



January 18, 2023

Dave Brazeal  
Dale Hunt  
Director of Operations  
Taproot Energy Partners  
518 17<sup>th</sup> Street, Suite 1800  
Denver, Colorado 80202

Submitted via e-mail to [dhunt@taprootep.com](mailto:dhunt@taprootep.com)

**RE: Confirmation Soil Sampling Following Produce Water Release  
Spill/Release ID Point 483128 near Keota, Colorado**

Dear Mr. Brazeal and Mr. Hunt,

Environmental Works, Inc. (EWI) is pleased to submit this letter report summarizing the additional investigation activities completed in conjunction with the initial release response on October 17, 2022, and follow-up confirmation sampling and excavation activities completed on October 18<sup>th</sup> through 20<sup>th</sup>, and December 20<sup>th</sup> through the 21<sup>st</sup>, 2022 at the Pintail Latera Spill/Release Point ID 483128 near Keota, Colorado (the Site). The purpose of this report is to aid with the submission of the Final Form 19 supplemental to the Colorado Oil and Gas Conservation Commission (COGCC) and to satisfy the requirements to achieve Site closure in accordance with COGCC Guidance Rule 913.

### Summary of Work Completed

Immediately following the discovery of the release of produced water, EWI began directing excavation and hydroexcavation activities. An emergency response report was developed by EWI following the release and was attached to the supplemental 10-day Form 19. With samples collected and submitted on 10/20, the Site was secured awaiting further direction from the initial analytical results. EWI re-mobilized to the Site on December 20<sup>th</sup> to direct the excavation of soils within the secondary excavation where produced water appears to have flowed and infiltrated soils to a depth of at least 3.5' based on initial analytical results. Surveying of maximum impacted aerial extent was completed hours after the release by Avery Technical Resources. GPS coordinates, sample names, and sample depths are recorded in Appendix A in accordance with COGCC Guidance Rule 915. Sample locations, the produced water line, excavation extents, and select site features for reference are depicted on Figure 1A and 1B.

Based on evaluation of Site survey data, the following samples were recommended in accordance COGCC Guidance Table 915-1:

- 5 sidewall samples (SW1 through SW5) for the primary excavation where the release occurred. Five initial sidewall samples have been collected, and additional are planned as part of a drilling investigation.
- Two floor samples were collected at two separate depths (FS1 and FS2) for the primary excavation where the release occurred of less than 500 square feet (sq. ft.). The floor samples

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were collected from the bottom of the excavation (from 8-8.5 feet below ground surface [bgs]) from the area directly under the failed pipe where the highest impacts to soil would be expected, in accordance with COGCC Guidance Rule 915.

- Five surface samples (SS1 through SS5) were collected from areas within the footprint of shallow impacted soil. Samples were collected from areas where approximately 0.5-1' of soil were initially removed. Additionally, samples SS1, SS2, and SS3 had an additional sample collected from 3' to 3.5' bgs to assist with vertical delineation and Site understanding. Approximately 13,500 sq ft. of impacted soil was initially observed. Confirmed by the onsite geologist, field observations, and a handheld soil conductivity meter.
- One background sample (BS1) was collected from soil outside the impacted area representative of native soil conditions.

Soil borings for sidewall samples were advanced with a hand auger while the excavations remained open following the initial release. Continuous soil screening for the presence of volatile organic compounds (VOCs) was also conducted on sidewall sample borings using a photoionization detector (PID) to aid in understanding Site conditions. Following sampling, soil borings were abandoned with clean soil cuttings and the hand auger was decontaminated between borings.

Samples were immediately placed on ice and delivered to Origins laboratory for analysis. All samples collected initially were analyzed for the full list of Table 915-1 analytes. Table 1 presents the full analytical results and compares them with the Residential Soil Screening Level Concentrations (RSSLs) and the Protection of Groundwater Soil Screening Level Concentrations listed in Table 915-1. According to COGCC Rule 915 RSSLs will be used unless otherwise required by the COGCC. Full Analytical Results are attached as Appendix B. Groundwater is located at an estimated 70 feet below ground surface based on topography and nearby well data. Well data backup was attached on previous Form 19 Supplemental reports.

A photographic log is attached as Appendix C to aid with the determination that appropriate action was taken to remove impacted material with the goal of achieving Site closure.

## **Results and Proposed Sampling**

Exceedances of the RSSLs were only observed for arsenic, boron, pH, sodium absorption ration (SAR), and conductivity.

Boron was detected above the soil suitability for reclamation standard of 2 mg/kg in all but BS1, SS1-3, SS2-3, SS3-3, and SW2. Exceedances ranged from slightly over the standard in FS1 (2.49 mg/kg) to 11.4 mg/kg in SW4. Additional excavation surrounding the primary release location was completed the week of 10/24 as the Thermoflex pipe was removed along the entire segment of produced water line.

SAR exceeded the RSSL in FS2, SS1-0.5, SS2-0.5, SS3-0.5, SS4, SS5, SW4, and SW5. Additional excavation was completed to address these exceedances. Limited exceedances likely remain in place and additional investigation is anticipated in the first quarter of 2023. Several of the observed exceedances occur below the root zone and a development of a reclamation plan may be advised to allow limited exceedances to remain in place.

Conductivity exceeded the RSSL of 4 mmhos/cm in several initial samples surrounding the primary excavation at a maximum concentration of 12.6 mmhos/cm. Deeper samples collected from 3-3.5' in SS1, SS2, and SS3 exhibited lower, but still elevated concentrations in several locations. Due to facility

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infrastructure a reclamation plan will be developed to allow limited exceedances to be left in place below the root zone.

Arsenic was detected at concentrations above the RSSL in all soil samples that were analyzed, including the background samples, (3.59 milligrams per kilogram [mg/kg] in BS1-0.5 and 3.49 mg/kg in BS1-3). Concentrations of arsenic can vary significantly within a vertical section of soil due to natural variations within soil types. Although arsenic was elevated in many samples, concentrations were highest in the background sample. Additional background samples are required at the depths of sidewall and floor samples. The concentrations observed at the Site are similar to elevated arsenic levels found in soils across the state and should not be a barrier to Site closure.

No TPH, semi-volatile or volatile organic compounds (VOCs) were detected in any soil samples above RSSLs. TPH was not detected above laboratory reporting limits in any soil samples collected.

Soil samples at the Site following the initial excavation exhibited several exceedances of the RSSLs and Protection of Groundwater Screening Level Concentrations, primarily for reclamation parameters. A secondary excavation was completed around the primary excavation to address the initial exceedances, however some exceedances for reclamation parameters still remained. Vertical delineation is incomplete surrounding the primary excavation as well as within the secondary excavation area. Additional shallow soil excavation is anticipated following the proposed soil sampling investigation.

Following additional excavation activities, confirmation soil samples will be collected to help delineate the vertical and horizontal extent of impacts at the Site where limited exceedances remain. A reclamation may be developed to address remaining within the primary excavation, as well as impacts below a feasible depth of excavation.

EWI believes a reduction in sample analysis to just Table 915 reclamation parameters is warranted based on initial sample results.

We appreciate the opportunity to provide this letter report to Taproot Energy Partners. Please contact me at 507-475-2825 or [akubat@environmentalworks.com](mailto:akubat@environmentalworks.com) if you have questions or we can be of further service.

Sincerely,

Adam Kubat, P.G.  
Professional Geologist  
Environmental Works, Inc.

