APPENDIX D

HYDRAULIC CONDUCTIVITY, LNAPL RECOVERABILITY OBSERVATIONS AND LNAPL TRANSMISSIVITY CALCULATIONS

APPENDIX D

LNAPL LIQUID PROPERTIES AND SMEAR ZONE PHYSICAL PROPERTIES PERMANENT SOLUTIONS WITH CONDITIONS REPORT ATLANTIC BRIDGE PROJECT WEYMOUTH COMPRESSOR STATION WEYMOUTH, MASSACHUSETTS

This Appendix summarizes LNAPL liquid and soil smear zone physical characteristics based on the analytical results from Alpha Laboratory and PST Laboratory, which are also included in this Appendix.

1.0 LNAPL LIQUID PROPERTIES

1.1 Initial LNAPL Sample

A sample of LNAPL was collected from MW-201 on November 3, 2016 and submitted to ALPHA Analytical Laboratory on the same day for analysis of VPH, EPH, and chemical properties (viscosity, density, specific gravity and molecular weight). The analytical results follow:

- The VPH analytical results indicated the detection of C9-C12 Aliphatics 2,120 mg/kg and 730 mg/kg (adjusted), and C9-C10 Aromatics 1,390 mg/kg. C5-C8 Aliphatics, and VPH target analytes (benzene, toluene, ethylbenzene, xylenes, MTBE and naphthalene) were not detected.
- The EPH results indicated the detection of C9-C18 Aliphatics at 58,700 mg/kg, C19-C36 Aliphatics at 93,200 mg/kg, and C11-C22 Aromatics at 93,200 mg/kg. EPH target analytes were not detected.
- The Kinematic Viscosity @ 104°F. was 1560 centistokes (cSt).
- API Gravity at @ 60° F. was 13.54,
- Specific Gravity and Density @ 60° F. was reported as 0.9756, and the molecular weight as 485 grams per mole (g/mol).

In summary, most #2 Fuel Oil, a middle distillates contain some benzene, toluene, ethylbenzene, and xylenes and naphthalene (Cole, 1994); therefore the absence of these compounds indicates the LNAPL has undergone weathering.

1.2 Comprehensive LNAPL Analysis

Additional LNAPL samples were collected from MW-201, during weekly gauging events between January 5 and January 15, 2017, and submitted to PTS Laboratories for three-point viscosity, density, and specific gravity analysis to support, in part analysis of LNAPL mobility. The three points selected were 50, 70, and 100 degrees, with the lowest temperature approximating the temperature of groundwater at the Site. The three point analysis was selected to support PTS testing of "LNAPL mobility parameters", rather than utilizing the previous results performed at higher

temperatures than groundwater. The PTS analytical results are provided in **Appendix C**. The analytical results are summarized below:

- At 50°F the specific gravity, density and kinematic viscosity were 0.9787, 0.9785 grams per cubic centimeter (g/cc), and 44,600 cSt. The dynamic viscosity is equal to the kinematic viscosity (cSt) multiplied by the density (g/cc) is equal to 43,641.1 centipoise (cP).
- At 70°F the specific gravity, density and kinematic viscosity were 0.9792, 0.9724 g/cc, and 10,700 cSt. The dynamic viscosity is 10,404.68 cP.
- At 100°F the specific gravity, density and kinematic viscosity were 0.9761, 0.9624 g/cc, and 2,070 cSt. The dynamic viscosity is 1,992.168 cP.

In summary, the analytical results indicate the LNAPL consists primarily of EPH long chain C11-C22 aromatic and C9-C36 aliphatic compounds and is a viscous, weathered, high molecular weight oil. The LNAPL dynamic viscosity value of 43,641 cP at 50°F is representative of groundwater temperature or LNAPL present in-situ, and is 4 orders of magnitude of a cutoff point for significant migration of 2-3 cSt (Cole, 1994), and above the "red line" in MassDEP's LCSM Policy Figure 8, for site data of 10⁻² cm/s hydraulic conductivity, and observed LNAPL thickness indicating "hydraulic/vacuum recovery technologies deemed to be infeasible" (MassDEP, 2016, p.33). The LNAPL kinematic velocity is a measure of the product's resistance to flow; that is a measure of the relative ease with which liquid flow through soils. The LNAPL kinematic viscosity of 10,700 cSt at 70°F is two orders of magnitude greater than the viscosity of light fuel oil (#1, and #2) reported as 1.4 to 3.6 cSt at 70°F. (Riddick, et al., 1986), indicating the reported product stored at the Site (#2 Fuel Oil) has undergone significant weathering over time. For comparison, the reported viscosity of lubricating oil of 400 to 600 cSt at 70°F. (Riddick, et al., 1986).

2.0 SMEAR ZONE SOIL PROPERTIES

2.1 Soil Core Collection and Preservation

This LNAPL mobility evaluation was based upon physical analysis of soil cores collected beside two borings (B-412, B-413) in the central portion of the former AST where observed product thickness was measured as high and at two borings (B-404, B-406) located near the perimeter of the former AST where the product thickness was measured as relatively lower. Refer to **Figure 2 or Figure 3** for the boring locations.

Two-foot soil cores from four borings located within 1 foot of B-404, B-406, B-412, and B-413 (B404A, B406A, B412A, and B413A) were submitted for laboratory analysis of "LNAPL mobility parameters". Borings B412A and B413A are located beneath the central portion of the former AST, and B404A and B406A are located near the boundary of the former AST. The cores were collected and placed on dry ice on December 15, 2016 and shipped via common carrier (Fedex) overnight in a large cooler with a chain-of-custody (COC) to PTS Laboratories (Santa Fe Springs, CA).

PTS received the cores on December 16, 2016, intact and frozen. PTS cut each core in longitudinal slabs, photographed both slabs, put one slab under natural light, and the other under ultraviolet (UV) light. The purpose of the slab photography was to identify depth intervals for selection of

subcores for analysis of "LNAPL mobility parameters". The UV fluorescence (UVF) was initially expected to be bright sky blue or purple, which is characteristic of the presence of polycyclic aromatic hydrocarbons (PAHs). TRC discussed the UV results with the PTS Laboratory Director, who identified the depth intervals of UVF. The UVF displayed in these cores consisted of shades of gold to dark brown. PTS suggested the shades of tan and brown are consistent with medium to high molecular weight petroleum compounds, respectively. The UVF findings were considered with LNAPL observations recorded on the boring logs and soil TPH results when selecting subcores for the LNAPL observations. Calculated soil TPH, and subcore sample depths are summarized on **Table A-1** (**Table 11 in the ISI Report**). Subcore soil samples were analyzed for the following "LNAPL mobility parameters":

- **Pore Fluid Saturation Package:** American Petroleum Institute (API) RP40 Dean-Stark method. Includes initial pore fluid saturations, total porosity, air-filled porosity, grain and dry bulk density, and moisture content. LNAPL permeability, and hydraulic conductivity on a subset of representative samples.
- Free Product Mobility Package: Applied centrifugal force demonstrates product mobility; included residual saturations by Dean-Stark, total porosity, grain and dry bulk density. Test procedure modified for centrifuge to run at speed and time to simulate 30 days of gravity drainage.
- LNAPL/Water Imbibition Capillary Pressure Curve: LNAPL/Water Drainage Capillary Pressure Curve (water displacing LNAPL), dry bulk density, moisture content, and total (water only) pore fluid saturations.
- **Grain Size Analysis**: Selected in fill and fine to medium sand for comparison with grain size analyses at other intervals to document grain size distribution in subsurface materials containing LNAPL.

A total of 12 subcores were selected consisting of three subcores from each of the four soil borings. Subcores were targeted from the upper, middle and lower part of the observed saturated product zone to characterize LNAPL mobility parameters and soil properties across the observed vertical product thickness based on UVF core photography, and the PTS minimum subcore sample size of 0.2 feet.

Also, after completion of three rounds of product gauging including the 400 series monitoring wells on January 23, 2017, the product thickness was less than 0.5 feet, which indicated that bailing tests and/or skimming tests may not be implementable. Therefore, on January 23, 2017, TRC requested LNAPL permeability and hydraulic conductivity be included in the testing to calculate LNAPL transmissivity – a key line of evidence identified in the MassDEP LNAPL Policy (#WSC-16-450). TRC selected subcores for LNAPL permeability and hydraulic conductivity analysis from the observed upper to middle product zones in the vicinity of the highest observed LNAPL thickness at B412A, and B413, and in the vicinity of the LNAPL boundary at B404A and B406A. The upper and middle product zones are where LNAPL is expected to be the most mobile. The UV results are summarized with other LNAPL observations, soil TPH results, and the depths of subcore samples in tables in the PSCS report. The UV logs, and final physical testing report are provided in this appendix.

2.2 Physical Testing Results

2.2.1 Soil Particle Size Results

Four subcore soil samples were submitted to PTS for particle size analysis (ASTM D422M) for comparison with soil observations recorded on the boring log at three locations where fill was observed and one location where fine-medium sand was observed. The results are presented in this appendix and summarized below:

- Three of the four samples were collected from B404A, B412A, and B413A from 14.6 to 14.8 feet bgs, and the samples contained the following size fractions 37.4 to 76.88% gravel, 8.61 to 20.57% coarse sand, 9.69 to 24.74% medium sand, 3.72 to 14.21% fine sand, and 1.1 to 5.65% silt/clay. These samples are associated with Historic Fill (coal, cola ash, and clinkers) where residual LNAPL has been observed.
- The remaining sample, collected from B-406A from 12.6 to 12.8 feet was comprised mostly of 15.77% medium sand, 79% fine sand, and 4.35% silt/clay, and less than 1% gravel and coarse sand combined. These results are consistent with the same depth interval at boring log from B-406, which indicated fine-medium sand with trace of silt/sand. The boring log indicated this zone was saturated with oil globules.

In summary, particle size results support boring log visual soil classifications. Fill materials consist of mostly coarse sand and gravel size material with lesser amounts of medium to fine sand and with trace of silt/clay.

2.2.2 Permeability Data – Oil/Water Capillary Pressure

A total of four subcore soil samples were collected from four borings (B404A, B406A, B412A, B413A) for analysis of hydraulic conductivity, and specific intrinsic permeability to LNAPL supplied from the Disposal Site. The results are summarized below:

- **Specific permeability to water** in three of the four subcores ranged from 6,790 millidarcy at 14.5 ft in B413A to 7,950 millidarcy at 12.5 ft in B412A, while in the remaining sample, it was an order of magnitude lower at 703 millidarcy at 11.4 ft bgs in B406A.
- **Hydraulic conductivity** ranged in three of the four subcores ranged from 6.72E⁻⁰³ to 7.89E⁻⁰³ cm/s, and was an order of magnitude lower at 6.99 E⁻⁰⁴ cm/s in the remaining subcore sample that was collected from B406A.
- **Specific permeability to LNAPL** (LNAPL from the Site), ranged from 18,000 to 23,700 millidarcy in three of the four subcores that consisted of sand and gravel, and only 491 millidarcy in the sample from B406A that consisted of fine-medium sand.

In summary, specific permeability to water, hydraulic conductivity and specific permeability to LNAPL values were within one order of magnitude in samples from 10.7 ft bgs in B404A, 12.5 ft bgs in B412A, and at 14.5 ft bgs in B413A, and an order of magnitude lower at 11.4 ft bgs in B406A. According to the logs for adjacent borings at B404, B412, and B413 subcore samples appear to be collected from coarse sand and gravel materials, which the particle size analysis indicated consist mostly of coarse sand and gravel, and the sample from B406 appears to be from fine to medium sand, which is consistent with particle size results. These analyses were conducted under 25 PSI pressure. In comparison, the in-situ hydraulic conductivity (K) results were an order of magnitude higher (3.0 x 10⁻³ to 3.7 x 10⁻² cm/s), which are representative of K in the horizontal direction (Kh), while the laboratory hydraulic conductivity were determined in vertical cores, which are representative of K in the vertical direction (Kv).

2.2.3 Pore Fluid Saturations

A total of 12 subcore soil samples were collected from four borings (B404A, B406A, B412A, B413A) for analysis of moisture content, dry bulk density, grain size density, total porosity, air filled porosity, water saturation, and LNAPL saturations. The results are summarized below:

- **Moisture Content** (% weight) ranged from 17.5% at 12.1 feet bgs in B406A to 31.9% at 12.1 feet bgs in B412A.
- **Dry bulk density** ranges from 1.05 g/cc at 11.0 feet bgs at B406A to 1.62 at 12.1 ft bgs at B406A.
- **Grain density** ranged from 2.30 g/cc at 14.1 ft bgs at B404A to 2.68 g/cc at 14.1 ft bgs at B406A.
- Total Porosity ranged from 37.8% at 12.1 ft bgs in B406A to 55.9% at 11.0 ft bgs at B406A
- **Air-Filled Porosity** ranged from 6.5% at 12.1 ft bgs in B412A to 31% at 11.0 ft bgs at B406A.
- Water Saturation ranged from 28.4 to 65.7% of pore volume.
- **LNAPL Saturation** ranged from 2.0 to 40.1% of pore volume.

In summary, the sample collected from 11.0 ft bgs at B406A showed the highest air filled porosity of 31%, and lowest water saturation of 28.4% of pore volume, which is interpreted to be from the vadose zone. The NAPL saturation of this sample was 16.3% of pore volume, while deeper samples in the saturated zone from B406A at 12.1 and 14.1 ft bgs contained higher water saturations ranging from 36.3 to 42.1% of pore volume, and higher LNAPL saturations ranging from 34.1 to 39.8% of pore volume. In the remaining three borings (B404A, B412A, B413A) samples collected from 10.3 to 14.1 ft bgs in each of these borings contained water saturations ranging from 52.7 to 65.7% of pore volume, and LNAPL saturations ranging from 2 to 30.5% of pore volume, with the exception of B413A. At B413A, at a depth of 14.1 ft bgs, the water saturation was 38.7% of pore volume and NAPL saturation was 40.1% of pore volume, which is similar to that observed at the same depth at B406A.

2.2.4 Free Product Mobility: Initial and Residual Saturations

A total of 12 subcore soil samples were collected from four borings (B404A, B406A, B412A, B413A) for analysis of water and NAPL saturations before and after centrifuging at 30 times gravity (30xG) for 24 hours, for simulating 30 days of gravity drainage. Comparison of the preand post-centrifuge results are summarized below:

- In 10 of the 12 samples, NAPL saturation decreased less than 3% after centrifuging indicating the NAPL is essentially immobile;
- In the remaining two samples, both collected from B406A, the NAPL saturation decreased 12.7% at 14.3 ft bgs and 27.8% at 12.3 ft bgs. These results suggest the NAPL has limited mobility in these two samples.

PTS noted the following after centrifuging.

- B404A at 10.5 ft bgs, brown water with no hydrocarbon odor was produced; at 12.3 ft, dark brown LNAPL and clear water was produced; at 14.3 ft clear water was produced.
- B406A at 11.2 ft bgs, <u>trace</u> dark brown LNAPL and clear water were produced; at 12.3 and at 14.3 ft, **dark brown LNAPL and clear water were produced**.
- B412A at 12.3 and 16.3 ft bgs, dark brown LNAPL and clear water were produced; at 14.3 ft, trace dark brown LNAPL and clear water were produced.
- B413A at 12.3 and 14.3 ft bgs, dark brown or brown LNAPL and clear water were produced; at 16.3 ft, <u>trace</u> LNAPL and clear water were produced.

In summary, LNAPL saturation decreased less than 3% in 83.3% of the samples after centrifuging at 30xG, for simulating 30 days of gravity drainage, which suggests that LNAPL has limited mobility. Under laboratory conditions, likely at higher temperatures than that in-situ, LNAPL and clear water were observed after centrifuging in samples from B404A at 12.3 ft, from B406A at 12.3 and 14.3 ft, from B412A at 12.3 and 16.3 ft, and from B413A from 12.3 and 14.3 ft bgs. Trace brown LNAPL was produced from B406A at 11.2 ft, from B412A at 14.3 ft, and from B413A at 14.3 ft bgs. With the exception of the sample from B404A at 11.2 ft that produced brown water, clear water was produced from the same samples that produced LNAPL, and clear water was produced from B404A at 14.3 ft bgs only. Overall, these laboratory test results support the LNAPL mobility is limited.

2.2.5 Oil/Water Capillary Pressure

A total of 12 subcore soil samples were collected from four borings (B404A, B406A, B412A, B413A) for analysis of moisture content, dry bulk density, grain size density, total porosity, air

filled porosity, and total port fluid saturations. The subcore samples are adjacent to those analyzed in previous subcore testing. The results are summarized below:

- **Moisture Content** (% weight) ranged from 17.2% at 16.5 feet bgs in B413A to 70.7% at 12.5 feet bgs in B413A.
- **Dry bulk density** ranges from 0.76 g/cc at 12.5 feet bgs at B413A to 1.50 at 12.5 ft bgs at B406A.
- Grain density ranged from 2.11 g/cc at 16.45 ft bgs at B412A to 2.68 g/cc at 12.5 ft bgs and 14.5 ft bgs at B406A.
- **Total Porosity** ranged from 40.0% at 11.4 ft bgs in B406A to 65.5% at 12.5 ft bgs at B413A.
- **Air-Filled Porosity** ranged from 9.9% at 14.5 ft bgs in B413A to 30% at 16.5 ft bgs at B413A.
- **Total Pore Fluid Saturation** ranged from 41.5% to 84.2% of pore volume.

2.2.6 Oil/Water Capillary Pressure Results

A total of 12 subcore soil samples were collected from four borings (B404A, B406A, B412A, B413A) for analysis of the effect of capillary pressure on water and oil saturation following ASTM D6836 Method E (Centrifugal Method: Single point drainage followed by imbibition). The results are summarized below:

2.2.6.1 *Boring B404A – NAPL Margin*

- At soil core B404A-B collected at 10.7 ft bgs, the oil saturation was 35.2% of pore space. When capillary pressure increased to the equivalent of 72.9 ft above the water table, it resulted in a 31.1 % increase in oil saturation (66.3-35.2). During imbibition, as capillary pressure decreased, water displaced oil. At the equivalent pressure of 2.9 feet of water table height, (representative of site seasonal water table fluctuation), oil saturation decreased to 65.7%, which represents only a 0.6% decrease in oil saturation (66.3-65.7%), which supports very limited NAPL mobility at a pressure representative of Disposal Site seasonal water table fluctuation. At the end of imbibition, at a water table height of 70.5 feet, the oil saturation was 14.4% higher than its initial value.
- The next deeper soil core at B404A-C at 12.5 ft bgs the oil saturation was 21.1% of pore space. When capillary pressure was increased to the equivalent of 79.2 feet of water, oil saturation increased from 21.1 to 66.5%, equivalent to an increase of 44.4%. At the equivalent of 3.05 feet of water height, oil saturation decreased slightly from 66.5% to 65.1% a change of only 1.4%. At the end of imbibition, at the equivalent of 77.3 feet of water table height, oil saturation decreased from 66.5% to 32.5% or only 34%, which is 11.4% higher than its initial value.

• In the next deeper soil core at B404A-D at 14.5 feet bgs, oil saturation at 3.5% of pore space. When capillary pressure increased to 75.6 feet of water table height, oil displaced water by 57.8% of pore space (61.3 – 3.5 initial). At a capillary pressure equivalent to 3.01 feet of water table height, oil saturation decreased from 61.3% to 50.1 %, a change of 11.2% of pore space. At the end of imbibition, at a water table height of 73.3 feet (similar to that of the initial water table height of 75.6 feet), the oil saturation was at 16.4%, which is 12.9% higher than that of the initial value.

In summary, at boring B404A, oil saturations decreased with depth from 35.2 to 3.5%. During imbibition, when negative capillary pressures equaled approximately 3 feet height above the water table, which is representative of seasonal water table fluctuation, oil saturation decreased slightly in the upper two samples with values of 0.6 and 1.4%, while in the deeper sample oil saturation decreased by 11.2%. End of test oil saturations ranged from 11.4 to 14.6% higher than initial values.

2.2.6.2 Boring B406A – LNAPL Margin

- At soil core B406A-B collected at 11.4 ft bgs, oil saturation was at 11.8% of pore space. When pressure increased to the equivalent of 75.2 ft above the water table, it resulted in a 19.4 % increase in oil saturation from 11.8 to 31.2%. At a capillary pressure equivalent of 3.00 feet of height above the water table, oil saturation decreased only 0.2%. At the end of imbibition, oil saturation was 23.8% of pore volume, which is 12% higher than its initial value.
- The next deeper soil core at B406A-C at 12.5 ft bgs, oil saturation was 27.0% of pore space. When capillary pressure was increased to 75.9 feet of water, oil saturation increased from 27 to 75.9% or by 48.9%. At the equivalent of 3.02 feet of water table height, oil saturation decreased 0.3% (75.9% initial 75.6%). At the end of imbibition, at a capillary pressure equal to 73.6 feet height above the water table, oil saturation was 43% of pore volume, which is 16.0% higher than its initial value.
- In the last (deeper) soil core at B406A-D at 14.5 feet bgs, oil saturation was at 31.6% of pore space. When capillary pressure was increased to 75.3 feet of water, oil displaced water by 50.6% of pore space (82.2 31.6 initial). At a capillary pressure equal to 3.00 feet of water height, oil saturation decreased from 82.2 to 74.8% or 7.4% decrease in oil saturation. At the end of imbibition, at a capillary pressure equal 73 ft height above the water table, oil saturation was 30.9% of pore volume, which is similar to its initial value.

In summary at boring B-406A, oil saturations increased with depth ranging from 11.8 to 31.6%. During imbibition, when negative capillary pressures equaled approximately 3 feet of height above the water table, which is representative of seasonal water table fluctuation, oil saturation decreased slightly in the upper two samples with values of 0.2 and 0.3%, and decreased only 7.4% in the

deeper sample at this location. End of test oil saturations was close to its initial value in the sample from 14.5 ft bgs, and 12% -16% higher than initial values in the remaining two subcore samples.

2.2.6.3 Boring B412A – Central Source Area

- At soil core B412A-B collected at 12.5 ft bgs, initial oil saturation was 16.4% of pore space. When pressure increased to the equivalent of 75.6 feet above the water table, oil saturation increased from 16.4 to 71.8%. At a capillary pressure equivalent to 3.2 feet height above the water table, the oil saturation decreased from 71.8% to 59%, a decrease of 46.4%. During imbibition, oil saturation decreased from 71.8% to 25.4% as negative pressure approaching the initial pressure, which is 9% higher than its initial value.
- The next deeper soil core at B412A-C at 14.5 ft bgs, initial oil saturation was 8.6%. When capillary pressure was increased to 75.8 feet of water, oil saturation increased to 67.1%. At a pressure equivalent to 3.21 feet of water, oil saturation decreased from 22.8% to 44.3%. At the end of imbibition, at 73.5 ft height above the water table, oil saturation decreased to 29.2% of pore space, which is 20.6% higher than its initial value.
- In the remaining (deeper) soil core, which was collected from B412A-D at 16.45 feet bgs, initial oil saturation was 11.1%. When the capillary pressure was increased to 70.9 feet height above the water table, oil saturation increased to 79.5% of pore volume. At a capillary pressure equal to 2.99 feet of water height above the water table, oil saturation decreased to 45.3% of pore space, a decrease of 34.2%. At the end of imbibition, at 68.5 feet height above the water table, oil saturation decreased to 26.2% of pore space, which is 15.1% higher than its initial value.

In summary, at boring B-412A, initial oil saturations varied with depth ranging from 16.4% at 12.5 ft bgs to 8.6% at 14.5 ft bgs. During imbibition, when negative capillary pressures equaled approximately 3 feet of height above the water table, which is representative of seasonal water table fluctuation, oil saturation decreased between 22.8 to 45.3% relative to that at static pressure 0 psi). End of test oil saturations were 9.0 to 20.6% higher than initial values. These results suggest NAPL has a tendency to stay in the soil.

2.2.6.4 Boring B413A – Central Source Area

• At soil core B413A-B collected at 12.5 ft bgs, initial oil saturation was at 27.8%. When pressure was increased to the equivalent of 71.5 ft above the water table, oil saturation increased to 69.2%. During imbibition, at a capillary pressure equal to 3.02 feet of water, oil saturation decreased from 69.2 to 61.1%, (8.1%). At the end of imbibition, at 69.1 ft height above the water table, oil saturation was 29% of pore volume, which is similar to its initial value.

- The next deeper soil core at B413A-C at 14.5 ft bgs, initial oil saturation was at 26.9%. When capillary pressure was increased to 71.9 feet of water, oil saturation increased to 80.8%. At the equivalent of 3.03 feet of height above the water table, oil saturation decreased 1.2% to 79.6%. At the end of imbibition, at 69.5 ft of water above the water table, oil saturation was 29.6% of pore volume, which is slightly higher than its initial value.
- In the last (deeper) soil core at B413A-D at 16.5 feet bgs, initial oil saturation was 42.7%. When capillary pressure was increased to 83 feet of water, oil saturation increased by 33.7% of pore space (76.4 42.7 initial). At a capillary pressure equal to 3.53 feet height of water above the water table, oil saturation decreased 2.2% from 76.4 to 74.2%. At the end of imbibition, at 80.9 ft of water above the water table, oil saturation was 22.3% of pore volume. When compared with the initial soil saturation, this is 20.4% lower in oil saturation relative to its initial value.

In summary, at boring B-413A, initial oil saturations ranged from 26.9% at 14.5 ft bgs to 42.7% at 16.5 ft bgs. During imbibition, when negative capillary pressures equaled approximately 3 feet of height above the water table (seasonal water table fluctuation), oil saturation decreased 8.1% at 12.5 ft bgs, decreasing to only 1.2% at 14.5 ft bgs, and decreased 2.2% at 16.5 ft bgs. End of test oil saturations were 1.2 to 2.7% higher in two samples, and were 20.4% lower in the subcore from 16.5 ft bgs relative to its initial value.

2.2.6.5 Comparison of Oil/Water Capillary Pressure Results: LNAPL Source Zone and Margin Zone

Soil borings B412A and B413A were selected beneath the central area of the former AST, in the vicinity of MW-201 where LNAPL was first observed, and where PSS was observed to range from 5 to 6 feet in thickness. In comparison, soil borings B404A and B406A were located in the vicinity of the south – southwest side of the former AST, where PSS was observed to range from 0.5 to 3.5 feet thick.

In the source vicinity borings, initial oil saturations ranged from 8.6 to 16.4% at B412A and were 26.9 to 42.7% at B413A. During imbibition, when the capillary pressure decreased from static to a negative pressure equal to approximately 3 feet height above the water table, the oil saturation decreased from 22.8 to 45.3% at B412A and only from 1.2 to 8.2% at B413A. These laboratory results indicated limited NAPL mobility, which is consistent with the lack of NAPL observed in MW-412 and MW-413 located beside B412A and B413A, respectively.

In the LNAPL margin soil borings, initial oil saturations ranged from 35.2 to 3.5% at B404A, and ranged from 11.8 to 31.6% at B406A. During imbibition at B404A, when the capillary pressure approximated 3 feet height above the water table, the oil saturation decreased only 0.6 to 1.4% of pore space in shallow and midlevel samples, and 11.2% in the deeper sample. Similarly, at B406A, when the capillary pressure approximated 3 feet height above the water table, the oil saturation

was close to the initial saturation in the shallow and midlevel samples and 11.4% lower in the deeper sample. These results suggest limited mobility of NAPL.

2.3 Limitations of Soil Core Laboratory Results

Laboratory testing assume the soil samples are representative, and undisturbed. The laboratory tests were performed on vertical subcores 0.1-0.2 ft long; therefore, individual test results are representative of small scale properties. However, the collection of multiple samples at four borings with two borings located in the vicinity of MW-201, and two locations near the south west side of the former AST by way of comparison provide information on larger scale properties. Nevertheless, advancing the soil sampler may compress the samples and displace fluid; fluids that accumulate in the sampling device above the sample will drain through the sample as it is brought to the surface altering water and product saturations; and/or air can invade the pore space as the core is retrieved allowing product/and/or water to drain out. The severity of these problems increase with the hydraulic conductivity and length of sample collected.

Soil cores were collected with direct push technology in acetate liners, the ends capped, immediately placed horizontally on/surrounded by dry ice, and shipped overnight to PTS Laboratory. PTS received the core shipment intact and frozen, which indicates the cores were not disrupted. The cores were not likely to be significantly compressed due to the coarse material observed. Most of the samples were collected at or below the water table, therefore, the impact on water and product saturations are unlikely to be minimal, if any. The percent saturation for water is unlikely to be significantly impacted because it is in direct contact with the soil, LNAPL is the non-wetting surface in contact with water not the soil. The percent water saturation varies over a narrow range for most of the samples that consist of sand and gravel. The percent saturation of LNAPL is unlikely to be significantly affected because of the high viscosity and sticky nature of the LNAPL. Laboratory temperature is higher than that in-situ. Viscosity decreases with increasing temperature, making it easier to flow. Therefore, the laboratory tests tend to be very conservative, biased high toward mobility. Although the mobility tests are biased high, the results support there is limited or no LNAPL mobility, which is consistent with field gauging, recoverability, and NAPL transmissivity testing.



ANALYTICAL REPORT

Lab Number: L1635614

Client: TRC Environmental Consultants

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Project Name: ATLANTIC BRIDGE

Project Number: 140143.0000.7478

Report Date: 11/29/16

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Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), VA (460195), MD (348), IL (200077), NC (666), TX (T104704476), DOD (L2217), USDA (Permit #P-330-11-00240).

Eight Walkup Drive, Westborough, MA 01581-1019 508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



11/03/16

Project Name: ATLANTIC BRIDGE **Project Number:** 140143.0000.7478

L1635614-01

MW-201 (LNAPL)

Lab Number: L1635614 **Report Date:** 11/29/16

11/03/16 09:30

Alpha Sample ID Client ID Matrix Sample Collection Date/Time Receive Date

WEYMOUTH, MA

OIL



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
В	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
С	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	YES
Εb.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES

A re	A response to questions G, H and I is required for "Presumptive Certainty" status							
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES						
Н	Were all QC performance standards specified in the CAM protocol(s) achieved?	NO						
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES						

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

Case Narrative (continued)

Report Submission

This final report replaces the partial report issued November 10, 2016 and includes the results of all requested analyses.

The analyses of Viscosity, Density, and Molecular Weight were subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

MCP Related Narratives

VPH

L1635614-01: The sample has elevated detection limits due to the dilution required by the sample matrix. In reference to question H:

L1635614-01: The surrogate recovery is outside the acceptance criteria for 2,5-Dibromotoluene-FID (167%); however, the sample was not re-analyzed due to coelution with obvious interferences. A copy of the chromatogram is included as an attachment to this report. The results are not considered to be biased.

EPH

L1635614-01: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

In reference to question H:

L1635614-01: The surrogate recoveries are below the acceptance criteria for chloro-octadecane (0%) and oterphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Michelle M. Morris

Authorized Signature:

Title: Technical Director/Representative

Date: 11/29/16



ORGANICS



PETROLEUM HYDROCARBONS



Project Name: ATLANTIC BRIDGE Lab Number: L1635614

SAMPLE RESULTS

Lab ID: L1635614-01 D Date Collected: 11/03/16 09:30

Client ID: MW-201 (LNAPL) Date Received: 11/03/16
Sample Location: WEYMOUTH, MA Field Prep: Not Specified

Matrix: Oil

Analytical Method: 100,VPH-04-1.1 Analytical Date: 11/09/16 10:13

Analyst: JM

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Quality Control Information

Condition of sample received:

Sample Temperature upon receipt:

Were samples received in methanol?

