Kennedy Jenks

10 February 2020

Ms. Sandra Treccani
Site Manager
Washington State Department of Ecology
4601 North Monroe Street
Spokane, Washington 99205

Subject: Second Semiannual 2019 Groundwater Sampling Results
BNSF Railway Company, Parkwater Rail Yard
Spokane, Washington
KJ 1996110.00

Dear Ms. Treccani:

This letter summarizes the monitoring activities and presents the field and laboratory results for samples collected during the second semiannual 2019 groundwater sampling event at the BNSF Railway Company (BNSF) Parkwater Rail Yard (Site) located in Spokane, Washington.

Background

Cleanup work at the Site is being implemented under Consent Decree No. 12202548-1 between BNSF and the Washington State Department of Ecology (Ecology). A soil and groundwater remediation system operated at the Site from March 2009 to May 2016. Ecology approved a request to shut down the remediation system and continue with a reduced groundwater monitoring schedule in a letter dated 26 January 2016.

Groundwater monitoring activities are conducted in accordance with the Compliance Monitoring Plan (CMP) included in the Engineering Design Report (EDR)[1]. As specified in the CMP, the reduced monitoring will be conducted on monitoring wells MW-6, MW 7, MW-14, and MW-19 (Fueling Area wells) for a minimum of four consecutive quarters. According to the CMP, groundwater monitoring "will be ceased in the Fueling Area wells after the remediation system has been shut down for one full year and laboratory data from four consecutive quarters of monitoring indicate diesel-range organics (DRO) and arsenic concentrations in groundwater samples are less than cleanup criteria." Four consecutive quarters of monitoring were conducted following the shutdown of the remediation system in 2016. In a letter dated 28 August 2017, BNSF requested that the frequency of groundwater monitoring and cap integrity inspections be reduced from quarterly to semiannual (second and fourth quarter each year). Ecology approved the proposed sampling reduction in a letter dated 25 September 2017.

Field Activities

The second semiannual 2019 groundwater sampling event was conducted on 25 November 2019. Well MW-6 was inaccessible due to trains parked in the vicinity of the well during multiple site visits in November 2019. Therefore, MW-6 was sampled on 8 January 2020. Groundwater monitoring activities included measuring depth-to-water in monitoring wells, then purging groundwater from each well using a

[1] GeoEngineers. 2013. Engineering Design Report, BNSF Parkwater Rail Yard Site, Spokane, Washington.

stainless steel bladder pump and collecting groundwater samples. Purging and sampling was conducted in general conformance with the U.S. Environmental Protection Agency's (EPA) low-flow groundwater sampling procedures[2].

Groundwater samples were collected in accordance with the requirements of the CMP, and stored in a cooler containing crushed ice until being delivered to Pace Analytical National Center for Testing & Innovation, of Mt. Juliet, Tennessee (Pace National), a Washington State-accredited environmental laboratory, under appropriate chain-of-custody. Samples were analyzed by Pace National for DRO by Method NWTPH-Dx with silica gel cleanup (SGC) and total arsenic by EPA Method 6020.

Results

Depth-to-groundwater measurements and calculated groundwater elevations are summarized in Table 1 and presented on Figure 1. Water quality parameters measured during groundwater purging are summarized in Table 2, and monitoring well purge forms are included in Attachment A. Analytical results are summarized in Table 3 and are presented on Figure 2 (arsenic and DRO), and the laboratory reports are included in Attachment B. The laboratory reports were reviewed for quality control/quality assurance purposes and the data found to be acceptable for its intended purpose. Data validation reports are included in Attachment B.

Groundwater elevation measurements indicate a west to west-northwest groundwater flow direction with an average hydraulic gradient of 0.0022 feet per foot. This is consistent with the groundwater flow direction observed during previous monitoring events at the Site.

During the November 2019/January 2020 sampling event, concentrations of total arsenic ranged from 0.00217 milligrams per liter (mg/L) in well MW-6 to 0.00496 mg/L in well MW-19. Concentrations of total arsenic during the event were not above the cleanup level (0.005 mg/L) established in the EDR. DRO was not reported above its laboratory reporting limit in the four samples.

Monitoring wells MW-6, MW-7, MW-14 and MW-19 were redeveloped in April 2019 until a turbidity below 10 nephelometric turbidity units (NTU) was achieved. Elevated turbidity levels were observed in each well during the second semiannual 2019 event, ranging from 17.8 NTU in well MW-6 to 33.0 NTU in well MW-19.

Previously reported total arsenic concentrations above the Site-specific cleanup level are generally associated with elevated turbidity, indicating that elevated arsenic concentrations are likely associated with the suspended sediment and not representative of groundwater quality. Groundwater samples collected with turbidity less than 5 NTU have reported total arsenic concentrations below the cleanup level in all but one of 23 samples. Elevated turbidity measurements above 5 NTU (up to 75.70 NTU in MW-19) have been observed in 13 samples (one or more from wells MW-6, MW-7, MW-14, and

[2] U.S. Environmental Protection Agency, Region 1. 1996. Low Stress (low-flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells, EPA SOP No. GW 0001, Revision No. 2, July 30.

MW-19), with total arsenic concentrations above the EDR Site-specific cleanup level in five of the 13 samples.

Summary

In the four consecutive sampling events conducted since June 2018, total arsenic has been reported at concentrations above the Site-specific cleanup level in one monitoring well during the first semiannual 2018 event (MW-19) and two wells during the second semiannual 2018 event (MW-6 and MW-14). Total and dissolved (sampled in May 2019) arsenic concentrations were below the Site-specific cleanup levels in the two semiannual 2019 events. DRO has not been reported at concentrations above the Site-specific cleanup levels since November 2016.

Please contact us at (503) 423-4018 if you have questions regarding the above information.

Very truly yours,

Kennedy/Jenks Consultants, Inc.

2/10/2020

Alice Robinson
Project Engineer

Ryan Hultgren, P.E.
Principal Engineer

cc: Shane DeGross, BNSF Railway Company

Attachments:

- Table 1 – Groundwater Elevation Summary 25 November 2019
- Table 2 – Water Quality Parameters Summary
- Table 3 – 2016-2019 Groundwater Analytical Results Summary
- Figure 1 – Groundwater Potentiometric Map, 25 November 2019
- Figure 2 – Groundwater Results Map, 2016-2019
- Attachment A – Spokane Environmental Services Monitoring Well Sampling Field Log
- Attachment B – Laboratory Analytical Report and Chain-of-Custody Documentation

Tables

TABLE 1

GROUNDWATER ELEVATION SUMMARY
25 November 2019
BNSF Parkwater Rail Yard
Spokane, Washington

Well Number	Date	Top of Casing Elevation (feet)[(a)]	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet amsl)[(a)]
MW-4	11/25/2019	1,950.76	66.08	1,884.68
MW-6	01/08/2020	1,951.04	67.31	1,883.73
MW-7	11/25/2019	1,951.13	67.47	1,883.66
MW-11	11/25/2019	1,951.20	70.19	1,881.01
MW-14	11/25/2019	1,951.41	68.20	1,883.21
MW-16	11/25/2019	1,950.44	67.90	1,882.54
MW-19	11/25/2019	1,951.24	67.52	1,883.72

Notes:

(a) Elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88).

btoc = below top of casing

amsl = above mean sea level

NM = not measured

Monitoring well MW-6 was not accessible on 25 November 2019. The well was gauged on 8 January 2020.

TABLE 2

WATER QUALITY PARAMETERS SUMMARY
BNSF Parkwater Rail Yard, Spokane, Washington

Monitoring Well ID	Sample Collection Date	Water Quality Parameters					
		pH	Conductivity (mS/cm)	Turbidity (NTU)	Temperature (°C)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-6	03/15/2016	7.37	0.278	0.72	11.17	1.34	76.4
	05/24/2016	7.41	0.254	1.63	12.59	1.03	83.9
	08/17/2016	7.40	0.255	5.78	14.37	6.56	14.8
	11/07/2016	6.79	0.412	1.21	12.66	0.60	-20.1
	03/08/2017	7.22	0.265	2.46	10.22	1.82	44.9
	11/06/2017	7.18	0.232	2.74	11.03	2.91	72.5
	06/28/2018	7.57	0.286	0.0	15.77	0.00	35.0
	12/05/2018	6.98	0.301	46.9	11.09	1.33	243.0
	05/14/2019	7.42	0.266	0.0	13.18	0.00	101.0
	01/08/2020	6.50	0.271	17.8	10.31	0.00	170.0
MW-7	03/15/2016	7.70	0.252	2.82	11.37	5.32	101.8
	05/24/2016	7.69	0.250	2.45	12.95	7.69	-72.9
	08/17/2016	7.87	0.244	3.42	15.11	7.77	38.8
	11/07/2016	7.53	0.255	0.23	11.93	6.45	83.6
	03/08/2017	7.32	0.290	2.77	10.29	4.46	51.5
	11/06/2017	7.88	0.251	7.79	11.33	5.89	73.9
	06/28/2018	7.82	0.275	0.0	14.91	1.78	131.0
	12/05/2018	7.63	0.290	5.2	10.87	4.25	258.0
	05/14/2019	7.28	0.260	0.0	12.78	4.54	138.0
	11/25/2019	8.00	0.340	25.5	7.41	7.70	36.0
MW-14	03/15/2016	7.64	0.251	0.00	10.21	7.26	75.8
	05/24/2016	7.72	0.252	2.48	13.27	7.84	45.5
	08/17/2016	7.48	0.261	2.92	17.13	5.12	17.2
	11/07/2016	7.00	0.372	0.88	12.64	1.47	-24.3
	03/08/2017	7.14	0.265	11.71	9.35	7.11	65.3
	11/06/2017	7.52	0.289	13.59	8.96	3.58	33.3
	06/28/2018	8.02	0.261	0.0	17.12	5.15	173.0
	12/05/2018	7.21	0.339	7.8	10.58	1.98	155.0
	05/14/2019	7.64	0.253	0.0	12.93	5.64	55.0
	11/25/2019	7.63	0.451	31.4	7.20	11.90	0.0
MW-19	03/15/2016	7.90	0.243	1.43	11.06	9.25	114.3
	05/24/2016	7.91	0.242	1.25	13.17	9.72	81.5
	08/17/2016	7.71	0.251	1.47	17.05	8.45	40.7
	11/07/2016	7.57	0.256	1.37	12.20	7.96	114.9
	03/08/2017	7.54	0.252	4.41	10.12	9.21	59.5
	11/06/2017	7.72	0.255	5.67	10.63	7.53	78.6
	06/28/2018	7.97	0.264	75.7	12.28	0.60	125.0
	12/05/2018	7.55	0.285	1.6	10.74	4.59	287.0
	05/14/2019	7.93	0.247	0.0	12.95	4.77	113.0
	11/25/2019	8.09	0.329	33.0	10.03	8.44	65.0

Notes:
mS/cm = milliSiemens per centimeter.
NTU = nephelometric turbidity units.
°C = degrees Celsius.
mg/L = milligrams per liter.
ORP = oxidation-reduction potential.
mV = millivolts.

