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2020 EMPIRE ABO GAS PLANT (AP-112)
Groundwater Monitoring and Remediation Report
Eddy County, New Mexico

Prepared for:

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1.0 EXECUTIVE SUMMARY

This report presents 2020 annual groundwater monitoring and remediation for the Empire Abo Gas Plant (Facility) and is submitted to the New Mexico Oil Conservation Division (NMOCD) Environmental Bureau on behalf of Aka Energy Group LLC (Aka Energy). Frontier Field Services LLC, an affiliate of Aka, was the previous operator and was sold to Durango Midstream Services, LLC, on March 1, 2019. Aka Energy retained liability for certain environmental conditions at the Facility including groundwater monitoring and remediation. The Facility is located approximately 9 miles east and southeast of Artesia, New Mexico. The legal description is Unit I (NE/4, SE/4), Section 3, Township 18 South, Range 27 East, Eddy County, New Mexico. The geodetic position is North 32.777056° and West -104.259083°.

This report presents the results of semi-annual (twice yearly) groundwater monitoring and remediation of light non-aqueous phase liquid (LNAPL) and groundwater during 2020. Depth to groundwater and LNAPL thickness measurements were collected from all monitoring wells except EB-06, which is obstructed, during the first (1st) semi-annual event on April 6 and 7, 2020 and during the second (2nd) semi-annual even on September 22 and 23, 2020. Groundwater samples were collected from twelve (12) monitoring wells (MW-03, MW-08, MW-12, MW-15, MW-17, MW-18, MW-20, MW-22, MW-23, MW-24, EB-02, and P-02) during the first (1st) semi-annual event and from eleven (11) monitoring wells (MW-02, MW-08, MW-12, MW-15, MW-17, MW-18, MW-20, MW-22, MW-24, EB-02, and P-02) during the second (2nd) semi-annual event. Monitoring well MW-02, EB-07 and P-05 contained insufficient water or were dry during the first (1st) and/or second (2nd) monitoring events. Monitoring wells MW-03 and MW-23 contained LNAPL during the second (2nd) semi-annual monitoring event and were not sampled. Groundwater samples were analyzed for cations (calcium, magnesium, sodium, and potassium), anions (alkalinity, sulfate, and chloride), and total dissolved solids (TDS) during the first (1st) semi-annual event, and benzene, toluene, ethylbenzene and xylenes (BTEX) during both events. The following is documented in the report:

- Groundwater is mounded from laterally discontinuous of clay and silty clay in two (2) areas near the north central and east areas of the Facility, which causes groundwater to flow in a radial pattern.
- The regional groundwater flow direction remains to the southeast.
- LNAPL was observed in eleven (11) monitoring wells during the first (1st) semi-annual monitoring event (April 6 - 7, 2020) and sixteen (16) monitoring wells during the second (2nd) semi-annual monitoring event (September 21 - 22, 2020) with apparent thicknesses ranging from 0.01 feet in (MW-03-03 and MW-19) to 0.74 feet (MW-14).
- Benzene decreased below the WQCC human health standard (0.01 mg/L) in all but three (3) monitoring wells (MW-22, MW-23, and MW-24).
- Benzene in well MW-22 decreased approximately 92 percent from 31.3 mg/L (March 16, 2011) to 2.63 mg/L (September 23, 2020) following SVE remediation.
- Benzene in well MW-23 remained stable with no significant changes until April 23, 2019, when LNAPL (0.09 feet) was observed and decreased to 0.01 feet (September 21, 2020) after SVE remediation.
- Benzene in well MW-24 appears stable following SVE remediation at well EB-08 located approximately 385 feet northwest (upgradient) of well MW-24.

- Ethylbenzene exceeded the WQCC human health standard (0.75 mg/L) in the groundwater sample from monitoring well MW-23 with a concentration of 0.779 mg/L during the first (1st) semi-annual event on April 6 and 7, 2020.
- Chloride exceeded the WQCC domestic water quality standard (250 mg/L) in samples from three (3) monitoring wells (MW-08, MW-15, and MW-18) with concentrations ranging from 461 mg/L (MW-18) to 2,840 mg/L (MW-15).
- Sulfate and TDS are naturally elevated parameters due to dissolution of gypsum from the Tansill formation and exceeded the WQCC domestic water quality standards of 600 mg/L and 1,000 mg/L, respectively, in all samples during the first semi-annual monitoring event (April 6 and 7, 2020).
- The highest sulfate (43,800 mg/L) and TDS (76,400 mg/L) concentrations were reported in groundwater samples from monitoring well MW-15, located north of the Facility, resulting from dissolution of minerals in the Tansill formation.
- SVE remediation by Catalytic Combustion Corporation and EcoVac recovered approximately 223,182.1 lbs or about 111.59 tons of hydrocarbon vapors, 2,955.2 gallons or 70.36 bbl of liquid hydrocarbons and 20,690 gallons or 492.62 barrels (bbl) of water between August 2018 and February 2021.
- LNAPL (Staging Area A) was successfully reduced between 98.7 and 99.9 percent from a beginning maximum thickness of 9.33 feet in MW-02-09 (September 14, 2009) and 25.42 feet in MW-10 (July 31, 2008) to 0.12 feet (MW-02-09) and 0.01 feet (MW-10) on February 22, 2021.
- LNAPL (Staging Area B) was successfully reduced between 99.5 and 99.7 percent from a beginning maximum thickness of 8.07 feet in MW-02-12 and 9.57 feet in MW-21 (December 4, 2018) and 7.39 feet in MW-23 (February 20, 2019) to 0.03 feet (MW-02-12), 0.05 feet (MW-21) and 0.02 feet (MW-23) on February 22, 2021, respectively.
- LNAPL in the remaining wells was reduced between approximately 50 percent (MW-03-03) and 100 percent (MW-02-06, MW-02-10, MW-02-11, MW-02-16, MW-03-04, MW-04, MW-13, and MW-20).
- SVE technology achieved between 92.7 (EB-03) and 99.8 (MW-06 and MW-19) percent reduction in LNAPL thickness.
- The most liquids (hydrocarbons and water) were recovered from the west side of the Facility (Staging Area A), south and southeast of the Facility in the vicinity of wells MW-02-13, MW-03-02 and MW-06.
- The liquids were disposed offsite in an NMOCD permitted commercial saltwater disposal (SWD) well.