Methanol ratio:

Satisfactory

Received on Ice

Covering the Soil

Qualifier Units RL MDL **Dilution Factor Parameter** Result Volatile Petroleum Hydrocarbons - Westborough Lab C5-C8 Aliphatics ND mg/kg 484 20 C9-C12 Aliphatics 2120 484 20 mg/kg --C9-C10 Aromatics 1390 484 20 mg/kg C5-C8 Aliphatics, Adjusted ND 484 20 mg/kg --C9-C12 Aliphatics, Adjusted 730 mg/kg 484 20 ND 20 Benzene mg/kg 19.4 --Toluene ND mg/kg 19.4 20 ND Ethylbenzene 19.4 20 mg/kg --ND p/m-Xylene mg/kg 19.4 20 -o-Xylene ND mg/kg 19.4 20 Methyl tert butyl ether ND mg/kg 9.69 20 Naphthalene ND mg/kg 38.8 __ 20

Surrogate	% Recovery	Qualifier	Acceptance Criteria	
2,5-Dibromotoluene-PID	127	Q ualifier	70-130	
2,5-Dibromotoluene-FID	167	Q	70-130	



Project Name: ATLANTIC BRIDGE Lab Number: L1635614

SAMPLE RESULTS

Lab ID: L1635614-01 D Date Collected: 11/03/16 09:30

Client ID: MW-201 (LNAPL) Date Received: 11/03/16

Sample Location: WEYMOUTH, MA Field Prep: Not Specified Matrix: Oil Extraction Method: EPA 3580A

Analytical Method: 98,EPH-04-1.1 Extraction Date: 11/07/16 17:15

Analytical Date: 11/09/16 00:20 Cleanup Method1: EPH-04-1
Analyst: DV Cleanup Date1: 11/07/16

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Quality Control Information

Condition of sample received: Satisfactory
Sample Temperature upon receipt: Received on Ice

Sample Extraction method: Extracted Per the Method

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor		
Extractable Petroleum Hydrocarbons - Westborough Lab								
C9-C18 Aliphatics	58700		mg/kg	1700		20		
C19-C36 Aliphatics	93200		mg/kg	1700		20		
C11-C22 Aromatics	93200		mg/kg	1700		20		
C11-C22 Aromatics, Adjusted	93200		mg/kg	1700		20		
Naphthalene	ND		mg/kg	84.9		20		
2-Methylnaphthalene	ND		mg/kg	84.9		20		
Acenaphthylene	ND		mg/kg	84.9		20		
Acenaphthene	ND		mg/kg	84.9		20		
Fluorene	ND		mg/kg	84.9		20		
Phenanthrene	ND		mg/kg	84.9		20		
Anthracene	ND		mg/kg	84.9		20		
Fluoranthene	ND		mg/kg	84.9		20		
Pyrene	ND		mg/kg	84.9		20		
Benzo(a)anthracene	ND		mg/kg	84.9		20		
Chrysene	ND		mg/kg	84.9		20		
Benzo(b)fluoranthene	ND		mg/kg	84.9		20		
Benzo(k)fluoranthene	ND		mg/kg	84.9		20		
Benzo(a)pyrene	ND		mg/kg	84.9		20		
Indeno(1,2,3-cd)Pyrene	ND		mg/kg	84.9		20		
Dibenzo(a,h)anthracene	ND		mg/kg	84.9		20		
Benzo(ghi)perylene	ND		mg/kg	84.9		20		



Project Name: ATLANTIC BRIDGE Lab Number: L1635614

SAMPLE RESULTS

Lab ID: L1635614-01 D Date Collected: 11/03/16 09:30

Client ID: MW-201 (LNAPL) Date Received: 11/03/16
Sample Location: WEYMOUTH, MA Field Prep: Not Specified

Parameter Result Qualifier Units RL MDL Dilution Factor

Extractable Petroleum Hydrocarbons - Westborough Lab

	Acceptance					
Surrogate	% Recovery	Qualifier	Criteria			
Chloro-Octadecane	0	Q	40-140			
o-Terphenyl	0	Q	40-140			
2-Fluorobiphenyl	89		40-140			
2-Bromonaphthalene	93		40-140			



L1635614

Lab Number:

Project Name: ATLANTIC BRIDGE **Project Number:**

140143.0000.7478 Report Date: 11/29/16

Method Blank Analysis Batch Quality Control

Analytical Method: Analytical Date:

98,EPH-04-1.1 11/08/16 01:46

Analyst:

DV

Extraction Method: EPA 3580A 11/07/16 17:15 Extraction Date:

EPH-04-1 Cleanup Method: Cleanup Date: 11/07/16

arameter	Result	Qualifier	Units	RL		MDL
xtractable Petroleum Hydrocar	bons - Westbor	ough Lab	for sample(s):	01	Batch:	WG949964-1
C9-C18 Aliphatics	ND		mg/kg	895		
C19-C36 Aliphatics	ND		mg/kg	895		
C11-C22 Aromatics	ND		mg/kg	895		
C11-C22 Aromatics, Adjusted	ND		mg/kg	895		
Naphthalene	ND		mg/kg	44.8		
2-Methylnaphthalene	ND		mg/kg	44.8		
Acenaphthylene	ND		mg/kg	44.8		
Acenaphthene	ND		mg/kg	44.8		
Fluorene	ND		mg/kg	44.8		
Phenanthrene	ND		mg/kg	44.8		
Anthracene	ND		mg/kg	44.8		
Fluoranthene	ND		mg/kg	44.8		
Pyrene	ND		mg/kg	44.8		
Benzo(a)anthracene	ND		mg/kg	44.8		
Chrysene	ND		mg/kg	44.8		
Benzo(b)fluoranthene	ND		mg/kg	44.8		
Benzo(k)fluoranthene	ND		mg/kg	44.8		
Benzo(a)pyrene	ND		mg/kg	44.8		
Indeno(1,2,3-cd)Pyrene	ND		mg/kg	44.8		
Dibenzo(a,h)anthracene	ND		mg/kg	44.8		
Benzo(ghi)perylene	ND		mg/kg	44.8		

	Acceptance						
Surrogate	%Recovery	Qualifier	Criteria				
Chloro-Octadecane	72		40-140				
o-Terphenyl	72		40-140				
2-Fluorobiphenyl	82		40-140				
2-Bromonaphthalene	79		40-140				



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

Method Blank Analysis Batch Quality Control

Analytical Method: 100,VPH-04-1.1 Analytical Date: 11/09/16 09:17

Analyst: JM

Parameter	Result	Qualifier	Units		RL	MDL	
Volatile Petroleum Hydrocarbons	- Westboroug	h Lab for s	ample(s):	01	Batch:	WG950701-3	
C5-C8 Aliphatics	ND		mg/kg	2	26.6		
C9-C12 Aliphatics	ND		mg/kg	2	26.6		
C9-C10 Aromatics	ND		mg/kg	2	26.6		
C5-C8 Aliphatics, Adjusted	ND		mg/kg	2	26.6		
C9-C12 Aliphatics, Adjusted	ND		mg/kg	2	26.6		
Benzene	ND		mg/kg	1	.07		
Toluene	ND		mg/kg	1	.07		
Ethylbenzene	ND		mg/kg	1	.07		
p/m-Xylene	ND		mg/kg	1	.07		
o-Xylene	ND		mg/kg	1	.07		
Methyl tert butyl ether	ND		mg/kg	0	.533		
Naphthalene	ND		mg/kg	2	2.13		

	Acceptance				
Surrogate	%Recovery	Qualifier	Criteria		
2,5-Dibromotoluene-PID	92		70-130		
2,5-Dibromotoluene-FID	93		70-130		



Lab Control Sample Analysis Batch Quality Control

Project Name: ATLANTIC BRIDGE
Project Number: 140143.0000.7478

Lab Number: L1635614

Report Date:

11/29/16

arameter	LCS %Recovery Qua	LCSD I %Recovery Q	%Recovery ual Limits	RPD	RPD Qual Limits
xtractable Petroleum Hydrocarbo	ons - Westborough Lab Associated	d sample(s): 01 Batch: V	VG949964-2 WG949964	-3	
C9-C18 Aliphatics	109	117	40-140	7	25
C19-C36 Aliphatics	114	135	40-140	17	25
C11-C22 Aromatics	109	97	40-140	12	25
Naphthalene	82	69	40-140	17	25
2-Methylnaphthalene	80	68	40-140	16	25
Acenaphthylene	85	72	40-140	17	25
Acenaphthene	85	70	40-140	19	25
Fluorene	82	69	40-140	17	25
Phenanthrene	80	67	40-140	18	25
Anthracene	83	68	40-140	20	25
Fluoranthene	85	72	40-140	17	25
Pyrene	88	74	40-140	17	25
Benzo(a)anthracene	78	66	40-140	17	25
Chrysene	85	72	40-140	17	25
Benzo(b)fluoranthene	80	71	40-140	12	25
Benzo(k)fluoranthene	88	74	40-140	17	25
Benzo(a)pyrene	79	68	40-140	15	25
Indeno(1,2,3-cd)Pyrene	75	66	40-140	13	25
Dibenzo(a,h)anthracene	77	63	40-140	20	25
Benzo(ghi)perylene	80	70	40-140	13	25
Nonane (C9)	76	78	30-140	3	25



Lab Control Sample Analysis Batch Quality Control

Project Name: ATLANTIC BRIDGE
Project Number: 140143.0000.7478

Lab Number:

L1635614

Report Date:

11/29/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	%Recovery Qual Limits	RPD	RPD Qual Limits
Extractable Petroleum Hydrocarbons - Wes	tborough Lab Ass	ociated samp	e(s): 01 Batc	h: WG949964-2 WG949964	-3	
Decane (C10)	81		82	40-140	1	25
Dodecane (C12)	82		84	40-140	2	25
Tetradecane (C14)	82		84	40-140	2	25
Hexadecane (C16)	85		89	40-140	5	25
Octadecane (C18)	89		95	40-140	7	25
Nonadecane (C19)	85		88	40-140	3	25
Eicosane (C20)	90		96	40-140	6	25
Docosane (C22)	90		94	40-140	4	25
Tetracosane (C24)	88		93	40-140	6	25
Hexacosane (C26)	86		91	40-140	6	25
Octacosane (C28)	86		90	40-140	5	25
Triacontane (C30)	83		88	40-140	6	25
Hexatriacontane (C36)	81		86	40-140	6	25

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	
Chloro-Octadecane	77		89		40-140	
o-Terphenyl	86		77		40-140	
2-Fluorobiphenyl	95		76		40-140	
2-Bromonaphthalene	94		74		40-140	
% Naphthalene Breakthrough	0		0			
% 2-Methylnaphthalene Breakthrough	0		0			



11/29/16

Lab Control Sample Analysis Batch Quality Control

Project Name: ATLANTIC BRIDGE
Project Number: 140143.0000.7478

Lab Number: L1635614

Report Date:

Parameter	LCS %Recovery	Qual	LCSD %Recovery	9 Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Petroleum Hydrocarbons - West	borough Lab Associa	ated sample(s)	: 01 Batch:	WG950701-1	WG950701-2			
C5-C8 Aliphatics	89		96		70-130	7		25
C9-C12 Aliphatics	100		106		70-130	6		25
C9-C10 Aromatics	95		99		70-130	5		25
Benzene	91		98		70-130	7		25
Toluene	94		100		70-130	6		25
Ethylbenzene	95		100		70-130	6		25
p/m-Xylene	95		100		70-130	5		25
o-Xylene	96		101		70-130	5		25
Methyl tert butyl ether	88		98		70-130	10		25
Naphthalene	91		102		70-130	12		25
1,2,4-Trimethylbenzene	95		99		70-130	5		25
Pentane	81		87		70-130	7		25
2-Methylpentane	89		96		70-130	7		25
2,2,4-Trimethylpentane	95		101		70-130	6		25
n-Nonane	100		105		30-130	5		25
n-Decane	101		105		70-130	4		25
n-Butylcyclohexane	101		107		70-130	6		25



Lab Control Sample Analysis Batch Quality Control

Project Name: ATLANTIC BRIDGE **Project Number:**

Lab Number:

L1635614

140143.0000.7478

Report Date:

11/29/16

	LCS		LCSD		%Recovery			RPD
Parameter	%Recovery	Qual	%Recovery	Qual	Limits	RPD	Qual	Limits

Volatile Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 01 Batch: WG950701-1 WG950701-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	
2,5-Dibromotoluene-PID	92		100		70-130	
2,5-Dibromotoluene-FID	91		100		70-130	



Project Name:ATLANTIC BRIDGELab Number: L1635614Project Number:140143.0000.7478Report Date: 11/29/16

Sample Receipt and Container Information

Were project specific reporting limits specified?

Cooler Information Custody Seal

Cooler

A Absent

Container Info	ormation			Temp			
Container ID	Container Type	Cooler	рН	deg C	Pres	Seal	Analysis(*)
L1635614-01A	Glass 60mL/2oz unpreserved	Α	N/A	3.8	Υ	Absent	-
L1635614-01B	Glass 500ml/16oz unpreserved	Α	N/A	3.8	Υ	Absent	VPH-DELUX-10(28),EPH- DELUX-10(14)
L1635614-01C	Glass 500ml/16oz unpreserved	Α	N/A	3.8	Y	Absent	SUB- MOLECULARWEIGHT(14),SUB- DENSITY(28),SUB-VISCOSITY()
L1635614-01X	Vial unpreserved	Α	N/A	3.8	Υ	Absent	VPH-DELUX-10(28)



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated

values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis

of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of

analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of

analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any

adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for

which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's

reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL

includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less

than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the

values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the

associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound

list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a "Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the

Report Format: Data Usability Report



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

Data Qualifiers

- reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.
- H The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I The lower value for the two columns has been reported due to obvious interference.
- M Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P The RPD between the results for the two columns exceeds the method-specified criteria.
- Q The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- **R** Analytical results are from sample re-analysis.
- **RE** Analytical results are from sample re-extraction.
- S Analytical results are from modified screening analysis.
- J · Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- **ND** Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report



Project Name:ATLANTIC BRIDGELab Number:L1635614Project Number:140143.0000.7478Report Date:11/29/16

REFERENCES

98 Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), MassDEP, May 2004, Revision 1.1 with QC Requirements & Performance Standards for the Analysis of EPH under the Massachusetts Contingency Plan, WSC-CAM-IVB, July 2010.

Method for the Determination of Volatile Petroleum Hydrocarbons (VPH), MassDEP, May 2004, Revision 1.1 with QC Requirements & Performance Standards for the Analysis of VPH under the Massachusetts Contingency Plan, WSC-CAM-IVA, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Alpha Analytical, Inc. Facility: Company-wide

Department: Quality Assurance

Title: Certificate/Approval Program Summary

Revision 7 Published Date: 8/5/2016 11:25:56 AM

ID No.:17873

Page 1 of 1

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624: m/p-xylene, o-xylene

EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-

Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 300: DW: Bromide

EPA 6860: NPW and SCM: Perchlorate

EPA 9010: NPW and SCM: Amenable Cyanide Distillation

EPA 9012B: NPW: Total Cyanide EPA 9050A: NPW: Specific Conductance

SM3500: NPW: Ferrous Iron

SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility **SM 2540D:** TSS

EPA 3005A NPW

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Nitrate-N, Fluoride, Sulfate; EPA 353.2: Nitrate-N, Nitrite-N; SM4500NO3-F: Nitrate-N, Nitrite-N; SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B

EPA 332: Perchlorate; EPA 524.2: THMs and VOCs; EPA 504.1: EDB, DBCP.

Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D.

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, EPA 350.1: Ammonia-N, LACHAT 10-107-06-1-B: Ammonia-N, SM4500NO3-F, EPA 353.2: Nitrate-N, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.

EPA 624: Volatile Halocarbons & Aromatics,

EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan II, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625: SVOC (Acid/Base/Neutral Extractables), EPA 600/4-81-045: PCB-Oil.

Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.

Mansfield Facility:

Drinking Water

EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. EPA 200.8: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. EPA 245.1 Hg.

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Pre-Qualtrax Document ID: 08-113 Document Type: Form

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Quantitation Report (QT Reviewed)

Data Path : I:\OVPH\161109ali\

Data File : O1109A05.d Signal(s) : FID2B.ch

Acq On : 9 Nov 2016 10:13 am

Operator : OVPH:JM

Sample : 11635614-01D,41,10.66,1.1,.005

Misc : WG950701,ICAL12828 ALS Vial : 5 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Nov 09 10:56:15 2016

Quant Method : I:\OVPH\161109ali\vph-ali160830.m

Quant Title : VPH ALIPHATIC

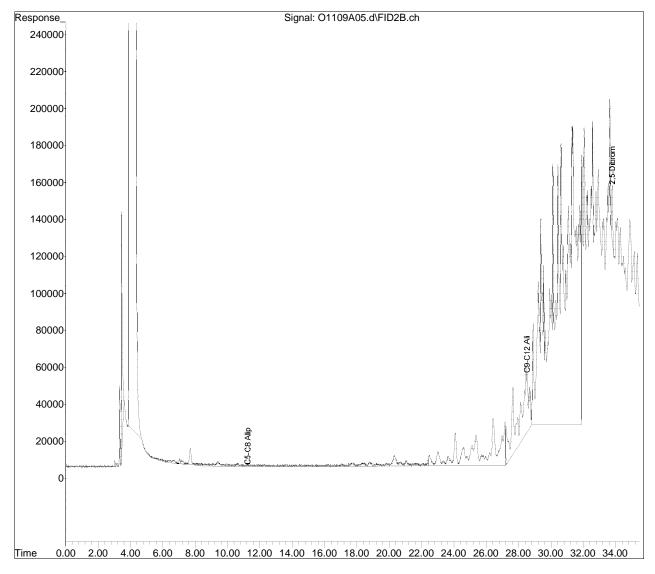
QLast Update : Wed Aug 31 07:53:22 2016

Response via : Initial Calibration

Integrator: ChemStation

Volume Inj. : Signal Phase : Signal Info :

Sub List : Default - All compounds listed



vph-ali160830.m Wed Nov 09 13:05:24 2016

Serial_No:11291617:55



Certificate of Analysis

Number: 1030-16110356-001A

Houston Laboratories 8820 Interchange Drive Houston, TX 77054 Phone 713-660-0901

Nov. 29, 2016

Ashaley Kane Alpha Analytical 8 Walkup Drive Westborough, MA 01581

Station Name: MW-201 (LNAPL)

Sample Conditions:

Sampled By: N/A

Sample Of: Liquid Spot Sample Date: 11/03/2016 09:30

Analytical Data

Test	Method	Result	Units	Detection Lab Limit Tech.	Analysis Date
Viscosity - Kinematic @ 104°F	ASTM D-445	1560	cSt	FM	11/29/2016
Viscosity - Kinematic @ 104°F	ASTM D-445	7228	SUS	FM	11/29/2016
API Gravity @ 60° F	ASTM D-5002	13.54	0	JJH	11/10/2016
Specific Gravity @ 60/60° F	ASTM D-5002	0.9756		JJH	11/10/2016
Density @ 60° F	ASTM D-5002	0.9746	g/ml	JJH	11/10/2016
Molecular Weight	Proprietary	485	g/mol	JSG	11/11/2016

Comments:

Quality Assurance:

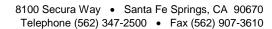
AS-D-445: Analysis perfored on hydrocarbon layer.

Chio Haley

Hydrocarbon Laboratory Manager

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

L1635614 Dept. Code SPL Work Order No.: Acct. Mate Code: Page **Pages** Report To: Alpha Analytical Project/Station Name: Project/Station Number: Project/Station Location: (Company Name): Requested TAT Address: 8 Walkup Drive Special Instructions: 10 business days City/State/Zip: Westboro 1581 MA Indicate Billing Type: Ashaley Kane subreports@alphalab.com Net 30 day Acct. Check # Contact: (Place "X", where Phone: 508-439-5158 508-898-9193 appropriate) <<Contact SPL, Inc for CC payment arrangements Credit Card * Surcharges May Apply Invoice To: Requested Analysis Alpha Analytical (See quote for details) (Company Name): (Place an "X" next to Sample ID below) Address: 8 Walkup Drive Terms: Cylinders will be rented for \$10/cyl. All cylinders checked out are to be returned within 21 days, City/State/Zip: Westboro MA 1581 whether they contain sample or not. Accounts Payable ap@alphalab.com Cylinders not returned after 30 days AS-D-5002 will be considered lost and will be AS-D-445 Phone: 508-439-5158 Fax: 508-898-9193 billed at current replacement cost. Client PO# or Ref. No.: N/A Contract/Proposal #: **SPLQ7378** (i.e. SPLQ####) Cylinder Tracking Info Sample Composite Duplicate Sample Sample Type Sample ID Spot (used to log/track sample) (Gas/Lig. Date -Time Cylinder # Date Out Date In Comments /Solid) MW-201 (LNAP) "/3/14 9:30 Oil V V Sampled By-Print Name: Received By-Company: Signature: Date: Time: Relinquished By-Print Name: Received By-Print Name: Date Time: 12.31 14:25 Signature: Signature: Date: Date: Relinquished By-Print Name: Time: Received By-Print Name: Time: Signature: Signature: Date: Relinquished By-Print Name: Received By-Print Name: Date: Time: Signature: Signature:





January 30, 2017

Ryan Niles TRC Companies, Inc. 2 Liberty Square 6th Floor Boston, MA 02109

Re: PTS File No: 47030

Physical Properties Data

Atlantic Bridge Project; 140143.0000.4903

Dear Mr. Niles:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your Atlantic Bridge Project; 140143.0000.4903 project. All analyses were performed by applicable ASTM, EPA, or API methodologies. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please give me a call at (562) 347-2502.

Sincerely,

PTS Laboratories, Inc.

Michael Mark Brady, P.G. Laboratory Director

Encl.

PTS Laboratories

Project Name: Atlantic Bridge Project PTS File No: 47030

Project Number: 140143.0000.4903 Client: TRC Companies, Inc.

TEST PROGRAM - 20170119

						• • • • • •		
FLUID ID	Date	Time	Fluid Type	Fluid Cleaning	3-Point Viscosity LNAPL			Comments
			Method:	Proprietary	ASTM D445, D1481			
Date Received: 20170119								
MW-201 LNAPL	20170105/ 20170117	1500	LNAPL	X	X			
TOTALS:				1	1			1

Laboratory Test Program Notes

Standard TAT for basic analysis is 10-15 business days.

3-point viscosity includes viscosity and density at three temperatures (70, 100, 130°F).

Per client request in COC comments, run 3-point viscosity and density at 50, 70, and 100°F.

PTS Laboratories

PTS File No: 47030

Client: TRC Companies, Inc.

Report Date: 01/30/17

VISCOSITY, DENSITY, and SPECIFIC GRAVITY DATA

(METHODOLOGY: ASTM D445, ASTM D1481, API RP40)

Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

SAMPLE	MATRIX	TEMPERATURE,	SPECIFIC	DENSITY,	VISCO	SITY
ID	WATKIA	°F	GRAVITY	g/cc	centistokes	centipoise
MW-201 LNAPL	NAPL	50	0.9787	0.9785	44600	43600
		70	0.9792	0.9724	10700	10400
		100	0.9761	0.9624	2070	1990

QUALITY CONTROL DATA

Date: 01/20/17 01/24/17

FLUID TYPE: Cannon® CVS S3 Cannon® CVS S3

TEMPERATURE, °F: 70 DENSITY, MEASURED: 0.8669 DENSITY, PUBLISHED: 0.8666 RPD: 0.04

 VISCOSITY, MEASURED: 4.64
 4.65

 VISCOSITY, PUBLISHED: 4.57
 4.57

 RPD: 1.57
 1.88

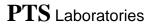
CVS Lot #: 16101 CVS = Certified Viscosity Standard

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PTS Laboratories, Inc.

COMPANY	CHAIN	씽	CUSTODY RECORD	RD	PAGE	I OF I
TAC SALETY	4.	 	ANALYSI	ANALYSIS REQUEST		 #
Sovere Ctrflor Pape wette Bridge Rigat Sovo, 4908	CROYCE TRCS. WHOS COME CROYCE OF TRCS. WHOS COME COLT - 385 - 6633 FAX NUMBER TIME DEPTH, FT	PORE FLUID SATURATIONS PACKAGE HYDRAULIC CONDUCTIVITY PACKAGE PORE FLUID SATURATIONS PACKAGE	TCEG/TURCC PROPERTIES PACKAGE CAPILLARITY PACKAGE PLUID PROPERTIES PACKAGE WAPOR TRANSPORT PACKAGE POROSITY: TOTAL, AIR FILLED, WATER FILLED POROSITY: EEEECTIVE ASTA DATA POROSITY ASTA DATA POROS	POROSITY: EFFECTIVE, ASTM DASSM SPECIFIC GRAVITY, ASTM DASS4 SULK DEUSITY (DRY), API RP40 or ASTM D2937 IYDRAULIC CONDUCTIVITY, EPA9100API RP40 or D5084 IYDRAULIC CONDUCTIVITY, EPA9100API RP40 or D5084 OC: WALKLEY-BLACK TTERBERG LIMITS, ASTM D4318 TTERBERG LIMITS, ASTM D4318	PROBUCT MOBILITY PACKAGE PLE PRODUCT MOBILITY PACKAGE PLICOSIVATIONS - 4N/69 E	TURNAROUND TIME 24 HOURS S 5 DAYS C 72 HOURS NORMAL C OTHER: SAMPLE INTEGRITY (CHECK): INTACT X TEMP(F) 63, 8 PTS QUOTE NO. PTS FILE: PTS FILE:
MV-301 MV-JM, MU-41M 1/2/2			d	9 H		50,70, [to Defent
TAM/S						
1 BEI NOI IIGHED BY						
COMPANY COMPANY	2. RECEIVED BY		3. RELINQÚISHED BY		4. RECEIVED BY	
DATE TAME	2AB5		COMPANY		COMPANY	
151	DAIE TIME TIME	50	рате	TIME	DATE	. TIME
PTS ahoratories Inc.	0400 000000					

PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 347-2500 • Fax (562) 279-1150



Project Name: Atlantic Bridge Project

Project Number: 140143.0000.4903 Client: TRC Companies, Inc.

TEST PROGRAM - 20170119

PTS File No: 47030

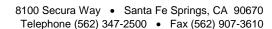
FLUID ID	Date	Time	Fluid Type	Fluid Cleaning	3-Point Viscosity LNAPL		Comments
					ASTM D445, D1481		
Date Received: 20170119							
MW-201 LNAPL	20170105/ 20170117	1500	LNAPL	Х	X		
TOTALS:				1	1		1

Laboratory Test Program Notes

Standard TAT for basic analysis is 10-15 business days.

3-point viscosity includes viscosity and density at three temperatures (70, 100, 130°F).

Per client request in COC comments, run 3-point viscosity and density at 50, 70, and 100°F.





April 26, 2017

Ryan Niles TRC Environmental Corp 650 Suffolk Street STE 200 Lowell, MA 01854

Re: PTS File No: 46705R1

Physical Properties Data – Revised Report Atlantic Bridge Project; 140143.0000.4903

Dear Mr. Niles:

Please find enclosed revised report for Physical Properties analyses conducted upon samples received from your Atlantic Bridge Project; 140143.0000.4903 project. The report was revised to add annotation to the analytical report documenting conditions under which the modified centrifugal test (Free Product Mobility) was conducted. All analyses were performed by applicable ASTM, EPA, or API methodologies.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please give me a call at (562) 347-2502.

Sincerely,

PTS Laboratories, Inc.

Michael Mark Brady, P.G. Laboratory Director

Encl.

PTS Laboratories

Project Name: Atlantic Bridge Project Project Number: 140143.0000.4903

PTS File No: 46705R1

Client: TRC Solutions

TEST PROGRAM - 20170127

CORE ID	Depth ft.	Core Recovery ft.	Slab and Core Photo	Grain Size Analyses	Pore Fluid Saturation Package	Free Product Mobility	O/W Imbibition Capillary Pressure Curve	NAPL Permeability API RP40	Hydraulic Conductivity API RP40	Comments
		Plugs:	1/4:3/4	Grab	Vert. 1.5"	Vert. 1.5"	Vert. 1"	Vert. 1"	Vert. 1"	
Date Received: 20161216	0.40	0.05								
B406A-A	8-10	0.95	1							Labella I B400A A Soul de la la la la
B406A-B	10-12	1.45	2		10.9-11.1	11.1-11.3	11.3-11.5	Х	Х	Labeled B406A-A, include hydraulic conductivity and LNAPL permeability
B406A-C	12-14	1.40	2	12.6-12.8	12-12.2	12.2-12.4	12.4-12.6			Labeled B406A-B
B406A-D	14-16	1.15	2		14-14.2	14.2-14.4	14.4-14.6			Labeled B406A-C
B406A-E	16-18	1.10	2							Labeled B406A-D
B404A-A	8-10	1.70	2							
B404A-B	10-12	0.80	1		10.2-10.4	10.4-10.6	10.6-10.8			
B404A-C	12-14	0.75	1		12-12.2	12.2-12.4	12.4-12.6	Х	Х	include hydraulic conductivity and LNAPL permeability
B404A-D	14-16	0.85	1	14.6-14.8	14-14.2	14.2-14.4	14.4-14.6			
B404A-E	16-18	0.85	1							
B412A-A	10-12	1.25	2							
B412A-B	12-14	1.35	2		12-12.2	12.2-12.4	12.4-12.6	х	Х	include hydraulic conductivity and LNAPL permeability
B412A-C	14-16	0.90	1	14.6-14.8	14-14.2	14.2-14.4	14.4-14.6			
B412A-D	16-18	0.55	1		16-16.2	16.2-16.4	16.4-16.55			
B412A-E	18-20	0.90	1							
B413A-A	10-12	1.00	1							
B413A-B	12-14	0.90	1		12-12.2	12.2-12.4	12.4-12.6			
B413A-C	14-16	1.20	2	14.6-14.8	14-14.2	14.2-14.4	14.4-14.6	х	Х	include hydraulic conductivity and LNAPL permeability
B413A-D	16-18	0.90	1		16-16.2	16.2-16.4	16.4-16.6			
B413A-E	18-20	0.65	1							
TOTALS:	20 Cores	20.60	28	4	12	12	12	4	4	36

Laboratory Test Program Notes

Contaminant identification:

Standard TAT for basic analysis is 10-15 business days.

Samples received cryogenically preserved will be stored frozen at standard core storage rates from sample date of receipt. Core storage charges will be billed monthly or quarterly depending upon project.

Sample locations to be selected by TRC Solutions personnel from core photography.

Grain Size Analysis: Laser or sieve method; includes tabular data, graphics and statistical sorting in Excel format.

Pore Fluid Saturation Package: API RP40 Dean-Stark Method: Includes initial pore fluid saturations, total porosity, air-filled porosity, grain density, dry bulk density and moisture content.

Hydraulic conductivity and LNAPL permeability added for four (4) O/W Imbibition Pc tests per C. Race/TRC 20170123. Use NAPL MW-201 (PTS File No. 47030).

Free Product Mobility Package: Applied centrifugal force demonstrates product mobility; includes residual saturations by Dean-Stark, total porosity, grain and dry bulk density.

Free Product Mobility – Extended Run tests are to be conducted at 30xG for 24 hours per C. Race/TRC 20170201.

Additional NAPL (MW-201, MW-410, MW-414 composite) received frm TRC on 20170216 to complete remaining O/W Pc tests.

PHYSICAL PROPERTIES DATA - PORE FLUID SATURATIONS

Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

API RP 40 /

		METHODS:	ASTM D2216	API RI	P 40	API F	RP 40	API F	RP 40
		SAMPLE	MOISTURE	DENS	ITY	POROSIT	Y, %Vb (2)		FLUID
SAMPLE	DEPTH,	ORIENTATION	CONTENT,	DRY BULK,	GRAIN,		AIR	SATURATIO	NS, % Pv (3)
ID.	ft.	(1)	% weight	g/cc	g/cc	TOTAL	FILLED	WATER	NAPL
B406A-B	11.0	V	23.6	1.05	2.38	55.9	31.0	28.4	16.3
B406A-C	12.1	V	17.5	1.62	2.60	37.8	9.0	42.1	34.1
B406A-D	14.1	V	18.8	1.60	2.68	40.2	9.6	36.3	39.8
B404A-B	10.3	V	29.6	1.27	2.42	47.5	9.7	59.8	19.7
B404A-C	12.1	V	17.7	1.61	2.54	36.8	8.3	65.7	11.8
B404A-D	14.1	V	25.3	1.18	2.30	48.8	18.9	59.2	2.0
B412A-B	12.1	V	31.9	1.25	2.36	46.8	6.5	55.7	30.5
B412A-C	14.1	V	20.2	1.36	2.51	45.7	18.0	52.7	7.8
B412A-D	16.1	V	20.3	1.30	2.43	46.3	19.8	49.7	7.5
B413A-B	12.1	V	30.4	1.24	2.40	48.5	10.6	53.5	24.6
B413A-C	14.1	V	29.2	1.27	2.41	47.6	10.1	38.7	40.1
B413A-D	16.1	V	27.3	1.22	2.31	47.1	13.6	59.0	12.2

⁽¹⁾ Sample Orientation: H = horizontal; V = vertical; R = remold

⁽²⁾ Total Porosity = all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids.

⁽³⁾ Fluid density used to calculate pore fluid saturations: Water = 0.9996 g/cc, NAPL = 0.9724 g/cc.

Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

FREE PRODUCT MOBILITY: INITIAL AND RESIDUAL SATURATIONS

(Centrifugal method: samples spun under air for 24 hours)

				METHODS:	API R	P 40	API RP 40			DEAN-STARK	
					DEM	NTV				RATIONS (3), % Pv	
			SAMPLE		DENS		TOTAL	Initial Fluid		After Centrif	•
SAMPLE ID.		DEPTH, ft.	ORIENTATION (1)	ANALYSIS DATE	DRY BULK, g/cc	GRAIN, g/cc	POROSITY (2), %Vb	WATER (Swi) SATURATION	NAPL (Soi) SATURATION	WATER (Srw) SATURATION	NAPL (Sor) SATURATION
D400A D		44.0		20470200	0.00	0.04	50.0	CO 4	24.2	24.0	24.4
B406A-B		11.2	V	20170209	0.89	2.21	59.9	62.4	21.2	24.8	21.1
	NOTE:	Trace dark b	rown LNAPL prod	uced. Produce	d water clear.						
B406A-C		12.3	V	20170209	1.57	2.68	41.4	34.6	49.8	14.4	22.0
	NOTE:	Dark brown	LNAPL produced.	Produced water	r clear.						
B406A-D		14.3	V	20170209	1.49	2.69	44.4	38.0	43.2	10.1	30.5
D-100A-D	NOTE:		LNAPL produced.			2.00	77.7	30.0	70.2	10.1	50.5
	NOTE.	Dark brown	LNAPL produced.	Produced water	r clear.						
B404A-B		10.5	V	20170209	1.40	2.46	43.3	52.4	20.1	24.5	20.1
	NOTE:	No visible N	APL produced. Pr	oduced water c	loudy with brown	color and no hyd	drocarbon odor.				
B404A-C		12.3	V	20170213	1.14	2.25	49.1	59.2	21.1	23.0	18.9
D404A-C	NOTE.					2.25	43.1	39.2	21.1	23.0	10.9
	NOTE:	Dark brown	DNAPL produced.	Produced water	er clear.						
B404A-D		14.3	V	20170213	1.41	2.38	40.7	78.2	1.8	32.8	1.8
	NOTE:	No visible N	APL produced. Pr	oduced water c	lear with no hydro	carbon odor.					
B412A-B		12.3	V	20170213	1.02	2.13	51.9	56.6	23.4	25.4	21.2
D4 12A-D	NOTE					2.13	31.9	30.0	23.4	25.4	21.2
	NOTE:	Dark brown	LNAPL produced.	Produced Wate	r ciear.						
B412A-C		14.3	V	20170213	1.48	2.44	39.4	80.7	12.0	30.6	11.6
	NOTE:	Trace dark b	rown LNAPL prod	uced. Produce	d water clear.						

⁽¹⁾ Sample Orientation: H = horizontal; V = vertical; R = remold

⁽²⁾ Total Porosity = all interconnected pore channels.

⁽³⁾ Fluid density used to calculate pore fluid saturations: Water = 0.9996 g/cc, NAPL = 0.9724 g/cc.

Swi = Initial Water Saturation as received prior to centrifuging at 1000xG, Soi = Initial NAPL Saturation as received prior to centrifuging at 1000xG.

Srw = Residual Water Saturation after centrifuging at 1000xG, Sor = Residual NAPL Saturation after centrifuging at 1000xG.

Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

FREE PRODUCT MOBILITY: INITIAL AND RESIDUAL SATURATIONS

(Centrifugal method: samples spun under air for 24 hours)

			METHODS:	API	RP 40	API RP 40			DEAN-STARK	
		SAMPLE		DEN	SITY	TOTAL		Saturations		uge at 30xG
SAMPLE ID.	DEPTH,	ORIENTATION (1)	ANALYSIS DATE	DRY BULK, g/cc	GRAIN, g/cc	POROSITY (2), %Vb	WATER (Swi) SATURATION	NAPL (Soi) SATURATION	WATER (Srw) SATURATION	NAPL (Sor) SATURATION
		\.,'/	571.2	9,00	g, 00	,,,,	0/11/0/11/10/1	0,1101111011	0/11/0/11/10/1	0/11/0/11/10/1
B412A-D	16.3	V	20170214	1.27	2.39	46.7	66.8	8.7	19.7	7.8
NO	TE: Dark brown	LNAPL produced.	Produced water	er clear.						
B413A-B	12.3	V	20170214	0.97	2.17	55.4	57.9	30.4	28.1	27.8
NO	TE: Dark brown	LNAPL produced.	Produced water	er clear.						
B413A-C	14.3	V	20170214	1.08	2.31	53.1	57.2	31.8	24.9	30.0
NO	TE: Brown LNA	PL produced. Produced.	duced water cle	ar.						
B413A-D	16.3	V	20170214	1.15	2.42	52.4	47.7	9.5	17.2	9.4
		L produced. Prod								

⁽¹⁾ Sample Orientation: H = horizontal; V = vertical; R = remold

⁽²⁾ Total Porosity = all interconnected pore channels.

⁽³⁾ Fluid density used to calculate pore fluid saturations: Water = 0.9996 g/cc, NAPL = 0.9724 g/cc.

