>	2:	10	#.5	-					
	34	2	30 V							**
	41		40-6-61						3	+,
	<b>#</b> 2	2	165							
<u> </u>	<b>b3</b>	2:	50		M colored Colo					<u>1</u>
8 Coal #	<b>‡ 4</b>	d/ 3=	50 J.	V						*
9				ļ					* * * * * * * * * * * * * * * * * * * *	
10										
Sampler(s) Please P	poledora KAVZGA	Shipment Met	hod Turnaround Time in Business  10 BD	. Les rest	(BD) 3 BD	☐ Other ☐ 2.80	<del></del>	Resi BD	ults Due Date;	
Rejiphuished/by:	11 9-30-16 1	Recei	222	Notes		7				- 1
Relingatated by 7	Date: ITIn	30 PM C	yest by (Lascolatory)	Co	oler ID	Cooler Ten	42.6		ne Box Below)	
Logger by (Laborator)	1) MB 9/36/16 ]	ne: Chec 70	ked by (Calcoratory),		ELE.	4.6	Level	II Std QC III Std QC/Rav IV SW846/CLF		
Preservative Key:	1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH	I 5-Na <sub>2</sub> S <sub>2</sub> O <sub>a</sub> 6	-NaHSO <sub>4</sub> 7-Oth 8-4°C 9-5035	j j		9	☐ Otthe			

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2012 by ALS Environmental.

# CCR Coal parameter list for inertness consideration

	Target detection levels	≱:! }::		
	Total concentrations	Target Detection levels		
	ash/coal/soil samples	SPLP Leachate samples		
		f.:		
	(ug/kg)	(ug/L)		
Aluminum:	1,000	50		
Antimony	1,000	<u>2</u>		
Arsenic-	2,000	5.0/1.0		
Barium	1,000	100/5.0		
Beryllium	500	1		
Boroń	8,000	300/20		
Cadmium	200	1/0.2		
Chromium	1,000	10		
Cobalt	500	20		
Copper	1,000	4.0/1.0		
Iron	5,000	200/20		
Lead	10,000	3.0/1.0		
Lithium	400	10		
Manganese	1,000	§ 50/5.0		
Mercury	50	<b>⊌</b> 0		
Molybdenum	1,000	50/25		
Nickel	1,000	20/5.0		
Selenium	200	5.0/1.0		
Silver	100	. 0		
Thallium	500	2		
Zinc	1,000	10		
calcium	NT	none specified by RRD		
chloride	NT	10,000		
fluoride	NT	1,000		
рН	NT	b.		
sulfate	NT	1,000		
TDS	NT	§   ·		

# ALS Group USA, Corp

#### Sample Receipt Checklist

Client Name:	<u>HBPW</u>			Date/Time	Received:	30-Sep-16	<u> 15:30</u>	
Work Order:	<u>16091814</u>			Received b	y:	<u>MBB</u>		
Checklist compl Matrices:	eted by <u>Meghan Broadbent</u> eSignature ash, coal	30-	-Sep-16 Date	Reviewed by:	Bill Carry eSignature	,		12-Oct-16 Date
Carrier name:	Client							
Shipping contain	ner/cooler in good condition?		Yes 🗸	No 🗆	Not Pres	ent		
Custody seals in	ntact on shipping container/coole	r?	Yes	No 🗆	Not Pres	ent 🗸		
Custody seals in	ntact on sample bottles?		Yes	No 🗌	Not Pres	ent 🗸		
Chain of custod	y present?		Yes 🗸	No 🗌				
Chain of custod	y signed when relinquished and	received?	Yes 🗸	No 🗌				
Chain of custod	y agrees with sample labels?		Yes 🗹	No 🗌				
Samples in prop	per container/bottle?		Yes 🗸	No 🗌				
Sample contain	ers intact?		Yes 🗸	No 🗆				
Sufficient sample	e volume for indicated test?		Yes 🗸	No 🗌				
All samples rece	eived within holding time?		Yes 🗸	No 🗆				
Container/Temp	Blank temperature in compliance	e?	Yes 🗸	No 🗆				
Sample(s) recei Temperature(s)	ved on ice? /Thermometer(s):		Yes <b>✓</b> 4.6/4.6	No 🗆	SR	12		
Cooler(s)/Kit(s):								
	ole(s) sent to storage:			5:16:53 PM	Na VOA dala		<b>✓</b>	
	als have zero headspace?		Yes □	No □	No VOA vials	submitted		
pH adjusted? pH adjusted by:	eptable upon receipt?		Yes _	No □	N/A V			
Login Notes:			_					
Logiii Notes.								
	========			=====		====		
Client Contacted	d:	Date Contacted:		Person	Contacted:			
Contacted By:		Regarding:						
Comments:								
CorrectiveAction	n:						SDC F	2000 1 of 1



# **APPENDIX C**

**PHOTO LOG** 



### PHOTO LOG NTH Project No. 73-160017-06 Holland Board of Public Works James DeYoung Power Plant Site Photos Taken July 14, 2020

Photo 1 – View from JDY MW-1 towards Adjacent Property



Photo 2 - View from JDY MW-1 towards Adjacent Property





### PHOTO LOG NTH Project No. 73-160017-06 Holland Board of Public Works James DeYoung Power Plant Site Photos Taken July 14, 2020

Photo 3 – Runoff from Adjacent Property unto JDY MW-1 Area



Photo 4 – Runoff from Adjacent Property unto JDY MW-1 Area





# **APPENDIX D**

**TABLE** 

### Total and Leachable Concentrations of Lithium in Samples of Coal and Bottom Ash DeYoung Power Plant

Analyte	CAS	Matrix	Units	16091814-05 Coal #1 9/30/2016	16091814-06 Coal # 2 9/30/2016	16091814-07 Coal # 3 9/30/2016	16091814-07 Coal # 4 9/30/2016
Lithium	7439-93-2	Total Conc.	mg/Kg	< 0.8	< 7.8	< 9.8	< 9.8
Lithium	7439-93-2	SPLP Extract	mg/L	< 0.010	< 0.010	< 0.010	< 0.010
Analyte	CAS	Matrix	Units	16091814-05 Ash #1 9/30/2016	16091814-06 Ash # 2 9/30/2016	16091814-07 Ash # 3 9/30/2016	16091814-07 Ash # 4 9/30/2016
Lithium	7439-93-2	Total Conc.	mg/Kg	13	< 10	< 11	25
Lithium	7439-93-2	SPLP Extract	mg/L	< 0.01	< 0.01	< 0.01	0.038