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10 December 2019
File No. 127841-006

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Attention: Kerry A. Maloney, P.G.

Subject: Groundwater Sampling and Analysis Transmittal – 2019 PFAS Sampling
1101 Prospect Avenue
Westbury, New York
Site No: C130178

Dear Ms. Maloney:

This letter is provided on behalf of Oerlikon Metco and transmits the validated results of the sampling and analysis of on-site and offsite groundwater at 1101 Prospect Avenue in Westbury, New York (the site). The sampling programs were conducted in response to the 16 January 2019 letter from the New York State Department Environmental Conservation (NYSDEC) delaying the issuance of the Decision Document and approval of the Remedial Action Work Plan (RAWP) for the Brownfield Cleanup Program (BCP) Site # C130178 pending additional investigation of per- and polyfluoroalkyl substances (PFAS) at the Site. The additional PFAS investigation was performed in accordance with scopes of work dated 8 May 2019 and 24 July 2019, and approved by the NYSDEC on 9 May 2019 and 15 August 2019, respectively.

BACKGROUND

The site is currently part of the NYSDEC BCP due to the detection of tetrachloroethene (PCE) in exterior soil vapor and sub-slab vapor. To date, Oerlikon has completed investigations and prepared a RAWP to install a sub-slab depressurization system (SSDS) within the machine shop area of the site building to mitigate potential soil vapor intrusion. The RAWP was submitted to the NYSDEC on 3 July 2018 and went through NYSDEC review and a 45-day public comment period, which concluded on 31 December 2018.

Recently, the NYSDEC has implemented an initiative to collect groundwater data for emerging contaminants 1,4-dioxane and PFAS across New York state. As part of this initiative and due to Oerlikon's participation in the BCP, the NYSDEC issued a 9 February 2018 email request to Oerlikon to conduct an additional groundwater sampling program of existing monitoring wells for the presence of these emerging contaminants. To comply with this request, Oerlikon prepared an emerging contaminants sampling plan dated 13 August 2018, which was conditionally approved by the NYSDEC on 31 August 2018. In accordance with the approved work plan, Oerlikon collected representative samples

from three (3) on-site groundwater monitoring wells in October 2018. The results of the sampling were provided in a data transmittal to the NYSDEC dated 19 December 2018. The sample analyses did not detect 1,4-dioxane, but PFAS were identified in groundwater at concentrations that were greater than the current guidance levels for drinking water sources issued by the USEPA in 2016. PFAS sampling results are provided on Table I for reference.

On 16 January 2019, the NYSDEC provided a letter which indicated that the combined detections of PFAS compounds exceeded the New York State Drinking Water Quality Council's proposed maximum contaminant levels (MCLs) for drinking water, and suggested that historical metal plating operations, metal work, and research and development at the site may have been the source of the PFAS. The NYSDEC also indicated in their letter that further work related to the BCP would be on hold and would not issue a decision on the proposed remedial action, pending further investigation and potential remediation of PFAS in groundwater.

Representatives from Oerlikon met with the NYSDEC on 10 April 2019 to discuss the PFAS data and potential for decoupling the completion of the BCP activities from the NYSDEC's request for PFAS data. Oerlikon also indicated that a source of PFAS in onsite groundwater is unknown and that it does not currently store, manage, or use PFAS in its operations, does not conduct plating, and does not know of any past metal plating operations or other use of PFAS at the site. Although the ownership has changed since the property development, past and current operations at the site have consistently been the manufacture of powder thermal coatings and thermal spray equipment rather than processes that would have utilized PFAS. During the meeting, the NYSDEC provided some data confirming other sources of PFAS in the vicinity of the site.

During a conference call on 18 April 2019, the NYSDEC indicated it would not decouple completion of the BCP activities from further work on its data gathering initiative. Accordingly, Oerlikon agreed to conduct an additional investigation of onsite groundwater for the presence of PFAS. Sampling was conducted in May 2019.

MAY 2019 ON-SITE SAMPLING

Scope of Work

On-site sampling consisted of collecting groundwater samples from existing permanent wells (MW-1, MW-2, MW-3, and MW-4) and from temporary grab sample locations (HA-101, HA-102, HA-103, HA-104, and HA-105) on 14 and 15 May 2019. Well locations are shown on Figure 1.

The existing wells were previously installed by AECOM on behalf of the NYSDEC in 2012 and are reported to be 70-feet deep, with 10-foot screen intervals installed at the bottom of the wells (e.g. 60-70 feet below ground surface). The existing monitoring wells were purged until dry prior to sampling using a stainless-steel bailer. Following recharge, groundwater samples were collected using a HDPE bailer and placed in laboratory-provided bottle-ware.

Per NYSDEC guidance[1,2], sampling equipment used to purge and sample the wells did not include polytetrafluoroethylene (e.g. Teflon), low density polyethylene (LDPE), or glass nor the use of aluminum foil or commercially purchased zip-top bags (e.g. Ziplock). Sampling equipment used to obtain the groundwater samples included high density polyethylene (HDPE) bailers, stainless-steel bailers, and galvanized uncoated wire rope.

Cascade Drilling, L.P. was subcontracted to install the five (5) temporary grab sample locations using direct push drilling equipment. The groundwater grab samples were collected using Geoprobe Systems® SP16 groundwater sampling tools using a stainless-steel screen and HDPE tubing. The samples were collected from between 60 and 70 feet below ground surface (ft. bgs) to coincide with the depths of the existing monitoring well screen intervals.

Equipment blanks, a field blank, field duplicate and matrix spike/matrix spike duplicate (MS/MSD) sample were collected during the sampling event for quality control/quality assurance purposes.

The samples were submitted under chain of custody via courier to Alpha Analytical Inc. of Westborough, MA for the analysis of NY Per- and Polyfluoroalkyl Analytes (NY PFAAs) via EPA Method 537(M)-Isotope Dilution.

Onsite Sampling Results

Sample analysis results, were validated by a qualified third-party data validator (Stone Environmental) and are summarized Table I. Data usability summary reports (DUSR) are provided in Appendix A. The DUSR indicates that the overall quality of the data was acceptable, and all results are considered usable as qualified. In summary, PFAS were detected in the groundwater samples collected with the highest concentrations limited to an area in the southeast corner of the site (MW-1 and HA-101), consistent with previous results.

The results of the sampling event were provided to the NYSDEC via email on 3 June 1019 and subsequently discussed in a conference call on 5 June 2019. During the call, the NYSDEC requested that additional offsite investigation be conducted to evaluate whether PFAS compounds are present on offsite properties and to help identify the potential source of the PFAS. Accordingly, Oerlikon agreed to conduct an additional investigation of offsite groundwater for the presence of PFAS. Sampling was conducted in August 2019 as described below.

[1] New York State Department of Environmental Conservation, 2016. PFC Groundwater Samples from Monitoring Wells Sample Protocol. Revision 1.2, 26 June 2016.
[2] New York State Department of Environmental Conservation, 2018. Groundwater Sampling for Emerging Contaminants. April 2018.

AUGUST 2019 OFFSITE SAMPLING

Scope of Work

Based on historical reports which indicate that groundwater flow direction is towards the south-southwest, Oerlikon arranged access to conduct an additional PFAS investigation of groundwater at the adjacent neighboring properties including the Nassau County Board of Cooperative Extension Services (BOCES) property located to the north and east of the Oerlikon property and the Nassau County Department of Public Works (DPW) Public Safety Center property located to the south of the Oerlikon Metco property. Upgradient samples north of the site were also included in the offsite groundwater investigation.

Consistent with previous PFAS investigations, the sampling event consisted of collection of groundwater samples from temporary grab sample locations. The samples were collected using the same means and methods used to collect the May 2019 samples. Temporary well locations were installed by Cascade Drilling, L.P. and samples were analyzed for NY PFAAs via EPA Method 537(M)-Isotope Dilution by Alpha Analytical. Equipment blanks, a field blank, field duplicate and MS/MSD sample were collected during the sampling event for quality control/quality assurance purposes

Samples were collected between 19 August and 22 August 2019 at sample locations designated HA-106 through HA-119 as shown on Figure 1. The samples were collected from approximately 60 to 70 ft. bgs to coincide with the depths of the existing monitoring well screen intervals. Samples HA-106 through HA-111 were collected from the BOCES property and samples HA-114 through HA-119 were collected from the DPW. Samples HA-112 and HA-113 were collected on the north side of the Oerlikon building at the property line between the site and the BOCES property.

Prior to sampling, static water level measurements were collected from the four (4) onsite monitoring wells to determine the depth to groundwater and confirm the previously reported southerly groundwater flow direction. Groundwater depth was measured between 57.83 and 59.31 ft. bgs with a relatively flat gradient in a southerly direction.

Offsite Sampling Results

Sample results were validated by a qualified third-party (Stone Environmental) and are summarized Table I. DUSR reports are provided in Appendix A. The DUSR indicates that the overall quality of the data was acceptable, and all results are considered usable as qualified. In summary, PFAS was detected at the onsite locations and the offsite upgradient and downgradient locations sampled, with the highest concentrations limited to an area in the southeast corner of the site.

