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ENTERED

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SEP 2013

Date: SEP 16 2013
Refer To: EP2013-0184

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Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Submittal of the Well Reconfiguration of CdV-16-4ip Field Summary Report

Dear Mr. Kieling:

Enclosed please find two hard copies with electronic files of the well reconfiguration of CdV-16-4ip field summary report.

If you have any questions, please contact John McCann at (505) 665-1091 (jmccann@lanl.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@nnsa.doe.gov).

Sincerely,

Jeff Mousseau, Associate Director
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Sincerely,

Peter Maggiore, Assistant Manager
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36007

JM/PM/DM/JM:vt

Enclosures: Two hard copies with electronic files – Well Reconfiguration of CdV-16-4ip Field Summary Report (LA-UR-13-26926)

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LA-UR-13-26926
September 2013
EP2013-0184

Well Reconfiguration of CdV-16-4ip Field Summary Report

Los Alamos
NATIONAL LABORATORY

Prepared by the Environmental Programs Directorate

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EP2013-0184

Well Reconfiguration of CdV-16-4ip Field Summary Report

September 2013

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Acronyms and Abbreviations

amsl	above mean sea level
bgs	below ground surface
Consent Order	Compliance Order on Consent
GGRL	Geochemistry and Geomaterials Research Laboratory (LANL)
gpm	gallons per minute
hp	horsepower
I.D.	inside diameter
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
NMED	New Mexico Environment Department
O.D.	outside diameter
PVC	polyvinyl chloride
RPF	Records Processing Facility
SOP	standard operating procedure
TA	technical area
WCSF	waste characterization strategy form

1.0 INTRODUCTION

This report provides a summary of field activities associated with the reconfiguration of monitoring well CdV-16-4ip at Los Alamos National Laboratory (LANL or the Laboratory). The report is written in accordance with the requirements for well completion reports in Section IV.A.3.e.iv of the March 1, 2005 (revised 2012), Compliance Order on Consent (Consent Order). The plan for reconfiguration of the well was presented in the "Work Plan to Reconfigure Well CdV-16-4ip" (LANL 2012, 232222) that was approved by the New Mexico Environment Department (NMED) in its approval with modifications letter dated December 21, 2012 (NMED 2012, 521747).

The primary objective of the work was to reconfigure CdV-16-4ip from a dual screen well into a single-screen well equipped for sampling.

Field activities for the reconfiguration of CdV-16-4ip occurred between June 21 and July 8, 2013. The field activities performed as part of the reconfiguration included removing the single set packers that isolate the screen intervals, abandoning the lower well screen, limited redeveloping the upper screen, purging and sampling, and installing a dedicated sampling system.

The information presented in this report was compiled from field reports and daily activity summaries. Records, including field reports, field logs, and survey information, are on file at the Laboratory's Records Processing Facility (RPF). This report contains brief descriptions of field activities along with supporting figures and tables associated with the well reconfiguration.

2.0 WELL RECONFIGURATION

Well CdV-16-4ip is located on the southern rim of Cañon de Valle near the Burning Ground in the Laboratory's Technical Area 16 (TA-16) in Los Alamos County, New Mexico (Figure 2.0-1). CdV-16-4ip was installed as a pumping test well to be used in extended pumping tests to assess the hydrogeologic properties of the perched-intermediate zone beneath Consolidated Unit 16-021(c)-99 (also known as the 260 Outfall) at TA-16 (LANL 2012, 213573). The borehole was drilled using standard air-rotary drilling methods. The CdV-16-4ip borehole was advanced to a total depth of 1153.7 ft below ground surface (bgs) using a combination of dual-rotary casing advance and open-hole drilling methods (LANL 2011, 111608). Pertinent well information is as follows:

- 5-in.–inside diameter (I.D.) stainless-steel casing
- Screen 1, 815.6–879.2 ft bgs (rod-based wire-wrapped screen)
- Screen 2, 1110.0–1141.1 ft bgs (rod-based wire-wrapped screen)
- Depth to water for the upper screen is 808 ft bgs

Figure 2.0-2 presents the CdV-16-4ip monitoring well construction and disposition before reconfiguration activities started.

Pumping tests conducted on the upper screen indicate the well is tapping a permeable region within the upper-perched saturated zone with a limited areal extent. During the pumping test, this zone appeared to be recharged by groundwater flowing in the perched zone at a rate of 4.8 gallons per minute (gpm) (LANL 2011, 203711).

2.1 Single Set Packer Removal

Two detachable single set packers had been installed between the screen intervals to prevent cross-flow from screen 1 to screen 2 at depths of 923 ft bgs and 990 ft bgs, respectively. The packers were in place and inflated as required. An overshot tool and BQ-size core pipe were used to remove the packers. (Note: BQ is a specific core rod diameter.) The upper packer was removed from the well late in the day on June 21, 2013, and the lower packer was removed on June 22, 2013. The lower packer was slow to deflate and took longer to remove than the upper packer.

2.2 Lower Well Screen Abandonment

Following packer removals, a hybrid tremie pipe consisting of 140 ft of 2-in. polyvinyl chloride (PVC) pipe on the bottom and 980 ft of steel BQ-size core pipe (above the PVC) was installed in the well on June 22, 2013. A cross-over coupling was used to join the compositionally different pipes. Backfilling the lower portion of the well with 10/20 filter-grade sand began on June 22, 2013. Difficulties associated with measuring the backfill were encountered and led to the removal of the tremie pipe on June 23, 2013. The lowermost 90 ft of PVC was found to be absent. Two stainless-steel centralizers had been installed on the PVC section of the tremie pipe. It is believed that the upper centralizer made contact with one of the upper well screen's weld rings and caused the separation. The separated section of PVC pipe was the cause of difficulties in making backfill measurements.

The tremie pipe was reinstalled in the well in a similar configuration with 140 ft of PVC and 920 ft of BQ-size core pipe. A 45-degree bevel was cut on the leading edge of the PVC, and no centralizers were installed on the PVC section of the tremie pipe. The 10/20 filter-grade sand was installed to a depth of 1088.8 ft bgs. Then, 20/40 filter-grade sand was installed to a depth of 1072.5 ft bgs. A total of 100 gal. of neat cement was emplaced above the 20/40 sand by pumping it through the tremie pipe. A total of 27 gal. of chase water was pumped through the tremie pipe to clear the upper (steel) portion of the pipe. The volume of chase water was determined to be the volume of the tremie pipe over the distance between the top of cement target (975 ft bgs) and the measured static water level in the well (817.9 ft bgs). The volume of chase water used ensures the PVC is full of cement. The addition of lower sand backfill and the installation of the cement interval took place on June 23, 2013.

The technical approach for the cementing work at well CdV-16-4ip included cementing the lower PVC section of the tremie pipe in place. This approach resulted in the least possible amount of time the well screens were in open communication. This approach also minimized the upper screen's exposure to fugitive cement grout because the tremie pipe had not been separated and removed until the following work shift.

