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ENVIRONMENT

Mr. Steven M. Scharf, P.E.
Project Engineer
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
Remedial Action, Bureau A
625 Broadway
Albany, New York 12233-7015

Subject:
Results of Pre-Closure Groundwater Sampling, Major Petroleum Licensing Facility (MPLF) Permit No. 01-1280, Northrop Grumman Systems Corporation, Bethpage, New York.

Date:
January 18, 2014

Contact:
David Stern

Phone:
631-391-5284

Email:
david.stern@arcadis-us.com

Our ref:
NY001496.0612.MSFJ6

Dear Steve:

This Pre-Closure Work Report (Report) was prepared by ARCADIS of New York, Inc. (ARCADIS) on behalf of Northrop Grumman Systems Corporation (Northrop Grumman) for closure of monitoring wells associated the with the MPLF Permit No. 01-1280 for the Northrop Grumman, Bethpage, New York Site (Site). This Report was prepared in accordance with the Monitoring Well Closure Work Plan (Work Plan), dated November 18, 2013, which was approved by NYSDEC on November 25, 2013. **Figure 1** depicts the Site with MPLF monitoring well locations. This Report presents the results of pre-closure groundwater samples from MPLF monitoring wells, conclusions and recommendations. **Attachment A** provides field records. **Attachment B** provides NYSDEC Category B analytical results of the groundwater sampling effort as well as data validation reports.

In accordance with the protocols set forth in the Work Plan, groundwater samples were collected from Monitoring Wells P-3, P-4 and P-6. Groundwater samples were submitted to ALS Environmental for analysis of volatile organic compounds (VOCs) plus Tentatively Identified Compounds (TICs) using NYSDEC Analytical Services Protocol (ASP) 2000 OLM4.3.

The validated analytical results are presented in **Table 1**. Results of quality assurance/quality control samples (i.e., field blanks and trip blanks) are provided in **Table 2**. The analytical results were compared to and compared to NYSDEC's Technical & Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. The analytical results indicated no detections of VOCs in two of the three wells with no

exceedances of NYSDEC TOGs in all three wells. Additionally, TICs were not detected in the samples collected from the three wells.

Based on the analytical results provided in this Report, ARCADIS concludes that the criteria established by the NYSDEC for decommissioning the seven MPLF wells have been satisfied. Therefore, ARCADIS recommends that NYSDEC approve the plan for decommissioning the seven MPLF Monitoring Wells (P-1, P-2, P-3, P-4, and P-6). Decommissioning and follow-up reporting will be performed as stated in the Work Plan.

Please contact us with any questions or comments.

Sincerely,

ARCADIS of New York, Inc.

David E. Stern
Senior Hydrogeologist

Enclosures

Copies:
Carlo San Giovanni, ARCADIS
Ed Hannon, Northrop Grumman
Fred Weber, Northrop Grumman
File

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Table 1. Concentrations of Volatile Organic Compounds in Groundwater Samples, MPLF Permit #01-1280, Northrop Grumman, Bethpage, New York.

| Constituent in ug/L | Well ID: / Sample ID: / Sample Date: | P-3 / P-3 / 12/4/2013 | P-4 / P-4 / 12/4/2013 | P-6 / P-6 / 12/4/2013 | P-6 / REP120413 / 12/4/2013 |
|---|---|---|---|---|---|
| | NYSDEC SCGs | | | | |
| 1,1,1-Trichloroethane (TCA) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,1,2,2-Tetrachloroethane | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,1,2-Trichloroethane | 1 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,1-Dichloroethane (1,1-DCA) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,1-Dichloroethene (1,1-DCE) | 5 | < 5.0 J | < 5.0 | < 5.0 | < 5.0 |
| 1,2-Dichloroethane | 0.6 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,2-Dichloropropane | 1 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 2-Butanone (MEK) | 50 | < 50 | < 50 | < 50 | < 50 |
| 2-Hexanone | 50 | < 50 | < 50 | < 50 | < 50 |
| Acetone | 50 | < 50 | < 50 | < 50 | < 50 |
| Benzene | 1 | < 0.7 J | < 0.7 | < 0.7 | < 0.7 |
| Bromodichloromethane | 50 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Bromoform | 50 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Bromomethane | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Carbon Disulfide | 60 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Carbon Tetrachloride | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Chlorobenzene | 5 | < 5.0 J | < 5.0 | < 5.0 | < 5.0 |
| Chloroethane | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Chloroform | 7 | < 5.0 | < 5.0 | **0.25 J** | **0.34 J** |
| Chloromethane | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Dibromochloromethane | 50 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Dichlorodifluoromethane (CFC 12) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Dichloromethane | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Ethylbenzene | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Methyl tert-Butyl Ether | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Styrene | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Tetrachloroethene (PCE) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Toluene | 5 | < 5.0 J | < 5.0 | < 5.0 | < 5.0 |
| Trichloroethene (TCE) | 5 | < 5.0 J | < 5.0 | **0.60 J** | **0.59 J** |
| Trichlorofluoromethane (CFC 11) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Vinyl Chloride | 2 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| cis-1,2-Dichloroethene | 5 | < 5.0 | < 5.0 | **1.3 J** | **1.1 J** |
| cis-1,3-Dichloropropene | 0.4 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| trans-1,2-Dichloroethene | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| trans-1,3-Dichloropropene | 0.4 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| o-Xylene | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| m,p-Xylenes | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Chlorodifluoromethane (CFC 22) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 1,1,2-Trichlorotrifluoroethane (CFC113) | 5 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| 4-Methyl-2-pentanone (MIBK) | 50 | < 50 | < 50 | < 50 | < 50 |
| **TVOCs** | | 0 | 0 | **2.2** | **2.1** |

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Table 1. Concentrations of Volatile Organic Compounds in Groundwater Samples,
MPLF Permit #01-1280, Northrop Grumman, Bethpage, New York.

**Notes and Abbreviations:**

(1) Samples were analyzed for the TCL VOCs using NYSDEC ASP 2000 Method OLM4.3. Data were validated in accordance with USEPA National Functional Guidelines of October 1999.

