Emerging Contaminants Sampling Plan

Carroll and Dubies Superfund Site 336015
Town of Deerpark, Orange County, New York

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
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Project No. 104-0012-0300

April 2019

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1.0 Background

1.1 Purpose of Emerging Contaminants Sampling and Analysis Program

This sampling and analysis program for emerging contaminants at the Carroll and Dubies Superfund site is being done at the request of the New York State Department of Environmental Conservation (NYSDEC). Mr. Scott Deyette, Project Manager for NYSDEC Remedial Bureau C, sent a letter dated March 1, 2019 to the potentially responsible party (PRP) representative, Mr. Jonathan Murphy, outlining the request. The letter explained that NYSDEC is undertaking an evaluation of remediation sites to better understand the risks posed by 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS). Further, the letter said that PFAS have not been historically evaluated at remediation sites, and 1,4-dioxane has not been evaluated at levels that are now thought to represent health concerns. PFAS are synthetic chemicals manufactured and used in a variety of industries, and are persistent in the environment. The synthetic chemical 1,4-dioxane has been used as a stabilizer in chlorinated solvents, and has been found in groundwater at some sites where chlorinated volatile organic compounds (VOCs) are detected.

The emerging contaminants sampling and analysis program will be done at the same time as the regularly scheduled groundwater sampling program, to be completed before June 30, 2019.

1.2 Site History

The three-acre Carroll and Dubies Superfund site is located in the Town of Deerpark in Orange County, New York, which is approximately 3,000 feet northeast of the City of Port Jervis, New York (Figure 1). The site is situated on the northwestern flank of the Neversink Valley. Gold Creek lies approximately 1,500 feet to the east, and the Neversink River is located approximately 2,500 feet beyond Gold Creek.

The site is underlain by sand and gravel deposits of glacial and glaciofluvial origin. Groundwater monitoring wells have been completed in the outwash unit, found above a low-permeability till zone that functions as an aquitard. The outwash unit consists of

fine to coarse sand with fine to coarse gravel. The direction of groundwater flow is generally toward the southeast.

In 1971, the Carroll and Dubies sewage disposal business began operating as a series of lagoons. The majority of wastes disposed in the lagoons were septic waste, municipal sewage sludge, and solid waste. The site also received liquid industrial wastes from approximately 1971 to 1979.

Over time, waste constituents in the lagoons leached into groundwater and affected the outwash aquifer. Benzene, vinyl chloride, and other VOCs were found through a series of investigations to exceed state and federal limits in site monitoring wells. The U.S. Environmental Protection Agency (U.S. EPA) placed the site on the National Priorities List (NPL) in 1990.

The remedies selected for the site were defined by two operable units (OU), the waste lagoons themselves (OU-1), and impacted groundwater (OU-2). Remedies were selected and executed to remove wastes from the lagoons, restore the site to a safe and stable condition, and promote and track improvements in groundwater quality.

The OU-1 remedy was conducted in 1999 to prevent further leaching of contaminants into groundwater and to eliminate direct contact risks. The steps in this process were:

- Excavation of all wastes from Lagoons 1, 2, 3, 4, 6, 7, and 8, along with surrounding soils that exceeded specified levels for indicator chemicals.
- Appropriate offsite management of all excavated wastes and soils.
- Placement of imported clean fill in the excavations, followed by grading for drainage control and vegetation.

The OU-2 remedy was initiated in 1999 and continues today. It is a monitoring program to verify source removal and site stability, while allowing natural attenuation to reduce or eliminate the risks associated with historic impacts to the outwash aquifer.

2.0 Wells Proposed for Sampling

The proposed monitoring wells for sampling for this program are OW-6, OW-13R, and OW-24, shown on Figure 2, which also shows the March 2018 groundwater elevation contours. The current monitoring program for U.S. EPA is conducted every five quarters, for ten monitoring wells, including the three selected. The three monitoring wells selected for the emerging contaminants program represent a variety of conditions:

- OW-6 is downgradient of the location of historic lagoons and has detectable chlorinated VOCs.
- OW-13R is downgradient of the location of historic lagoons and sidegradient of the closed local landfill. Benzene is detected in this well; historically chlorinated VOCs were detected.
- OW-24 is far downgradient and is nondetectable for VOCs.