The cement was allowed to cure for 24 h before the tremie pipe was rotated clockwise to cause the PVC to fail and break off. A total of 60 ft of PVC was recovered after the tremie pipe was removed, and 80 ft of PVC remained embedded in the cement. The tremie pipe was broken off, and the top of the cement interval was measured at 977.2 ft bgs on June 24, 2013.

A submersible pump was installed in the well to purge any cement-impacted water before the upper sand backfill was emplaced. Pumping from immediately above the cement seal was conducted for 25 min at 10.8 gpm. Approximately 270 gal. was purged before removing the pump. One sample was collected for analysis at LANL's Geochemistry and Geomaterials Research Laboratory (GGRL). Table 2.2-1 presents a summary of samples collected during the well reconfiguration at CdV-16-4ip. Appendix A presents analytical results for the samples collected.

The tremie pipe was installed in the well and 10/20 filter-grade sand was emplaced from 977.2 to 902.4 ft bgs. A k-packer constructed of stainless-steel and Viton was installed above the upper sand backfill. The top of the k-packer was measured at 901.2 ft bgs.

The cement was mixed and the sand backfill was emplaced with potable water from the Los Alamos County municipal supply source near the Los Alamos County Eco Station on East Jemez Road.

Well reconfiguration details and the final disposition of CdV-16-4ip are presented in Figure 2.2.1. Backfill material volumes for the respective intervals are presented in Table 2.2-2.

The duration between packer deflation and cement installation was 1875 min. Previous cross-flow estimates between the screens at CdV-16-4ip were on the order of 4 gpm. This estimated volume would result in a total cross-flow of 7500 gal. during reconfiguration activities and most likely represents an overestimation of the cross-flow volume, given the difficulties encountered when the lower packer was removed.

2.3 Redevelopment, Purging, and Sampling Activities

Following reconfiguration, screen 1 was redeveloped between June 27 and June 28, 2013, per the approved work plan (LANL 2012, 232222; NMED 2012, 521747). Redevelopment activities consisted of swabbing and bailing and then pumping throughout the screen interval with a submersible pump.

A 4.25-in.–outside diameter (O.D.), 1-in.-thick nylon disc attached to a weighted steel rod was used for swabbing. The wireline conveyed tool was drawn repeatedly across the screened interval, causing a surging action across the screen interval and filter pack. A 4.0-in.- O.D. by 21.0-ft-long carbon steel bailer with a total capacity of 12 gal. was used for bailing. The bailer was lowered by wireline and repeatedly filled, withdrawn from the well, and emptied into a container. Approximately 117 gal. of groundwater was removed during bailing activities. Swabbing and bailing took approximately 2 h on June 27, 2013. Water-quality parameters were not recorded during swabbing and bailing.

After swabbing and bailing, a 5 horsepower (hp) submersible pump inside a pump shroud was installed in the well. Pump development at the retained screen 1 interval occurred over 8 h. The pump was raised throughout the screen interval from bottom to top in 2-ft increments for 10- to 15-min intervals between the screen bottom at 879 and 837 ft bgs. The pumping level was encountered at 837 ft bgs, and no discrete pumping was conducted above that depth. The pump was repositioned in the sump space at 897 ft bgs, and purging continued for the remainder of the 8-h pumping duration. Two samples were collected for analysis by GGRL. Table 2.2-1 presents a summary of samples collected during the well reconfiguration at CdV-16-4ip. Appendix A presents analytical results for the samples collected.

Table 2.3-1 presents a summary of volumes purged and water-quality parameters collected during the pump development. Approximately 5052 gal. of groundwater was purged with the submersible pump during pump development activities.

3.0 DEDICATED SAMPLING SYSTEM INSTALLATION

The dedicated sampling system for CdV-16-4ip was installed on June 29 and June 30, 2013. The pumping system utilizes an environmentally retrofitted 4-in. 5 hp Grundfos submersible pump installed in a stainless-steel pump shroud. The bottom of the pump shroud (the pump intake) is set below the screened interval at 890.0 ft bgs. The pump column is constructed of 1-in. threaded/coupled, schedule 80, passivated stainless-steel pipe. A weep hole was installed at the bottom of the uppermost

pipe joint to protect the pump column from freezing. To measure water levels in the well, two 1-in.-I.D. schedule 80 flush threaded PVC pipes were installed to sufficient depth to set a dedicated transducer and to provide access for manual water-level measurements. The PVC transducer tubes are equipped with 0.75-ft sections of 0.010-in. slot screen with a threaded end cap on the bottom of each tube. An In-Situ Level Troll 500 100-psig transducer was installed in one of the PVC tubes to monitor the water level in the well's screened interval.

Details of the sampling system for CdV-16-4ip are provided in Figures 3.0-1 and 3.0-2.

4.0 DEVIATIONS FROM WORK PLAN

The separation of the bottom section of the tremie pipe during the initial installation and subsequent in situ abandonment of 90 ft of PVC in the bottom of the well were not planned. Because PVC is inert and the pipe is located below the cement seal, the separation will not result in any undesirable effects.

The in situ abandonment of the 80-ft section of PVC tremie pipe within the cement seal was not part of the NMED-approved work plan.

Redevelopment activities did not include jetting the retained well screen interval. While NMED's approval with modifications letter, dated December 21, 2012 (LANL 2012, 232222; NMED 2012, 521747), directed the jetting activity during redevelopment, it was decided, with NMED's concurrence, that jetting was unnecessary, given the age of the well and its good hydraulic performance (Dale 2013, 249094).

5.0 WASTE MANAGEMENT

All investigation-derived waste (IDW) generated during well reconfiguration activities will be managed in accordance with the applicable standard operating procedures (SOP). The SOP incorporates the requirements of all applicable U.S. Environmental Protection Agency and NMED regulations, U.S. Department of Energy orders, and Laboratory requirements. The SOP applicable to the characterization and management of IDW is

- SOP-10021, Characterization and Management of Environmental Program Waste.

A waste characterization strategy form (WCSF) has been prepared and approved per the requirements of SOP-10021. The WCSF provides detailed information on IDW characterization methods, management, containerization, and potential volumes.

Fluids (i.e., redevelopment and decontamination waters) and contact waste (e.g., gloves, paper towels, plastic, and/or glass sample bottles) were the primary waste streams generated during well reconfiguration activities. The fluids produced will be sampled and analyzed for the suite of constituents listed in the WCSF.

Fluids produced during well reconfiguration activities were containerized, and the fluids will be sampled and evaluated for compliance with the New Mexico Water Quality Control Commission Regulation 3103 groundwater standards and applicable Resource Conservation and Recovery Act regulatory limits before any release of water occurs. Decisions regarding the release of water will be made in accordance with the 2006 notice of intent decision tree for drilling, development, rehabilitation, and sampling purge water. The decontamination water, contact waste, and any other IDW will be managed in accordance with the approved WCSF.