Swi = Initial Water Saturation as received prior to centrifuging at 1000xG, Soi = Initial NAPL Saturation as received prior to centrifuging at 1000xG.

Srw = Residual Water Saturation after centrifuging at 1000xG, Sor = Residual NAPL Saturation after centrifuging at 1000xG.

Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

SAMPLE PROPERTIES - OIL/WATER CAPILLARY PRESSURE

Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

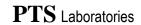
API RP 40 /

		METHODS:	ASTM D2216	API R	P 40		RP 40	API RP 40
		SAMPLE	MOISTURE	DENS	SITY	POROSIT	Y, %Vb (2)	TOTAL PORE FLUID
SAMPLE	DEPTH,	ORIENTATION	CONTENT,	DRY BULK,	GRAIN,		AIR	SATURATIONS (3),
ID.	ft.	(1)	% weight	g/cc	g/cc	TOTAL	FILLED	% Pv
B406A-B	11.4	V	17.5	1.42	2.37	40.0	15.1	62.3
B406A-C	12.5	V	22.0	1.50	2.68	44.0	10.9	75.1
B406A-D	14.5	V	22.3	1.47	2.68	45.2	12.4	72.5
B404A-B	10.7	V	27.8	1.25	2.49	49.8	15.1	69.6
B404A-C	12.5	V	18.4	1.37	2.32	41.1	15.9	61.3
B404A-D	14.5	V	13.0	1.35	2.42	44.3	26.8	39.6
B412A-B	12.5	V	58.9	0.83	2.19	62.0	13.0	79.1
B412A-C	14.5	V	46.5	0.99	2.29	56.7	10.6	81.2
B412A-D	16.45	V	62.4	0.79	2.11	62.8	13.7	78.1
B413A-B	12.5	V	70.7	0.76	2.19	65.5	12.0	81.7
B413A-C	14.5	V	64.7	0.82	2.19	62.7	9.9	84.2
B413A-D	16.5	V	17.2	1.23	2.53	51.3	30.0	41.5

⁽¹⁾ Sample Orientation: H = horizontal; V = vertical; R = remold

⁽²⁾ Total Porosity = all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids.

⁽³⁾ Fluid densities used to calculate pore fluid saturations: Water = 0.9996 g/cc; MW-5 NAPL = 0.9724 g/cc Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected



PERMEABILITY DATA - OIL/WATER CAPILLARY PRESSURE

Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

METHODS: API RP 40; EPA 9100

		WEIRODS.		AITKI 40, LI A 3100	
			25	5 PSI CONFINING STRES	S
		SAMPLE	SPECIFIC	HYDRAULIC	SPECIFIC
SAMPLE	DEPTH,	ORIENTATION	PERMEABILITY TO WATER,	CONDUCTIVITY,	PERMEABILITY TO NAPL,
ID.	ft.	(1)	millidarcy (2,3)	cm/s (3)	millidarcy (4)
		•			
B406A-B	11.4	V	703	6.99E-04	491
B406A-C	12.5	V	Permeability Analyses Not Re	equested	
B406A-D	14.5	V	Permeability Analyses Not Re	equested	
B404A-B	10.7	V	Permeability Analyses Not Re	equested	
B404A-C	12.5	V	7320	7.29E-03	18000
B404A-D	14.5	٧	Permeability Analyses Not Re	equested	
B412A-B	12.5	٧	7950	7.89E-03	23700
B412A-C	14.5	٧	Permeability Analyses Not Re	equested	
B412A-D	16.45	V	Permeability Analyses Not Re	equested	
B413A-B	12.5	V	Permeability Analyses Not Re	equested	
B413A-C	14.5	V	6790	6.72E-03	21900
B413A-D	16.5	V	Permeability Analyses Not Re	equested	

⁽¹⁾ Sample Orientation: H = horizontal; V = vertical; R = remold

⁽²⁾ Effective (Native) = With as-received pore fluids in place.

⁽³⁾ Permeability/conductivity measured at saturated condition.

⁽⁴⁾ Specific (intrinsic) permeability.

OIL/WATER CAPILLARY PRESSURE TABULAR DATA

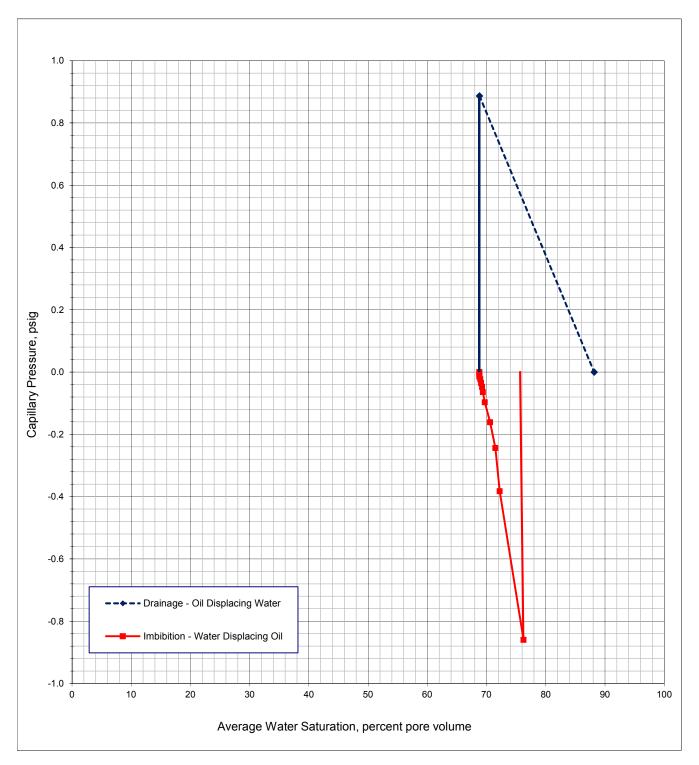
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

				nple ID
Capillary Pressure		Height Above Water Table,	B406A-B at 11.4 ft. Average Saturation, % pore volume	
			Drainage - Oil Displacing Water	
0.000	0.00	0.00	88.2	11.8
0.887	62.4	75.2	68.8	31.2
			Spontaneo	ous Imbibition
0.000	0.00	0.00	68.8	31.2
0.000	0.00	0.00	68.8	31.2
			Imbibition - Wa	ter Displacing Oil
0.000	0.00	0.00	68.8	31.2
-0.004	-0.31	0.38	68.8	31.2
-0.009	-0.62	0.75	68.8	31.2
-0.015	-1.06	1.28	68.8	31.2
-0.023	-1.64	1.98	68.9	31.1
-0.035	-2.48	3.00	69.1	30.9
-0.048	-3.37	4.06	69.2	30.8
-0.065	-4.54	5.47	69.4	30.6
-0.097	-6.83	8.23	69.7	30.3
-0.161	-11.4	13.7	70.6	29.4
-0.244	-17.2	20.7	71.5	28.5
-0.383	-26.9	32.5	72.2	27.8
-0.860	-60.5	72.9	76.2	23.8

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

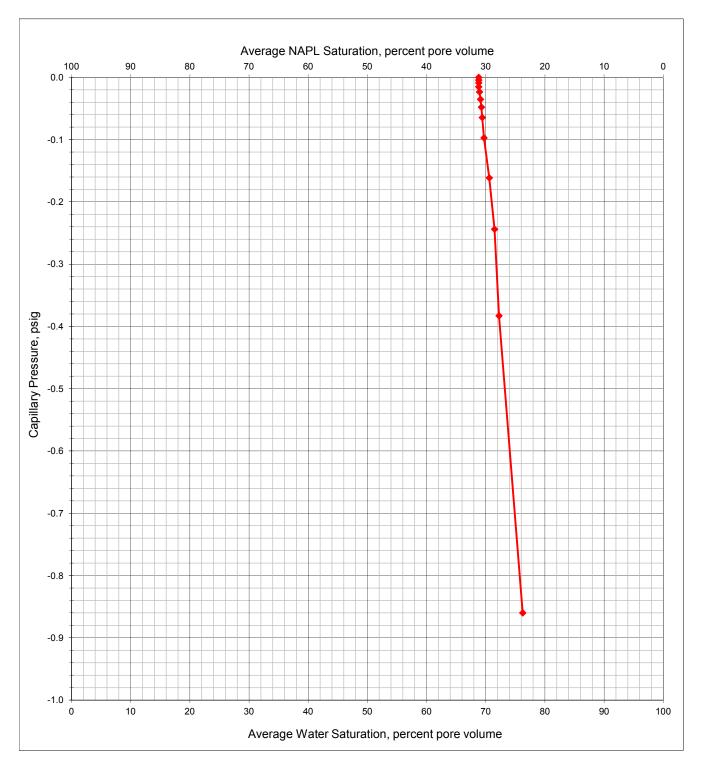
Project Name: Atlantic Bridge Project Sample ID: B406A-B Project No: 140143.0000.4903 Depth, ft.: 11.4



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B406A-B Project No: 140143.0000.4903 Depth, ft.: 11.4



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

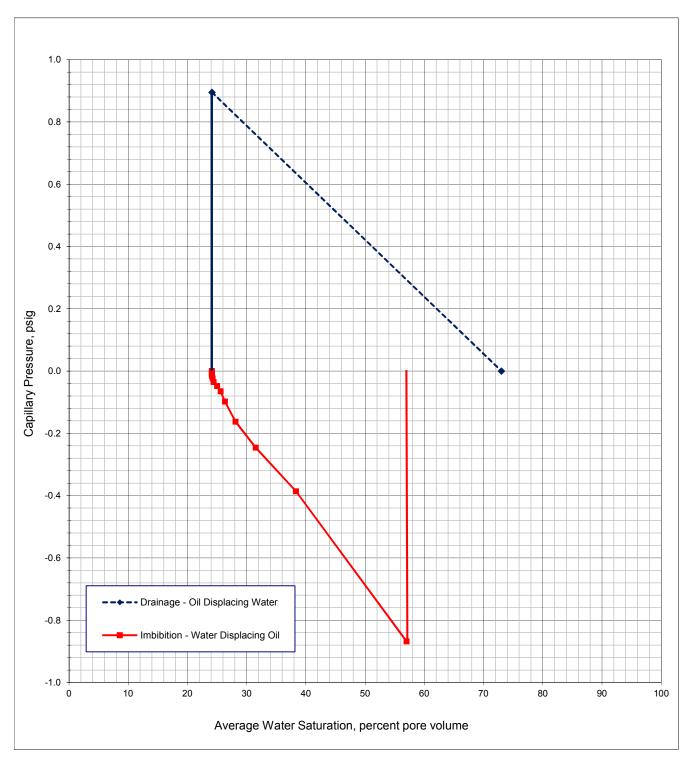
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

		Height Above		nple ID
Capillary F	Capillary Pressure		B406A-C at 12.5 ft. Average Saturation, % pore volume	
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil Displacing Water	
0.000	0.00	0.00	73.0	27.0
0.895	62.9	75.9	24.1	75.9
			Spontaneo	ous Imbibition
0.000	0.00	0.00	24.1	75.9
0.000	0.00	0.00	24.1	75.9
			Imbibition - Water Displacing Oil	
0.000	0.00	0.00	24.1	75.9
-0.005	-0.32	0.38	24.1	75.9
-0.009	-0.63	0.76	24.1	75.9
-0.015	-1.07	1.30	24.1	75.9
-0.024	-1.65	2.00	24.3	75.7
-0.036	-2.51	3.02	24.4	75.6
-0.048	-3.40	4.10	25.0	75.0
-0.065	-4.58	5.53	25.6	74.4
-0.098	-6.89	8.31	26.4	73.6
-0.163	-11.5	13.8	28.1	71.9
-0.246	-17.3	20.9	31.5	68.5
-0.387	-27.2	32.8	38.4	61.6
-0.868	-61.0	73.6	57.0	43.0

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

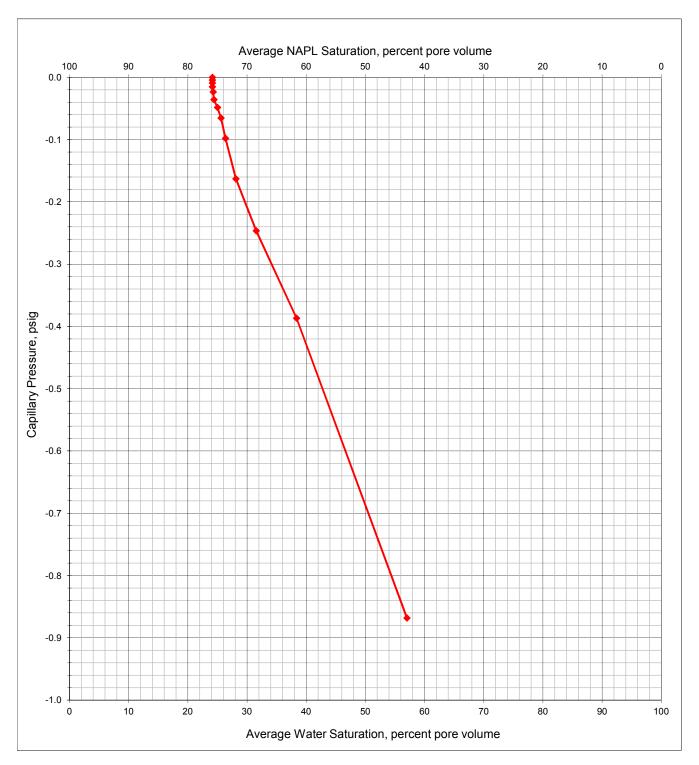
Project Name: Atlantic Bridge Project Sample ID: B406A-C Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B406A-C Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

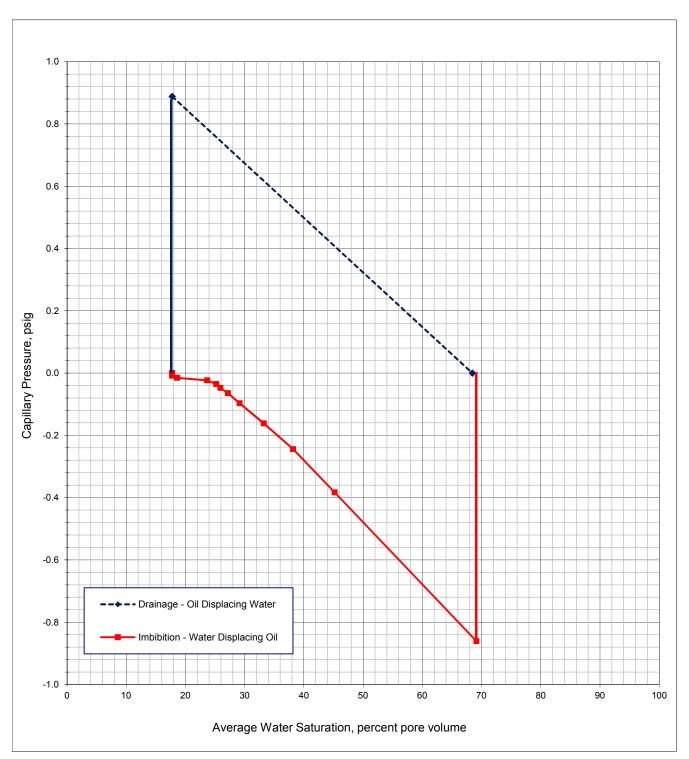
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

		San	nple ID
Capillary Pressure		B406A-D at 14.5 ft.	
- lessuie	Water Table,	Average Saturation, % pore volume	
cm water	ft	Water	Oil (NAPL)
		Drainage - Oil Displacing Water	
0.00	0.00	68.4	31.6
62.5	75.3	17.8	82.2
		Spontaneo	ous Imbibition
0.00	0.00	17.8	82.2
0.00	0.00	17.8	82.2
		Imbibition Wa	stor Displacing Oil
			. •
			82.2
			82.2
-0.62	0.75	17.8	82.2
-1.07	1.29	18.6	81.4
-1.64	1.98	23.7	76.3
-2.49	3.00	25.2	74.8
-3.37	4.07	25.9	74.1
-4.54	5.48	27.2	72.8
-6.83	8.24	29.2	70.8
-11.4	13.7	33.2	66.8
-17.2	20.7	38.2	61.8
-27.0	32.5	45.2	54.8
-60.5	73.0	69.1	30.9
	0.00 62.5 0.00 0.00 0.00 -0.31 -0.62 -1.07 -1.64 -2.49 -3.37 -4.54 -6.83 -11.4 -17.2	0.00 0.00 62.5 75.3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.38 0.62 0.75 0.107 1.29 0.164 1.98 0.249 3.00 0.337 4.07 0.4.54 5.48 0.683 8.24 0.11.4 13.7 0.17.2 20.7 0.27.0 32.5	Height Above Water Table, Average Saturate

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

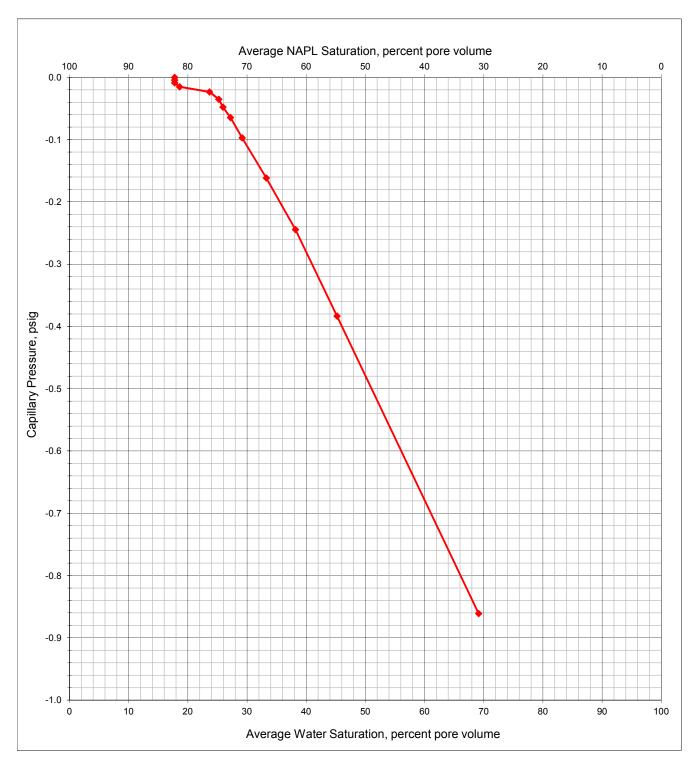
Project Name: Atlantic Bridge Project Sample ID: B406A-D Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B406A-D Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

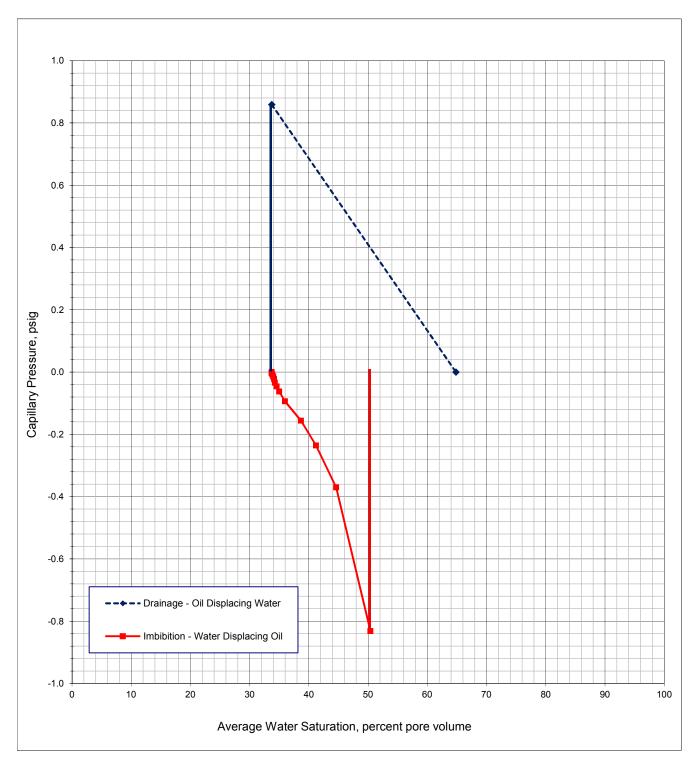
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

			San	nple ID
Capillary Pressure		Height Above	B404A-B at 10.7 ft.	
Gapillal y 1	ressure	Water Table,	Average Saturation, % pore volume	
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil Displacing Water	
0.000	0.00	0.00	64.8	35.2
0.859	60.4	72.9	33.7	66.3
			Spontaneous Imbibition	
0.000	0.00	0.00	33.7	66.3
0.000	0.00	0.00	33.7	66.3
			Imbibition - Wa	iter Displacing Oil
0.000	0.00	0.00	33.7	66.3
-0.004	-0.30	0.37	33.7	66.3
-0.009	-0.60	0.72	33.9	66.1
-0.015	-1.03	1.24	34.0	66.0
-0.023	-1.59	1.91	34.1	65.9
-0.034	-2.40	2.90	34.3	65.7
-0.046	-3.26	3.93	34.6	65.4
-0.062	-4.39	5.29	35.0	65.0
-0.094	-6.60	7.96	36.0	64.0
-0.156	-11.0	13.2	38.7	61.3
-0.236	-16.6	20.0	41.2	58.8
-0.370	-26.0	31.4	44.6	55.4
-0.832	-58.5	70.5	50.4	49.6

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

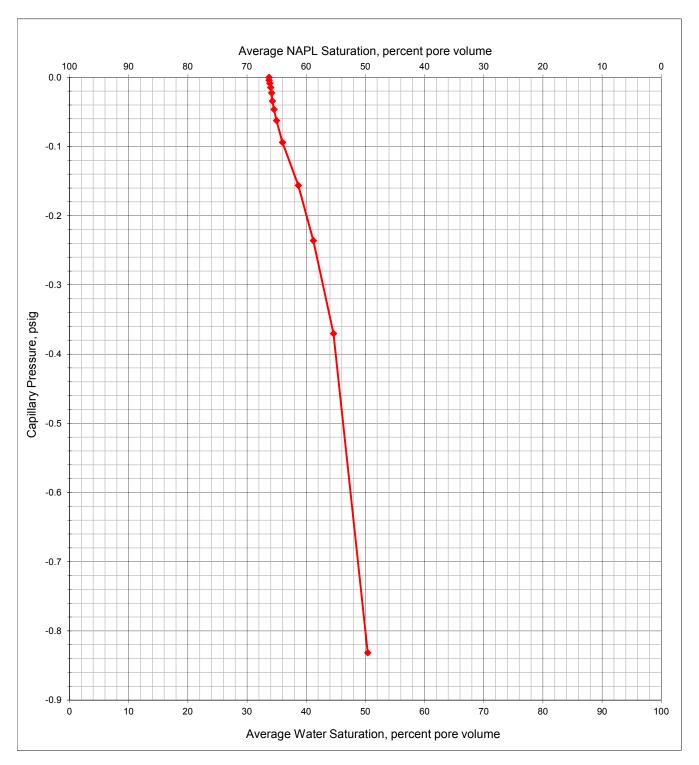
Project Name: Atlantic Bridge Project Sample ID: B404A-B Project No: 140143.0000.4903 Depth, ft.: 10.7



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B404A-B Project No: 140143.0000.4903 Depth, ft.: 10.7



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

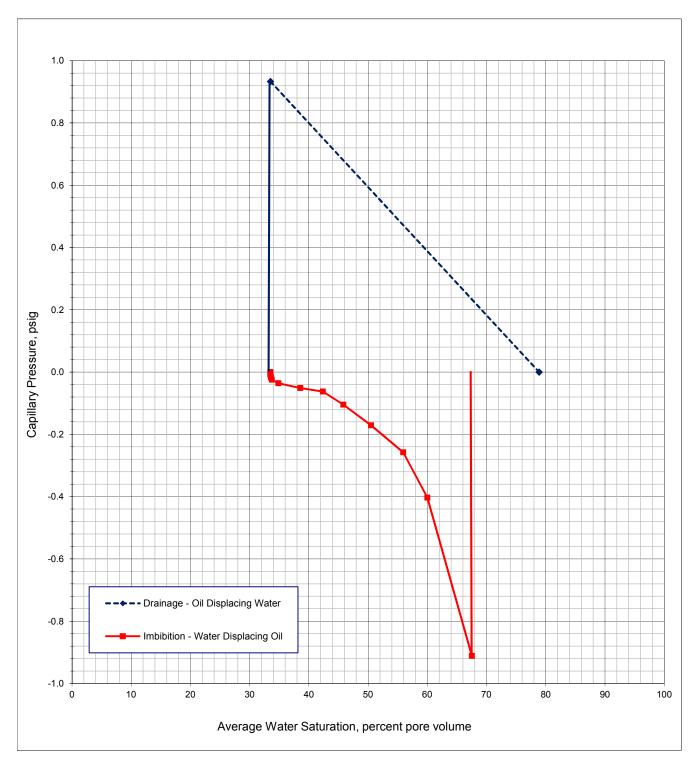
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

			San	nple ID
Capillary Pressure		Height Above Water Table,	B404A-C at 12.5 ft. Average Saturation, % pore volume	
			Drainage - Oil Displacing Water	
0.000	0.00	0.00	78.9	21.1
0.933	65.6	79.2	33.5	66.5
			Spontaneous Imbibition	
0.000	0.00	0.00	33.5	66.5
0.000	0.00	0.00	33.5	66.5
			Imbibition - Water Displacing Oil	
0.000	0.00	0.00	33.5	66.5
-0.005	-0.32	0.39	33.5	66.5
-0.009	-0.64	0.78	33.5	66.5
-0.017	-1.21	1.46	33.6	66.4
-0.025	-1.72	2.08	33.7	66.3
-0.036	-2.53	3.05	34.9	65.1
-0.051	-3.60	4.34	38.6	61.4
-0.063	-4.41	5.32	42.4	57.6
-0.105	-7.38	8.90	45.8	54.2
-0.171	-12.0	14.5	50.5	49.5
-0.258	-18.1	21.9	55.9	44.1
-0.404	-28.4	34.2	60.0	40.0
-0.912	-64.1	77.3	67.5	32.5

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

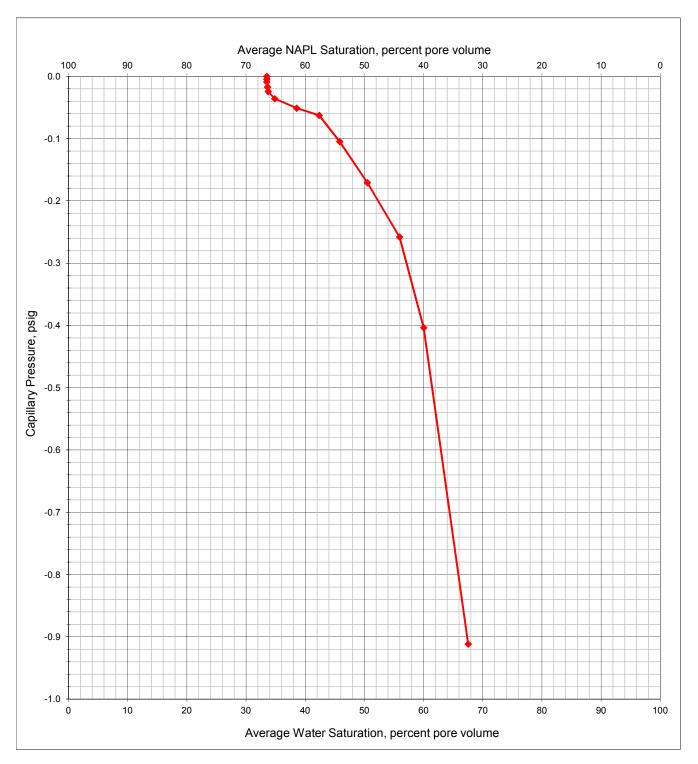
Project Name: Atlantic Bridge Project Sample ID: B404A-C Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B404A-C Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

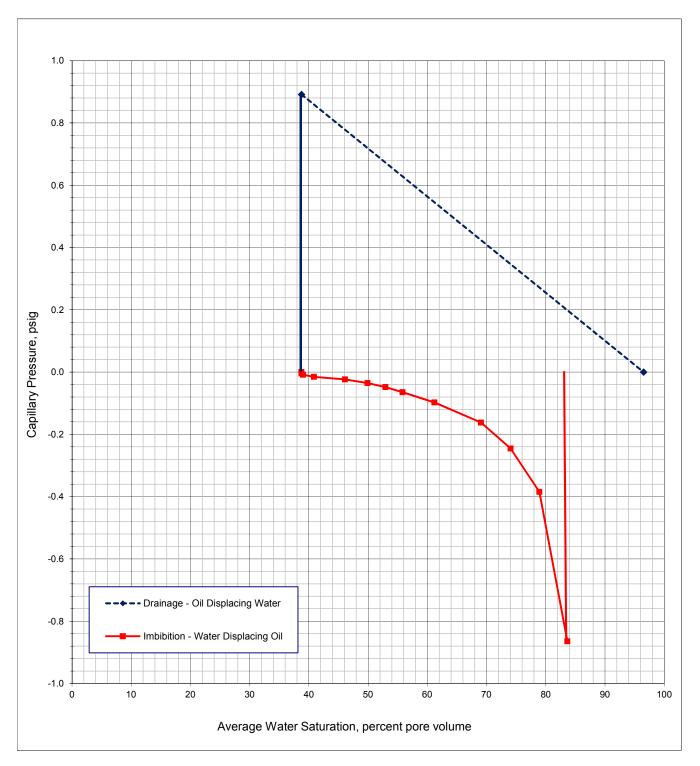
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

		San	nple ID
Capillary Pressure		B404A-D at 14.5 ft.	
ressure	Water Table,	Average Saturation, % pore volume	
cm water	ft	Water	Oil (NAPL)
		Duntum CII	Diaminalum Matan
		•	. •
			3.5
62.7	75.6	38.7	61.3
		Spontaneous Imbibition	
0.00	0.00	38.7	61.3
0.00	0.00	38.7	61.3
		Imbibition - Water Displacing Oil	
0.00	0.00		61.3
		38.7	61.3
-0.62	0.75	39.0	61.0
-1.07	1.29	40.8	59.2
-1.65	1.99	46.1	53.9
-2.50	3.01	49.9	50.1
-3.39	4.08	52.9	47.1
-4.56	5.50	55.8	44.2
-6.86	8.28	61.2	38.8
-11.4	13.8	69.1	30.9
-17.2	20.8	74.1	25.9
-27.1	32.7	78.9	21.1
-60.8	73.3	83.6	16.4
	0.00 62.7 0.00 0.00 0.00 -0.32 -0.62 -1.07 -1.65 -2.50 -3.39 -4.56 -6.86 -11.4 -17.2	0.00 0.00 62.7 75.6 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.29 -1.65 1.99 -2.50 3.01 -3.39 4.08 -4.56 5.50 -6.86 8.28 -11.4 13.8 -17.2 20.8 -27.1 32.7	Height Above Water Table, Average Saturate

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

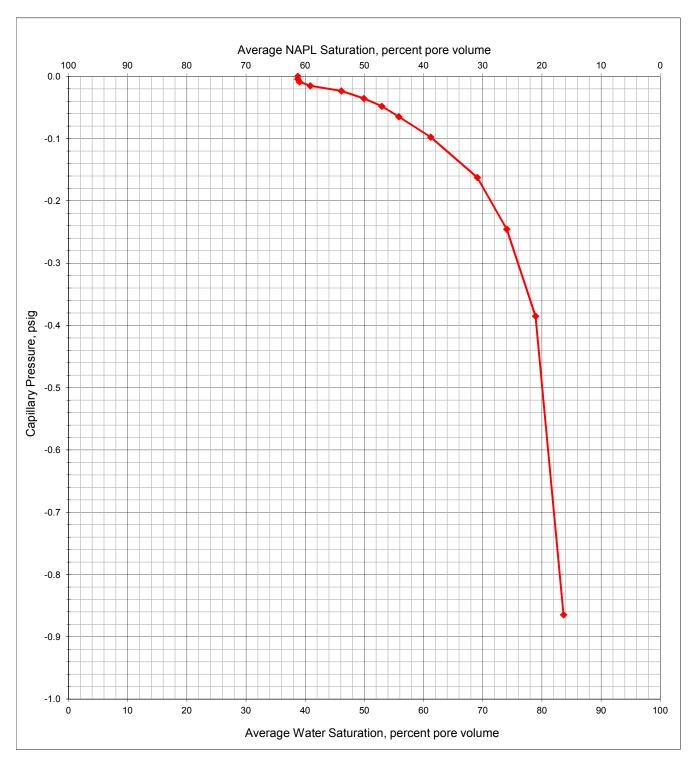
Project Name: Atlantic Bridge Project Sample ID: B404A-D Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B404A-D Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

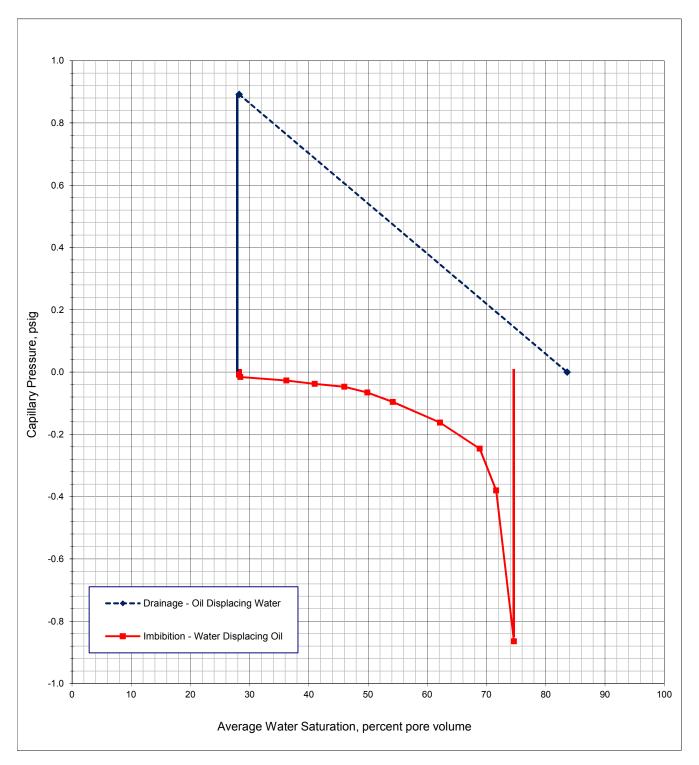
ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

			San	nple ID
Capillary Pressure		Height Above	B412A-B at 12.5 ft.	
Capillary	ressure	Water Table,	Average Saturation, % pore volume	
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil Displacing Water	
0.000	0.00	0.00	83.6	16.4
0.892	62.7	75.6	28.2	71.8
			Spontaneo	ous Imbibition
0.000	0.00	0.00	28.2	71.8
0.000	0.00	0.00	28.2	71.8
			Imbibition - Water Displacing Oil	
0.000	0.00	0.00	28.2	71.8
-0.004	-0.30	0.36	28.2	71.8
-0.009	-0.61	0.74	28.2	71.8
-0.016	-1.11	1.34	28.4	71.6
-0.027	-1.90	2.30	36.2	63.8
-0.038	-2.65	3.20	41.0	59.0
-0.047	-3.33	4.02	46.0	54.0
-0.066	-4.61	5.56	49.9	50.1
-0.096	-6.75	8.15	54.2	45.8
-0.162	-11.4	13.8	62.1	37.9
-0.246	-17.3	20.9	68.8	31.2
-0.380	-26.7	32.3	71.6	28.4
-0.864	-60.8	73.3	74.6	25.4