NYSDEC has recommended that one of the selected monitoring wells be upgradient of the site. There is not a true upgradient monitoring well remaining at this site. OW-24 has been selected in lieu of an upgradient monitoring well. VOCs have not been detected at the reporting limits in this monitoring well since it was installed in 2006.

3.0 Sample Collection Methods

Sample collection methods will be consistent with the approved U.S. EPA sampling protocols that have been in place for this site. In addition, the guidelines provided by New York State DEC in a letter dated March 1, 2019 will be followed. Specifically:

- Sampling equipment and sample containers will be stainless steel, high density polyethylene (HDPE), and polypropylene. This includes a stainless-steel body QED Sample Pro bladder pump (Appendix A); QED HDPE disposable pump bladders; and fused dual air and sample HDPE tubing (fresh tubing for each sample location).
- Sampling equipment and sample containers will be protected from contact with aluminum foil, low density polyethylene (LDPE), glass, or polytetrafluoroethylene (PTFE, or Teflon^{TM}).
- Equipment will be decontaminated with a tap water and nonphosphate detergent wash, tap water rinse, and deionized water rinse.
- No food or drink containers will be allowed near sampling equipment or samples.
- Sampling personnel will put on clean nitrile gloves when filling and sealing the sample bottles.
- Sampling personnel will avoid GORE-TEX clothing or other clothing such as rainwear that may have been treated with PFAS-containing waterproof materials.

Monitoring wells OW-13R and OW-24 have never been fitted with dedicated sampling equipment. OW-6 is an older monitoring well that was fitted with a dedicated Well Wizard sampling device several years ago. For the emerging contaminants sampling program, the Well Wizard and all associated tubing will be removed completely from the monitoring well. The well will be purged using low-flow techniques with the bladder pump (between 100 and 200 milliliters per minute [mL/min]) to stability for pH, temperature, dissolved oxygen, and specific conductance, and oxidation/reduction potential (redox). A flow-through multiparameter instrument will be used, and the goal is to obtain three consecutive readings of the field parameters within the following ranges:

- ±1.0 degree centigrade (°C) for temperature
- ±10 percent (%) for dissolved oxygen
- ±10 millivolts (mV) for redox potential
- ±3% for conductivity
- ±0.1 for pH

Groundwater samples will be collected directly from the HDPE tubing, not from the flow-through cell used to monitor groundwater stabilization. Samples will be collected into precleaned HDPE or polypropylene sample containers provided by the laboratory, capped, labeled, recorded on the chain of custody, and placed in a cooler with ice to maintain 4± 2° Celsius.

4.0 Selected Laboratory and Analysis

Pace Analytical Services has been selected to perform the emerging contaminants analysis using 8270 SIM for 1,4-dioxane and a modified version of Method 537 for PFAS that uses isotope dilution quantitation. This method detects the NYSDEC compound list at the required reporting limits. A description of the laboratory's PFAs analytical services is attached in Appendix B, along with their New York drinking water certification for PFAS.

5.0 Quality Assurance and Quality Control

For the three groundwater samples collected, these quality assurance / quality control samples will also be collected:

- One equipment blank (bladder pump)
- One field duplicate
- One matrix spike/matrix spike duplicate
- One field blank