Aka requests approval for the following:

- **Aka requests approval from NMOCD to discontinue LNAPL and groundwater remediation based on reduction of LNAPL between 92.7 and 99.9 percent and technical infeasibility to recover the remaining 0.1 and 7.3 percent of hydrocarbons in soil and groundwater.**
- **Aka requests approval from NMOCD to allow residual dissolved benzene in groundwater to naturally attenuate based on source (LNAPL) removal, concentration reductions and no**

groundwater receptors (i.e., domestic, industrial, livestock) wells within 2 miles as documented by NMOSE.

- **Aka requests approval from NMOCD to discontinue groundwater monitoring at the Facility.**

2.0 INTRODUCTION

This report is submitted to the New Mexico Oil Conservation Division (NMOCD) Environmental Bureau on behalf of Aka Energy Group, LLC (Aka), a wholly owned subsidiary of Southern Ute Indian Tribe Growth Fund (SUGF), for its former Empire Abo Gas Plant (Facility) that was operated by Frontier Field Services LLC (Frontier), an entity of Aka. The Facility is located approximately 9 miles east and southeast of Artesia, New Mexico, in Unit I (NE/4, SE/4), Section 3, Township 18 South, Range 27 East, Eddy County, New Mexico. The geodetic position is North 32.777056° and West -104.259083°. Figure 1 presents a topographic map. Figure 2 presents an aerial map.

2.1 Background

Frontier operated the Facility as a gas plant processing natural gas using cryogenic methods to remove simple alkanes (i.e., ethane, propane, pentane, and hexane). The Facility was later converted to a compressor station. On March 1, 2019, Aka sold Frontier including the Facility and gathering system to Durango Midstream Services LLC (Durango). Aka retained liability for certain environmental conditions at the Facility including groundwater monitoring and remediation.

The Facility operated under a New Mexico Water Quality Control Commission (WQCC) discharge permit (GW-022) administered by the NMOCD until the permit was rescinded after Frontier confirmed the Facility did not have intentional discharges other than potable water onto the ground or directly into surface water or groundwater. The NMOCD assigned the Facility abatement permit number AP-112 after rescinding the discharge permit for remediation of groundwater contamination and requested Frontier to submit an abatement plan for groundwater contamination. On January 15, 2013, Frontier submitted an abatement plan to the NMOCD that was contingent on approval from the New Mexico Office of the State Engineer (NMOSE) approving Frontier's request to extract groundwater for remediation and disposal contingent upon permitting, installation and start-up of a disposal (SWD or AGI) well permitted through NMOCD. OSE approved Frontier's request on March 8, 2013, concluding that the remediation would not have an impact on the Pecos River and no water wells were known to exist within two (2) miles of the Facility. Appendix A presents the NMOSE communications.

In August 2018, Aka management elected to use the soil vapor extraction (SVE) method rather than recovery wells (pump and dispose) to remediate light non-aqueous phase liquid (LNAPL) in soil and on the groundwater. The groundwater abatement plan ("Groundwater Abatement Plan, Empire Abo Gas Plant, Eddy County, New Mexico") was submitted to NMOCD on January 15, 2013, and amended on March 12, 2018, to use the SVE method for LNAPL and groundwater remediation. NMOCD approved SVE testing for the abatement plan on August 2, 2012, and October 23, 2017. Appendix B presents NMOCD communications.

Previous investigations identified LNAPL in the form of natural gas condensate on groundwater and dissolved benzene in groundwater resulting from historic releases of natural gas condensate from subsurface piping. The LNAPL and dissolved benzene are present in five (5) areas including the northeast, west-central, east-central, southwest, and southeast areas of the Facility. The groundwater

contains naturally elevated concentrations of sulfate and total dissolved solids (TDS) from dissolution of gypsum in the Tansill formation that exceeds the WQCC domestic water quality standards.

On October 23, 2017, NMOCD approved Aka's request to reduce the number of monitoring wells for semi-annual (twice yearly) groundwater sample collection to the following: MW-02, MW-03, MW-08, MW-12, MW-15, MW-17, MW-18, MW-20, MW-22, MW-23, MW-24, EB-02, EB-07, P-02 and P-05. On May 6, 2019, NMOCD approved Aka's request to analyze groundwater samples for benzene, toluene, ethylbenzene, and xylenes (BTEX) during each semi-annual monitoring event and once annually for cations (calcium, magnesium, potassium, and sodium), anions (alkalinity, chloride, and sulfate) and TDS. Figure 3 presents a Facility drawing showing monitoring well locations and highlighted wells for semi-annual groundwater monitoring. Appendix B presents NMOCD communications.

2.2 Physical Setting

2.2.1 Topography and Surface Water

The surface elevation is approximately 3,550 feet above mean sea level (MSL) and slopes to the southeast. The Facility is located approximately 3.4 miles east-northeast from the Pecos River. The nearest drainage is an unnamed wash located west of the Facility. The unnamed wash flows south to Scoggin Draw (aka Coggin Draw on some early maps) located about 1,300 feet south of the Facility. Scoggin Draw flows southwest to ephemeral Chalk Bluff Draw located about three (3) miles downstream. Chalk Bluff Draw flows to the Pecos River located about 1.8 miles further downstream.

When comparing the elevation of Scoggin Draw and the depth to groundwater from the nearest monitoring wells (P-04, EB-07 and EB-01), depth to groundwater is estimated to be about 25 or more feet below the drainage. However, these monitoring wells are currently dry therefore the separation between the base of Scoggin Draw and groundwater may be greater than 25 feet. Scoggin Draw is a losing stream without groundwater affecting surface water or discharging to the surface. There are no documented springs, seeps, or marshes within 1-mile of the outside perimeter of the Facility.