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

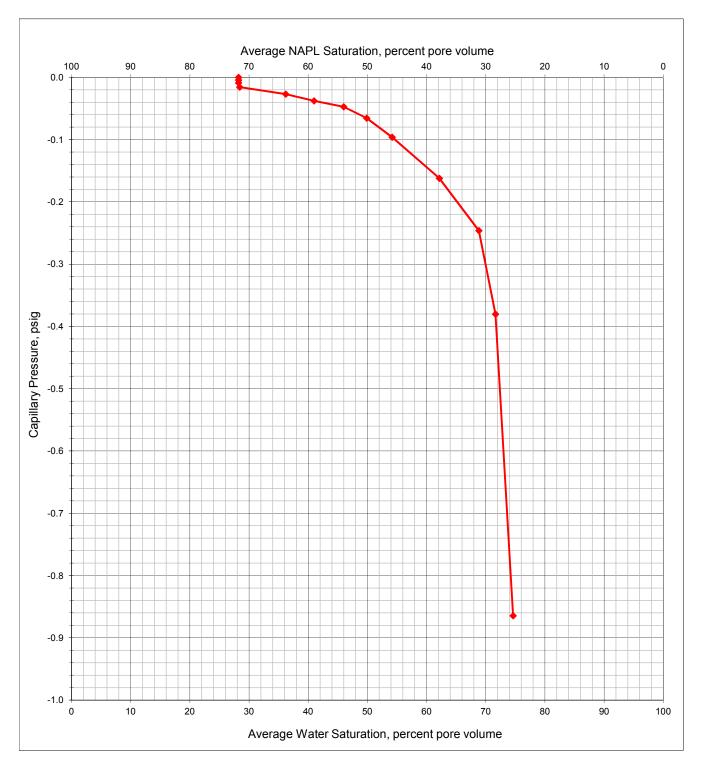
Project Name: Atlantic Bridge Project Sample ID: B412A-B Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B412A-B Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

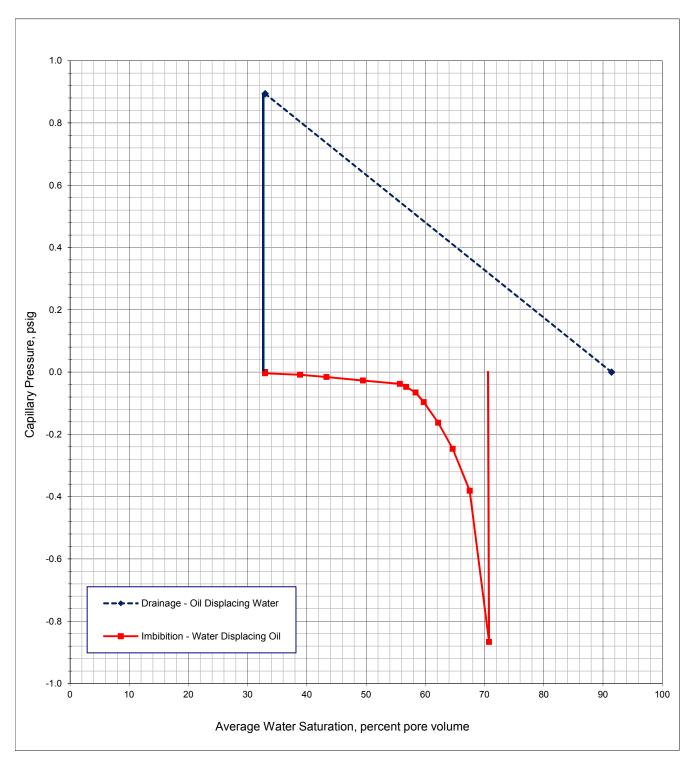
Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

			San	nple ID
Canillan	v Proceuro	Height Above		at 14.5 ft.
Capillar	y Pressure	Water Table,	Average Saturat	ion, % pore volume
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil	Displacing Water
0.000	0.00	0.00	91.4	8.6
0.894	62.9	75.8	32.9	67.1
			Spontaneo	us Imbibition
0.000	0.00	0.00	32.9	67.1
0.000	0.00	0.00	32.9	67.1
			Imbibition - Wa	ter Displacing Oil
0.000	0.00	0.00	32.9	67.1
-0.004	-0.30	0.37	32.9	67.1
-0.009	-0.62	0.74	38.9	61.1
-0.016	-1.11	1.34	43.3	56.7
-0.027	-1.91	2.30	49.5	50.5
-0.038	-2.66	3.21	55.7	44.3
-0.048	-3.34	4.03	56.8	43.2
-0.066	-4.62	5.58	58.4	41.6
-0.096	-6.77	8.17	59.7	40.3
-0.163	-11.4	13.8	62.2	37.8
-0.247	-17.4	20.9	64.6	35.4
-0.381	-26.8	32.3	67.5	32.5
-0.867	-60.9	73.5	70.8	29.2

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

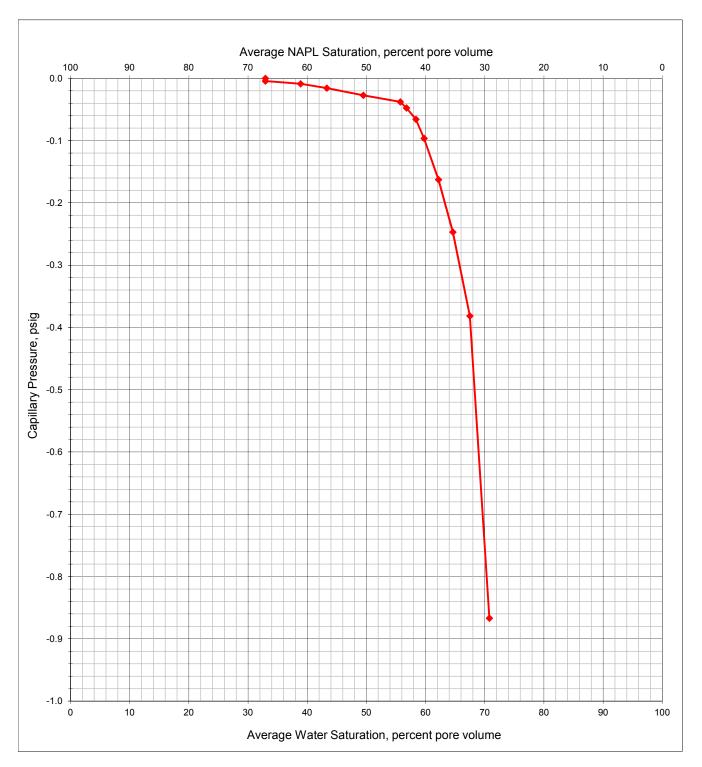
Project Name: Atlantic Bridge Project Sample ID: B412A-C Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B412A-C Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

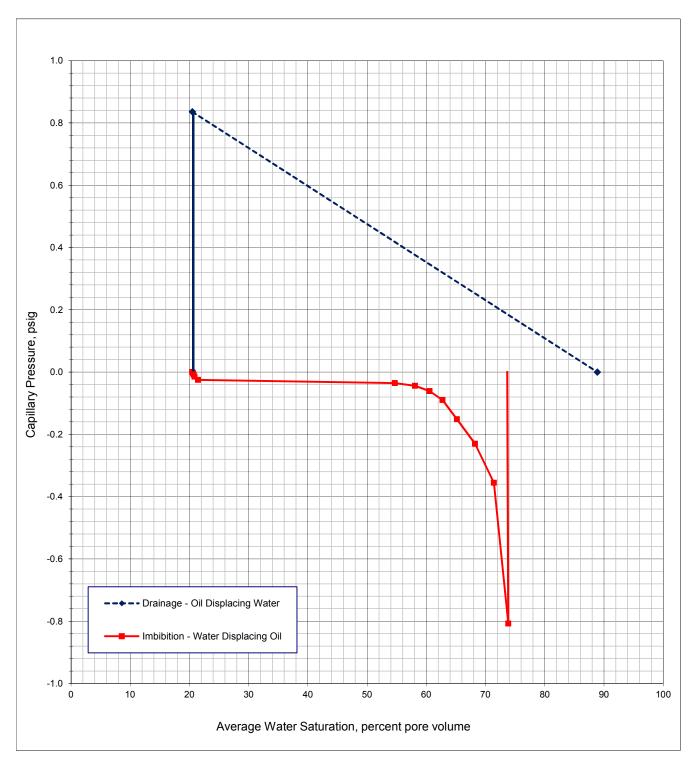
Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

			San	nple ID
Capillary P	ressure	Height Above		at 16.45 ft.
Опримену г	resoure	Water Table,	Average Saturat	ion, % pore volume
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil	Displacing Water
0.000	0.00	0.00	88.9	11.1
0.836	58.8	70.9	20.5	79.5
			Spontaneo	us Imbibition
0.000	0.00	0.00	20.5	79.5
0.000	0.00	0.00	20.5	79.5
			Imbibition - Wa	ter Displacing Oil
0.000	0.00	0.00	20.5	79.5
-0.004	-0.28	0.34	20.6	79.4
-0.008	-0.57	0.69	20.7	79.3
-0.015	-1.04	1.25	20.9	79.1
-0.025	-1.78	2.14	21.5	78.5
-0.035	-2.48	2.99	54.7	45.3
-0.044	-3.11	3.76	58.1	41.9
-0.061	-4.31	5.20	60.5	39.5
-0.090	-6.31	7.61	62.7	37.3
-0.151	-10.7	12.8	65.2	34.8
-0.230	-16.2	19.5	68.2	31.8
-0.355	-25.0	30.1	71.4	28.6
-0.808	-56.8	68.5	73.8	26.2

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

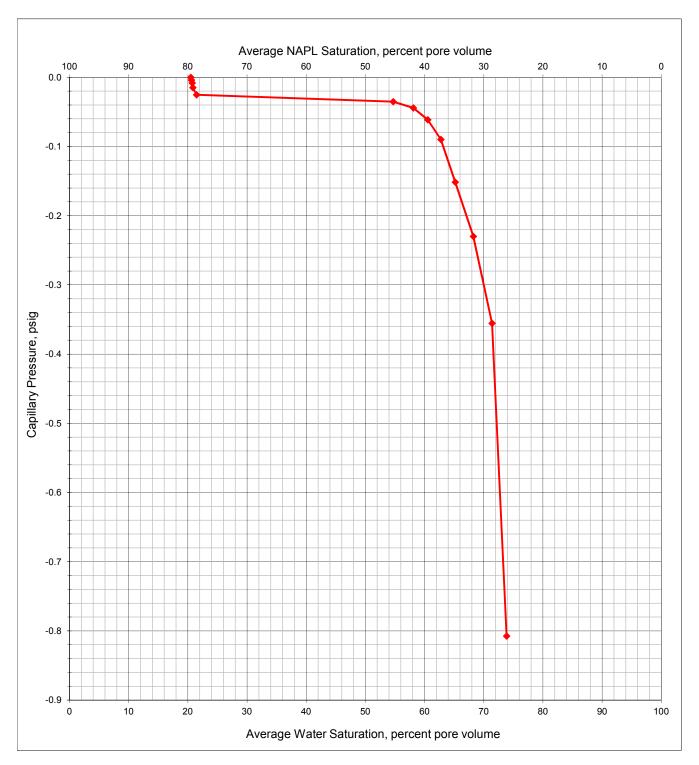
Project Name: Atlantic Bridge Project Sample ID: B412A-D Project No: 140143.0000.4903 Depth, ft.: 16.45



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B412A-D Project No: 140143.0000.4903 Depth, ft.: 16.45



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

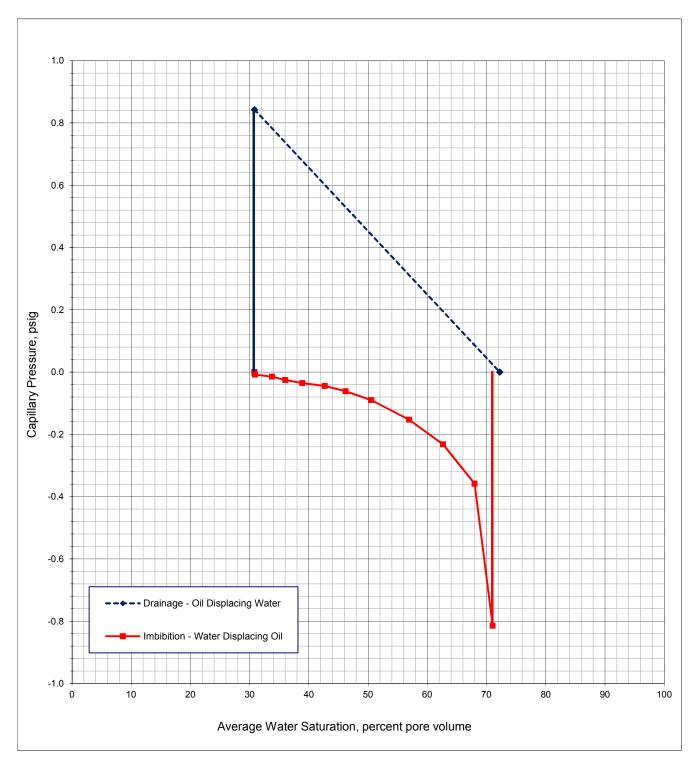
Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

			San	nple ID
Capillary I	Praesura	Height Above	B413A-E	3 at 12.5 ft.
Capillary	ressure	Water Table,	Average Saturat	ion, % pore volume
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil	Displacing Water
0.000	0.00	0.00	72.2	27.8
0.843	59.3	71.5	30.8	69.2
			Spontaneo	ous Imbibition
0.000	0.00	0.00	30.8	69.2
0.000	0.00	0.00	30.8	69.2
			Imbibition - Wa	ter Displacing Oil
0.000	0.00	0.00	30.8	69.2
-0.004	-0.28	0.34	30.8	69.2
-0.008	-0.58	0.70	30.9	69.1
-0.015	-1.04	1.26	33.8	66.2
-0.026	-1.79	2.16	36.0	64.0
-0.036	-2.50	3.02	38.9	61.1
-0.045	-3.14	3.79	42.7	57.3
-0.062	-4.35	5.24	46.2	53.8
-0.091	-6.36	7.68	50.6	49.4
-0.153	-10.7	13.0	56.9	43.1
-0.232	-16.3	19.7	62.7	37.3
-0.358	-25.2	30.4	68.0	32.0
-0.815	-57.3	69.1	71.0	29.0

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

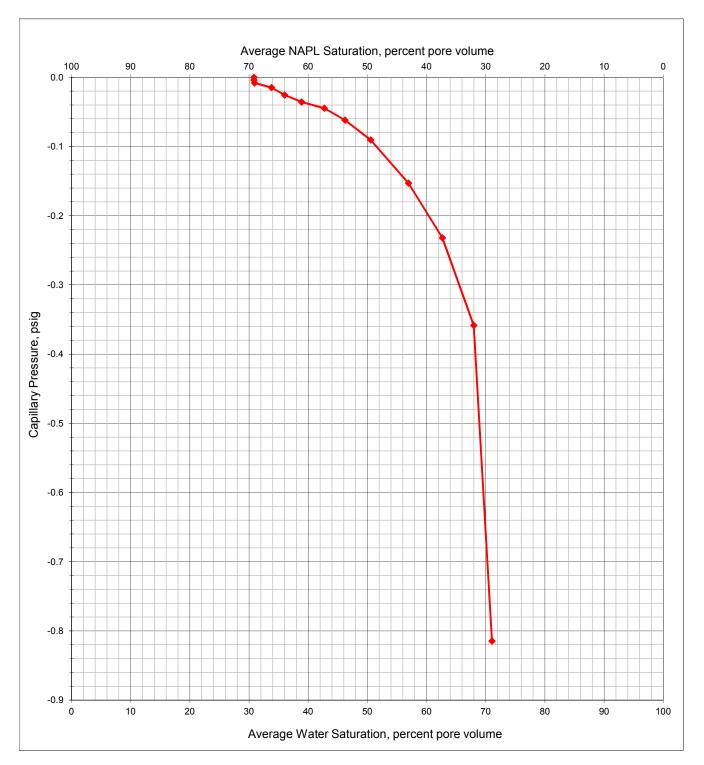
Project Name: Atlantic Bridge Project Sample ID: B413A-B Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B413A-B Project No: 140143.0000.4903 Depth, ft.: 12.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

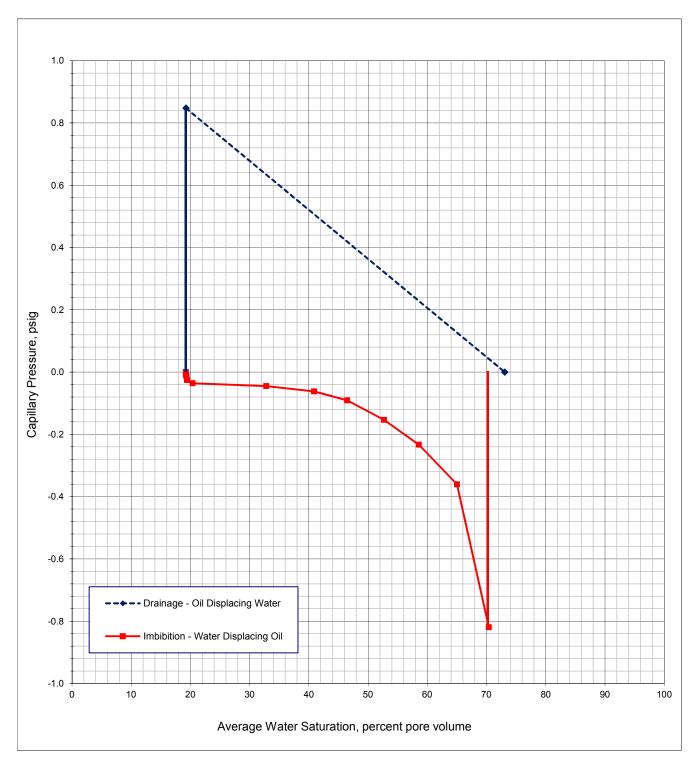
Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

	San	nple ID
Height Above	B413A-0	C at 14.5 ft.
Water Table,	Average Saturat	ion, % pore volume
ft	Water	Oil (NAPL)
	Drainage - Oil	Displacing Water
0.00	73.1	26.9
71.9	19.2	80.8
	Spontaneo	us Imbibition
0.00	19.2	80.8
0.00	19.2	80.8
	Imbibition - Wa	ter Displacing Oil
0.00	19.2	80.8
0.35	19.2	80.8
0.70	19.2	80.8
1.27	19.3	80.7
2.18	19.4	80.6
3.03	20.4	79.6
3.81	32.8	67.2
5.27	40.9	59.1
7.72	46.5	53.5
13.0	52.7	47.3
19.8	58.6	41.4
30.6	65.0	35.0
69.5	70.4	29.6
	0.00 71.9 0.00 0.00 0.00 0.35 0.70 1.27 2.18 3.03 3.81 5.27 7.72 13.0 19.8 30.6	Height Above Water Table, ft Average Saturat

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

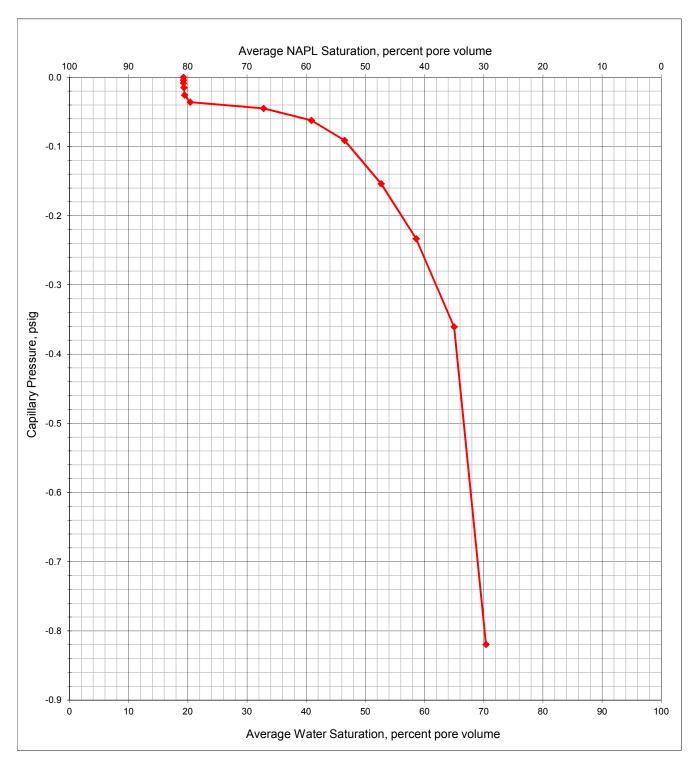
Project Name: Atlantic Bridge Project Sample ID: B413A-C Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B413A-C Project No: 140143.0000.4903 Depth, ft.: 14.5



OIL/WATER CAPILLARY PRESSURE TABULAR DATA

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

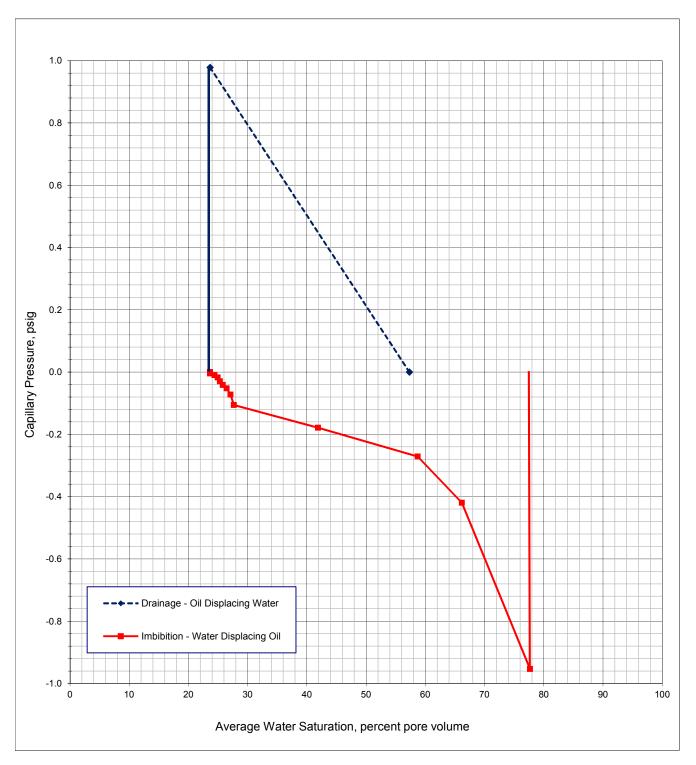
Project Name: Atlantic Bridge Project Project No: 140143.0000.4903

			San	nple ID
Capillan	Pressure	Height Above	B413A-I	o at 16.5 ft.
Сарінаі ў	riessuie	Water Table,	Average Saturat	ion, % pore volume
psi	cm water	ft	Water	Oil (NAPL)
			Drainage - Oil	Displacing Water
0.000	0.00	0.00	57.3	42.7
0.978	68.8	83.0	23.6	76.4
			•	us Imbibition
0.000	0.00	0.00	23.6	76.4
0.000	0.00	0.00	23.6	76.4
			Imbibition - Wa	ter Displacing Oil
0.000	0.00	0.00	23.6	76.4
-0.005	-0.33	0.40	23.6	76.4
-0.010	-0.68	0.82	24.4	75.6
-0.017	-1.22	1.47	25.0	75.0
-0.030	-2.10	2.53	25.3	74.7
-0.042	-2.93	3.53	25.8	74.2
-0.052	-3.68	4.43	26.5	73.5
-0.072	-5.09	6.13	27.1	72.9
-0.106	-7.45	8.98	27.7	72.3
-0.179	-12.6	15.2	41.9	58.1
-0.271	-19.1	23.0	58.7	41.3
-0.420	-29.5	35.6	66.2	33.8
-0.953	-67.0	80.9	77.7	22.3

OIL/WATER DRAINAGE & IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

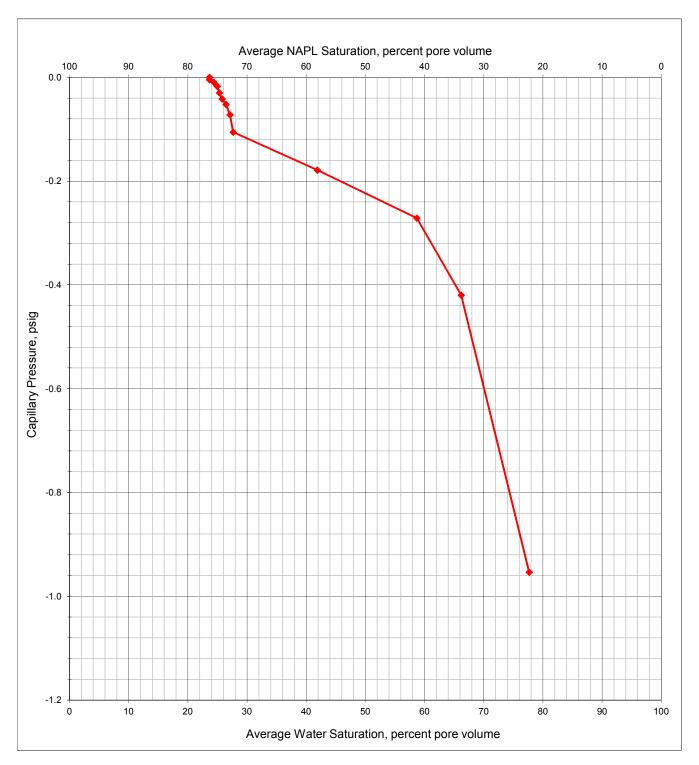
Project Name: Atlantic Bridge Project Sample ID: B413A-D Project No: 140143.0000.4903 Depth, ft.: 16.5



OIL/WATER IMBIBITION CAPILLARY PRESSURE GRAPH

ASTM D6836; Method E (Centrifugal Method: Single point drainage followed by imbibition)

Project Name: Atlantic Bridge Project Sample ID: B413A-D Project No: 140143.0000.4903 Depth, ft.: 16.5



TRC Solutions PTS File No: 46705R1

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422M)

PROJECT NAME: Atlantic Bridge Project PROJECT NO: 140143.0000.4903

Sample ID	Depth, ft.	Mean Grain Size Description USCS/ASTM (1)	Median Grain Size, mm	P. Gravel	article Size Coarse	Distribution Sand Size Medium	, wt. perce Fine	ent Silt/Clay
B406A-C	12.6-12.8	Fine sand	0.255	0.53	0.37	15.77	78.99	4.35
B404A-D	14.6-14.8	Gravel	13.468	76.88	8.61	9.69	3.72	1.10
B412A-C	14.6-14.8	Coarse sand	2.585	37.40	18.00	24.74	14.21	5.65
B413A-C	14.6-14.8	Gravel	3.861	44.50	20.57	18.85	11.65	4.42

PTS Laboratories, Inc. Particle Size Analysis - ASTM D422M Client: TRC Solutions PTS File No: 46705R1 Project: Atlantic Bridge Project Sample ID: B406A-C **Project No:** 140143.0000.4903 Depth, ft: 12.6-12.8 Sand Silt/Clay Gravel coarse medium fine 30 100 90 25 80 % 70 Retained Weight, % 20 Cumulative Weight, 60 15 50 40 10 30 20 5 10 0 9 PAN 9 1/2 7 4 9 25 35 4 45 8 8 120 200 270 8 Sieve Size U.S. Sample Incremental Cumulative Cumulative Weight Percent greater than Phi Opening Phi of Sieve Weight Weight, Weight, Weight Particle Size Millimeters percent Inches Screen No. grams percent percent Value Inches Millimeters 0.9844 25.002 -4.64 0.00 0.00 0.00 0.47 0.0285 0.723 5 1/2 0.4922 12.501 -3.64 0.00 0.00 0.00 10 0.88 0.0214 0.544 0.3740 9.500 -3.253/8 0.00 0.00 0.00 16 1.22 0.0169 0.430 1/4 25 0.2500 6.351 -2.670.71 0.53 0.53 1.49 0.0140 0.355 0.1873 4.757 -2.25 4 0.00 0.00 0.53 40 1.78 0.0115 0.291 0.1324 3.364 -1.75 6 0.09 0.07 0.60 50 1.97 0.0100 0.255 2.000 10 0.40 0.30 0.90 60 0.0088 0.0787 -1 00 2.16 0.223 0.0557 1.414 -0.50 14 0.53 0.40 1.30 75 2.46 0.0072 0.182 1.000 0.0394 0.00 18 1.33 1.00 2.30 84 0.0058 0.147 2.77 0.0278 0.707 0.50 25 3.84 2.89 5.19 90 3.02 0.0049 0.123 35 95 0.500 1.00 8.47 6.37 11.56 3.67 0.0031 0.079 0.0197 0.0166 0.420 1.25 40 6.80 5.11 16.67 0.0139 0.354 1.50 45 11 35 8.53 25.20 Folk-Ward 1.97 **Inman** 1.97 Measure Trask 0.0098 0.250 35.05 26.35 51.55 Median, phi 2.00 60 0.0100 0.0070 2.50 80 Median, in. 0.0100 0.0100 0.177 34.22 25.73 77.28 0.0049 0.125 3.00 120 16.72 12.57 89.85 Median, mm 0.255 0.255 0.255 0.0029 0.074 3.75 200 7.72 5.80 95.65 0.0021 4.25 270 2.27 97.36 Mean, phi 1.90 1.99 1.99 0.053 1.71 0.0015 0.037 4.75 400 1.44 1.08 98.44 Mean, in. 0.0106 0.0099 0.0099 PAN 2.07 1.56 100.00 Mean, mm 0.269 0.251 0.253 1.396 0.872 0.775 Sorting 0.997 0.044 Skewness 0.028 Kurtosis 0.205 1.063 1.363 **Grain Size Description** Fine sand (based on Mean from Trask (ASTM-USCS Scale) Description Retained Weight on Sieve # Percent Gravel 10 0.37 Coarse Sand 40 15.77 Medium Sand

100.00

100.00

133.01

TOTALS

78.99

4.35

100

200

<200

Total

Fine Sand

Silt/Clay

PTS Laboratories, Inc. Particle Size Analysis - ASTM D422M Client: TRC Solutions PTS File No: 46705R1 B404A-D Project: Atlantic Bridge Project Sample ID: **Project No:** 140143.0000.4903 Depth, ft: 14.6-14.8 Sand Silt/Clay Gravel fine coarse medium 60 100 90 50 80 % 70 Retained Weight, % 40 Cumulative Weight, 60 30 50 40 20 30 20 10 10 0 PAN ဖ 9 1/2 7 4 9 25 35 4 45 9 8 120 200 270 9 Sieve Size U.S. Sample Incremental Cumulative Cumulative Weight Percent greater than Phi Opening Phi of Sieve Weight Weight, Weight, Weight Particle Size Millimeters percent Inches Screen No. grams percent percent Value Inches Millimeters 0.9844 25.002 -4.64 0.00 0.00 0.00 -4.55 0.9253 23.503 5 1/2 0.8698 0.4922 12.501 -3.64 65.46 56.02 56.02 10 -4.47 22.093 0.8076 0.3740 9.500 -3.253/8 10.97 9.39 65.41 16 -4.36 20.512 1/4 25 0.2500 6.351 -2.678.95 7.66 73.07 -4.200.7225 18.350 0.1873 4.757 -2.25 4 4.46 3.82 76.88 40 -3.93 0.6001 15.242 0.1324 3.364 -1.75 6 4.07 3.48 80.37 50 -3.750.5302 13.468 2.000 10 60 11.128 0.0787 -1 00 5 99 5.13 85 49 -3.480.4381 0.0557 1.414 -0.50 14 3.44 2.94 88.44 75 -2.460.2160 5.487 1.000 0.0394 0.00 18 2.54 2.17 90.61 84 0.0916 -1.222.327 0.0278 0.707 0.50 25 2.48 2.12 92.73 90 -0.14 0.0434 1.102 35 95 0.500 1.00 2.06 1.76 94.50 1.18 0.0173 0.440 0.0197 0.0166 0.420 1.25 40 08.0 0.68 95.18 0.0139 0.354 1.50 45 0.80 0.68 95.87 Measure Trask Inman Folk-Ward 0.0098 0.250 0.98 96.84 vledian, phi 2.00 60 1.14 0.0070 0.5302 0.5302 0.5302 2.50 80 0.90 0.77 97.61 Median, in. 0.177 0.0049 0.125 3.00 120 0.78 0.67 98.28 Median, mm 13.468 13.468 13.468 0.0029 0.074 3.75 200 0.73 0.62 98.90 0.0021 4.25 270 0.40 0.34 99.25 Mean, phi -3.58 -2.79 -3.11 0.053 0.0015 0.037 4.75 400 0.34 0.29 99.54 Mean, in. 0.4692 0.2720 0.3398 PAN 0.54 0.46 100.00 Mean, mm 11.919 6.909 8.631 1.570 1.654 1.829 Sorting 0.667 Skewness 0.745 0.613 Kurtosis 0.306 0.828 1.350 **Grain Size Description** Gravel (based on Mean from Trask (ASTM-USCS Scale) Description Retained Weight on Sieve # Percent Gravel 10 Coarse Sand 8.61 40 9.69 Medium Sand 200 3.72 Fine Sand <200 1.10 Silt/Clay