**Bold value indicates a detection.**

TVOCs values are rounded to two significant figures.

| | |
|---|---|
| MPLF | Major Petroleum Licensing Facility |
| NYSDEC | New York State Department of Environmental Conservation. |
| TCL | Target compound list. |
| VOC | Volatile Organic Compound |
| TVOCs | Total Volatile Organic Compounds |
| ASP | Analytical services protocol |
| SCGs | Standards, criteria, and guidance values |
| ug/L | Micrograms per liter |
| NE | Not established |
| J | Value is estimated |
| < 5 | Compound not detected above its laboratory quantification limit |

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Table 2. Concentrations of Volatile Organic Compounds in QA/QC Samples, MPLF Permit #01-1280, Northrop Grumman, Bethpage, New York.

| Constituent in ug/L | Location ID: | Trip Blank | Field Blank |
|---|---|---|---|
| | Sample ID: | TB120413 | FB120413 |
| | Sample Date: | 12/4/2013 | 12/4/2013 |
| 1,1,1-Trichloroethane (TCA) | | < 5.0 | < 5.0 |
| 1,1,2,2-Tetrachloroethane | | < 5.0 | < 5.0 |
| 1,1,2-Trichloroethane | | < 5.0 | < 5.0 |
| 1,1-Dichloroethane (1,1-DCA) | | < 5.0 | < 5.0 |
| 1,1-Dichloroethene (1,1-DCE) | | < 5.0 | < 5.0 |
| 1,2-Dichloroethane | | < 5.0 | < 5.0 |
| 1,2-Dichloropropane | | < 5.0 | < 5.0 |
| 2-Butanone (MEK) | | < 50 | < 50 |
| 2-Hexanone | | < 50 | < 50 |
| Acetone | | < 50 | < 50 |
| Benzene | | < 0.7 | < 0.7 |
| Bromodichloromethane | | < 5.0 | < 5.0 |
| Bromoform | | < 5.0 | < 5.0 |
| Bromomethane | | < 5.0 | < 5.0 |
| Carbon Disulfide | | < 5.0 | < 5.0 |
| Carbon Tetrachloride | | < 5.0 | < 5.0 |
| Chlorobenzene | | < 5.0 | < 5.0 |
| Chloroethane | | < 5.0 | < 5.0 |
| Chloroform | | < 5.0 | < 5.0 |
| Chloromethane | | < 5.0 | < 5.0 |
| Dibromochloromethane | | < 5.0 | < 5.0 |
| Dichlorodifluoromethane (CFC 12) | | < 5.0 | < 5.0 |
| Dichloromethane | | < 5.0 | < 5.0 |
| Ethylbenzene | | < 5.0 | < 5.0 |
| Methyl tert-Butyl Ether | | < 5.0 | < 5.0 |
| Styrene | | < 5.0 | < 5.0 |
| Tetrachloroethene (PCE) | | < 5.0 | < 5.0 |
| Toluene | | < 5.0 | < 5.0 |
| Trichloroethene (TCE) | | < 5.0 | < 5.0 |
| Trichlorofluoromethane (CFC 11) | | < 5.0 | < 5.0 |
| Vinyl Chloride | | < 2.0 | < 2.0 |
| cis-1,2-Dichloroethene | | < 5.0 | < 5.0 |
| cis-1,3-Dichloropropene | | < 5.0 | < 5.0 |
| trans-1,2-Dichloroethene | | < 5.0 | < 5.0 |
| trans-1,3-Dichloropropene | | < 5.0 | < 5.0 |
| o-Xylene | | < 5.0 | < 5.0 |
| m,p-Xylenes | | < 5.0 | < 5.0 |
| Chlorodifluoromethane (CFC 22) | | < 5.0 | < 5.0 |
| 1,1,2-Trichlorotrifluoroethane (CFC113) | | < 5.0 | < 5.0 |
| 4-Methyl-2-pentanone (MIBK) | | < 50 | < 50 |
| **TVOCs** | | 0 | 0 |

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Table 2. Concentrations of Volatile Organic Compounds in QA/QC Samples, MPLF Permit #01-1280, Northrop Grumman, Bethpage, New York.

| | Location ID: | Trip Blank | Field Blank |
|---|---|---|---|
| | Sample ID: | TB120413 | FB120413 |
| | Sample Date: | 12/4/2013 | 12/4/2013 |