# Figure 1A - Site Layout

Maximum aerial impacts

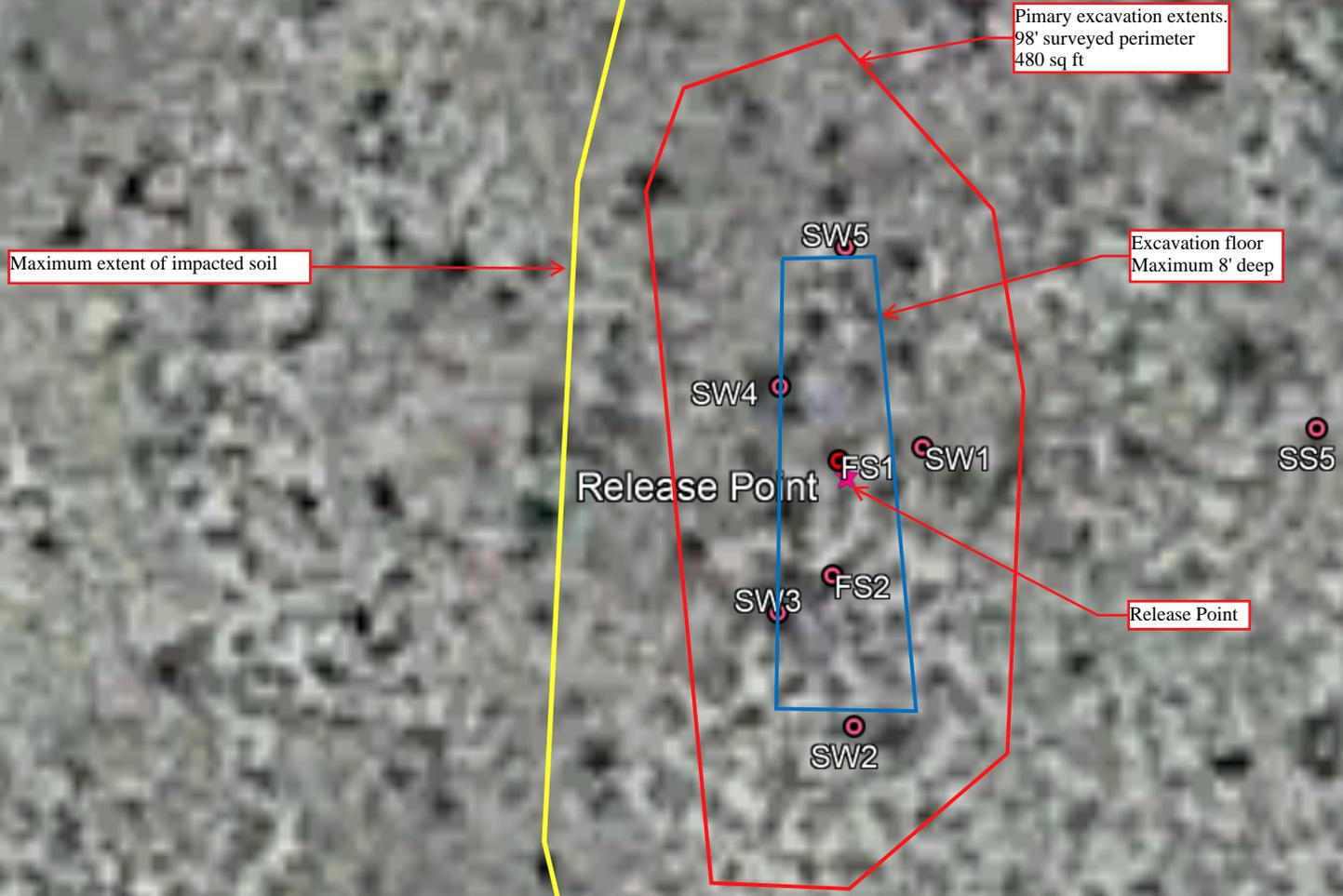


Maximum extent of impacted soil. Soil excavated to ~2.5' depth  
Maximum aerial extent surveyed at 13,500 sq ft impacted.

Primary Excavation

# Figure 1B - Primary Excavation

Primary Excavation Location  
soil sampling points



Taproot Rockies Midstream  
Pintail Lateral - Produced Water Release  
Spill/Release Point ID 483128  
Keota, Colorado

**Table 1. Summary of Analytical Results**

Station Name	CAS Number	Units	Protection of Groundwater Soil Screening Level	Residential Soil Screening Level Concentrations	BS1	BS1	SS1	SS1	SS2	SS2	SS3	SS3
Sample Date					10/18/22	10/18/22	10/18/22	10/18/22	10/18/22	10/18/22	10/18/22	10/18/22
Sample Depth					0 - 0.5 ft	3 - 3.5 ft	0 - 0.5 ft	3 - 3.5 ft	0 - 0.5 ft	3 - 3.5 ft	0 - 0.5 ft	3 - 3.5 ft
<b>Metals</b>												
ARSENIC	7440-38-2	mg/kg	0.29	0.68	<b>3.59</b>	<b>3.49</b>	<b>3.43</b>	<b>3.75</b>	<b>3.61</b>	<b>3.80</b>	<b>3.53</b>	<b>4.78</b>
BARIUM	7440-39-3	mg/kg	82	15,000	<b>186</b>	<b>215</b>	<b>191</b>	<b>200</b>	<b>145</b>	<b>400</b>	<b>141</b>	<b>211</b>
CADMIUM	7440-43-9	mg/kg	0.38	71	<b>0.157</b>	<b>0.134</b>	<b>0.173</b>	<b>0.127</b>	<b>0.147</b>	<b>0.127</b>	<b>0.139</b>	<b>0.116</b>
CALCIUM	7440-70-2	mg/l			<b>2.62</b>	<b>1.79</b>	<b>14.8</b>	<b>58.5</b>	<b>25.6</b>	<b>35.4</b>	<b>35</b>	<b>60.8</b>
CHROMIUM	7440-47-3	mg/kg	0.00067	0.3	<1.22	<0.244	<1.22	<0.488	<0.488	<0.251	<1.26	<0.244
COPPER	7440-50-8	mg/kg	46	3,100	<b>13.1</b>	<b>11.1</b>	<b>10.7</b>	<b>10.3</b>	10.6	10.6	<b>11.6</b>	<b>10.0</b>
LEAD	7439-92-1	mg/kg	14	400	<b>14.2</b>	<b>15.9</b>	<b>14.3</b>	<b>20.5</b>	<b>11.6</b>	<b>11.4</b>	<b>12.0</b>	<b>16.7</b>
MAGNESIUM	7439-95-4	mg/l			<b>1.02</b>	<0.823	<b>5.08</b>	<b>21.3</b>	<b>9.34</b>	<b>13.2</b>	<b>13.0</b>	<b>25.9</b>
NICKEL	7440-02-0	mg/kg	26	1,500	<9.53	<9.13	<9.95	<8.79	<9.15	<9.70	<9.79	<9.72
SELENIUM	7782-49-2	mg/kg	0.26	390	<b>0.158</b>	<0.0913	<b>0.115</b>	<b>0.112</b>	<b>0.137</b>	<0.0970	<b>0.128</b>	<0.0972
SILVER	7440-22-4	mg/kg	0.8	390	<0.0953	<0.0913	<0.0995	<0.0879	<0.0915	<0.0970	<0.0979	<0.0972
SODIUM	7440-23-5	mg/l			<b>0.812</b>	<b>2.76</b>	<b>91.8</b>	<b>10.7</b>	<b>85.9</b>	<b>22.1</b>	<b>66.4</b>	<b>29.0</b>
ZINC	7440-66-6	mg/kg	370	23,000	<95.3	<91.3	<99.5	<87.9	<91.5	<97.0	<97.9	<97.2
<b>VOCs</b>												
BENZENE	71-43-2	mg/kg	0.0026	1.2	<0.00200	<0.00200	<0.00200	<0.00200	<b>0.00374</b>	<0.00200	<0.00200	<b>0.00522</b>
ETHYLBENZENE	100-41-4	mg/kg	0.78	5.8	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
TOLUENE	108-88-3	mg/kg	0.69	490	<0.00200	<0.00200	<0.00200	<0.00200	<b>0.00536</b>	<0.00200	<0.00200	<b>0.00282</b>
XYLENES, TOTAL	1330-20-7	mg/kg	9.9	58	<0.00200	<0.00200	<b>0.00218</b>	<0.00200	<b>0.00316</b>	<0.00200	<0.00200	<0.00200
1,2,4-TRIMETHYLBENZENE	95-63-6	mg/kg	0.0081	30	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
1,3,5-TRIMETHYLBENZENE	108-67-8	mg/kg	0.0087	27	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
<b>Semi-VOCs</b>												
1-METHYLNAPHTHALENE	90-12-0	mg/kg	0.006	18	<0.000364	<0.000364	<b>0.00586</b>	<0.000364	<0.00182	<0.000364	<0.000364	<0.00182
2-METHYLNAPHTHALENE	91-57-6	mg/kg	0.019	24	<0.000645	<0.000645	<0.00323	<0.000645	<0.00323	<0.000645	<0.000645	<0.00323
ACENAPHTHENE	83-32-9	mg/kg	0.55	360	<0.000304	<0.000304	<0.00152	<0.000304	<0.00152	<0.000304	<0.000304	<0.00152
ANTHRACENE	120-12-7	mg/kg	5.8	1,800	<0.000334	<0.000334	<0.00167	<0.000334	<0.00167	<0.000334	<0.000334	<0.00167
BENZO(A)ANTHRACENE	56-55-3	mg/kg	0.011	1.1	<0.000493	<0.000493	<0.00247	<0.000493	<0.00247	<0.000493	<0.000493	<0.00247
BENZO(A)PYRENE	50-32-8	mg/kg	0.24	0.11	<0.000468	<0.000468	<b>0.00278</b>	<0.000468	<b>0.00332</b>	<0.000468	<0.000468	<0.00234
BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0.3	1.1	<0.000585	<0.000585	<0.00293	<0.000585	<0.00293	<0.000585	<0.000585	<0.00293
BENZO(K)FLUORANTHENE	207-08-9	mg/kg	2.9	11	<0.000437	<0.000437	<0.00219	<0.000437	<0.00219	<0.000437	<0.000437	<0.00219
CHRYSENE	218-01-9	mg/kg	9	110	<0.000624	<0.000624	<0.00312	<0.000624	<0.00312	<0.000624	<0.000624	<0.00312
DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0.096	0.11	<0.000614	<0.000614	<0.00307	<0.000614	<0.00307	<0.000614	<0.000614	<0.00307
FLUORANTHENE	206-44-0	mg/kg	8.9	240	<0.000394	<0.000394	<0.00197	<0.000394	<0.00197	<0.000394	<0.000394	<0.00197
FLUORENE	86-73-7	mg/kg	0.54	240	<0.000286	<0.000286	<0.00143	<0.000286	<0.00143	<0.000286	<0.000286	<0.00143
INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0.98	1.1	<0.000627	<0.000627	<0.00314	<0.000627	<0.00314	<0.000627	<0.000627	<0.00314
NAPHTHALENE	91-20-3	mg/kg	0.0038	2	<0.000484	<0.000484	<0.00242	<0.000484	<0.00242	<0.000484	<0.000484	<0.00242
PYRENE	129-00-0	mg/kg	1.3	180	<0.000643	<0.000643	<0.00322	<0.000643	<0.00322	<0.000643	<0.000643	<0.00322
<b>TPH**</b>												
Gasoline Range Hydrocarbons	NA	mg/kg	--	500	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
C10-C28 DIESEL RANGE	NA	mg/kg	--	500	<25	<25	<25	<25	<25	<25	<25	<25
C28-C40 RESIDUAL RANGE ORGANICS	NA	mg/kg	--	500	<100	<100	<100	<100	<100	<100	<100	<100
<b>Soil Suitability for Reclamation**</b>												
BORON	7440-42-8	mg/l	--	2	<b>0.889</b>	<b>0.915</b>	<b>6.93</b>	<b>0.685</b>	<b>4.33</b>	<b>1.49</b>	<b>3.27</b>	<b>0.669</b>
PH	NA	s.u.	--	6 - 8.3	<b>8.03</b>	<b>8.32</b>	<b>7.65</b>	<b>7.53</b>	<b>7.70</b>	<b>7.80</b>	<b>7.83</b>	<b>7.76</b>
SODIUM ADSORPTION RATIO	NA	NA	--	6	<b>0.602</b>	<b>2.59</b>	<b>29.1</b>	<b>1.70</b>	<b>20.6</b>	<b>4.48</b>	<b>13.5</b>	<b>4.41</b>
SPECIFIC CONDUCTANCE	NA	mmhos/cm	--	4	<b>0.536</b>	<b>0.458</b>	<b>11.8</b>	<b>9.29</b>	<b>12.6</b>	<b>7.46</b>	<b>12.1</b>	<b>11.8</b>