TABLE 3

2016-2019 GROUNDWATER ANALYTICAL RESULTS SUMMARY
BNSF Parkwater Rail Yard, Spokane, Washington

Monitoring Well ID[a]	Date	Total Arsenic[b] (mg/L)		Dissolved Arsenic[b] (mg/L)		Diesel-Range Organics[c] (mg/L)		Turbidity (NTU)
MW-6	03/15/2016	0.002	U	0.002	U	0.488		0.72
	05/24/2016	0.002	U	--		0.201		1.63
	08/17/2016	**0.00505**		--		0.131	B	5.78
	11/07/2016	0.00450		--		**1.560**		1.21
	03/08/2017	0.00323		--		0.250	U	2.46
	11/06/2017	0.00139	J	--		0.095	J	2.74
	06/28/2018	0.00334		--		0.200	U	0.0
	12/05/2018	**0.02090**		--		0.096	J	46.9
	05/14/2019	0.00131	J	0.0014	J	0.200	U	0.0
	01/08/2020	0.00217		--		0.200	U	17.8
MW-7	03/15/2016	0.00336		0.0032		0.153		2.82
	05/24/2016	0.00485		--		0.138		2.45
	08/17/2016	**0.00548**		--		0.100	U	3.42
	11/07/2016	0.00342		--		0.250	U	0.23
	03/08/2017	0.00200	U	--		0.250	U	2.77
	11/06/2017	0.00370		--		0.200	U	7.79
	06/28/2018	0.00388		--		0.200	U	0.0
	12/05/2018	0.00495		--		0.200	U	5.2
	05/14/2019	0.00305		0.00334		0.200	U	0.0
	11/25/2019	0.00332		--		0.200	U	25.5
MW-14	03/15/2016	0.00283/0.00289[d]		0.00272/0.00279		0.100/0.100	U	0.0
	05/24/2016	0.00423/0.00397		--/--		0.100/0.100	U	2.48
	08/17/2016	0.00445/0.00371		--/--		0.100/0.112	U/B	2.42
	11/07/2016	0.00223/0.00225		--/--		**0.647/0.648**		0.88
	03/08/2017	**0.0104/0.0107**		--/--		0.250/0.250	U/U	11.71
	11/06/2017	0.00286/0.00295		--/--		0.200/0.200	U	13.59
	06/28/2018	0.00482/0.00474		--/--		0.200/0.200	U	0.0
	12/05/2018	**0.00548**/0.00331		--/--		0.200/0.200	U	7.8
	05/14/2019	0.00323/0.00358		0.00321/0.00313		0.200/0.200	U	0.0
	11/25/2019	0.00381/0.00390		--/--		0.106/0.107	J/J	31.4
MW-19	03/15/2016	0.00394		0.00455		0.100	U	1.43
	05/24/2016	0.00416		--		0.100	U	1.25
	08/17/2016	0.00367		--		0.100	U	1.47
	11/07/2016	0.00334		--		0.250	U	1.37
	03/08/2017	0.00387				0.250	U	4.41
	11/06/2017	0.00302		--		0.200	U	5.67
	06/28/2018	**0.00564**		--		0.200	U	75.7
	12/05/2018	0.00389		--		0.200	U	1.6
	05/14/2019	0.00432		0.00467		0.200	U	0.0
	11/25/2019	0.00496		--		0.200	U	33.0
Field Blank	03/15/2016	0.002	U	0.002	U	0.100	U	--
	05/24/2016	0.002	U	--		0.100	U	--
	08/17/2016	0.002	U	--		0.100	U	--
	11/07/2016	0.002	U	--		0.250	U	--
	03/08/2017	0.002	U	--		0.250	U	--
Rinsate Blank	03/15/2016	0.002	U	0.002	U	0.100	U	--
	05/24/2016	0.002	U	--		0.218		--
	08/17/2016	0.002	U	--		0.100	U	--
	11/07/2016	0.002	U	--		0.250	U	--
	03/08/2017	0.002	U	--		0.250	U	--
	05/14/2019	0.002	U	--		0.200	U	--
EDR Site-Specific Cleanup Levels		0.005		0.005		0.5		--

TABLE 3

2016-2019 GROUNDWATER ANALYTICAL RESULTS SUMMARY
BNSF Parkwater Rail Yard, Spokane, Washington

Notes:

(a) Samples analyzed by ESC Lab Sciences Inc., Mt. Juliet, Tennessee (now Pace National).

(b) Total and dissolved arsenic analyzed using U.S. Environmental Protection Agency Method 6020.

(c) Diesel-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx with silica-gel cleanup during 2016, November 2017, 2018, and 2019 sampling events. Diesel-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx without silica-gel cleanup during the March 2017 sampling event.

(d) Where two values are displayed for the same date, the second value is the analytical result for a duplicate sample.

Bold indicates detected concentration above the EDR Site-Specific cleanup level.

mg/L = milligrams per liter.

U = not detected at a concentration greater than or equal to the listed laboratory reporting limit.

B = The sample analyte is found in the associated blank.

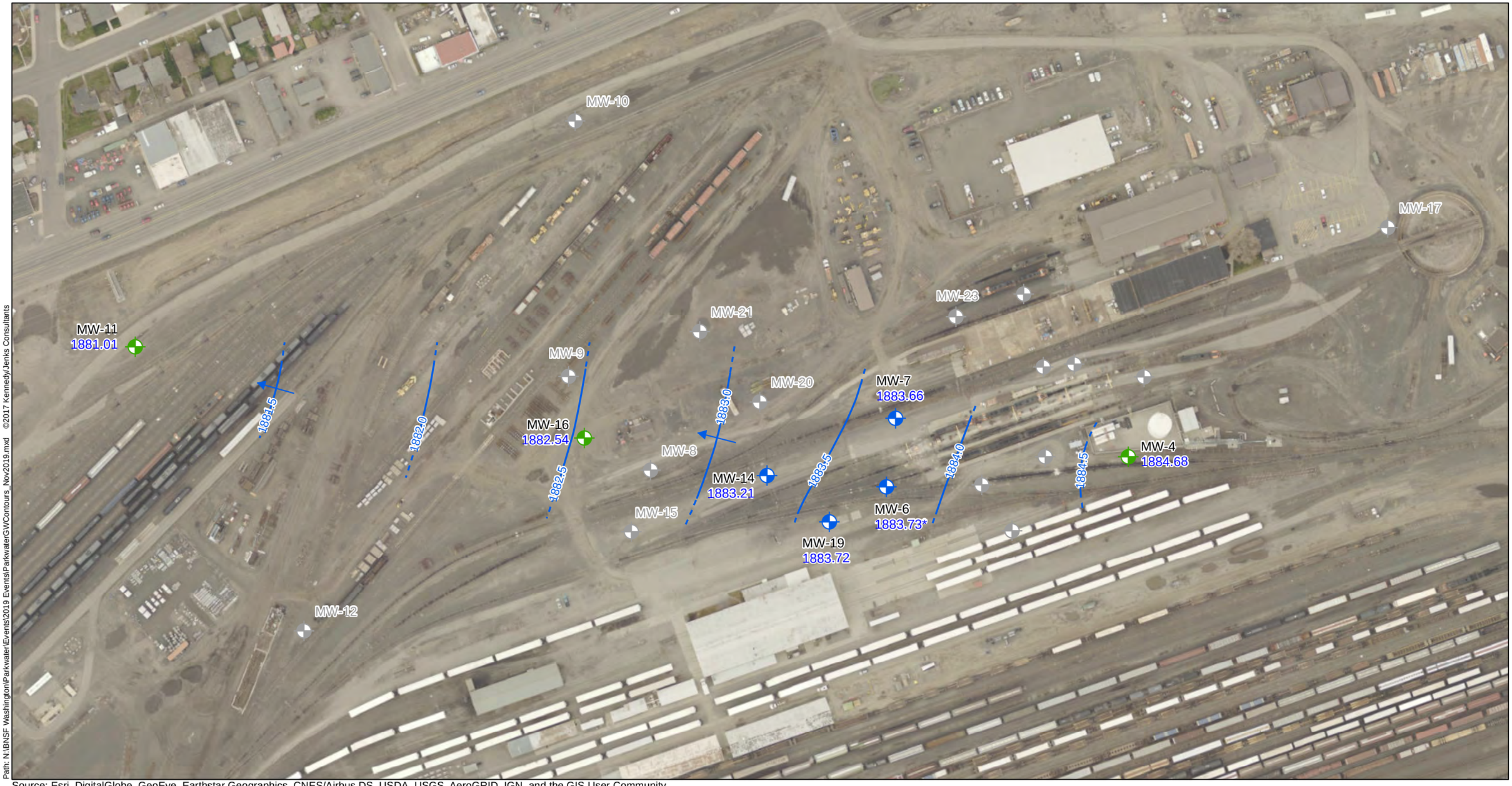
J = Analyte concentration is an estimated value less than the laboratory reporting limit.