Constituent in ug/L

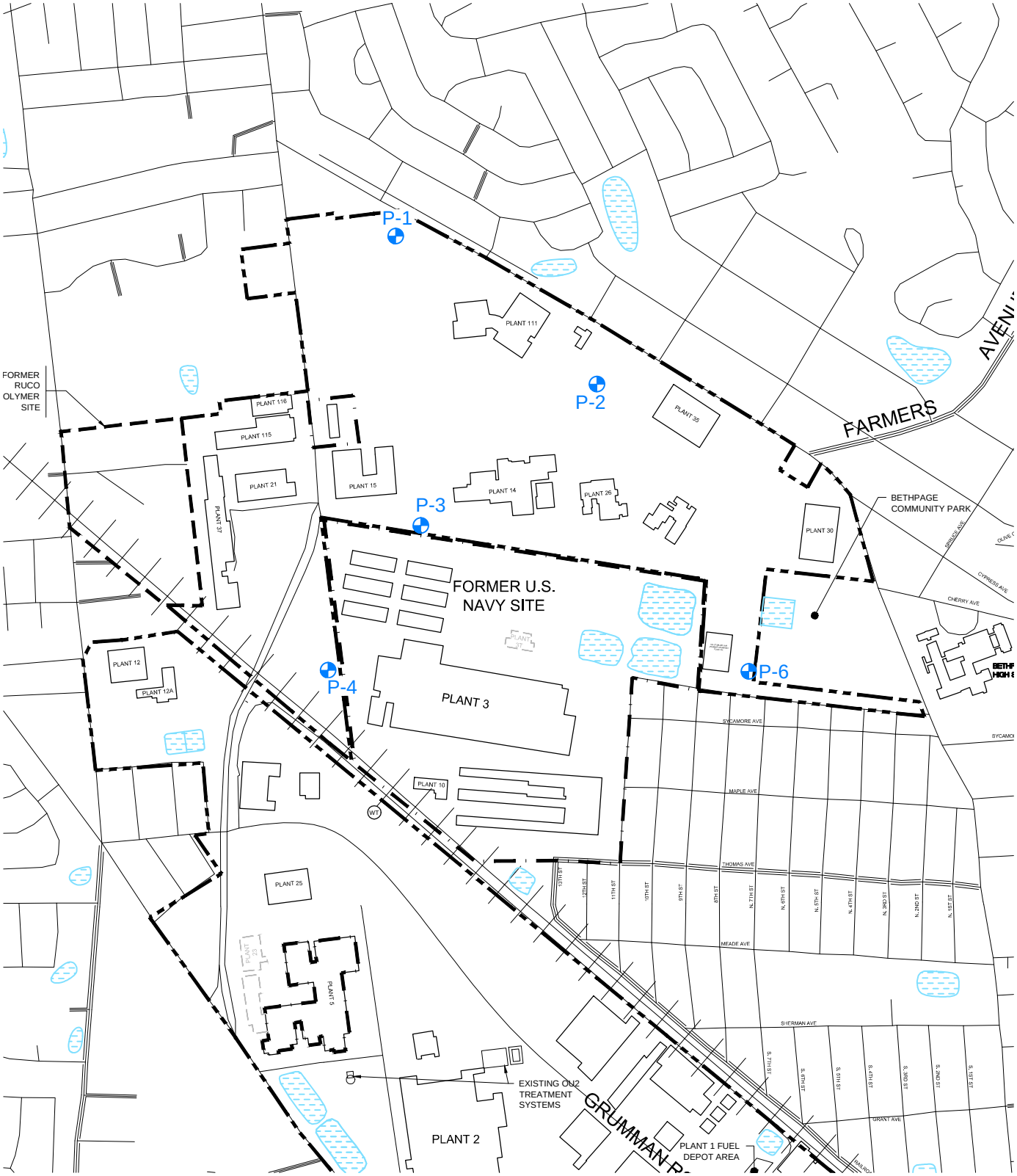
**Notes and Abbreviations:**

(1) Samples were analyzed for the TCL VOCs using NYSDEC ASP 2000 Method OLM4.3. Data were validated in accordance with USEPA National Functional Guidelines of October 1999.

**Bold value indicates a detection.**

TVOCs values are rounded to two significant figures.

| | |
|---|---|
| MPLF | Major Petroleum Licensing Facility |
| QA/QC | Quality Assurance/Quality Control |
| TCL | Target compound list |
| VOC | Volatile Organic Compound |
| TVOCs | Total Volatile Organic Compounds |
| ASP | Analytical services protocol |
| ug/L | Micrograms per liter |
| < 5 | Compound not detected above its laboratory quantification limit |




LEGEND:

WELL LOCATION

MPFL MAJOR PETROLEUM FACILITY LICENSE

NOTE:
WELLS P-5 AND P-7 COULD NOT BE LOCATED.

0 1000' 2000'

SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

# MPFL WELL LOCATIONS

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FIGURE 1


CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD: PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\NY001496\0612\MJSF3\WellLocaMap2.dwg LAYOUT: 1 SAVED: 11/8/2013 12:48 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/8/2013 12:48 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
Xref_OffSite

**Attachment A**

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Infrastructure, environment, facilities

Arrive: 1248
Exit: 1405

# Water Sampling Log

Project NGC OU2 4TH QTR GW Sampling  Project No. NY001496.0612.MSFJ3
Site Location Bethpage, NY  Date 12/04/13
Well No. P-3  Replicate No. MS/MSD *  Weather Sunny, 45°F partly cloudy/overcast ~1335
Sampling Personnel Gary Williams, Karla Miranda  Sampling Time: Begin 1345  End 1351

| Purge Data | | Field Parameters | | | | |
|---|---|---|---|---|---|---|
| | | | | colorless | | |
| Measuring Point (describe) | TOC | Color | ORANGE | clear | colorless | Colorless |
| Sounded Well Depth (ft bmp) | 77.21 | Odor | ø odor | ø odor | ø odor | ø odor |
| Depth to Water (ft bmp) | 60.60 | Appearance | cloudy; ~~sediment~~ | clear | clear | clear |
| Depth to Packer (ft bmp) | — | | | | | |
| Water Column in Well (ft) | 16.61 | | I | 1V | 2V | 3V |
| Casing Diameter | 4" (0.65) | pH (s.u.) | 6.06 | 6.07 | 5.91 | 6.00 |
| Gallons in Well | 10.80 | Conductivity | | | | |
| Gallons Purged | x 3 | ~~(mS/cm)~~ or | — | — | — | — |
| Prior to Sampling | 32.4 gal | (µmhos/cm) [1] (mS/cm) | 256 | 701 | 699 | 709 |
| Pump Intake | | | | | | |
| Setting (ft bmp) | ~62 - 63 ft bmp | Temperature (°C) | 13.9 | 14.8 | 15.8 | 15.6 |
| Packer Pressure (psi) | — | | | | | |
| Pumping Rate (gpm) | ~1 gpm | ~~DO (mg/L)~~ | — | — | — | — |
| Evacuation Method | Non-dedicated Reel/Flow | ~~ORP (mV)~~ | — | — | — | — |
| Sampling Method | 3WV | Turbidity (NTU) | >100 | 9.35 | 2.64 | 1.61 |
| Purge Time | Begin 1308 End 1351 | Time | 1308 | 1319 | 1330 | 1344 |
| | | DTW (ft bmp) | — | — | — | — |

Remarks: ✓ Volume measured in 55 gal/1drum; ∴ parameters ev. ~11 gal;
✓ MS = "P-3 MS"; MSD = "P-3 MSD"

| Parameter | Container | No. | Preservative |
|---|---|---|---|
| * See chain of Custody | | | |
| | | | |
| | | | |

PID Reading —

Well Casing Volumes

| Gal./Ft. | | | | |
|---|---|---|---|---|
| | 1 1/4" = 0.06 | 2" = 0.16 | 3" = 0.37 | 4" = 0.65 |
| | 1 1/2" = 0.09 | 2-½" = 0.26 | 3-½" = 0.50 | 6" = 1.47 |