6.0 REFERENCES AND MAP DATA SOURCES

6.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's RPF and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Dale, M., May 1, 2013. RE: CdV-16-4ip development protocol. E-mail message to M. Everett (LANL) from M. Dale (NMED), Santa Fe, New Mexico. (Dale 2013, 249094)

LANL (Los Alamos National Laboratory), January 2011. "Completion Report for Intermediate Well CdV-16-4ip," Los Alamos National Laboratory document LA-UR-11-0187, Los Alamos, New Mexico. (LANL 2011, 111608)

LANL (Los Alamos National Laboratory), June 2011. "Hydrologic Testing Report for Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-11-3072, Los Alamos, New Mexico. (LANL 2011, 203711)

LANL (Los Alamos National Laboratory), March 2012. "Technical Area 16 Well Network Evaluation and Recommendations," Los Alamos National Laboratory document LA-UR-12-1082, Los Alamos, New Mexico. (LANL 2012, 213573)

LANL (Los Alamos National Laboratory), November 2012. "Work Plan to Reconfigure Well CdV-16-4ip," Los Alamos National Laboratory document LA-UR-12-26150, Los Alamos, New Mexico. (LANL 2012, 232222)

NMED (New Mexico Environment Department), December 21, 2012. "Approval with Modifications, Work Plan to Reconfigure Well CdV-16-4ip," New Mexico Environment Department letter to P. Maggiore (DOE-LASO) and J.D. Mousseau (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2012, 521747)

6.2 Map Data Sources

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0109; 14 March 2012.

Hypsography, 100 and 20 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

Surface Drainages, 1991; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, ER2002-0591; 1:24,000 Scale Data; Unknown publication date.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Division; 4 December 2009.