**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	Protection of Groundwater Soil Screening Level	Residential Soil Screening Level Concentrations	SS4	SS5	FS1	FS2	SW1	SW2	SW3	SW4	SW5
Sample Date			10/20/2022	10/20/2022	10/20/22	10/20/22	10/20/22	10/20/22	10/20/22	10/20/22	10/20/22
Sample Depth			0.5 ft	0.5 ft	8 ft	8 ft	7 ft	7 ft	7 ft	7 ft	7 ft
<b>Metals</b>											
ARSENIC	0.29	0.68	<b>3.36</b>	<b>3.07</b>	<b>3.64</b>	<b>4.08</b>	<b>4.24</b>	<b>3.67</b>	<b>3.57</b>	<b>4.16</b>	<b>4.09</b>
BARIUM	82	15,000	<b>202</b>	<b>157</b>	<b>400</b>	<b>175</b>	<b>136</b>	<b>173</b>	<b>123</b>	<b>257</b>	<b>180</b>
CADMIUM	0.38	71	<b>0.112</b>	<b>0.155</b>	<0.0959	<0.0963	<0.0994	<b>0.122</b>	<0.0987	<0.0974	<b>0.126</b>
CALCIUM			<b>32.6</b>	<b>17</b>	<b>84.3</b>	<b>62.3</b>	<b>9.28</b>	<b>5.43</b>	<b>43.8</b>	<b>10.4</b>	<b>21.9</b>
CHROMIUM	0.00067	0.3	<0.488	<2.47	<0.248	<0.245	<0.246	<0.248	<0.244	<0.244	<0.25
COPPER	46	3,100	<b>10.5</b>	<b>12.2</b>	<b>10.2</b>	<b>10.1</b>	<b>12.7</b>	<b>10.7</b>	<b>10.7</b>	<b>11.2</b>	<b>11.4</b>
LEAD	14	400	<b>12.9</b>	<b>12.8</b>	<b>15.4</b>	<b>15.1</b>	<9.94	<b>11.4</b>	<9.87	<b>14.8</b>	<b>13.4</b>
MAGNESIUM			<b>10.2</b>	<b>5.08</b>	<b>20.8</b>	<b>15.6</b>	<b>2.97</b>	<b>1.91</b>	<b>10.9</b>	<8.23	<8.23
NICKEL	26	1,500	<9.76	<9.58	<9.59	<9.63	<9.94	<9.48	<9.87	<9.74	<9.78
SELENIUM	0.26	390	<0.0976	<b>0.187</b>	<0.0959	<0.0963	<0.0994	<b>0.107</b>	<0.0987	<0.0974	<0.0978
SILVER	0.8	390	<0.0976	<0.0958	<0.0959	<0.0963	<0.0994	<0.0948	<0.0987	<0.0974	<0.0978
SODIUM			<b>71</b>	<b>86.5</b>	<b>25.1</b>	<b>40.5</b>	<b>82.5</b>	<b>6.10</b>	<b>19.2</b>	<b>107</b>	<b>97.9</b>
ZINC	370	23,000	<97.6	<95.8	<95.9	<96.3	<99.4	<94.8	<98.7	<97.4	<97.8
<b>VOCs</b>											
BENZENE	0.0026	1.2	<b>0.0498</b>	<b>0.108</b>	<b>0.172</b>	<b>0.134</b>	<0.00200	<0.00200	<0.00200	<b>0.00842</b>	<b>0.0742</b>
ETHYLBENZENE	0.78	5.8	<0.00200	<0.00200	<b>0.00256</b>	<b>0.00276</b>	<0.00200	<0.00200	<0.00200	<0.00200	<b>0.00444</b>
TOLUENE	0.69	490	<b>0.0159</b>	<0.00200	<b>0.0886</b>	<b>0.0390</b>	<0.00200	<0.00200	<0.00200	<b>0.00200</b>	<0.00200
XYLENES, TOTAL	9.9	58	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
1,2,4-TRIMETHYLBENZENE	0.0081	30	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<b>0.00478</b>
1,3,5-TRIMETHYLBENZENE	0.0087	27	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
<b>Semi-VOCs</b>											
1-METHYLNAPHTHALENE	0.006	18	<0.00182	<b>0.000465</b>	<b>0.00108</b>	<0.00182	<0.000364	<0.000364	<0.000364	<0.00182	<b>0.00348</b>
2-METHYLNAPHTHALENE	0.019	24	<0.00323	<0.000645	<b>0.000726</b>	<0.00323	<0.000645	<0.000645	<0.000645	<0.00323	<0.00323
ACENAPHTHENE	0.55	360	<0.00152	<0.000304	<0.000304	<0.00152	<0.000304	<0.000304	<0.000304	<0.00152	<0.00152
ANTHRACENE	5.8	1,800	<0.00167	<0.000334	<0.000334	<0.00167	<0.000334	<0.000334	<0.000334	<0.00167	<0.00167
BENZO(A)ANTHRACENE	0.011	1.1	<0.00247	<0.000493	<0.000493	<0.00247	<0.000493	<0.000493	<0.000493	<0.00247	<0.00247
BENZO(A)PYRENE	0.24	0.11	<0.00234	<0.000468	<0.000468	<0.00234	<0.000468	<0.000468	<0.000468	<0.00234	<0.00234
BENZO(B)FLUORANTHENE	0.3	1.1	<0.00293	<0.000585	<0.000585	<0.00293	<0.000585	<0.000585	<0.000585	<0.00293	<0.00293
BENZO(K)FLUORANTHENE	2.9	11	<0.00219	<0.000437	<0.000437	<0.00219	<0.000437	<0.000437	<0.000437	<0.00219	<0.00219
CHRYSENE	9	110	<0.00312	<0.000624	<0.000624	<0.00312	<0.000624	<0.000624	<0.000624	<0.00312	<0.00312
DIBENZ(A,H)ANTHRACENE	0.096	0.11	<0.00307	<0.000614	<0.000614	<0.00307	<0.000614	<0.000614	<0.000614	<0.00307	<0.00307
FLUORANTHENE	8.9	240	<0.00197	<0.000394	<0.000394	<0.00197	<0.000394	<0.000394	<0.000394	<0.00197	<0.00197
FLUORENE	0.54	240	<0.00143	<0.000286	<0.000286	<0.00143	<b>0.000367</b>	<0.000286	<0.000286	<0.00143	<0.00143
INDENO(1,2,3-CD)PYRENE	0.98	1.1	<0.00314	<0.000627	<0.000627	<0.00314	<0.000627	<0.000627	<0.000627	<0.00314	<0.00314
NAPHTHALENE	0.0038	2	<0.00242	<b>0.00108</b>	<0.000484	<0.00242	<0.000484	<0.000484	<0.000484	<0.00242	<0.00242
PYRENE	1.3	180	<0.00322	<0.000643	<0.000643	<0.00322	<0.000643	<0.000643	<0.000643	<0.00322	<0.00322
<b>TPH**</b>											
GASOLINE RANGE HYDROCARBONS	NA	500	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
C10-C28 DIESEL RANGE	--	500	<25	<25	<25	<25	<25	<25	<25	<25	<25
C28-C40 RESIDUAL RANGE ORGANICS	--	500	<100	<100	<100	<100	<100	<100	<100	<100	<100
<b>Soil Suitability for Reclamation**</b>											
BORON	--	2	<b>3.23</b>	<b>9.04</b>	<b>2.49</b>	<b>5.58</b>	<b>8.47</b>	<b>1.92</b>	<b>2.10</b>	<b>11.4</b>	<b>9.35</b>
PH	--	6 - 8.3	<b>7.85</b>	<b>7.91</b>	<b>7.77</b>	<b>7.74</b>	<b>8.05</b>	<b>8.12</b>	<b>7.74</b>	<b>7.97</b>	<b>8.02</b>
SODIUM ADSORPTION RATIO	--	6	<b>15.3</b>	<b>26</b>	<b>3.47</b>	<b>6.49</b>	<b>33.3</b>	<b>3.18</b>	<b>3.67</b>	<b>41.7</b>	<b>25.9</b>
SPECIFIC CONDUCTANCE	--	4	<b>11.7</b>	<b>11.9</b>	<b>11.0</b>	<b>11.8</b>	<b>9.43</b>	<b>1.51</b>	<b>7.63</b>	<b>11.4</b>	<b>11.9</b>

**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.

**Appendix A - Pintail Lateral Soil Sampling Locations**  
**Taproot Energy Partners**  
**Facility ID 467382**  
**Spill/Release ID 483128**  
**Briggsdale, Colorado**