DISCUSSION

PFAS was detected at all upgradient and downgradient locations sampled with the highest concentrations limited to and area in the southeast corner of the site at MW-1 and grab sample location HA-101. There are no state regulatory groundwater standards or guidance values for cleanup of PFAS in groundwater.

The data from the three rounds of sampling, including data collected by others as provided by the NYSDEC, suggests that PFAS are ubiquitous in groundwater in this area of Long Island, including at upgradient locations. The samples collected on properties downgradient of Oerlikon are consistent with or lower than background levels detected at other locations. Groundwater level data suggest that the hydraulic gradient is relatively flat. Furthermore, the PFAS-impacted area of the site is overlain by pavement and building foundation precluding infiltration of surface water. Overall, the data support that PFAS in groundwater in the southeast corner of the site is not appreciably impacting adjacent offsite locations and not anticipated to be an appreciable source of impact to regional drinking water. The nearest downgradient drinking water wells are approximately 0.5 to 1.25 miles southwest, south, and southeast of the site.

As Oerlikon reported to the NYSDEC on 10 April 2019, the source of PFAS in onsite groundwater is unknown. Oerlikon Metco does not currently nor does it reportedly have a documented history of use of PFAS as part of its manufacturing processes, which have consistently been the manufacture of powder thermal coatings and thermal spray equipment. Therefore, it is anticipated that the detections of PFAS in the southeast corner of the site may be the result of an incidental release of PFAS-containing material such as firefighting foam that may have historically discharged on or proximate to MW-1 and HA-101 and unrelated to Oerlikon's present or past operations. It is assumed that such a release would have had to have occurred long ago since Oerlikon reviewed records for their facility and interviewed personnel at the DPW and did not identify records associated with fire response or fire suppression. Since the data support that the potential PFAS source is limited to an area in the southeast corner of the facility and that the PFAS is not appreciably migrating to downgradient groundwater, Oerlikon has proposed to conduct continued monitoring of groundwater quality downgradient of the site as a course of action.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Claire L. Mondello
Senior Project Manager

Richard J. Rago
Senior Associate

Attachments:

Table I – Summary of Groundwater Data – PFAS
Figure 1 – Groundwater Sampling Location Plan
Appendix A - Data Usability Summary Reports

c: Jacquelyn Nealon, New York State Department of Health
Charlotte Bethoney, New York State Department of Health
Michael Lydon; Oerlikon Metco (U.S.) Inc
Scott Turner, Esq.; Nixon Peabody LLP

Tables

TABLE I
SUMMARY OF GROUNDWATER DATA - PFAS
1101 PROSPECT AVENUE
WESTBURY, NY
BCP SITE #C130178

	OERLIKON PERMANENT WELLS									OERLIKON GRAB SAMPLES						
Location	MW-1	MW-1	MW-1 (Dup)	MW-2	MW-2 (Dup)	MW-2	MW-3	MW-4	MW-4	HA-101	HA-102	HA-103	HA-104	HA-105	HA-112	HA-113
Sample Date	10/30/2018	05/15/2019	05/15/2019	10/30/2018	10/30/2018	05/15/2019	05/15/2019	10/31/2018	05/15/2019	05/13/2019	05/13/2019	05/14/2019	05/14/2019	05/14/2019	08/20/2019	08/21/2019
PFAS (ng/L)																
Fluorotelomer sulfonic acid (6:2 FTSA)	**57.8**	**2.63**	**2.5**	**14.4**	**13.2**	**28.3**	ND (2.24)	**3.32**	ND (2.06)	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Fluorotelomer sulfonic acid (8:2 FTSA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	ND (1.89)	ND (2.06)	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	**10**	**5.08**	**13.3**	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	**1.86 J**	ND (2.06)	**15.2**	**1.14 J**	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	**1.3 J**	ND (2.06)	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluorobutanesulfonic Acid (PFBS)	**12.7**	**9.38**	**9.86**	**2.44**	**2.8**	**0.39 J**	ND (2.24)	**1.84 J**	**1.55 J**	**8.3**	**2.22**	**2.57**	**1.53 J**	**7.17**	**7.04**	**0.724 J**
Perfluorobutanoic Acid (PFBA)	**57.2**	**56.4**	**54.4**	**28.4**	**31.5**	**12.1**	**209**	**83.2**	**183**	**18.5**	**9.96**	**4.56**	**10.2**	**17.4**	**6.41**	**26.3**
Perfluorodecane sulfonic Acid (PFDS)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	**1.47 J**	**30.4**	**40.6**	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluorodecanoic acid (PFDA)	**1.94**	**3.36**	**3.55**	**18.4**	**21**	**26.6**	**12.9**	**30.6**	**21.7**	**2.25**	**2.7**	**0.417 J**	**16.4**	**0.962 J**	**1.99 J**	**3.79**
Perfluorododecanoic acid (PFDoDA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	**1.52 J**	**2.18**	**1.44 J**	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluoroheptane sulfonic acid (PFHpS)	**12.6**	**21.1**	**24.1**	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	ND (1.89)	ND (2.06)	**59**	**1.46 J**	**1.07 J**	ND (2.02)	**18.4**	**16.6**	ND (2.12)
Perfluoroheptanoic acid (PFHpA)	**167**	**268**	**280**	**23.6**	**26.3**	**11**	**39.8**	**55.5**	**64.9**	**212**	**6.99**	**6.62**	**14.9**	**120**	**28.2**	**49.3**
Perfluorohexanesulfonic acid (PFHxS)	**205**	**349**	**360**	**0.771 J**	**0.794 J**	ND (2.01)	**0.65 J**	**4.3**	**5.61**	**510**	**1.44 J**	**2.08**	**3.51**	**231**	**65.5**	**3.37**
Perfluorohexanoic acid (PFHxA)	**106**	**105**	**106**	**46.2**	**51.2**	**19.2**	**34.3**	**199**	**883**	**80**	**12.7**	**8.19**	**13.4**	**47.9**	**14.2**	**76**
Perfluorononanoic Acid (PFNA)	**5.55**	**5.8**	**5.71**	**24**	**26.9**	**16.5**	**16.6**	**113**	**106**	**8.38**	**40.4**	**13.2**	**9.62**	**17.6**	**4.81**	**10**
Perfluorooctane sulfonamide (FOSA)	**9.3**	**5.78**	**7.95**	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	**0.943 J**	ND (2.06)	**9.83**	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluorooctanesulfonic acid (PFOS)	**803**	**1130**	**1200**	**5.91**	**5.51**	**3.86**	**19.5**	**12.8**	**23.4**	**1320**	**626**	**5.9**	**38.8**	**41.8**	**64.6**	**9.58**
Perfluorooctanoic Acid (PFOA)	**216**	**414**	**435**	**45.2**	**51.4**	**32.6**	**15**	**150**	**42.9**	**618**	**31.9**	**53**	**39.5**	**392**	**84.4**	**101**
Perfluoropentanoic Acid (PFPeA)	**74**	**49.8**	**49.7**	**64.3**	**70.9**	**23.9**	**307**	**374**	**1100**	**30.3**	**16.7**	**6.56**	**12.7**	**35.6**	**9.52**	**90.3**
Perfluorotetradecanoic acid (PFTeDA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	ND (2.24)	ND (1.89)	**0.272 J**	ND (1.94)	ND (2.02)	ND (2.07)	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluorotridecanoic acid (PFTrDA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	**2.24 J**	ND (1.89)	**2.06 J**	ND (1.94)	ND (2.02)	**2.07 J**	ND (2.02)	ND (2.1)	ND (1.99)	ND (2.12)
Perfluoroundecanoic acid (PFUnA)	ND (1.91)	ND (2.02)	ND (2.12)	ND (2.2)	ND (2.02)	ND (2.01)	**7.96**	**2.61**	**2.67**	**1.94 J**	**2.02 J**	**3.83**	ND (2.02)	ND (2.1)	**0.41 J**	**0.593 J**
PFOS + PFOA, Total (reported from lab)	**1020**	**1540**	**1640**	**51**	**57**	**36.5**	**34.5**	**163**	**66.3**	**1940**	**658**	**58.9**	**78.3**	**434**	**149**	**111**
TOTAL PFAS	**1740.**	**2430.**	**2550.**	**274.**	**302.**	**174.**	**668.**	**1070.**	**2480.**	**2890**	**756**	**110**	**161**	**930**	**304**	**371**

Notes:
1. Results in **bold** were detected.
2. ND - Not detected above the reporting limit
   J - Estimated value
3. Results are reported in nanograms/liter (ng/L)
4. Data have been validated by Stone Environmental.