100.00

116.85

TOTALS

100

Total

PTS Laboratories, Inc. Particle Size Analysis - ASTM D422M Client: TRC Solutions PTS File No: 46705R1 Project: Atlantic Bridge Project Sample ID: B412A-C **Project No:** 140143.0000.4903 Depth, ft: 14.6-14.8 Sand Silt/Clay Gravel coarse medium fine 16 100 90 14 80 12 % 70 Retained Weight, % Cumulative Weight, 10 60 8 50 40 6 30 4 20 2 10 0 PAN 3/8 ဖ 1/2 7 9 4 9 25 35 4 45 9 8 120 200 270 6 Sieve Size U.S. Sample Incremental Cumulative Cumulative Weight Percent greater than Phi Opening Phi of Sieve Weight Weight, Weight, Weight Particle Size Millimeters percent Inches Screen No. grams percent percent Value Inches Millimeters 0.9844 25.002 -4.64 0.00 0.00 0.00 -4.17 0.7087 18.000 5 1/2 0.4922 12.501 -3.64 10.55 10.55 10 -3.70 0.5102 12.959 8.44 0.3740 9.500 -3.253/8 3.65 4.56 15.11 16 -3.21 0.3653 9.279 1/4 25 0.2500 6.351 -2.6712.17 15.21 30.32 -2.870.2878 7.311 0.1873 4.757 -2.25 4 5.67 7.09 37.40 40 -2.07 0.1649 4.188 0.1324 3.364 -1.75 6 5.65 7.06 44.46 50 -1.370.1018 2.585 2.000 10 10.93 55.40 60 -0.68 0.0630 1.601 0.0787 -1 00 8.75 0.0557 1.414 -0.50 14 5.74 7.17 62.57 75 0.63 0.0254 0.646 1.000 5.99 0.0394 0.00 18 4.79 68.56 84 0.293 1.77 0.0115 0.0278 0.707 0.50 25 4.21 5.26 73.82 90 2.76 0.0058 0.148 35 95 0.500 1.00 78.34 3.95 0.0025 0.065 0.0197 3.62 4.52 0.0166 0.420 1.25 40 1.44 1.80 80.14 0.0139 0.354 1.50 45 1.55 1.94 82.08 Folk-Ward -1.37 Measure Inman -1.37 Trask 0.0098 0.250 3.55 85.63 2.00 60 2.84 Median, phi 0.1018 0.0070 80 2.25 88.44 Median, in. 0.1018 0.1018 0.177 2.50 2.81 0.0049 0.125 3.00 120 2.39 2.99 91.43 Median, mm 2.585 2.585 2.585 0.0029 0.074 3.75 200 2.34 2.92 94.35 0.0021 4.25 270 1.27 1.59 95.94 Mean, phi -1.99 -0.72 -0.94 0.053 0.0015 0.037 4.75 400 1.00 1.25 97.19 Mean, in. 0.1566 0.0649 0.0754 PAN 2.81 100.00 Mean, mm 3.979 1.649 1.916 2.25 3.364 2.492 2.477 Sorting 0.841 0.286 Skewness 0.260 Kurtosis 0.260 0.630 0.951 **Grain Size Description** Coarse sand (based on Mean from Trask) (ASTM-USCS Scale) Description Retained Weight on Sieve # Percent Gravel 10 18.00 Coarse Sand 40 24.74 Medium Sand 200 14.21 Fine Sand

100.00

80.02

TOTALS

5.65

100

<200

Total

Silt/Clay

PTS Laboratories, Inc. Particle Size Analysis - ASTM D422M Client: TRC Solutions PTS File No: 46705R1 Project: Atlantic Bridge Project Sample ID: B413A-C **Project No:** 140143.0000.4903 Depth, ft: 14.6-14.8 Sand Silt/Clay Gravel coarse medium fine 20 100 18 90 80 16 % 14 70 Retained Weight, % Cumulative Weight, 12 60 10 50 8 40 6 30 4 20 2 10 PAN ဖ 1/2 7 9 4 9 25 35 4 45 9 8 120 200 270 6 Sieve Size U.S. Sample Incremental Cumulative Cumulative Weight Percent greater than Phi Opening Phi of Sieve Weight Weight, Weight, Weight Particle Size Millimeters percent Inches Screen No. grams percent percent Value Inches Millimeters 0.9844 25.002 -4.64 0.00 0.00 0.00 -4.37 0.8146 20.691 5 1/2 0.4922 12.501 -3.64 18.31 10 -4.10 0.6741 13.84 18.31 17.123 0.5371 0.3740 9.500 -3.253/8 5.76 7.62 25.93 16 -3.77 13.643 1/4 10.68 25 0.2500 6.351 -2.678.07 36.61 -3.300.3868 9.824 0.1873 4.757 -2.25 4 5.97 7.90 44.50 40 -2.49 0.2208 5.609 0.1324 3.364 -1.75 6 6.90 9.13 53.63 50 -1.950.1520 3.861 2.000 10 11.44 60 0.0992 2.519 0.0787 -1 00 8.65 65.07 -1.330.0557 1.414 -0.50 14 4.14 5.48 70.55 75 0.03 0.0386 0.979 1.000 3.18 4.21 0.0394 0.00 18 74.76 84 0.0164 0.417 1.26 0.0278 0.707 0.50 25 3.05 4.03 78.79 90 2.34 0.0078 0.197 35 95 0.500 1.00 2.82 3.57 0.0033 0.084 0.0197 3.73 82.52 0.0166 0.420 1.25 40 1.06 1.40 83.93 0.0139 0.354 1.50 45 1.25 1.65 85.58 Folk-Ward -1.95 Measure Trask Inman -1.95 0.0098 0.250 2.83 88.41 2.00 60 2.14 Median, phi 0.1520 0.0070 80 2.32 90.73 Median, in. 0.1520 0.1520 0.177 2.50 1.75 0.0049 0.125 3.00 120 1.83 2.42 93.15 Median, mm 3.861 3.861 3.861 0.0029 0.074 3.75 200 1.84 2.43 95.58 0.0021 4.25 270 1.03 1.36 96.94 Mean, phi -2.43-1.25 -1.49 0.053 0.0015 0.037 4.75 400 0.82 1.08 98.03 Mean, in. 0.2127 0.0939 0.1103 PAN 1.49 100.00 Mean, mm 5.402 2.386 2.801 1.97 2.516 2.461 3.167 Sorting 0.333 Skewness 0.803 0.276 Kurtosis 0.261 0.5/8 0.979 **Grain Size Description** Gravel (based on Mean from Trask (ASTM-USCS Scale) Description Retained Weight on Sieve # Percent Gravel 10 20.57 Coarse Sand 40 18.85 Medium Sand 200 11.65 Fine Sand <200 4.42 Silt/Clay

100.00

75.59

TOTALS

100

Total

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PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 347-2500 • Fax (562) 279-1150

SAMPLE INTEGRITY (CHECK):
INTACT TEMP(F) 33 determined based on core 5 DAYS NORMAL Additional analyses to be 103297 COMMENTS Q16-170R1 L O TURNAROUND TIME PTS QUOTE NO. photography 24 HOURS 72 HOURS PTS FILE: OTHER: INTACT PO# PAGE FREE PRODUCT MOBILITY PACKAGE VAPOR INTRUSION PACKAGE ATTERBERG LIMITS, ASTM D4318 OC: WALKLEY-BLACK SRAIN SIZE DISTRIBUTION, ASTM D422 or 4464M 4YDRAULIC CONDUCTIVITY, EPA9100/API RP40 or D5084 ANALYSIS REQUEST орчя іча утіліваэмяэч яід BULK DENSITY (DRY), API RP40 or ASTM D2937 SPECIFIC GRAVITY, ASTM D854 CHAIN OF CUSTODY RECORD POROSITY: EFFECTIVE, ASTM D425M RELINQUISHED POROSITY: TOTAL, AIR FILLED, WATER FILLED APOR TRANSPORT PACKAGE × × PHOTOLOG: CORE PHOTOGRAPHY × × × × × × × × FLUID PROPERTIES PACKAGE ABAXOAY Y LIHAJJIYAC TCEQ/TNRCC PROPERTIES PACKAGE OHE FLUID SATURATIONS PACKAGE HYDRAULIC CONDUCTIVITY PACKAGE SOIL PROPERTIES PACKAGE NUMBER OF SAMPLES 617-385-6033 ZIP CODE 口 02109 crace@trcsolutions.com PHONE NUMBER FAX NUMBER 2/8/ 18-20 DEPTH, アーゴ 10-12 81-91 カノー 10-12 81-91 RECEIVED BY 9/161 91-21 7 0830 0820 0855 6835 0845 1015 1030 1845 TIME 1625 16 35 112/15/16 Boston 12/15110 1/1/2/16 12/15/116 0//S/h2 21/2//211 17/12/1/2 12/15/16 DATE 12/12/16 **PTS** Laboratories, Inc. 1/J×1/h1 6 & 50 Bridge Street, Weymouth, MA 6th Floor Atlantic Bridge Project Two Liberty Square, \Box B413A-E SAMPLER SIGNATURE B48A-D B4134-C 140143.0000.4903 4124 - D RYBA-B RYILA-C 4131-A ないる市 PROJECT MANAGER SAMPLE BY124-B PROJECT NUMBER R412A-A Rick Paquette PROJECT NAME SITE LOCATION ADDRESS COMPAN $\Delta \Delta$

PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 347-2500 • Fax (562) 279-1150

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17/16/16

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12/15/16

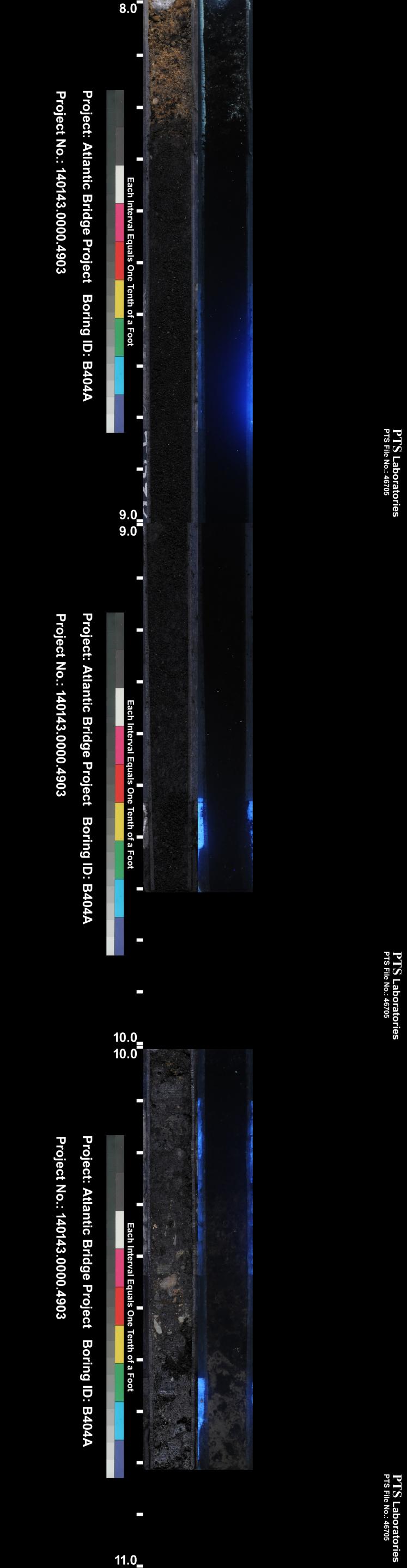
Page 50 of 50

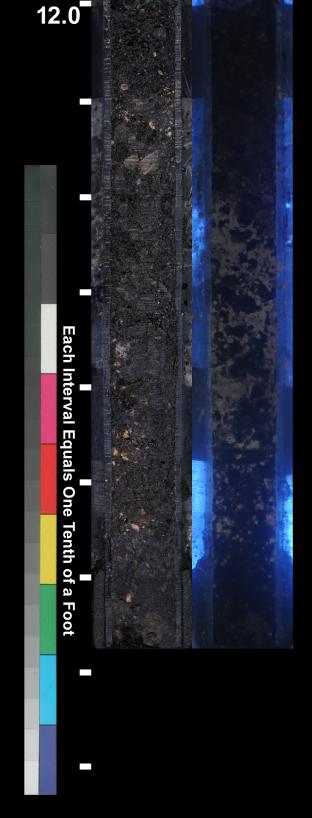
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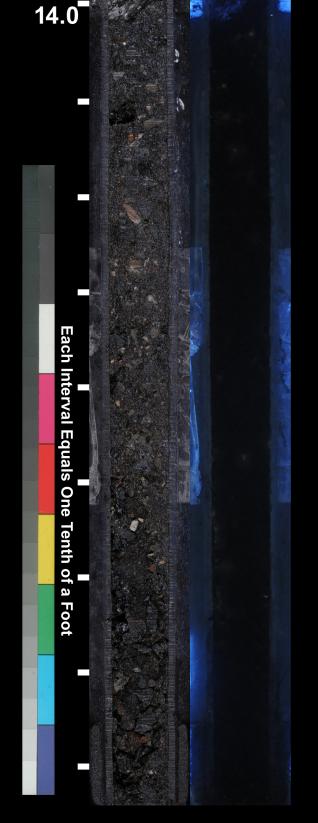
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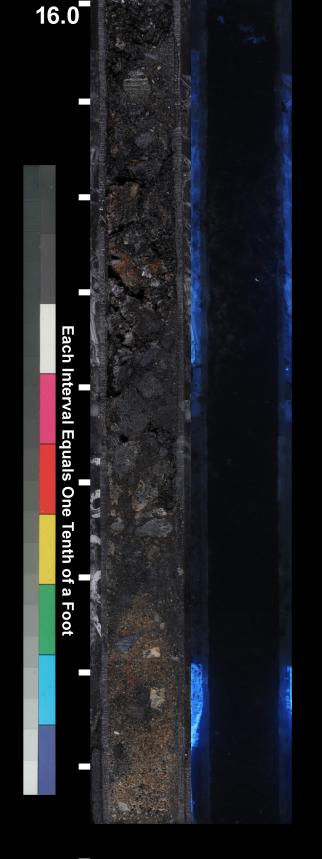




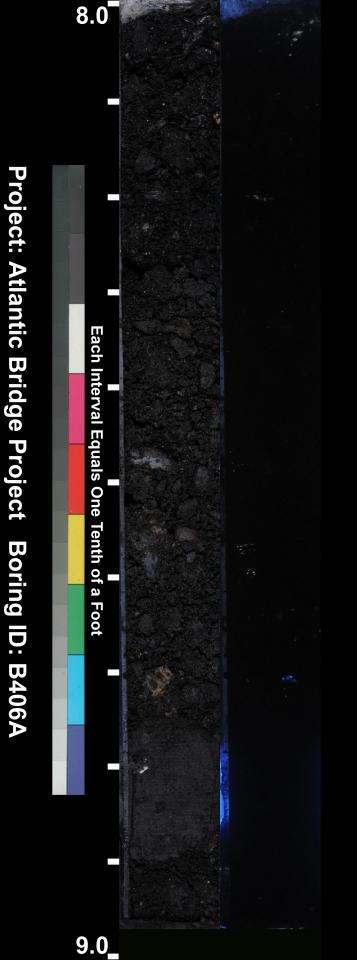
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Project: Atlantic Bridge Project Boring ID: B404A

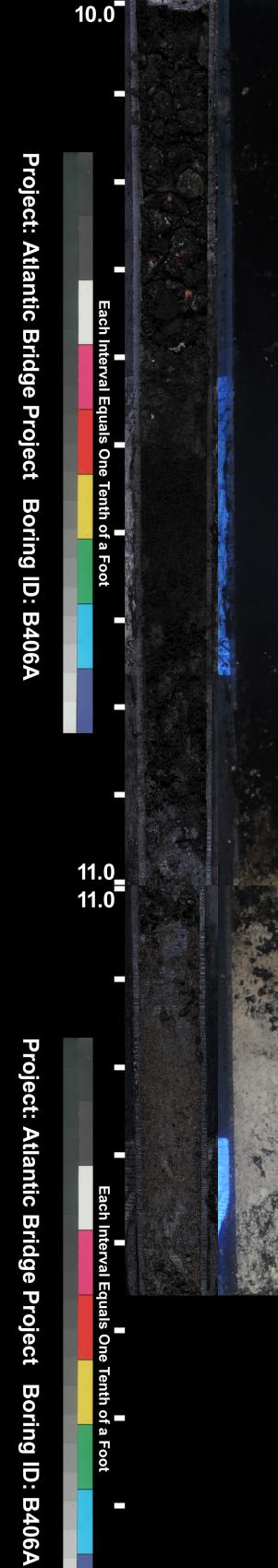


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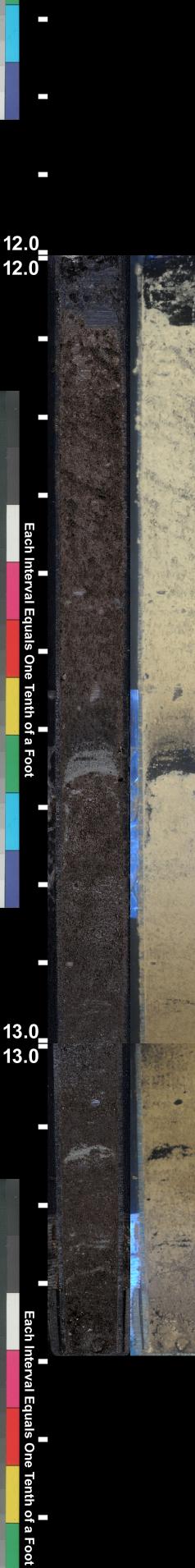






Project No.: 140143.0000.4903

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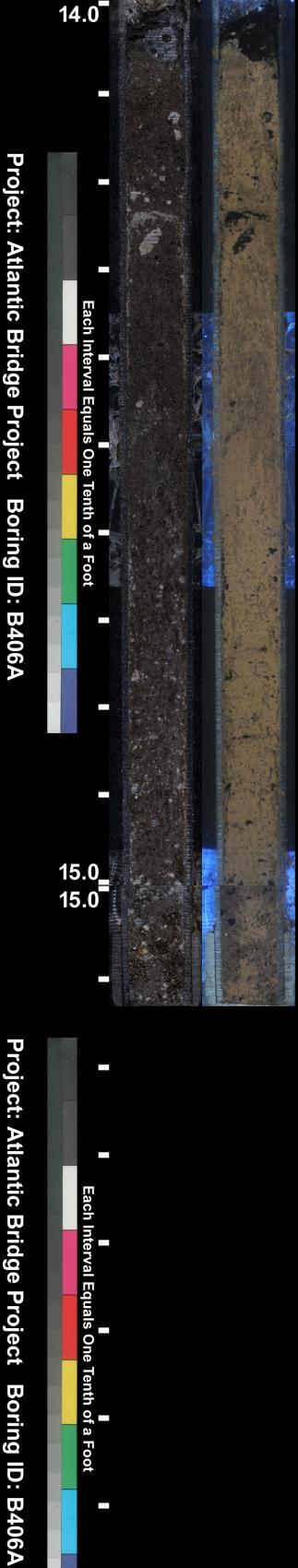
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Project: Atlantic Bridge Project Boring ID: B406A

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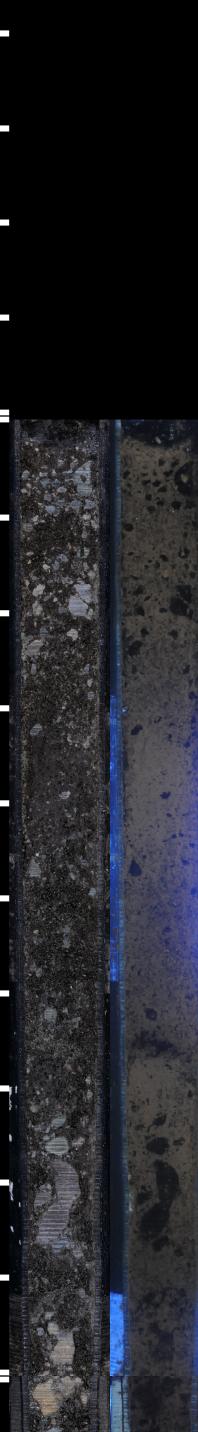
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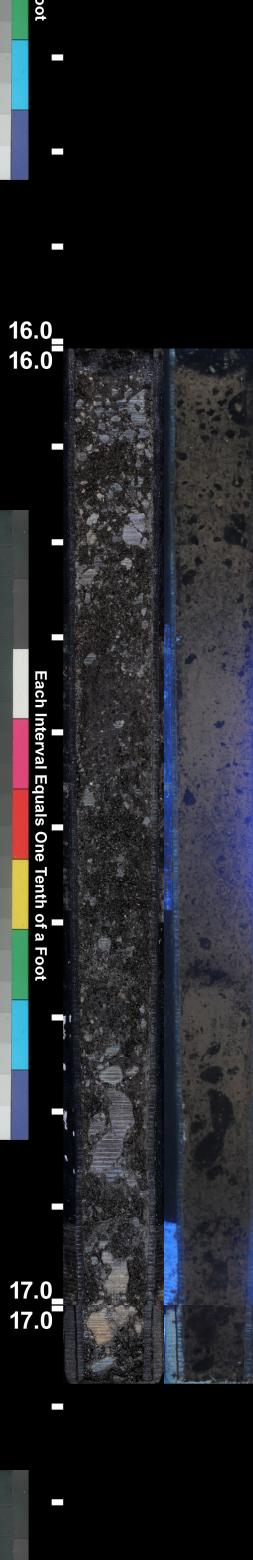
PTS File No.: 46705 PTS Laboratories



Project No.: 140143.0000.4903

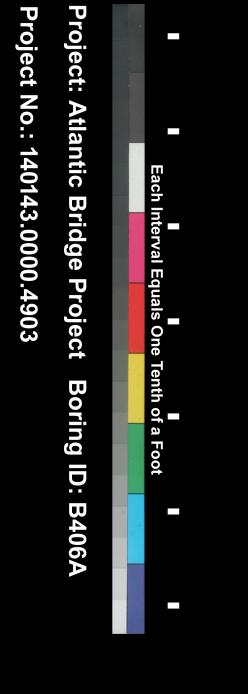
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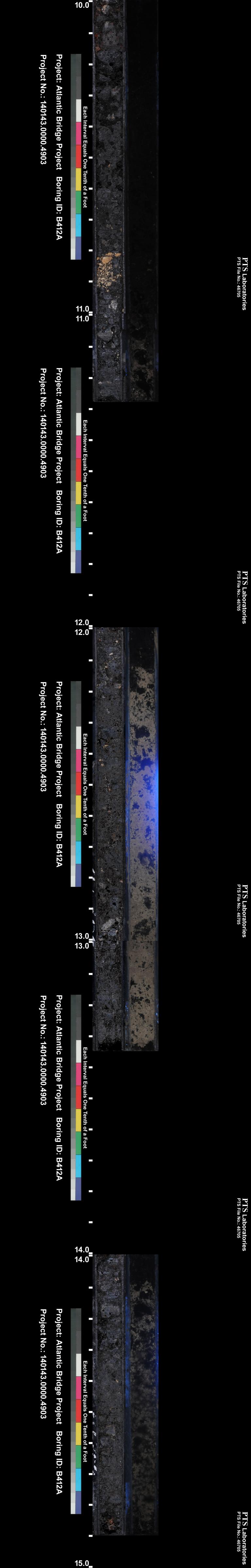
Project: Atlantic Bridge Project Boring ID: B406A

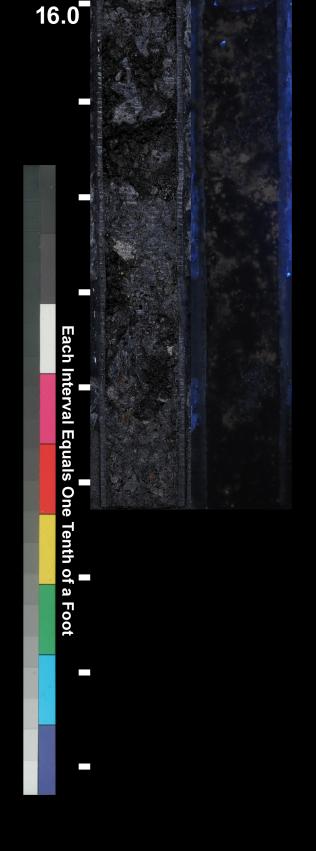
Each Interval Equals One Tenth of a Foot



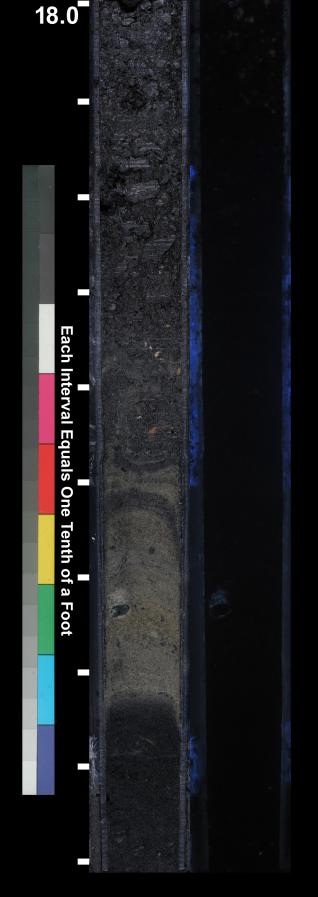
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Project No.: 140143.0000.4903



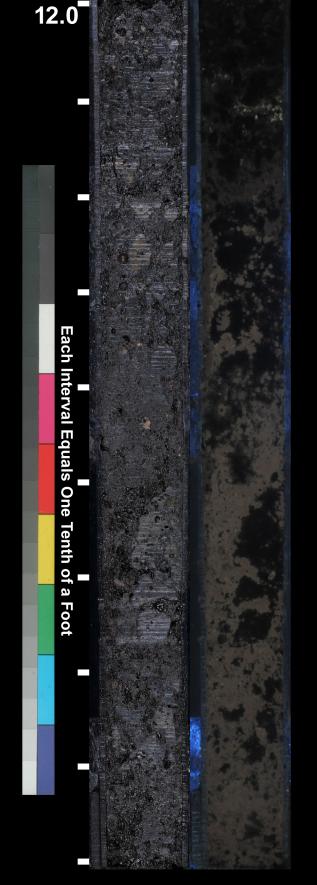


Project: Atlantic Bridge Project Boring ID: B412A



Project: Atlantic Bridge Project Boring ID: B412A

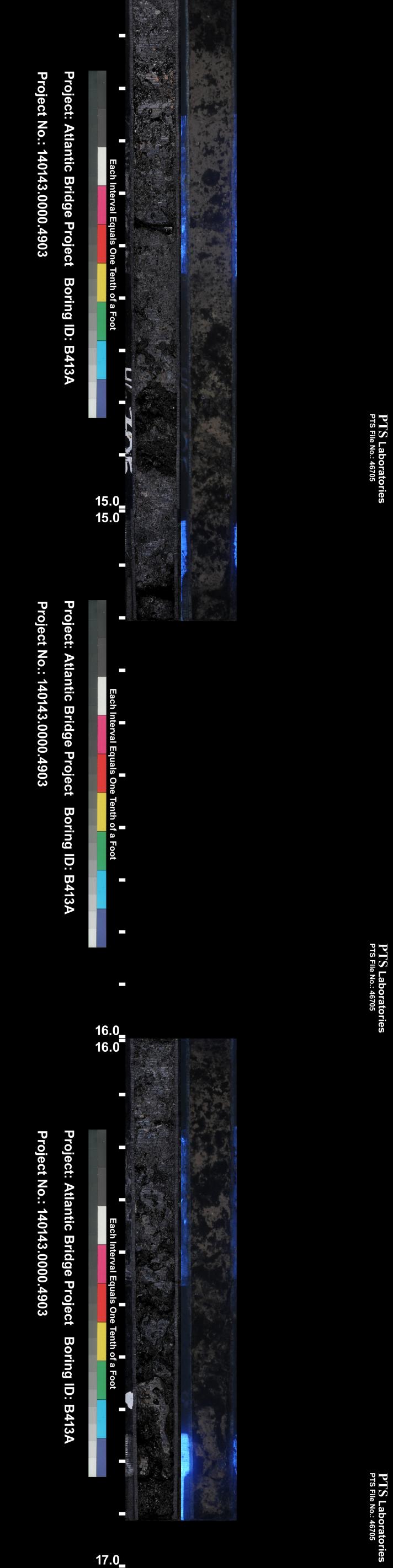


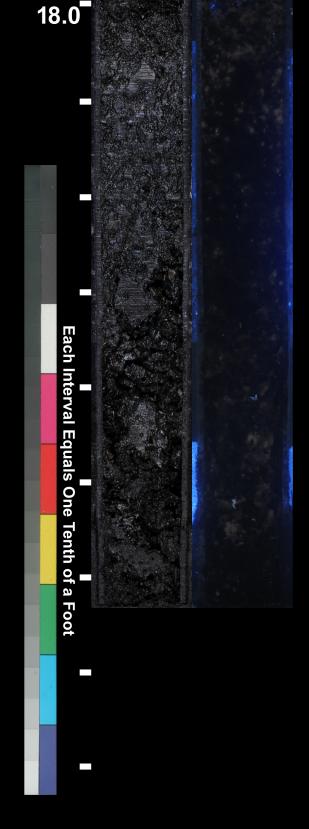


Project: Atlantic Bridge Project Boring ID: B413A

Project No.: 140143.0000.4903

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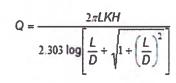
Project: Atlantic Bridge Project Boring ID: B413A

MW-202 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

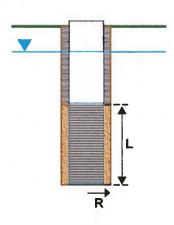
Intake (screen) length (cm)	L=	206.35	cm	
Intake (hole) diameter (cm)	D =	22.860	cm	
Steady state discharge (L/min)	Q=	0.36	L/min	
Steady state drawdown (cm)	H=	0.91	cm	
* This workbook can be used with the half ellipsoidal model	(Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	1.47E-02 cm/s		
	K=	4.18E+01	ft/day	

Formula



Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-203 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

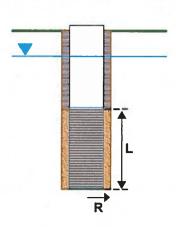
Intake (screen) length (cm)	L=	173.13	cm
Intake (hole) diameter (cm)	D'=	22.860	cm
Steady state discharge (L/min)	Q=	0.27	L/min
Steady state drawdown (cm)	H=	2.13	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	5.29E-03 cm/s	
	K=	1.50E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-204 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

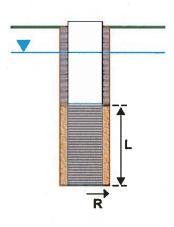
Intake (screen) length (cm)	L=	204.83	cm	
Intake (hole) diameter (cm)	D =	22.860	cm	
Steady state discharge (L/min)	Q=	0.29	L/min	
Steady state drawdown (cm)	H≔	1.22	cm	
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	Computed Values 8.89E-03 cm/s		
	K=	2.52E+01	ft/day	

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-205 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

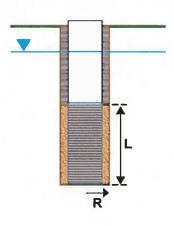
Intake (screen) length (cm)	L=	152.40	cm
Intake (hole) diameter (cm)	D =	22.860	cm
Steady state discharge (L/min)	Q=	0.5	L/min
Steady state drawdown (cm)	H=	0.61	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	3.70E-02 cm/s	
TO THE RESERVE OF THE PARTY OF	K=	1.05E+02	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-206 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

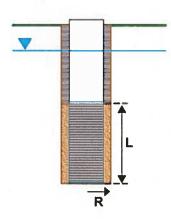
Intake (screen) length (cm)	L=	146.91	cm
Intake (hole) diameter (cm)	D =	22.860	cm
Steady state discharge (L/min)	Q=	0.35	L/min
Steady state drawdown (cm)	H=	0.61	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K= 2.65E-02 cr		cm/s
	K=	7.52E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-400 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

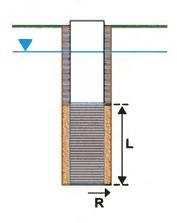
Intake (screen) length (cm)	L=	356.31	cm
Intake (hole) diameter (cm)	D =	12.700	cm
Steady state discharge (L/min)	Q=	0.22	L/min
Steady state drawdown (cm)	H=	1.22	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by substituting the intake hole radius (R) instead of the			
intake hole diameter (D).	K=	5.41E-03	cm/s
	K=	1.53E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



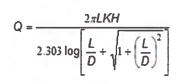
Model based on Hvorslev (1951)

MW-401 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

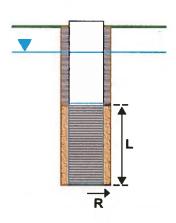
Intake (screen) length (cm)	L=	250.55	cm
Intake (hole) diameter (cm)	D =	12.700	cm
Steady state discharge (L/min)	Q=	0.15	L/min
Steady state drawdown (cm)	H=	1.22	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	4.79E-03 cm/s	
	K=	1.36E+01	ft/day

Formula



Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-402 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

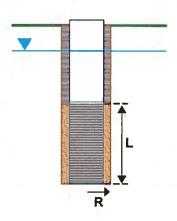
Intake (screen) length (cm)	L=	244.14	cm
Intake (hole) diameter (cm)	D=	12.700	cm
Steady state discharge (L/min)	Q=	0.3	L/min
Steady state drawdown (cm)	H=	1.22	cm
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	9.75E-03 cm/s	
	K=	2.76E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-403 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

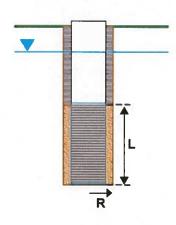
Intake (screen) length (cm)	L=	284.99	cm
Intake (hole) diameter (cm)	D =	12.700	cm
Steady state discharge (L/min)	Q=	0.27	L/min
Steady state drawdown (cm)	H=	0.61	cm
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the	Computed Values		
intake hole diameter (D).	K= 1.57E-02 cm/s		cm/s
	K=	4.44E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-404 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

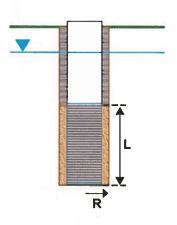
Intake (screen) length (cm)	L=	230.12	cm
Intake (hole) diameter (cm)	D =	22.860	cm
Steady state discharge (L/min)	Q=	0.375	L/min
Steady state drawdown (cm)	H=	0.91	cm
* This workbook can be used with the half ellipsoidal model	Computed Values		
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K= 1.43E-02		cm/s
	K=	4.05E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-405 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

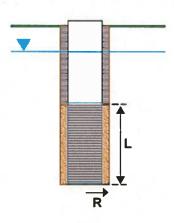
Intake (screen) length (cm)	L=	218.54	cm
Intake (hole) diameter (cm)	D'=	12.700	cm
Steady state discharge (L/min)	Q=	0.375	L/min
Steady state drawdown (cm)	H=	0.61	cm
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	Computed Values 2.64E-02 cm/s	
	K=	7.49E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-406 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

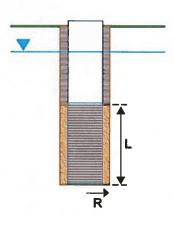
Intake (screen) length (cm)	L=	279.20	cm	
Intake (hole) diameter (cm)	D =	12.700	cm	
Steady state discharge (L/min)	Q=	0.32	L/min	
Steady state drawdown (cm)	H=	1.52	cm	
* This workbook can be used with the half ellipsoidal model	Computed Values			
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	7.57E-03 cm/s		
	K=	2.15E+01	ft/day	

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-408 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

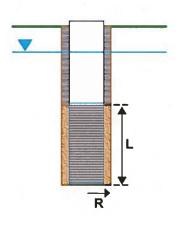
Intels (agreen) length (age)		000.00	
Intake (screen) length (cm)	L=	293.83	cm
Intake (hole) diameter (cm)	D =	cm	
Steady state discharge (L/min)	Q=	0.3	L/min
Steady state drawdown (cm)	H=	0.91	cm
* This workbook can be used with the half ellipsoidal model by substituting the intake hole radius (R) instead of the		computed Value	
intake hole diameter (D).	K=	1.14E-02	cm/s
	K=	3.24E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-409 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