-- = not sampled

Rinsate blank was collected by pumping distilled water through the sampling pump after it was decontaminated.

NTU = nephelometric turbidity units.

Figures



Path: N:\BNSF Washington\Parkwater\Events\2019 Events\ParkwaterGW\Contours_Nov2019.mxd ©2017 Kennedy/Jenks Consultants

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well, Groundwater Elevation, Sample Collected
- Monitoring Well, Groundwater Elevation Only
- Monitoring Well, Groundwater Not Measured
- 1883.91 Groundwater Elevation
- Groundwater Contour (Dashed Where Inferred)
- Approximate Direction of Hydraulic Flow

Note:

1. All locations are approximate.
2. Groundwater elevation measured in feet above mean sea level.
3. Groundwater elevations are relative to the NAVD 88 Datum.
4. * = Groundwater elevation measured on 8 January 2020; not included in contouring.

N

0 75 150

Scale: Feet

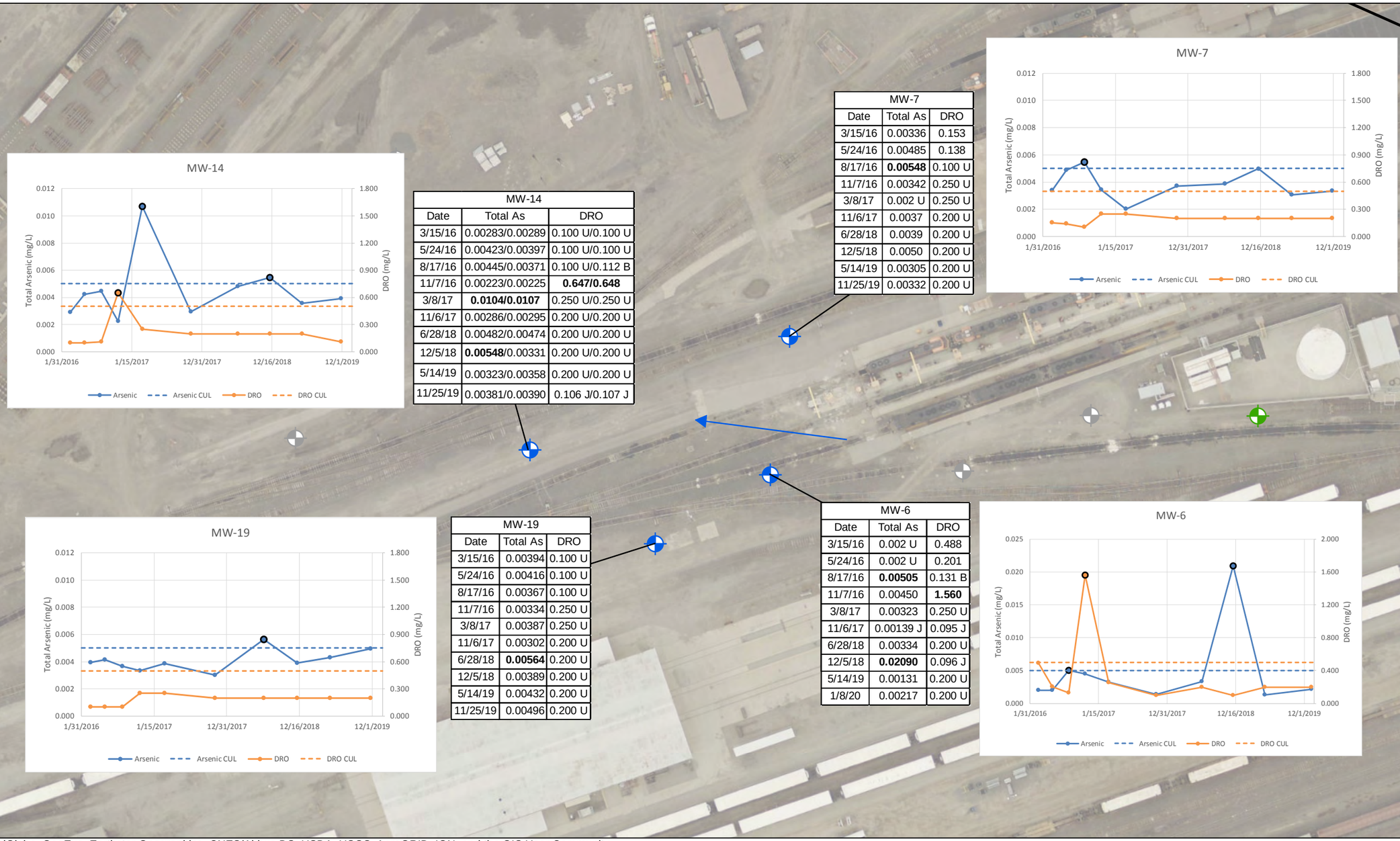
Kennedy/Jenks Consultants

BNSF Railway Company
Parkwater Railyard
Spokane, Washington

Groundwater Potentiometric Map
25 November 2019

1996110*00
January 2020

Figure 1



MW-14		
Date	Total As	DRO
3/15/16	0.00283/0.00289	0.100 U/0.100 U
5/24/16	0.00423/0.00397	0.100 U/0.100 U
8/17/16	0.00445/0.00371	0.100 U/0.112 B
11/7/16	0.00223/0.00225	**0.647/0.648**
3/8/17	**0.0104/0.0107**	0.250 U/0.250 U
11/6/17	0.00286/0.00295	0.200 U/0.200 U
6/28/18	0.00482/0.00474	0.200 U/0.200 U
12/5/18	**0.00548**/0.00331	0.200 U/0.200 U
5/14/19	0.00323/0.00358	0.200 U/0.200 U
11/25/19	0.00381/0.00390	0.106 J/0.107 J

MW-19		
Date	Total As	DRO
3/15/16	0.00394	0.100 U
5/24/16	0.00416	0.100 U
8/17/16	0.00367	0.100 U
11/7/16	0.00334	0.250 U
3/8/17	0.00387	0.250 U
11/6/17	0.00302	0.200 U
6/28/18	**0.00564**	0.200 U
12/5/18	0.00389	0.200 U
5/14/19	0.00432	0.200 U
11/25/19	0.00496	0.200 U

MW-7		
Date	Total As	DRO
3/15/16	0.00336	0.153
5/24/16	0.00485	0.138
8/17/16	**0.00548**	0.100 U
11/7/16	0.00342	0.250 U
3/8/17	0.002 U	0.250 U
11/6/17	0.0037	0.200 U
6/28/18	0.0039	0.200 U
12/5/18	0.0050	0.200 U
5/14/19	0.00305	0.200 U
11/25/19	0.00332	0.200 U

MW-6		
Date	Total As	DRO
3/15/16	0.002 U	0.488
5/24/16	0.002 U	0.201
8/17/16	**0.00505**	0.131 B
11/7/16	0.00450	**1.560**
3/8/17	0.00323	0.250 U
11/6/17	0.00139 J	0.095 J
6/28/18	0.00334	0.200 U
12/5/18	**0.02090**	0.096 J
5/14/19	0.00131	0.200 U
1/8/20	0.00217	0.200 U

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Monitoring Well, Groundwater Elevation, Sample Collected
- Monitoring Well, Groundwater Elevation Only
- Monitoring Well, Groundwater Not Measured
- Approximate Direction of Hydraulic Flow

Note:

1. All locations are approximate.
2. Groundwater results are in milligrams per liter (mg/L).
3. DRO = Diesel-Range Organics.
   Total As = Total Arsenic.
   CUL = Cleanup Level.
   U = Below the laboratory reporting limit.
   B = Analyte is found in the associated blank.
   J = Concentration is estimated value above the laboratory detection limit and less than the laboratory reporting limit.
4. Duplicate samples collected from MW-14.
5. Black outline on chart symbols indicates detected concentration exceeds the Site-Specific cleanup level for arsenic (0.005 mg/L) or DRO (0.5 mg/L).

N

0 40 80

Scale: Feet

Kennedy/Jenks Consultants

BNSF Railway Company
Parkwater Railyard
Spokane, Washington

Groundwater Results Map 2016-2019

1996110*00
January 2020

Figure 2

Attachment A

Spokane Environmental Services
Monitoring Well Sampling Field Log

Monitoring Well Sampling Field Log

SPOKANE ENVIRONMENTAL SOLUTIONS

Well Number: MW-14

Date: 11/25/19

Project Information	
Project Name:	Port Lwater
Project Number:	

Sampling Information	
Field Team:	GP
Purge Method:	Low Flow
Sampling Method:	Low Flow
Water Quality Meter:	Model: U-52
	Serial Number: 66428
Purge Water Disposition:	ONS

Comments

Well Construction Information

Stick-up or Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)
F	2	~75	

Monitoring Information

Initial DTW (ft btoc)	Saturated Screen Interval (ft bgs or btoc)	Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval)
68.20		

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?
2	VOA	HCL	DX	
1	Poly	Nitric	AS	

Well Purge Data

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial 68.20	-	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
5				5.67	550	21.31	8.19	61	45.5	
10				6.25	519	5.30	8.01	36	40.5	
15				6.65	478	3.10	7.84	20	35.1	
20				6.96	455	12.19	7.70	10	31.8	
25				7.00	452	12.01	7.68	5	32.1	
30				7.02	451	11.96	7.60	0	30.7	
35				7.20	451	11.90	7.63	0	31.4	

	Start Sampling 1030	Sample ID: MW-14-112519	Sample Time: 1030
	End Sampling 1035	QA/QC Sample ID: DUP 112519	QA/QC Sample Time: -

Note: bgs= below ground surface btoc=below top of casing DTW=depth to water
Clarity: VC=very cloudy Cl=cloudy SC=slightly cloudy AC=almost clear C=clear CC=crystal clear

Monitoring Well Sampling Field Log

SPOKANE ENVIRONMENTAL SOLUTIONS

Well Number: MW-7

Date: 11-25-19

Project Information	
Project Name:	Parkwater
Project Number:	

Sampling Information	
Field Team:	GP
Purge Method:	Low Flow
Sampling Method:	Low Flow
Water Quality Meter:	Model: U-52
	Serial Number: 66428
Purge Water Disposition:	ONS

Comments

soft Bottom - DepTH Approx.