TABLE I
SUMMARY OF GROUNDWATER DATA - PFAS
1101 PROSPECT AVENUE
WESTBURY, NY
BCP SITE #C130178

	BOCES GRAB SAMPLES							NASSAU DPW GRAB SAMPLES					
Location	HA-106	HA-107	HA-108	HA-109	HA-110	HA-111	HA-111 (Dup)	HA-114	HA-115	HA-116	HA-117	HA-118	HA-119
Sample Date	08/19/2019	08/19/2019	08/19/2019	08/20/2019	08/20/2019	08/20/2019	08/20/2019	08/21/2019	08/21/2019	08/22/2019	08/22/2019	08/22/2019	08/22/2019
PFAS (ng/L)													
Fluorotelomer sulfonic acid (6:2 FTSA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Fluorotelomer sulfonic acid (8:2 FTSA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluorobutanesulfonic Acid (PFBS)	**1.39 J**	**2.24**	**1.01 J**	**1.56 J**	**0.903 J**	**3.56**	**3.3**	**2.22**	**2.88**	**2.22**	**2.61**	**4.18**	**1.88 J**
Perfluorobutanoic Acid (PFBA)	**8.09**	**8.34**	**2.79**	**2.94**	**2.03**	**18.1**	**16.5**	**5.03**	**1.88 J**	**15.3**	**34.6**	**12.3**	**7.51**
Perfluorodecane sulfonic Acid (PFDS)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluorodecanoic acid (PFDA)	**2.49**	ND (1.89)	**6.13**	**1.98 J**	**2.28**	**1.93 J**	**2 J**	**1.9 J**	**1.93 J**	**3.3**	ND (1.93)	ND (1.89)	**1.89 J**
Perfluorododecanoic acid (PFDoDA)	**0.594 J**	ND (1.89)	**0.451 J**	**0.48 J**	ND (1.94)	ND (1.93)	ND (2)	**0.422 J**	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluoroheptane sulfonic acid (PFHpS)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	**0.857 J**	**0.888 J**	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluoroheptanoic acid (PFHpA)	**4.67**	**126**	**2.32**	**3.03**	**2.11**	**26.4**	**25.5**	**6.78**	**1.33 J**	**27.9**	**32.4**	**9.77**	**6.12**
Perfluorohexanesulfonic acid (PFHxS)	**0.587 J**	**4.35**	ND (1.89)	**1.5 J**	ND (1.94)	**6.33**	**5.59**	ND (1.9)	ND (1.93)	**2.13**	**1.8 J**	**4.94**	**1.76 J**
Perfluorohexanoic acid (PFHxA)	**14.1**	**32.4**	**3.25**	**8.48**	**4.49**	**28.5**	**27.2**	**7**	**2.51**	**27.7**	**38.8**	**28.8**	**9.31**
Perfluorononanoic Acid (PFNA)	**5.38**	**15**	**7.04**	**4.86**	**14.3**	**12.2**	**12.4**	**1.93**	**1.14 J**	**17.2**	**0.722 J**	**1.58 J**	**2.5**
Perfluorooctane sulfonamide (FOSA)	**1.23 J**	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluorooctanesulfonic acid (PFOS)	**11.8**	**4.35**	**6.75**	**9.84**	**6.1**	**21.8**	**20.2**	**3.57**	**4.45 J**	**6.19**	**0.861 J**	**3.72**	**20.3**
Perfluorooctanoic Acid (PFOA)	**11.5**	**30.2**	**7.72**	**8.13**	**5.28**	**84**	**78.2**	**9.4**	**1.93 J**	**61.4**	**19.2**	**7.7**	**10.6**
Perfluoropentanoic Acid (PFPeA)	**15.4**	**11.5**	**3.7**	**10.1**	**5.34**	**24.1**	**22.8**	**7.95**	**3.51**	**33**	**33.5**	**38.6**	**12.8**
Perfluorotetradecanoic acid (PFTeDA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluorotridecanoic acid (PFTrDA)	ND (1.97)	ND (1.89)	ND (1.89)	ND (1.98)	ND (1.94)	ND (1.93)	ND (2)	ND (1.9)	ND (1.93)	ND (1.98)	ND (1.93)	ND (1.89)	ND (1.89)
Perfluoroundecanoic acid (PFUnA)	**2.09**	ND (1.89)	**0.917 J**	**2.01**	ND (1.94)	**0.672 J**	**0.488 J**	**0.403 J**	**0.749 J**	**0.387 J**	**0.506 J**	ND (1.89)	**0.389 J**
PFOS + PFOA, Total (reported from lab)	**23.3**	**34.6**	**14.5**	**18**	**11.4**	**106**	**98.4**	**13**	**6.11 J**	**67.6**	**20.1 J**	**11.4**	**30.9**
TOTAL PFAS	**79.3**	**234**	**42.1**	**54.9**	**42.8**	**228**	**215**	**46.6**	**22.3**	**197**	**163**	**112**	**74.7**

Notes:
1. Results in **bold** were detected.
2. ND - Not detected above the reporting limit
   J - Estimated value
3. Results are reported in nanograms/liter (ng/L)
4. Data have been validated by Stone Environmental.

Figures

LEGEND

- GROUNDWATER MONITORING WELL, INSTALLED BY OTHERS
- TEMPORARY GRAB SAMPLE, COLLECTED MAY 2019
- TEMPORARY GRAB SAMPLE, COLLECTED AUGUST 2019
- RAILROAD
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

N

0 200 400

SCALE IN FEET

HALEY ALDRICH

OERLIKON METCO
1101 PROSPECT AVENUE
WESTBURY, NEW YORK

GROUNDWATER SAMPLING LOCATION PLAN

DECEMBER 2019

FIGURE 1

Appendix A

Data Usability Summary Reports

STONE ENVIRONMENTAL
535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

DATA USABILITY SUMMARY REPORT (DUSR)

Site Name: OERLIKON METCO, Hicksville, New York

Performing Laboratories: Alpha Analytical Laboratories, Westborough, Massachusetts

Haley & Aldrich Project No.: 127841-006

Project Manager: Claire Mondello, Project Manager

Stone Project Number: 16-040 2019 DUSR H&A OERLIKON

Analyses/Methods: US EPA Method 537 Modified PFAS Isotope Dilution

Data Validation Level: Data Validation 100% and Usability

Prepared by: Kim Watson, Stone Environmental, Inc. Completed on: June 18, 2019

Reviewed by: Laura Kujawa, Stone Environmental, Inc. SDG No.: L1920609

Introduction

Stone Environmental, Inc. (Stone) has completed a data validation and quality assurance (QA) evaluation on the analysis data prepared by Alpha Analytical Laboratories in Westborough and Mansfield, Massachusetts for ten ground water samples, three equipment blanks (EB), and one field blank (FB) sample collected on May 13-15, 2019 and received the following day. The laboratory reported the data under Sample Delivery Group (SDG) No. L1920609. The data and electronic deliverable data (EDD) were received electronically by Stone as a single data package on June 3, 2019. The sample and laboratory identifiers and the selected analyses as shown on the COC records are provided in Attachment A. The laboratory analyses were performed according to US EPA Method 537 Perfluorinated Alkyl Acids (PFAS) by Isotope Dilution Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) for Perfluorinated Alkyl Acids in drinking water (Modified).

This data validation and usability assessment was based on reviews of the laboratory SDG case narratives and the QA evaluations of all the quality control (QC) data. Components evaluated include:

- Chain-of-Custody (COC) (completeness and sample custody)
- Holding times, sample preservation, and integrity
- Blanks: method, field blanks, and trip blank contamination (if applicable)
- Instrument tunings and calibration verifications
- Spiked recoveries and laboratory control samples

- Surrogates/Internal Standards (IS)
- Duplicates: field and laboratory (if applicable), and
- Sample result verification, calculation checks, and compound quantitation limits

This DUSR is based on reviews of the laboratory SDG case narratives which are provided in Attachment B. They provide a limited summary of QC outliers identified by the laboratory and any qualifications the laboratory applied to the results. Data validation was performed on 100% of the data for PFAS samples, in accordance with Dioxans and Furans by Isotope Dilution (HRGC/HRMS) (SOP#HW-55, where applicable), EPA Method 537, and NYSDEC's Technical Guidance for Site Investigation and Remediation (DRAFT DER-10, Nov. 2009): Appendix 2B, Guidance for Data Deliverables and Development of Data Usability Summary Reports. "EPA's National Functional Guidelines for Organic Data Review" (June 2008) were also considered during the evaluation, and professional judgment was applied as necessary and appropriate.

Results of sample analyses are reported by the laboratory as either qualified or unqualified; various qualifier codes are used by the laboratory to denote specific information regarding the analytical results. During the data review process, similar to a modified Stage 3 manual validation or Tier III validation, laboratory data are verified against all available supporting QA/QC documentation and, based on this evaluation effort, laboratory qualifier codes may warrant modifications. Final results may warrant annotation with the following codes, as defined in the EPA National Functional Guidelines:

U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted sample Quantitation Limit (QL), otherwise known as Reporting Limit (RL), for sample and method.

J - The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the QL) for sample and method.

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected at a level greater than or equal to the adjusted QL. However, the reported adjusted QL is approximate and may be inaccurate or imprecise.

R - The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

These codes (qualifiers) are assigned by the reviewer during a validation and have been added to the laboratory-supplied Excel-compatible format files.