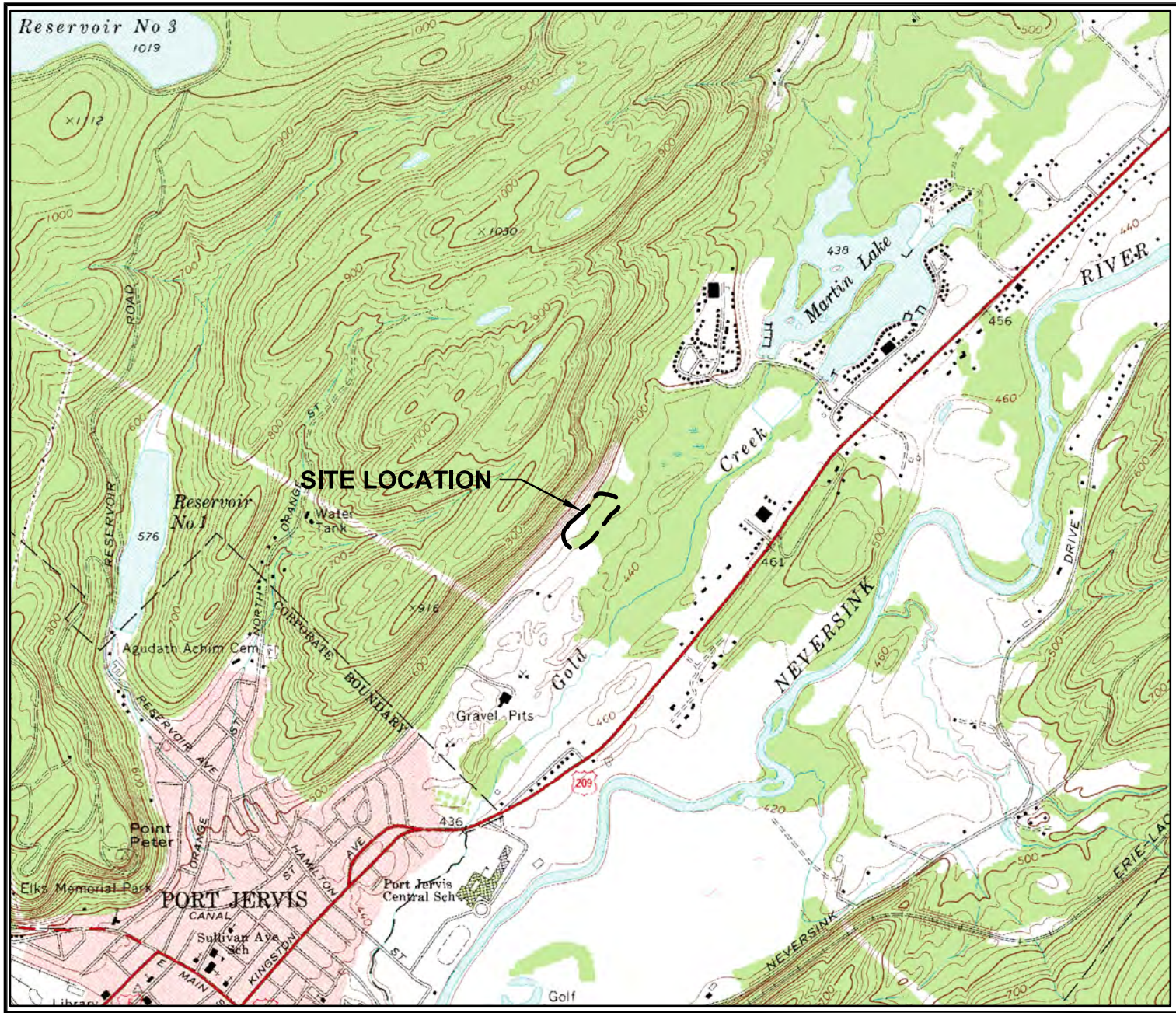
A category B data package will be provided by the laboratory. A Tier II data quality review of the sample data package will be completed using U.S. EPA guidelines and a data usability summary report will be provided. The Tier II data evaluation consists of a review of data package completeness and a quality control (QC) review, as summarized in the QC forms provided by the laboratory, covering, as applicable:

- Signed transmittal page
- Data package narrative
- Sample transmittal documentation
- Reagent traceability summary
- Standard VOC QC forms for:
  - System monitoring compound (surrogate recovery)
  - Matrix spike/matrix spike duplicate (MS/MSD) recovery
  - Laboratory control samples
  - Method blank summary
  - Instrument performance check
  - Internal standard summary and retention time (RT) summary
  - Initial calibration data
  - Continuing calibration data
- Form Is and raw data for field samples, blanks, laboratory control samples, MS/MSDs
- Copies of logbook pages documenting sample preparation, extract transfer, instruments, and sample tracking
- Holding times
- Form Is and raw data for field and QC samples
- Field duplicates and field, trip, and equipment rinsate blanks

6.0 Reporting

The results of the emerging contaminants program will be provided in a report that describes that sampling methodology, tabulates the results, and provides a data usability review. The category B data package will be provided in electronic format. In addition, the data will be electronically uploaded in Electronic Data Deliverable (EDD) Format to NYSDEC's website.