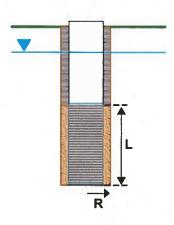
Intake (screen) length (cm)	L=	302.36	cm		
Intake (hole) diameter (cm)	D'=	cm			
Steady state discharge (L/min)	Q=	0.27	L/min		
Steady state drawdown (cm)	H=	3.05	cm		
* This workbook can be used with the half ellipsoidal model	Computed Values				
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	3.00E-03	cm/s		
the state of the s	K=	8.51E+00	ft/day		

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-411 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

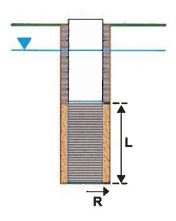
Intake (screen) length (cm)	L=	309.07	cm		
Intake (hole) diameter (cm)	D =	12.700	cm		
Steady state discharge (L/min)	Q=	0.4	L/min		
Steady state drawdown (cm)	H=	cm			
* This workbook can be used with the half ellipsoidal model	Computed Values				
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	2.19E-02	cm/s		
to the first three to be a like to the	K=	6.20E+01	ft/day		

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-412 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

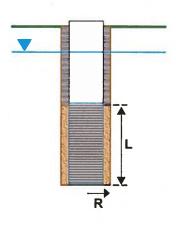
Intake (screen) length (cm)	L=	293.52	cm
Intake (hole) diameter (cm)	D =	22.860	cm
Steady state discharge (L/min)	Q=	0.2	L/min
Steady state drawdown (cm)	H=	cm	
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the		Computed Value	s
intake hole diameter (D).	K=	3.86E-03	cm/s
a complete a second of the second	K=	1.09E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-413 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

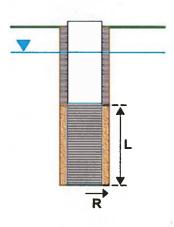
Intake (screen) length (cm)	L=	283.16	cm
Intake (hole) diameter (cm)	D =	22.860	cm
Steady state discharge (L/min)	Q=	0.33	L/min
Steady state drawdown (cm)	H=	1.22	cm
* This workbook can be used with the half ellipsoidal model by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	Computed Value	
	N=	8.14E-03 cm/s	
	K=	2.31E+01	ft/day

Formula

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q \cdot 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

MW-415 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

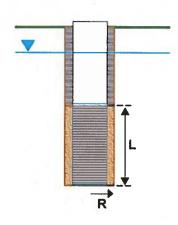
Intake (screen) length (cm)	L=	233.17	cm		
Intake (hole) diameter (cm)	D =	12.700	cm		
Steady state discharge (L/min)	Q=	0.33	L/min		
Steady state drawdown (cm)	H=	1.22	cm		
* This workbook can be used with the half ellipsoidal model	Computed Values				
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	1.11E-02	cm/s		
	K=	3.14E+01	ft/day		

<u>Formula</u>

$$Q = \frac{2\pi LKH}{2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D}\right)^2}\right]}$$

Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



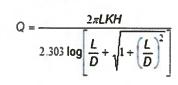
Model based on Hvorslev (1951)

MW-416 Low Flow Kh Calculation Sheet Spectra Energy Partners Atlantic Bridge Project Weymouth Compressor Station, Weymouth, Massachusetts

Ellipsoidal Flow Steady State Model Single Pair of Discharge and Drawdown

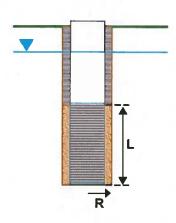
Intake (screen) length (cm)	L=	356.01	cm		
Intake (hole) diameter (cm)	D'=	12.700	cm		
Steady state discharge (L/min)	Q=	0.24	L/min		
Steady state drawdown (cm)	H=	1.52	cm		
* This workbook can be used with the half ellipsoidal model	Computed Values				
by subsitituting the intake hole radius (R) instead of the intake hole diameter (D).	K=	4.74E-03 cm/s			
	K=	1.34E+01	ft/day		

<u>Formula</u>



Single O/H

$$K = \frac{Q * 2.303 \log \left[\frac{L}{D} + \sqrt{1 + \left(\frac{L}{D} \right)^2} \right]}{2\pi LH}$$



Model based on Hvorslev (1951)

TPC	Proje	ect:	· F	roject	No.:	Date/Ti	me:		
	20	UM		140	145	11/4/	17	Sheet of	
Groundwater	TRC	Person	nel:			We	II ID:		
Field Data Record	H	0110	unsn	26	(18.15)		MV	U-201	
WELL INTEGRITY	Prote	ective			Well	X	top of riser	measured	
Protect Cosing Secure		ng Stick- n ground		ft.	Depth	0.500	top of casi		
Protect. Casing Secure	HII-"-	- — —	/ – –					low	
PVC Stick-up Intact		r Stick-u			Water - Depth	ft.	LNAPL/DN	IAPL Depth = 🔀 🖰	
Well Cap Present	ПI-"-	ground	' — —	ft.	Well Volum	e	NAPL Thic	kness =	
Security Lock Present		L DIAME		z men	Depth of pu			into well:	
Sampling Equipment:	Othe	r:		4 inch	Static water level after pump put into well:				
Flow-thru Cell Volume:				6 inch	Initial purge	Rate/ Wat	er Level (1	00-400 ml/min):	
PID SCREENING MEAS.					Adjusted pu	irge Rates	/time/WL(re	cord changes)	
Background	WEL	L MATER	RIAL						
Well Mouth	\searrow	1 [
	PV	_	SS		Flow rate at	time of sa	mpling: 3	ROUMILMIN	
	Oth				Total volum	e of water	purged:	7	
FIELD WATER QUALITY MEAS				iate inte	ervals)				
Time	0930	1935	aud	094	5 145	1955	उरुग	1085 1010	
Temp. (°C)	10 11	0194	11.83	12.0	3 12.03	1203	12.13	12/10 12/08	
Conduct. (µmhos/cm)	3	36833	36418	3646	22 36 Y63	36463	36507	365367656	
DO (mg/L)	UZ	350	2.71	202	3 2.24	2162	1,93	1.85 105	
pH (su)	P.	M.DO	6406	1,13	7 6.27	6.20	10.35	1.25 1.25	
ORP (millivolts)	57	44:0	-560,9	64.	11-	-	-1.9.5	71. Y -71.5	
Turbidity (NTU)	EI	30	7.90	3.19	1.69	2.05	100	153 200	
Flow (ml/min)		350	300	300	300	300	1	300 200	
Depth To Water (ft)	13.64		CHAPTERSON		_	January, and the same of the s	***************************************		
Cumulative Purge Vol. (gal or L)		*					2.00	
Time	11145 1	030	10.25	1025	v		Stabil	ization Criteria*	
Temp. (°C)),[]	12.10	11/12/2			930.00	ecutive readings)	
Conduct. (µmhos/cm)	36586	A 111		>		1	- Temperat - Conduct.	(µmhos/cm): + 3 %	
DO (mg/L)	1 28	75	1,78	A			- DO (mg/L >0.5 mg/L)): <u>+</u> 10 % (for values	
pH (Std. Units)	6.25 1	i. 25	10 25	100				Jnits): <u>+</u> 0.1 SU	
Eh/ORP (millivolts)	720 -	73.0	- 735	M			1	ivolts): <u>+</u> 10 mV	
Turbidity (NTU)	203 1	141	106	P			- Turbidity	(NTU): +/- 10 % >5.0 NTUs)	
Flow (ml/min)		000	300	i			- Drawdow	n: < 0.3 ft (can be	
Depth To Water (ft)	300	*	100	V V		*		long as water level above well screen)	
Cumulative Purge Vol. (gal or L)							Jota Bilizes e	above well screen)	
Purg	e Sample	Comme	nts: ,	1	70				
Peristaltic Pump	X	-0	real	DIF	3313	SGP]_	*;, .	
Submersible Pump Bladder Pump	П	d 100			6 11		A 6.		
Bailer		dola	1DV	le	90110	MIN	Wer	IN labolet	
Other:		ann	W (-		
Analytical Parameter Filtered ((/N) Preser	vation	# Bottle		ize/Type	Time	QC	Sample #	
EPH N	H		9	11	Bottles	Collected	nove	<u> </u>	
VPH N	itt		3	VI	muft	025	nono		
	V	,		,	0 M D				
				6					
Consult the applicable regulato	ry guidance f	or the sp	ecific	Signe	d: 75 001	1110		Rev: April 2014	

©TRC	Proje	ect:	Р	roject	No.:	Date/T	ime:				
(C) INC		Sp	e(tra		1	43140	1/41	₹ Sheet ⊥ of			└ ot
Groundwater			Personn	el:			W	ell ID:			
Field Data Record		K	elle	enh	1			mW =	90	2	
WELL INTEGRITY		Prot	ective		1	Well >7	X	top of ri	ser	\Box	measured
Brotost Cooling Secure	YES NO		ing Stick-ı n ground)		_ ft.	Depth 25	_ ft.	top of c	asing		historical
Protect. Casing Secure Concrete Collar Intact	HH					<u> </u>		-			
PVC Stick-up Intact	MH		r Stick-up n ground)		ft.	Water Depth ≀ à.∂	3 ft.				th = NA
Well Cap Present		(1101			= ":	Well Volume					= NA
Security Lock Present		WEL	L DIAME	TER 🔲 :		Depth of pun Static water			Dut int	_	
Sampling Equipment:	71	Oth	er:		4 inch						
Flow-thru Cell Volume:					6 inch	Initial purge		ater Leve) MI N		400 ml	l/min):
PID SCREENING MEAS.						Adjusted pur	rge Rate	s/time/W	L(reco	rd cha	nges)
Background	1	WEI	LL MATER	RIAL		350-	300	@ 0	120		
Well Mouth			3 [ŀ					(4. 1)	11.
	J	P\		ss		Flow rate at				50 M	Min
			her:			Total volume	of wate	er purged	i:		
FIELD WATER QUALITY	1		- America	A-	202		0.025	1001	10 10	01:-	10.53
Time	109	0	0915	M20	092	= 10.4.30 = 10.4.30	0935	1099	0 0	442	0950
Temp. (°C)	- 1	,2	ILM	11.56	1110	2 11.57	11.67	1111		69	11.103
Conduct. (µmhos/cm)	1.			3013 t	3180	- 71		100	,	1991	3000 5
DO (mg/L)				0.69	168	rled	165	,5	0-1	57	,5+
pH (su)	X		6.48	6.27	Carls	o dilly	4.12	(6.10	ي (10	610
ORP (millivolts)	+	7	-18.9	-15.4	-15.		-Kik	141	0 -	5.8	7/91
Turbidity (NTU)		1	32.1	20,0	11,5	1111111	4.8		-	a	4.12
Flow (ml/min)		50	350	350	300	300.	300	300) 3	00	300
Depth To Water (ft)	19.	23	12.26	12.27	.27 12,2612.		12.21	0 12.2	6 10	alph 1	12/26
Cumulative Purge Vol. (gal or L)			3							· ·
Time	00	55	1000	1500				100000000000000000000000000000000000000			riteria* readings)
Temp. (°C)		(05	11.65)				- Tem	peratui	re: <u>+</u> 3 %	%
Conduct. (µmhos/cm)	30	100	30000) (cm): <u>+</u> 3 % (for values
DO (mg/L)	,,,	86	57	H				>0.5 n	ng/L)		
pH (Std. Units)	6	DI	6.10	W						nits): <u>+</u> (
Eh/ORP (millivolts)	-1	6.1	-16.2	0					a Pilon	voits): <u>+</u> VTU): +	<u>:</u> 10 mV /- 10 %
Turbidity (NTU)	Ч	33	4.11					(for v	alues >	5.0 NT	Us)
Flow (ml/min)	3	00	300	F							ft (can be water level
Depth To Water (ft)		124	12,24				7				ell screen)
Cumulative Purge Vol. (g	gal or L)										
	Purge	Sample	e Comme	ents:							
Peristaltic Pump										-	
Submersible Pump Bladder Pump	\vdash	H	-	_							
Bailer			-								10
Other:											
4-1-2-15 : [-		1 -		T		Sizo/Tuna	Time			T -	
Analytical Parameter F	itered (Y/N)		servation	# Bott	les	Size/Type Bottles	Collect	ed	QC	Sa	ample #
FPH	N	1	TCI	2		116	1000		ONQ	,	
VPT	N	17		3		Youla	100) M	one	-	
					-					+-	
Consult the applicable	regulatory o	uidan	ce for the s	necific	Sigr	and: M	all	118	11 0	Re	ev: April 2014
and applicable	- January &	,		Peaning	Sigi	ieuf	MI	CLL	~		

©TRC	Pre	oject:		Project	No.:	Date/Ti			
	8	Pectra	Wenn	louter 1	140143.00	1/3/1	7 1410	Sheet _	<u>l</u> of <u>l</u>
Groundwater	TR	C Person					II ID:		
Field Data Record		B4					MI.)	506	
WELL INTEGRITY	Pr	otective	0		Well		top of rise		measured
YES	NO Ca	sing Stick		ft.	Depth		top of rise		historical
Protect. Casing Secure Concrete Collar Intact	- -(m	om ground	·, — —						ilistoricai
PVC Stick-up Intact Well Cap Present	Ris	ser Stick-u	p n		Water 13.	32.	LNAPI /DN	JAPI Der	oth =
Well Cap Present		om ground	1)	ft.	Well Volum		NAPL Thic		
Security Lock Present	$\Box \Box \Box$	ELL DIAME	TER K	2 inch	Depth of pump intake:				
Sampling Equipment:				4 inch	Static water	level after	pump put	into well	:
Peristaltic pum	£	her:	_ [6 inch	Initial purge	Rate/ Wat	er Level (1	00-400 m	l/min):
Flow-thru Cell Volume:				- 1	990				
PID SCREENING MEAS.	W	ELL MATE	RIAL		Adjusted pu			cord cha	inges)
Background	l r		S.		96	6,370)		
Well Mouth			<i>℁</i> SS	Ī	Flow rate at	time of sa	mpling: 5	370	
		ther:			Total volum			10	
FIELD WATER QUALITY MEA	SURFMENT	S (record :	ot annron			c or water	purgeu.		
Time	1410	1415	1430	1113		1435	1100.	11/11/10	1110
Temp. (°C)	Slot	11.37	11.40	11.40	1	11.64	1490	1995	1450
Conduct. (µmhos/cm)	Proje	4	41964	4/193			11.49	1150	11,40
DO (mg/L)	1	2/19/17	0			41875		486.4	4173.3
pH (su)	+	3.61	2.41	3.73		41.39		454	41.53
ORP (millivolts)	+		89.1	6.5		6,48	6.48	6.47	6.47
accon to an accompany of the contract of the c	-1.	93,4		921.		5.9	84.3	8711	86.1
Turbidity (NTU)	200	24	28.4	23.7	26.4	21.0	14.3	18.7	13,6
Flow (ml/min) Depth To Water (ft)	330	260	270	paragraphic della					->
	13.32	13.39	6			The state of the s			
Cumulative Purge Vol. (gal or	L)		The state of the s						
Time	1455	1500	1505	1510	1515	1320		ization Cı ecutive re	
Temp. (°C)	11,41	11.47	11.53	11.5	1 11.56	11.57	- Temperat	ure: + 3 %	6
Conduct. (µmhos/cm)	41734	4183]	41976	4201.	6-1163.4	41896	- Conduct.		
DO (mg/L)	\$176	4.41	5.21	5.61	550	5.63	>0.5 mg/L)): ± 10 % ((for values
pH (Std. Units)	646	6.47	6.47	6.5	6.46	645	- pH (Std. L		
Eh/ORP (millivolts)	85.3	84.4	12.6	827	82 4	82.6	- ORP (mill - Turbidity		
Turbidity (NTU)	11.4	9.79	876	10.4	112	9.70	(for values	>5.0 NTU	s)
Flow (ml/min)	270	-			1111	-3	- Drawdow		
Depth To Water (ft)	13.39					_>	greater as stabilizes a	bove wel	l screen)
Cumulative Purge Vol. (gal or L	.)								
Pur	ge Sample	Comme	nts:	11.	11.	1 1			
Peristaltic Pump Submersible Pump	7			Che	=, N/	2, N/	5		
Bladder Pump	1 H								
Bailer	1 H								
Other:									
Analytical Parameter Filtered	(Y/N) Pres						San	nple #	
UPH N	11	<u>e</u> 1	18	3 40	Bottles	Collected		+	
E817 F	FI I	el	33	1	L Ambo	1500		1	,
			,	72					
 Consult the applicable regulate 	ory guidance	for the sp	ecific	Signe	d: Boy	7	cetalib	Rev:	April 2014

TDC	Pre	oject:		Project	t No.:	Date/Ti	me:			
(C) INC	(8	ection W	enmin to	140	143,000,44	3 1/-117	0845	Sheet	of/	
Groundwater	TR	C Person	nel:			•	II ID:			
Field Data Record		BA				•••	MU	1-104		
WELL INTEGRITY	Pr	otective	_		Well		top of rise		magazira	
	ES, NO Ca	sing Stick	-up <u>2</u>	ft.	Depth		top of risei		measured historical	
Protect. Casing Secure Concrete Collar Intact		om ground	· — —					_	ilistoricai	
PVC Stick-up Intact	/ Ris	ser Stick-u			Water 3	38 .	I NAPI /DN	- JAPI Dei	nth =	
Well Cap Present	4 /+r	om ground	1)	ft.	Depth 5; 38 ft. LNAPL/DNAPL Depth = Well Volume NAPL Thickness =					
Security Lock Present	$\square \square \square_{w}$	ELL DIAME	TER 📝	2 inch	Depth of pu	ımp intake:	18			
Sampling Equipment:		her:		4 inch	Static wate	r level aftei	pump put	into well	l:	
Perstaltic			— L	6 inch	Initial purge	Rate/ Wat	er Level (1	00-400 m	nl/min):	
					Adjusted p	30				
PID SCREENING MEAS.	W	ELL MATE	RIAL		Adjusted p	A A	tille/AAF(Le	cora ena	anges)	
Background	1 1	ブー			Ø	40				
Well Mouth		vc	SS		Flow rate a	t time of sa	mpling:	290		
	0	ther:		- 1	Total volum			140		
FIELD WATER QUALITY ME	ASUREMENT	S (record a	at appropr							
Time	0850	0855	0900	0405		0915	0420	have	0430	
Temp. (°C)	Stort	12.36	19.37	1224	12.3	12.13	12.48	12.46	1320	
Conduct. (µmhos/cm)	Purze	31913	32059	2214		32273	3247/	e,	1235	
DO (mg/L)	10	2.19	2,14	5	The second second second second	1		3150	32673	
pH (su)		6.76	6.73	6.68	1.85	1.82	1.57	1.99	1,92	
ORP (millivolts)		50.3	44.5	-		6.61	6.61	6.58	656	
Turbidity (NTU)	1	(14.4	417.3	44.60		42.6	403	31.1	27.6	
Flow (ml/min)	730	296	1/1)	12.1	33.4	24,7	21.3	19.7	6.41	
Depth To Water (ft)	100 No.	- 0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Mary Control	CALLED SECURIOR CONTRA	THE PERSON NAMED IN COLUMN	-	Control of the last of the las		
Cumulative Purge Vol. (gal o	13,78	13.32	· Anguardon	No. of Concession, Name of Street, or other Designation, or other		Management of the Parket of Street			—>	
1000		11	Δ.				04.111			
Time Temp. (°C)	, , ,	0940	0945	0450	6955			ization C	riteria* eadings)	
Conduct. (µmhos/cm)		12.57	12.53	12.53	12.50		- Temperat	ure: + 3 %	6	
	23417		32004	3174	7 3 1013				m): ± 3 % (for values	
DO (mg/L)	3.03	2.16	2.24	2.39	2.26		>0.5 mg/L)			
pH (Std. Units)	6.5	6.53	6.53	6.5	3 6.54		- pH (Std. U - ORP (mill	-		
Eh/ORP (millivolts)	20,7	15.2	10.5	7.2	6.2		- Turbidity			
Turbidity (NTU)	5.31	2.55	2.31	2.01	1.93		(for values	>5.0 NTU	ls)	
Flow (ml/min)	290		-	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is	>		- Drawdow greater as I	n: < 0.3 ft	(can be	
Depth To Water (ft)	13.30	-	FROM THE STREET	-			stabilizes a			
Cumulative Purge Vol. (gal or										
	rge Sample	Commer	nts:	2 1 12 12	1					
Peristaltic Pump Submersible Pump	4 1	_	(lea	1, 0	0, N	1)			
Bladder Pump	1 H	-								
Bailer										
Other:										
A1.0.15										
Analytical Parameter Filtered	(Y/N) Prese	ervation	# Bottle		ize/Type Bottles	Time Collected	QC	Sar	mple #	
SbH V	11-	١	3		Anto	0955		MI	136	
VIII L	110	1	3	40	al Amba	d		\	7	
Companie 41					3	,				
Consult the applicable regula	tory guidance	for the spe	ecific	Signe	1.110	1		Rev	April 2014	

			Project:	Project:		Project No.: Date/1		Time:		
			Spe1	M	14	014:	3 1/31	1	Shee	t_of
	/		TRC Pers	onnel:		01 15	-11/-21	Vell ID:		
	òrd		150/	(00 m	ma			D-10	NW-	TARE
			Protective			Well		_		000
/	Secure X	NO	Casing St (from grou	ick-up	ft.	Depth	ft.	top of rise		measured
/ -	Intact	HI		una) — — .				top of cas	ing	historical
.p Int	tact 😾		Riser Stick (from grou	k-up		Water	m' n	I NADI /D	— NADI D	—
/ / · · · · ·	Lock Present				ft.	ft. Depth 1500ft. LNAPL/DNAPL De NAPL Thickness				
/	1/2		WELL DIA	METER D	2 inch	Depth o	of pump intak	2110	1 2	
₁g Equipm	ent: VS		Other:	1	_ 4 inch	Static w	vater level aft	er pump pu		
w-thru Cell Vo	lume:			L	_ 6 inch	Initial p	urge Rate/ W	ater Level (1	100-400 1	ml/min).
ID SCREENING			-			Adjusto	d pure Dat	JOMIM	TIN.	······································
Background	-		WELL MAT	ERIAL		Aujuste	d purge Rate	s/time/WL(r	ecord ch	anges)
Well Mouth		-					100 D	>00(a)	1 UV	30
			PVC	SS		Flow rat	e at time of s	ampling		14.1.1.
			Other:		ı	Total vo	lume of wate		380	MIMIN
FIELD WATER QU	ALITY MEAS	UREME	NTS (record	d at appro	nriato inte	music)	ranic of water	r purgea:		
Time		1430	1480	1435	11///	rvais)	UF IIC.	10/0-		
Temp. (°C)		6	12.0	12,03	117	3/17	45/1450	1955	1500	2020
Conduct. (µmhos/d	em)	U	2000		1010		2011 3	1944	Valos	12.04
DO (mg/L)		'n	1,31		1	1	11-1	27611	27635	27653
pH (su)		(-	7.08	1120	1113	-	,90	Wa	2,19	226
ORP (millivolts)		9		1.00	-		7	7.07	706	TOW
Turbidity (NTU)		t	-94.6 5.5.6		13.7			-95.6	-98.7	96.8
Flow (ml/min)	2 7	400	586	7	4.2			289	3, 24	250
Depth To Water (ft)				350	350	350	350	300	320	350
Cumulative Purge		15.00	15.02	15.00	15,01	15.0	15,00	15 10	0101	12,00
	voi. (gal or L)							153,00	00.00	10,00
Time		15/15	1515	1520	1692	141	-	Stabiliz	zation Cr	ritoria*
Temp. (°C)		12.0:	3 12,11	12,01	1199	- ma	-	(3 conse	cutive re	adings)
Conduct. (µmhos/cr	n)	7810	27899	27911	27941	15		- Temperatu - Conduct. (re: ± 3 %	m) 0.00
DO (mg/L)	A.,	2.20	2100	251	147	A		- DO (ma/L):	± 10 % (for values
pH (Std. Units)		7.06		225	311	ha		>0.5 mg/L) - pH (Std. Ui		
Eh/ORP (millivolts)		-94.8		-8U2	7.05	IN		- ORP (milliv	(olts): + 1	1 SU
Turbidity (NTU)		292	381	3.92	83, 6	D'		- Turbidity (NTU): +/-	10 %
Flow (ml/min)		356	380	-	3,34			(for values >	5.0 NTUs	i) [
Depth To Water (ft)		1500		350	350	15	2	- Drawdown: greater as lo	ng as wa	ter level
Cumulative Purge Vo	l. (gal or L)	.(300	1300	1500	1500			stabilizes ab	ove well	screen)
Peristaltic Pump	Purge	Samp	le Comme	nts:		,		100		
Submersible Pur	np 🗀	, V			500					
Bladder Pump Bailer	\vdash									
Other:	\vdash									
	⊔									
Analytical Parameter	Filtered (Y/N) Dec	servation		1					
EPA)			# Bottle		/Type ttles	Time Collected	QC	Samp	ole #
VPH	N	1		2.	1 1	Ą	1525	none		
V 1 /	·V	#	CA	D	40	MA	1525	none		
							0			
Consult the applicab	le regulatore	mie-								
criteria.	regulatory g	uidanc	e for the spe	cific	Signed:	2010	eller	m	Rev: A	pril 2014

OTRC	ľ	Project	t:	Pr	oject -{ ^ 1	No.:	7	Date/T	ime: 子		Sheet _	of
		SIX	CAL	1	10	7	>	4-11)			
Groundwater		TRC P	ersonne	el:					ell IC		0	
Field Data Record		Ki	MAR	nen	ll	~		MI	<u>/V</u>	20 k	<u> </u>	
WELL INTEGRITY		Protec				Well		\times	0.00	of riser		neasured
Protect. Casing Secure	NO	(from o	j Stick-u ground)	р	. tt.	Dep	th	. ft.	top	of casir	ng h	nistorical
Concrete Collar Intact	HII					147-4	2002		-		-	
PVC Stick-up Intact	HII		Stick-up		ft.	Wate	er th <u>14.13</u>	ft.			APL Dept	
Well Cap Present		(110111 <u>(</u>	ground) — —		= "-	Well	Volume_				kness =	
Security Lock Present		WELL	DIAMET	ER 🔀 2	inch	Dept	h of pum	p intak	e: <u>'</u>	Wn put	into well:	
Sampling Equipment:		Other		_	inch				552			
<u> </u>		0		— <u>П</u> е	inch	Initia	al purge F	Rate/ W	ater I	_evel (1	00-400 mi	/min):
Flow-thru Cell Volume:						Adju	sted pur	ge Rate	s/tim	e/WL(re	∕∕\ ecord cha	nges)
PID SCREENING MEAS.		WELL	MATER	IAL			(FO)					
Background		N	/ г	1		·						
Well Mouth		PVC		_ SS		Flov	v rate at t	ime of	samp	ling:	350M	Ilmin
		Other: Total volume of water purged:										
FIELD WATER QUALITY MEA	SURFM	ENTS (record a	t appropri	ate int							
Time			h hO	1225	1221	\	1235	1240	1	245	1350	1355
Temp. (°C)	11.	-110	1.97	12,93	12.9	1	12.96	13.0		3.01	12/12	12,49
Conduct. (µmhos/cm)	1		081	5454	549	_	14	544			5211	5306
	TU			2.97	29		3.00	3.33		4//	240	2 4 2
DO (mg/L)	V		3.28	2.97	1		-			3/2	3.40	3,44
pH (su)	-		1.58	44	6,4	7	~	446	-	242	643	ley1
ORP (millivolts)	7	1	ex.1	14.5	14	5	73.8	71.1	_	71,0	-70.9	-69.9
Turbidity (NTU)	6		13.1	10160	4, ,	6	197	3.11	3		3,17	0.97
Flow (ml/min)	401		100	350	35		350	350	3		350	350
Depth To Water (ft)	14.	18 1	4.21	14.20	14.8	20	14.20	19.19	1	4.19	14.19	14.19
Cumulative Purge Vol. (gal o	r L)											
Time	131	00	305	1310	13)	0					ilization C secutive r	
Temp. (°C)	13.	01 10	3.00	12,99		B 7.85				Temper	ature: <u>+</u> 3 °	%
Conduct. (µmhos/cm)	56	PÚX	5385	5280)							cm): ± 3 % (for values
DO (mg/L)	3	51	3,750	3261	A				>	0.5 mg/l	_)	
pH (Std. Units)	0.0	^	6.42	(1.47)	13	V					. Units): <u>+</u>	
Eh/ORP (millivolts)	-12		6 2 3	-165	M	-					illivolts): <u>+</u> ty (NTU): +	
Turbidity (NTU)	10 C	7	150	0,61	V)					es >5.0 NT	
Flow (ml/min)	30	3	2<0	350	+						wn: < 0.3	
Depth To Water (ft)	1	1119	14.19	14.19	Y						s long as s	water level ell screen)
Cumulative Purge Vol. (gal o		CHY	1997	19117	+)						
		ample	Comme	ents:			L					
Peristaltic Pump	gc 3											
Submersible Pump												
Bladder Pump												
Bailer	H	H										
Other:	Ш											
Analytical Parameter Filter	ed (Y/N)	Prese	rvation	# Bott	les		e/Type	Tim		QC	s	ample #
TOA I	,,,,,,,	H	1	2		B	ottles	Collec		no		7.502
JOH I		HAT	1	2	-	61	MA	137	0	no		
	<u> </u>	110		1		111	,	, -		1,00		
				1								
8 1							4.0	111	101	1.1		evr. April 201

Consult the applicable regulatory guidance for the specific criteria.

Signed: 10/11/1/1/1/

Rev: April 2014

P TDC	F	Proje	ct:	Pr	oject		3.000	Date/Tin 1/3/17	ie: 1335	5 5	Sheet 1	of
CTRC	6	Pec	tra Ve	mouth	CIS	10 19	s.cca	1/3/1/	10.50			
Groundwater	1	TRC I	Personne	el:				Wel	ID:			
Field Data Record		B	SA						ML	1-1	100	
WELL INTEGRITY		Prote	ctive (B	ALX	2	Well		. R. 1	op of ri	ser	> m	easured
Protect. Casing Secure Concrete Collar Intact PVC Stick-up Intact Well Cap Present Security Lock Present Sampling Equipment: Pendal Legister Flow-thru Cell Volume! PID SCREENING MEAS.	9 -	Casir (from Riser (from WEL	ng Stick-u nground) r Stick-u nground) L DIAMET	ER 2	ft. ft. ft. inch inch	Wat Dep Well Dep Stat	er 13.2 Volume th of pun ic water l	ft. pp intake: evel after	pump er Leve	/DN/ Thick put i	g hi APL Depth kness = into well: 00-400 ml/	min):
Background		WEL	L MATER	IAL				ora				
Well Mouth		V	7 [-					260	
Well Mouth		Ě۷	0.50	SS				time of sa			0.60	
		Other: Total volume of water purged: MENTS (record at appropriate intervals)										
FIELD WATER QUALITY MEASL	REM	ENTS			ate in	terva	ls)	Г.	T		10 (10.1-
Time	133	5	1240	12415		0	1988	1300	130		1310	1315
Temp. (°C)	Sta	12	12.37	19.71	12.	_	12.07	12.10	19.0		10.01	12.11
Conduct. (µmhos/cm)	Ar	10	4136.4	4127.6	411	4.3	4117.7	4128.9	4150		11631	41711
DO (mg/L)	1	U	1,23	1.24	3.	47	4.46	4.52	450	0	4.49	4.47
pH (su)		911	6.45	6.39	6.3	J.	636	6.36	6.3	S	6.35	r.32
ORP (millivolts)			151.5	143.6	137		134.5	130,6	126	2	120.3	1204
Turbidity (NTU)		_		29.4	24		21.6	17.7	7.	40	2,27	2.17
Flow (ml/min)	23	103	260	42.000					-			
Depth To Water (ft)		31	11.35	11:37	7							
Cumulative Purge Vol. (gal or L	_			1110								
		_	1325	1330	13.	35					ilization C	
Time Temp. (°C)	133	18	T.	13-38	10	16		+			secutive r	
			12.18		119			•	- Cor	nduc	t. (µmhos/	cm): ± 3 %
Conduct. (µmhos/cm)	4,0		C11998		(1)	111			- DO >0.5			(for values
DO (mg/L)	- 6		4,63		Li	75				•	. Units): <u>+</u>	0.1 SU
pH (Std. Units)		35	6.35	634	1	35	•	-			nillivolts): <u>+</u>	
Eh/ORP (millivolts)	_	1.8	1186		_	6,9					ty (NTU): + es >5.0 NT	
Turbidity (NTU)	_	.31	3:10	1:96	1.	10	-		- Dra	awdo	own: < 0.3	ft (can be
Flow (ml/min)		00					-	-				water level ell screen)
Depth To Water (ft)		(3.					-	_	Stat	mize	S above w	en sciccity
Cumulative Purge Vol. (gal or I				1.								
Pur Peristaltic Pump Submersible Pump Bladder Pump Bailer Other:	ge	Samp	Comm	ents:	Clea	åt, —	N/0,	N/S				
Analytical Parameter Filtered	(Y/N)		servation	# Bot	tles		ze/Type Bottles	Time		QC	S	Sample #
NOH V)		41003	3			(your	133	5			1
564		1	itcl	3		1	L Ambe	2 1				V
		-				-						
							- 1			-		Rev: April 20

Consult the applicable regulatory guidance for the specific criteria.