All data users should note two facts. First, the "R" qualifier means that the laboratory-reported value is completely unusable. The analysis is invalid due to significant quality control problems, and provides no information as to whether the compound is present or not. Rejected values should not appear on data tables because they have no useful purpose under any circumstances. Second, no analyte concentration is guaranteed to be accurate, even if all associated quality control is acceptable. While strict quality control conformance provides well-defined confidence in the reported results, any analytical result will always contain some uncertainty, as demonstrated by the laboratory control limits.

The user is also cautioned that the evaluation effort is based on the materials provided by the laboratory. Software manipulation, resulting in misleading raw data printouts, cannot be routinely detected during an evaluation; unless otherwise stated in the report, these kinds of issues are outside the scope of this review.

These qualifiers are assigned by the reviewer during a validation and have been added to the laboratory-supplied Excel-compatible EQUIS format files, identified as follows: L1920609_validation_Stone under the “validator_qualifiers” column. The reason for the qualifier change can be found under the “remark” column and the “Reason codes” used in this column can be found in Attachment C.

Summary of Data Validation and Usability

The validation and usability assessments indicate that the data from this sample set are usable and valid as presented by the laboratory with the exceptions listed below. The overall quality control data provided in the laboratory report and in the case narrative indicate that the data represent adequate method accuracy and precision with regard to project objectives. The qualification made to the data set is summarized below and in the data validation report.

- Based on the EB contamination, positive results for perfluoroundecanoic acid (PFUnA) in HA-101-051319-1130-65 and HA-102-051319-1320-65, and perfluorotridecanoic acid (PFTrDA) in HA-103-051419-0815-65, MW-3-051519-1615-65 and MW-4-051519-0435-65 were qualified as less than the reporting limit (U)

- Based on the elevated surrogate recoveries, positive hits in the associated samples (excluding the MS/MSD samples) for perfluoropentanoic acid (PFPeA) in FD-051519-0001 and MW-1-051519-1155-65, perfluorohexanesulfonic acid (PFHxS) in HA-101-051319-1130-65 and HA-102-051319-1320-65, and perfluoroundecanoic acid (PFUnA) in HA-103-051419-0815-65 were qualified as estimated (J).

- Based on the poor reproducibility in the field duplicate pair, results for N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA) and perfluorooctane sulfonamide (FOSA) in FD-051519-0001 and MW-1-051519-1155-65 were qualified as estimated (J).

The completeness level attained for the analysis of the field samples was 100%. The overall quality of the data was acceptable and all results as qualified are considered usable.

DATA EVALUATION

The following parameters were reviewed during the data evaluation process:

Chain of Custody (COC) Records (completeness and sample custody):

The COC records were complete.

Data package was complete and presented in accordance with NYS ASP Category B Data Deliverables - CLP – Like Protocols.

According to the client, sample FD-051519-001 was a field duplicate of MW1-051519-1155-65.

Holding Times, Sample Preservation and Integrity:

The temperature of sample coolers was taken upon receipt at the laboratory and was marginally below the lower limit of 2°C at 1.1°C. Since the samples were not frozen, on ice and just below the limit; no action was taken.

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

All extractions were performed within 14 days after sample collection for PFAS and analyzed within 28 days.

Blanks: Method blank, Field Blanks, and Trip Blank Contamination (if applicable), Ambient Water Sample:

The laboratory method blank (MB) was prepared with the analytical batch. No target analytes were detected in the method blank (WG1238288-1).

Three equipment blanks (EB) were prepared and analyzed for PFAS. No target analytes were detected in the equipment blanks with the exceptions of perfluoroundecanoic acid (PFUnA) at 0.519J ng/L and 1.08J ng/L in EB 1 and EB-2 on 05/13/19, respectively and perfluorotridecanoic acid (PFTrDA) in EB-2 on 05/13/19 at 0.489J ng/L, below the reporting limit. A field blank (FB) collected on 05/15/19 was prepared and analyzed for PFAS. No target compounds were detected in the FB.

Based on the EB contamination, positive results for perfluoroundecanoic acid (PFUnA) in HA-101-051319-1130-65 and HA-102-051319-1320-65 and perfluorotridecanoic acid (PFTrDA) in HA-103-051419-0815-65, MW-3-051519-1615-65 and MW-4-051519-0435-65 were qualified as less than the reporting limit (U).

Instrument Tunings and Calibration Verifications: Initial/Continuing Calibration Verification (where applicable, include table of calibration ID and associated samples):

ESI-MS/MS tune for PFAS is prescribed by the manufacturers specifications and was acceptable.

Calibration (acceptance Limits <20%RSD IC, ±30%R, 50%R closing ICV/CCV, r^2>0.99)

Calibration data (IC, ICV, CCV) were reviewed for conformance with the QC acceptance criteria and appropriate frequencies to ensure that:

- the initial calibration (ICAL) percent relative standard deviation or correlation coefficient (r)/coefficient of determination (r2) method acceptance criteria were met.
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met, and
- the continuing calibration verification standard (CCV) frequency and method percent recovery criteria were met.

The QC acceptance criteria were met with the following exceptions:

WG1238956-1: The continuing calibration standard on 5/20/2019 @09:34 exhibited low level recovery for surrogate 1H,1H,2H,2H-perfluoro[1,2-13C2]octanesulfonic acid (M2-6:2FTS) at 43.1%, recovery was acceptable according to the laboratory limits for the surrogate in the field samples, therefore no action was taken.

WG1238956-5: The continuing calibration standard on 5/20/19@21:57 exhibited elevated recovery of 1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2FTS) at 156.5%. Since fluorotelomersulfonicacid (8:2 FTSA) associated with this surrogate was not detected in any of the field samples and the recovery was just above the limit; no action was taken.

Spike Recoveries and Laboratory Control Samples:

MS/MSD analyses were performed on sample HA-103-051419-0815-65. All QC acceptance criteria were met with the following exception: for perfluorotridecanoic acid (PFTrDA) (MS/MSD at 213%R, 226%R%, respectively). The high percent recoveries may be attributed to matrix interferences since this compound was detected in the parent sample and in the EBs below the quantitation limit and has been qualified as less than the reporting limit (U) in the parent sample; therefore, no further action was taken.

Zero blind PE samples (commonly known as a laboratory control samples, LCS and LCSD) were prepared and analyzed for each batch by the laboratory in support of the sample analyses. All target analytes were spiked into the QC samples. Percent recoveries (%R) were correctly calculated for the spiked compounds, accurately reported on the Form 3 summary in the data package and were within the laboratory established QC limits and laboratory precision for all target analytes was acceptable.

Surrogates/Internal Standards (IS):

The surrogate standard and extracted internal standard recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met for these standards with the following exceptions: recoveries were outside the acceptance criteria for perfluoro[13C5]pentanoic acid (M5PFPEA) in MW-1-051519-1155-65 (217%) and FD-051519-0001 (194%), for perfluoro[1,2,3-13C3]hexanesulfonic acid (M3PFHxS) in HA-101-051319-1130-65 (179%) and HA-102-051319-1320-65 (166%), for 1H,1H,2H,2H-perfluoro[1,2-13C2]decanesulfonic acid (M2-8:2FTS) in MW-3-051519-1615-65 (388%), for perfluoro[1,2,3,4,5,6,7-13C7]undecanoic acid (M7-PFUDA) in HA-102-051319-1320-65 (153%), HA-103-051419-0815-65 (145%), HA-104-051419-1130-65 (180%) and HA-105-051419-1410-65 (174%), HA-103-051419-0815-65MSD (183%), for N-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-NEtFOSAA) in HA-103-051419-0815-65MSD (147%), for perfluoro[1,2-13C2]dodecanoic acid (MPFDOA) in HA-104-051419-1130-65 (180%), HA-105-051419-1410-65 (207%) and HA-103-051419-0815-65MSD (198%) for perfluoro[1,2-13C2]tetradecanoic Acid (M2PFTEDA) in HA-103-051419-0815-65 (198%), HA-104-051419-1130-65 (203%), HA-105-051419-1410-65 (284%), MW-1-051519-1155-65 (184%), FD-051519-0001 (170%), HA-103-051419-0815-65MS (174%) and HA-103-051419-0815-65MSD (272%).

Based on the elevated surrogate recoveries, positive hits in the associated samples (excluding the MS/MSD samples) were qualified as estimated (J).

- Perfluoropentanoic acid (PFPeA) in FD-051519-0001 and MW-1-051519-1155-65
- Perfluorohexanesulfonic acid (PFHxS) in HA-101-051319-1130-65 and HA-102-051319-1320-65
- Perfluoroundecanoic acid (PFUnA) in HA-103-051419-0815-65.

Duplicates: Field and Laboratory (if applicable):

Sample FD-051519-0001 was identified as a field duplicate of MW-1-051519-1155-65. For the PFAS analysis, all detected target analytes exhibited acceptable reproducibility (<30%RPD-Limit) with the exceptions of N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA) at 89.4%RPD and perfluorooctane sulfonamide (FOSA) at 31.6%RPD. Based on the poor reproducibility in the field duplicate pair, results for N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA) and perfluorooctane sulfonamide (FOSA) in FD-051519-0001 and MW-1-051519-1155-65 were qualified as estimated (J).