Figures



2,000' 0 2,000'

SCALE IN FEET

LEGEND:

APPROXIMATE SITE BOUNDARY

SOURCE:

USGS TOPOGRAPHIC QUADRANGLE MAP
PORT JERVIS NORTH, NEW YORK, DATED 1991.

CARDINAL RESOURCES

CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK

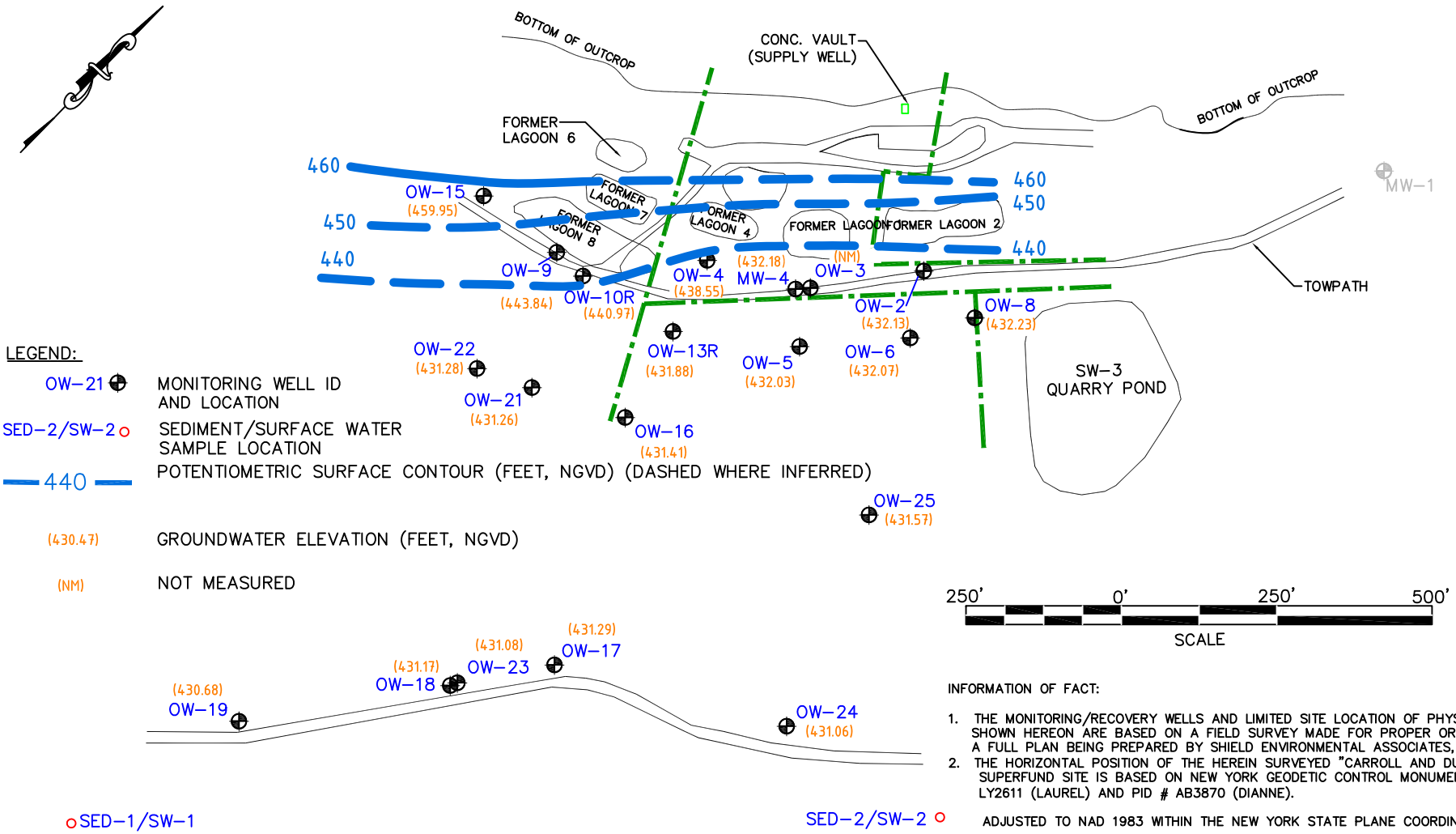
105-0035

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
1							
0	ECM						

FIGURE 1

SITE LOCATION MAP

CADD FILE	9005	SCALE	AS NOTED	CURRENT DATE:	03-07-2005
DRAWING NO.	105-0035-0300-01			REVISION	0



INFORMATION OF FACT:

1. THE MONITORING/RECOVERY WELLS AND LIMITED SITE LOCATION OF PHYSICAL FEATURES SHOWN HEREON ARE BASED ON A FIELD SURVEY MADE FOR PROPER ORIENTATION WITH A FULL PLAN BEING PREPARED BY SHIELD ENVIRONMENTAL ASSOCIATES, INC.
2. THE HORIZONTAL POSITION OF THE HEREIN SURVEYED "CARROLL AND DUBIES" SUPERFUND SITE IS BASED ON NEW YORK GEODETIC CONTROL MONUMENTS PID # LY2611 (LAUREL) AND PID # AB3870 (DIANNE).

ADJUSTED TO NAD 1983 WITHIN THE NEW YORK STATE PLANE COORDINATE SYSTEM.

NOTE:
1. OW-9 AND OW-10R WERE DRY IN JUNE 2014 AND ARE NOT USED IN CREATION OF THESE CONTOURS.
2. THE OUTLINES OF THE FORMER LAGOONS ARE BASED ON THE ACTUAL EXCAVATION.

SOURCES: MASTER CONSULTING P.A. MONITORING WELL LOCATION PLAN. INDEXN). SU0009, MARCH 3, 1999.

CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK
104-0012

FIGURE 2
GROUNDWATER ELEVATION CONTOURS
MARCH 2018

CARDINAL

CURRENT DATE	03-27-2018	CB		DRAWING NO.	104-0012 - C&D OU2\MARCH 2018	SCALE	AS NOTED	REVISION	

Appendix A

Sampling Pump Information

PORTABLE GROUNDWATER SAMPLING PUMP

The Most Reliable Portable Sampling Pump is PFC-Free

Sample Pro®

The Original PFC-Free Bladder Pump

The Sample Pro pump and tubing are and have always been PFC-Free*