Well Construction Information

Stick-up or Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)
F	2	~75.5	

Monitoring Information

Initial DTW (ft btoc)	Saturated Screen Interval (ft bgs or btoc)	Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval)
67.47		

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?
2	VOA	HCL	DX	
1	Poly	NITRIC	As	

Well Purge Data

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial 67.47	-	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
5				6.90	340	11.71	7.79	34	31.8	
10				7.08	351	9.01	7.99	27	30.1	
15				7.24	340	8.40	7.97	32	26.6	
20				7.33	340	8.01	8.02	33	25.4	
25				7.39	340	7.90	8.02	35	25.5	
30				7.41	340	7.70	8.00	36	25.5	

Start Sampling 1210	Sample ID: MW-7-112519	Sample Time: 1210	
End Sampling 1213	QA/QC Sample ID: —	QA/QC Sample Time: —	

Note: bgs= below ground surface btoc=below top of casing DTW=depth to water
Clarity: VC=very cloudy Cl=cloudy SC=slightly cloudy AC=almost clear C=clear CC=crystal clear

Monitoring Well Sampling Field Log

Well Number: MW-19

Date: 112519

Project Information	
Project Name:	PARKWATER
Project Number:	

Sampling Information	
Field Team:	GP
Purge Method:	Low Flow
Sampling Method:	Low Flow
Water Quality Meter:	Model: U-52
	Serial Number:
Purge Water Disposition:	

Comments

Well Construction Information

Stick-up or Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)
F	2	81.5	

Monitoring Information

Initial DTW (ft btoc)	Saturated Screen Interval (ft bgs or btoc)	Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval)
67.52		

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?
2	VOA	HCL	DV	
1	Poly	Nitric	As	

Well Purge Data

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial	-	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
5				8.54	311	14.01	7.99	59	30.7	
10				9.04	308	12.12	8.04	66	30.9	
15				9.61	301	10.45	8.19	71	33.1	
20				9.65	300	10.75	8.18	73	32.0	
25				10.01	329	8.49	8.06	66	34.2	
30				10.03	328	8.40	8.09	65	33.7	
35				10.03	329	8.44	8.09	65	33.0	
						5				

Start Sampling	1400	Sample ID: MW-19-112519	Sample Time:	1400
End Sampling	1403	QA/QC Sample ID: —	QA/QC Sample Time:	

Note: bgs= below ground surface btoc=below top of casing DTW=depth to water
Clarity: VC=very cloudy Cl=cloudy SC=slightly cloudy AC=almost clear C=clear CC=crystal clear

Monitoring Well Sampling Field Log

SPOKANE ENVIRONMENTAL SOLUTIONS

Well Number: MW-6

Date: 01/08/20

Project Information	
Project Name:	PARKWATER
Project Number:	

Sampling Information	
Field Team:	Flavio
Purge Method:	Low Flow
Sampling Method:	Low Flow
Water Quality Meter:	Model: U-52
	Serial Number:
Purge Water Disposition:	

Comments

Well Construction Information

Stick-up or Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)
FLUSH	2		

Monitoring Information

Initial DTW (ft btoc)	Saturated Screen Interval (ft bgs or btoc)	Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval)
67.31		

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?

Well Purge Data

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity ~~(uS/cm)~~ mS/cm	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial	-	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
9:05	2	0.250		11.81	0.260	0.00	6.87	162	18.8	
9:10	3.25			11.05	0.266	0.00	6.59	168	18.4	
9:15	4.5			10.91	0.267	0.00	6.57	168	17.4	
9:20	5.75			10.56	0.270	0.00	6.53	169	18.1	
9:25	7			10.57	0.271	0.00	6.51	169	18.0	
9:30	8.25			10.35	0.271	0.00	6.51	170	17.6	
9:35	9.5			10.31	0.271	0.00	6.50	170	17.8	

Start Sampling	8:15	Sample ID: PW-MW6-010820	Sample Time: 9:40
End Sampling	10:00	QA/QC Sample ID:	QA/QC Sample Time:

Note: bgs= below ground surface btoc=below top of casing DTW=depth to water
Clarity: VC=very cloudy Cl=cloudy SC=slightly cloudy AC=almost clear C=clear CC=crystal clear

PW-MW6-010820. @ 9:40

Attachment B

Laboratory Analytical Report and
Chain-of-Custody Documentation

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 04, 2019

Kennedy/Jenks Con-BNSF Region 1

Sample Delivery Group:	L1165718
Samples Received:	11/27/2019
Project Number:	
Description:	BNSF - Parkwater, WA

Report To: Diane Tackett
275 Battery Street, Ste 550
San Francisco, CA 94111

Entire Report Reviewed By:

Mark W. Beasley
Project Manager

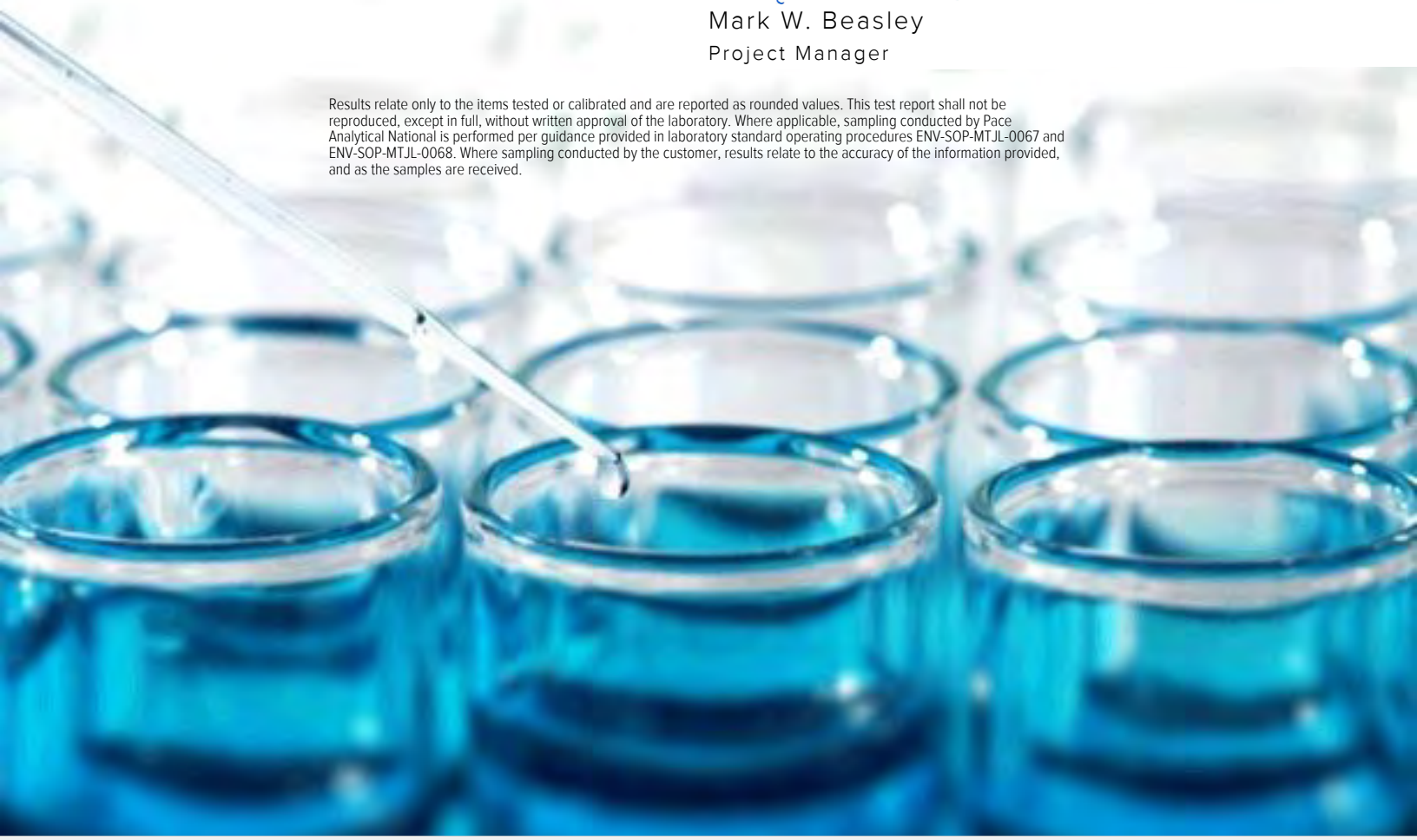


TABLE OF CONTENTS

MW-14-112519 L1165718-01 GW

Collected by: Gary Panther | Collected date/time: 11/25/19 10:30 | Received date/time: 11/27/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1388626	1	11/29/19 06:20	11/29/19 09:10	JPD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT	WG1389458	1	12/01/19 21:27	12/02/19 09:08	JN	Mt. Juliet, TN