Sample Result Verification and Compound Quantitation Limits:

Target compound quantitation and reporting limits (RLs) were accurately reported on the Form 1 summaries. All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column on the laboratory reports.

General Comments:

Manual integrations were performed on target analytes in calibrations, quality control samples, and sample analyses (M flag). All manual integrations were properly marked with the reason for the manual integration. For all manual integrations, the automated and resulting ion chromatograms and spectra were included in the data package. Validation of the data was completed on the assumption that all manual integrations were correctly performed and accurately reported by the laboratory.

ATTACHMENT A

CHAIN OF CUSTODY (COC) RECORDS
SDG No. L1920609
PFAS in Groundwater Samples

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 2

Date Rec'd in Lab: 5-17-19

ALPHA Job #: L1920609

Client Information

Client: HALEY & ALDRICH
Address: 200 TOWN CENTRE DR.
STE#2. ROCHESTER. NY 14623
Phone: 585-359-9000
Fax: 585-359-4650
Email: CMONDELLO@haleyaldrich.

Project Information

Project Name: OERLIKON, METCO
Project Location: 1101 PROSPECT AVE. WESTBURY. NY
Project #: 127841-006
(Use Project name as Project #)
Project Manager: CLAIRE MONDELLO
ALPHAQuote #:

Turn-Around Time

Standard [X] Due Date:
Rush (only if pre approved) [ ] # of Days:

These samples have been previously analyzed by Alpha [ ]

Other project specific requirements/comments:

EPA 537 (M) - ISOTOPE DILUTION
NY POLYFLUOROALKYL ANALYTES (NY PFAAS)

Please specify Metals or TAL.

Deliverables

[ ] ASP-A [X] ASP-B
[X] EQuIS (1 File) [ ] EQuIS (4 File)
[ ] Other CATEGORY-B

Regulatory Requirement

[ ] NY TOGS [ ] NY Part 375
[ ] AWQ Standards [ ] NY CP-51
[ ] NY Restricted Use [ ] Other
[ ] NY Unrestricted Use
[ ] NYC Sewer Discharge

Billing Information

[X] Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
[ ] NJ [ ] NY
[ ] Other:

Sample Filtration

[ ] Done
[ ] Lab to do
Preservation
[ ] Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: EPA 537 (m)	Sample Specific Comments	Total # Bottles
20609-01	EB-051319-0001	5/13/19	0820	AQ	DM	X	EQUIPMENT BLANK	1
02	EB-051319-0002		1040	AQ		X	EQUIPMENT BLANK	1
03	HA-101-051319-1130-65		1130	GW		X		2
04	HA-102-051319-1320-65		1320	GW		X		2
05	HA-103-051419-0915-65	5/14/19	0915	GW		X	MS/MSD	6
06	HA-104-051419-1130-65		1130	GW		X		2
07	HA-105-051419-1410-65		1410	GW		X		2
08	EB-051519-0001	5/15/19	0745	AQ		X	EQUIPMENT BLANK	1
09	MW-2-051519-0955-65	5/15/19	0955	GW		X		2
10	MW-1-051519-1155-65	5/15/19	1155	GW		X		2

Container Type: P
Preservative: A

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	5/16/19 0925	AAL	5-16-19 0925
	5-16-19 1500		5/16/19 1500
	5/16/19 2110		5/16/19 2110
	5/17/19 0545	AAL	5/17/19 545

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 2 of 2

Date Rec'd in Lab: 5-17-19

ALPHA Job #: L1920609

Client Information

Client: HALEY & ALDRICH
Address: 200 TOWN CENTRE DR. STE#2. ROCHESTER, NY 14623
Phone: 585-359-9000
Fax: 585-359-4650
Email: CMONDELLO@HALEYALDRICH.COM

Project Information

Project Name: OERLIKON / METCO
Project Location: 1101 PROSPECT AVE. WESTBURY. NY
Project #: 127841-006
(Use Project name as Project #)
Project Manager: CLAIRE MONDELLO
ALPHAQuote #:

Turn-Around Time

Standard [X] Due Date:
Rush (only if pre approved) [ ] # of Days:

These samples have been previously analyzed by Alpha [ ]

Other project specific requirements/comments:

EPA 537 (M) - ISOTOPE DILUTION
NY POLY FLUORO ALKYL ANALYTES (NY PFAAs)

Please specify Metals or TAL.

Deliverables

[ ] ASP-A [X] ASP-B
[X] EQuIS (1 File) [ ] EQuIS (4 File)
[ ] Other CATEGORY B

Billing Information

[X] Same as Client Info
PO #

Regulatory Requirement

[ ] NY TOGS [ ] NY Part 375
[ ] AWQ Standards [ ] NY CP-51
[ ] NY Restricted Use [ ] Other
[ ] NY Unrestricted Use
[ ] NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
[ ] NJ [ ] NY
[ ] Other:

ANALYSIS

EPA 537 (M)

Sample Filtration
[ ] Done
[ ] Lab to do
Preservation
[ ] Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	EPA 537 (M)	Sample Specific Comments	Total Bottle
0609-11	MW-4-051519-1435-65	5/15/19	1435	GW AQ	DM	X		2
12	MW-3-051519-1615-65	5/15/19	1615	AQ	DM	X		2
13	FB-051519-0001	5/15/19	0750	AQ	DM	X	FIELD BLANK	1
14	FD-051519-0001	5/15/19	—	AQ	DM	X	FIELD DUPLICATE	2

Container Type: P
Preservative: A

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	5/16/19 0925		5-16-19 0925
	5-16-19 15:00		5/16/19 1640
	5/16/19 21:00		5/16/19 2110
	05/16/19 0545		5-17-19 545

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

ATTACHMENT B

CASE NARRATIVES
SDG No. L1920609
PFAS in Groundwater Samples

Project Name: OERLIKON, METCO
Project Number: 127841-006

Lab Number: L1920609
Report Date: 05/21/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1920609-01	EB-051319-0001	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/13/19 08:20	05/16/19
L1920609-02	EB-051319-0002	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/13/19 10:40	05/16/19
L1920609-03	HA-101-051319-1130-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/13/19 11:30	05/16/19
L1920609-04	HA-102-051319-1320-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/13/19 13:20	05/16/19
L1920609-05	HA-103-051419-0815-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/14/19 09:15	05/16/19
L1920609-06	HA-104-051419-1130-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/14/19 11:30	05/16/19
L1920609-07	HA-105-051419-1410-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/14/19 14:10	05/16/19
L1920609-08	EB-051519-0001	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 07:45	05/16/19
L1920609-09	MW-2-051519-0955-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 09:55	05/16/19
L1920609-10	MW-1-051519-1155-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 11:55	05/16/19
L1920609-11	MW-4-051519-0435-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 14:35	05/16/19
L1920609-12	MW-3-051519-1615-65	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 16:15	05/16/19
L1920609-13	FB-051519-0001	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 07:50	05/16/19
L1920609-14	FD-051519-0001	WATER	1101 PROPSECT AVE., WESTBURY, NY	05/15/19 00:00	05/16/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

The samples were received at the laboratory below the required temperature range. The samples were transported to the laboratory in a cooler with ice and were not received frozen.

Perfluorinated Alkyl Acids by Isotope Dilution

L1920609-03, -04, -05, -06, -07, -10, -12, and -14: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1238288-4 and WG1238288-5: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

The WG1238288-4/5 MS/MSD recoveries, performed on L1920609-05, are outside the acceptance criteria for perfluorotridecanoic acid (pftrda) (213% and 226%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Report Date: 05/21/19

Title: Technical Director/Representative

ATTACHMENT C

QUALIFIED DATA SETS and REASON CODES
SDG No. L1920609
PFAS in Groundwater Samples

sample_name	lab_sdg	chemical_name	result_text	lab_qualifiers	validator_qualifiers	approval_code	interpreted_qualifiers	result_unit
FD-051519-0001	L1920609	Perfluoropentanoic Acid (PFPeA)	49.7		J	e,f	J	ng/L
FD-051519-0001	L1920609	N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	13.3		J	i	J	ng/L
FD-051519-0001	L1920609	Perfluorooctane sulfonamide (FOSA)	7.95		J	i	J	ng/L
HA-101-051319-1130-65	L1920609	Perfluoroundecanoic acid (PFUnA)	1.94	J	U	d	U	ng/L
HA-101-051319-1130-65	L1920609	Perfluorohexanesulfonic acid (PFHxS)	510		J	e,f	J	ng/L
HA-102-051319-1320-65	L1920609	Perfluoroundecanoic acid (PFUnA)	2.02	J	U	d	U	ng/L
HA-102-051319-1320-65	L1920609	Perfluorohexanesulfonic acid (PFHxS)	1.44	J	J	e,f	J	ng/L
HA-103-051419-0815-65	L1920609	Perfluoroundecanoic acid (PFUnA)	3.83		J	e,f	J	ng/L
HA-103-051419-0815-65	L1920609	Perfluorotridecanoic acid (PFTrDA)	2.07	J	U	d	U	ng/L
MW-1-051519-1155-65	L1920609	Perfluoropentanoic Acid (PFPeA)	49.8		J	e,f	J	ng/L
MW-1-051519-1155-65	L1920609	N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	5.08		J	i	J	ng/L
MW-1-051519-1155-65	L1920609	Perfluorooctane sulfonamide (FOSA)	5.78		J	i	J	ng/L
MW-3-051519-1615-65	L1920609	Perfluorotridecanoic acid (PFTrDA)	2.24	J	U	d	U	ng/L
MW-4-051519-0435-65	L1920609	Perfluorotridecanoic acid (PFTrDA)	2.06	J	U	d	U	ng/L