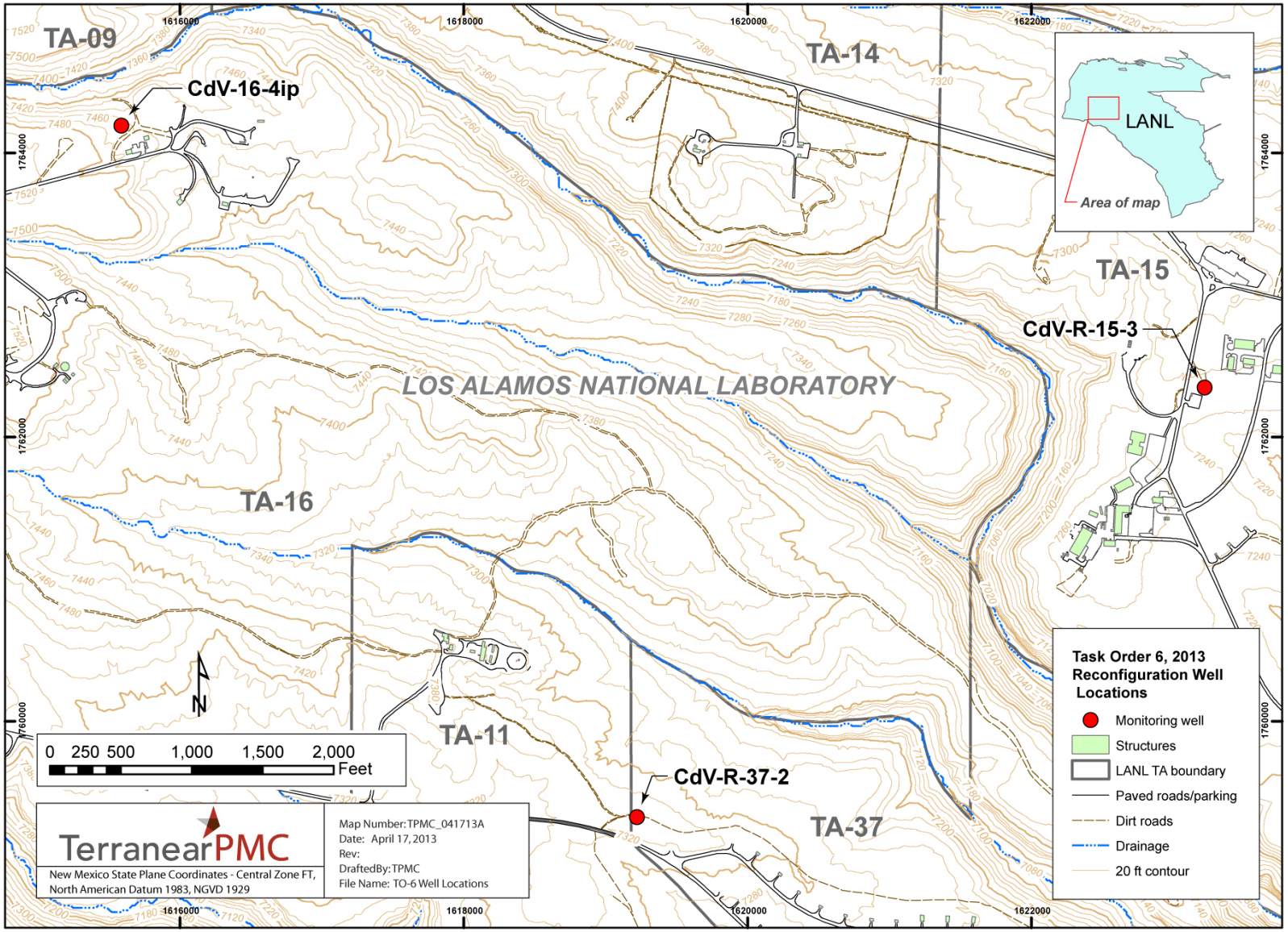

Figure 2.0-1 Location of well CdV-16-4ip

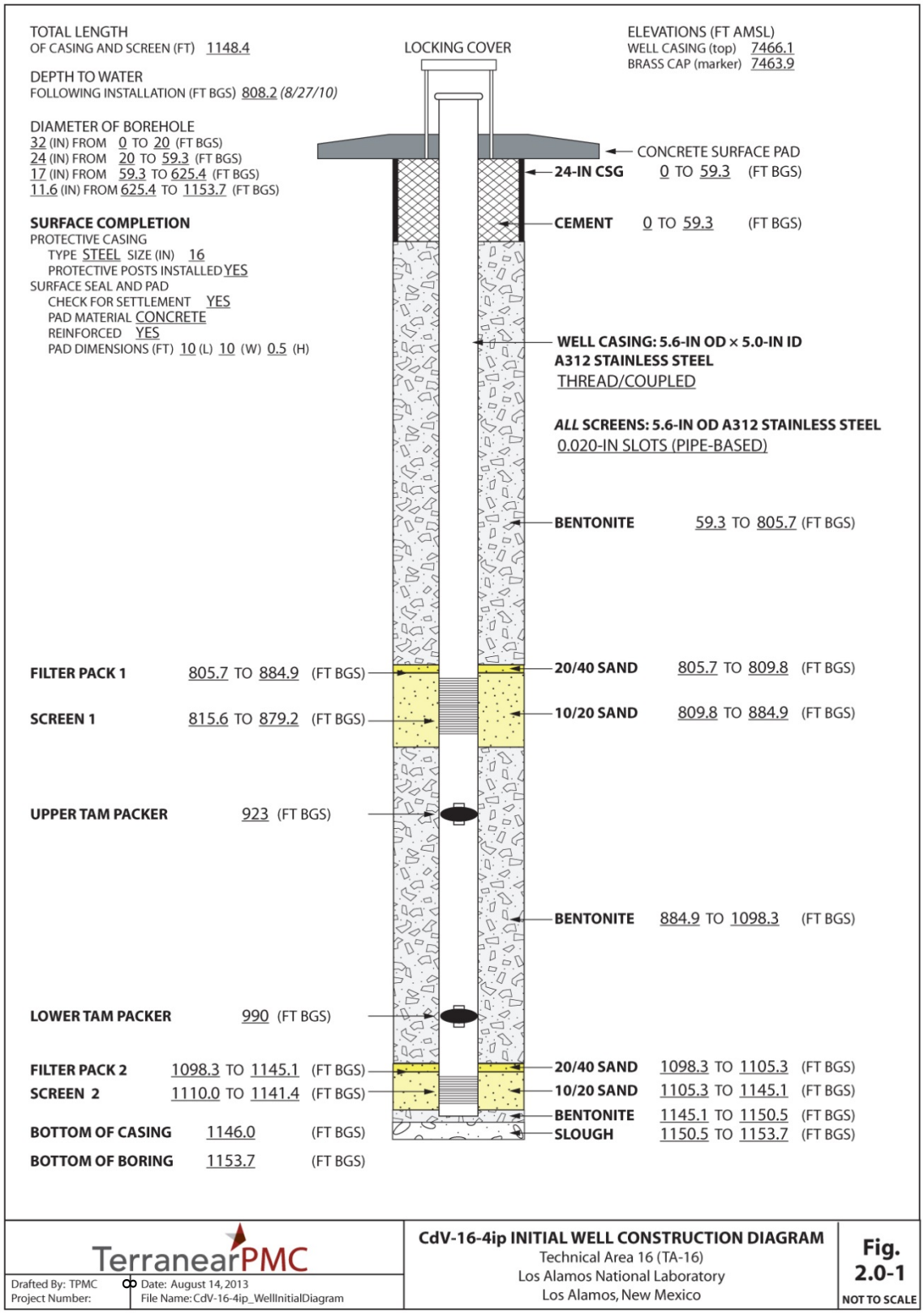

Figure 2.0-2 Initial well construction diagram of monitoring well CdV-16-4ip

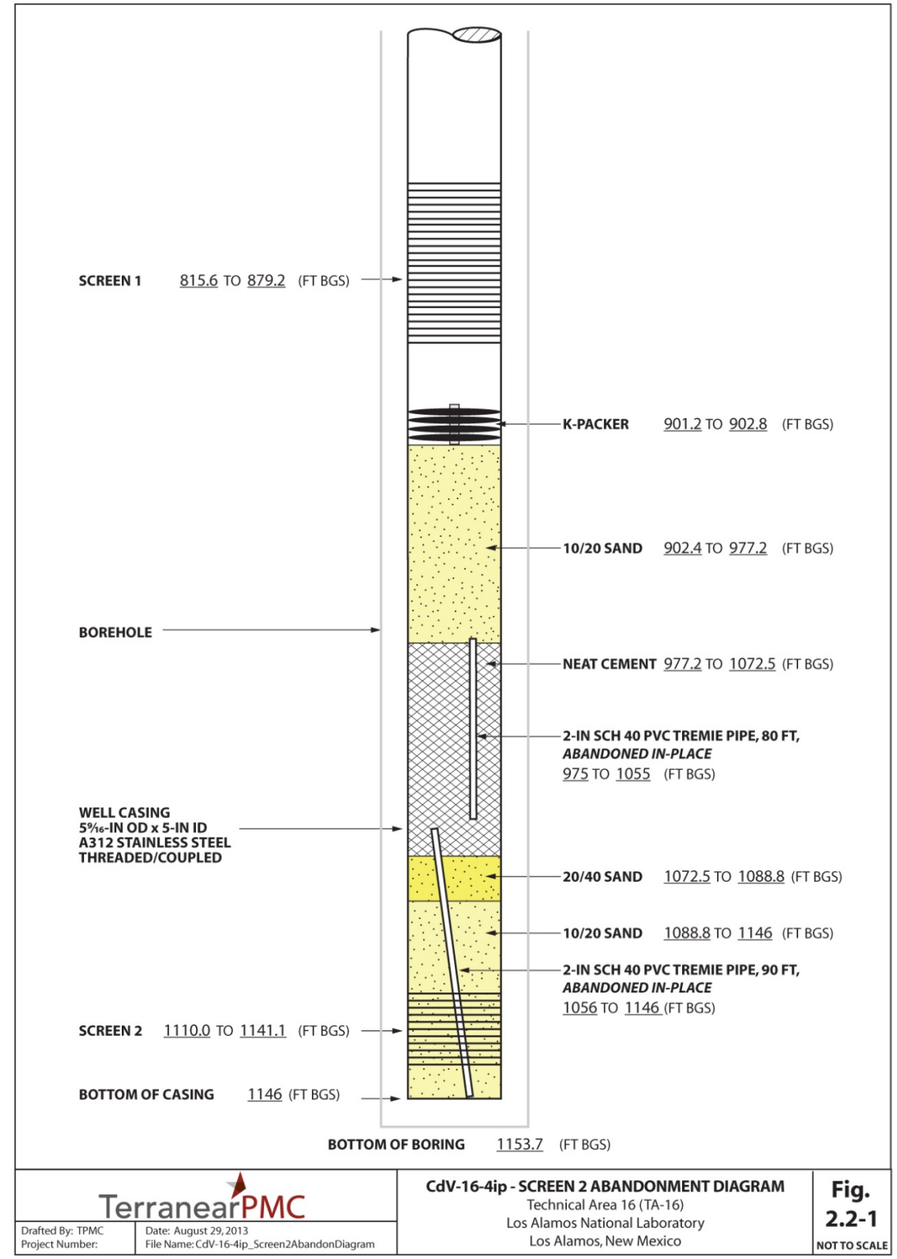

Figure 2.2-1 Backfill diagram of monitoring well CdV-16-4ip

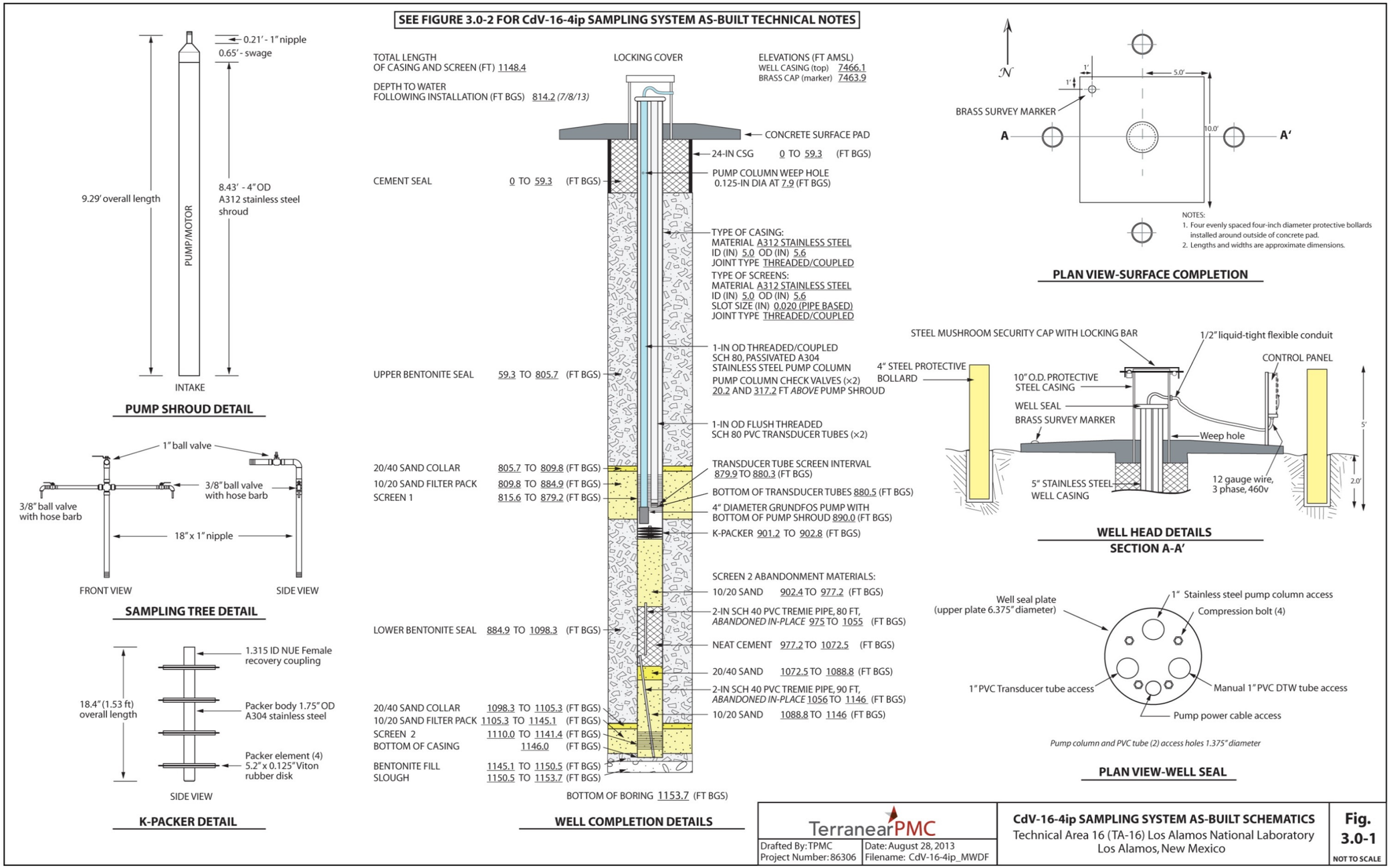

Figure 3.0-1 As-built schematics of monitoring well CdV-16-4ip sampling system

CdV-16-4ip SAMPLING SYSTEM AS-BUILT TECHNICAL NOTES:

SURVEY INFORMATION*

Brass Marker

Northing: 1764195.74 ft
Easting: 1615587.07 ft
Elevation: 7463.91 ft AMSL

Well Casing (top of stainless steel)

Northing: 1764190.43 ft
Easting: 1615590.17 ft
Elevation: 7466.13 ft AMSL

SAMPLING SYSTEM MATERIALS AND PRODUCT LIST

Pump: Grundfos, 10S50-930CBM, environmental retrofit

Pump motor: Franklin Electric, 5HP, 3-phase, 460V

Motor cable: 10g, 3 lead with ground, double jacket

Discharge column: 1-in, threaded and coupled, sch 80, pickled and passivated A304 stainless steel

Check valves (x2): Flomatic, 1-in female x female, 303 stainless steel, mod. 4201LSS2, 400 psi

Couplings: A304 stainless steel deep well couplings

Gauge tubes (x2): 1-in, flush-threaded, sch 80 PVC, each with 0.75-ft (long), 0.010-in slot screens, female bottom caps

Banding: 5/8-in or 3/4-in 201 stainless steel with 201 stainless steel buckles