MW-7-112519 L1165718-02 GW

Collected by: Gary Panther | Collected date/time: 11/25/19 12:10 | Received date/time: 11/27/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1388626	1	11/29/19 06:20	11/29/19 09:13	JPD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT	WG1389458	1	12/01/19 21:27	12/02/19 09:34	JN	Mt. Juliet, TN

MW-19-112519 L1165718-03 GW

Collected by: Gary Panther | Collected date/time: 11/25/19 14:00 | Received date/time: 11/27/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1388626	1	11/29/19 06:20	11/29/19 09:16	JPD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT	WG1389458	1	12/01/19 21:27	12/03/19 04:02	JN	Mt. Juliet, TN

DUP-112519 L1165718-04 GW

Collected by: Gary Panther | Collected date/time: 11/25/19 00:00 | Received date/time: 11/27/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1388626	1	11/29/19 06:20	11/29/19 09:19	JPD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT	WG1389458	1	12/01/19 21:27	12/03/19 04:28	JN	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Project Manager

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Arsenic	3.81		0.250	2.00	1	11/29/2019 09:10	WG1388626

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	106	J	66.7	200	1	12/02/2019 09:08	WG1389458
(S) o-Terphenyl	*67.0*			*52.0-156*		*12/02/2019 09:08*	WG1389458

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Arsenic	3.32		0.250	2.00	1	11/29/2019 09:13	WG1388626

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	12/02/2019 09:34	WG1389458
(S) o-Terphenyl	*66.5*			*52.0-156*		*12/02/2019 09:34*	WG1389458

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Arsenic	4.96		0.250	2.00	1	11/29/2019 09:16	WG1388626

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	12/03/2019 04:02	WG1389458
(S) o-Terphenyl	*63.5*			*52.0-156*		*12/03/2019 04:02*	WG1389458

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Arsenic	3.90		0.250	2.00	1	11/29/2019 09:19	WG1388626

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	107	J	66.7	200	1	12/03/2019 04:28	WG1389458
(S) o-Terphenyl	*70.5*			*52.0-156*		*12/03/2019 04:28*	WG1389458

Method Blank (MB)

(MB) R3477296-1 11/29/19 08:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Arsenic	U		0.250	2.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3477296-2 11/29/19 08:20 • (LCSD) R3477296-3 11/29/19 08:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Arsenic	50.0	48.0	49.3	96.0	98.7	80.0-120			2.73	20

L1165338-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1165338-04 11/29/19 08:26 • (MS) R3477296-5 11/29/19 08:33 • (MSD) R3477296-6 11/29/19 08:36

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Arsenic	50.0	1.32	50.9	51.1	99.2	99.5	1	75.0-125			0.243	20

Method Blank (MB)

(MB) R3478013-1 12/02/19 03:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Diesel Range Organics (DRO)	U		66.7	200
(S) o-Terphenyl	*66.0*			*52.0-156*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3478013-2 12/02/19 03:54 • (LCSD) R3478013-3 12/02/19 04:20

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Diesel Range Organics (DRO)	1500	1510	1430	101	95.3	50.0-150			5.44	20
(S) o-Terphenyl				*79.5*	*74.0*	*52.0-156*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

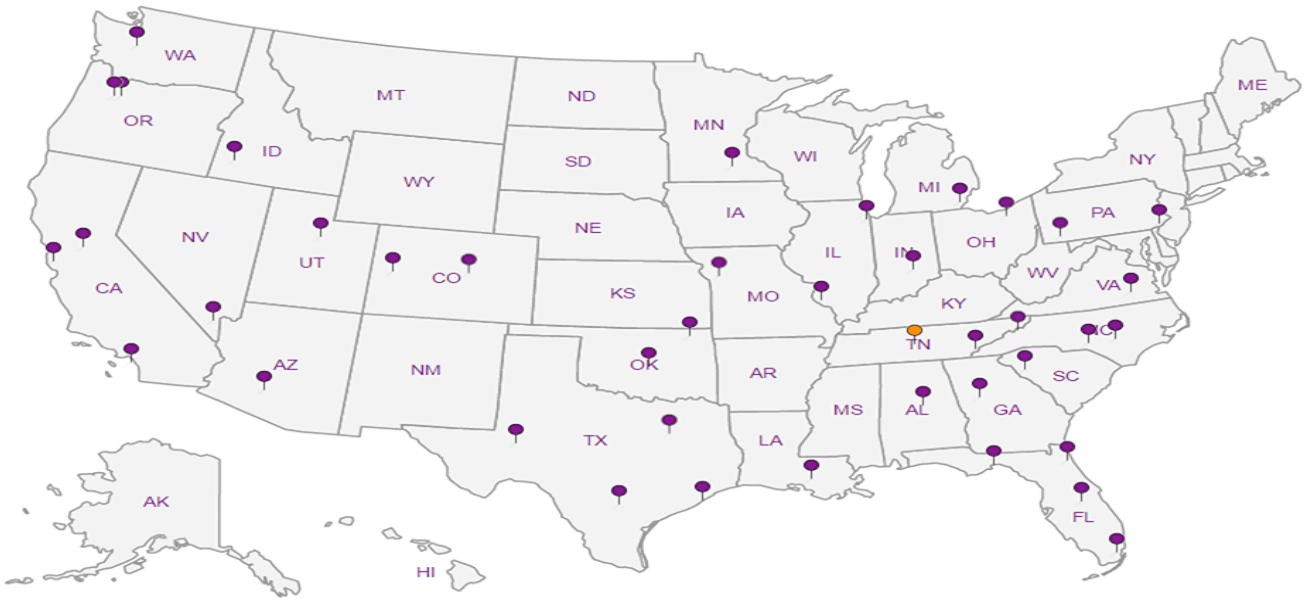
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Kennedy/Jenks Con-BNSF Region 1

275 Battery Street, Ste 550
San Francisco, CA 94111

Billing Information:
Accounts Payable
32001 32nd Ave. S.,Ste. 100
Federal Way, WA 98001

Pres Chk

Report to: Diane Tackett

Email To: DianeTackett@KennedyJenks.com, RyanHultgren@kennedyjenks.com,

Project Description: BNSF - Parkwater, WA

City/State Collected: Spokane, WA

Please Circle: (PT) MT CT ET

Phone: 503-423-4000
Fax:

Client Project #

Lab Project # BNSF1KEN-PARKWATER

Collected by (print): GARY PANTHER

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ✓ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	NWTPHDX w/ SGT 40mlAmb-HCl-BT	Total As 250mlHDPE-HNO3								Remarks	Sample # (lab only)
MW-14-112519	G	GW	71	112519	1030	3	X	X									-01
MW-7-112519	G	GW	71	112519	1210	3	X	X									-02
MW-19-112519	G	GW	70	112519	1400	3	X	X									-03
DUP-112519	G	GW	71	112519	-	3	X	X									-04
		GW															
		GW															
		GW															
		GW															
		GW															
		GW															

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 1165718
B084

Acctnum: BNSF1KEN
Template: T159211
Prelogin: P741097
PM: 134 - Mark W. Beasley
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS X FedEx __ Courier _____

Tracking # 4714 8843 7973

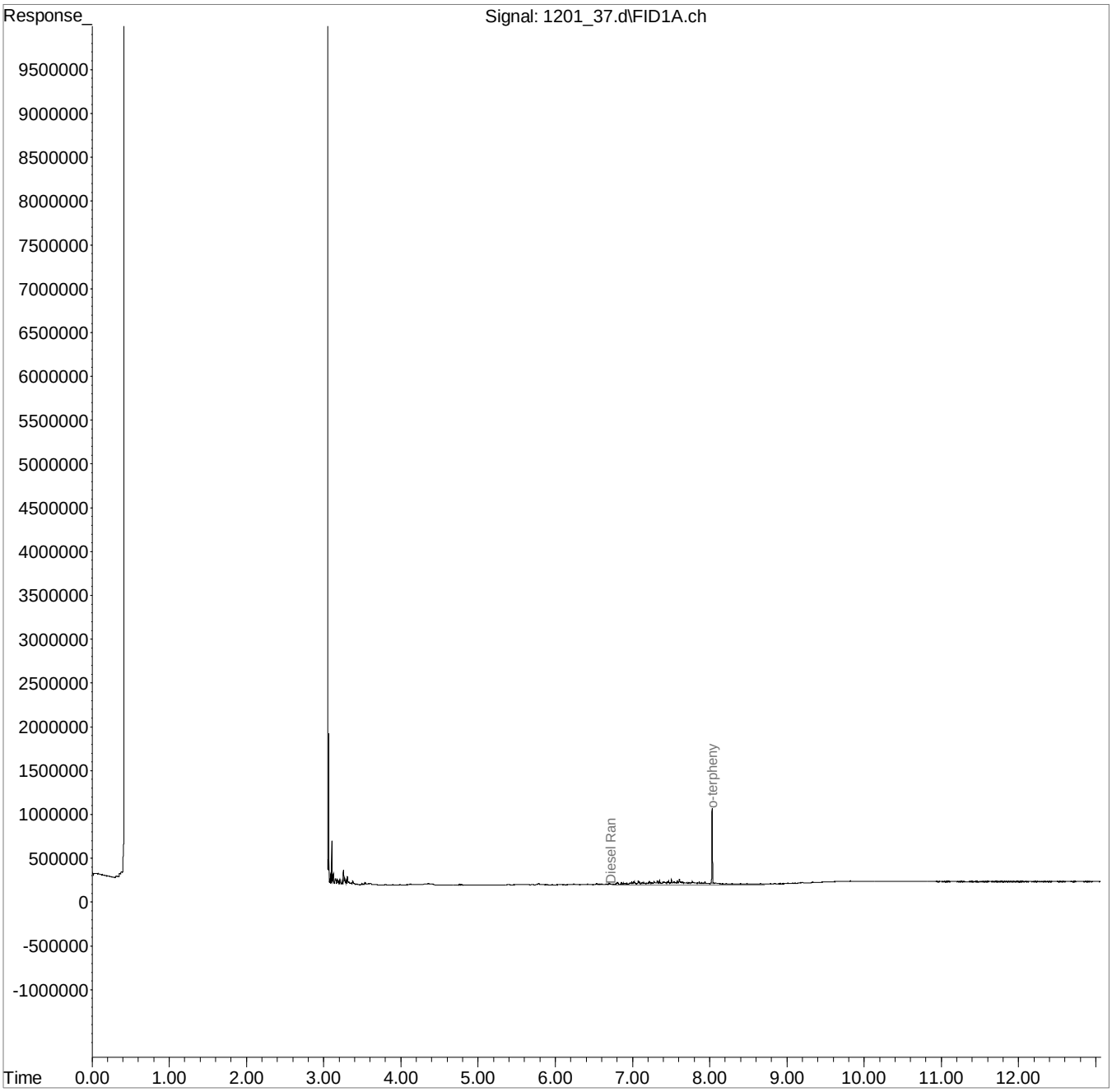
Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: ✓ N
Bottles arrive intact: ✓ N
Correct bottles used: ✓ N
Sufficient volume sent: ✓ N
If Applicable
VOA Zero Headspace: ✓ N
Preservation Correct/Checked: ✓ N
RAD Screen <0.5 mR/hr: ✓ N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Gary Panther	112619	1100			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received: 3.2+2=3.4 12	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11-27-19 Time: 0845	Hold: Conditions NCF / OK