Reason Code	Explanation
a	Holding times exceeded
b	Temperature or chemical preservation issue
c	Calibration standard exceedance (initial and/or continuing)
d	Laboratory or field blank contamination
e	Surrogate standard recovery exceedance
f	Internal standard area exceedance
g	Spiked standard (LCS, MS, BS, MSD, LCSD, BSD) recovery exceedance
h	Spiked Duplicate RPD exceedance
i	Field duplicate RPD exceedance
j	Serial dilution results issue
k	Chromatographic resolution, interference, or pattern match issue
l	Clean-up standard recovery exceedance
m	Sample preparation issue
n	Quantitation issue
o	Dual column RPD exceedance
p	Compound identification issue
q	Low % solids
r	defined in body of report
z	no change made during validation
sc	QAPP Specific: Based on the selected VOC soils collection method employed at the site (5030), all VOC samples with results less than 200 µg/kg will be qualified as biased low
tic	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate

DATA USABILITY SUMMARY REPORT (DUSR)

Site Name: OERLIKON METCO, Hicksville, New York

Performing Laboratories: Alpha Analytical Laboratories, Westborough, Massachusetts

Haley & Aldrich Project No.: 127841-006

Project Manager: Claire Mondello, Project Manager

Stone Project Number: 16-040 2019 August Samples DUSR H&A OERLIKON

Analyses/Methods: US EPA Method 537 Modified PFAS Isotope Dilution

Data Validation Level: Data Validation 100% and Usability

Prepared by: Kim Watson, Stone Environmental, Inc. Completed on; October 4, 2019

Reviewed by: Laura Kujawa, Stone Environmental, Inc. SDG Nos.: L1937738 and L1938143

Introduction

Stone Environmental, Inc. (Stone) has completed a data validation and quality assurance (QA) evaluation on the analysis data prepared by Alpha Analytical Laboratories in Westborough, Massachusetts for fourteen ground water samples, two equipment blanks (EB), and one field blank (FB) samples collected on August 19-22, 2019 and received at the laboratory on August 21 and 22, 2019. The laboratory reported the data under Sample Delivery Group (SDG) Nos. L1937738 and L1938143. The data and electronic deliverable data (EDD) were received electronically by Stone as two data packages on September 10, 2019. The sample and laboratory identifiers and the selected analysis as shown on the COC records are provided in Attachment A. The laboratory analyses were performed according to US EPA Method 537 Perfluorinated Alkyl Acids (PFAS) by Isotope Dilution Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) for Perfluorinated Alkyl Acids in drinking water (Modified). The target compound list was limited to the New York Polyfluoroalkyl Analytes (NY PFAAs).

This data validation and usability assessment was based on reviews of the laboratory SDG case narratives and the QA evaluations of all the quality control (QC) data. Components evaluated include:

- Chain-of-Custody (COC) (completeness and sample custody)
- Holding times, sample preservation, and integrity
- Blanks: method, field blanks, and trip blank contamination (if applicable)

- Instrument tunings and calibration verifications
- Spiked recoveries and laboratory control samples
- Surrogates (SS)/Internal Standards (IS)
- Duplicates: field and laboratory (if applicable), and
- Sample result verification, calculation checks, and compound quantitation limits

This DUSR is based on reviews of the laboratory SDG case narratives which are provided in Attachment B. They provide a limited summary of QC outliers identified by the laboratory and any qualifications the laboratory applied to the results. Data validation was performed on 100% of the data for PFAS samples, in accordance with EPA Method 537 (modified), and NYSDEC's Technical Guidance for Site Investigation and Remediation (DER-10, Nov. 2009): Appendix 2B, Guidance for Data Deliverables and Development of Data Usability Summary Reports. "EPA's National Functional Guidelines for Organic Data Review" (June 2008) were also considered during the evaluation, and professional judgment was applied as necessary and appropriate.

Results of sample analyses are reported by the laboratory as either qualified or unqualified; various qualifier codes are used by the laboratory to denote specific information regarding the analytical results. During the data review process, similar to a modified Stage 3 manual validation or Tier III validation, laboratory data are verified against all available supporting QA/QC documentation and, based on this evaluation effort, laboratory qualifier codes may warrant modifications. Final results may warrant annotation with the following codes, as defined in the EPA National Functional Guidelines:

U - The analyte was analyzed for but, was not detected at a level greater than or equal to the level of the adjusted sample Quantitation Limit (QL), otherwise known as Reporting Limit (RL), for sample and method.

J - The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the QL) for sample and method.

NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected at a level greater than or equal to the adjusted QL. However, the reported adjusted QL is approximate and may be inaccurate or imprecise.

R - The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

These codes (qualifiers) are assigned by the reviewer during a validation and have been added to the laboratory-supplied Excel-compatible format files.

All data users should note two facts. First, the "R" qualifier means that the laboratory-reported value is completely unusable. The analysis is invalid due to significant quality control problems, and provides no information as to whether the compound is present or not. Rejected values should not appear on data tables because they have no useful purpose under any circumstances. Second, no analyte concentration is guaranteed to be accurate, even if all associated quality control is acceptable. While strict quality control conformance provides well-defined confidence in the reported results, any analytical result will always contain some uncertainty, as demonstrated by the laboratory control limits.

The user is also cautioned that the evaluation effort is based on the materials provided by the laboratory. Software manipulation, resulting in misleading raw data printouts, cannot be routinely detected during an evaluation; unless otherwise stated in the report, these kinds of issues are outside the scope of this review.

These qualifiers are assigned by the reviewer during a validation and have been added to the laboratory-supplied Excel-compatible EQUIS format files, identified as follows: L1937738_validation_Stone and L1938143_validation_Stone under the “validator_qualifiers” column. The reason for the qualifier change can be found under the “remark” column and the “Reason codes” used in this column can be found in Attachment C.

Summary of Data Validation and Usability

The validation and usability assessments indicate that the data from this sample set are usable and valid as presented by the laboratory with the exceptions listed below. The overall quality control data provided in the laboratory report and in the case narratives indicate that the data represent adequate method accuracy and precision with regard to project objectives. The qualification made to the data set is summarized below and in the data validation report.

- Based on the FB and EB contamination, positive results (below the RL) for Perfluorodecanoic Acid (PFDA) in HA-111-082019-0825-70, FD-082019-0001, HA-109-082019-1300-70, HA-112-082019-1505-70, HA-114-082119-1130-70, HA-115-082119-1415-70, and HA-119-0822191430-70 and for Perfluorooctanoic Acid (PFOA) in HA-115-082119-1415-70 were qualified as less than the reporting limit (U).

The completeness level attained for the analysis of the field samples was 100%. The overall quality of the data was acceptable and all results as qualified are considered usable.

DATA EVALUATION

The following parameters were reviewed during the data evaluation process:

Chain of Custody (COC) Records (completeness and sample custody):

The COC records were complete.

Data packages were complete and presented in accordance with NYS ASP Category B Data Deliverables - CLP – Like Protocols.

According to the client, sample FD-082019-001 was a field duplicate of HA-111-082019-0825-70.

Holding Times, Sample Preservation and Integrity:

The temperature of sample coolers was taken upon receipt at the laboratory and was acceptable (3.6°C, 3.2°C).

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

All extractions were performed within 14 days after sample collection for PFAS and analyzed within 28 days.

Blanks: Method blank, Field Blanks, and Trip Blank Contamination (if applicable), Ambient Water Sample:

Laboratory method blanks (MB) were prepared with each analytical batch. No target analytes were detected in the method blanks (WG1278113-1, WG1278624-1 and WG1279028-1) except for Perfluorohexanoic Acid (PFHxA) at 0.380 ng/L in WG1278624-1. Results for this compound in the associated samples were reported above the action limit, therefore, no action was taken.

Two equipment blanks (EB) were collected on 8/19/2019 and 08/21/2019 (EB-081919-0001 and EB-082119-0002) and analyzed for PFAS. No target analytes were detected in the equipment blanks. A field blank (FB) collected on 08/19/19 (FB-081919-0001) was prepared and analyzed for PFAS. No target compounds were detected in the FB with the exceptions of Perfluorohexanoic Acid (PFHxA) (0.588 J ng/L), Perfluorodecanoic Acid (PFDA) (1.48 J ng/L), and N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA) (0.751 J ng/L) below the reporting limit (RL), Perfluorooctanoic Acid (PFOA) (2.32 ng/L) and PFOA/PFOS, Total (2.32 ng/L) reported just marginally above the reporting limit of 2 ng/L.