1) Circle one unit type

Karla Miranda

Page 1 of 1

ARCADIS
Infrastructure, environment, facilities

Arrive: 1450
Exit: 1543

# Water Sampling Log

Project NGC 002 4TH QTR GW Sampling  Project No. NY001496.0612.MSFJ3
Site Location Bethpage, NY  Date 12/04/13
Well No. P-4  Replicate No. N/A  Weather Overcast, 45°F
Sampling Personnel ~~Gary Williams~~ Karla Miranda  Sampling Time: Begin 1528  End 1530

**Purge Data**

| | |
|---|---|
| Measuring Point (describe) | TOC |
| Sounded Well Depth (ft bmp) | 75.31 |
| Depth to Water (ft bmp) | 56.82 |
| Depth to Packer (ft bmp) | — |
| Water Column in Well (ft) | 18.49 |
| Casing Diameter | 4" (0.65) |
| Gallons in Well | 12.02 |
| Gallons Purged | x 3 |
| Prior to Sampling | 36 |
| Pump Intake | |
| Setting (ft bmp) | ~59-60 ft bmp |
| Packer Pressure (psi) | — |
| Pumping Rate (gpm) | ~~1.5~~ 2 |
| Evacuation Method | Non-dedicated Redi-flo |
| Sampling Method | 3WV |
| Purge Time | Begin 1505 End |

**Field Parameters**

| | | 1 | 1V | 2V | 3V |
|---|---|---|---|---|---|
| Color | | Colorless | colorless | colorless | colorless |
| Odor | | Odor | Odor | Odor | Odor |
| Appearance | | clear | clear | clear | clear |
| pH (s.u.) | | 5.66 | 5.39 | 5.44 | 5.49 |
| Conductivity | | | | | |
| ~~(mS/cm)~~ or | | — | — | — | — |
| (µmhos/cm) [1] µS/cm | | 471 | 590 | 577 | 553 |
| Temperature (°C) | | 14.8 | 14.8 | 15.0 | 15.1 |
| ~~DO (mg/L)~~ | | — | — | — | — |
| ~~ORP (mV)~~ | | — | — | — | — |
| Turbidity (NTU) | | 11.61 | 33.60 | 11.70 | 5.02 |
| Time | | 1507 | 1513 | 1529 | 1528 |
| DTW (ft bmp) | | — | — | — | — |

Remarks: ✓ Volume measured in 55 gal/1 drum; ∴ parameters ea. ~12 gal;
✓ Sample collected 1528–1530; Sample ID indicates 1530;

| Parameter | Container | No. | Preservative |
|---|---|---|---|
| * See Chain of Custody | | | |

PID Reading —

Karla Miranda

Well Casing Volumes

| Gal./Ft. | | | | |
|---|---|---|---|---|
| | 1 1/4" = 0.06 | 2" = 0.16 | 3" = 0.37 | 4" = 0.65 |
| | 1 1/2" = 0.09 | 2-½" = 0.26 | 3-½" = 0.50 | 6" = 1.47 |

1) Circle one unit type

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Infrastructure, environment, facilities



Arrive : 1053
Exit : 1215

# Water Sampling Log

Project NGC 042 4TH QTR GW Sampling  Project No. NY001496.0612.MSFJ2
Site Location Bethpage, NY  Date 12/04/13
Well No. P-6  Replicate No. REP120413  Weather Sunny, 45°F
Sampling Personnel ~~Tony Williams~~ Karla Miranda  Sampling Time: Begin 1157  End 1201

## Purge Data

| | |
|---|---|
| Measuring Point (describe) | TOC |
| Sounded Well Depth (ft bmp) | 75.83 |
| Depth to Water (ft bmp) | 59.23 |
| Depth to Packer (ft bmp) | – |
| Water Column in Well (ft) | 16.60 |
| Casing Diameter | 4" (0.65) |
| Gallons in Well | 10.79 |
| Gallons Purged | x 3 |
| Prior to Sampling | = 32.37 gal |
| Pump Intake | |
| Setting (ft bmp) | ~63-64 |
| Packer Pressure (psi) | – |
| Pumping Rate (gpm) | 1 gpm |
| Evacuation Method | Non dedicated Rediflow |
| Sampling Method | 3WV |
| Purge Time | Begin 1124 End 1201 |

## Field Parameters

| | I | 1V | 2V | 3V |
|---|---|---|---|---|
| Color | colorless | colorless | colorless | colorless |
| Odor | Ø odor | Ø odor | Ø odor | Ø odor |
| Appearance | clear | clear | clear | clear |
| pH (s.u.) | 4.73 | 5.35 | 5.31 | 5.33 |
| Conductivity ~~(mS/cm) or~~ (µmhos/cm) [1] mS/cm | 554 | 569 | 648 | 670 |
| Temperature (°C) | 13.9 | 15.6 | 14.8 | 15.4 |
| ~~DO (mg/L)~~ | – | – | – | – |
| ~~ORP (mV)~~ | – | – | – | – |
| Turbidity (NTU) | 7.23 | 10.25 | 13.1 | 9.79 |
| Time | 1124 | 1134 | 1144 | 1157 |
| DTW (ft bmp) | – | – | – | – |

Remarks: ✓ volume measured in 55 gal/2mm; ∴ parameters ev ~11 gal;

| Parameter | Container | No. | Preservative |
|---|---|---|---|
| * See C.O.C. | | | |

PID Reading –

Well Casing Volumes

| Gal./Ft. | | | | |
|---|---|---|---|---|
| | $1^{1/4}$" = 0.06 | 2" = 0.16 | 3" = 0.37 | 4" = 0.65 |
| | $1^{1/2}$" = 0.09 | 2-½" = 0.26 | 3-½" = 0.50 | 6" = 1.47 |

Karla Miranda

1) Circle one unit type

ARCADIS
*Infrastructure, environment, buildings*

ID#:

# CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

**Send Results to:**

| | |
|---|---|
| Contact & Company Name: Xuan Xu / ARCADIS | Telephone: 631 249-7600 |
| Address: 2 Huntington Quadrangle Suite 1S10 | Fax: 631 249-7610 |
| City: Melville State: NY Zip: 11747 | E-mail Address: xuan.xu@arcadis-us.com |
| Project Name/Location (City, State): NGC 0124 4TH QTR / Bethpage, NY | Project #: NY001496.0612.MSFT3 |
| Sampler's Printed Name: Karla Miranda, Gary Williams | Sampler's Signature: |

| Sample ID | Collection Date | Collection Time | Type (✓) Comp | Type (✓) Grab | Matrix | Preservative | Filtered (✓) | # of Containers | Container Information | TVOC OLM4.3 | TVOC OLM4.3 | PARAMETER ANALYSIS & METHOD | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TB120413 | 120413 | 1000 | | ✓ | W | B | — | 3 | 1 | ✓ | | | |
| FB120413 | 120413 | 1045 | | ✓ | W | B | — | 3 | 1 | ✓ | | | |
| REP120413 | 120413 | — | | ✓ | W | B | — | 3 | 1 | ✓ | | | |
| P-6 | 120413 | 1157 | | ✓ | W | B | — | 3 | 1 | ✓ | | | |
| P-3 | 120413 | 1345 | | ✓ | W | B | — | 3 | 1 | | ✓ | | * Use for MS/MSD |
| P-4 | 120413 | 1530 | | ✓ | W | B | — | 3 | 1 | ✓ | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**Keys**

**Preservation Key:**
A. $H_2SO_4$
B. HCL
C. $HNO_3$
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

**Container Information Key:**
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

**Matrix Key:**
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

**Special Instructions/Comments:**

☐ **Special QA/QC Instructions(✓):** please use Sample "P-3" for QA/QC MS/MSD.

| Laboratory Information and Receipt | | Relinquished By | Received By | Relinquished By | Laboratory Received By |
|---|---|---|---|---|---|
| Lab Name: ALS Environmental | Cooler Custody Seal (✓) | Printed Name: Karla Miranda | Printed Name: | Printed Name: | Printed Name: |
| ☐ Cooler packed with ice (✓) | ☐ Intact ☐ Not Intact | Signature: Karla Miranda | Signature: | Signature: | Signature: |
| Specify Turnaround Requirements: 24 hr. T.A.T. | Sample Receipt: | Firm: ARCADIS | Firm/Courier: | Firm/Courier: | Firm: |
| Shipping Tracking #: | Condition/Cooler Temp: _____ | Date/Time: 12/04/13 ; 1700 | Date/Time: | Date/Time: | Date/Time: |



**Distribution:** WHITE – Laboratory returns with results; YELLOW – Lab copy; PINK – Retained by ARCADIS

**Attachment B**

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

# Northrop Grumman Corporation-Operable Unit 2

## Data Usability Summary Report

BETHPAGE, NEW YORK

Volatile Analysis

SDG #R1309135

Analyses Performed By:
ALS
Rochester, New York

Report #20864R
Review Level: Tier III
Project #NY001496.0612.MSFJ3

# SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #R1309135 for samples collected in association with the Northrop Grumman-Bethpage Site. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

| Sample ID | Lab ID | Matrix | Sample Collection Date | Parent Sample | Analysis | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | VOC | SVOC | PCB | MET | MISC |
| TB120413 | R1309135-001 | Water | 12/4/2013 | | X | | | | |
| FB120413 | R1309135-002 | Water | 12/4/2013 | | X | | | | |
| REP120413 | R1309135-003 | Water | 12/4/2013 | P-6 | X | | | | |
| P-6 | R1309135-004 | Water | 12/4/2013 | | X | | | | |
| P-3 | R1309135-005 | Water | 12/4/2013 | | X | | | | |
| P-4 | R1309135-006 | Water | 12/4/2013 | | X | | | | |

Note:

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location P-3.

## ANALYTICAL DATA PACKAGE DOCUMENTATION

### GENERAL INFORMATION

| Items Reviewed | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| Sample receipt condition | | X | | X | |
| Requested analyses and sample results | | X | | X | |
| Collection Technique (grab, composite, etc.) | | X | | X | |
| Methods of analysis | | X | | X | |
| Reporting limits | | X | | X | |
| Sample collection date | | X | | X | |
| Laboratory sample received date | | X | | X | |
| Sample preservation verification (as applicable) | | X | | X | |
| Sample preparation/extraction/analysis dates | | X | | X | |
| Fully executed Chain-of-Custody (COC) form completed | | X | | X | |
| Narrative summary of QA or sample problems provided | | X | | X | |
| Data Package Completeness and Compliance | | X | | X | |

QA - Quality Assurance

# VOLATILE ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA), Contract Laboratory Program (CLP), and Statement of Work (SOW) Method OLM04.3. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

  U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

  B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

  E The compound was quantitated above the calibration range.

  D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

  J The compound was positively identified; however, the associated numerical value is an estimated concentration only.

  UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

  JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.

  UB Compound considered non-detect at the listed value due to associated blank contamination.

  N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.

  R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

# VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

## 1. Holding Times

The specified holding times for the following methods are presented in the following table.

| Method | Matrix | Holding Time | Preservation |
|---|---|---|---|
| OLM04.3 | Water | 10 days from validated time of sample receipt to analysis | Cool to <6°C; preserved to a pH of less than 2 s.u. |

s.u. Standard units

All samples were analyzed within the specified holding time criteria.

## 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were detected in the associated QA blanks; however, the associated sample results were greater than the BAL and/or were non-detect. No qualification of the sample results was required.

## 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

## 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (25%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

| Sample Locations | Initial/Continuing | Compound | Criteria |
|---|---|---|---|
| TB1200413<br>FB120413<br>REP120413<br>P-6<br>P-3<br>P-4 | CCV %D | Bromoform | +55.3% |
| | | Carbon tetrachloride | +27.6% |
| | | Dibromochloromethane | +36.8% |

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

| Initial/Continuing | Criteria | Sample Result | Qualification |
|---|---|---|---|
| Initial and Continuing Calibration | RRF <0.05 | Non-detect | R |
| | | Detect | J |
| | RRF <0.01[1] | Non-detect | R |
| | | Detect | J |
| | RRF >0.05 or RRF >0.01[1] | Non-detect | No Action |
| | | Detect | |
| Initial Calibration | %RSD > 30% or a correlation coefficient <0.99 | Non-detect | UJ |
| | | Detect | J |
| | %RSD >90% | Non-detect | R |
| | | Detect | J |
| Continuing Calibration | %D >25% (increase in sensitivity) | Non-detect | No Action |
| | | Detect | J |
| | %D >25% (decrease in sensitivity) | Non-detect | UJ |
| | | Detect | J |
| | %D >90% (increase/decrease in sensitivity) | Non-detect | R |
| | | Detect | J |

[1] RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e., ketones, 1,4-dioxane, etc.)