<b>Point</b>	<b>Sample Depth (ft)</b>	<b>PID (ppm)</b>	<b>Elevation (a)</b>	<b>Latitude, Longitude (b)</b>
BS1	0.0-0.5, 3-3.5	0.0	4942.51	40.71102,-104.06786
FS1	8.0-8.5	19.0	4935.23	40.71172,-104.06773
FS2	8.0-8.5	41.0	4935.17	40.71171,-104.06773
SS1	0.0-0.5	1.0	4943.90	40.71142,-104.06772
SS2	0.0-0.5	2.2	4942.95	40.71123,-104.06767
SS3	0.0-0.5	0.0	4942.22	40.71102,-104.06766
SS4	0.0-0.5	10.0	4943.11	40.71182,-104.06773
SS5	0.0-0.5	6.0	4943.81	40.71173,-104.06766
SW1	7.0-7.5	24.0	4937.25	40.71173,-104.06772
SW2	7.0-7.5	7.0	4937.72	40.71169,-104.06773
SW3	7.0-7.5	11.0	4936.88	40.71170,-104.06775
SW4	7.0-7.5	35.0	4936.57	40.71173,-104.06777
SW5	7.0-7.5	71.0	4936.50	40.71175,-104.06773

- (a) Ground surface elevation, feet above mean sea level.
- (b) All coordinates converted to NAD83 coordinate system.
- BS background sample
- FS primary excavation floor sample
- SS surface sample
- SW primary excavation sidewall sample

November 01, 2022

**Environmental Works**

**Adam Kubat**

**AP@environmentalworks.com**

**Briggsdale CO 80204**

**Project Name - Taproot - Pintail Release**

**Project Number - 223274**

Attached are your analytical results for Taproot - Pintail Release received by Origins Laboratory, Inc. October 19, 2022. This project is associated with Origins project number Y210424-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS1-0.5	Y210424-01	Soil	October 18, 2022 16:45	10/19/2022 09:20
SS1-3	Y210424-02	Soil	October 18, 2022 16:50	10/19/2022 09:20
SS2-0.5	Y210424-03	Soil	October 18, 2022 17:00	10/19/2022 09:20
SS2-3	Y210424-04	Soil	October 18, 2022 17:05	10/19/2022 09:20
SS3-0.5	Y210424-05	Soil	October 18, 2022 17:10	10/19/2022 09:20
SS3-3	Y210424-06	Soil	October 18, 2022 17:20	10/19/2022 09:20
BS1-0.5	Y210424-07	Soil	October 18, 2022 17:25	10/19/2022 09:20
BS1-3	Y210424-08	Soil	October 18, 2022 17:30	10/19/2022 09:20

Origins Laboratory, Inc.



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Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release



www.originslaboratory.com

4210424

page of

Client: Environmental Works, Inc  
 Address: 301 Century Rd.  
 Telephone Number: 507-475-7825  
 Email Address: AKubat@environmentalworks.com

Project Manager: Adam Kubat  
 Project Name: Taproot - Pintail Release  
 Project Number: 223274  
 Samples Collected By: Adam Kubat

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	As Summa #			Other
551-0.5	10/18	1645	2	X				X					
551-3	10/18	1650	2	X				X					
552-0.5	10/18	1700	2	X				X					
552-3	10/18	1705	2	X				X					
553-0.5	10/18	1710	2	X				X					
553-3	10/18	1720	2	X				X					
551-0.5	10/18	1725	2	X				X					
551-3	10/18	1730	2	X				X					
Relinquished By: <i>Adam Kubat</i>	Date: 10/19/22	Time: 0920						Received By: <i>AK</i>	Date: 10/19/22	Time: 0920			Turnaround Time: Some Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input checked="" type="checkbox"/>
Relinquished By:	Date:	Time:						Received By:	Date:	Time:			

Temp Received: 2.9 Date Results Needed

Origins Laboratory, Inc.

*J. Bynon*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

Origins Laboratory

F-012207-01-R1  
Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4210424

Client: Environmental Works

Client Project ID: Taproot - Pintail release

Checklist Completed by: EHIS/DE

Shipped Via: HD  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 10/19/12

Airbill #: NA

Matrix(s) Received: (Check all that apply):  Soil/Solid

Water

Other:

Cooler Number/Temperature: 1 / 2.9 °C / °C / °C (Describe)

Thermometer ID: T004

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	X			
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		X		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			X	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH < 2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)			X	
Additional Comments (if any):				

<sup>(1)</sup>If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by: JB (Project Manager)

10-20-12  
Date/Time Reviewed

Origins Laboratory, Inc.



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Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-0.5**

**10/18/2022 4:45:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-01 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	6.93		0.100	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	78.8 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	0.00218		0.00200	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	113 %		70-130			"	"	"	
Surrogate: Toluene-d8	100 %		70-130			"	"	"	

Origins Laboratory, Inc.



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Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-0.5**

**10/18/2022 4:45:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-01 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: 4-Bromofluorobenzene	95.6 %		70-130			B2J20 33	10/20/2022	10/25/2022	
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**Metals by Saturated Paste by EPA 6010**

Calcium	14.8		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	5.08		0.823	"	"	"	"	"	
Sodium	91.8		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	0.00586	0.00182	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.00323	0.00335	"	"	"	"	"	
Acenaphthene	ND	0.00152	0.00335	"	"	"	"	"	
Anthracene	ND	0.00167	0.00335	"	"	"	"	"	
Benzo(a)anthracene	ND	0.00247	0.00335	"	"	"	"	"	
Benzo(a)pyrene	0.00278	0.00234	0.00335	"	"	"	"	"	J
Benzo(b)fluoranthene	ND	0.00293	0.00335	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.00219	0.00335	"	"	"	"	"	
Chrysene	ND	0.00312	0.00335	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.00307	0.00335	"	"	"	"	"	
Fluoranthene	ND	0.00197	0.00335	"	"	"	"	"	
Fluorene	ND	0.00143	0.00335	"	"	"	"	"	

Origins Laboratory, Inc.



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Environmental Works

AP@environmentalworks.com

Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-0.5**

**10/18/2022 4:45:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-01 (Soil)**

**PAH by 8270D SIM**

Indeno(1,2,3-cd)pyrene	ND	0.00314	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
Naphthalene	ND	0.00242	0.00335	"	"	"	"	"	
Pyrene	ND	0.00322	0.00335	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	64.4 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	75.2 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	68.1 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.65			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	29.1			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	11.8		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.43		0.0995	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Barium	191		9.95	"	"	"	"	"	

Origins Laboratory, Inc.



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Environmental Works

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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-0.5**

**10/18/2022 4:45:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-01 (Soil)**

**Table 915 metals by EPA 6020B**

Cadmium	0.173		0.0995	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Copper	10.7		9.95	"	"	"	"	"	
Lead	14.3		9.95	"	"	"	"	"	
Nickel	ND		9.95	"	"	"	"	"	
Selenium	0.115		0.0995	"	"	"	"	"	
Silver	ND		0.0995	"	"	"	"	"	
Zinc	ND		99.5	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	1.22	2.5	mg/Kg	5	L645065	10/18/2022	10/25/2022	
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Origins Laboratory, Inc.



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Environmental Works

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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-3**

**10/18/2022 4:50:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-02 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	0.685		0.0992	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	86.7 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	106 %		70-130			"	"	"	
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Origins Laboratory, Inc.



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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-3**

**10/18/2022 4:50:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.  
Y210424-02 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: Toluene-d8	93.8 %		70-130			B2J20 33	10/20/2022	10/25/2022	
Surrogate: 4-Bromofluorobenzene	96.4 %		70-130			"	"	"	

**Metals by Saturated Paste by EPA 6010**

Calcium	<b>58.8</b>		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	<b>21.3</b>		0.823	"	"	"	"	"	
Sodium	<b>10.7</b>		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.000364	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.000645	0.00067	"	"	"	"	"	
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"	
Anthracene	ND	0.000334	0.00067	"	"	"	"	"	
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"	
Benzo(a)pyrene	ND	0.000468	0.00067	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.000585	0.00067	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.000437	0.00067	"	"	"	"	"	
Chrysene	ND	0.000624	0.00067	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"	
Fluoranthene	ND	0.000394	0.00067	"	"	"	"	"	

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Environmental Works

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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS1-3**

**10/18/2022 4:50:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-02 (Soil)**

**PAH by 8270D SIM**

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
Indeno(1,2,3-cd)pyrene	ND	0.000627	0.00067	"	"	"	"	"	
Naphthalene	ND	0.000484	0.00067	"	"	"	"	"	
Pyrene	ND	0.000643	0.00067	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	65 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	75.5 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	60.1 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.53			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	1.70			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	9.29		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.75		0.0879	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
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Briggsdale CO 80204

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Project Number: 223274

Project: Taproot - Pintail Release

**SS1-3**

**10/18/2022 4:50:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-02 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	200		8.79	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Cadmium	0.127		0.0879	"	"	"	"	"	
Copper	10.3		8.79	"	"	"	"	"	
Lead	20.5		8.79	"	"	"	"	"	
Nickel	ND		8.79	"	"	"	"	"	
Selenium	0.112		0.0879	"	"	"	"	"	
Silver	ND		0.0879	"	"	"	"	"	
Zinc	ND		87.9	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	0.488	1	mg/Kg	2	L645065	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-0.5**

**10/18/2022 5:00:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-03 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	4.33		0.0999	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	84.6 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	0.00374		0.00200	"	"	"	"	"	
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	0.00536		0.00200	"	"	"	"	"	
Xylenes, total	0.00316		0.00200	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	110 %		70-130			"	"	"	
Surrogate: Toluene-d8	88.0 %		70-130			"	"	"	

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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS2-0.5**

**10/18/2022 5:00:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-03 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: 4-Bromofluorobenzene	109 %		70-130			B2J20 33	10/20/2022	10/25/2022	
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**Metals by Saturated Paste by EPA 6010**

