

19 June 2019

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

Subject: First 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 first 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

Because elevated turbidity [46.90 nephelometric turbidity units (NTU) in MW-6, see Table 2] was observed during the December 2018 monitoring event, the four monitoring wells included in the semiannual monitoring program were redeveloped on 29 April 2019. Each well was redeveloped by surging and jetting until a turbidity below 10 NTU was achieved. Well redevelopment field notes are included in Attachment A.

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



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The first semiannual 2019 groundwater sampling event was conducted on 14 May 2019. Groundwater monitoring activities included measuring depth to water in seven monitoring wells (MW-4, MW-6, MW-7, MW-11, MW-14, MW-16, and MW-19), then purging groundwater from the four Fueling Area wells (MW-6, MW-7, MW-14, and MW-19) using a 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 procedures². Samples collected for analysis of dissolved metals were filtered in the field with a single-use 0.45-micrometer (μm) filter.

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 and Innovation (Pace National), of Mt. Juliet, Tennessee, a Washington State-accredited environmental laboratory, under appropriate chain-of-custody procedures. Samples were analyzed by Pace National for DRO by Method NWTPH-Dx with silica gel cleanup and total and dissolved arsenic by EPA Method 6020.

Results

Depth-to-groundwater measurements and resulting groundwater elevation calculations are summarized in Table 1 and presented on Figure 1. Water quality parameters measured during purging are summarized in Table 2, and monitoring well purge forms are included in Attachment A. Analytical results are summarized in Table 3, and the laboratory report is included in Attachment B. The laboratory report was reviewed for quality control/quality assurance purposes and was found to be acceptable for its intended purpose.

Groundwater elevation measurements indicate a west to west-northwest groundwater flow direction with an average hydraulic gradient of 0.002 feet per foot. This is consistent with the groundwater flow direction observed during previous monitoring events at the Site.

During the May 2019 sampling event, concentrations of total arsenic ranged from an estimated ("J" flagged) 0.00131 J milligrams per liter (mg/L) in well MW-6 to 0.00432 mg/L in well MW-19. Dissolved arsenic concentrations ranged from 0.0014 J mg/L in well MW-6 to 0.00467 mg/L in well MW-19. Concentrations of total and dissolved arsenic during the May 2019 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.

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, 30 July.



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In the four consecutive sampling events conducted since November 2017, total arsenic has been reported at concentrations above the Site-specific cleanup level in one monitoring well during each of the first (MW-19) and second (MW-7) semiannual 2018 events. Total and dissolved arsenic concentrations were below the Site-specific cleanup levels in the four monitoring wells sampled during the second semiannual 2017 and first 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.

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Alice Robinson Project Manager Ryan Hultgren, P.E. Principal Engineer

cc: Shane DeGross, BNSF Railway Company

Attachments:

Table 1 – Groundwater Elevation Summary, 14 May 2019

Table 2 – Water Quality Parameters Summary

Table 3 – 2016-2019 Groundwater Analytical Results Summary

Figure 1 – Groundwater Potentiometric Map, 14 May 2019

Attachment A – Spokane Environmental Services Well Redevelopment and Monitoring Well Sampling Field Logs

Attachment B – Laboratory Analytical Report and Chain-of-Custody Documentation

Tables

TABLE 1

GROUNDWATER ELEVATION SUMMARY 14 May 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	5/14/2019	1,950.76	60.12	1,890.64
MW-6	5/14/2019	1,951.04	61.04	1,890.00
MW-7	5/14/2019	1,951.13	61.34	1,889.79
MW-11	5/14/2019	1,951.20	63.60	1,887.60
MW-14	5/14/2019	1,951.41	61.99	1,889.42
MW-16	5/14/2019	1,950.44	61.61	1,888.83
MW-19	5/14/2019	1,951.24	61.39	1,889.85

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

TABLE 2

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

			,	Nater Quali	ty Parameters		
Monitoring Well ID	Sample Collection Date	рН	Conductivity (mS/cm)	Turbidity (NTU)	Temperature (°C)	Dissolved Oxygen (mg/L)	ORP (mV)
	3/15/2016	7.37	0.278	0.72	11.17	1.34	76.4
	5/24/2016	7.41	0.254	1.63	12.59	1.03	83.9
	8/17/2016	7.40	0.255	5.78	14.37	6.56	14.8
	11/7/2016	6.79	0.412	1.21	12.66	0.60	-20.1
MW-6	3/8/2017	7.22	0.265	2.46	10.22	1.82	44.9
	11/6/2017	7.18	0.232	2.74	11.03	2.91	72.5
	6/28/2018	7.57	0.286	0.00	15.77	0.00	35.0
	12/5/2018	6.98	0.301	46.90	11.09	1.33	243.0
	5/14/2019	7.42	0.266	0.00	13.18	0.00	101.0
	3/15/2016	7.70	0.252	2.82	11.37	5.32	101.8
	5/24/2016	7.69	0.250	2.45	12.95	7.69	-72.9
	8/17/2016	7.87	0.244	3.42	15.11	7.77	38.8
	11/7/2016	7.53	0.255	0.23	11.93	6.45	83.6
MW-7	3/8/2017	7.32	0.290	2.77	10.29	4.46	51.5
	11/6/2017	7.88	0.251	7.79	11.33	5.89	73.9
	6/28/2018	7.82	0.275	0.00	14.91	1.78	131.0
	12/5/2018	7.63	0.290	5.20	10.87	4.25	258.0
	5/14/2019	7.28	0.260	0.00	12.78	4.54	138.0
	3/15/2016	7.64	0.251	0.00	10.21	7.26	75.8
	5/24/2016	7.72	0.252	2.48	13.27	7.84	45.5
	8/17/2016	7.48	0.261	2.92	17.13	5.12	17.2
	11/7/2016	7.00	0.372	0.88	12.64	1.47	-24.3
MW-14	3/8/2017	7.14	0.265	11.71	9.35	7.11	65.3
	11/6/2017	7.52	0.289	13.59	8.96	3.58	33.3
	6/28/2018	8.02	0.261	0.00	17.12	5.15	173.0
	12/5/2018	7.21	0.339	7.80	10.58	1.98	155.0
	5/14/2019	7.64	0.253	0.00	12.93	5.64	55.0
	3/15/2016	7.90	0.243	1.43	11.06	9.25	114.3
	5/24/2016	7.91	0.242	1.25	13.17	9.72	81.5
	8/17/2016	7.71	0.251	1.47	17.05	8.45	40.7
	11/7/2016	7.57	0.256	1.37	12.20	7.96	114.9
MW-19	3/8/2017	7.54	0.252	4.41	10.12	9.21	59.5
	11/6/2017	7.72	0.255	5.67	10.63	7.53	78.6
	6/28/2018	7.97	0.264	75.70	12.28	0.60	125.0
	12/5/2018	7.55	0.285	1.60	10.74	4.59	287.0
	5/14/2019	7.93	0.247	0.00	12.95	4.77	113.0