The Sample Pro® Portable Pump, the first pump developed specifically to bring the advantages of low-flow sampling to sites requiring portable pumps, has been shown to be PFC-Free. Sample analysis by an independent laboratory showed no detections for 24 different perfluorinated compounds at detection limits much lower than the US EPA Health Advisory of 70 nanograms per liter (parts per trillion)*.

The Sample Pro Pump not only delivers consistent low-flow rates, it's easy to disassemble without tools, simple to clean and truly field rugged.

The Sample Pro portable pump combines the unparalleled sample accuracy and high reliability of a bladder pump in an easy-to-use design. It runs cool and can run dry without damage, and can be operated using any of QED's MicroPurge controller options - 12-volt integral compressor, a Honda-powered gasoline-driven compressor, an external compressed air cylinder, or a lightweight backpack with integral CO_2 cylinder.

The Sample Pro pump's reliability and low maintenance make it more economical to use. Its twist-open design makes it easy to change the disposable bladder in seconds. The compact 14.75" length fits in a bucket for easy cleaning between uses.

Other innovations include interchangeable tubing connection options - conventional compression fittings or a "push to lock" head that eliminates fittings, perfect for use with disposable tubing. The Sample Pro pump's rugged, all-stainless construction will stand up to tough portable use. With thousands in service and nearly two decades of proven performance, the Sample Pro pump is the most reliable portable sampling pump ever made.

*See details on the testing procedure and results on the back page.