Calcium	25.6		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	9.34		0.823	"	"	"	"	"	
Sodium	85.9		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.00182	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.00323	0.00335	"	"	"	"	"	
Acenaphthene	ND	0.00152	0.00335	"	"	"	"	"	
Anthracene	ND	0.00167	0.00335	"	"	"	"	"	
Benzo(a)anthracene	ND	0.00247	0.00335	"	"	"	"	"	
Benzo(a)pyrene	0.00332	0.00234	0.00335	"	"	"	"	"	J
Benzo(b)fluoranthene	ND	0.00293	0.00335	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.00219	0.00335	"	"	"	"	"	
Chrysene	ND	0.00312	0.00335	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.00307	0.00335	"	"	"	"	"	
Fluoranthene	ND	0.00197	0.00335	"	"	"	"	"	
Fluorene	ND	0.00143	0.00335	"	"	"	"	"	

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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS2-0.5**

**10/18/2022 5:00:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-03 (Soil)**

**PAH by 8270D SIM**

Indeno(1,2,3-cd)pyrene	ND	0.00314	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
Naphthalene	ND	0.00242	0.00335	"	"	"	"	"	
Pyrene	ND	0.00322	0.00335	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	69.9 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	64.8 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	71.7 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.70			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	20.6			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	12.6		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.61		0.0915	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Barium	145		9.15	"	"	"	"	"	

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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-0.5**

**10/18/2022 5:00:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-03 (Soil)**

**Table 915 metals by EPA 6020B**

Cadmium	0.147		0.0915	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Copper	10.6		9.15	"	"	"	"	"	
Lead	11.6		9.15	"	"	"	"	"	
Nickel	ND		9.15	"	"	"	"	"	
Selenium	0.137		0.0915	"	"	"	"	"	
Silver	ND		0.0915	"	"	"	"	"	
Zinc	ND		91.5	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	0.488	1	mg/Kg	2	L645065	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-3**

**10/18/2022 5:05:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-04 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	1.49		0.100	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	81.1 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	96.4 %		70-130			"	"	"	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-3**

**10/18/2022 5:05:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-04 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: Toluene-d8	103 %		70-130			B2J20 33	10/20/2022	10/25/2022	
Surrogate: 4-Bromofluorobenzene	101 %		70-130			"	"	"	

**Metals by Saturated Paste by EPA 6010**

Calcium	35.4		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	13.2		0.823	"	"	"	"	"	
Sodium	22.1		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.000364	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.000645	0.00067	"	"	"	"	"	
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"	
Anthracene	ND	0.000334	0.00067	"	"	"	"	"	
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"	
Benzo(a)pyrene	ND	0.000468	0.00067	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.000585	0.00067	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.000437	0.00067	"	"	"	"	"	
Chrysene	ND	0.000624	0.00067	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"	
Fluoranthene	ND	0.000394	0.00067	"	"	"	"	"	

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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-3**

**10/18/2022 5:05:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-04 (Soil)**

**PAH by 8270D SIM**

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
Indeno(1,2,3-cd)pyrene	ND	0.000627	0.00067	"	"	"	"	"	
Naphthalene	ND	0.000484	0.00067	"	"	"	"	"	
Pyrene	ND	0.000643	0.00067	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	61.3 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	76.1 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	63.8 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.80			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	4.48			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	7.46		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.80		0.0970	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS2-3**

**10/18/2022 5:05:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-04 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	400		9.70	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Cadmium	0.127		0.0970	"	"	"	"	"	
Copper	10.6		9.70	"	"	"	"	"	
Lead	11.4		9.70	"	"	"	"	"	
Nickel	ND		9.70	"	"	"	"	"	
Selenium	ND		0.0970	"	"	"	"	"	
Silver	ND		0.0970	"	"	"	"	"	
Zinc	ND		97.0	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	0.251	0.516	mg/Kg	1	L645065	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS3-0.5**

**10/18/2022 5:10:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-05 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	3.27		0.101	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	83.6 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	112 %		70-130			"	"	"	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS3-0.5**

**10/18/2022 5:10:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-05 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: Toluene-d8	100 %		70-130			B2J20 33	10/20/2022	10/25/2022	
Surrogate: 4-Bromofluorobenzene	97.2 %		70-130			"	"	"	

**Metals by Saturated Paste by EPA 6010**

Calcium	35.0		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	13.0		0.823	"	"	"	"	"	
Sodium	66.4		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.000364	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.000645	0.00067	"	"	"	"	"	
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"	
Anthracene	ND	0.000334	0.00067	"	"	"	"	"	
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"	
Benzo(a)pyrene	ND	0.000468	0.00067	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.000585	0.00067	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.000437	0.00067	"	"	"	"	"	
Chrysene	ND	0.000624	0.00067	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"	
Fluoranthene	ND	0.000394	0.00067	"	"	"	"	"	

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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS3-0.5**

**10/18/2022 5:10:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-05 (Soil)**

**PAH by 8270D SIM**

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
Indeno(1,2,3-cd)pyrene	ND	0.000627	0.00067	"	"	"	"	"	
Naphthalene	ND	0.000484	0.00067	"	"	"	"	"	
Pyrene	ND	0.000643	0.00067	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	58 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	62.8 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	56.8 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.83			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	13.5			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	12.1		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.53		0.0979	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
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Environmental Works  
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 Briggsdale CO 80204

Adam Kubat  
 Project Number: 223274  
 Project: Taproot - Pintail Release

**SS3-0.5**

**10/18/2022 5:10:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-05 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	141		9.79	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Cadmium	0.139		0.0979	"	"	"	"	"	
Copper	11.6		9.79	"	"	"	"	"	
Lead	12.0		9.79	"	"	"	"	"	
Nickel	ND		9.79	"	"	"	"	"	
Selenium	0.128		0.0979	"	"	"	"	"	
Silver	ND		0.0979	"	"	"	"	"	
Zinc	ND		97.9	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	1.26	2.59	mg/Kg	5	L645066	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**SS3-3**

**10/18/2022 5:20:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-06 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	<b>0.669</b>		0.0992	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: <i>o</i> -Terphenyl	85.0 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	<b>0.00522</b>		0.00200	"	"	"	"	"	
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	<b>0.00282</b>		0.00200	"	"	"	"	"	
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.3 %		70-130			"	"	"	
Surrogate: Toluene-d8	117 %		70-130			"	"	"	

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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS3-3**

**10/18/2022 5:20:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-06 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: 4-Bromofluorobenzene	94.6 %		70-130			B2J20 33	10/20/2022	10/25/2022	
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**Metals by Saturated Paste by EPA 6010**

Calcium	60.8		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	25.9		0.823	"	"	"	"	"	
Sodium	29.0		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.00182	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.00323	0.00335	"	"	"	"	"	
Acenaphthene	ND	0.00152	0.00335	"	"	"	"	"	
Anthracene	ND	0.00167	0.00335	"	"	"	"	"	
Benzo(a)anthracene	ND	0.00247	0.00335	"	"	"	"	"	
Benzo(a)pyrene	ND	0.00234	0.00335	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.00293	0.00335	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.00219	0.00335	"	"	"	"	"	
Chrysene	ND	0.00312	0.00335	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.00307	0.00335	"	"	"	"	"	
Fluoranthene	ND	0.00197	0.00335	"	"	"	"	"	
Fluorene	ND	0.00143	0.00335	"	"	"	"	"	

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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**SS3-3**

**10/18/2022 5:20:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-06 (Soil)**

**PAH by 8270D SIM**

Indeno(1,2,3-cd)pyrene	ND	0.00314	0.00335	mg/Kg	5	L644816	10/24/2022	10/24/2022	
Naphthalene	ND	0.00242	0.00335	"	"	"	"	"	
Pyrene	ND	0.00322	0.00335	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	52.7 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	69.1 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	62.4 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	7.76			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	4.41			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	11.8		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	4.78		0.0972	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Barium	211		9.72	"	"	"	"	"	

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 Project Number: 223274  
 Project: Taproot - Pintail Release

**SS3-3**

**10/18/2022 5:20:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-06 (Soil)**

**Table 915 metals by EPA 6020B**

Cadmium	0.116		0.0972	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Copper	10.0		9.72	"	"	"	"	"	
Lead	16.7		9.72	"	"	"	"	"	
Nickel	ND		9.72	"	"	"	"	"	
Selenium	ND		0.0972	"	"	"	"	"	
Silver	ND		0.0972	"	"	"	"	"	
Zinc	ND		97.2	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	0.244	0.5	mg/Kg	1	L645066	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**BS1-0.5**

**10/18/2022 5:25:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-07 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	<b>0.889</b>		0.100	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	107 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	106 %		70-130			"	"	"	
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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**BS1-0.5**

**10/18/2022 5:25:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-07 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: Toluene-d8	109 %		70-130			B2J20 33	10/20/2022	10/25/2022	
Surrogate: 4-Bromofluorobenzene	92.0 %		70-130			"	"	"	

**Metals by Saturated Paste by EPA 6010**

Calcium	<b>2.62</b>		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	<b>1.02</b>		0.823	"	"	"	"	"	
Sodium	<b>0.812</b>		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.000364	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.000645	0.00067	"	"	"	"	"	
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"	
Anthracene	ND	0.000334	0.00067	"	"	"	"	"	
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"	
Benzo(a)pyrene	ND	0.000468	0.00067	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.000585	0.00067	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.000437	0.00067	"	"	"	"	"	
Chrysene	ND	0.000624	0.00067	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"	
Fluoranthene	ND	0.000394	0.00067	"	"	"	"	"	

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Project Number: 223274

Project: Taproot - Pintail Release

**BS1-0.5**

**10/18/2022 5:25:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-07 (Soil)**

**PAH by 8270D SIM**

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
Indeno(1,2,3-cd)pyrene	ND	0.000627	0.00067	"	"	"	"	"	
Naphthalene	ND	0.000484	0.00067	"	"	"	"	"	
Pyrene	ND	0.000643	0.00067	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	60.4 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	69.4 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	60.1 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	8.03			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	0.602			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	0.536		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.59		0.0953	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
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 Project Number: 223274  
 Project: Taproot - Pintail Release