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

(a)	_	Total Arsenic ^(b)		Dissolved Arse	nic ^(b)	Diesel-Range Organic	s ^(c)	Turbidity
Monitoring Well ID ^(a)	Date	(mg/L)		(mg/L)		(mg/L)		(NTU)
MW-6	3/15/2016	0.002		0.002	U	0.488		0.72
	5/24/2016	0.002	U			0.201		1.63
	8/17/2016	0.00505				0.131	В	5.78
	11/7/2016	0.00450				1.560		1.21
	3/8/2017	0.00323				0.250		2.46
	11/6/2017	0.00139	J			0.095		2.74
	6/28/2018	0.00334				0.200		0.00
	12/5/2018	0.02090				0.096		46.90
	5/14/2019	0.00131	J	0.0014	J	0.200	U	0.00
MW-7	3/15/2016	0.00336		0.0032		0.153		2.82
	5/24/2016	0.00485				0.138		2.45
	8/17/2016	0.00548				0.100		3.42
	11/7/2016	0.00342				0.250		0.23
	3/8/2017	0.002	U			0.250		2.77
	11/6/2017	0.0037				0.200		7.79
	6/28/2018	0.0039				0.200	_	0.00
	12/5/2018	0.0050				0.200		5.20
	5/14/2019	0.00305		0.00334		0.200		0.00
MW-14	3/15/2016	0.00283/0.00289 ^(d)		0.00272/0.00279		0.100/0.100		0.00
	5/24/2016	0.00423/0.00397		/		0.100/0.100		2.48
	8/17/2016	0.00445/0.00371		/		0.100/0.112	U/B	2.42
	11/7/2016	0.00223/0.00225		/		0.647/0.648		0.88
	3/8/2017	0.0104/0.0107		/		0.250/0.250		11.71
	11/6/2017	0.00286/0.00295		/		0.200/0.200		13.59
	6/28/2018	0.00482/0.00474		/		0.200/0.200		0.00
	12/5/2018	0.00548/0.00331		/		0.200/0.200		7.80
	5/14/2019	0.00323/0.00358		0.00321/0.00313		0.200/0.200		0.00
MW-19	3/15/2016	0.00394		0.00455		0.100		1.43
	5/24/2016	0.00416				0.100		1.25
	8/17/2016	0.00367				0.100		1.47
	11/7/2016	0.00334				0.250		1.37
	3/8/2017	0.00387				0.250		4.41
	11/6/2017	0.00302				0.200		5.67
	6/28/2018	0.00564				0.200		75.70
	12/5/2018	0.00389				0.200		1.60
	5/14/2019	0.00432		0.00467		0.200		0.00
Field Blank	3/15/2016	0.002		0.002	U	0.100		
	5/24/2016	*****	U			0.100		-
	8/17/2016	0.002				0.100		-
	11/7/2016	0.002				0.250		-
	3/8/2017		U			0.250		-
Rinsate Blank	3/15/2016	0.002	-	0.002	U	0.100	U	
	5/24/2016	0.002				0.218		-
	8/17/2016	0.002	-			0.100		-
	11/7/2016	0.002				0.250		-
	3/8/2017	0.002				0.250		-
	5/14/2019	0.002	U			0.200	U	
EDR Site-Specific Clea	anup Levels	0.005		0.005		0.5		

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.

 ${\sf NTU} = {\sf nephelometric} \ {\sf turbidity} \ {\sf units}.$

Figure

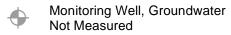


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

Monitoring Well, Groundwater Elevation, Sample Collected

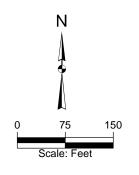
Monitoring Well, Groundwater Elevation Only



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.