PFC FREE

Ideal for PFC Sampling
Tested for purity

Simple to Service
Twist-open design with disposable bladders

Nearly Unbreakable
Stainless steel construction stands up to tough use

QED®

Innovative Environmental Products

(800) 624-2026 • www.qedenv.com
P.O. Box 3726 Ann Arbor, MI 48106-3726 USA • (734) 995-2547 • Fax (734) 995-1170 • info@qedenv.com

PFC-Free Groundwater Sampling

Specifications:

MATERIALS

Body	303 Stainless Steel
Inlet and Discharge Housing	303 Stainless Steel
Bladder	Polyethylene
O-Rings*	Viton® or Buna-N

DIMENSIONS

Diameter	1.75 in. (44.5 mm)
Length	14.75 in. (37.5 cm) w/ Push-In Fittings 16.5 in. (41.9 cm) w/ Compression Fittings 12.12 in. (30.8 cm) Bottom of pump to centerline of inlet
Weight	4.25 lbs. (1.93 kg)

FITTINGS (Stainless Steel Compression or Push-In Type)

Air	1/4 in. (6.4 mm) OD x 3/16 in. (4.7 mm) ID
Discharge	3/8 in. (9.5 mm) OD x 1/4 in. (6.4 mm) ID or 1/4 in. (6.4 mm) OD x 3/16 (4.7 mm) ID
Maximum Lift	250 ft. (76 m)
Flow Rates	3/8 in. OD Discharge Tubing, 10 ft. submergence: 1.6 Lpm @ 25 ft. 0.75 Lpm @ 100 ft. 1/4 in. OD Discharge Tubing, 10 ft. submergence: 1.25 Lpm @ 25 ft. 0.55 Lpm @ 100 ft.
Pump Volume	100 mL / 0.1 L / 0.026 gal. / 3.38 oz.

* For applications where materials specifications prohibit the use of Viton O-rings, QED has Buna-n (nitrile) O-ring kits for the Sample Pro portable bladder pump. The kit contains 10 complete sets of O-rings, and can be ordered using Part Number 38362-B.

Sampling Consultant's Kit

The Sample Pro Consultant's Kit includes accessories and supplies in a rugged case that also carries and protects the pump.

The kit includes all supplies, accessories, and replacement parts necessary to sample 10 wells, packed in a 9x9x20" heavy-duty structural foam tool box for easy portability on-site.

Testing of QED Sample Pro® for Perfluorinated Compounds

Introduction

Perfluorinated compounds (PFCs, also called perfluorinated alkylated substances or PFAS) have been identified as an emerging contaminant in ground water. Site owners and their environmental consultants are being tasked with sampling for the presence of these chemicals at extremely low concentration levels, down to several parts per trillion (or nanograms per liter). As part of this sampling, concerns have been raised that any sampling equipment that contains fluoropolymers of polytetrafluoroethylene (e.g., *Teflon®, such as PTFE, FEP and PFA) and fluoropolymer elastomers (e.g., Viton® or FKM) could leach PFCs into ground water samples. This has already led some users to exclude the use of any sampling equipment containing fluoropolymers or fluoroelastomers when sampling for PFCs.

QED conducted a test of the Sample Pro® 1.75" Portable Bladder Pump to determine if any PFCs would leach from materials in the pump. We also tested our commonly used sample tubing materials for the same purpose.

Test Method and Results

The Sample Pro 1.75-inch portable bladder pump was tested as a complete assembly (pump body, housing and check balls, polyethylene bladder and Viton O-rings). The test was conducted by soaking for 24 hours in a stainless steel test fixture (5 gallons / 20 liters volume) and collecting samples from the stand tube. The samples were analyzed for 24 different perfluorinated compounds using US EPA Method 537M, with method detection limits below 1 ng/L and reporting limits of 5 ng/L for most PFCs. In addition, QED also tested all of our twin-bonded tubing materials – polyethylene (PE), Teflon-lined PE and all Teflon tubing – by soaking each tubing material for 48-72 hours directly in sample bottles.

The results for the Sample Pro pump and all three tubing materials were non-detect for all 24 PFCs above the stated Method Detection Limits (MDLs). Based on this, our QED Sample Pro pump and any standard QED tubing should not contribute any PFCs to ground water samples taken with these products.