**BS1-0.5**

**10/18/2022 5:25:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-07 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	186		9.53	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Cadmium	0.157		0.0953	"	"	"	"	"	
Copper	13.1		9.53	"	"	"	"	"	
Lead	14.2		9.53	"	"	"	"	"	
Nickel	ND		9.53	"	"	"	"	"	
Selenium	0.158		0.0953	"	"	"	"	"	
Silver	ND		0.0953	"	"	"	"	"	
Zinc	ND		95.3	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	1.22	2.5	mg/Kg	5	L645066	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**BS1-3**

**10/18/2022 5:30:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-08 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	0.915		0.0999	mg/L	1	B2J2009	10/20/2022	10/24/2022	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B2J2529	10/25/2022	10/26/2022	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: o-Terphenyl	82.2 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B2J2033	10/20/2022	10/25/2022	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4	111 %		70-130			"	"	"	
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Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**BS1-3**

**10/18/2022 5:30:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-08 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: Toluene-d8	96.5 %		70-130			B2J20 33	10/20/2022	10/25/2022	
Surrogate: 4-Bromofluorobenzene	95.8 %		70-130			"	"	"	

**Metals by Saturated Paste by EPA 6010**

Calcium	1.79		0.499	meq/L	10	[CALC]	10/21/2022	10/25/2022	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	2.76		0.435	"	"	"	"	"	

**PAH by 8270D SIM**

1-Methylnaphthalene	ND	0.000364	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
2-Methylnaphthalene	ND	0.000645	0.00067	"	"	"	"	"	
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"	
Anthracene	ND	0.000334	0.00067	"	"	"	"	"	
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"	
Benzo(a)pyrene	ND	0.000468	0.00067	"	"	"	"	"	
Benzo(b)fluoranthene	ND	0.000585	0.00067	"	"	"	"	"	
Benzo(k)fluoranthene	ND	0.000437	0.00067	"	"	"	"	"	
Chrysene	ND	0.000624	0.00067	"	"	"	"	"	
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"	
Fluoranthene	ND	0.000394	0.00067	"	"	"	"	"	

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Project Number: 223274

Project: Taproot - Pintail Release

**BS1-3**

**10/18/2022 5:30:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Waypoint Analytical, LLC.**  
**Y210424-08 (Soil)**

**PAH by 8270D SIM**

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L644816	10/24/2022	10/24/2022	
Indeno(1,2,3-cd)pyrene	ND	0.000627	0.00067	"	"	"	"	"	
Naphthalene	ND	0.000484	0.00067	"	"	"	"	"	
Pyrene	ND	0.000643	0.00067	"	"	"	"	"	

Surrogate: 2-Fluorobiphenyl	63.3 %		33-115			"	"	"	
Surrogate: 4-Terphenyl-d14	50.6 %		33-122			"	"	"	
Surrogate: Nitrobenzene-d5	58.2 %		29-110			"	"	"	

**pH in Soil by 9045D**

pH	8.32			pH Units	1	B2J2121	10/21/2022	10/25/2022	
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**SAR by 20B Saturated Paste**

SAR	2.59			SAR	1	B2J2113	10/21/2022	10/25/2022	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	0.458		0.00500	mmhos/cm	1	B2J2121	10/21/2022	10/25/2022	
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**Table 915 metals by EPA 6020B**

Arsenic	3.49		0.0913	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**BS1-3**

**10/18/2022 5:30:00PM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y210424-08 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	215		9.13	mg/kg	10	B2J2402	10/24/2022	10/27/2022	
Cadmium	0.134		0.0913	"	"	"	"	"	
Copper	11.1		9.13	"	"	"	"	"	
Lead	15.9		9.13	"	"	"	"	"	
Nickel	ND		9.13	"	"	"	"	"	
Selenium	ND		0.0913	"	"	"	"	"	
Silver	ND		0.0913	"	"	"	"	"	
Zinc	ND		91.3	"	"	"	"	"	

**Total Metals by 7196A**

Chromium, Hexavalent	ND	0.244	0.5	mg/Kg	1	L645066	10/18/2022	10/25/2022	
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Project Number: 223274

Project: Taproot - Pintail Release

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B2J2033 - EPA 5030 (soil)

Blank (B2J2033-BLK1)

Prepared: 10/20/2022 Analyzed: 10/21/2022

1,2,4-Trimethylbenzene	ND	0.00200	mg/kg							U
1,3,5-Trimethylbenzene	ND	0.00200	"							U
Benzene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Naphthalene	ND	0.00380	"							U
Toluene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125	98.0		70-130			
Surrogate: Toluene-d8	0.13		"	0.125	101		70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125	105		70-130			

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Project: Taproot - Pintail Release

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B2J2033 - EPA 5030 (soil)

**LCS (B2J2033-BS1)**

Prepared: 10/20/2022 Analyzed: 10/21/2022

1,2,4-Trimethylbenzene	0.117	0.00200	mg/kg	0.100		117	70-130			
1,3,5-Trimethylbenzene	0.117	0.00200	"	0.100		117	70-130			
Benzene	0.105	0.00200	"	0.100		105	70-130			
Ethylbenzene	0.109	0.00200	"	0.100		109	70-130			
Naphthalene	0.104	0.00380	"	0.100		104	70-130			
Toluene	0.108	0.00200	"	0.100		108	70-130			
o-Xylene	0.110	0.00200	"	0.100		110	70-130			
m,p-Xylene	0.224	0.00400	"	0.200		112	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		101	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		102	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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Project: Taproot - Pintail Release

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B2J2033 - EPA 5030 (soil)

Matrix Spike (B2J2033-MS1)	Source: Y210372-01			Prepared: 10/20/2022 Analyzed: 10/21/2022						
1,2,4-Trimethylbenzene	0.0976	0.00200	mg/kg	0.100	ND	97.6	70-130			
1,3,5-Trimethylbenzene	0.0970	0.00200	"	0.100	ND	97.0	70-130			
Benzene	0.0971	0.00200	"	0.100	ND	97.1	70-130			
Ethylbenzene	0.0945	0.00200	"	0.100	ND	94.5	70-130			
Naphthalene	0.0896	0.00380	"	0.100	ND	89.6	70-130			
Toluene	0.0958	0.00200	"	0.100	ND	95.8	70-130			
o-Xylene	0.0970	0.00200	"	0.100	ND	97.0	70-130			
m,p-Xylene	0.195	0.00400	"	0.200	ND	97.6	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		109	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		99.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		103	70-130			

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Project: Taproot - Pintail Release

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B2J2033 - EPA 5030 (soil)

Matrix Spike Dup (B2J2033-MSD1)	Source: Y210372-01			Prepared: 10/20/2022 Analyzed: 10/21/2022						
1,2,4-Trimethylbenzene	0.0921	0.00200	mg/kg	0.100	ND	92.1	70-130	5.80	20	
1,3,5-Trimethylbenzene	0.0919	0.00200	"	0.100	ND	91.9	70-130	5.44	20	
Benzene	0.0953	0.00200	"	0.100	ND	95.3	70-130	1.89	20	
Ethylbenzene	0.0921	0.00200	"	0.100	ND	92.1	70-130	2.61	20	
Naphthalene	0.0876	0.00380	"	0.100	ND	87.6	70-130	2.24	20	
Toluene	0.0933	0.00200	"	0.100	ND	93.3	70-130	2.64	20	
o-Xylene	0.0954	0.00200	"	0.100	ND	95.4	70-130	1.62	20	
m,p-Xylene	0.188	0.00400	"	0.200	ND	94.2	70-130	3.59	20	
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		106	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.3	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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Project: Taproot - Pintail Release

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B2J2529 - EPA 3550B</b>										
<b>Blank (B2J2529-BLK1)</b>										
					Prepared: 10/25/2022 Analyzed: 10/25/2022					
Diesel (C10-C28)	ND	25.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	100	"							U
Surrogate: o-Terphenyl	27		"	24.9		109	50-150			

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Project: Taproot - Pintail Release

**Extractable Petroleum Hydrocarbons by 8015D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2529 - EPA 3550B**

**LCS (B2J2529-BS1)**

Prepared: 10/25/2022 Analyzed: 10/25/2022

Diesel (C10-C28)	1000	50.0	mg/kg	1000		100	70-130			
Residual Range Organics (C28-C40)	940	200	"	1000		94.0	70-130			
Surrogate: o-Terphenyl	46		"	49.8		93.4	50-150			

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Project: Taproot - Pintail Release

**Extractable Petroleum Hydrocarbons by 8015D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2529 - EPA 3550B**

<b>Matrix Spike (B2J2529-MS1)</b>	<b>Source: Y210424-01</b>			<b>Prepared: 10/25/2022 Analyzed: 10/25/2022</b>						
Diesel (C10-C28)	1080	50.0	mg/kg	1000	ND	108	70-130			
Residual Range Organics (C28-C40)	1010	200	"	1000	ND	101	70-130			
Surrogate: o-Terphenyl	46		"	49.8		92.6	50-150			

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Project: Taproot - Pintail Release

**Extractable Petroleum Hydrocarbons by 8015D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2529 - EPA 3550B**

<b>Matrix Spike Dup (B2J2529-MSD1)</b>	<b>Source: Y210424-01</b>			<b>Prepared: 10/25/2022 Analyzed: 10/25/2022</b>						
Diesel (C10-C28)	947	50.0	mg/kg	1000	ND	94.7	70-130	13.0	35	
Residual Range Organics (C28-C40)	857	200	"	1000	ND	85.7	70-130	16.4	35	
Surrogate: o-Terphenyl	41		"	49.8		82.0	50-150			

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**Extractable Petroleum Hydrocarbons by 8015D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**\*\*\* DEFAULT GENERAL METHOD \*\*\* - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2402 - Default Prep Metals**