Kennedy/Jenks Consultants

BNSF Railway Company Parkwater Railyard Spokane, Washington

Groundwater Potentiometric Map 14 May 2019

> 1996110*00 June 2019

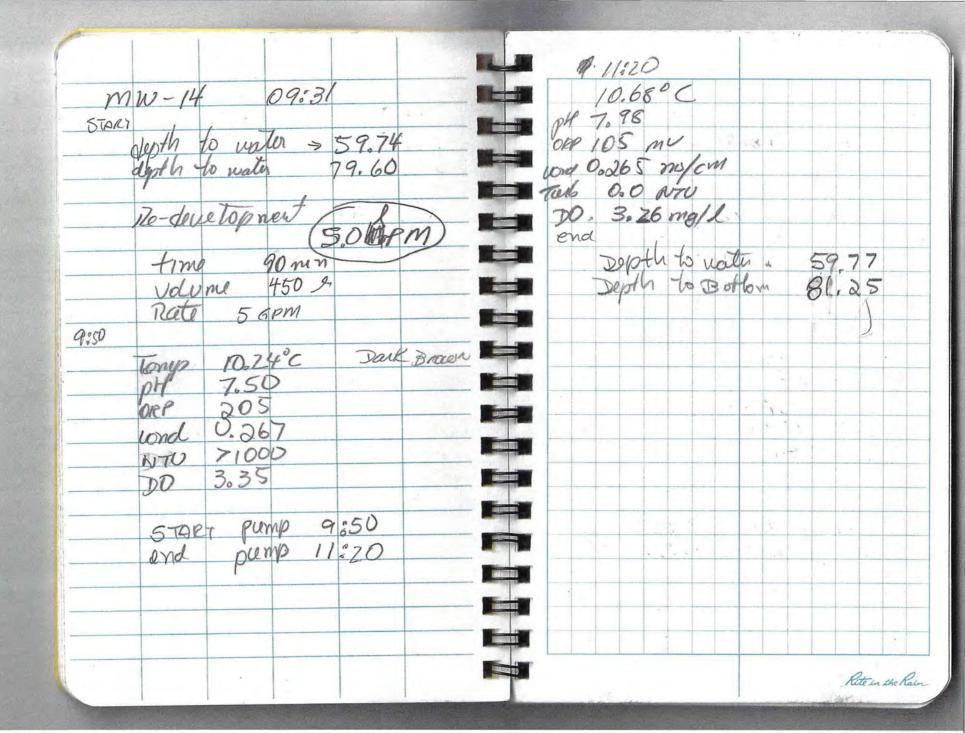
> > Figure 1

1883.91 Groundwater Elevation

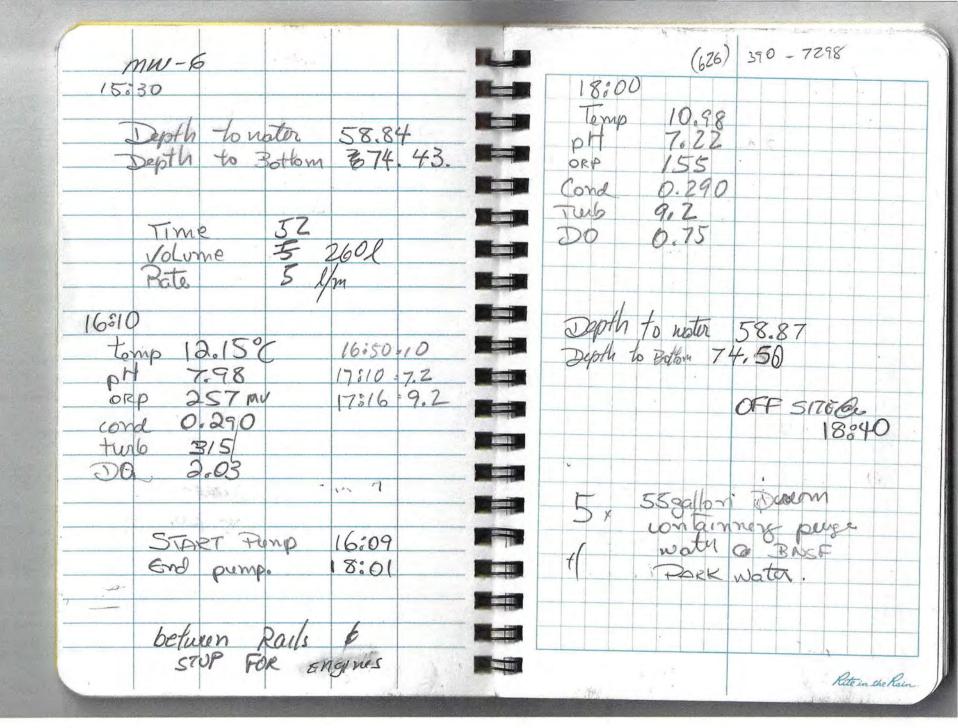
Attachment A

Spokane Environmental Services Monitoring Redevelopment and Monitoring Well Sampling Field Logs

PAR	ek water BI	NSF 4/29	/19		4.5l/m	'n
	SPOKENE	/ /		8:33	1	
7:20	Sofety me	ediz		Temp	10.45°C	
	Elacio.			PM	8.33	4
_	stor			ORP	235 mu	
	KART		N N	Lond	0.307 m/sem	
	16			NTU	>1000	
		N 10		DO	4.79 mg/4	
28:00					4	
mul	-7		5-10	a a		
7	opth to Bo	Hom - 75.00		START pur	mp 8:40	
9 2	opth to not	\$ = 59.01		end pur	mp 9:17	
				9:13	1	
- R 700	dalengonosit			Tenp 10, 34	0	
	time	37mm		pu 7075		
	Volume.	166,5		ORP 221		
-	Rate = 4,	50/m		400 0.273 2	nelm	. 44
		7		Tied 7.6 N		
_				20 3.55	ng/L	
Door	Brown			30, 3,30 /	10/2	
-				alto		
1/4	uteal hurs	1 (moder)	ted I	10500	9 1	1.
- uth	brites to	ASSESS de	V13	75.09	9 to wa	town
	aciri vi	1/2000		15.01	1007	
1				1000		
						Rite in the Rain



mw-19	11:36	13:00 /3:	
Depth to up	th 59,20 Roflom 79,9	T= 10.69 pH= 7.20 ocp 220	me
time Volume Rate 3	72 min 360 L 500	PH = 7.20 OCP 220 Cond 0.262 Tub 4.8 No. DO 2.43	nis/em
12:02 temp 10.66°C pH 7.83 ORP 157	0	Depth to	6 nats 59.14 666m 79.92
Cord 0.265	Dark From		
DO 3.48	12:00		
START pump	13:12		
			Rite in the