2.2.2 Geology

The dominant regional geological feature is the Pecos Slope; a broad geologic structure with a low eastward dip of about 50 to 100 feet per mile. The western extents of the Pecos Slope are the Mescalero Arch, and Sacramento and Guadalupe uplift structural divides (Kelley, 1971). The eastern extents of the Pecos Slope are the Delaware and Midland Basins. Pecos Slope is a monocline that is imprinted with other structural features, including the southern flank of the Artesia-Vacuum Arch, which reflects the underlying ABO reef trend.

The Artesia-Vacuum Arch extends from beneath the Pecos Valley fill to the west, extending through Townships 17 through 19 south, eastward to Range 35 East in Lea County (Kelley, 1971). The arch is covered by post-Permian strata, except in a four to five mile stretch near Chalk Bluff Draw. The plunging south limb of Yates Formation and Tansill Formation, in ascending order, dips about 4° South 47° East in

the vicinity of the Facility. Brittle deformation of the Artesia Group members caused fractures that are subject to dissolution by groundwater interaction.

The lowest encountered formation at the Facility is the Permian-age Yates Formation of the Artesia Group. The Yates Formation is named for the Yates oilfield in Pecos County, Texas, and has wide aerial extent in both surface exposures and subsurface wells samples. The Yates Formation is approximately 250 to 350 feet thick and is documented as siltstone north of Roswell, New Mexico, as carbonate and evaporites west and northwest of Carlsbad, as gypsum north of Lake McMillan to near Roswell, and the vicinity of the Facility. Beneath the Facility, red mudstone, shale, and clay reported at the base of monitor well borings represent the top of the Yates Formation.

Above the Yates Formation is the Tansill Formation of the Artesia Group. The type-section for the Tansill Formation is found along US Highway 285 about two (2) miles north of Carlsbad and is reported to be predominantly dolomite. The reef shelf margin is about 300 to 325 feet thick (Kelley, 1971), however, these facies give way to an evaporite facies about ten (10) miles north of the type section. The Tansill Formation in the vicinity of the Facility is part of an irregularly shaped north-trending belt that is generally less than a mile wide and comprised of anhydrite and salt about 100 feet thick. At the Facility the anhydrite, gypsum and salts of the Tansill Formation appear to be the bulk of the strata encountered in monitor wells and borings.

2.2.3 Groundwater Occurrence

The historic groundwater flow direction is towards the south and southeast and consistent with the surface drainage (Hendrickson and Jones, 1952). During investigations, LAI observed groundwater mounding under the Facility which has locally affected the groundwater flow direction.

3.0 GROUNDWATER MONITORING

3.1 LNAPL Measurements

LNAPL in the form of natural gas condensate was observed in eleven (11) monitoring wells during the first (1st) semi-annual monitoring event on April 6 and 7, 2020, and sixteen (16) monitoring wells during the second (2nd) semi-annual monitoring event on September 21 and 22, 2020. The following monitoring wells reported LNAPL during 2020:

Monitoring Well	April 6 – 7, 2020	September 21 - 22, 2020
MW-02-09	✓	✓
MW-02-10	✓	✓
MW-02-12	✓	✓
MW-02-13	✓	✓
MW-02-14	✓	✓
MW-02-15	✓	✓
MW-03		✓
MW-03-01	✓	
MW-03-03		✓

MW-06	✓	✓
MW-10		✓
MW-14	✓	✓
MW-19		✓
MW-21	✓	✓
MW-23		✓
EB-03		✓
EB-08	✓	✓

LNAPL was previously observed in monitoring wells MW-02-06, MW-02-11, MW-02-16, MW-03-01, and MW-04 but was not observed during 2020 due to remediation more fully discussed in Section 4.0.

On April 6 and 7, 2020, LNAPL ranged in thickness from 0.01 feet in well MW-03-03 to 0.74 feet in well MW-14. On September 21 and 22, 2020, LNAPL ranged in thickness from 0.01 feet in well MW-19 to 0.82 feet in well MW-21. Table 1 presents a summary of LNAPL measurements during semi-annual groundwater monitoring. Table 2 presents the LNAPL gauging summary during SVE remediation. Figure 3 presents the monitoring well locations. Figure 4a and Figure 4b present LNAPL thickness maps for April 6 and 7, 2020 and September 21 and 22, 2020, respectively.

3.2 Depth to Groundwater and Potentiometric Surface Elevation

Monitoring wells were gauged for depth to LNAPL and groundwater during the first (1st) and second (2nd) semi-annual groundwater monitoring events on April 16 and 17, 2020 and September 21 and 22, 2020, respectively. The measurements were collected at the top of the PVC well casing with an electronic oil and water interface probe that was decontaminated between wells with a solution of Alconox® detergent and water and rinsed with distilled water. Table 1 presents a summary of the depth to groundwater and LNAPL thickness measurements.

Groundwater potentiometric maps from April 6 and 7, 2020 and September 22 and 23, 2020, depict groundwater movement south of the mound moving towards the east and southeast, while groundwater to the north of the mound appears to be moving towards the north and northeast. The groundwater mounding is due in part to water perched on shallow discontinuous clay and silty-clay units beneath the central and east areas of the Facility.

Groundwater occurs in the Tansill Formation. The base of the water-bearing strata (Yates Formation) is interpreted as the red shale between about 3,525.08 feet above mean sea level (MSL) in monitoring well MW-02-02 located in the area of groundwater mounding near the north central parts of the Facility to 3,453.97 feet above MSL in well EB-07 located southeast of the Facility. Groundwater elevations in the more peripheral monitor wells remained relatively stable with seasonal fluctuation of not more than a few feet between April and September 2020. On April 16 and 17, 2020, groundwater was observed between approximately 3,537.69 feet above MSL at well MW-07 and 3,460.45 feet above MSL at well MW-14. On September 21 and 22, 2020, groundwater was observed between approximately 3,536.97 feet above MSL at well MW-07 and 3,454.73 feet above MSL in well MW-14. Similar groundwater

conditions were observed during previous groundwater monitoring events. The regional groundwater flow direction is to the southeast. Figure 5a and Figure 5b present groundwater potentiometric maps for April 16 and 17, 2020, and September 21 and 22, 2020, respectively.