**Blank (B2J2402-BLK1)**

Prepared: 10/24/2022 Analyzed: 10/27/2022

Arsenic	ND	0.000100	mg/kg							
Barium	ND	0.0100	"							
Cadmium	ND	0.000100	"							
Copper	ND	0.0100	"							
Lead	ND	0.0100	"							
Nickel	ND	0.0100	"							
Selenium	ND	0.000100	"							
Silver	ND	0.000100	"							
Zinc	ND	0.100	"							

**LCS (B2J2402-BS1)**

Prepared: 10/24/2022 Analyzed: 10/27/2022

Arsenic	0.0511	0.000100	mg/kg	0.0500		102	80-120			
Barium	4.84	0.0100	"	5.00		96.7	80-120			
Cadmium	0.0535	0.000100	"	0.0500		107	80-120			
Copper	0.558	0.0100	"	0.500		112	80-120			
Lead	0.0525	0.0100	"	0.0500		105	80-120			
Nickel	0.0531	0.0100	"	0.0500		106	80-120			
Selenium	0.0495	0.000100	"	0.0500		98.9	80-120			
Silver	0.0524	0.000100	"	0.0500		105	80-120			
Zinc	0.543	0.100	"	0.500		109	80-120			

**Matrix Spike (B2J2402-MS1)**

Source: Y210424-01

Prepared: 10/24/2022 Analyzed: 10/27/2022

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Project: Taproot - Pintail Release

**\*\*\* DEFAULT GENERAL METHOD \*\*\* - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2402 - Default Prep Metals**

<b>Matrix Spike (B2J2402-MS1)</b>		<b>Source: Y210424-01</b>			<b>Prepared: 10/24/2022 Analyzed: 10/27/2022</b>					
Arsenic	7.48	0.0995	mg/kg	4.98	3.43	81.5	75-125			
Barium	629	9.95	"	498	191	88.2	75-125			
Cadmium	5.28	0.0995	"	4.98	0.173	103	75-125			
Copper	55.6	9.95	"	49.8	10.7	90.3	75-125			
Lead	18.5	9.95	"	4.98	14.3	83.1	75-125			
Nickel	11.9	9.95	"	4.98	7.86	82.2	75-125			
Selenium	4.73	0.0995	"	4.98	0.115	92.7	75-125			
Silver	4.72	0.0995	"	4.98	0.0279	94.4	75-125			
Zinc	90.1	99.5	"	49.8	49.6	81.5	75-125			
<b>Matrix Spike Dup (B2J2402-MSD1)</b>		<b>Source: Y210424-01</b>			<b>Prepared: 10/24/2022 Analyzed: 10/27/2022</b>					
Arsenic	7.53	0.0893	mg/kg	4.47	3.43	92.0	75-125	0.710	20	
Barium	670	8.93	"	447	191	107	75-125	6.30	20	
Cadmium	5.26	0.0893	"	4.47	0.173	114	75-125	0.428	20	
Copper	58.4	8.93	"	44.7	10.7	107	75-125	4.96	20	
Lead	19.4	8.93	"	4.47	14.3	113	75-125	4.90	20	
Nickel	12.8	8.93	"	4.47	7.86	111	75-125	6.98	20	
Selenium	4.61	0.0893	"	4.47	0.115	101	75-125	2.45	20	
Silver	4.75	0.0893	"	4.47	0.0279	106	75-125	0.520	20	
Zinc	95.8	89.3	"	44.7	49.6	104	75-125	6.14	20	

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Project Number: 223274

Project: Taproot - Pintail Release

**Classical Chemistry Parameters - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2009 - Default Prep Metals**

**Blank (B2J2009-BLK1)**

Prepared: 10/20/2022 Analyzed: 10/24/2022

Boron ND 0.100 mg/L

**Duplicate (B2J2009-DUP1)**

**Source: Y210423-03**

Prepared: 10/20/2022 Analyzed: 10/24/2022

Boron 3.78 0.0991 mg/L 3.83 1.36 50

**Batch B2J2113 - Default Prep Metals**

**Blank (B2J2113-BLK1)**

Prepared: 10/21/2022 Analyzed: 10/25/2022

Calcium PPM ND 10.0 mg/L

SAR 0.00 SAR

Magnesium PPM ND 10.0 mg/L

Sodium PPM ND 10.0 "

**Duplicate (B2J2113-DUP1)**

**Source: Y210439-02**

Prepared: 10/21/2022 Analyzed: 10/25/2022

SAR 0.00 SAR 1.98 200 200

Calcium PPM 65.4 10.0 mg/L 65.1 0.478 50

Magnesium PPM 20.9 10.0 " 20.9 0.0907 50

Sodium PPM 73.2 10.0 " 71.8 1.86 50

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 Project Number: 223274  
 Project: Taproot - Pintail Release

**Saturated Paste - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B2J2121 - NO PREP**

**Blank (B2J2121-BLK1)**

Prepared: 10/21/2022 Analyzed: 10/25/2022

pH	0.00		pH Units							
Specific Conductance (EC)	ND	0.00500	mmhos/cm							

**Duplicate (B2J2121-DUP1)**

**Source: Y210439-02**

Prepared: 10/21/2022 Analyzed: 10/25/2022

pH	7.89		pH Units		8.05			2.01	25	
Specific Conductance (EC)	0.902	0.00500	mmhos/cm		0.863			4.45	25	

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Project Number: 223274

Project: Taproot - Pintail Release

**PAH by 8270D SIM - Quality Control**  
**Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch L644816 - 3550B**

<b>MSD (L 81850-MSD-L644816)</b>		<b>Source: Y210424-08</b>			<b>Prepared: 10/24/2022 Analyzed: 10/24/2022</b>					
Naphthalene	0.102	0.00067	mg/Kg	0.167	<0.000484	61	30-130	4	30	
Benzo(b)fluoranthene	0.101	0.00067	"	0.167	<0.000585	60.4	30-130	1.7	30	
1-Methylnaphthalene	0.0708	0.00067	"	0.167	<0.000364	42.3	30-130	33.5	30	*
2-Methylnaphthalene	0.071	0.00067	"	0.167	<0.000645	42.5	30-130	28.5	30	
Acenaphthene	0.112	0.00067	"	0.167	<0.000304	67	30-130	6.4	30	
Anthracene	0.121	0.00067	"	0.167	<0.000334	72.4	30-130	5.9	30	
Pyrene	0.131	0.00067	"	0.167	<0.000643	78.4	30-130	3.1	30	
Benzo(a)pyrene	0.135	0.00067	"	0.167	<0.000468	80.8	30-130	4.5	30	
Benzo(k)fluoranthene	0.101	0.00067	"	0.167	<0.000437	60.4	30-130	3.1	30	
Chrysene	0.106	0.00067	"	0.167	<0.000624	63.4	30-130	3.7	30	
Dibenz(a,h)anthracene	0.163	0.00067	"	0.167	<0.000614	97.6	30-130	18	30	
Fluoranthene	0.131	0.00067	"	0.167	<0.000394	78.4	30-130	2.3	30	
Fluorene	0.155	0.00067	"	0.167	<0.000286	92.8	30-130	39.3	30	*
Indeno(1,2,3-cd)pyrene	0.135	0.00067	"	0.167	<0.000627	80.8	30-130	12.5	30	
Benzo(a)anthracene	0.121	0.00067	"	0.167	<0.000493	72.4	30-130	4.2	30	
Surrogate: Nitrobenzene-d5	68.4		"	0.333	192	68.4	29-110			
Surrogate: 2-Fluorobiphenyl	45.6		"	0.333	209	45.6	33-115			
Surrogate: 4-Terphenyl-d14	83.7		"	0.333	167	83.7	33-122			

<b>MS (L 81850-MS-L644816)</b>		<b>Source: Y210424-08</b>			<b>Prepared: 10/24/2022 Analyzed: 10/24/2022</b>					
Naphthalene	0.098	0.00067	mg/Kg	0.164	<0.000484	59.7	30-130			
Indeno(1,2,3-cd)pyrene	0.119	0.00067	"	0.164	<0.000627	72.5	30-130			
Pyrene	0.127	0.00067	"	0.164	<0.000643	77.4	30-130			
1-Methylnaphthalene	0.0993	0.00067	"	0.164	<0.000364	60.5	30-130			
2-Methylnaphthalene	0.0946	0.00067	"	0.164	<0.000645	57.6	30-130			
Acenaphthene	0.105	0.00067	"	0.164	<0.000304	64	30-130			
Anthracene	0.114	0.00067	"	0.164	<0.000334	69.5	30-130			

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Environmental Works

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Briggsdale CO 80204

Adam Kubat

Project Number: 223274

Project: Taproot - Pintail Release

**PAH by 8270D SIM - Quality Control**  
**Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch L644816 - 3550B**

MS (L 81850-MS-L644816)	Source: Y210424-08			Prepared: 10/24/2022 Analyzed: 10/24/2022						
Benzo(a)anthracene	0.116	0.00067	mg/Kg	0.164	<0.000493	70.7	30-130			
Fluoranthene	0.128	0.00067	"	0.164	<0.000394	78	30-130			
Benzo(b)fluoranthene	0.0992	0.00067	"	0.164	<0.000585	60.4	30-130			
Benzo(k)fluoranthene	0.0979	0.00067	"	0.164	<0.000437	59.6	30-130			
Chrysene	0.11	0.00067	"	0.164	<0.000624	67	30-130			
Dibenz(a,h)anthracene	0.136	0.00067	"	0.164	<0.000614	82.9	30-130			
Benzo(a)pyrene	0.129	0.00067	"	0.164	<0.000468	78.6	30-130			
Fluorene	0.104	0.00067	"	0.164	<0.000286	63.4	30-130			
Surrogate: Nitrobenzene-d5	68.9		"	0.329	192	68.9	29-110			
Surrogate: 4-Terphenyl-d14	77.5		"	0.329	167	77.5	33-122			
Surrogate: 2-Fluorobiphenyl	65		"	0.329	209	65	33-115			