Data Path : C:\msdchem\1\data\120119\
Data File : 1201_37.d
Signal(s) : FID1A.ch
Acq On : 2 Dec 2019 9:08 am
Operator : 473
Sample : L1165718-01 1x WG1389458
Misc : M.I.s on ranges are corrections
ALS Vial : 21 Sample Multiplier: 1
InstName : SVGC31

Integration File: events.e
Quant Time: Dec 02 10:00:41 2019
Quant Method : C:\msdchem\1\methods\DM31K28S.M
Quant Title :
QLast Update : Thu Nov 28 08:02:04 2019
Response via : Initial Calibration
Integrator: ChemStation

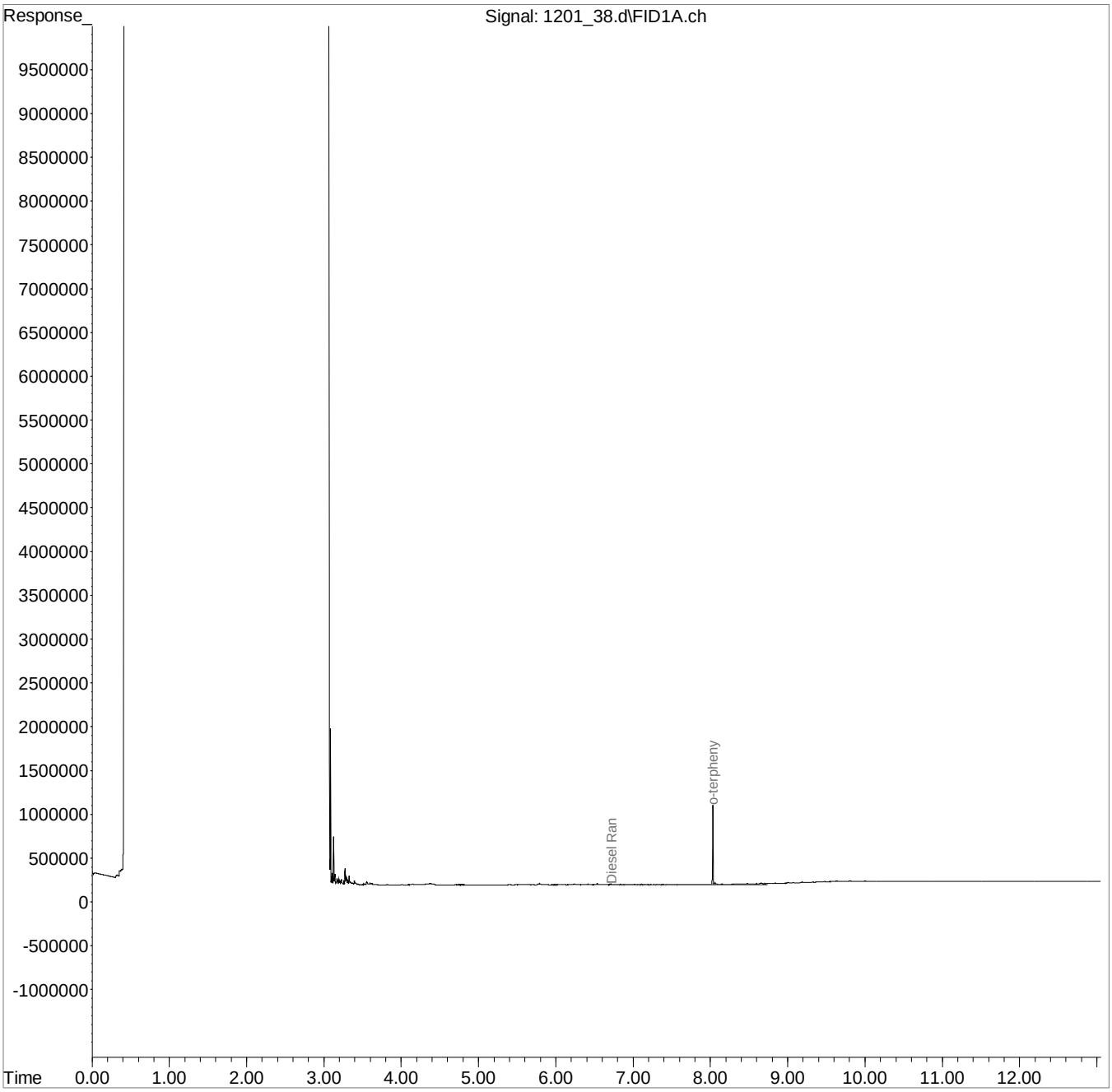
Volume Inj. :
Signal Phase :
Signal Info :



Data Path : C:\msdchem\1\data\120119\
Data File : 1201_38.d
Signal(s) : FID1A.ch
Acq On : 2 Dec 2019 9:34 am
Operator : 473
Sample : L1165718-02 1x WG1389458
Misc : M.I.s on ranges are corrections
ALS Vial : 22 Sample Multiplier: 1
InstName : SVGC31

Integration File: events.e
Quant Time: Dec 02 10:01:28 2019
Quant Method : C:\msdchem\1\methods\DM31K28S.M
Quant Title :
QLast Update : Thu Nov 28 08:02:04 2019
Response via : Initial Calibration
Integrator: ChemStation

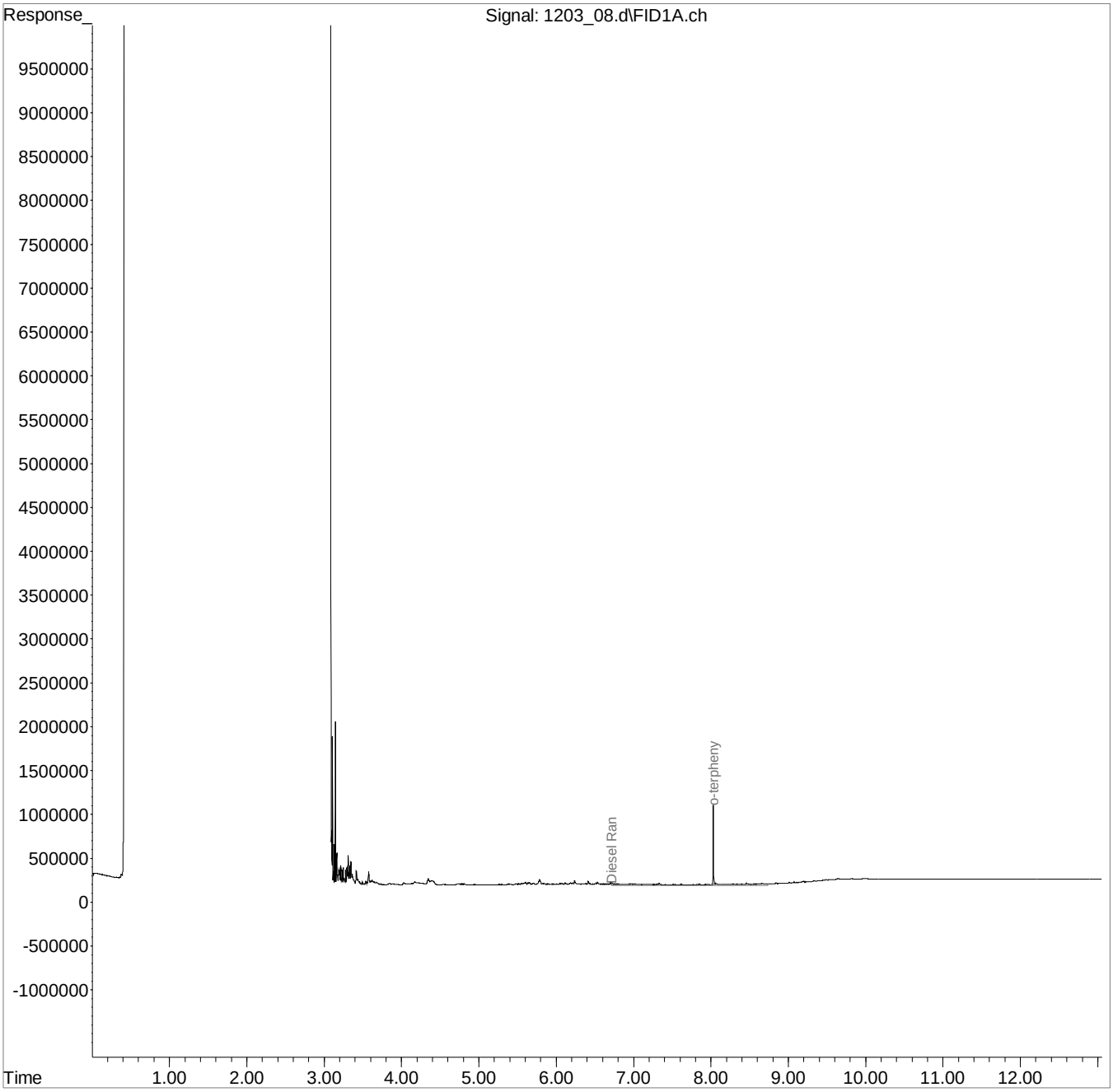
Volume Inj. :
Signal Phase :
Signal Info :