### 5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

## 6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

## 7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

| Sample Locations | Compound | MS Recovery | MSD Recovery |
|---|---|---|---|
| P-6 | Benzene | AC | <LL but >10% |
| | Chlorobenzene | | |
| | Toluene | | |
| | Trichloroethene | | |

AC Acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| > the upper control limit (UL) | Non-detect | No Action |
| | Detect | J |
| < the lower control limit (LL) but > 10% | Non-detect | UJ |
| | Detect | J |
| < 10% | Non-detect | R |
| | Detect | J |
| Parent sample concentration > four times the MS/MSD spiking solution concentration. | Detect | No Action |
| | Non-detect | |

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

| Sample Locations | Compound |
|---|---|
| P-3 | 1,1-Dichloroethene |
| | Benzene |
| | Chlorobenzene |
| | Toluene |

| Sample Locations | Compound |
|---|---|
| | Trichloroethene |

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

| Control Limit | Sample Result | Qualification |
|---|---|---|
| > UL | Non-detect | UJ |
| | Detect | J |

**8. Laboratory Control Sample (LCS) Analysis**

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

**9. Field Duplicate Analysis**

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

| Sample ID/ Duplicate ID | Compound | Sample Result | Duplicate Result | RPD |
|---|---|---|---|---|
| P-6/ REP120413 | Chloroform | 0.25 J | 0.34 J | AC |
| | Trichloroethene | 0.60 J | 0.59 J | |

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

**10. System Performance and Overall Assessment**

Tentatively identified compounds (TICs) were not detected in any of the sample locations.

Overall system performance was noted by the laboratory in the case narrative as acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

# DATA VALIDATION CHECKLIST FOR VOCs

| VOCs: OLM04.3 | Reported | | Performance Acceptable | | Not Required |
|---|---|---|---|---|---|
| | No | Yes | No | Yes | |
| GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS) | | | | | |
| **Tier II Validation** | | | | | |
| Holding times | | X | | X | |
| Reporting limits (units) | | X | | X | |
| Blanks | | | | | |
| A. Method blanks | | X | X | | |
| B. Equipment blanks | | X | | X | |
| C. Trip blanks | | X | | X | |
| Laboratory Control Sample (LCS) | | X | | X | |
| Laboratory Control Sample Duplicate(LCSD) | | | | | X |
| LCS/LCSD Precision (RPD) | | | | | X |
| Matrix Spike (MS) | | | | | X |
| Matrix Spike Duplicate(MSD) | | X | | X | |
| MS/MSD Precision (RPD) | | X | X | | |
| Field/Lab Duplicate (RPD) | | X | X | | |
| Surrogate Spike Recoveries | | X | | X | |
| Dilution Factor | | X | | X | |
| Moisture Content | | | | | X |
| **Tier III Validation** | | | | | |
| System performance and column resolution | | X | | X | |
| Initial calibration %RSDs | | X | | X | |
| Continuing calibration RRFs | | X | | X | |
| Continuing calibration %Ds | | X | X | | |
| Instrument tune and performance check | | X | | X | |
| Ion abundance criteria for each instrument used | | X | | X | |
| Internal standard | | X | | X | |
| Compound identification and quantitation | | | | | |
| A. Reconstructed ion chromatograms | | X | | X | |
| B. Quantitation Reports | | X | | X | |
| C. RT of sample compounds within the established RT windows | | X | | X | |
| D. Transcription/calculation errors present | | X | | X | |
| E. Reporting limits adjusted to reflect sample dilutions | | X | | X | |

%RSD Relative standard deviation
%R Percent recovery
RPD Relative percent difference
%D Percent difference

# SAMPLE COMPLIANCE REPORT

## SAMPLE COMPLIANCE REPORT

| Sample Delivery Group (SDG) | Sampling Date | Protocol | Sample ID | Matrix | Compliancy[1] | | | | | Noncompliance |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | VOC | SVOC | PCB/PEST /HERB | MET | MISC | |
| R1309135 | 12/4/2013 | OLM04.3 | TB1200413 | Water | Yes | -- | -- | -- | -- | |
| | | | FB120413 | Water | Yes | -- | -- | -- | -- | |
| | | | REP120413 | Water | Yes | -- | -- | -- | -- | |
| | | | P-6 | Water | Yes | -- | -- | -- | -- | |
| | | | P-3 | Water | No | -- | -- | -- | -- | VOC-MSD & RPD |
| | | | P-4 | Water | Yes | -- | -- | -- | -- | |

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Lisa Horton

SIGNATURE: 

DATE: December 13, 2013

PEER REVIEW BY: Todd Church

DATE: December 13, 2013

## CHAIN OF CUSTODY/LABORATORY QUALIFIER DEFINITIONS/ CORRECTED SAMPLE ANALYSIS DATA SHEETS

ARCADIS
Infrastructure, environment, buildings

ID#:

# CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

**Send Results to:**

| | |
|---|---|
| Contact & Company Name: | Xuan Xu/ARCADIS |
| Address: | 2 Huntington Quadrangle Suite 1S10 |
| City / State / Zip | Melville NY 11747 |
| Telephone: | 631-249-7600 |
| Fax: | 631-249-7610 |
| E-mail Address: | xuan.xu@arcadis-us.com |
| Project Name/Location (City, State): | NGC042 4TH QTR/ Bethpage, NY |
| Project #: | NY001496.0612.MSFT3 |
| Sampler's Printed Name: | Karla Miranda, Gary Williams |
| Sampler's Signature: | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservative | B | B | | | | | | | | | | | | |
| Filtered (✓) | — | — | | | | | | | | | | | | |
| # of Containers | 3 | 9 | | | | | | | | | | | | |
| Container Information | 1 | 1 | | | | | | | | | | | | |