3.3 Groundwater Chemistry

Groundwater samples were collected from twelve (12) monitoring wells (MW-03, MW-08, MW-12, MW-15, MW-17, MW-18, MW-20, MW-22, MW-23, MW-24, EB-02, and P-02) during the first (1st) semi-annual event and from eleven (11) monitoring wells (MW-02, MW-08, MW-12, MW-15, MW-17, MW-18, MW-20, MW-22, MW-24, EB-02, and P-02) during the second (2nd) semi-annual event. Monitoring well MW-02, EB-07 and P-05 contained insufficient water or were dry during the first (1st) and/or second (2nd) monitoring events. Monitoring wells MW-03 and MW-23 contained LNAPL during the second (2nd) semi-annual monitoring event.

The samples were collected using the low stress or low flow method according to EPA protocol (EQASOP-GW4, Revision 4, September 19, 2017) where an environmental pump is submerged near the middle of the well screen and the well is pumped at a low rate until environmental parameters stabilize. Groundwater samples were collected from the discharge of the dedicated disposable Tygon tubing. The tubing was discarded after each use and the pump was thoroughly cleaned with a solution of potable water and laboratory grade detergent (Alconox®) and rinsed with distilled water. The samples were analyzed by DHL Analytical, Inc. (DHL), a National Environmental Laboratory Accreditation Conference (NELAC) accredited laboratory, located in Round Rock, Texas. Samples from both events were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA SW-846 Method 8260D. Samples from the first (1st) event were analyzed for cations (calcium, magnesium, sodium, and potassium), anions (alkalinity, sulfate and chloride) by EPA Method E300, and TDS by EPA Method M2540C. The cation samples were filtered by the laboratory to exclude particles larger than 0.45 micron (µm) and acidified with hydrochloric acid within 24-hours of collection. The purged water was contained in a portable tank and discharged to the Facility's process water system for disposal in an offsite OCD permitted Class II injection well. Table 3 presents the BTEX analytical data summary. Table 4 presents the cation, anion, and TDS analytical data summary. Appendix C presents laboratory analytical reports.

3.3.1 BTEX Analysis

All benzene values represent dissolved-phase concentrations that are well below the solubility limit (1,770 mg/L).

April 2020 BTEX Results

The following samples were reported with benzene concentrations above the WQCC human health standard of 0.01 milligrams per liter (mg/L):

Well	Benzene (mg/L)
MW-03	0.0569
MW-22	1.22

MW-23	2.64
MW-24	2.73

Figure 6a presents a dissolved benzene concentration in groundwater map for April 7 and 8, 2020.

Ethyl benzene in MW-24 (0.821 mg/L) exceeded WQCC human health standards of 0.75 mg/L. Toluene and xylenes were reported below the WQCC human health standards of 0.75 mg/L and 0.62 mg/L, respectively, in all samples collected in April 2020.

September 2020 Results
The following samples were reported with benzene concentrations above the WQCC human health standard of 0.01 mg/L:

Well	Benzene (mg/L)
MW-22	2.63
MW-24	2.28

Figure 6b presents a dissolved benzene concentration in groundwater map on September 22 and 23, 2020.

Toluene, ethyl benzene and xylenes were reported below the WQCC human health standards in all samples collected on September 22 and 23, 2020.

The benzene concentration in groundwater samples decreased below the WQCC human health standard (0.01 mg/L) in all but three (3) monitoring wells (MW-22, MW-23, and MW-24) under the current groundwater monitoring program. The benzene concentrations in well MW-22 decreased from 17.7 mg/L (April 13, 2016) to 2.63 mg/L (September 23, 2020). The benzene concentrations in groundwater samples from well MW-23 decreased from 2.26 mg/L (July 15, 2009) to 0.002 mg/L (April 12, 2016) and increased to 2.64 mg/L (April 7, 2020). The increase in benzene concentrations in well MW-23 may coincide with influence from SVE remediation on the west side of the Facility allowing dissolved benzene and LNAPL to increase in wells MW-21 and MW-23. In January 2019, SVE remediation was initiated east of the Facility in the vicinity of MW-21 and MW-23. Appendix D presents Chart A showing the benzene concentrations in groundwater over time for monitoring wells MW-22, MW-23, and MW-24.

Benzene was highest in well MW-22 (31.3 mg/L) and decreased in concentration by approximately 92 percent following initiation of SVE remediation in January 2019. The benzene concentration in well MW-23 was highest on July 15, 2009 (2.26 mg/L) and decreased to 0.002 mg/L on April 12, 2016. The benzene concentration in well MW-23 remained stable with no significant changes until April 7, 2020 (2.64 mg/L) and September 23, 2020, when LNAPL was observed in the well.

EcoVac performed SVE remediation at MW-23 on February 5, 2021 and removed a combined total of 125.1 lbs of vapor, 64.6 gallons of combined liquid hydrocarbons and vapor equivalent and 36.4 gallons of water. LNAPL was recorded at 0.02 feet thick in well MW-23 on February 22, 2021.

Well MW-24 was installed about 385 feet southeast (down gradient) from well EB-08 on September 28, 2011. Benzene was reported at 4.16 mg/L on March 13, 2012, and has varied in concentration from 5.1 mg/L on September 27, 2012, 4.51 mg/L on December 5, 2018 and 2.28 mg/L on September 23, 2020. LNAPL in well EB-08 is the suspected source for the benzene in well MW-24. The benzene concentration in well MW-24 appears stable while SVE remediation in well EB-08 has reduced the LNAPL from a maximum thickness of 4.11 feet (September 24, 2012) to 0.15 feet on February 22, 2021.