Well seal: Maas Midwest Manufacturing 5.62-in dia top plate x 1/2 inch steel, 4 access holes, custom

Thread compound: Jet Lube, V2

Sampling Tree: A304 sch 40 stainless steel 1-in nipples, elbows, cross, bushings, hose barbs, and Apollo ball valves 1-in (76-105-01A) and (x2) 3/8-in (76-102-01A)

AQUIFER TESTING

Step Drawdown and Constant Rate Pumping Tests

Specific Capacity: 0.16 gpm/ft
Apparant Recharge Rate: 4.8 gpm
Performed on: 02/24–03/20/2011

DEDICATED SAMPLING SYSTEM

Pump (Shrouded)

Make: Grundfos
Model: 10S50-930CBM
S/N: B91126364-P11143213
Environmental retrofit

Motor

Make: Franklin Electric
Model: 234327 8602
S/N: 13C14-27-00805C 337610908
5 hp, 3-phase, 460V

Pump Shroud

A312 stainless steel, schd. 5 with schd. 40 pipe connections, 4-in male and female flush threaded ASTM F-480-88A threads, Pumps of Oklahoma custom

Pump Column

1-in. threaded/coupled schd. 80, pickled and passivated A304 stainless steel tubing

Transducer Tubes

2 × 1-in. flush threaded schd. 80 PVC tubing, each with 0.75-ft (long), 0.010-in. slot screens located above pump shroud

Transducer

Make: In-Situ, Inc.
Model: Level TROLL 500
100 psig range (vented)
S/N: 344782

NOTES:

* Coordinates based on New Mexico State Plane Grid Coordinates, Central Zone (NAD83); Elevation expressed in feet amsl using the National Geodetic Vertical Datum of 1929.