**PARAMETER ANALYSIS & METHOD**

| Sample ID | Collection Date | Collection Time | Type (✓) Comp | Type (✓) Grab | Matrix | TVOC OLM 4.3 | TVOC OLM 4.3 | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TB120413 | 120413 | 1000 | | ✓ | W | ✓ | | | | | | | |
| FB120413 | 120413 | 1045 | | ✓ | W | ✓ | | | | | | | |
| REP120413 | 120413 | — | | ✓ | W | ✓ | | | | | | | |
| P-6 | 120413 | 1157 | | ✓ | W | ✓ | | | | | | | |
| P-3 | 120413 | 1345 | | ✓ | W | | ✓ | | | | | | *Use for MS/MSD |
| P-4 | 120413 | 1530 | | ✓ | W | ✓ | | | | | | | |

**Keys**

**Preservation Key:**
A. $H_2SO_4$
B. HCL
C. $HNO_3$
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

**Container Information Key:**
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

**Matrix Key:**
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

**Special Instructions/Comments:**

**Special QA/QC Instructions(✓):**
please use Sample "P-3" for QA/QC MS/MSD.

| Laboratory Information and Receipt | | Relinquished By | Received By | Relinquished By | Laboratory Received By |
|---|---|---|---|---|---|
| Lab Name: ALS Environmental | Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact | Printed Name: Karla Miranda | Printed Name: J. Saward | Printed Name: | Printed Name: |
| ☒ Cooler packed with ice (✓) | | Signature: | Signature: | Signature: | Signature: |
| Specify Turnaround Requirements: 24 hr. T.A.T. | Sample Receipt: | Firm: ARCADIS | Firm/Courier: ALS | Firm/Courier: | |
| Shipping Tracking #: | Condition/Cooler Temp: _____ | Date/Time: 12/04/13 ; 1700 | Date/Time: 12/5/13 1030 | Date/Time: | |

20730526 CofC AR Form 01.12.2007

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy

ALS Environmental

# REPORT QUALIFIERS AND DEFINITIONS

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

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

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

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

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

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

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

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

# Spike was diluted out.

\+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

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

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

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

P Concentration >40% (25% for CLP) difference between the two GC columns.

C Confirmed by GC/MS

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

X See Case Narrative for discussion.

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

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

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

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

ACCREDITED IN ACCORDANCE WITH nelac

## Rochester Lab ID # for State Certifications[1]

| | | |
|---|---|---|
| NELAP Accredited | Maine ID #NY0032 | New Hampshire ID # 294100 A/B |
| Connecticut ID # PH0556 | Nebraska Accredited | |
| Delaware Accredited | Nevada ID # NY-00032 | North Carolina #676 |
| DoD ELAP #65817 | New Jersey ID # NY004 | Pennsylvania ID# 68-786 |
| Florida ID # E87674 | New York ID # 10145 | Rhode Island ID # 158 |
| Illinois ID #200047 | | Virginia #460167 |

[1] Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the laboratory case narrative provided. For a specific list of accredited analytes, refer to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1000 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 14:33 |
| **Sample Name:** | TB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-001 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2137.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | 5.0 | U | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | 5.0 | U | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1000 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 14:33 |
| **Sample Name:** | TB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-001 | **Basis:** | NA |

## Volatile Organic Compounds by GC/MS

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2137.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 101 | 76-114 | 12/10/13 14:33 | |
| 4-Bromofluorobenzene | 97 | 86-115 | 12/10/13 14:33 | |
| Toluene-d8 | 100 | 88-110 | 12/10/13 14:33 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1433 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | TB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-001 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1045 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:00 |
| **Sample Name:** | FB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-002 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2138.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | 5.0 | U | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | 5.0 | U | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1045 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:00 |
| **Sample Name:** | FB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-002 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2138.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 98 | 76-114 | 12/10/13 15:00 | |
| 4-Bromofluorobenzene | 95 | 86-115 | 12/10/13 15:00 | |
| Toluene-d8 | 98 | 88-110 | 12/10/13 15:00 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1500 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | FB120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-002 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**

## ALS Group USA, Corp. dba ALS Environmental

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:30 |
| **Sample Name:** | REP120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-003 | **Basis:** | NA |

### Volatile Organic Compounds by GC/MS

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2139.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | **0.34** | J | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | **0.59** | J | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | **1.1** | J | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:30 |
| **Sample Name:** | REP120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-003 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2139.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 101 | 76-114 | 12/10/13 15:30 | |
| 4-Bromofluorobenzene | 96 | 86-115 | 12/10/13 15:30 | |
| Toluene-d8 | 97 | 88-110 | 12/10/13 15:30 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1530 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | REP120413 | **Units:** | µg/L |
| **Lab Code:** | R1309135-003 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1157 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:57 |
| **Sample Name:** | P-6 | **Units:** | µg/L |
| **Lab Code:** | R1309135-004 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2140.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | **0.25** | J | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | **0.60** | J | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | **1.3** | J | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |

## ALS Group USA, Corp. dba ALS Environmental

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1157 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 15:57 |
| **Sample Name:** | P-6 | **Units:** | µg/L |
| **Lab Code:** | R1309135-004 | **Basis:** | NA |

### Volatile Organic Compounds by GC/MS

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2140.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 98 | 76-114 | 12/10/13 15:57 | |
| 4-Bromofluorobenzene | 96 | 86-115 | 12/10/13 15:57 | |
| Toluene-d8 | 100 | 88-110 | 12/10/13 15:57 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1557 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | P-6 | **Units:** | µg/L |
| **Lab Code:** | R1309135-004 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1345 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 16:24 |
| **Sample Name:** | P-3 | **Units:** | µg/L |
| **Lab Code:** | R1309135-005 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2141.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | | MRL | MDL | Note |
|---|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | J | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | J | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | J | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | 5.0 | U | | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | J | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | 5.0 | U | J | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | 5.0 | U | | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | | 5.0 | 0.20 | |

## ALS Group USA, Corp. dba ALS Environmental

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1345 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 16:24 |
| **Sample Name:** | P-3 | **Units:** | µg/L |
| **Lab Code:** | R1309135-005 | **Basis:** | NA |