PATPC	Pro	ject:	P	roject N	o.:	Date/Tim	e:	Sheet "	1 - 1
(IRC	8	pectr	a	1	MOLYS	113/17	5	Sneet_	of
Groundwater	TRO	C Personn	el:			Well	ID:	2000	
Field Data Record	K	(1010)	Ne				MW-	401	
WELL INTEGRITY	Pro	otective			ell		op of riser		neasured
		sing Stick-uom ground)		_ ft. De	epth	_ ft. to	op of casi	ng 🔲 I	nistorical
Protect. Casing Secure Concrete Collar Intact	- -'''	— — —				Ш-		-	
Protect. Casing Secure Concrete Collar Intact PVC Stick-up Intact		ser Stick-up		ft. D	ater 147	Šξ _{ft.} ι	NAPL/DN	IAPL Dept	h =
Well Cap Present] ("'	om ground) — — —		_ ' <u></u> w	ell Volume			kness =	
Security Lock Present		ELL DIAMET	rer 🔯 2			np intake: level after			
Sampling Equipment:	Ot	her:	-	4 inch	X (1 (2 ()) () () () () () () () (With the State of		101101000000 00210000000000000000000000	
El (I Cell Velume)	-		— Ш	6 inch In	itial purge	Rate/ Wate	r Level (1	00-400 ml	/min):
Flow-thru Cell Volume:				A		rge Rates/t	ime/WL(re	cord cha	
PID SCREENING MEAS.	W	ELL MATER	IAL		200	1 CC	50 (a	130	5
Background		¬/ [
Well Mouth		PVC S	ss	FI	ow rate at	time of sar	npling:	100 M	nllmir
	C	Other:	_	Т	otal volume	of water	purged:		
FIELD WATER QUALITY MEASU		rs (record a		ate interv	/als)				
Time	1255	1300	1305	1310	1315	1320	1325	1330	1332
Temp. (°C)	10	12.40	12.39	1251	12,50	12.53	12,69	12.71	12.72
Conduct. (µmhos/cm)	1	a9077	29005	29026	29035	39219	293813	3382	29910
DO (mg/L)	S	1.86	171	1.73	1.76	1,450	1.58	1,54	1.55
pH (su)	15	7.02	5.09	7.02	FO.7	10,F	10, F	7.01	7.02
ORP (millivolts)	1	31. à	21.3	20.8	20.5	19.6	19.5	16.91	ゆう
Turbidity (NTU)	0	0,95	3.05	2.97	375	2.00	3.23	4.01	3.02
Flow (ml/min)	200	200	156	150	150	100	ITD	120	120
Depth To Water (ft)		14.42	14.42	14.43	14.43	14.42	14.42	14.42	14.42
Cumulative Purge Vol. (gal or L		1		1 1		1			,
Time	1340	1345	1350	1350				lization C	
Temp. (°C)	13,69	4.2	12,73	-				secutive re sture: + 3 %	
Conduct. (µmhos/cm)	29898		29879				- Conduct	t. (µmhos/c	:m): <u>+</u> 3 %
DO (mg/L)	1,55		154	1	1		- DO (mg/ >0.5 mg/L		(for values
	7.02	7.03	111	M		1	- pH (Std.	Units): <u>+</u> 0	
pH (Std. Units) Eh/ORP (millivolts)	111 /	14,2	14.1	111	1		and the same of the same of	llivolts): +	
* *	3.12	3.10	360	1	-	1		y (NTU): +/ s >5.0 NTU	CONTRACT STATE
Turbidity (NTU) Flow (ml/min)	150	150	16D	1				wn: < 0.3 ft	
Depth To Water (ft)	14.4		-	8				s long as w above we	
Cumulative Purge Vol. (gal or L	1 1 1	1 141 10	11119			 			
Purg		ple Comme	ents:	1	1	-1			
Peristaltic Pump								-	
Submersible Pump		-						261	
Bladder Pump Bailer	-								
Other:	-	-							
		_							
Analytical Parameter Filtered (Y/N) Pr	eservation	# Bottl		ze/Type	Time	QC	Sa	mple #
EPH N		HU	2	11	Bottles	Collected	non	2	
VPKN	1	tcl	3	43	MLA	1350	nov		
		,							
Consult the applicable regulat	orv guida	nce for the s	pecific	Signe	d.)	nelle	MA	Rev	: April 2014

@ TRC	Proje	ect:	Pi	roject	No.:	Date/Tim	e:	Sheet	of \		
	8	XIM	ì	141	0143	1/5/17	pr.				
Groundwater	TRC	Personn	el:			Well	ID:	1 1 ,			
Field Data Record	K	allel	Men				111/1	1-4	O(y)		
WELL INTEGRITY	Prot	ective			Well	T to	op of riser	. П	neasured		
YES N	O Casi	ing Stick-u n ground)	ıp	_ ft.	Depth	_ ft to	op of casin	ng 🗌 l	nistorical		
Protect. Casing Secure Concrete Collar Intact	-					□-		_			
PVC Stick-up Intact		r Stick-up			Water Depth	99 ft. 1	_NAPL/DN	IAPL Dept	h =		
Well Cap Present	(froi	m ground) 		_ ft.	Well Volume	<u> </u>	NAPL Thic	kness =	n.estrophopolich		
Security Lock Present	WEI	L DIAMET	ER 🕅 2	2 inch	Depth of pur						
Sampling Equipment:				inch	Static water	level after	pump put	into well:			
_X8)	_ 000	er:	— _Ш ,	3 inch	Initial purge	Rate/ Wate	r Level (1	00-400 ml	/min):		
Flow-thru Cell Volume:	_				Adjusted pu	rgo Patacit	3 50 11	1/m1	2000)		
PID SCREENING MEAS.	WE	LL MATER	IAL		Aujusteu pu	The Ratesit	A COLOR	SOLO	ilges)		
Background		J [590	350 B3000 0840					
Well Mouth	į į) L		mpling: 300m//min							
		PVC SS Flow rate at time of sampling: SOOM Other: Total volume of water purged:									
						le Oi Water	purgeu.				
FIELD WATER QUALITY MEASUR	NS35	(record a	t appropri ∂SYS	1111		- 0000	.010	CCIO	6010		
	(1832	0370		055		1 70	6965	0910	0915		
Temp. (°C)	-12	14())	14.03	14,0	1 14.12	14.18	14.18	14129	14.22		
Conduct. (µmhos/cm)	-V	3538	3+305	3-73	095703	136/61	36165	35545			
DO (mg/L)	2	1.11	1.44	113	1 1.44	1,10	142	1.56	1,51		
pH (su)	6	4.59	50.0	-	69 MIG	4.67	4.47	0,68	6168		
ORP (millivolts)	T-	2.8	-25.2	-31.	2-442		-54.6	-61.4	-61.6		
Turbidity (NTU)		10.3	5.81	114	1 1,29	3,55	3,78	0.87	0:53		
Flow (ml/min)	350	350	300	301	300	300	300	360	360		
Depth To Water (ft)	14,99	15,03	15.03	15:	03 1563	1503	15,63	1500	15,83		
Cumulative Purge Vol. (gal or L)											
Time	09'20	(0) 25	0930	093	0			ilization C			
Temp. (°C)	14/19	11/0/	14,20	<		1		secutive r ature: + 3 ⁹			
Conduct. (µmhos/cm)	34975	24003	1	1)		- Conduc	t. (µmhos/	cm): <u>+</u> 3 %		
DO (mg/L)	1,50	340100	1 10	1	-		- DO (mg/l >0.5 mg/l		(for values		
	1 / 6	1120	1140	1,11				- <i>)</i> . Units): <u>+</u> (0.1 SU		
pH (Std. Units)	Civi	1600	(2,7-0	YV	,	-		illivolts): ±			
Eh/ORP (millivolts)	17.99	10012	(ph)	1	/			ty (NTU): + es >5.0 NT			
Turbidity (NTU)	0.11	62.0	0.92	1	_		and the second	wn: < 0.3 f			
Flow (ml/min)	300	300	300	F			greater a	s long as v	water level		
Depth To Water (ft)	15103	15.03	15,00	-	/		stabilizes	s above we	il screen)		
Cumulative Purge Vol. (gal or L)		e Comme	l nto								
Purge Peristaltic Pump	• Sampl			uvh	1/20/1	rella	α / λ	CORIV	AHIAN		
Submersible Pump		2700	+ al	(b)	MUMAR	LIT	land	Tome	W CO		
Bladder Pump		NOVI	THE Y	NCK	ex	360	100	, 011			
Bailer		-0	1	P	~0						
Other:											
Analytical Parameter Filtered ()	(/N) Pre	servation	# Bott	les	Size/Type	Time	QC	S	ample #		
- 2111	1		2	-	Bottles	Collected	1000				
TYP N	1	101	10	-	TIMES	0930	MON				
VID	-	16.6	-5		COMICO	0.130	1001	4			
	_		+	+					- k		
					210	1101	1000		1 11001		

 Consult the applicable regulatory guidance for the specific criteria. Signed: MOLLIMAN

Rev: April 2014

©TRC	20.000	ject:		roject। १५७५३	No.:	Date/Tim	ie:	Sheet _	0.5
		etia Ve	grayth	(15	-1403	1/4/17	1727	Sheet _	_ 01
Groundwater	TRO	Personr	nel:			Well			
Field Data Record		194				1	MW -	403	
WELL INTEGRITY		tective	0		Well		op of riser	× 1	measured
Protect. Casing Secure		ing Stick- m ground)		_ ft.	Depth	_ ft to	op of casir	ng 🔲 I	historical
						Ш-		-	181
Concrete Collar Intact PVC Stick-up Intact Well Cap Present		er Stick-up m ground)		ft.	Water Depth <u>B.6</u>	5 ft. l	LNAPL/DN	30795900 T PERSONS C#050	and the same and t
Well Cap Present] <u> </u>	— — —	==	= '=[Well Volume	ا	NAPL Thic		·
Totality Teen Treesing	IJ WE	LL DIAME	TER 🔀		Depth of pun Static water I			El into well:	
Sampling Equipment:	— Oth	er:		4 inch			**************************************		
Flow-thru Cell Volume:	_		— Ш	6 inch	Initial purge	Rate/ Wate	Level (1	00-400 ml	/min):
PID SCREENING MEAS.					Adjusted pur		2000		
Background	WE	LL MATER	RIAL	1					- 1
	15	a [L					
Well Mouth			ss		Flow rate at t	time of sar	mpling:	270	
	0	ther:			Total volume	of water	purged:		
FIELD WATER QUALITY MEASU	REMENT	S (record a	t appropri	ate inte	ervals)				
Time	1355	1-100	1403	ناان	1415	1420	10135	1430	1435
Temp. (°C)	Sterl	13,46	13.99	13,3	1 13.68	13.69	13.4	13.67	13.68
Conduct. (µmhos/cm)	Perge	29057	29431	2960			34177	34379	36967
DO (mg/L)	10	4.47	1.52	41.60		3.43	3.21	3.03	2.53
pH (su)		6.47	1,46	6,412			6.36	6.36	6.35
ORP (millivolts)		624	62.9	63,4	-	64.2	69.7	69.6	-
Turbidity (NTU)		6.41	6.32	4.48		3.69	3.60	214	2.71
Flow (ml/min)	1	270	6.24	1. 40	312	3, 64	000	2	a. 11
Depth To Water (ft)	13,65	13.67	-						->>
Cumulative Purge Vol. (gal or L)	100	13,01							,
Time	1440	1445	200	1.100			Stabi	l lization C	l riteria*
Temp. (°C)	13.61	0.00		1955				secutive re	
Conduct. (µmhos/cm)			13.59	13.6			- Tempera	ture: <u>+</u> 3 %	% cm): <u>+</u> 3 %
		37821	38675				- DO (mg/	L): <u>+</u> 10 %	(for values
DO (mg/L)	2.61	-	2.53	2.61		-	>0.5 mg/L - pH (Std.) Units): <u>+</u> ().1 SU
pH (Std. Units)	6.35	-	6.34	6.31	4	ļ		llivolts): ±	
Eh/ORP (millivolts)	70.7	70.7	171.7	12.5				/ (NTU): +/	
Turbidity (NTU)	2.96	2.87	2.74	2.6	8		- W	s >5.0 NTL wn: < 0.3 fi	
Flow (ml/min)	270	_		-			greater as	long as w	vater level
Depth To Water (ft)	13.67	-		-	•		stabilizes	above we	ll screen)
Cumulative Purge Vol. (gal or L)		Commi	nte:				1		
Purge Peristaltic Pump	Sampl	e Comme	ents:	Cle	ear. N	1/2 /	VK		
Submersible Pump		11 - 1				10) 1	- V')		
Bladder Pump									
Bailer	Ц	2							
Other:		-							
Analytical Parameter Filtered (Y	/N) Pre	servation	# Bottl	es ;	Size/Type	Time	QC	Sa	mple #
UPH N		HCI			Bottles	Collected			2-403
EPI4 V		7	3	1	L AMEN)	1.127			<u>v-905</u>
				1	147 6	•			
	2020	12 102	-		67		1		

Consult the applicable regulatory guidance for the specific criteria.

Signed: Rev: April :

@ TRC	Project:	Proj	ject No.:	Date/Time:		. 1
	Sporter	VT	140143	115117	Shee	t <u></u> of <u></u>
Groundwater	TRC Perso	nnel:		Well ID		
Field Data Record	Koll	en Im	/		MM-	404
WELL INTEGRITY	Protective	J 0	Well	T top o	of riser	measured
Protect. Casing Secure	NO Casing Stic		ft. Depth		of casing	historical
Concrete Collar Intact			_			119h
PVC Stick-up Intact	Riser Stick	-up	Water Depth	SS# LNA	PL/DNAPL D	epth = STOR
Well Cap Present	(from ground the first the	na)	ft. Well Volum	16.	L Thickness	
Security Lock Present	WELL DIAN	METER 2 in	Depth of p		V189	
Sampling Equipment:	Other:	√ 4 in	ici i	er level after pun		
Flow-thru Cell Volume:		[6 in	Initial purg	e Rate/ Water Le	evel (100-400	ml/min):
PID SCREENING MEAS.			Adjusted p	Urge Rates/time	WL(record c	hanges)
Background	WELL MAT	ERIAL	UN	+376	@1215	900/
Well Mouth	W		7/00	7 7 5 7 9 (
	PVC	SS	Flow rate a	t time of sampli	ng: 375	5
	Other:			ne of water purg	jed:	
FIELD WATER QUALITY MEASL	JREMENTS (record	at appropriate	intervals)			
Time	1310 1315	130013	325 1330	133513	40 1345	1357
Temp. (°C)	13,0 13,3	7 1333 12	37125	13.38 13	43 134	413,44
Conduct. (µmhos/cm)	45777 4577	445768 46	57444575		76/1870	62763
DO (mg/L)	100 0.55		49 04	70,46 0	15 0 W	L L IGO
pH (su)	4,54 6,40	1	35 6.34	1 10 11	33 6,30	1 31
ORP (millivolts)	-25.6 -13.5	-13,3 -11	9-120	-12 00 -13	7 -11.6	1600
Turbidity (NTU)	4.51 6.59		69 3,35	3.7130	53 3, 21	7,34
Flow (ml/min)	900 400		5 375	375 3	C 235	3.2
Depth To Water (ft)	12.85 12.85		188 13.88	7 7	86 138	1 10 40
Cumulative Purge Vol. (gal or L)		10/32/19	10193	10122 10	18 1298	1422
Time	1355 7400	140514	05		Stabilization	Criteria*
Temp. (°C)	11.00 17.00	1 12 40 6	0		consecutive	
Conduct. (µmhos/cm)	457504575	(45+8)	>	- Tei	mperature: <u>+</u> 3 nduct. (µmhos	% /cm): + 3 %
DO (mg/L)	013 1113		A-		(mg/L): + 10 %	
pH (Std. Units)	10,31 6,31	1 71 10	10		mg/L) (Std. Units): +	0.1 SU
Eh/ORP (millivolts)	115 116	10,51	<u>V)</u>		P (millivolts):	
Turbidity (NTU)	7.500.90	3.10			rbidity (NTU): - values >5.0 NT	
Flow (ml/min)	375 375	325		- Dra	wdown: < 0.3	ft (can be
Depth To Water (ft)	12.8812.80	13.80 F	2	grea	ter as long as ilizes above w	water level
Cumulative Purge Vol. (gal or L)	TOTAS I NES	5 1 N 35 C	_	Stab	ilizes above w	ell screen)
Purge	Sample Comm	ents:			7	
Peristaltic Pump	×					
Submersible Pump	Д					
Bladder Pump Bailer	H					
Other:	H					
Analytical Parameter Filtered (Y	/N) Preservation	# Bottles	Size/Type	Time	QC Sa	ample #
FRH N	Hel	2 .	Bottles	Collected	1000	
VPF N	IACI	,	AJM W	Part .	ine	
	(3.4		7,11	1	VVIV	
Consult the applicable regulator	y guidance for the s	pecific Sign	ned Kol	182M XI	1 Re	v: April 2014

P TPC	Proje	ct:	Pr	oject		Date/Ti	me:	Shee	t \ of
(C) INC	80	eltr		11	10145	1141	17	Silee	
Groundwater	TRC	Personne	el:			/ We	II IĎ:	0.14	111
Field Data Record	Ke	Meer	Will				<u> </u>	/W -	405
WELL INTEGRITY	Prote	ective			Well	X	top of ri	ser	measured
YES NO		ng Stick-u n ground)	р	ft.	Depth	_ ft	top of ca	asing	historical
Protect. Casing Secure	- "- -								
PVC Stick-up Intact		r Stick-up			Water Depth	34	LNAPL	DNAPL D	epth =
Well Cap Present	(from	ground)		_ ft. 	Well Volume			hickness	=
Security Lock Present	$ _{WEL}$	L DIAMET	ER 📈 2	inch	Depth of pur Static water	mp intake	: W	(A	voll:
Sampling Equipment:	Othe		4	inch	_				
	_		— <u>Ш</u> е	inch	Initial purge	Rate/ Wa			
Flow-thru Cell Volume:	-L_				Adjusted pu	rge Rates	t()() (V)(m)h	changes)
PID SCREENING MEAS.	WEL	L MATER	IAL		400=				5
Background	I.	u r	٦		100	- 0 5	- (
Well Mouth	PV	d L	_l SS		Flow rate at	time of s	ampling	: 875	malland
		ner:	_		Total volum	e of wate	r purged	l:	
FIELD WATER QUALITY MEASUR	PEMENTS	(record a	t annronri	ate in	tonyale)				
	850	1355	DO	14/	1410	11415	114	10 14	25/1430
Temp. (°C)	10 V	15/16	15.08	15	1 15.07	15.0	510.1	7615	12/5/11
	7	13/00	22154	121	07 3539	7 3688	2 - 2	20368	31361
Conduct. (µmhos/cm)	1	103	20108	0 1		- m 0	0 36	20 50 0	0,53
DO (mg/L)	y		1.08	U T	1 0.66	100	5,8	123	
pH (su)	YC CO	5,84	2.80	5.8		2188	010	7.10	
ORP (millivolts)		98.2	98.9	-	9 101.1	1017	101	2 101	101.0
Turbidity (NTU)	t	6.64	3,95		52 2.35		11.5	2 10	d 1.31
Flow (ml/min)	400	300	375	37	5 375	375	57	5 575	375
Depth To Water (ft)	14.33	14,35	14.35	114.	35 14.35	14.39	5 14.3	5 143	5 14.35
Cumulative Purge Vol. (gal or L)									
Time / 시시	1435	1440	1440				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		on Criteria* ve readings)
Temp. (°C)	37141	373545	Silv					perature:	The second of th
Conduct. (µmhos/cm)	37141	37359	M						hos/cm): ± 3 %
DO (mg/L)	154	<7	P				>0.5	(mg/L): <u>+</u> ' mg/L)	10 % (for values
pH (Std. Units)	5.87	5,87	- M					• • • • • • • • • • • • • • • • • • • •): <u>+</u> 0.1 SU
Eh/ORP (millivolts)	1011	11/11	10				200,000,000		s): <u>+</u> 10 mV
Turbidity (NTU)	1,01	197	1	+				alues >5.0	J): +/- 10 %) NTUs)
Flow (ml/min)	236	375	1	1					0.3 ft (can be
Depth To Water (ft)	14.53	M.3}	16	1-		_			as water level e well screen)
Cumulative Purge Vol. (gal or L)		(VI.7)	-	+		_			*
Purge		e Comm	ents:						
Peristaltic Pump									
Submersible Pump									
Bladder Pump		·			17				
Bailer	$ \square$	D							
Other:	ı L								
Analysical Payanta Fitters 4 6	VAN De-	oonistis	1 "		Size/Type	Time	-	QC	Sample #
Analytical Parameter Filtered (servation	# Bott	ies	Bottles	Collec	ted	100	Sample #
FPH A	H	4	3		1119	144	7-7	one	
VPH 3	1		3		40MB	- 140	V	ione	
			-			-			
						-1100	10 W	/	Rev: April 2014

Consult the applicable regulatory guidance for the specific criteria.

Signed: nollling

©TRC	Pro	oject:	H SMOSH	Project N NOVS	lo.: 0001. 4403	Date/Tir	ne: \$10	Sheet _	of	
Groundwater Field Data Record	TR	C Person	0100			We	II ID: ML	> - 40C		\mathcal{D}_{l}
WELL INTEGRITY	Pr	otective	^	W	/ell	[V]	top of rise	<i>ا بر ا</i>	measured	
Protect. Casing Secure Concrete Collar Intact PVC Stick-up Intact	NO Ca	sing Stick om ground — — — ser Stick-u	p \(\cdot \)	ft. D	epth	_ ft !	top of casi	ing 📋	historical th = 13.60	
Well Cap Present		om ground)		ell Volume		NAPL Thi	ckness :	0.04	
Security Lock Present	$\square \parallel_{w}$	ELL DIAME	TER X	2 inch D	epth of pur	mp intake:		181		
Sampling Equipment:	959,5385	her:		4 inch	atic water	level after	pump put	into well:		
Flow-thru Cell Volume:			— Ш		itial purge	10				
PID SCREENING MEAS.	w	ELL MATE	RIAI	A	djusted pu		time/WL(r	ecord cha	nges)	
Background	1	<u> </u>				321				
Well Mouth		Ϋ́ I	 SS	FI	ow rate at	time of sa	mplina: 2	30		
		ther:	_		otal volume					
FIELD WATER QUALITY MEASI	JREMENT	S (record :	at appropr			atol	gou.			
Time	Blo	1515	1520	1225	162 -	KX	1540	1545	Keo	
Temp. (°C)	Stut	12.56	Q.61	12.59	13.62	12.70	12.66	12.62	(3)	-
Conduct. (µmhos/cm)	Pyraw	and	26311	27401	26407	266/4	35281	371 00	3207	
DO (mg/L)	1730	11.12	3.74	3,01	1.86	7 25	1.80	3/00	37471	
pH (su)		6.91	6.23	6.27	6.19	6.18	6.19	1,87	1.00	
ORP (millivolts)		-104.4	-93.6	-84.9	-80.9		-73.7	6.22	6.22 -77.2	
Turbidity (NTU)	V	000	13.0	120.3	13.9	-77.4		7.31	4,22	
Flow (ml/min)	280	320		-0017	15.4	10.1	8,94	7131	9,22	
Depth To Water (ft)	13,84	18:59		-		THE RESERVE OF THE PERSON NAMED IN			-	
Cumulative Purge Vol. (gal or L		10.71								
Time	1555	-1600			 		Stabi	lization C	riteria*	
Temp. (°C)	12.59						(3 cons	secutive re	eadings)	
Conduct. (µmhos/cm)	3771	22112					- Tempera - Conduct	ture: <u>+</u> 3 % . (µmhos/c	m): <u>+</u> 3 %	
DO (mg/L)	2.10	318					- DO (mg/	L): <u>+</u> 10 %	(for values	
pH (Std. Units)	6.22	9.10					>0.5 mg/L - pH (Std.) Units): <u>+</u> 0	.1 SU	
Eh/ORP (millivolts)		6.22 - 7a.a					- ORP (mi	llivolts): ±	10 mV	
Turbidity (NTU)	-78.7 & 45	3.74						/ (NTU): +/- s >5.0 NTU		3
Flow (ml/min)	320	317					- Drawdov	vn: < 0.3 ft	(can be	
Depth To Water (ft)	13.89	-			 			long as w		
Cumulative Purge Vol. (gal or L)	12.04	-			 		1		. 50.6611)	
Purge	Sample							<u> </u>		
Peristaltic Pump	Y	p	roduct	@ 13	7.80,	DIN		sy'		
Submersible Pump Bladder Pump			Tibing	able t			hrouge	1 Pro	duct	
Bailer	H		(rd)	nto	h gh	746	18	I.		į.
Other:			Clean	الكرا	odo"	_51.	Sheer			
Analytical Parameter Filtered (Y	//N) Pres	ervation	# Bottle		e/Type ottles	Time	QC	Sar	nple #	1
UPIT	H	cl	3		i Amb v	Collected		MU	1106	-
ENT C	!		2		Antor	1				
					w					
Consult the applicable regulator criteria.	y guidanc	e for the sp	ecific	Signed		377		Rev	April 2014	

A TDC	Pro	ject:	F	Project	No.:	Date/Tir	ņe:		1 - 1
CIAC	8	pettro		140	143	15	17	Sheet _	of
Groundwater	TR	C Person	nel:			Wel	I ID:		
Field Data Record	ł	follle	Mec	1			-M	MV-	407
WELL INTEGRITY	— Pro	otective	1	1,	Well	V	op of riser	. П	measured
		sing Stick- om ground		_ ft. i	Depth		op of casi		historical
Protect. Casing Secure Concrete Collar Intact		— — —	′			\Box		_	
PVC Stick-up Intact		er Stick-u		- 11	Water Depth	57 ft	LNAPL/DN	IAPL Dep	th = 145
Well Cap Present		om ground	" ——	<u> </u>	Vell Volume)	NAPL Thic	kness =	103
Security Lock Present	Ŭ WE	LL DIAME	TER		Depth of pur Static water			847	
Sampling Equipment:	Oti	her:		4 inch			120 12 10 10 10 10		
Flow-thru Cell Volume:		1		6 inch	nitial purge	Rate/ Wat	er Level (1	00-400 ml	/min):
PID SCREENING MEAS.				7	Adjusted pu	rge Rates/	time/WL(re	cord cha	nges)
Background	WE	ELL MATE	RIAL						- '
Well Mouth	1 5	X		L					
Well Mouth	P	vc	SS	F	low rate at	time of sa	mpling:	350n	M/mn
	0	ther:	-	1	otal volum	e of water	purged:		
FIELD WATER QUALITY MEASL		S (record a	at appropr	iate inter	vals)		14		
Time	1515	1500	1525	1339	1540	1545	1550	1555	1600
Temp. (°C)	V	13.12	13.14	13.13	5 13.24	13,24	13,24	13.31	13,32
Conduct. (µmhos/cm)	١,	18080	15065	1794	718014	18001	18013	CEORI	18635
DO (mg/L)	V	1,74	2.05	209	1.87	189	1.87	1.89	1,91
pH (su)	R	6.54	654	6.53	6.55	655	4,55	6.55	655
ORP (millivolts)	6	116.6	-116.7	-114.6	2 -23.0	-126.0	-127.0	1381	-1278
Turbidity (NTU)	M	ndi	10:10	5,60	3,77	3,49	2,65	2.37	3/15
Flow (ml/min)	6	350	350	350	1550	350	350	350	C725
Depth To Water (ft)	14.51	14.57	14.57	145			14.0	14.5	1467
Cumulative Purge Vol. (gal or L)			1	, (,),			1 () /	111	1177
Time	1605	Ordi	11010					ization Cı	
Temp. (°C)	1322	13.33	1410				(3 cons - Tempera	ecutive re	
Conduct. (µmhos/cm)	16816		>	987			- Conduct.		
DO (mg/L)	1.92	1.89	4				- DO (mg/L >0.5 mg/L)		for values
pH (Std. Units)	6.55	1,55	IM				- pH (Std.		.1 SU
Eh/ORP (millivolts)	109.	1284	0				- ORP (mil		
Turbidity (NTU)	3110	2 1	1				- Turbidity (for values		
Flow (ml/min)	350	350					- Drawdow	n: < 0.3 ft	(can be
Depth To Water (ft)	14.57	Wer	U				greater as stabilizes		
Cumulative Purge Vol. (gal or L)	1	1 A(. 2)							22.00.11
Purge	Sample	Comme	nts:			1101110		A134 =	
Peristaltic Pump	X	tain	tshall	JWY	vater)	(IUND)) V) d	NW	
Submersible Pump Bladder Pump	Н								
Bailer									
Other:									
Analytical Parameter Filtered (Y	/N) Pres	ervation	# Bottle		ze/Type Bottles	Time Collected	QC	Sar	nple #
EPH N	157	1	3		A	7270			
UPH N	U	a	3	4	ONLA	1610			
							2 6/1		
 Consult the applicable regulator 	ry guidanc	e for the sp	ecific	Signed	1. The	MIN	MIM	Rev	April 2014

©TRC	Pro	oject:	١	Project		Date/Tin	And the second s	Sheet)_ of
Groundwater	1	C Person	Deymos	n cr	s 4003	1, , , ,		_	
Field Data Record	P	3A	ner:			Wel	MW	-408	,
WELL INTEGRITY		otective	2		Well	1	op of rise	. 7	measured
Protect. Casing Secure		sing Stick om ground — — —		_ ft.	Depth		op of casi		historical
PVC Stick-up Intact	Ri:	ser Stick-u om ground	p 2		Water 3.		LNAPL/DN		
Well Cap Present Security Lock Present	HIL.			/ 17	<u>Well Volume</u> Depth of pu		NAPL Thic	a'	-
Sampling Equipment:		ELL DIAME	TER	2 inch 4 inch	Static water	level after	pump put	into well	:
Flow-thru Cell Volume:	42 Ot	her:	— <u> </u>		nitial purge	Rate/ Wate	er Level (1	00-400 m	l/min):
PID SCREENING MEAS.				—— 7	Adjusted pu	rge Rates/	time/WL(re	cord cha	nges)
Background		ELL MATEI	RIAL			280, 3	300		
Well Mouth	F	PVC	ss	F	low rate at	time of sar	mpling: 🤅	300	
		ther:			Total volume	e of water	purged:		
FIELD WATER QUALITY MEASI				iate inter	rvals)			3000	
Time	0845	0850	0855	6900	0905	0910	0915	0420	caas
Temp. (°C)	2015	10.31	1.08	10.98		11.46	11.36	11,35	11.38
Conduct. (µmhos/cm)	brite	6741	7592	7240	-	Per	6774	6731	6744
DO (mg/L) pH (su)		6.31	7.69	6.44	7.4/	7.24	6.91	6.44	7.31
ORP (millivolts)		6.67	6.91	6.86	679	6.78	6.76	6.75	675
		-130.3	-120.8	-134.6		-152.8	-1508	-1541	-153.7
Turbidity (NTU)	230	73.4	68.3	57.4	41.6	35.4	231	24.3	18.4
Flow (ml/min) Depth To Water (ft)			280	300	~~~			CONTRACTOR STATE	-
Cumulative Purge Vol. (gal or L)	13.36	13.39	13.39	-	The Real Property lies and the Party lies and the P		The same of the sa	AND THE PARTY OF THE PARTY OF THE PARTY.	7
Time	ogiso	0935	ndulo.	Salle	80-		Stabil	ization Cı	riteria*
Temp. (°C)	11.41		0940		950		(3 cons	ecutive re	eadings)
Conduct. (µmhos/cm)	6725	6954	11.33	11,4 h	6487		 Temperat Conduct. 		; :m): <u>+</u> 3 %
DO (mg/L)	4.31	4.24	4,11	4.03				.): <u>+</u> 10 % ((for values
pH (Std. Units)	6.74	6.72	6.76	6.74			- pH (Std. I		.1 SU
Eh/ORP (millivolts)	-155.5		-1634	-1650	6.76		- ORP (mill		
Turbidity (NTU)	16.7	12.7	4.75	8.73	7.31		 Turbidity (for values 		
Flow (ml/min)	300	- Co	4.72	1.13	1,31		- Drawdow		
Depth To Water (ft)	13,39	Manusconnected Association	No. of Concession, Name of Street, or other Desires, Name of Street, or other Desires, Name of Street, Original Street, Origi	and the plantage of the latest and	>		greater as stabilizes a	long as was bove well	ater level I screen)
Cumulative Purge Vol. (gal or L)	,,,,,		-						
Purge	Sample	Comme	nts:	Class			,		
Peristaltic Pump	X	-		Clear	, 107	0, N/	>		
Submersible Pump Bladder Pump	Н								
Bailer	H								
Other:									
A 1 // 1 P									
Analytical Parameter Filtered (Y		ervation	# Bottle	, o	ze/Type Bottles	Time Collected	QC	San	nple #
UPH N	1	ÇI	3		our tupe	p450		MY	-ueg
CPH		L	9	11	ANOU	¥ .	-	1	
				_			-		
Consult the applicable regulator	y guidanc	e for the sp	ecific	Signed		, 7	2	Rev:	- April 2014

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		itra We		US	4405	Well I		**		
Groundwater	TRC	Personne	el:			welli		-409		
Field Data Record	-	DM								
Protect. Casing Secure Concrete Collar Intact PVC Stick-up Intact Well Cap Present Security Lock Present Sampling Equipment: POSTATION FOR THE PURPLE PROPERTY OF THE PURPLE PUR	(from Riser (from	ctive ng Stick-up ground) Stick-up ground) L DIAMET	 ER 2	ft. De We inch inch inch Ini	ater 13.03 epth 13.03 epth 15.03 epth of pume epth of pum atic water le	ft. L ft. N p intake: evel after p Rate/ Water	APL Thic LS pump put r Level (10	APL Depth kness = into well:	min):	
PID SCREENING MEAS.	WEL	L MATER	IAL		ajustou pur				,	
Background		У Г	7	L		270)			
Well Mouth	PV	PVC SS Flow rate at time of sampling: 276								
	Oth	Other: Total volume of water purged:								
FIELD WATER QUALITY MEASURI	EMENTS (record at appropriate intervals)									
	1035	1000		1050		1100	1105	1110	115	
Temp. (°C)	stat	•	12.23	19.70	1 12.37	12.50	12.88	12.66	Pu. C/	
Conduct. (µmhos/cm)	pinje		6057	7107	6688	6590	3568	1582	6490	
DO (mg/L)	1		6.97	(3.6)	10.14	11.40	8.85	10.31	10.55	
pH (su)			6.85	6:11	6.64	670	6.70	6.69	667	
ORP (millivolts)			-130.0	-1317	1-134.1	-136.7	-133.3			
Turbidity (NTU)	1		21.6	14.1	10.2	8.16	8.01	7.4-1	7.31	
Flow (ml/min)	230	270			***		-		->	
Depth To Water (ft)	3,00	13.17	13.18	_	The same of the sa	AND RESIDENCE THE RESIDENCE		-	\rightarrow	
Cumulative Purge Vol. (gal or L)										
Time	1130	1125	1130	1135	1140	1145		ilization C secutive r		
Temp. (°C)	12.34	13616		12.37	12.38		- Temper	ature: ± 3 °	%	
Conduct. (µmhos/cm)	6315	6751	6166	(260	6269				cm): ± 3 % (for values	
DO (mg/L)	4.92	9.54	7.93	7.35	7.39		>0.5 mg/	L)		
pH (Std. Units)	6,68	6.68	6.69	669	6.68			l. Units): <u>+</u> nillivolts): <u>+</u>		
Eh/ORP (millivolts)	444.0		+14.9	-150,7	3-1510		- Turbidi	ty (NTU): +	·/- 10 %	
Turbidity (NTU)	6.21	4.23	3:79	2.9	9 291			es >5.0 NT		
Flow (ml/min)	270	Attention			,		greater		water level	
Depth To Water (ft)	13.18			AND DESCRIPTION OF THE PERSONS	->		stabilize	s above w	ell screen)	
Cumulative Purge Vol. (gal or L)										
Purge Peristaltic Pump Submersible Pump Bladder Pump Bailer Other:	Samp	le Comm	ents:	C126T,	NIO, 1)/S				
Analytical Parameter Filtered ()	(/N) Pre	servation	# Bot	tles	Size/Type	Time	d Q	c s	Sample #	
EPH N	23/2	HCI	2	1	Bottles LAMber	Collecte		М	V-409	
NOH T		1	3		in Anbo	1			1	
					11	8				
						1/4	4		Rev: April 201	

Consult the applicable regulatory guidance for the specific criteria.