TerranearPMC	CdV-16-4ip SAMPLING SYSTEM AS-BUILT TECHNICAL NOTES	Fig. 3.0-2
Drafted By: TPMC Project Number: 86306	Date: August 28, 2013 Filename: CdV-16-4ip_SampSysTechnicalNotes	Technical Arera 16 (TA-16) Los Alamos National Laboratory Los Alamos, New Mexico	NOT TO SCALE

Figure 3.0-2 Technical notes for as-built sampling system for monitoring well CdV-16-4ip

Table 2.2-1
Summary of Groundwater Samples Collected during Reconfiguration of Well CdV-16-4ip

Location ID	Sample ID	Date/Time Collected	Screen (1 = Upper, 2 = Lower)	Analysis*
Chase Water Purge after Cementing				
CdV-16-4ip	CAWA-13-36251	6/26/13; 1125h	Screen 1	MET
CdV-16-4ip	CAWA-13-36246	6/26/13; 1125h	Screen 1	HEXP, ALK, ANIONS, TOC
4-h Redevelopment Samples (843 ft bgs)				
CdV-16-4ip	CAWA-13-36252	6/28/13; 1235h	Screen 1	MET
CdV-16-4ip	CAWA-13-36247	6/28/13; 1235h	Screen 1	HEXP, ALK, ANIONS, TOC
8-h Redevelopment Samples (897.13 ft bgs)				
CdV-16-4ip	CAWA-13-36253	6/28/13; 1845h	Screen 1	MET
CdV-16-4ip	CAWA-13-36248	6/28/13; 1845h	Screen 1	HEXP, ALK, ANIONS, TOC
Sampling System Rinsate Samples (Equipment Blank)				
CdV-16-4ip	CAWA-13-36256	6/29/13; 0930h	1 SS Drop Pipe	VOC, SVOC
CdV-16-4ip	CAWA-13-36257	6/29/13; 0955h	Pump Shroud	VOC, SVOC
CdV-16-4ip	CAWA-13-36258	6/29/13; 1020h	Pump & Motor	VOC, SVOC
CdV-16-4ip	CAWA-13-36259	8/29/13; 1621h	First Water	VOC, SVOC

* Analysis abbreviations: ALK = alkalinity, ANIONS = positive (+) ions, HEXP = high explosives, MET = metals, SVOC = semivolatile organics, TOC = total organic carbon, VOC = volatile organics.

Table 2.2-2
CdV-16-4ip Monitoring Well Lower Well Screen Abandonment Materials

Material	Interval (ft bgs)	Volume (ft^3)	Calculated Volume (ft^3)
Lower 10/20 filter-grade sand interval	1088.8–1146	6.5*	7.8
Lower 20/40 filter-grade sand interval	1072.5–1088.8	1.8*	2.2
Neat cement interval	977.2–1072.5	13.3	13.0
Upper 10/20 filter-grade sand interval	902.4–977.2	10.3	10.2

* Lower sand interval volume(s) less than calculated volume(s) because of existing 2.2 ft of material measured in sump before backfilling started and the broken piece of 2-in. PVC, which occupies approximately 0.72 ft^3.

Table 2.3-1
Purge Volumes and Field Parameters during Well Redevelopment at CdV-16-4ip

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/l)	Oxidation-Reduction Potential (mV)	Eh (mV)	Specific Conductivity (µS/cm)	Turbidity (NTU)	Purge Volume between Samples (gal.)	Cumulative Purge Volume (gal.)
Well Redevelopment									
	5.70	13.00	9.50	246.0	454.9	0.156	8.1	0	0
	6.05	13.02	8.52	219.1	428.0	0.133	3.1	143	143
	6.52	13.35	7.15	191.9	400.8	0.124	1.9	143	286
	6.56	13.21	7.65	183.6	392.5	0.122	2.2	142	428
	6.89	14.45	6.90	173.7	382.6	0.124	4.8	177	605
	6.30	13.61	7.24	202.2	411.1	0.120	2.5	144	749
	6.32	13.33	7.34	209.7	418.6	0.120	1.6	145	894
	6.41	13.61	7.13	191.9	400.8	0.121	2.8	146	1040
	6.55	13.60	7.32	200.0	408.9	0.120	1.5	144	1184
	6.79	13.74	7.08	183.5	392.4	0.119	1.6	93	1277
	6.72	13.74	7.15	185.7	394.6	0.120	1.6	93	1370
	6.88	14.32	7.43	176.6	385.5	0.120	1.6	93	1463
	6.35	13.29	7.92	193.1	402.0	0.120	1.5	253	1716
	6.57	13.39	7.64	184.1	393.0	0.120	1.7	95	1811
	6.77	13.91	7.51	177.2	386.1	0.120	1.7	95	1906
	6.88	14.85	7.45	173.4	382.3	0.120	2.2	95	2001
	6.50	13.98	7.40	186.8	395.7	0.119	1.9	95	2096
6/28/13	6.63	14.19	7.39	172.3	381.2	0.119	2.5	95	2191
	6.60	14.16	7.41	175.8	384.7	0.119	3.2	95	2286
	6.38	13.74	7.29	201.9	410.8	0.119	4.5	95	2381
	6.39	13.90	6.92	213.6	422.5	0.119	3.2	95	2476
	5.95	13.63	7.48	234.4	443.3	0.119	3.7	144	2620
	5.81	14.27	7.30	255.2	464.1	0.120	1.4	375	2995
	5.79	12.94	8.07	273.0	481.9	0.128	62.7	145	3140
	6.36	12.58	7.72	250.1	459.0	0.118	1.6	350	3490
	6.49	12.74	7.62	246.6	455.5	0.118	1.5	145	3635
	6.55	12.76	7.60	244.0	452.9	0.118	1.5	144	3779
	6.63	12.62	7.25	232.8	441.7	0.119	1.4	196	3975
	6.77	12.68	7.54	214.0	422.9	0.119	3.2	196	4171
	6.69	12.21	7.49	221.0	429.9	0.119	2.2	158	4329
	6.80	12.30	7.50	186.1	395.0	0.118	1.0	145	4474
	6.80	12.25	7.49	169.9	378.8	0.118	0.9	144	4618
	6.88	12.35	7.41	167.2	376.1	0.118	1.0	145	4763
	6.86	12.19	7.42	169.1	378.0	0.119	1.1	144	4907
	6.86	12.17	7.43	171.4	380.3	0.118	1.3	145	5052

Appendix A

CdV-16-4ip Indicator Suite and Dedicated Sampling System Equipment Blank Analytical Results