On March 5, 2013, NMOSE concluded the initial groundwater abatement plan that proposed using nine (9) recovery wells pumping approximately 36.32 acre-feet of water per year for 5.52 years would not impact the Pecos River. NMOSE also concluded there were no records for active water wells within two (2) miles of the plant, supporting Aka's requests to allow the residual BTEX to naturally attenuate over time given the fact that there are no groundwater receptors within two (2) miles of the plant.

3.3.3 General Chemistry Analysis

The cation metals (calcium, magnesium, potassium, and sodium) concentrations were consistent with previous monitoring events. No WQCC domestic water quality standards are available for cation metals. Sulfate and TDS are naturally occurring minerals dissolved from gypsum in the Tansill formation that exceed the WQCC domestic water quality standards of 600 mg/L and 1,000 mg/L, respectively. Chloride was variable in concentration and exceeded the WQCC domestic water quality standard of 250 mg/L in samples from three (3) wells on April 7 and 8, 2020. Sulfate, and TDS concentrations have similar trends over time with neither increasing and/or decreasing concentrations. Dissolution of gypsum from a leak in the cooling tower basin is suspected to have contributed to elevated chloride, sulfate, and TDS near the northwest corner of the Facility. The cooling tower was dismantled and is no longer in service. Mounded groundwater causes groundwater with elevated sulfate, chloride, and TDS to migrate in the direction of groundwater flow.

April 2020 Results

Chloride – The following samples were reported with chloride concentrations above the WQCC domestic water quality standard of 250 mg/L:

Well	Chloride (mg/L)
MW-08	524
MW-15	2,840
MW-18	461

Chloride in MW-15 is suspected from hydrochloric acid and dissolution of gypsum due to a leak in the cooling tower basin. Figure 6a presents a map of chloride concentrations in groundwater on April 7 and 8, 2020.

Sulfate – All sulfate concentrations exceeded the WQCC domestic water quality standard of 600 mg/L and ranged from 1,400 mg/L (MW-03) to 43,800 mg/L (MW-15). Sulfate concentrations are notably elevated above the background concentration in the sample from well MW-15 located north of the Facility where the plume migrates in the direction of localized groundwater flow. Sulfate in MW-15 is suspected from dissolution of gypsum due to a leak in the cooling tower basin. Figure 7a presents an isopleth map of sulfate concentrations in groundwater on April 7 and 8, 2020.

TDS – All TDS concentrations exceeded the WQCC domestic water quality standard of 1,000 mg/L and ranged from 3,030 mg/L (MW-03) to 76,400 mg/L (MW-15). The TDS concentration in sample MW-15 is likely the result of dissolution of minerals in the Tansill formation from a past leak in the cooling tower basin. The TDS in MW-15 migrates north in the direction of localized groundwater flow. Figure 8a presents a map of TDS concentrations in groundwater on April 7 and 8, 2020.

Elevated chloride in groundwater is limited to three (3) monitoring wells (MW-08, MW-15 and MW-18). The chloride concentration in monitoring well MW-08 located on site near the southwest corner of the Facility may be attributed to an offsite and hydraulically upgradient (west-northwest) source. Wells MW-15 and MW-18 are located west and north of the Facility, respectively. The groundwater has naturally occurring concentrations of sulfate and TDS owing to dissolution of minerals (gypsum) in the Tansill Formation.

4.0 REMEDIATION

4.1 LNAPL and Groundwater Remediation

In August 2018, Aka implemented LNAPL and groundwater remediation using SVE and thermal destruction methods. A mobile SVE system manufactured by CCC was used on the west side of the Facility (Staging Area 1) at monitoring wells MW-02-09, MW-02-13, MW-02-14, MW-03-01, MW-09, MW-10, MW-11, and test well AS-1. Between August 2018 through March 2019 the run time and average VOC combustion with the CCC system were 3,817 hours with approximately 28.9 pounds per hour (lbs/hr) for a total VOC combustion of approximately 85,274 lbs or about 42.64 tons. Air sparging was initiated in well MW-03-01 following removal of LNAPL from the well.

In March 2019, the CCC unit was moved to Staging Area B located near the east side of the Facility where LNAPL began to appear in monitoring wells MW-02-12 (8.07 feet), MW-21 (9.57 feet) and MW-23 (7.39 feet). It is speculated that the occurrence of LNAPL in wells MW-21 and MW-23 may have resulted from reduction of mounding beneath the central part of the Facility during LNAPL and groundwater recovery at Staging Area A allowing LNAPL and groundwater to migrate east and southeast. Between March 15, 2019, and August 5, 2019, the CCC system combusted approximately 130,293 pounds (lbs) or

about 65.15 tons of VOC vapors and recovered approximately 480 gallons or approximately 11.43 barrels (bbl) of liquid.

Between March 2019 and August 2019, the runtime for the CCC noticeably decreased and the system was replaced with a truck-mounted dual phase SVE system with Enhanced Fluid Recovery® (EFR) operated by EcoVac Services (EcoVac), Moore, Oklahoma. The EcoVac system vacuum blower draws higher liquid and vapor volumes from the well and utilizes two (2) auxiliary internal combustion engines to combust vapors while liquids are contained in an onboard tank. Liquids were discharged to a portable (frac) tank leased from Gandy Corporation and staged near the east side of the Facility. The recovered liquid is disposed in an OCD permitted offsite commercial Class II SWD well.