Data Path : C:\msdchem\1\data\120319\
Data File : 1203_08.d
Signal(s) : FID1A.ch
Acq On : 3 Dec 2019 4:02 am
Operator : 784
Sample : L1165718-03 1x WG1389458
Misc : M.I.s on ranges are corrections
ALS Vial : 6 Sample Multiplier: 1
InstName : SVGC31

Integration File: events.e
Quant Time: Dec 03 07:10:37 2019
Quant Method : C:\msdchem\1\methods\DM31K28S.M
Quant Title :
QLast Update : Thu Nov 28 08:02:04 2019
Response via : Initial Calibration
Integrator: ChemStation

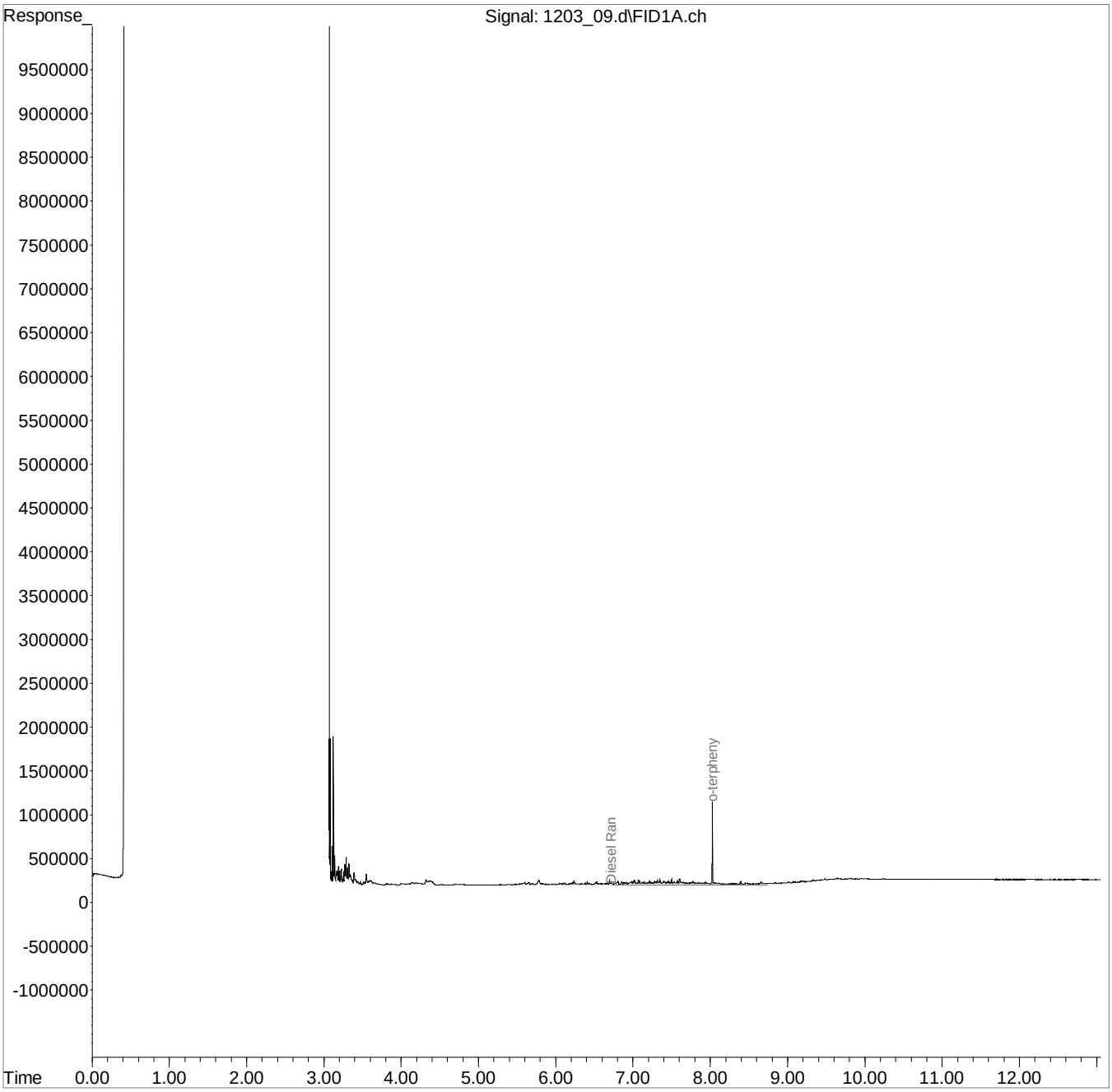
Volume Inj. :
Signal Phase :
Signal Info :



Data Path : C:\msdchem\1\data\120319\
Data File : 1203_09.d
Signal(s) : FID1A.ch
Acq On : 3 Dec 2019 4:28 am
Operator : 784
Sample : L1165718-04 1x WG1389458
Misc : M.I.s on ranges are corrections
ALS Vial : 7 Sample Multiplier: 1
InstName : SVGC31

Integration File: events.e
Quant Time: Dec 03 07:11:02 2019
Quant Method : C:\msdchem\1\methods\DM31K28S.M
Quant Title :
QLast Update : Thu Nov 28 08:02:04 2019
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

January 14, 2020

Kennedy/Jenks Con-BNSF Region 1

Sample Delivery Group:	L1177668
Samples Received:	01/09/2020
Project Number:	
Description:	BNSF - Parkwater, WA

Report To: Alice Robinson
275 Battery Street, Ste 550
San Francisco, CA 94111

Entire Report Reviewed By:

Mark W. Beasley
Project Manager

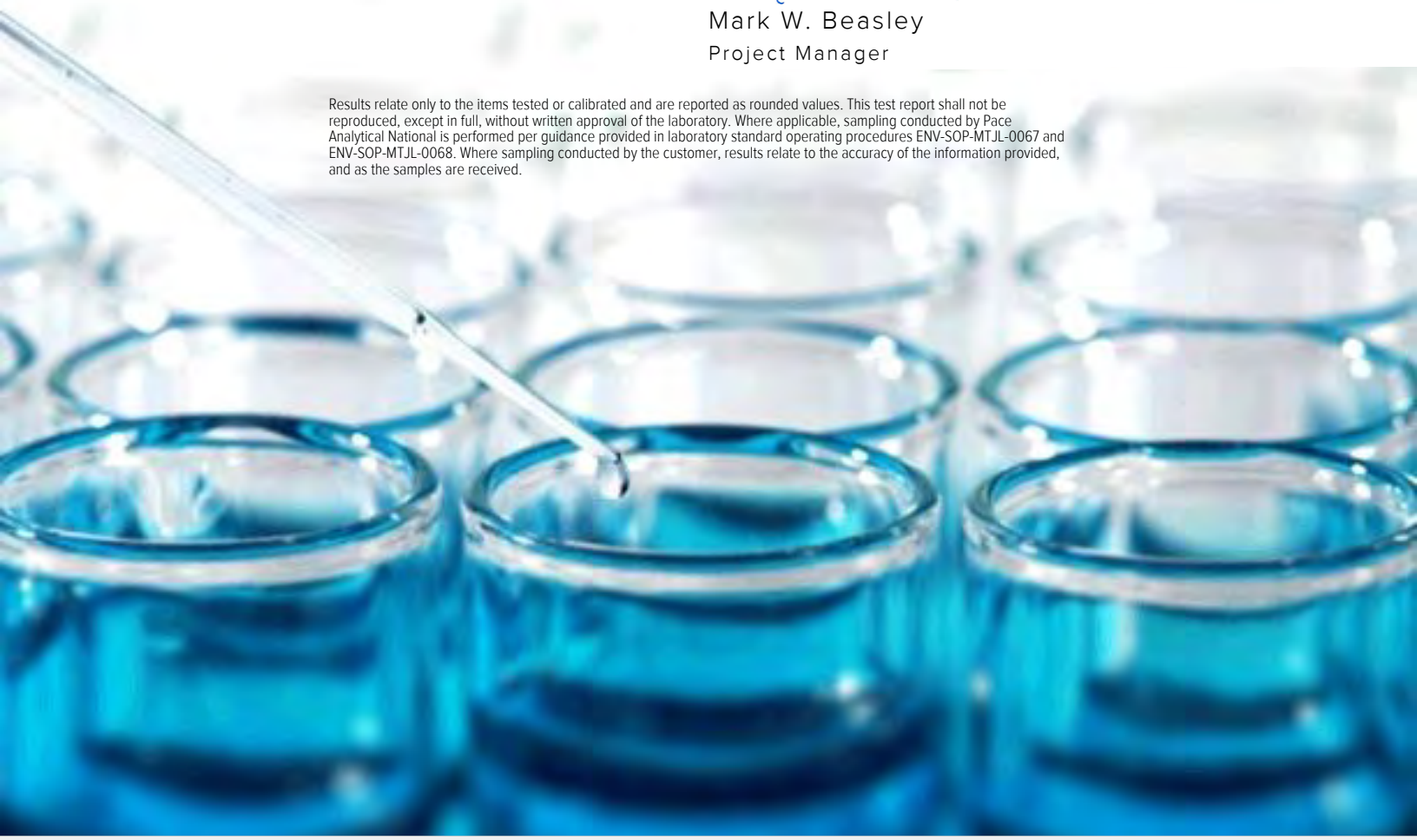


TABLE OF CONTENTS

PW-MW6-010820 L1177668-01 GW

Collected by: Flavio
Collected date/time: 01/08/20 09:40
Received date/time: 01/09/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1408781	1	01/09/20 21:05	01/10/20 12:23	TM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT	WG1408776	1	01/10/20 07:40	01/11/20 16:30	JN	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Project Manager