Table A-1
Indicator Suite Analytical Results for Well CdV-16-4ip

Parameter	Analytical Method	CAWA-13-36246 06/26/2013 11:25	CAWA-13-36251 06/26/2013 11:25	CAWA-13-36247 06/28/2013 12:35	CAWA-13-36252 06/28/2013 12:35	CAWA-13-36248 06/28/2013 18:45	CAWA-13-36253 06/28/2013 18:45
Acidity or Alkalinity of a solution	EPA:150.1	9.01 SU	—*	7.2 SU	—	6.94 SU	—
Alkalinity-CO_3	EPA:310.1	22.3 mg/L	—	0.8 mg/L (U)	—	0.8 mg/L (U)	—
Alkalinity-CO_3+HCO_3	EPA:310.1	74.4 mg/L	—	67.5 mg/L	—	63.9 mg/L	—
Aluminum	EPA:200.7	—	40.3 µg/L	—	17.2 µg/L	—	64.9 µg/L
Antimony	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Arsenic	EPA:200.8	—	0.79 µg/L	—	0.6 µg/L	—	0.53 µg/L
Barium	EPA:200.7	—	3.42 µg/L	—	6.16 µg/L	—	4.19 µg/L
Beryllium	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Boron	EPA:200.7	—	75.9 µg/L	—	111 µg/L	—	83.5 µg/L
Bromide	EPA:300.0	0.01 mg/L (U)	—	0.01 mg/L (U)	—	0.01 mg/L (U)	—
Cadmium	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Calcium	EPA:200.7	—	10.8 mg/L	—	22.8 mg/L	—	10.9 mg/L
Cesium	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Chloride	EPA:300.0	4.05 mg/L	—	4.12 mg/L	—	4.11 mg/L	—
Chromium	EPA:200.8	—	9.14 µg/L	—	4.72 µg/L	—	4.47 µg/L
Cobalt	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Copper	EPA:200.8	—	7.49 µg/L	—	1.55 µg/L	—	1 µg/L (U)
Fluoride	EPA:300.0	0.113 mg/L	—	0.133 mg/L	—	0.115 mg/L	—
Iron	EPA:200.7	—	193 µg/L	—	210 µg/L	—	152 µg/L
Lead	EPA:200.8	—	0.2 µg/L (U)	—	0.2 µg/L (U)	—	0.2 µg/L (U)
Lithium	EPA:200.7	—	7.68 µg/L	—	10.6 µg/L	—	7.38 µg/L
Magnesium	EPA:200.7	—	3.08 mg/L	—	2.82 mg/L	—	3.1 mg/L
Manganese	EPA:200.7	—	9.38 µg/L	—	2.91 µg/L	—	8.99 µg/L

Table A-1 (continued)

Parameter	Analytical Method	CAWA-13-36246 06/26/2013 11:25	CAWA-13-36251 06/26/2013 11:25	CAWA-13-36247 06/28/2013 12:35	CAWA-13-36252 06/28/2013 12:35	CAWA-13-36248 06/28/2013 18:45	CAWA-13-36253 06/28/2013 18:45
Mercury	EPA:200.8	—	0.05 µg/L (U)	—	0.05 µg/L (U)	—	0.05 µg/L (U)
Molybdenum	EPA:200.8	—	1.61 µg/L	—	1 µg/L (U)	—	1 µg/L (U)
Nickel	EPA:200.8	—	3.5 µg/L	—	1.95 µg/L	—	2.11 µg/L
Nitrate	EPA:300.0	5.08 mg/L	—	5.23 mg/L	—	5.11 mg/L	—
Nitrite	EPA:300.0	0.01 mg/L (U)	—	0.01 mg/L (U)	—	0.01 mg/L (U)	—
Oxalate	EPA:300.0	0.01 mg/L (U)	—	0.01 mg/L (U)	—	0.01 mg/L (U)	—
Phosphorus, Orthophosphate (Expressed as PO_4)	EPA:300.0	0.01 mg/L (U)	—	0.01 mg/L (U)	—	0.01 mg/L (U)	—
Potassium	EPA:200.7	—	1.13 mg/L	—	6.05 mg/L	—	1.14 mg/L
Selenium	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Silicon Dioxide	EPA:200.7	—	64 mg/L	—	62.5 mg/L	—	64.3 mg/L
Silver	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Sodium	EPA:200.7	—	10.1 mg/L	—	11.2 mg/L	—	10.1 mg/L
Strontium	EPA:200.7	—	61.5 µg/L	—	88.2 µg/L	—	55.4 µg/L
Sulfate	EPA:300.0	20.6 mg/L	—	3.93 mg/L	—	3.78 mg/L	—
Thallium	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Tin	EPA:200.8	—	1 µg/L (U)	—	1 µg/L (U)	—	1 µg/L (U)
Titanium	EPA:200.7	—	2 µg/L (U)	—	2 µg/L (U)	—	2 µg/L (U)
Total Organic Carbon	SW-846:9060	0.926 mg/L	—	0.572 mg/L	—	0.613 mg/L	—
Uranium	EPA:200.8	—	0.5 µg/L	—	0.42 µg/L	—	0.44 µg/L
Vanadium	EPA:200.8	—	2.82 µg/L	—	2.92 µg/L	—	3.03 µg/L
Zinc	EPA:200.7	—	1.75 µg/L	—	1.98 µg/L	—	4.11 µg/L
2,4-Diamino-6-nitrotoluene	SW-846:8321A_MOD	2.84 µg/L (U)	—	2.6 µg/L (U)	—	2.66 µg/L (U)	—
2,6-Diamino-4-nitrotoluene	SW-846:8321A_MOD	2.84 µg/L (U)	—	2.6 µg/L (U)	—	2.66 µg/L (U)	—
3,5-Dinitroaniline	SW-846:8321A_MOD	1.14 µg/L (U)	—	1.04 µg/L (U)	—	1.06 µg/L (U)	—
Amino-2,6-dinitrotoluene[4-]	SW-846:8321A_MOD	2.08 µg/L	—	2.06 µg/L	—	1.97 µg/L	—

Table A-1 (continued)

Parameter	Analytical Method	CAWA-13-36246 06/26/2013 11:25	CAWA-13-36251 06/26/2013 11:25	CAWA-13-36247 06/28/2013 12:35	CAWA-13-36252 06/28/2013 12:35	CAWA-13-36248 06/28/2013 18:45	CAWA-13-36253 06/28/2013 18:45
Amino-4,6-dinitrotoluene[2-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Dinitrobenzene[1,3-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Dinitrotoluene[2,4-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Dinitrotoluene[2,6-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Nitrobenzene	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Nitrotoluene[2-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.0988 µg/L (J)	—	0.266 µg/L (U)	—
Nitrotoluene[3-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Nitrotoluene[4-]	SW-846:8321A_MOD	0.568 µg/L (U)	—	0.521 µg/L (U)	—	0.532 µg/L (U)	—
PETN	SW-846:8321A_MOD	0.568 µg/L (U)	—	0.521 µg/L (U)	—	0.532 µg/L (U)	—
HMX	SW-846:8321A_MOD	7.28 µg/L	—	7.05 µg/L	—	7.35 µg/L	—
RDX	SW-846:8321A_MOD	139 µg/L	—	172 µg/L	—	155 µg/L	—
TATB	SW-846:8321A_MOD	1.14 µg/L (U)	—	1.04 µg/L (U)	—	1.06 µg/L (U)	—
Tetryl	SW-846:8321A_MOD	0.568 µg/L (U)	—	0.521 µg/L (U)	—	0.532 µg/L (U)	—
Trinitrobenzene[1,3,5-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Trinitrotoluene[2,4,6-]	SW-846:8321A_MOD	0.284 µg/L (U)	—	0.26 µg/L (U)	—	0.266 µg/L (U)	—
Tris (o-cresyl) phosphate	SW-846:8321A_MOD	1.14 µg/L (U)	—	1.04 µg/L (U)	—	1.06 µg/L (U)	—

Notes: SU = Standard unit. U = The analyte was analyzed for but was not detected. J = The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.

*— = Not analyzed.