TDC	Pro	ject:	Р	roject	No.:	Date/Tim	e:		1 . 1
'RC	SI	XUM	alleva	OTH	140143	11/201	17		1 of 1
2	TRO	Person	nel:			Well	ID: AA	. 1 \	1115
a Record	1	KMILL	MM	a			ID: M	N-	110
NTEGRITY	Pro	tective	S. C.J.		Well		op of riser		measured
YES	NO Cas	sing Stick-		_ ft.		. —	op of casi		historical
Protect. Casing Secure Concrete Collar Intact	HII-""	om ground) — — —					*	_	. 2
PVC Stick-up Intact		er Stick-u			Water Depth		NAPL/DN		OUTCOME THE PARTY OF THE PARTY
Well Cap Present		m ground)	ft.	Well Volume	1	NAPL Thi		= :
Security Lock Present		LL DIAME	TER X	2 inch	Depth of pur Static water	np intake:	184	into well	
Sampling Equipment:	Ott	ner:		4 inch					
PUNCTAL DC Flow-thru Cell Volume:			— Ш	6 inch	Initial purge	Rate/ Wate	r Level (1	00-400 m	l/min):
					Adjusted pu	rge Rates/t	ime/WL(re	ecord cha	nges)
PID SCREENING MEAS.	WE	ELL MATER	RIAL						
Background		XÍ [
Well Mouth	F	vc	ss		Flow rate at	time of san	npling:	200 N	num
	0	ther:			Total volume	e of water p	ourged:		
FIELD WATER QUALITY MEAS	UREMENT	S (record a	t appropri	iate int	ervals)				
Time	1135	1140	1145	NB	0 1455	RUO	1205	1210	1215
Temp. (°C)	0	11.78	11.83	11.8	3 11.76	11.78	1145	11.78	11.79
Conduct. (µmhos/cm)	Ü	31990	35260	355	33 25898	36233	36653	36901	31920
DO (mg/L)	2	4.91	4.66	4.7	3 4,83	4.93	5.10	h.76	5:30
pH (su)	6	6.68	4.51	6,46	6.46	6.44	6141	10.39	1059
ORP (millivolts)	1	-74.2	-19,8	-27	8-360	- 34.3	-24,2	- 29.6	-41.6
Turbidity (NTU)		23.3	12.7	Sag	7- 3,04	5.59	284	294	2.41
Flow (ml/min)		300	OUR	300		300	300	300	305
Depth To Water (ft) M &	13.02	-		Management of the last of the	- J	Bank Carlo	gamen -	-	CompleyAddress/77111
Cumulative Purge Vol. (gal or								180	
Time	11 20	1125	1230	123	6		Stabi	lization C	riteria*
Temp. (°C)	11.81	1430	11.39	100	0				eadings)
Conduct. (µmhos/cm)	3701	137721	37210)	and the same		- Conduct		cm): ± 3 %
DO (mg/L)	5 34	E 23	E UD	1			- DO (mg/ >0.5 mg/L	L): <u>+</u> 10 %	(for values
pH (Std. Units)	10.13	1 27	(0.37	M	-			., Units): <u>+</u> (0.1.SU
Eh/ORP (millivolts)	112 2	1150	-111.0	P			10 F	illivolts): <u>+</u>	
Turbidity (NTU)	1 25	V 60	1 20	16	-			y (NTU): +/ s >5.0 NTU	
Flow (ml/min)	3/17	200	Jan D	E			- Drawdo	wn: < 0.3 f	t (can be
Depth To Water (ft)	300	300	100				greater as	s long as v above we	vater level
Cumulative Purge Vol. (gal or	_)				×- 2-				σσισσιιή
Pui		e Comme	ents:			4 1			1 - 4
Peristaltic Pump	X Z		Ma	1 D	TIPO 13	108 K	7		
Submersible Pump] [. 11		V. 7		
Bladder Pump Bailer	+ H	$-q\dot{\rho}$	mp ~	640	Mons	OF W	ender	int	00
Other:	1 H	<u>u</u>	De M	da	WW			(8)	
Analytical Parameter Filtered	(Y/N) Pre	servation	# Bottle	es	Size/Type	Time	QC	Sa	mple #
EPH NI	H	71	2	1	Bottles	Collected	FYI		120
UPH N		TCI	3	1	HIML	12 30	MA		700
0.17		,		127	, , .	1	4.		M. Carlot
				,		- 5.	-18		
Consult the applicable regula	tory guidan	ce for the s	pecific	Sign	ed: 74.01	10000	MAI	Re	v: April 2014

P TPC	Proje	ect:	Pı	roject	No.:		Date/Tim	e:	Shoot	\ of \
CIRC	S	seldy	1	10	1943		11411	7	Sneet_	T 01 T
Groundwater	TRC	Personn					Well	ID:		
Field Data Record	X	Olle	urs	N				MW-	-41)
WELL INTEGRITY	Prot	ective			Well		⊠ to	p of riser	· 'n	measured
YES N		ng Stick-ung ground)	ıp	_ ft.	Depth _		_ ft to	p of casi	ng 🗌	historical
Protect. Casing Secure	- -	- — —			*1				_	
PVC Stick-up Intact		r Stick-up			Water Depth	2,8	6 ft. L	NAPL/DN	IAPL De	oth =
Well Cap Present		n ground) - — —		_ ft. 	Well Vol	ume	r	IAPL Thi	GUARANTE COUNTY	=
Security Lock Present	∐ WEL	L DIAMET		2 inch	Static w		np intake: level after			ı·
Sampling Equipment: \(\lambda \)	— Oth	er:		inch						×255
Flow-thru Cell Volume:			— Ц	inch	Initial pu	urge	Rate/ Wate	r Level (1 }-	00-400 n	nl/min):
							rge Rates/t		ecord ch	anges)
PID SCREENING MEAS.	WEI	LL MATER	IAL		1000	375	50104	0		
Background		7 г								
Well Mouth	P\	/c :	SS .		Flow rat	te at	time of sar	npling:	378	My /MM
	Ot	her:	_		Total vo	lume	e of water	ourged:		
FIELD WATER QUALITY MEASUR	REMENTS	(record a	t appropri	ate in	tervals)					
Time	1035	1040	1045	105		55	1100	1105	1110	115
Temp. (°C)	h	13.73	13,7-1	13.0	08 13	30	13,64	13.66	13.6	713.67
Conduct. (µmhos/cm)	i I	29071	28986	_	1	826	1			29135
DO (mg/L)	V	1.01	.99	,5			.52	149	.49	1.51
pH (su)	(10.03	6.02	(0,0)		02	6.00	6.00	603	6.03
ORP (millivolts)	A	-20 3	-40.7	-4		9.4	50.9	-640	-579	7-578
Turbidity (NTU)	6	5.50	4,60	41	2 4.0	-	4.39	4.05	3.82	3,92
Flow (ml/min)	400	yon	275	37	3 3 3	_	225	375	375	275
Depth To Water (ft)	1286	1286	19.80	-	200 1 h	00	10 88	17.09	1289	1499
Cumulative Purge Vol. (gal or L)	10.00	10199	101400	Ha.	1 1/1	100	10.00	10101	101.61	10.01
	W O O	MAC	1120	-		-		Stab	ilization	Criteria*
Time	1120	1125	1125	-			-	(3 con	secutive	readings)
Temp. (°C)	13.72	13,71	9					- Temper	rature: ± 3	3 % s/cm): <u>+</u> 3 %
Conduct. (µmhos/cm)	29139	24122	A	-		_	-	- DO (mg	J/L): ± 10	% (for values
DO (mg/L)	151	152	#				-	>0.5 mg/	L) I. Units): :	+ 0.1 SU
pH (Std. Units)	6.09	6.09	M					1	nillivolts):	in Comment of the Com
Eh/ORP (millivolts)	-58,3	-58,5	p'						ty (NTU):	
Turbidity (NTU)	4.12	3.84	0						es >5.0 N own: < 0.3	TUs) 3 ft (can be
Flow (ml/min)	375	375	1					greater	as long as	s water level
Depth To Water (ft)	12.89	12.89	E	-				stabilize	s above v	well screen)
Cumulative Purge Vol. (gal or L)	L		ب							
Purge	e Sampl	e Comme	ents:							
Peristaltic Pump Submersible Pump		•						-		
Bladder Pump		-								
Bailer										
Other:										
Analysical Demand	van la				Size/Ty	ne	Time	1 22		Comple #
Analytical Parameter Filtered (Y/N) Pre	servation	# Bott	les	Bottle		Collected	1 1		Sample #
FPH N	1	4	2		HIL	A	1125	120		
UPIT N	1	21_	3		YOUR	1	1125	1/(ne	
	<u> </u>		-				-			
						11	04.4.1.1	1800	10	Rev: April 201

Consult the applicable regulatory guidance for the specific $\,\,\cdot\,\,$ criteria.

Signed: _

P TDC	Proj	ect:		roject		Date/Time	e:	Chast	
CIRC	SX	20 (M	1	43	140	11515	7	Sheet _	
Groundwater	TRC	Personn	el:		12	Well	ID:	_	
Field Data Record	R	011000	Mu	1			:////	W-4	17(1)
WELL INTEGRITY	Prof	tective	10000		Well	1 to	p of riser		neasured
YES NO	Cas	ing Stick-u m ground)	ip	_ ft.	Depth	4.	p of casin		nistorical
Protect. Casing Secure						Ш-		-	
PVC Stick-up Intact		er Stick-up		£ı	Water Depth) / IL.		APL Dept	th = TO A
Well Cap Present] ["0"	m ground) 		_ ft. 	Well Volume	N	APL Thic		Shew
Security Lock Present	∐ we	LL DIAMET	ER 🔲	2 inch	Depth of pur Static water	np intake: level after r	VB++	into well:	
Sampling Equipment:	— Oth	er:		inch					
Flow-thru Cell Volume:	-		— Ш,	inch	Initial purge	Rate/ Water	Level (1		/min):
PID SCREENING MEAS.					Adjusted pu		me/WL/(re	cord cha	nges)
Background Background	WE	LL MATER	IAL		250	720	000	040	
Well Mouth									
Well Mouth	, P,	vc s	SS		Flow rate at	time of sam	pling: 7	300n	ulmp
	01	ther:			Total volum	e of water p	urged:		
FIELD WATER QUALITY MEASUR	EMENTS	(record a	t appropri	ate in					
Time	1035	1040	1045	105	0 1055	1100	1105	ШО	1115
Temp. (°C)	10	12,61	12.57	12	49 1255	12.59	12/01	12,65	19,70
Conduct. (µmhos/cm)	1	30388	30392	303	,9-730385	30395	303 VS	30345	30333
DO (mg/L)	1	1,38	1,13	115	1,03	1,07	198	0.99	0.94
pH (su)		6,30	6.24	6	DY 6,22	6,32	(0,2)	1012	6,20
ORP (millivolts)	Y	8,5	2.11	(a	68911Y	11,4	12,1	12,9	13.2
Turbidity (NTU)	t	210	12.8	11.0	a 9121	728	1016	7.10	6144
Flow (ml/min)	250	250	COR	20	0 200	300	かい	200	200
Depth To Water (ft)	12.37	15,47	13.42	13.1	1247	12.43	13,43	15,42	15,40
Cumulative Purge Vol. (gal or L))	,			11111	1,3,	, -		
Time	120	1125	1130	113	0			lization C	
Temp. (°C)	12.48	121107	12.66	111 3				secutive i	
Conduct. (µmhos/cm)	35,50				>		- Conduct	t. (µmhos/	cm): ± 3 %
DO (mg/L)	0.42	0.92	7.91	A			- DO (mg/ >0.5 mg/L		(for values
pH (Std. Units)	6.19	618	619	10			- pH (Std.	Units): ±	
Eh/ORP (millivolts)	14.6	19.4	15.4	111				illivolts): ±	
Turbidity (NTU)	4 89	448	4,47	X				y (NTU): + es >5.0 NT	
Flow (ml/min)	200	MO	200	-				wn: < 0.3	
Depth To Water (ft)	13.40	13,42	13,42	1 4	5				water level ell screen)
Cumulative Purge Vol. (gal or L)	13 10	1 311.	1 3						-
Purge	Samp			100	idia cla	300 -		1-:-	
Peristaltic Pump	X	101	K PU	MI	MAX DISK!	a post	* DOD	切板	
Submersible Pump		EIVE	6476	MON	anun K	ROP LIK	typtic	e at	-
Bladder Pump Bailer	H	bot	JEM.	04	Porg	COVC	ret		
Other:		()							
Analytical Parameter Filtered (Y	/N) Pre	servation	# Bott	les	Size/Type Bottles	Time Collected	QC	S	ample #
EPH N	N	(1)	2		ILA	1130	· MEM		2)
Jet N	V	4	3		10 MLA	1130	1	at DV	P-)
			1		\/	11010	40.0		ov: April 2014

Consult the applicable regulatory guidance for the specific criteria.

Signed: XXIIII

©TRC	Project	• * * * * * * * * * * * * * * * * * * *	Project N	18.000 UP)	Date/Tin	1 -		- 1		
(C) INC	Stee	to were	butuc's	B'on M'>	1/3/07	1030	Sheet	of		
Groundwater	TRC Pe	ersonnel:			Wel					
Field Data Record	BA	4				· M	W-41	3		
WELL INTEGRITY	Protect	tive ^	\ \ \ \v	Vell	√ t	op of riser	- TX	measured		
II ———————————————————————————————————		Stick-up		Depth	c.	op of casi		historical		
Protect. Casing Secure Concrete Collar Intact		— — — -			, 🔲 -					
PVC Stick-up Intact		Stick-up	F	Vater Depth 13.7	l #	LNAPL/DN	APL Dep	th =		
Well Cap Present		round) _		Vell Volume		NAPL Thic	kness :			
Security Lock Present	WELL [DIAMETER S		epth of pur						
Sampling Equipment:	Other:		4 inch	tatic water		VEX. 18 (18) 30				
Flow-thru Cell Volume:	_		_ 6 inch Ir	nitial purge	Rate/ Wate	er Level (1	00-400 ml	/min):		
PID SCREENING MEAS.			Ā	djusted pu	rge Rates/	time/WL(re	cord cha	nges)		
Background	WELL	WELL MATERIAL 336								
Well Mouth	PVC									
	Other	:	T	otal volume	of water	purged:				
FIELD WATER QUALITY MEASU	REMENTS (re	ecord at appro	priate inter	vals)						
Time		35 1640	A 1100000000	1050	1055	1100	1105	mó		
Temp. (°C)		.64 11.80		12.10	11,43	11,91	11.74	11.70		
Conduct. (µmhos/cm)	Puge 26	013 2617					27584	28030		
DO (mg/L)	• . ()	21 4.95		4.02	3.88	- 4	3.54	1.80		
pH (su)		37 6.3	1.00	6.24	6.20	6.18	6.17	()		
ORP (millivolts)		13.0 -41.0		-3847	-26.7	-114	-32.7	-30,2		
Turbidity (NTU)		1.3 37.9		26.9		20,2		13.1		
Flow (ml/min)		30	131.7	401	23.4	20,0	15.6	1211		
Depth To Water (ft)	~ .	75	The second of th	and the second						
Cumulative Purge Vol. (gal or L)	1 11	1/3	COLUMN STREET,							
		0.0	100 0	1120	11. 1	Stabil	ization C	ritorio*		
Time Temp. (°C)		20 125	100	1165	1/40	10000	ecutive re			
Conduct. (µmhos/cm)	1174 11		2 12.07	11.95	12.09	- Temperat				
	28/34 विश	3/18/2 3/8/12		28150	176 7155 55	- Conduct. - DO (mg/L	(μπποs/c .): <u>+</u> 10 %	(for values		
DO (mg/L)	174 1	57 1.50	1.13	1.21	1.21	>0.5 mg/L) - pH (Std. I				
pH (Std. Units)	6.16 6	11.2 41.	6.16	6.16	6.16	- pri (Sta. t - ORP (mil				
Eh/ORP (millivolts)		27,3-26	2 -25.7	1-24.9	-24.6	- Turbidity	(NTU): +/-	10 %		
Turbidity (NTU)		1.8 10.4	1 8.85	7.41	7.43	(for values		•		
Flow (ml/min)	330				->	- Drawdow greater as		***		
Depth To Water (ft)	13.75	Nilson Street Contract Contrac			->	stabilizes a				
Cumulative Purge Vol. (gal or L)										
Purge	Sample Co	omments:	YSI N	o readi	WK 1		alle			
Peristaltic Pump Submersible Pump	- 4 -	(C) 10:) · · · · ·	Call	e Ni	n, 120	dli Gal			
Bladder Pump		Class	51 514	1 Carry	STW	olro e	Dar	040		
Bailer		CIEWI,	31, 3M	w,	su pe	DI DI	цо	-		
Other:					12		-			
Analytical Parameter Filtered (Y	/N) Preserva	ation # Bo		ze/Type	Time	QC	Sar	nple #		
8 UPH N	#4	7) [Ja/	ottles	Collected	+				
EPH 1	1	0	12	Anles	-1			V		
. 4					Total					
3 60				0				25		
· Consult the applicable regulator	y guidance for	the specific	Signed	15	152		Rev	: April 2014		

NO Cac (from the control of the cont	c Person otective sing Stick- om ground er Stick-u om ground cll DIAME	pp	ft. ft. ft. 2 inch 4 inch	Well Depth	Wel ft. ft. ft. ft. pp intake: level after Rate/ Wat	top of riser top of casir LNAPL/DN NAPL Thic pump put	APL Depkness	_ <u> </u>	BD 141.
NO Cac (from the control of the cont	c Person otective sing Stick- om ground er Stick-u om ground cll DIAME	nel:	ft. ft. ft. 2 inch 4 inch	Well Depth	ft.	top of riser top of casir LNAPL/DN NAPL Thic pump put	APL Depkness	historical (oth = 0.03 : I/min):	3 141:
NO Cai (fro	sing Stick- om ground er Stick-u om ground StLL DIAME	TER X	ft. ft. 2 inch 4 inch	Water Depth Well Volume Depth of pur Static water Initial purge	ft.	top of riser top of casir LNAPL/DN NAPL Thic pump put	APL Depkness	historical (oth = 0.03 : I/min):	3 141:
NO Cai (fro	sing Stick- om ground er Stick-u om ground StLL DIAME	TER X	ft. ft. 2 inch 4 inch	Water Depth Well Volume Depth of pur Static water Initial purge	ft.	LNAPL/DN NAPL Thic	APL Depkness	historical (oth = 0.03 : I/min):	3 141:
NO Cai (fro	sing Stick- om ground er Stick-u om ground StLL DIAME	TER X	ft. ft. 2 inch 4 inch	Water Depth Well Volume Depth of pur Static water Initial purge	ft.	LNAPL/DN NAPL Thic	APL Depkness	historical (oth = 0.03 : I/min):	3 141:
Ris (fro	er Stick-upm ground	TER X	 2 inch 4 inch	Depth of pur Static water Initial purge Adjusted pu	mp intake: level after Rate/ Wat	NAPL Thic	APL Dep kness into well	oth =	00
Oth	om ground	TER X	 2 inch 4 inch	Depth of pur Static water Initial purge Adjusted pu	mp intake: level after Rate/ Wat	NAPL Thic	kness into well	_ <u> </u>	00
WE Oth	ELL DIAME	TER X	 2 inch 4 inch	Depth of pur Static water Initial purge Adjusted pu	mp intake: level after Rate/ Wat	NAPL Thic	kness into well	_ <u> </u>	I EU
WE P	ELL MATER	_ 🗵	4 inch	Depth of pur Static water Initial purge Adjusted pu	np intake: level after Rate/ Wat rge Rates/	pump put er Level (10	00-400 m	l/min):	
WE P	ELL MATER	_ 🗵	4 inch	Initial purge 300 Adjusted pu	Rate/ Wat	er Level (10	00-400 m	l/min):	
WE P	ELL MATER	200	6 inch	Adjusted pu	rge Rates/				
P Or		200		Adjusted pu	rge Rates/				
P Or		RIAL		_		time/vvi_tre			
P Or		7		55	17	(10	cord cha	nges)	
P			L	00	U				
0	**	ss	Γ	Flow rate at	time of sa	mpling			
	ther:		ŀ					-1	
DEMENT		_		Total volume	or water	purgea:			
REMENTS	(record a	at appropri	GIVEN IN		l lo	10 1	100		
		1745	1250	13/55	1300	1305	1310	1315	
-	-		^	11/4	12.06	12.16	• //	13.31	
KUJ?	, ,,		A 1	1 /	26195	26055	15-745	A .	
		1			6.54	6.58	660	6,69	Ą
		6,26			6,21	621	6.21	6.21	
		-33.1		1-38.4	-34.3	740,3	-417.Z	-41312	
4	42.7	33.9	31.6	22.5	17.2	13,9	1.31	1 1 1 1 1	
300	330	-	-		1		,	->	
14.65	_		-	The state of the s				>	
									1
1340		- 1		11					1
								-	
						- Conduct.	(µmhos/c	m): <u>+</u> 3 %	
						- DO (mg/L	: <u>+</u> 10 %		
								.1 SU	
0,				-		- ORP (mill	ivolts): +	10 mV	
									100
				_		25			1.
10 10				-		greater as	óng as w	ater level	1141
1-1.65				-		stabilizes a	bove wel	I screen)	in the
Samula	Commo	L						100°	111
- Sample	Comme	(1	ear	, Slipp	trond	er a	en		A
	8				0.	1 3		Art to	N.
	2				· ·		13.0		v.1
								The state of	,
	X						To be	W. A.	Marine 1
AN D	I	Name and America	1 6	Sizo/Tuno	Time		1,3	Service Comment	1
					Collected	QC 👭	Sar	nple #	(2)
		3		one Ambe	1320		MU	-414	
	~	3	10	L AMBIT	1		1	2	
		en.					6	3.7	
					1	45. A	/		
	340 222 25450 (670 (670 (731 330 4.65 Sample	(A) 26707 (C) 3 (C	Start 205 312.11 802 2673 6.36	Start 12,05 3 3,11 12.3 26.31 26.3	Start 12,05 812.11 12.27 12.16 RUZE 26107 36731 24688 26367 6.31 6.36 6.11 6.50 6.26 6.26 6.24 6.22 -32.4 -33.1 -35.1 -38.5 412.7 33.9 31.6 22.5 300 33.0 14.65 Sample Comments: (1eav, 511 per (1) per (N) Preservation # Bottles Size/Type Bottles 14.0 3 10.04 Mar. 1	Comments:	Construction	Stabilization C Stabilizat	Stabilization Criteria* Stabilization Cr

TPC		Pro	ject:	P	rojeç	t No	\$ 000.	Date/Tim	ne:		,
(C) INC		500	Hall	reaks	(5	wii	4403	1/5/	1310	Sheet _	_ of
Groundwater		TRO	Personr	nel:			y	Well	I ID:		
Field Data Record			BA						M2-4	-115	
WELL INTEGRITY		Pro	tective			We	AII	V t	op of riser		neasured
Protect. Casing Secure	NO	Cas	sing Stick- m ground)	up	_ ft.		pth	7.0	op of casi		nistorical
Concrete Collar Intact				- 5		w	eter	∐-		_	
PVC Stick-up Intact			er Stick-up m ground		ft.	De	oter 15.	<u>σ</u> π.		IAPL Dept	
Well Cap Present Security Lock Present	Н			/			Il Volume	np intake:	NAPL Thic	kness =	
44	Ш	WE	LL DIAME		2 inch	Sta		level after	pump put	into well:	
Sampling Equipment:		Oth	er:		4 inch 6 inch	l					
Flow-thru Cell Volume:						imit	iai purge	Rate/ Wate	er Levei (1	00-400 mi	min):
PID SCREENING MEAS.						Adj	justed pu	rge Rates/			nges)
Background		WE	LL MATER	RIAL				30	0,3	36	
Well Mouth						<u> </u>					
		1		SS		_		time of sar		330	
			ther:					of water	purged:		
FIELD WATER QUALITY MEA			100	t appropri	ate int	terva	als)	100			
Time	19	<u>, w</u>	1315	1320	132	5	1330	1335	1340	13015	1350
Temp. (°C)	2	27	13.03	13.45	13.3	_	13.65		13.98	11.01	13.00
Conduct. (µmhos/cm)	1	me	25482	25446	2269	2	25768	25797	25953	26093	26100
DO (mg/L)		1	1.79	1.89	1.76	0	1.34	1.22	6.51	0.99	1,65
pH (su)	L		6.78	6.75	6.7	2	6.72	6.72	6.72	6.76	6.73
ORP (millivolts)			-43.1	-56.2	1-67	8	-72.7	-94.6	-81.0	-85/3	-88.4
Turbidity (NTU)	\	1	7.86	4.97	2.9	18	2.86	2.63	1.60	1.37	1.21
Flow (ml/min)	20	0	300	330		_	0.00		-07		>
Depth To Water (ft)	15	35	15.39								->
Cumulative Purge Vol. (gal or	L)										
Time	13	55	1400	1405	144	0	1415	14/20	West (1997)	lization C	
Temp. (°C)	-	84	B1282	13.86	13.			1401	and the second	secutive re sture: ± 3 %	-
Conduct. (µmhos/cm)	2.73	069	26031	BZLICE	260			16107		t. (µmhos/c	
DO (mg/L)		19	1.24	1.37	1.5	31	1.41	1.29	- DO (mg/ >0.5 mg/L		for values
pH (Std. Units)		73	6.73	6.73	100	.1	1 211	674		Units): <u>+</u> 0	.1 SU
Eh/ORP (millivolts)		G QH		-97.6	9/	12	-101.2	103.4		llivolts): +	111
Turbidity (NTU)		9	0.91	0.89	0.	15	8.59	0.61		y (NTU): +/- s >5.0 NTU	
Flow (ml/min)	_	30	0.91	0.94	-		0.59	0.01	- Drawdo	wn: < 0.3 ft	(can be
Depth To Water (ft)		39						->		s long as w above wel	
Cumulative Purge Vol. (gal or	L) 1	· J7	-					-			,E)
		ample	e Comme	ents:	1						
	x	ΧÌ	<u>u</u>	ecr,	She.	w	. 51	. Pet	10 od	0	
Submersible Pump								,			
Bladder Pump Bailer		Н									
Other:	_	\vdash									
		Ш									
Analytical Parameter Filtered	(Y/N)	Pres	servation	# Bottl	es		e/Type	Time	QC	Sa	mple #
THE Y	3	L	J-C1	3	L		ottles LAu(v	Collected		M	W-U15
763			1	2	/	1	Andr	1		-/*\	1
							-,-				~
							,				19.5
· Consult the applicable regul	atory g	uidand	e for the s	pecific	Sigr	ned:	05	7	1	Rev	/: April 2014

©TRC		ject:		roject	b . 6	UN3.000	Date/Tim	e: ogus	Sheet	of \$
	Si	ectra L	EMOUH	rc/	5	0.12.00	1/3/11		Officet _	
Groundwater	TRO	Personn	el:	•			Well		(d	
Field Data Record	P	$\mathcal{A}_{}$					_5	MU -	418	
WELL INTEGRITY	Pro	tective			We			p of riser	~	measured
YES	NO Cas	tective sing Stick-t m ground)	ib D. M.	_ ft.	De	pth	ft. to	op of casi	ng 📙 I	historical
Protect. Casing Secure Concrete Collar Intact							_ U_		=	1
		er Stick-up m ground)		ft	De	ter 11,3	ft.	NAPL/DN		
PVC Stick-up Intact Well Cap Present Security Lock Present] -""	— — —	10 114	= "-		II Volume-		NAPL Thic	kness =	
Security Lock Present	WE	LL DIAME		2 inch	Sta	oth of pum tic water le			into well:	
Sampling Equipment:	Oth	ner:		inch inch				30 5		
Flow-thru Cell Volume:	_		ъ,	HICH		ial purge F	ML	MIL		
PID SCREENING MEAS.	10/5	II MATEE			Adj	justed pur				nges)
Background	_	LL MATER	IIAL				270	ML/	min	
Well Mouth		K L			EIO	w rate at t			270 m	1
		VC ther:	SS		-				0010 /	/ha
				2011 201 22	_	tal volume	or water p	Jurgea.		
FIELD WATER QUALITY MEASI		1000		1		1.	1416	INF	600	1025
Time	oqus	0950	MSS Mal	100		1005	1010	1015		1005
Temp. (°C)	Stort	11,93	***	11.8		11.98	11.86	11.90	11.99	211010
Conduct. (µmhos/cm)	Pogs	2	31746	-	100,000	3369.0		33616		3481.0
DO (mg/L)	-	16.5	1,99	1.8.		3.11	231	2.39	2.41	7.68
pH (su)	\vdash	6.24	6.2	6,3		6.78	6.28	629	6.29	6.79
ORP (millivolts)		191.3	190.1	186		181.7	173.4	171.6	1743	118.7
Turbidity (NTU)	<u> </u>	OOR	29.6	24.)	39.7	19.3	17.6	15.5	17.
Flow (ml/min)	340	270	0.0	***						
Depth To Water (ft)	11.32	11.37	11.37	11.38	5	-				->
Cumulative Purge Vol. (gal or L)									
Time	1030	035	1040	104	5_	1050	1055		ilization C secutive r	
Temp. (°C)	2.15	D.10	12.04	6.6	Ó	12.19	15.39	- Tempera	ature: ± 3 9	%
Conduct. (µmhos/cm)	3561.	335710		4016	Ű.	3950.1	3457.6			cm): <u>+</u> 3 % (for values
DO (mg/L)	2,71	2.81	302	3.1	6	3,36	3.17	>0.5 mg/L	-)	
pH (Std. Units)	6,29	6.20	6.31	(18	6.29	6.24		Units): <u>+</u> illivolts): <u>+</u>	
Eh/ORP (millivolts)	172.9	174.0	172.8	173	, (169,1	168.3	1 - 100 - 10	y (NTU): +	
Turbidity (NTU)	16:7	17.2	17.0	25	51	10.01	8.27	A STATE OF STREET	s >5.0 NT	
Flow (ml/min)	270								wn: < 0.3 f s long as v	t (can be water level
Depth To Water (ft)	10.35	Variable			***************************************	AND THE PARTY OF T				ell screen)
Cumulative Purge Vol. (gal or L) '			3p		5 291				
Purg	e Sampl	e Comme	ents:	0.0	A 3 .					
Peristaltic Pump	· X	-	Ci	ee*	10)	0, 25				
Submersible Pump Bladder Pump	$+$ \vdash \vdash									
Bailer	1 🖂	-	-				P.,			
Other:										
	wast =				Si-	e/Type	Time	1 00		
Analytical Parameter Filtered		servation	# Bottl	es	B	ottles	Collected	QC	0000	ample #
POH N	10.	4575 HC	3	-	16	Anbr	1055		(M/V	-418 E
NAM T	141	103		\dashv	3	Hom	· U			A.
			-	-						
		2 02				1		2	. P	ev: April 2014

Consult the applicable regulatory guidance for the specific criteria.

PC TPC	Proj	ect:	P	roject	t No.:	:	Date/Tim	ie:	Sheet _	\ of
	2	ge CIV	_	1	40	145	113/17	0955		<u> </u>
Groundwater	TRO	Personn	(.				Well	ID:	11117	
Field Data Record	17	al lel	n su	<u></u>				11/1	N417	
WELL INTEGRITY YES N		tective ing Stick-	un	ft.	Well	th —	. /	op of riser	-	neasured
Protect. Casing Secure	(fro	m ground)					- H_`	op or cusii	'9'' -	nistorical
Concrete Collar Intact	Rise	er Stick-up			Wate	er 1 oc		LNAPL/DN	- APL Dept	h =
PVC Stick-up Intact Well Cap Present	(fro	m ground)	-	ft.	- 65	th) (05	<u>></u> π. ,	NAPL Thic		
Security Lock Present		LL DIAME	TER 🔯		Dept	th of pum	p intake:			
Sampling Equipment: y s	-11	er:	· - · · · · · · · · · · · · · · · · · ·	4 inch	Stati	ic water I	evel after	pump put	into well:	
	_ "	oi	<u> —</u> Ш	6 inch		al purge	Rate/ Wate	er Level (10	00-400 ml	/min):
Flow-thru Cell Volume:	-				Adju	sted pur	ge Rates/f	ime/WL(re	cord cha	nges)
PID SCREENING MEAS.	WE	LL MATER	RIAL		0	00 =	P150	@ 100	00	010 00000000000000000000000000000000000
Background	5	л г								
Well Mouth	P	vc :	ss		Flow	v rate at t	ime of sar	mpling:	50M	Umin
,	Ot	her:			Tota	ıl volume	of water	purged:		1
FIELD WATER QUALITY MEASU	REMENTS	(record a	t appropr	ate in	terval	s)		27		
Time	0955	1000	1005	1010)	1015	1020	1025	1030	1035
Temp. (°C)	11.62	11.93	11.93	11.9	41	1194	11,95	11.99	12.03	11.61
Conduct. (µmhos/cm)	36131	35965	35966	354	1893	3595Y	36017	36052	36103	36152
DO (mg/L)	1.33	1.40	1.39	1,35	$\overline{}$	135	1,36	1126	1,21	117
pH (su)	600	6.38	6.37	(013	55	6.83	6.33	6.33	6.32	6.30
ORP (millivolts)	63.3	104.36	117.5	115	6	117.0	119.1	122.2	126.3	126.4
Turbidity (NTU)	19.37	15.53	15,41	14:	321	1291	10,51	9.97	8.56	10.01
Flow (ml/min)	300	150	150	150	0	150	150	150	150	150
Depth To Water (ft)	11.07	11.07	11.07	11.0	1-50	F0.11	11,07	11107	11.07	11.07
Cumulative Purge Vol. (gal or L)										
Time	1040	1045							lization C secutive re	The state of the s
Temp. (°C)	12,12	C						- Tempera		
Conduct. (µmhos/cm)	36163	A								m): <u>+</u> 3 % (for values
DO (mg/L)	117	B						>0.5 mg/L) _	
pH (Std. Units)	6,30	ls/						Commence and the second	Units): <u>+</u> 0	
Eh/ORP (millivolts)	126.9	P							/ (NTU): +/	
Turbidity (NTU)	9.98	V						(for value	s >5.0 NTL	ls)
Flow (ml/min)	i 50	1							vn: < 0.3 ft long as w	(can be rater level
Depth To Water (ft)	11.07	0							above we	
Cumulative Purge Vol. (gal or L)										
Purge	Sampl	e Comme	ents:							
Peristaltic Pump Submersible Pump	\sim									
Bladder Pump	H	0								
Bailer		S-								
Other:							-			
Analytical Parameter Filtered (Y	/N) Pres	servation	# Bottl	es		/Type	Time	QC	Sa	mple #
EPH N		tel	2		Bot	Itles IA	Collected	M ON		13-417
UPY N	_	tel	3	(101	nLA	1045	non		- 11 /
		1								

Consult the applicable regulatory guidance for the specific criteria.

Signed: Kollumb