Between August 5, 2019, and February 6, 2021, the EcoVac system was operated on all wells reporting LNAPL during eleven (11) events of various lengths. The EcoVac system was used at Staging Area A (MW-02-09, MW-02-13, MW-02-14, MW-03-01, MW-09, MW-10, MW-11, and AS-1), Staging Area B (MW-02-12, MW-21 and MW-23) and seventeen (17) other wells including MW-02-10, MW-02-11, MW-02-15, MW-012-16, MW-03 ME-03-02, MW-03-03, MW-04, MW-06, MW-13, MW-14, MW-19 and MW-20. During this period, the EcoVac combusted approximately 7,615.1 pounds or about 3.81 tons of VOC vapors, recovered approximately 2,475.2 gallons of hydrocarbon liquid including 1,261.1 equivalent gallons of hydrocarbons in vapor, 1,214 gallons of liquid hydrocarbons, and 20,690 gallons of water. The water volume recovered with the EcoVac system decreased significantly from 3,648 gallons in October 2019 to 121 gallon in February 2021. Between August 2018 and February 2021, the combined total vapor recovery from the CCC and EcoVac systems was approximately 223,182.1 lbs or about 111,591 tons of hydrocarbons vapors, 2,955.2 gallons or 70.36 bbl of hydrocarbon liquid and 20,690 gallons or 492.62 bbl of water. Appendix E presents the EcoVac reports.

4.2 LNAPL Reduction

LNAPL in Staging Area A was successfully reduced between 98.7 and 99.9 percent from a maximum thickness of 9.33 feet in MW-02-09 (September 14, 2009) and 25.42 feet in MW-10 (July 31, 2008) to 0.12 feet (MW-02-09) and 0.01 feet (MW-10) on February 22, 2021, respectively. Chart B (Appendix D) presents a LNAPL reduction curve for Staging Area A.

LNAPL in Staging Area B was successfully reduced between 99.5 and 99.7 percent from a maximum thickness of 8.07 feet in MW-02-12 and 9.57 feet in MW-21 (December 4, 2018) and 7.39 feet in MW-23 (February 20, 2019) to 0.03 feet (MW-02-12), 0.05 feet (MW-21) and 0.02 feet (MW-23) on February 22, 2021, respectively. Chart C (Appendix D) presents an LNAPL reduction curve for Staging Area B.

LNAPL in the remaining wells was reduced between approximately 50 percent (MW-03-03) and 100 percent (MW-02-06, MW-02-10, MW-02-11, MW-02-16, MW-03-04, MW-04, MW-13, and MW-20). SVE technology achieved between 92.7 (EB-03) and 99.8 (MW-06 and MW-19) percent reduction in LNAPL thickness. Appendix D presents scatter plots for LNAPL reduction in the remaining wells.

The most liquids (hydrocarbons and water) were recovered from Staging Area A and area to the south and southeast in the vicinity of wells MW-02-13, MW-03-02 and MW-06. Appendix D presents a diagram titled, "Extraction Over Time, Liquid Gallons" that shows the area for liquid recovery over time.

Hydrocarbon vapor concentrations in soil greater than 100,000 parts per million (ppm) were recorded from wells MW-02-10, MW-02-11, MW-03, MW-04 located east of the former main compressor (Clark) building and from well MW-10 located in Staging Area A near the west side of the Facility. During the last quarter of 2018, the Clark Building was demolished along with the compressor engines, piping, and concrete. During February and March 2020, SDR Enterprises, LLC (SDR), under supervision from LAI, excavated approximately 3,500 cubic yards of soil from beneath the Clark Building foundation between about 2 and 15 feet bgs resulting in removal of a significant mass of hydrocarbons. The soil remediation was compiled into a report dated November 6, 2020 ("Empire Abo Plant (AP-112) Soil Remediation Report, Eddy County, New Mexico") was submitted to NMOCD on December 7, 2020, and approved on December 30, 2020.

4.3 Soil Remediation

Soil remediation was performed at eight (8) areas inside the Facility that included the Wastewater Tanks (EA-02), Amine Sump (EA-03), Slop Oil Tanks (EA-05), Cooling Tower (EA-07), Main Compressor (Clark) Building (EA-12), Compressor (Engine 9) Building (EA-13), Area North of Engine 9 (EA-14) and Southwest Containment Area (EA-15). The remediation was performed in accordance with a remediation plan titled, "Empire Abo Plant (AP-112) Soil Investigation Report and Remediation Plan, Eddy County, New Mexico, February 7, 2020" that was approved by NMOCD on February 14, 2020. NMOCD approved a variance (March 4, 2020) to use crushed concrete for backfilling the excavations with the following conditions:

1. Must have letter, signed, included in remedial report detailing concrete use and the internal approval of the "owner" for said use/activity.
2. Concrete must not be derived from any areas that may have been subject to contaminants of concern for this location. Remedial report needs to attest to this requirement.

NMOCD also agreed with the plan presented by Aka and Durango (April 14, 2020) for testing each 2,000 cubic yards of concrete with the following exception: please give all concrete to be used a good water and soap wash down post crushing and before use. In a written agreement between Aka and Durango, Durango is responsible for backfilling the excavations with concrete.

Between February 18, 2020, and April 8, 2020, approximately 8,108.65 tons (equivalent to cubic yards) of soil and rock were hauled and disposed at Lea Land Landfill, LLC, an OCD permitted surface waste management facility (NM-1-0035), located at Mile Marker 64 south of U.S. Highway 62/180 east of Carlsbad, New Mexico. Personnel from Larson & Associates, Inc. (LAI) supervised the excavation of soil, manifests and collected bottom and sidewall composite samples according to OCD rule for releases (19.15.29 NMAC) for about every 200 square feet of the excavations. The samples were analyzed by Xenco Laboratories, a NELAP accredited laboratory, located in Carlsbad, New Mexico and Midland, Texas. Soil was excavated until the concentrations of BTEX, TPH and chloride were below the OCD remediation standards in Table 1 (19.15.29 NMAC) and/or metals concentrations were below the NMED soil screening levels (chromium and arsenic) unless physical conditions (i.e., pipelines, equipment, etc.) prevented complete remediation.