Table A-2
Dedicated Sampling System Equipment Blank Analytical Results for Well CdV-16-4ip

Parameter	Analytical Method	CAWA-13-36257 06/29/2013 9:55	CAWA-13-36256 06/29/2013 9:30	CAWA-13-36258 06/29/2013 10:20
Acenaphthene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Acenaphthylene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Acetone	SW-846:8260B	10 µg/L (U)	10 µg/L (U)	10 µg/L (U)
Acetonitrile	SW-846:8260B	25 µg/L (U)	25 µg/L (U)	25 µg/L (U)
Acrolein	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Acrylonitrile	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Aniline	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Anthracene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Atrazine	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Azobenzene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Benzene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Benzidine	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Benzo(a)anthracene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Benzo(a)pyrene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Benzo(b)fluoranthene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Benzo(g,h,i)perylene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Benzo(k)fluoranthene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Benzoic Acid	SW-846:8270C	20.8 µg/L (U)	20 µg/L (U)	20.4 µg/L (U)
Benzyl Alcohol	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Bis(2-chloroethoxy)methane	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Bis(2-chloroethyl)ether	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Bis(2-ethylhexyl)phthalate	SW-846:8270C	10.4 µg/L (U)	4.79 µg/L (J)	3.35 µg/L (J)
Bromobenzene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Bromochloromethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Bromodichloromethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Bromoform	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Bromomethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Bromophenyl-phenylether[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Butanol[1-]	SW-846:8260B	50 µg/L (U)	50 µg/L (U)	50 µg/L (U)
Butanone[2-]	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Butylbenzene[n-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Butylbenzene[sec-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Butylbenzene[tert-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Butylbenzylphthalate	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)

Table A-2 (continued)

Parameter	Analytical Method	CAWA-13-36257 06/29/2013 9:55	CAWA-13-36256 06/29/2013 9:30	CAWA-13-36258 06/29/2013 10:20
Carbon Disulfide	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Carbon Tetrachloride	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chloro-1,3-butadiene[2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chloro-1-propene[3-]	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Chloro-3-methylphenol[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Chloroaniline[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Chlorobenzene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chlorodibromomethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chloroethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chloroform	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chloromethane	SW-846:8260B	1 µg/L (UJ)	1 µg/L (UJ)	1 µg/L (UJ)
Chloronaphthalene[2-]	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Chlorophenol[2-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Chlorophenyl-phenyl[4-] Ether	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Chlorotoluene[2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chlorotoluene[4-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Chrysene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Dibenz(a,h)anthracene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Dibenzofuran	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dibromo-3-Chloropropane[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dibromoethane[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dibromomethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichlorobenzene[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichlorobenzene[1,2-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dichlorobenzene[1,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichlorobenzene[1,3-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dichlorobenzene[1,4-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichlorobenzene[1,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dichlorobenzidine[3,3'-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dichlorodifluoromethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloroethane[1,1-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloroethane[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloroethene[1,1-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloroethene[cis-1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloroethene[trans-1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichlorophenol[2,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dichloropropane[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)

Table A-2 (continued)

Parameter	Analytical Method	CAWA-13-36257 06/29/2013 9:55	CAWA-13-36256 06/29/2013 9:30	CAWA-13-36258 06/29/2013 10:20
Dichloropropane[1,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloropropane[2,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloropropene[1,1-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloropropene[cis-1,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Dichloropropene[trans-1,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Diethyl Ether	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Diethylphthalate	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dimethyl Phthalate	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dimethylphenol[2,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Di-n-butylphthalate	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dinitro-2-methylphenol[4,6-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dinitrophenol[2,4-]	SW-846:8270C	20.8 µg/L (U)	20 µg/L (U)	20.4 µg/L (U)
Dinitrotoluene[2,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dinitrotoluene[2,6-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Di-n-octylphthalate	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dinoseb	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Dioxane[1,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Diphenylamine	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Ethyl Methacrylate	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Ethylbenzene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Fluoranthene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Fluorene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Hexachlorobenzene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Hexachlorobutadiene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Hexachlorobutadiene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Hexachlorocyclopentadiene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Hexachloroethane	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Hexanone[2-]	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Indeno(1,2,3-cd)pyrene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Iodomethane	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Isobutyl alcohol	SW-846:8260B	50 µg/L (U)	50 µg/L (U)	50 µg/L (U)
Isophorone	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Isopropylbenzene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Isopropyltoluene[4-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Methacrylonitrile	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Methyl Methacrylate	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Methyl tert-Butyl Ether	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)

Table A-2 (continued)

Parameter	Analytical Method	CAWA-13-36257 06/29/2013 9:55	CAWA-13-36256 06/29/2013 9:30	CAWA-13-36258 06/29/2013 10:20
Methyl-2-pentanone[4-]	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Methylene Chloride	SW-846:8260B	10 µg/L (U)	10 µg/L (U)	10 µg/L (U)
Methylnaphthalene[1-]	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Methylnaphthalene[2-]	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Methylphenol[2-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Methylphenol[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Naphthalene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Naphthalene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Nitroaniline[2-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitroaniline[3-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitroaniline[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrobenzene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrophenol[2-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrophenol[4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrosodiethylamine[N-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrosodimethylamine[N-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitroso-di-n-butylamine[N-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitroso-di-n-propylamine[N-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Nitrosopyrrolidine[N-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Oxybis(1-chloropropane)[2,2'-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Pentachlorobenzene	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Pentachlorophenol	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Phenanthrene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Phenol	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Propionitrile	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Propylbenzene[1-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Pyrene	SW-846:8270C	1.04 µg/L (U)	1 µg/L (U)	1.02 µg/L (U)
Pyridine	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Styrene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Tetrachlorobenzene[1,2,4,5]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Tetrachloroethane[1,1,1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Tetrachloroethane[1,1,2,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Tetrachloroethene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Tetrachlorophenol[2,3,4,6-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Toluene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichloro-1,2,2-trifluoroethane[1,1,2-]	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)

Table A-2 (continued)

Parameter	Analytical Method	CAWA-13-36257 06/29/2013 9:55	CAWA-13-36256 06/29/2013 9:30	CAWA-13-36258 06/29/2013 10:20
Trichlorobenzene[1,2,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichlorobenzene[1,2,4-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichlorobenzene[1,2,4-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Trichloroethane[1,1,1-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichloroethane[1,1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichloroethene	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichlorofluoromethane	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trichlorophenol[2,4,5-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Trichlorophenol[2,4,6-]	SW-846:8270C	10.4 µg/L (U)	10 µg/L (U)	10.2 µg/L (U)
Trichloropropane[1,2,3-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trimethylbenzene[1,2,4-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Trimethylbenzene[1,3,5-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Vinyl Acetate	SW-846:8260B	5 µg/L (U)	5 µg/L (U)	5 µg/L (U)
Vinyl Chloride	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Xylene[1,2-]	SW-846:8260B	1 µg/L (U)	1 µg/L (U)	1 µg/L (U)
Xylene[1,3-]+Xylene[1,4-]	SW-846:8260B	2 µg/L (U)	2 µg/L (U)	2 µg/L (U)

Notes: U = The analyte was analyzed for but was not detected. J = The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.