LCS (LCS-L644816)	Prepared: 10/24/2022 Analyzed: 10/24/2022									
Chrysene	0.117	0.00067	mg/Kg	0.167		70	30-130			
Dibenz(a,h)anthracene	0.177	0.00067	"	0.167		106	30-130			
Fluoranthene	0.128	0.00067	"	0.167		76.6	30-130			
Fluorene	0.116	0.00067	"	0.167		69.4	30-130			
Pyrene	0.127	0.00067	"	0.167		76	30-130			
Benzo(k)fluoranthene	0.0721	0.00067	"	0.167		43.1	30-130			
Indeno(1,2,3-cd)pyrene	0.143	0.00067	"	0.167		85.6	30-130			
Naphthalene	0.105	0.00067	"	0.167		62.8	30-130			
1-Methylnaphthalene	0.114	0.00067	"	0.167		68.2	30-130			
Benzo(a)pyrene	0.139	0.00067	"	0.167		83.2	30-130			
Benzo(a)anthracene	0.123	0.00067	"	0.167		73.6	30-130			
Anthracene	0.123	0.00067	"	0.167		73.6	30-130			
Acenaphthene	0.113	0.00067	"	0.167		67.6	30-130			
2-Methylnaphthalene	0.123	0.00067	"	0.167		73.6	30-130			

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Project: Taproot - Pintail Release

**PAH by 8270D SIM - Quality Control**  
**Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch L644816 - 3550B**

**LCS (LCS-L644816)**

Prepared: 10/24/2022 Analyzed: 10/24/2022

Benzo(b)fluoranthene	0.0807	0.00067	mg/Kg	0.167		48.3	30-130			
Surrogate: 4-Terphenyl-d14	90		"	0.333		90	33-122			
Surrogate: 2-Fluorobiphenyl	84.9		"	0.333		84.9	33-115			
Surrogate: Nitrobenzene-d5	82.2		"	0.333		82.2	29-110			

**LRB (LRB-L644816)**

Prepared: 10/24/2022 Analyzed: 10/24/2022

Chrysene	ND	0.00067	mg/Kg				-			
Dibenz(a,h)anthracene	ND	0.00067	"				-			
Fluoranthene	ND	0.00067	"				-			
Fluorene	ND	0.00067	"				-			
Indeno(1,2,3-cd)pyrene	ND	0.00067	"				-			
Naphthalene	ND	0.00067	"				-			
Pyrene	ND	0.00067	"				-			
Benzo(a)pyrene	ND	0.00067	"				-			
1-Methylnaphthalene	ND	0.00067	"				-			
Benzo(a)anthracene	ND	0.00067	"				-			
Anthracene	ND	0.00067	"				-			
Acenaphthene	ND	0.00067	"				-			
2-Methylnaphthalene	ND	0.00067	"				-			
Benzo(b)fluoranthene	ND	0.00067	"				-			
Benzo(k)fluoranthene	ND	0.00067	"				-			
Surrogate: Nitrobenzene-d5	80.4		"	0.333		80.4	29-110			
Surrogate: 4-Terphenyl-d14	102		"	0.333		102	33-122			
Surrogate: 2-Fluorobiphenyl	73.8		"	0.333		73.8	33-115			

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Project Number: 223274

Project: Taproot - Pintail Release

**Total Metals by 7196A - Quality Control  
Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch L645066 -</b>										
<b>DUP (L 81850-DUP)</b>		<b>Source: Y210424-08</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	ND	0.5	mg/Kg		<0.500		-	0	20	
<b>MS (L 81850-MS)</b>		<b>Source: Y210424-08</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	38.2	2.57	mg/Kg	41.2	< 0.244	93	75-125			
<b>MSD (L 81850-MSD)</b>		<b>Source: Y210424-08</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	362	50	mg/Kg	712	<24.4	51	75-125			*
<b>LCS (LCS)</b>					Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	6.8	0.5	mg/Kg	8		85	75-125			
<b>LRB (LRB)</b>					Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	ND	0.5	mg/Kg				-			

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 Project Number: 223274  
 Project: Taproot - Pintail Release

**Total Metals by 7196A - Quality Control**  
**Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch L645065 -</b>										
<b>DUP (L 81795-DUP)</b>		<b>Source: 81795</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	ND	0.501	mg/Kg		<0.501		-	0	20	
<b>MS (L 81795-MS)</b>		<b>Source: 81795</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	38	2.53	mg/Kg	40.5	< 0.244	94	75-125			
<b>MSD (L 81795-MSD)</b>		<b>Source: 81795</b>			Prepared: Analyzed: 10/25/2022					
Chromium, Hexavalent	637	51.5	mg/Kg	703	<25.1	91	75-125			

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### Notes and Definitions

U Sample is Non-Detect.

J Estimated Value. Analyte below reported quantitation limit.

\* QC Failure

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported on a wet weight basis.

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Taproot – Pintail Lateral – Produced Water Release

**Photo: 1**

**Description:**

Release location looking east. Photo taken at 8:00 AM 11/18.



**Photo: 2**

**Description:**

Release location looking southwest.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 3**

**Description:**

South end of the impacted area looking north towards the release location. Maximum extents were determined by wet soil and surveyed by a professional surveyor.



**Photo: 4**

**Description:**

Impacted area looking south from the release location.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 5**

**Description:**

Hydro excavator working in the primary excavation area to locate the pipeline failure.



**Photo: 6**

**Description:**

The failure in the pipeline. Deformed Thermoflex 6" pipe.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 7**

**Description:**

Surface scraping of impacted area to remove visible wet soil.



**Photo: 8**

**Description:**

Surface scraping of impacted area.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 9**

**Description:**

Looking south at the primary and secondary excavation areas on 11/18



**Photo: 10**

**Description:**

Primary excavation area after exposing failed pipeline. Day 2 of hydroexcavation 10/19/22.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 11**

**Description:**

Secondary excavation area after surface scrape looking south.



**Photo: 12**

**Description:**

Secondary excavation area after surface scrape looking southeast.



**Photo: 13**

**Description:**

Secondary excavation looking South. Following impacts with visual observations of impacts, as well as with a soil conductivity meter. Impacted soil was observed  $>4.0$  mmhos/cm on the darker soil on the right, and  $<0.5$ mmhos/cm in the lighter soil on the left.

12/20/22

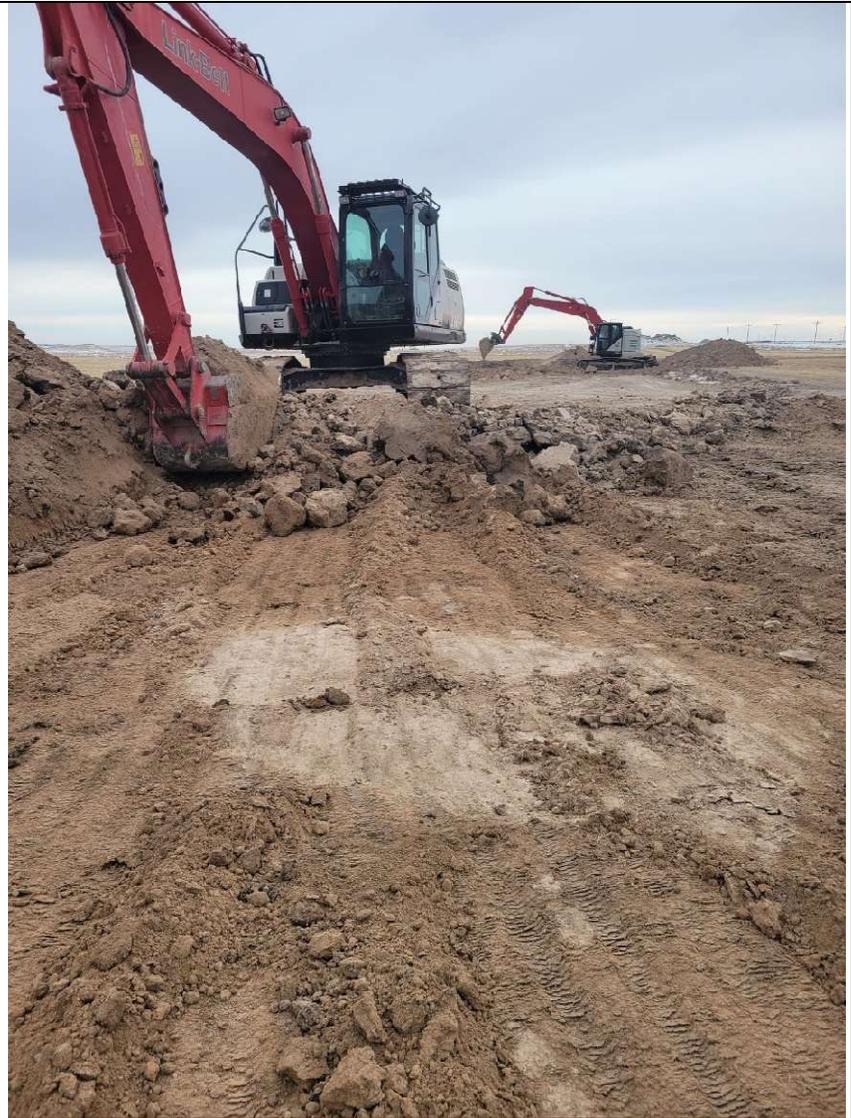


Taproot – Pintail Lateral – Produced Water Release

**Photo: 14**

**Description:**

Excavation and disposal of impacted soil on 12/20/22.



Taproot – Pintail Lateral – Produced Water Release

**Photo: 15**

**Description:**

Final Site Conditions following excavation of 1,150 tons of soil on 12/20 and 12/21.