Based on the FB contamination, positive results (below the RL) for Perfluorodecanoic Acid (PFDA) in HA-111-082019-0825-70, FD-082019-0001, HA-109-082019-1300-70, HA-112-082019-1505-70, HA-114-082119-1130-70, HA-115-082119-1415-70, and HA-119-0822191430-70 and for Perfluorooctanoic Acid (PFOA) in HA-115-082119-1415-70 were qualified as less than the reporting limit (U).

Instrument Tunings and Calibration Verifications: Initial/Continuing Calibration Verification (where applicable, include table of calibration ID and associated samples):

ESI-MS/MS tune for PFAS is prescribed by the manufacturers specifications and was acceptable.

Calibration (acceptance Limits <20%RSD IC, ±30%R, 50%R closing ICV/CCV, r^2>0.99)

Calibration data (IC, ICV, CCV) were reviewed for conformance with the QC acceptance criteria and appropriate frequencies to ensure that:

- the initial calibration (ICAL) percent relative standard deviation or correlation coefficient (r)/coefficient of determination (r2) method acceptance criteria were met.
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met, and
- the continuing calibration verification standard (CCV) frequency and method percent recovery criteria were met.

The QC acceptance criteria were met with the following exceptions:

WG1279488-3; The continuing calibration standard on 09/03/19 17:22 exhibited low level recovery for compounds 1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS) at 48.8% and 1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS) at 28.0% and for surrogate 1H,1H,2H,2H-perfluoro[1,2-13C2]octanesulfonic acid (M2-6:2FTS) at 46.5%, since recovery was acceptable according to the laboratory limits for the surrogate in the QC samples (blank, LCS, LCSD and MS), and these target compounds were acceptable in the laboratory QC samples, no action was taken.

WG1279488-5: the closing continuing calibration standard on 09/04/19 01:22 exhibited low recovery for Perfluorohexanesulfonic Acid-Branched (br-PFHxS) at 33.7%. Since the low recovery was limited to only the branched and the linear was acceptable along with the surrogate, no data was qualified on this basis.

WG1279488-7: The continuing calibration standard on 09/04/19 09:23 exhibited low level recovery for1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS) at 35.3%. Since the compound was all non-detects in the associated samples and the opening standard was acceptable, no data was qualified on this basis.

WG1280241-2: The continuing calibration standard on 09/05/19 20:51 exhibited low recovery of 1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS) at 67.1%. Since this compound was non-detect in the associated sample and all the QC in the batch was acceptable, no data was qualified on this basis.

WG1280241-3; The continuing calibration standard on 09/06/19 01:17 exhibited low recovery of 1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS) at 43.0 %. Since this compound was non-detect in the associated samples, no data was qualified on this basis.

Spike Recoveries and Laboratory Control Samples:

MS/MSD analyses were performed on sample HA-109-082019-1300-70. All QC acceptance criteria were met and acceptable.

Zero blind PE samples (commonly known as a laboratory control samples, LCS and LCSD) were prepared and analyzed for each batch by the laboratory in support of the sample analyses (WG1278113-2/3, WG1278624-2/3 and WG1279028-2/3). All target analytes were spiked into the QC samples. Percent recoveries (%R) were correctly calculated for the spiked compounds, accurately reported on the Form 3 summary in the data package and were within the laboratory established QC limits and laboratory precision for all target analytes was acceptable.

Surrogates (SS)/Internal Standards (IS):

The surrogate standard and extracted internal standard recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met for these standards with the following exceptions: recoveries were outside the acceptance criteria for 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS) in HA-111-082019-0825-70 (199%), HA-109-082019-1300-70 (261%) and HA-113-082119-0810-70 (266%), for 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS) in HA-109-082019-1300-70 (328%), HA-113-082119-0810-70 (298%), and HA-109-082019-1300-70MSD (286%), for Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) in HA-109-082019-1300-70MSD (162%).

No action was taken on the elevated surrogate recoveries in the samples noted above since the associated compounds in these samples were all non-detects.

Duplicates: Field and Laboratory (if applicable):

Sample FD-082019-0001 was identified as a field duplicate of HA-111-082019-0825-70. For the PFAS analysis, all detected target analytes above the reporting limit exhibited acceptable reproducibility (<30%RPD,Limit).

Sample Result Verification and Compound Quantitation Limits:

Target compound quantitation and reporting limits (RLs) were accurately reported on the Form 1 summaries. All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column on the laboratory reports.

General Comments:

Validation of the data was completed on the assumption that all integrations were correctly performed and accurately reported by the laboratory.

ATTACHMENT A

CHAIN OF CUSTODY (COC) RECORDS
SDG Nos. L1937738 and L1938143
PFAS in Groundwater Samples

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 2

Date Rec'd in Lab: 8/22/19

ALPHA Job #: L1937738

Client Information

Client: HALEY & ALDRICH
Address: 200 TOWN CENTER DR. STE#2 ROCHESTER, NY 14623
Phone: 585-359-9000
Fax: 585-359-4650
Email: CNONDELLO@haleyaldrich.com

Project Information

Project Name: OERLIKON, METCO
Project Location: 1101 PROSPECT AVE. WESTBURY, NY
Project #: 127841-006
(Use Project name as Project #)
Project Manager: CLAIRE MONDELLO
ALPHAQuote #:

Turn-Around Time

Standard [X] Due Date:
Rush (only if pre approved) [ ] # of Days:

Deliverables

[ ] ASP-A [X] ASP-B
[X] EQuIS (1 File) [ ] EQuIS (4 File)
[ ] Other LEVEL IV/CATEGORY B

Regulatory Requirement

[ ] NY TOGS [ ] NY Part 375
[ ] AWQ Standards [ ] NY CP-51
[ ] NY Restricted Use [ ] Other
[ ] NY Unrestricted Use
[ ] NYC Sewer Discharge

Billing Information

[X] Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
[ ] NJ [ ] NY
[ ] Other:

[ ] These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

EPA 537 (mod) - ISOTOPE DILUTION NY POLY FLUORO ALKYL ANALYTES (NY PFAAS)

Please specify Metals or TAL.

ANALYSIS

EPA 537 (mod)

Sample Filtration
[ ] Done
[ ] Lab to do
Preservation
[ ] Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	EPA 537 (mod)	Sample Specific Comments	Total Bottle
L1937738-01	FB-081919-0001	8/19/19	0900	AQ	DM	X	FIELD BLANK	1
-02	EB-081919-0001	8/19/19	0915	AQ	DM	X	EQUIPMENT BLANK	1
-03	HA-106-081919-1100-70	8/19/19	1100	GW	DM	X		2
-04	HA-107-081919-1315-70	8/19/19	1315	GW	DM	X		2
-05	HA-108-081919-1430-70	8/19/19	1430	GW	DM	X		2
-06	HA-111-082019-0825-70	8/20/19	0825	GW	DM	X		2
-07	FD-082019-0001	8/20/19	—	GW	DM	X	FIELD DUPLICATE	2
-08	HA-110-082019-1015-70	8/20/19	1015	GW	DM	X		2
-09	HA-109-082019-1300-70	8/20/19	1300	GW	DM	X	MS/MSD	6
-10	HA-112-082019-1505-70	8/20/19	1505	GW	DM	X		2
	Container Type					P		
	Preservative					A		

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	8/21/19 0815		8/21/19 08:16
	08/21/19 13:25		8/21/19 1325
	8/21/19 2105		8/21/19 2105
	8/22/19 0400		8/22/19 04:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

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NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 2 of 2

Date Rec'd in Lab: 8/22/19

ALPHA Job #: L1937730

Client Information

Client: HALEY & ALDRICH
Address: 200 TOWN CENTRE DR. ST#2. ROCHESTER NY 14623
Phone: 585-359-9000
Fax: 585-359-4650
Email: CMONDELLO@haleyaldrich.com

Project Information

Project Name: OERLIKON METCO.
Project Location: 1101 PROSPECT AVE. WESTBURY. NY
Project #: 127841-006
(Use Project name as Project #) ☐
Project Manager: CLAIRE MONDELLO
ALPHAQuote #:

Turn-Around Time

Standard ☒ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☐ ASP-A ☒ ASP-B
☒ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other LEVEL IV / CATEGORY B

Billing Information

☒ Same as Client Info
PO #

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

EPA 537(m) - ISOTOPE DILUTION
NY POLY FLUORO ALKYL ANALYTES (NY PFAAs)

Please specify Metals or TAL.