	Well#	Start time	Date	Initial depth to Total water Depth	Start Stop Pump Pump	Initial	Development Time Volume (min) (L) Rate (L/m)	Final	Final depth to Total water Depth
	MW-7	8:00	4/29/2019	59.01 75	8:40 9:17	Time 8:33 Temp © 10.45 pH 8.33 ORP (mv) 235 Cond(ms/cm 0.307 Turb (NTU) >1000 DO (mg/L) 4.79	37 166.5 4.5	Time 9:13 Temp © 10.34 pH 7.75 ORP (mv) 221 Cond(ms/cm 0.273 Turb (NTU) 7.6 DO (mg/L) 3.55	59.09 75.09
Parkwater	MW-14	9:31	4/29/2019	50.74 79.6	9:50 11:20	Time 9:50 Temp © 10.24 pH 7.5 ORP (mv) 205 Cond(ms/cm 0.267 Turb (NTU) >1000 DO (mg/L) 3.35	90 450 5	Time 11:20 Temp © 10.68 pH 7.98 ORP (mv) 105 Cond(ms/cm 0.265 Turb (NTU) 0.00 DO (mg/L) 3.26	59.77 81.25
Parkv	MW-19	11:36	4/29/2019	50.2 79.9	12:00 13:12	Time 12:02 Temp © 10.66 pH 7.83 ORP (mv) 157 Cond(ms/cm 0.265 Turb (NTU) >1000 DO (mg/L) 3.48	72 360 5	Time 13:12 Temp © 10.69 pH 7.2 ORP (mv) 220 Cond(ms/cm 0.262 Turb (NTU) 4.80 DO (mg/L) 2.43	59.14 79.92
	MW-6	15:30	4/29/2019	58.84 74.43	16:09 18:01	Time 16:10 Temp © 12.15 pH 7.98 ORP (mv) 257 Cond(ms/cm 0.29 Turb (NTU) 315 DO (mg/L) 2.03	52 260 5	Time 18:00 Temp © 10.98 pH 7.22 ORP (mv) 155 Cond(ms/cm 0.29 Turb (NTU) 9.2 DO (mg/L) 0.75	58.87 74.5



MW-7

Well Number:

Well Construc	tion Inform	nation			
Stick-up o	r Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)	
F		Z			
Monitoring In	formation				
		0.0000000000000000000000000000000000000		Pump Intake Depth (ft btoc): (Mid Sat. Screen Interv	al)
61	34				
			11		2P
Number	Туре	Prese	rvative	Analytical Parameters	Filtered?
	Monitoring Initial E (ft bto	Stick-up or Flush Monitoring Information Initial DTW (ft btoc) 61.34 Sample Containers	Stick-up or Flush Diameter (in) Monitoring Information Initial DTW Saturate Interval (ft btoc) 6 1.34 Sample Containers	Stick-up or Flush Well Diameter (in) Monitoring Information Initial DTW Saturated Screen Interval (ft bgs or btoc) 6 1.34 Sample Containers	Stick-up or Flush Well Diameter (in) Total Depth (ft btoc) (ft bgs or btoc) Monitoring Information Initial DTW (ft btoc) Interval (ft bgs or btoc) Screen Interval (ft bgs or btoc) Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval (ft bgs or btoc)

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 Umin)	DTW (ft btoc)	Temp. (°C)	Conductivity (us/en)	D.O. (mg/L)	рН	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial		±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
10:00	2.0	0250		15.14	0.333	2.89	9.44	44	00	clear
10:05	3.25			13.34	0.274	1.86	8.63	73	0.0	
10310	4.5			12.92	0.263	4.97	7.85	108	0.0	
108/5	5.75			12.80	0261	4.74	7.52	125	0.0	
10820	7			12.78	00260	4.54	7.28	138	0.0	
10125		1								
	Start Sampli	ng		Sample ID:				Sample Time	9:	
	End Samplin	g		QA/QC Sample	ID:			QA/QC Sam	ple 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-MW7-051419 @ 10:25





mw-19

Well Number: MW-/9

Project Information		Well Constru	ction Inform	nation			
Project Name: P	RK WATER	Stick-up o	or Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)	
Sampling Information	pling Information Team: Fau u e Method: Low Flow			2			
Field Team:	Monitoring Information Low Flow Low Flow Low Flow Model: U-52 Serial Number: (in 2 Monitoring Information Initial DTW (ft btoc) Intended Sample Containers						
Purge Method: Sampling Method:		2777.00		1 12 37 57 57 57 57	ed Screen bgs or btoc)	Pump Intake Depth (ft btoc): (Mid Sat. Screen Interv	al)
Water Quality Meter:	Model: U-52	61.3	39				
	Serial Number:	Sample Conta	ainers				d?
Ourge Water Disposition:		Number	Туре	Prese	ervative	Analytical Parameters	Filtered?
Comments							

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	рН	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial	-	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
12:25	2	0.250		13.10	0.244	5.95	7.99	77	0.5	
12:30	3,25	1		13.11	0.246	5.09	7.98	89	0.0	
1235	4.5			12,93	0.245	4.87	7.96	99	0.0	
1240	5.75			12.89	0.245		7.93	106	0,0	
1245	7			12,92	0.247	4.53	7.93	110	0.0	
1250	8.25			12.95	0.247	4,77	7.93	113	0.0	
	Start Samplin	g		Sample ID:				Sample Tim	e:	
	End Sampling			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-MW19-051419 @ 12:50

M



collect duplicate

Well Number: MW-14
Date:

Well Construct	ion Inforn	nation			
Stick-up or	Flush	Well Diameter (in)	Total Depth (ft btoc)	Screen Interval (ft bgs or btoc)	
F		2			
Monitoring Info	rmation				
				Pump Intake Depth (ft btoc): (Mid Sat. Screen Interv	ral)
610	99				
Sample Contain	ners				42
Number	Туре	Prese	ervative	Analytical Parameters	Filtered?
	Mell Construct Stick-up or Monitoring Info Initial D' (ft btoo	Well Construction Inform Stick-up or Flush Monitoring Information Initial DTW (ft btoc) 6 / 6 9 9 Sample Containers	Well Construction Information Well Stick-up or Flush P Monitoring Information Initial DTW (ft btoc) Sample Containers	Well Construction Information Stick-up or Flush Well Diameter (in) Total Depth (ft btoc) Monitoring Information Initial DTW Saturated Screen Interval (ft bgs or btoc) 6 / 9 9 Sample Containers	Well Construction Information Well Diameter (in) Total Depth (ft btoc) Screen Interval (ft bgs or btoc) Monitoring Information Initial DTW (ft btoc) Interval (ft bgs or btoc) (ft btoc) Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval (ft bgs or btoc)

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pН	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On	(so simy	Initial	1	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
11810	2	0.250		14.42	0258	4.61	7.91	92	0.6	
11:15	3.25			1323	0252	2.59	7.78	108	0.0	
11820	4.5			13.12	0251	5.21	7.69	113	0.0	
11:25	5.75			13,19	0-252	5.66	7.65	109	0.0	
11:30	7			13.04	O.d 53	6.03	7.64	74	0.0	
11:35	8.25	1		12.93	0.253	5.64	7.64	55	000	
	Start Samplin	ng		Sample ID:				Sample Tim	e:	
	End Sampling			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-MW14-051419 PW-DUP-051419 Q 11:35

Q 12:40



Well Number:

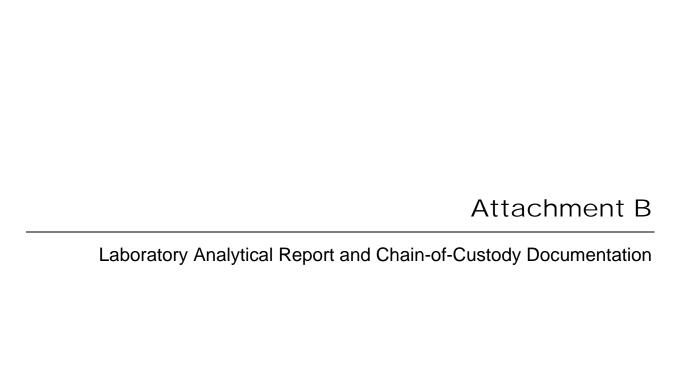
Project Information		
Project Name:	PARK NATER	
Project Number:		
Sampling Information		
Field Team:	Placis	
Purge Method:	Low Flow	
Sampling Method:	Low Flow	
Water Quality Meter:	Model: U-52	
	Serial Number:	
Purge Water Disposition	1:	
Comments		5 4

lell Constru	ction Inform	nation				
Stick-up or Flush		Well Diameter (in) Total Depth (ft btoc)		Screen Interval (ft bgs or btoc)		
F						
Monitoring In	formation			A. I		
Initial DTW (ft btoc)		Saturated Screen Interval (ft bgs or btoc) Pump Intake Depth (ft btoc): (Mid Sat. Screen Interval				
610	04					
Sample Conta	ainers		No. 2 STA		92	
Number	Туре	Prese	ervative	Analytical Parameters	Filtered?	
					-	
		1				
					1	

Time	Volume Purged (L)	Purge Rate (L/min) (<0.5 L/min)	DTW (ft btoc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pН	ORP (mV)	Turbidity (NTUs)	Clarity/Color/ Remarks
	Pump On		Initial	3	±3%	±10%	±0.1	±10mv	±10%	<= Stabilization Criteria
13:20	7/	0.250		15.73	0266	0.0	7.79	97	0.0	
13:25	2.25	1		1366	0.266	0.0	7.56	100	0.0	
13:30	3.5			13.29	0.267	0.0	7.51	101	0.0	
13635	4,75			13.27	0.266	0.0	7,43	101	0.0	
13:40	6			13.18	0.266	100	7.42	101	0.0	
	Start Samplin	ng		Sample ID:				Sample Time) ::	
	End Samplin	g		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-EB-05/419 a 14:00



DATA VALIDATION SUMMARY BNSF Parkwater - Spokane, WA

Laboratory Reports included in Data Validation	Dates	Sample IDs
Laboratory: ESC SDG: L1099176	Report Date: 5/23/2019	Aqueous Samples: PW-MW19-051419, PW-MW14-051419, PW-MW7-051419, PW-MW6-051419
Analyses: Metals, NWTPH-Dx	Sample Dates: 5/14/2019	Field Duplicates: PW-DUP-051419 (duplicate of PW-MW14-051419)
	Validation Date: 6/10/2019	Equipment Blank: PW-EB-051419 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	
<u>Laboratory method blank samples</u> – Analytes present in method blank samples?	No	
<u>Field/Equipment blank samples</u> – Analytes present in field/equipment blank samples?	No	
<u>Trip blank samples</u> – Analytes present in trip blank samples?	NA	Not collected.
Matrix Spikes (MS)/Matrix Spike Duplicate (MSD) samples – Control limits met?	Yes	
Surrogate percent recoveries – Control limits met?	Yes	
<u>Laboratory Control Sample (LCS)</u> – Control limits met?	Yes	
<u>Laboratory duplicate samples (if applicable)</u> – Control limits met?	NA	
<u>Field duplicate samples (if submitted)</u> – Relative percent differences within control limits?	Yes	
Other Issues?	No	

Temperature Note: Samples arrived at a temperature of 1 degrees Celsius (°C) which was within the recommended temperature of 0-6°C.

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.



ANALYTICAL REPORT

May 23, 2019



















Kennedy/Jenks Con-BNSF Region 1

Sample Delivery Group: L1099176 Samples Received: 05/15/2019

Project Number:

BNSF - Parkwater, WA Description:

Report To: Diane Tackett

421 SW 6th Avenue, Suite 1000

Portland, OR 97204

Entire Report Reviewed By:

Mark W. Beasley





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PW-DUP-051419 L1099176-02	6
PW-MW14-051419 L1099176-03	7
PW-MW7-051419 L1099176-04	8
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SAMPLE SUMMARY

Collected by

ONE		

Collected date/time Received date/time

PW-MW19-051419 L1099176-01 GW			Flavio	05/14/19 12:50	05/15/19 08:	45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICPMS) by Method 6020B	WG1283224	1	05/21/19 09:46	05/22/19 14:52	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG1283237	1	05/21/19 01:14	05/22/19 17:23	LD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) $\hfill \square$ by Method NWTPHDX-SGT	WG1282654	1	05/20/19 20:43	05/21/19 16:05	TH	Mt. Juliet, TN
DW DUD 054440 14000470 00 004			Collected by	Collected date/time 05/14/19 12:40	Received da 05/15/19 08:	
PW-DUP-051419 L1099176-02 GW			FIGVIO	03/14/19 12.40	03/13/19 06.	
Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Metals (ICPMS) by Method 6020B	WG1283224	1	05/21/19 09:46	05/22/19 15:57	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG1283237	1	05/21/19 01:14	05/22/19 17:29	LD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) \square by Method NWTPHDX-SGT	WG1282654	1	05/20/19 20:43	05/21/19 16:25	TH	Mt. Juliet, TN
			Collected by	Collected date/time	Received da	te/time
PW-MW14-051419 L1099176-03 GW			Flavio	05/14/19 11:35	05/15/19 08:	45

Dilution

1

1

Preparation

05/21/19 09:46

05/21/19 01:14

05/20/19 20:43

Collected by

Collected by

Collected by

Flavio

Flavio

Flavio

date/time

Analysis

date/time

05/22/19 16:03

05/22/19 17:34

05/21/19 16:45

05/14/19 10:25

05/14/19 14:00

05/14/19 13:40

PW-MW7-051419	L1099176-04 GW	
1 44-141447-051413	L1033170-04 OVV	

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

Method

Metals (ICPMS) by Method 6020B

Metals (ICPMS) by Method 6020B

Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Metals (ICPMS) by Method 6020B	WG1283224	1	05/21/19 09:46	05/22/19 16:08	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG1283237	1	05/21/19 01:14	05/22/19 17:49	LD	Mt. Juliet, TN
Semi-Volatile Organic Compounds $(GC) \square$ by Method NWTPHDX-SGT	WG1282654	1	05/20/19 20:43	05/21/19 17:05	TH	Mt. Juliet, TN

Batch

WG1283224

WG1283237

WG1282654

PW-EB-051419 L1099176-05 GW

Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Metals (ICPMS) by Method 6020B	WG1283224	1	05/21/19 09:46	05/22/19 16:13	LD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) $\hfill \square$ by Method NWTPHDX-SGT	WG1282654	1	05/20/19 20:43	05/21/19 17:25	TH	Mt. Juliet, TN

PW-MW6-051419 L1099176-06 GW

Method	Batch	Dilution	Preparation	Analysis	Analyst	Location
			date/time	date/time		
Metals (ICPMS) by Method 6020B	WG1283224	1	05/21/19 09:46	05/22/19 16:19	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG1283237	1	05/21/19 01:14	05/22/19 17:54	LD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC)□ by Method NWTPHDX-SGT	WG1282654	1	05/20/19 20:43	05/21/19 17:46	TH	Mt. Juliet, TN



















Location

Mt. Juliet, TN

Mt. Juliet, TN

Mt. Juliet, TN

Analyst

LD

LD

ΤH

05/15/19 08:45

05/15/19 08:45

05/15/19 08:45

Collected date/time Received date/time

Collected date/time Received date/time

Collected date/time Received date/time

Kennedy/Jenks Con-BNSF Region 1



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

Collected date/time: 05/14/19 12:50

SAMPLE RESULTS - 01 L1099176

ONE LAB. NATIONWIDE.

Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	4.32		0.250	2.00	1	05/22/2019 14:52	WG1283224
Arsenic, Dissolved	4.67		0.250	2.00	1	05/22/2019 17:23	WG1283237







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

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	05/21/2019 16:05	WG1282654
(S) o-Terphenyl	71.5			52.0-156		05/21/2019 16:05	WG1282654













SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.

Collected date/time: 05/14/19 12:40

Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	3.58		0.250	2.00	1	05/22/2019 15:57	WG1283224
Arsenic, Dissolved	3.13		0.250	2.00	1	05/22/2019 17:29	WG1283237

¹Cp





Semi-Volatile Organic Compounds (GC) \cite{G} by Method NWTPHDX-SGT

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	05/21/2019 16:25	WG1282654
(S) o-Terphenyl	93.0			52.0-156		05/21/2019 16:25	WG1282654













PW-MW14-051419

SAMPLE RESULTS - 03

ONE LAB. NATIONWIDE.

DE.

Collected date/time: 05/14/19 11:35

Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	3.23		0.250	2.00	1	05/22/2019 16:03	WG1283224
Arsenic, Dissolved	3.21		0.250	2.00	1	05/22/2019 17:34	WG1283237





Semi-Volatile Organic Compounds (GC) \cite{G} by Method NWTPHDX-SGT

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	05/21/2019 16:45	WG1282654
(S) o-Terphenyl	77.5			52.0-156		05/21/2019 16:45	WG1282654



Ss





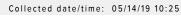






SAMPLE RESULTS - 04

ONE LAB. NATIONWIDE.



Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	3.05		0.250	2.00	1	05/22/2019 16:08	WG1283224
Arsenic, Dissolved	3.34		0.250	2.00	1	05/22/2019 17:49	WG1283237







	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	05/21/2019 17:05	WG1282654
(S) o-Terphenyl	99.0			52.0-156		05/21/2019 17:05	WG1282654



Ss













PW-EB-051419

Diesel Range Organics (DRO)

(S) o-Terphenyl

Analyte

SAMPLE RESULTS - 05

ONE LAB. NATIONWIDE.

Collected date/time: 05/14/19 14:00

Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	<u>Batch</u>
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	U		0.250	2.00	1	05/22/2019 16:13	WG1283224

RDL

ug/l

200

52.0-156



















Result

ug/l

67.5

U

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

Qualifier

MDL

ug/l

66.7

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	U		0.250	2.00	1	05/22/2019 16:13	WG1283224

Dilution

1

Analysis

date / time

05/21/2019 17:25

05/21/2019 17:25

Batch

WG1282654

WG1282654

PW-MW6-051419

SAMPLE RESULTS - 06

ONE LAB. NATIONWIDE.

Collected date/time: 05/14/19 13:40

Metals (ICPMS) by Method 6020B

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Arsenic	1.31	J	0.250	2.00	1	05/22/2019 16:19	WG1283224
Arsenic, Dissolved	1.40	J	0.250	2.00	1	05/22/2019 17:54	WG1283237

¹Cp





Semi-Volatile Organic Compounds (GC) \cite{G} by Method NWTPHDX-SGT

	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Analyte	ug/l		ug/l	ug/l		date / time	
Diesel Range Organics (DRO)	U		66.7	200	1	05/21/2019 17:46	WG1282654
(S) o-Terphenyl	79.0			52.0-156		05/21/2019 17:46	WG1282654













QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

Metals (ICPMS) by Method 6020B

L1099176-01,02,03,04,05,06

Method Blank (MB)

(MB) R3413931-1 05/22/19 14:37 MB Result

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



²Tc



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

(LCS) R3413931-2 05/22/19 14:42 • (LCSD) R3413931-3 05/22/19 14:47

,	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%	
Arsenic	50.0	52.3	53.1	105	106	80.0-120			1.45	20	





⁶Qc

L1099176-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1099176-01 05/22/19 14:52 • (MS) R3413931-5 05/22/19 15:03 • (MSD) R3413931-6 05/22/19 15:08

. ,	Spike Amount	Original Result		MSD Result	MS Rec.	MSD Rec.	Dilution	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits	
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%	
Arsenic	50.0	4.32	58.9	56.3	109	104	1	75.0-125			4.55	20	







QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

Metals (ICPMS) by Method 6020B

L1099176-01,02,03,04,06

Method Blank (MB)

(MB) R3413929-1 05/22/19 16:47										
	MB Result	MB Qualifier	MB MDL	MB RDL						
Analyte	ug/l		ug/l	ug/l						
Arsenic, Dissolved	U		0.250	2.00						









(LCS) R3413929-2	05/22/19 16:52	• (LCSD) R3413929-3	05/22/19 16:58	

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%
Arsenic, Dissolved	50.0	52.1	50.4	104	101	80.0-120			3.30	20







(OS) L1099676-05 05/22/19 17:03 • (MS) R3413929-5 05/22/19 17:13 • (MSD) R3413929-6 05/22/19 17:18

(00) 21000070 00 0	(30) 21033370 00 00/22/10 17:00 (110) No 110323 0 00/22/10 17:10											
	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	n Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Arsenic, Dissolved	50.0	4.93	53.5	55.1	97.2	100	1	75.0-125			2.84	20







QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.

Semi-Volatile Organic Compounds (GC) ${\mathbin{\mathbin{\sqcup}}}$ by Method NWTPHDX-SGT

L1099176-01,02,03,04,05,06

Method Blank (MB)

(MB) R3413560-1 05/21/19 14:43							
	MB Result	MB Qualifier	MB MDL	MB RDL			
Analyte	ug/l		ug/l	ug/l			
Diesel Range Organics (DRO)	U		66.7	200			
(S) o-Terphenyl	56.5			52.0-156			







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

(LCS) R3413560-2 05/21/19 15:03 • (LCSD) R3413560-3 05/21/19 15:23											
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits	
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%	
Diesel Range Organics (DRO)	1500	1270	1200	84.7	80.0	50.0-150			5.67	20	
(S) o-Ternhenyl				101	94 5	52 0-156					













GLOSSARY OF TERMS

ONE LAB. NATIONWIDE.