**Teflon® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates. It is used herein to describe a range of various fluorocarbon plastic resin formulations.*

For more detailed information visit:
www.qedenv.com/PFCtesting

QED®
Innovative Environmental Products

 CODE 2378 — October 2017

Appendix B

Laboratory Certificate and Analysis Summary

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2020
Issued April 01, 2019

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. DENNIS J. LEEKE
PACE ANALYTICAL SERVICES, LLC - MINNEAPOLIS MN
1700 ELM STREET SE SUITE 200
MINNEAPOLIS, MN 55414-2465

NY Lab Id No: 11647

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Metals I	
Arsenic, Total	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.8 Rev. 5.4
Lead, Total	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.8 Rev. 5.4
Metals II	
Aluminum, Total	EPA 200.8 Rev. 5.4
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Metals III	
Uranium (Mass)	EPA 200.8 Rev. 5.4
Miscellaneous	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 1613B
Perfluorinated Alkyl Acids	
Perfluorooctanesulfonic acid (PFOS)	EPA 537
Perfluorooctanoic acid (PFOA)	EPA 537

Serial No.: 59743

Pace Analytical Services, LLC
Method Detection Limit and Reporting Limit
PFAS by EPA 537M Isotope Dilution

			Water		Control limits		
Analyte	**Acronym**	**CAS#**	**MDL (ng/L)**	**PRL (ng/L)**	**Lower**	**Upper**	**RPD**
Perfluorobutanoic acid	PFBA	375-22-4	0.222	2.00	70	130	20
Perfluoropentanoic acid	PFPeA	2706-90-3	0.266	2.00	70	130	20
Perfluorohexanoic acid	PFHxA	307-24-4	0.473	2.00	70	130	20
Perfluorobutanesulfonic acid	PFBS	375-73-5	0.190	1.77	70	130	20
Perfluoroheptanoic acid	PFHpA	375-85-9	0.137	2.00	70	130	20
Perfluorohexanesulfonic acid	PFHxS	355-46-4	0.348	1.82	70	130	20
Perfluorooctanoic acid	PFOA	335-67-1	0.623	2.00	70	130	20
Perfluorononanoic acid	PFNA	375-95-1	0.635	2.00	70	130	20
Perfluorooctanesulfonic acid	PFOS	1763-23-1	0.327	1.85	70	130	20
Perfluorodecanoic acid	PFDA	335-76-2	0.860	2.00	70	130	20
Perfluoroundecanoic acid	PFUdA or PFUnA	2058-94-8	0.873	2.00	70	130	20
Perfluorodecanesulfonic acid	PFDS	335-77-3	0.527	2.00	70	130	20
Perfluorododecanoic acid	PFDoA	307-55-1	0.730	2.00	70	130	20
Perfluorotridecanoic acid	PFTrDA	72629-94-8	0.702	2.00	70	130	20
Perfluorotetradecanoic acid	PFTeDA	376-06-7	0.377	2.00	70	130	20
N-methyl perfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9	0.485	2.00	70	130	20
N-ethyl perfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6	0.918	2.00	70	130	20
Fluorotelomer sulphonic acid 4:2	4:2FTS	757124-72-4	0.347	2.00	70	130	20
Fluorotelomer sulphonic acid 6:2	6:2FTS	27619-97-2	0.930	2.00	70	130	20
Fluorotelomer sulphonic acid 8:2	8:2FTS	39108-34-4	0.763	2.00	70	130	20
Perfluorooctanesulfonamide	PFOSA	754-91-6	0.400	2.00	70	130	20
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	0.850	1.90	70	130	20
Perfluoropentanesulfonic acid	PFPeS	2706-91-4	0.184	1.88	70	130	20
Perfluorononanesulfonic acid	PFNS	68259-12-1	0.661	2.00	70	130	20

			Control limits	
			Lower	**Upper**
Perfluoro-n-[1,2-13C2]hexanoic acid	13C2_PFHxA		70	130
Perfluoro-n0-[1,2-13C2]decanoic acid	13C2_PFDA		70	130
N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid	d5-EtFOSAA		70	130