### Volatile Organic Compounds by GC/MS

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2141.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 100 | 76-114 | 12/10/13 16:24 | |
| 4-Bromofluorobenzene | 97 | 86-115 | 12/10/13 16:24 | |
| Toluene-d8 | 97 | 88-110 | 12/10/13 16:24 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1624 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | P-3 | **Units:** | µg/L |
| **Lab Code:** | R1309135-005 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1530 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 16:51 |
| **Sample Name:** | P-4 | **Units:** | µg/L |
| **Lab Code:** | R1309135-006 | **Basis:** | NA |

**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2142.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 71-55-6 | 1,1,1-Trichloroethane (TCA) | 5.0 | U | 5.0 | 0.20 | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5.0 | U | 5.0 | 0.20 | |
| 79-00-5 | 1,1,2-Trichloroethane | 5.0 | U | 5.0 | 0.20 | |
| 75-34-3 | 1,1-Dichloroethane (1,1-DCA) | 5.0 | U | 5.0 | 0.20 | |
| 75-35-4 | 1,1-Dichloroethene (1,1-DCE) | 5.0 | U | 5.0 | 0.20 | |
| 107-06-2 | 1,2-Dichloroethane | 5.0 | U | 5.0 | 0.21 | |
| 78-87-5 | 1,2-Dichloropropane | 5.0 | U | 5.0 | 0.20 | |
| 78-93-3 | 2-Butanone (MEK) | 50 | U | 50 | 1.3 | |
| 591-78-6 | 2-Hexanone | 50 | U | 50 | 1.2 | |
| 67-64-1 | Acetone | 50 | U | 50 | 1.4 | |
| 71-43-2 | Benzene | 0.70 | U | 0.70 | 0.20 | |
| 75-27-4 | Bromodichloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-25-2 | Bromoform | 5.0 | U | 5.0 | 0.20 | |
| 74-83-9 | Bromomethane | 5.0 | U | 5.0 | 0.49 | |
| 75-15-0 | Carbon Disulfide | 5.0 | U | 5.0 | 0.20 | |
| 56-23-5 | Carbon Tetrachloride | 5.0 | U | 5.0 | 0.20 | |
| 108-90-7 | Chlorobenzene | 5.0 | U | 5.0 | 0.23 | |
| 75-00-3 | Chloroethane | 5.0 | U | 5.0 | 0.22 | |
| 67-66-3 | Chloroform | 5.0 | U | 5.0 | 0.20 | |
| 74-87-3 | Chloromethane | 5.0 | U | 5.0 | 0.20 | |
| 124-48-1 | Dibromochloromethane | 5.0 | U | 5.0 | 0.20 | |
| 75-71-8 | Dichlorodifluoromethane (CFC 12) | 5.0 | U | 5.0 | 0.20 | |
| 75-09-2 | Dichloromethane | 5.0 | U | 5.0 | 0.26 | |
| 100-41-4 | Ethylbenzene | 5.0 | U | 5.0 | 0.20 | |
| 1634-04-4 | Methyl tert-Butyl Ether | 5.0 | U | 5.0 | 0.20 | |
| 100-42-5 | Styrene | 5.0 | U | 5.0 | 0.20 | |
| 127-18-4 | Tetrachloroethene (PCE) | 5.0 | U | 5.0 | 0.20 | |
| 108-88-3 | Toluene | 5.0 | U | 5.0 | 0.20 | |
| 79-01-6 | Trichloroethene (TCE) | 5.0 | U | 5.0 | 0.27 | |
| 75-69-4 | Trichlorofluoromethane (CFC 11) | 5.0 | U | 5.0 | 0.20 | |
| 75-01-4 | Vinyl Chloride | 2.0 | U | 2.0 | 0.20 | |
| 156-59-2 | cis-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.20 | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |
| 156-60-5 | trans-1,2-Dichloroethene | 5.0 | U | 5.0 | 0.22 | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5.0 | U | 5.0 | 0.20 | |

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/ 4/13 1530 |
| **Sample Matrix:** | Water | **Date Received:** | 12/ 5/13 |
| | | **Date Analyzed:** | 12/10/13 16:51 |
| **Sample Name:** | P-4 | **Units:** | µg/L |
| **Lab Code:** | R1309135-006 | **Basis:** | NA |

## Volatile Organic Compounds by GC/MS

| | | | |
|---|---|---|---|
| **Analytical Method:** | CLP-VOA OLM04.3 | **Analysis Lot:** | 372055 |
| **Data File Name:** | I:\ACQUDATA\MSVOA6\DATA\121013\L2142.D\ | **Instrument Name:** | R-MS-06 |
| | | **Dilution Factor:** | 1 |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5.0 | U | 5.0 | 0.20 | |
| 179601-23-1 | m,p-Xylenes | 5.0 | U | 5.0 | 0.22 | |
| 75-45-6 | Chlorodifluoromethane (CFC 22) | 5.0 | U | 5.0 | 0.20 | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroethane (CFC 113) | 5.0 | U | 5.0 | 0.29 | |
| 108-10-1 | 4-Methyl-2-pentanone (MIBK) | 50 | U | 50 | 0.78 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Q |
|---|---|---|---|---|
| 1,2-Dichloroethane-d4 | 100 | 76-114 | 12/10/13 16:51 | |
| 4-Bromofluorobenzene | 97 | 86-115 | 12/10/13 16:51 | |
| Toluene-d8 | 100 | 88-110 | 12/10/13 16:51 | |

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCADIS of New York, Inc. | **Service Request:** | R1309135 |
| **Project:** | NGC - OU2 Quarterly System/NY001496.0612.WSFJ3 | **Date Collected:** | 12/4/13 |
| **Sample Matrix:** | Water | **Date Received:** | 12/5/13 |
| | | **Date Analyzed:** | 12/10/13 1651 |

**Tentatively Identified Compounds (TIC)**
**Volatile Organic Compounds by GC/MS**

| | | | |
|---|---|---|---|
| **Sample Name:** | P-4 | **Units:** | µg/L |
| **Lab Code:** | R1309135-006 | **Basis:** | NA |

**Analytical Method:** CLP-VOA OLM04.3

| CAS # | Analyte Name | RT | Result | Q |
|---|---|---|---|---|

No Tentatively Identified Compounds Detected.

**Comments:**