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Arsenic	2.17		0.250	2.00	1	01/10/2020 12:23	WG1408781

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-SGT

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	01/11/2020 16:30	WG1408776
(S) o-Terphenyl	*61.6*			*52.0-156*		*01/11/2020 16:30*	WG1408776

Method Blank (MB)

(MB) R3489663-1 01/10/20 10:17

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Arsenic	U		0.250	2.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3489663-2 01/10/20 10:20 • (LCSD) R3489663-3 01/10/20 10:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Arsenic	50.0	48.5	49.6	97.0	99.2	80.0-120			2.21	20

L1177713-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1177713-01 01/10/20 10:27 • (MS) R3489663-5 01/10/20 10:33 • (MSD) R3489663-6 01/10/20 10:37

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Arsenic	50.0	1.13	50.4	51.3	98.6	100	1	75.0-125			1.65	20

Method Blank (MB)

(MB) R3489865-1 01/10/20 16:36

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Diesel Range Organics (DRO)	U		66.7	200
(S) o-Terphenyl	*54.0*			*52.0-156*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3489865-2 01/10/20 16:57 • (LCSD) R3489865-3 01/10/20 17:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Diesel Range Organics (DRO)	1500	1270	1290	84.7	86.0	50.0-150			1.56	20
(S) o-Terphenyl				*137*	*70.0*	*52.0-156*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

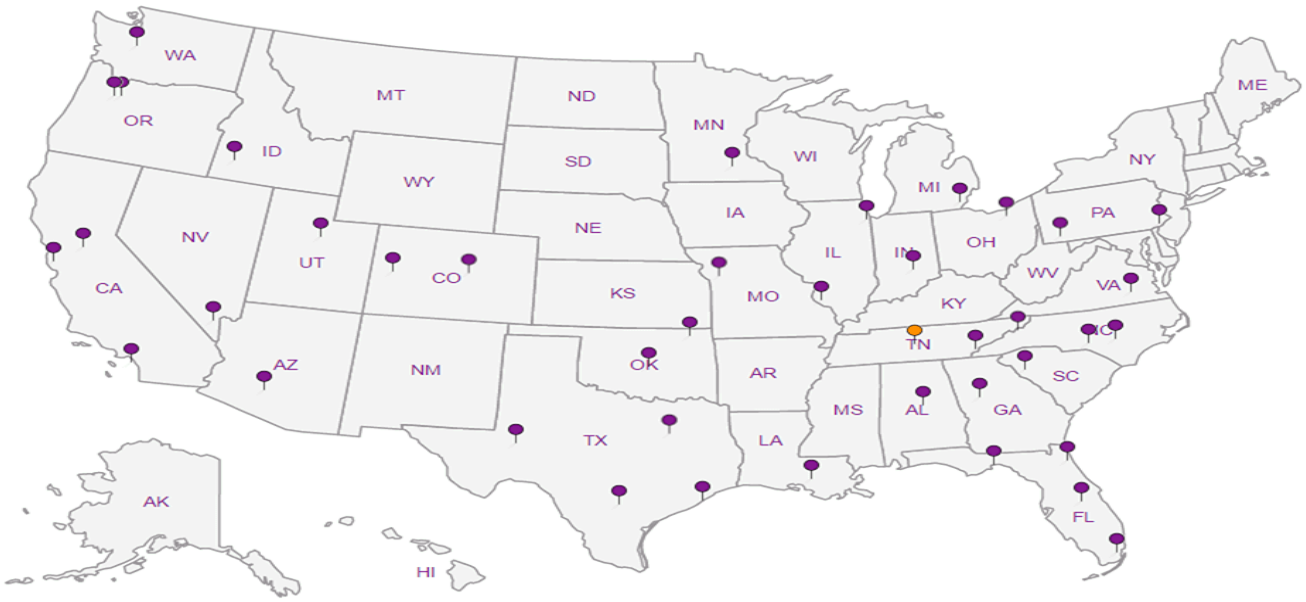
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Kennedy/Jenks Con-BNSF Region 1

275 Battery Street, Ste 550
San Francisco, CA 94111

Billing Information:
Accounts Payable
32001 32nd Ave. S.,Ste. 100
Federal Way, WA 98001

Report to: ALICE ROBINSON ~~Diane Tackett~~ ALICEROBINSON@KENNEDYJENKS.COM

Email To: DianeTackett@KennedyJenks.com, RyanHultgren@kennedyjenks.com,

Project Description: BNSF - Parkwater, WA

City/State Collected:

Please Circle: PT MT CT ET

Phone: 503-423-4000
Fax:

Client Project #

Lab Project # BNSF1KEN-PARKWATER

Collected by (print): FLAVIO

Site/Facility ID #

P.O. #

Collected by (signature):

Quote #

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed: STANDARD

Analysis / Container / Preservative

Pres Chk									
	<2								
NWTPHDX w/ SGT 40mlAmb-HCl-BT	Total As 250mlHDPE-HNO3								
✓	✓								

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1177668

Ta 1235

Acctnum: BNSF1KEN

Template: T159211

Prelogin: P741097

PM: 134 - Mark W. Beasley

PB:

Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Remarks	Sample # (lab only)
PW-MW6-010820		GW		01-08-20	09:40	3		-01
		GW						
		GW						
		GW						
		GW						
		GW						
		GW						
		GW						
		GW						
		GW						

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 1382 4812 7624

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
	01/08/20	10:30			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: AIR °C .6-.1=.5	Bottles Received: 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 1/9/20	Time: 8:30

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

DATA VALIDATION SUMMARY
BNSF Parkwater

Laboratory Reports included in Data Validation	Dates	Sample IDs
Laboratory: Pace Analytical SDG: L1165718 Analyses: NWTPHDX-SGT, Metals	**Report Date:** 12/4/2019 **Sample Dates:** 11/25/2019-11/25/2019 **Validation Date:** 1/13/2020	Aqueous Samples: MW-14-112519, MW-7-112519, MW-19-112519 Field Duplicates: DUP-112519 (duplicate of MW-14-112519) Equipment Blank: Not Collected Trip Blank: Not Collected

Criteria	(Yes or No)	Comment
Chain-of-Custody (COC) – Chain-of-custody protocol followed?	Yes	
Temperature Blank – Sample temperature criteria met?	Yes	
Holding times – Samples analyzed within specified holding time?	Yes	
Laboratory method blank samples – Analytes present in method blank samples?	No	
Field/Equipment blank samples – Analytes present in field/equipment blank samples?	No	See Note
Trip blank samples – Analytes present in trip blank samples?	No	See Note
Matrix Spikes (MS)/Matrix Spike Duplicate (MSD) samples – Control limits met?	Yes	See Note
Surrogate percent recoveries – Control limits met?	Yes	
Laboratory Control Sample (LCS) – Control limits met?	Yes	
Laboratory duplicate samples (if applicable) – Control limits met?	Yes	
Field duplicate samples (if submitted) – Relative percent differences within control limits?	No	See Note
Other Issues?	No	

Field Blank Note: Not Collected
Trip Blank Note: Not Collected
MS/MSD Note: Not applicable
Field Duplicate Note: The RPD for the duplicate pair DUP-112519 and MW-14-112519 ranges from 0-3%, which is within the acceptance criteria.

SUMMARY
Overall, the findings with respect to the quality assurance/quality control (QA/QC) data do not adversely affect the use of the analytical results.

DATA VALIDATION SUMMARY
BNSF Parkwater

Laboratory Reports included in Data Validation	Dates	Sample IDs
Laboratory: Pace Analytical Services, Mt.Juliet, TN SDG: L1177668 Analyses: Metals, TPH-NWTPH-DXSG	**Report Date:** 1/9/2020 **Sample Dates:** 1/8/2020-1/8/2020 **Validation Date:** 1/23/2020	Aqueous Samples: PW-MW6-010820 Field Duplicates: Not Collected Equipment Blank: Not Collected Trip Blank: Not Collected

Criteria	(Yes or No)	Comment
Chain-of-Custody (COC) – Chain-of-custody protocol followed?	Yes	
Temperature Blank – Sample temperature criteria met?	Yes	
Holding times – Samples analyzed within specified holding time?	Yes	
Laboratory method blank samples – Analytes present in method blank samples?	No	
Field/Equipment blank samples – Analytes present in field/equipment blank samples?	No	See Note
Trip blank samples – Analytes present in trip blank samples?	No	See Note
Matrix Spikes (MS)/Matrix Spike Duplicate (MSD) samples – Control limits met?	Yes	See Note
Surrogate percent recoveries – Control limits met?	Yes	
Laboratory Control Sample (LCS) – Control limits met?	Yes	
Laboratory duplicate samples (if applicable) – Control limits met?	Yes	See Note
Field duplicate samples (if submitted) – Relative percent differences within control limits?	Yes	See Note
Other Issues?	No	

Field Blank Note: Not Collected
Trip Blank Note: Not Collected
MS/MSD Note: Not applicable
Lab Duplicate Note: Not applicable
Field Duplicate Note: Not applicable

SUMMARY
Overall, the findings with respect to the quality assurance/quality control (QA/QC) data do not adversely affect the use of the analytical results.