Laboratory analysis confirmed that remediation is complete at the following areas: EA-02, EA-03, EA-05, and EA-07. Remediation at the main compressor (Clark) building (EA-12) was not completed where an above-ground steel inlet gas line crosses the excavation from east to west and runs north along the west side of the excavation. Remediation at the Engine 9 (compressor) building (EA-13) was not completed on the north side of the former building where total petroleum hydrocarbons (TPH) in soil extends north approximately 100 feet beneath a paved road where concrete from demolition is piles and a horizontal vessel is located. LAI personnel delineated albeit not fully the extent of hydrocarbon contamination north of Engine 9 (compressor) building. Remediation on the south side of the Engine 9 (compressor) building was not completed due to high pressure natural gas pipeline. Aka and Durango request approval to defer final remediation until the plant ceases to operate and is demolished. The remediation was documented in the report titled, "EMPIRE ABO GAS PLANT (AP-112) Soil Remediation Report, Eddy County, New Mexico, November 6, 2020" that was approved by NMOCD on December 30, 2020. Appendix B presents NMOCD communications.

4.4 PCB Remediation

LAI personnel supervised SDR Enterprises, LLC, for remediating soil and rock contaminated from historic use of polychlorinated biphenyl (PCB). The remediation was performed in accordance with a plan titled, "Final PCB REMEDIATION PLAN Empire Abo Gas Plant, Eddy County, New Mexico, December 31, 2019" that was approved by the U.S. Environmental Protection Agency (EPA) Region 6 on February 4, 2020, with certification required under 40 CFR 761.61(a)(3) submitted on April 8, 2020. Appendix F presents EPA communications.

Between May 5, 2020, and September 16, 2020, approximately 2,113,048 lbs or 1,056.95 tons of PCB contaminated soil, rock, and concrete were disposed under EPA approval at the Waste Controlled Specialists (WCS) Landfill in Andrews County, Texas. The remediation was documented in the final report titled, "Final PCB REMEDIATION REPORT, Empire Abo Plant, Eddy County, New Mexico, May 16, 2021" that was submitted to EPA Region 6 on June 3, 2021 (approval pending).

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following observations are documented in this report:

- Groundwater is mounded beneath the Facility in two (2) areas near the north central and east areas of the Facility, which causes groundwater to flow in a radial pattern.
- The mounding is caused by shallow groundwater perched on units of laterally discontinuous clay and silty clay.
- Monitoring well EB-06 has typically been used as the up-gradient monitoring well for the Facility but is obstructed and not accessible for collecting depth to groundwater measurements.
- Mounded (perched) groundwater occurs near the central area of the Facility (MW-7) where laterally discontinuous clay and silty clay is present in the subsurface, and where leaking water lines may have contributed to the shallow (perched) groundwater. The mounding causes

groundwater to flow away from the Facility. Mounding was also observed east of the Facility in the area monitoring wells MW-02-11 and MW-24.

- The regional groundwater flow direction remains to the southeast.
- LNAPL was observed in eleven (11) monitoring wells during the first (1st) semi-annual monitoring event (April 6 - 7, 2020) and sixteen (16) monitoring wells during the second (2nd) semi-annual monitoring event (September 21 - 22, 2020) with apparent thicknesses ranging from 0.01 feet in (MW-03-03 and MW-19) to 0.74 feet (MW-14).
- Benzene decreased below the WQCC human health standard (0.01 mg/L) in all but three (3) monitoring wells (MW-22, MW-23, and MW-24) under the current groundwater monitoring program during 2020.
- Benzene in well MW-22 decreased approximately 92 percent from 31.3 mg/L (March 16, 2011) to 2.63 mg/L (September 23, 2020) following SVE remediation.
- Benzene in well MW-23 remained stable with no significant changes until April 23, 2019, when LNAPL (0.09 feet) was observed and decreased to 0.01 feet (September 21, 2020) after EcoVac performed SVE remediation.
- Benzene in well MW-24 appears stable following SVE remediation at well EB-08 located approximately 385 feet northwest (upgradient) of well MW-24.
- Ethylbenzene exceeded the WQCC human health standard (0.75 mg/L) in the groundwater sample from monitoring well MW-23 with a concentration of 0.779 mg/L during the first semi-annual monitoring event (April 6 – 7, 2020).
- Toluene and xylenes were not reported above the WQCC human health standards in groundwater samples during 2020.
- Chloride exceeded the WQCC domestic water quality standard (250 mg/L) in samples from three (3) monitoring wells (MW-08, MW-15, and MW-18) with concentrations ranging from 461 mg/L (MW-18) to 2,840 mg/L (MW-15) during the first semi-annual monitoring event (April 6 – 7, 2020).
- Sulfate and TDS exceeded the WQCC domestic water quality standards of 600 mg/L and 1,000 mg/L, respectively, in all samples during the first semi-annual monitoring event (April 6 – 7, 2020).
- The highest sulfate (43,800 mg/L) and TDS (76,400 mg/L) concentrations were reported in groundwater samples from monitoring well MW-15, located north of the Facility, resulting from dissolution of minerals in the Tansill formation.
- SVE remediation recovered approximately 223,182.1 lbs or about 111.59 tons of hydrocarbons vapors, 2,955.2 gallons or 70.36 bbl of hydrocarbon liquid and 20,690 gallons or 492.62 bbl of water between August 2018 and February 2021.
- LNAPL (Staging Area A) was successfully reduced between 98.7 and 99.9 percent from a beginning maximum thickness of 9.33 feet in MW-02-09 (September 14, 2009) and 25.42 feet in MW-10 (July 31, 2008) to 0.12 feet (MW-02-09) and 0.01 feet (MW-10) on February 22, 2021.
- LNAPL (Staging Area B) was successfully reduced between 99.5 and 99.7 percent from a beginning maximum thickness of 8.07 feet in MW-02-12 and 9.57 feet in MW-21 (December 4,

2018) and 7.39 feet in MW-23 (February 20, 2019) to 0.03 feet (MW-02-12), 0.05 feet (MW-21) and 0.02 feet (MW-23) on February 22, 2021, respectively.