ANALYSIS

EPA 537(m)

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	EPA 537(m)	Sample Specific Comments	Total Bottle
-11	HA-113-082119-0810-70	8/21/19	0810	GW	DM	X		2

Page 10 of 22

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	P									
Preservative	A									

Relinquished By:	Date/Time	Received By:	Date/Time
	8/21/19 - 0815		08/21/19 08:16
	08/21/19 13:25		8/21/19 1645
	8/21/19 2105		8/21/19 2105
	8/22/19 0700		8/22/19 0700

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of

Date Rec'd in Lab: 8/25/19

ALPHA Job #: L1938143

Client Information

Client: HALEY AND ALDRICH
Address: 200 TOWN CENTRE DR. STE2. ROCHESTER NY 14623
Phone: 585-359-9000
Fax: 585-359-4650
Email: CMONDELLO@haleyaldrich.com

Project Information

Project Name: OERLIKON, METCO
Project Location: 1101 PROSPECT AVE. WESTBURY. NY
Project #: 127891-006
(Use Project name as Project #)
Project Manager: CLAIRE MONDELLO
ALPHAQuote #:

Turn-Around Time

Standard
Rush (only if pre approved)
Due Date:
# of Days:

Deliverables

- ASP-A
- [X] ASP-B
- [X] EQuIS (1 File)
- EQuIS (4 File)
- Other LEVEL IV/CATEGORY B

Billing Information

- [X] Same as Client Info
PO #

Regulatory Requirement

- NY TOGS
- NY Part 375
- AWQ Standards
- NY CP-51
- NY Restricted Use
- Other
- NY Unrestricted Use
- NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
- NJ
- NY
- Other:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:
EPA 537 (M) – ISOTOPE DILUTION
NY PER FLUOROALKYL ANALYTES (NY PFAAS)

Please specify Metals or TAL.

ANALYSIS

EPA (537) m

Sample Filtration
- Done
- Lab to do

Preservation
- Lab to do

(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	EPA (537) m	Sample Specific Comments	Total Bottle
	~~HA-113-082119-0810-70~~	~~8/21/19~~	~~0810~~	GW	DM			
938143-01	HA-114-082119-1130-70	8/21/19	1130	GW	DM	X		12
-02	HA-115-082119-1415-70	8/21/19	1415	GW	DM	X		12
-03	EB-082119-0001	8/21/19	1530	~~GW~~ AQ	DM	X		12
-04	HA-116-082219-0815-70	8/22/19	0815	GW	DM	X		12
-05	HA-117-082219-0945-70	8/22/19	0945	GW	DM	X		12
-06	HA-118-082219-1050-70	8/22/19	1050	GW	DM	X		12
-07	HA-119-082219-1430-70	8/22/19	1430	GW	DM	X		12

Container Type: P
Preservative: A

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	8/22/19 1545		8/22/19 17:48
	8/22/19 1900		8/22/19 19:00
	8/23/19 0005		8/23/19 00:05
	8/23/19 0400		8/25/19 04:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

ATTACHMENT B

CASE NARRATIVES
SDG Nos. L1937738 and L1938143
PFAS in Groundwater Samples

Project Name: OERLIKON, METCO
Project Number: 127841-006

Lab Number: L1937738
Report Date: 09/04/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1937738-01	FB-081919-0001	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/19/19 09:00	08/21/19
L1937738-02	EB-081919-0001	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/19/19 09:15	08/21/19
L1937738-03	HA-106-081919-1100-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/19/19 11:00	08/21/19
L1937738-04	HA-107-081919-1315-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/19/19 13:15	08/21/19
L1937738-05	HA-108-081919-1430-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/19/19 14:30	08/21/19
L1937738-06	HA-111-082019-0825-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/20/19 08:25	08/21/19
L1937738-07	FD-082019-0001	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/20/19 00:00	08/21/19
L1937738-08	HA-110-082019-1015-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/20/19 10:15	08/21/19
L1937738-09	HA-109-082019-1300-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/20/19 13:00	08/21/19
L1937738-10	HA-112-082019-1505-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/20/19 15:05	08/21/19
L1937738-11	HA-113-082119-0810-70	WATER	1101 PROSPECT AVE. WESTBURY. NY	08/21/19 08:10	08/21/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L1937738-06, -09, and -11: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1278113-5: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1279488-3: The continuing calibration standard had the response for M2-6:2 FTSoutside the acceptance criteria for the method. The associated target analytes were within acceptance criteria; therefore, no further action was taken.

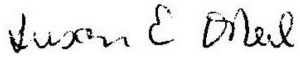
WG1279488-3: The continuing calibration standard had the response for 6:2 FTS & 8:2 FTS outside the acceptance criteria for the method. This value represents less than 10% of all compounds; therefore, the calibration was accepted.

WG1279488-5: The continuing calibration standard had the response for Perfluorohexanesulfonic Acid-Branched (br-PFHxS), outside of acceptance criteria. The response for Perfluorohexanesulfonic Acid (PFHxS) was within acceptance criteria; therefore, no further action was taken.

WG1279488-7: The continuing calibration standard had the response for M2-8:2 FTS outside the acceptance criteria for the method. The associated target analytes were within acceptance criteria; therefore, no further action was taken.

G1279488-7: The continuing calibration standard had the response for 8:2-FtS outside the acceptance criteria for the method. This value represents less than 10% of all compounds; therefore, the calibration was accepted.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Report Date: 09/04/19

Title: Technical Director/Representative

Project Name: OERLIKON, METCO
Project Number: 127841-006

Lab Number: L1938143
Report Date: 09/06/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1938143-01	HA-114-082119-1130-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/21/19 11:30	08/22/19
L1938143-02	HA-115-082119-1415-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/21/19 14:15	08/22/19
L1938143-03	EB-082119-0002	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/21/19 15:30	08/22/19
L1938143-04	HA-116-082219-0815-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/22/19 08:15	08/22/19
L1938143-05	HA-117-082219-0945-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/22/19 09:45	08/22/19
L1938143-06	HA-118-082219-1050-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/22/19 10:50	08/22/19
L1938143-07	HA-119-082219-1430-70	WATER	1101 PROSPECT AVE., WESTBURY, NY	08/22/19 14:30	08/22/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

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In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

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Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

WG1280241-2: The continuing calibration standard had the response for 8:2 FTS outside the acceptance criteria for the method. This value represents less than 10% of all compounds; therefore, the calibration was accepted.

WG1280241-3: The continuing calibration standard had the response for 8:2 FTS outside the acceptance criteria for the method. This value represents less than 10% of all compounds; therefore, the calibration was accepted.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Report Date: 09/06/19

Title: Technical Director/Representative

ATTACHMENT C

QUALIFIED DATA SETS and REASON CODES
SDG Nos. L1937738 and L1938143
PFAS in Groundwater Samples

Sample_ name	lab_sdg	chemical_name	result_text	lab_ qualifiers	validator_ qualifiers	interpreted_ qualifiers	method_ detection_ limit	reporting_ detection_ limit	result_ unit	remark
FD-082019-0001	L1937738	Perfluorodecanoic acid (PFDA)		J	U	U	0.304	2.00	ng/L	d
HA-109-082019-1300-70	L1937738	Perfluorodecanoic acid (PFDA)		J	U	U	0.302	1.98	ng/L	d
HA-111-082019-0825-70	L1937738	Perfluorodecanoic acid (PFDA)		J	U	U	0.293	1.93	ng/L	d
HA-112-082019-1505-70	L1937738	Perfluorodecanoic acid (PFDA)		J	U	U	0.303	1.99	ng/L	d

Sample_Name	lab_sdg	chemical_name	result_text	lab_qualifiers	validator_qualifiers	interpreted_qualifiers	method_detection_limit	reporting_detection_limit	result_unit	remark
HA-114-082119-1130-70	L1938143	Perfluorodecanoic acid (PFDA)		J	U	U	0.289	1.90	ng/L	d
HA-115-082119-1415-70	L1938143	Perfluorooctanoic Acid (PFOA)		J	U	U	0.228	1.93	ng/L	d
HA-115-082119-1415-70	L1938143	Perfluorodecanoic acid (PFDA)		J	U	U	0.293	1.93	ng/L	d
HA-119-082219-1430-70	L1938143	Perfluorodecanoic acid (PFDA)		J	U	U	0.287	1.89	ng/L	d

Reason Code	Explanation
a	Holding times exceeded
b	Temperature or chemical preservation issue
c	Calibration standard exceedance (initial and/or continuing)
d	Laboratory or field blank contamination
e	Surrogate standard recovery exceedance
f	Internal standard area exceedance
g	Spiked standard (LCS, MS, BS, MSD, LCSD, BSD) recovery exceedance
h	Spiked Duplicate RPD exceedance
i	Field duplicate RPD exceedance
j	Serial dilution results issue
k	Chromatographic resolution, interference, or pattern match issue
l	Clean-up standard recovery exceedance
m	Sample preparation issue
n	Quantitation issue
o	Dual column RPD exceedance
p	Compound identification issue
q	Low % solids
r	defined in body of report
z	no change made during validation
sc	QAPP Specific: Based on the selected VOC soils collection method employed at the site (5030), all VOC samples with results less than 200 µg/kg will be qualified as biased low
tic	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate