

Taproot Rockies Midstream
Boomslang Produced Water Release
Spill/Release Point ID 480564
Briggsdale, Colorado

Table 1. Summary of Analytical Results

Station Name	CAS Number	Units	Protection of Groundwater Soil Screening Level	Residential Soil Screening Level Concentrations	BS-1	FS-1	FS2	SS1	SS2	SS3	SS4	SS5	SS6
Sample Date					8/20/2021	8/20/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021
Sample Depth					0.5 - 0.5 ft	11 - 11 ft	10 - 10.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft
Metals													
ARSENIC	7440-38-2	mg/kg	0.29	0.68	3.24	2.28	3.14	2.02	2.28	2.74	2.34	2.55	2.95
BARIUM	7440-39-3	mg/kg	82	15,000	350	405	110	166	139	175	292	188	242
CADMIUM	7440-43-9	mg/kg	0.38	71	0.122	0.121	0.293	0.289	0.281	0.326	0.241	0.213	0.279
COPPER	7440-50-8	mg/kg	46	3,100	10.8	6.31	11.3	8.4	8.54	9.39	5.83	7.65	8.03
CHROMIUM (VI)	18540-29-9	mg/kg	0.00067	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1
LEAD	7439-92-1	mg/kg	14	400	9.29	7.55	8.44	9.52	9.67	9.51	8.33	8.91	11.3
NICKEL	7440-02-0	mg/kg	26	1,500	9	5.44	10.3	6.98	6.95	8.36	5.47	6.31	7.78
SELENIUM	7782-49-2	mg/kg	0.26	390	1.76	<2	1.05	0.877	0.994	0.96	<2	1.02	1.05
SILVER	7440-22-4	mg/kg	0.8	390	<1	<1	<1	<1	<1	<1	<1	<1	<1
ZINC	7440-66-6	mg/kg	370	23,000	35.1	23.8	39.9	32.1	32.6	31.4	21.7	23.5	28.8
VOCs													
BENZENE	71-43-2	mg/kg	0.0026	1.2	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHYLBENZENE	100-41-4	mg/kg	0.78	5.8	<0.0025	0.0243	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
TOLUENE	108-88-3	mg/kg	0.69	490	<0.005	0.0397	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
XYLENES, TOTAL	1330-20-7	mg/kg	9.9	58	<0.0065	0.0869	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065
1,2,4-TRIMETHYLBENZENE	95-63-6	mg/kg	0.0081	30	<0.005	0.0473	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,3,5-TRIMETHYLBENZENE	108-67-8	mg/kg	0.0087	27	<0.005	0.0119	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Semi-VOCs													
1-METHYLNAPHTHALENE	90-12-0	mg/kg	0.006	18	<0.02	0.0383	<0.02	<0.02	<0.02	0.00451	<0.02	<0.02	<0.02
2-CHLORONAPHTHALENE	91-58-7	mg/kg	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-METHYLNAPHTHALENE	91-57-6	mg/kg	0.019	24	<0.02	0.0326	<0.02	<0.02	<0.02	0.00652	<0.02	<0.02	<0.02
ACENAPHTHENE	83-32-9	mg/kg	0.55	360	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
ACENAPHTHYLENE	208-96-8	mg/kg	--	--	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
ANTHRACENE	120-12-7	mg/kg	5.8	1,800	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(A)ANTHRACENE	56-55-3	mg/kg	0.011	1.1	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(A)PYRENE	50-32-8	mg/kg	0.24	0.11	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0.3	1.1	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(G,H,I)PERYLENE	191-24-2	mg/kg	--	--	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(K)FLUORANTHENE	207-08-9	mg/kg	2.9	11	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
CHRYSENE	218-01-9	mg/kg	9	110	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0.096	0.11	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
FLUORANTHENE	206-44-0	mg/kg	8.9	240	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
FLUORENE	86-73-7	mg/kg	0.54	240	<0.006	0.00242	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0.98	1.1	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
NAPHTHALENE	91-20-3	mg/kg	0.0038	2	<0.0125	0.017	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PHENANTHRENE	85-01-8	mg/kg	--	--	<0.006	0.00612	<0.006	0.00639	0.00874	<0.006	<0.006	<0.006	<0.006
PYRENE	129-00-0	mg/kg	1.3	180	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
TPH**													
TPH (GC/FID) LOW FRACTION	8006-61-9	mg/kg	--	500	<0.1	10.4	0.0434	0.0691	0.0504	0.0397	<0.1	<0.1	<0.1
C10-C28 DIESEL RANGE	NA	mg/kg	--	500	<4	26.8	<4	22.6	12.5	<4	1.86	2.16	2.13
C28-C36 MOTOR OIL RANGE	NA	mg/kg	--	500	4.55	25.7	<4	56.2	40	3.39	3.94	5.64	5.95

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Sample Depth					0.5 - 0.5 ft	11 - 11 ft	10 - 10.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft	0.5 - 0.5 ft
Soil Suitability for Reclamation**													
HOT WATER SOL. BORON	7440-42-8	mg/l	--	2	0.359	0.673	0.289	1.31	0.249	0.18	0.183	0.291	0.166
PH	NA	s.u.	--	6 - 8.3	8.58	7.53	7.82	7.8	7.9	8.31	8.63	8.43	8.45
SODIUM ADSORPTION RATIO	NA	Na/(Ca+Mg)	--	6	2.55	5.93	1.83	17.9	0.296	1.05	0.23	1.72	0.923
SPECIFIC CONDUCTANCE	Specific Conductance	mmhos/cm	--	4	0.345	2.37	2.88	4.00	3.48	0.226	0.203	0.327	0.277

NOTES:

Boldface type indicates the analyte was detected above the reporting limit.

Highlighted text indicates an exceedance of either the protection of groundwater soil screening level or residential soil screening level.

** Where RSSL or protection of groundwater screening level is not present, Table 915-1 Cleanup Concentrations are used.

-- No standard established.

NA Not applicable.

NS Not sampled.

BS indicates a background sample collected from unaffected soil nearby.

FS indicates a sample collected from the floor of an excavation.

SS indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.

SW indicates a sample collected from the sidewall of an excavation.

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Station Name	SS7	SS8	SS9	SS10	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12	SW13
Sample Date	9/23/2021	4/27/2022	4/27/2022	4/27/2022	8/20/2021	8/20/2021	8/20/2021	8/20/2021	8/20/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021
Sample Depth	0.5 - 0.5 ft	1 - 1 ft	1 - 1 ft	1 - 1 ft	9 - 9 ft	4 - 4 ft	4 - 4 ft	4 - 4 ft	4 - 4 ft	4.5 - 5 ft	6 - 6.5 ft	4 - 4.5 ft	5 - 5.5 ft	4 - 4.5 ft	6 - 6.5 ft	3 - 3.5 ft	3.5 - 4 ft
Metals																	
ARSENIC	7.59	NS	NS	NS	7.84	6.33	3.69	15.6	3.53	2.06	2.76	2.76	2.99	2.62	2.29	2.9	2.68
BARIUM	165	165	163	131	414	298	339	401	369	228	213	262	228	309	195	218	230
CADMIUM	0.389	NS	NS	NS	0.102	0.093	0.186	0.148	0.112	0.197	0.295	0.22	0.272	0.234	0.233	0.261	0.26
COPPER	16	NS	NS	NS	12.7	10.8	10.4	10.5	9.16	5.73	9.54	7.88	9.38	7.71	7.65	9.37	9.03
CHROMIUM (VI)	<1	NS	NS	NS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
LEAD	12.1	NS	NS	NS	10.6	11.8	13.3	10	11.2	7.54	10	9.18	8.37	8.58	8.02	8.48	7.59
NICKEL	11.4	NS	NS	NS	8.39	8.17	8.75	9.08	7.75	4.99	9.07	7.34	8.1	7.57	7.07	8.89	8.18
SELENIUM	1.55	NS	NS	NS	1.65	<2	1.59	1.89	1.21	<2	1.82	<2	0.793	<2	1.23	<2	1.25
SILVER	<1	NS	NS	NS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ZINC	39.7	NS	NS	NS	30.8	28.2	34	36.8	31.1	20.1	34.6	27.8	31.3	29.4	28.1	33.4	32
VOCs																	
BENZENE	<0.001	NS	NS	NS	0.0006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHYLBENZENE	<0.0025	NS	NS	NS	<0.0025	<0.0025	<0.0025	0.0047	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
TOLUENE	<0.005	NS	NS	NS	<0.005	<0.005	<0.005	0.0017	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
XYLENES, TOTAL	<0.0065	NS	NS	NS	0.00523	<0.0065	<0.0065	0.0257	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	0.00104
1,2,4-TRIMETHYLBENZENE	<0.005	NS	NS	NS	0.00755	<0.005	<0.005	0.04	0.00168	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00535
1,3,5-TRIMETHYLBENZENE	<0.005	NS	NS	NS	<0.005	<0.005	<0.005	0.00867	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Semi-VOCs																	
1-METHYLNAPHTHALENE	<0.02	NS	NS	NS	0.0773	<0.02	0.00746	0.63	0.0774	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.00545
2-CHLORONAPHTHALENE	<0.02	NS	NS	NS	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-METHYLNAPHTHALENE	<0.02	NS	NS	NS	0.0649	<0.02	<0.02	0.384	0.0537	<0.02	<0.02	<0.02	<0.02	<0.02	0.00576	<0.02	<0.02
ACENAPHTHENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	0.0144	0.00247	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
ACENAPHTHYLENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
ANTHRACENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(A)ANTHRACENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(A)PYRENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(B)FLUORANTHENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	0.00369	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(G,H,I)PERYLENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
BENZO(K)FLUORANTHENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
CHRYSENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	0.0178	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
DIBENZ(A,H)ANTHRACENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
FLUORANTHENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	0.00726	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
FLUORENE	<0.006	NS	NS	NS	0.0101	<0.006	<0.006	0.084	0.0096	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.00237
INDENO(1,2,3-CD)PYRENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
NAPHTHALENE	<0.02	NS	NS	NS	0.0106	<0.0125	<0.0125	0.08	<0.0125	<0.02	<0.02	<0.02	<0.02	<0.02	0.00425	0.00526	<0.02
PHENANTHRENE	<0.006	NS	NS	NS	0.023	<0.006	0.00622	0.317	0.028	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.0171
PYRENE	<0.006	NS	NS	NS	<0.006	<0.006	<0.006	0.0177	0.00205	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.00233
TPH**																	
TPH (GC/FID) LOW FRACTION	<0.1	NS	NS	NS	3.09	0.0441	<0.1	1.52	<0.1	0.0383	0.0343	0.0349	0.0351	<0.1	0.0447	0.0402	2.1
C10-C28 DIESEL RANGE	1.92	NS	NS	NS	51.3	<4	9.63	149	52.1	<4	<4	<4	<4	<4	<4	<4	63.6
C28-C36 MOTOR OIL RANGE	3.42	NS	NS	NS	35.1	0.987	13.2	109	33.9	0.697	0.863	0.368	<4	<4	<4	<4	44.1

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Sample Date	9/23/2021	4/27/2022	4/27/2022	4/27/2022	8/20/2021	8/20/2021	8/20/2021	8/20/2021	8/20/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021	9/23/2021
Sample Depth	0.5 - 0.5 ft	1 - 1 ft	1 - 1 ft	1 - 1 ft	9 - 9 ft	4 - 4 ft	4 - 4 ft	4 - 4 ft	4 - 4 ft	4.5 - 5 ft	6 - 6.5 ft	4 - 4.5 ft	5 - 5.5 ft	4 - 4.5 ft	6 - 6.5 ft	3 - 3.5 ft	3.5 - 4 ft
Soil Suitability for Reclamation**																	
HOT WATER SOL. BORON	0.291	0.384	0.287	0.442	1.11	0.463	0.363	0.619	0.503	0.238	0.168	0.109	0.567	0.0208	0.269	0.22	0.411
PH	8.24	8.27	7.81	7.77	7.98	8.39	8.3	8.12	8.15	7.97	8.63	8.57	9.59	9.49	9.62	9.43	8.88
SODIUM ADSORPTION RATIO	3.75	0.264	0.146	0.961	6.92	1.68	2.12	4.01	4.23	2.61	2.35	0.213	3.46	2.56	2.52	2.03	4.77
SPECIFIC CONDUCTANCE	0.966	0.1810	0.1990	0.3180	2.47	0.408	0.556	1.31	1.42	2.76	0.970	0.164	0.629	0.507	0.522	0.464	0.858