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.

Abbreviations and Definitions

, 100101110111011101111	
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 identification of the analyte is acceptable; the reported value is an estimate.





















ACCREDITATIONS & LOCATIONS





State Accreditations

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia ¹	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
lowa	364
Kansas	E-10277
Kentucky 16	90010
Kentucky ²	16
Louisiana	Al30792
Louisiana ¹	LA180010
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086

Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey-NELAP	TN002
New Mexico ¹	n/a
New York	11742
North Carolina	Env375
North Carolina ¹	DW21704
North Carolina ³	41
North Dakota	R-140
Ohio-VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LAO00356
South Carolina	84004
South Dakota	n/a
Tennessee 1 4	2006
Texas	T104704245-18-15
Texas ⁵	LAB0152
Utah	TN00003
Vermont	VT2006
Virginia	460132
Washington	C847
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01
A2LA – ISO 17025 ⁵	1461.02
Canada	1461.01
EPA-Crypto	TN00003

AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

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.



















and the second s			Billing Information:						A	nalysi	s / Conta	iner / Pri	eservative	Chain of Custody Page of			
32001 32				ts Payable 2nd Ave. S.,Ste. 100 Way, WA 98001			Pres L ²		12						Pace.	Analytical * anter for Teeting & Innovestion	
Report to: Diane Tackett	DianeTackett@KennedyJenks.com, gren@kennedyjenks.com,											12065 Lebanon Rd Mount Juliet, TN 37 Phone: 615-758-58					
Project Description: BNSF - Parkwater, W	City/State STOKANS											Phone: 800-767-58 Fax: 615-758-5859	. P.				
Phone: 503-423-4000 Fax:	Client Project	nt Project #			Lab Project # BNSF1KEN-PARKWATER			NWTPHDXLVI 40mlAmb-HCI-BT	250mlHDPE-HNO3					L# CI		09176	
Collected by (print):	Site/Facility ID	#		P.O. #	40		250mlHDPE-	IAmb	HHD						Acctnum: BN:	num; BNSF1KEN	
Collected by (signature):	Street Street Street Street	ab MUST Be		Quote #	1941		(FF)	1 40m	0 250					Template:T14978			
mmediately Acked on Ice NY_	Next Day	5 Day	(Rad Only)	Date R	esults Needed	No.	020	НРХ ГУ	As 6020					TSR: 134 - Mark W. Bea		k W. Beasley	
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs SSIO		TWI	Total						Shipped Via: F	Sample # (lab only)	
PW-mw19-05141	7	GW		5/14/10	1 /2:50	4	V	V	V							-01	
PW-DUP-05/4/9		GW		11	17:40	7 100000	V	V	V						3 K	-91	
Pur-mw14-05/41	9	GW		V	11:35	4	~	V	V	1000					S. VIETE	.03	
PW-MW7-05/4/4		GW		()	10:25		/	V	/							140	
PW-EB-05/4/9		GW		- (1	14:00	3	1	/	V							105	
PW-MW6-05/49		GW		4	13:40	14	V	V	V	V						-06	
		GW										-					
		GW										40.					
		GW						PVA	0.50	REE	N: <0.	mR/I	r				
	1.4	GW		1					1 3	14		F			11-50	1	
Matrix: - Soil AIR - Air F - Filter W - Groundwater B - Bioassay W - WasteWater									pi	1	Tem		COC Sea COC Sig Bottles	Sample Receipt C 1 Present/Intact ned/Accurate: arrive intact:	hecklist : NP N N EY N		
		turned via: FedEx _ Courier Tracking # 1/5)						49	7	1-	7			Correct bottles used: Y N Sufficient volume sent: Y N If Applicable			
elinquished by : (Signature)	~	Date: 05/4	14/19 15:50 Received by: (Signatur					111-110					VOA Zero Headspace: Preservation Correct/Checked: Y N If preservation required by Login: Date/Time				
700			lime:	Received by: (Signature)					Temp: °C Bottles Received:								
elinquished by : (Signature)	Date: Time: Received for lab by				Received for lab by:	(Signat	ure)	Signature)			Date: Fiffie: 5/15/19 0845			Hold:		Condition: NCF / ON	



Login #: L1099176	Client: BNSF1KEN	Date: 5/15/19	Evaluated by: Troy Dunlap

Non-Conformance (check applicable items)

Sample Integrity	133	Chain of Custody Clarification	
Parameter(s) past holding time		Login Clarification Needed	If Broken Container:
Temperature not in range		Chain of custody is incomplete	Insufficient packing material around container
Improper container type		Please specify Metals requested.	Insufficient packing material inside cooler
pH not in range.		Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courie
Insufficient sample volume.		Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	x	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.		Trip Blank not received.	If no Chain of Custody:
Broken container		Client did not "X" analysis.	Received by:
Broken container:		Chain of Custody is missing	Date/Time:
Sufficient sample remains		7	Temp./Cont. Rec./pH:
			Carrier:
			Tracking#

<u>Login Comments: Received two containers for PW-EB-051419 one with time 1400 which matches the COC and one with time 1340 that matches PW-MW6 time. Did not receive a total metals container for PW-MW6 for Total metals. Logged the mislabeled container with correct time as PW-MW6 at 1340.</u>

Client informed by:	Call	Email	Voice Mail	Date: 5/16/19	Time: 0810	
TSR Initials: MR	Client Con	tact:				

Login Instructions:

Log per times