- LNAPL in the remaining wells was reduced between approximately 50 percent (MW-03-03) and 100 percent (MW-02-06, MW-02-10, MW-02-11, MW-02-16, MW-03-04, MW-04, MW-13, and MW-20).
- SVE technology achieved between 92.7 (EB-03) and 99.8 (MW-06 and MW-19) percent reduction in LNAPL thickness.
- The most liquid (hydrocarbons and water) was recovered from the west side of the Facility (Staging Area A), south and southeast of the Facility in the vicinity of wells MW-02-13, MW-03-02 and MW-06.

5.2 Recommendations

Aka offers the following recommendations which are supported by the results of soil remediation performed between February 18, 2020, and April 8, 2020, PCB remediation performed between May 5, 2020, and September 16, 2020, and groundwater and LNAPL remediation performed between August 2018 and February 2021:

- Aka requests approval to discontinue SVE remediation based on the reduction of LNAPL between 92.7 and 99.9 percent from pre-remediation thicknesses and technically infeasible to recover the remaining 0.1 and 7.3 percent, excluding MW-03-03.
- Aka requests approval to allow residual dissolved benzene in groundwater to naturally attenuate based on demonstrated concentration reductions and no groundwater receptors (i.e., domestic, industrial, livestock) wells within 2 miles as documents by NMOSE.
- Aka requests approval to discontinues groundwater monitoring at the Facility.

Tables

Table 1
Monitor Well Completion and Gauging Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well Information								Groundwater Data				
Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
MW-1						Plugged						
MW-2	12/29/1991	37.88	4	3,545.3	19 - 34	2.89	3,548.19	5/20/2013	--	34.00	--	3,514.19
								10/15/2013	--	34.05	--	3,514.14
								5/14/2014	--	34.00	--	3,514.19
								10/14/2014	--	34.05	--	3,514.14
								4/21/2015	--	34.05	--	3,514.14
								12/8/2015	--	34.10	--	3,514.09
								4/11/2016	--	34.06	--	3,514.13
								12/12/2016	--	34.06	--	3,514.13
								4/17/2017	--	34.06	--	3,514.13
								10/25/2017	--	34.03	--	3,514.16
								12/8/2017	--	34.13	--	3,514.06
								3/19/2018	--	34.13	--	3,514.06
								4/29/2019	--	34.08	--	3,514.11
								12/9/2019	--	34.08	--	3,514.11
								4/7/2020		Dry	--	--
								9/22/2020	--	34.11	--	3,514.08
MW-02-01						Plugged						
MW-02-02	10/6/1992	48.65	4	3,549.3	35 - 45	2.96	3,552.26	5/20/2013	--	26.91	--	3,525.35
								10/15/2013	--	27.00	--	3,525.26
								5/14/2014	--	27.22	--	3,525.04
								10/14/2014	--	27.20	--	3,525.06
								4/21/2015	--	26.96	--	3,525.30
								12/8/2015	--	27.20	--	3,525.06
								4/11/2016	--	27.18	--	3,525.08
								12/12/2016	--	27.06	--	3,525.20
								4/17/2017	--	26.99	--	3,525.27
								10/25/2017	--	27.49	--	3,525.20
								12/8/2017	--	27.40	--	3,525.29
								3/19/2018	--	27.21	--	3,518.59
								12/9/2019	--	27.13	--	3,525.13
								4/7/2020	--	27.25	--	3,525.01
								9/22/2020	--	27.36	--	3,524.90
MW-02-03	9/28/1992	108.50	4	3,553.0	95 - 105	3.03	3,556.03	5/20/2013	--	77.55	--	3,478.48
								10/15/2013	--	79.00	--	3,477.03
								5/14/2014	--	81.11	--	3,474.92
								10/14/2014	--	79.12	--	3,476.91
								4/21/2015	--	79.65	--	3,476.38
								12/8/2015	--	79.95	--	3,476.08
								4/11/2016	--	80.03	--	3,476.00
								12/12/2016	--	89.50	--	3,466.53
								4/17/2017	--	82.44	--	3,473.59
								10/25/2017	--	83.15	--	3,472.88
								12/8/2017	--	83.46	--	3,472.57
								3/13/2018	--	84.51	--	3,471.52
								3/19/2018	--	84.23	--	3,471.80
								12/4/2018	--	85.02	--	3,471.01
								4/24/2019	--	86.02	--	3,470.01
								12/9/2019	--	83.42	--	3,472.61
								4/6/2020	--	84.12	--	3,471.91
								9/22/2020	--	85.56	--	3,470.47
MW-02-04	9/30/1992	61.60	4	3,550.9	45 - 55	2.89	3,553.79	5/20/2013	--	51.45	--	3,502.34
								10/15/2013	--	51.00	--	3,502.79
								5/14/2014	--	52.80	--	3,500.99
								10/14/2014	--	48.58	--	3,505.21

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								4/21/2015	--	50.70	--	3,503.09
								12/8/2015	--	52.30	--	3,501.49
								4/11/2016	--	52.58	--	3,501.21
								12/12/2016	--	53.00	--	3,500.79
								4/17/2017	--	54.30	--	3,499.49
								10/25/2017	--	53.18	--	3,500.61
								12/8/2017	--	53.80	--	3,499.99
								3/13/2018	--	54.82	--	3,498.97
								3/19/2018	--	54.90	--	3,498.89
								12/4/2018	--	53.36	--	3,500.43
								4/24/2019	--	54.52	--	3,499.27
								12/9/2019	--	53.20	--	3,500.59
								4/6/2020	--	52.93	--	3,500.86
								9/22/2020	--	54.41	--	3,499.38
MW-02-05	10/6/1992	52.31	4	3,549.9	40 - 50	2.79	3,552.69	5/20/2013	--	27.45	--	3,525.24
								10/15/2013	--	27.60	--	3,525.09
								5/14/2014	--	27.90	--	3,524.79
								10/14/2014	--	27.90	--	3,524.79
								4/21/2015	--	27.62	--	3,525.07
								12/8/2015	--	27.80	--	3,524.89
								4/11/2016	--	27.82	--	3,524.87
								12/12/2016	--	28.71	--	3,523.98
								4/17/2017	--	27.00	--	3,525.69
								10/25/2017	--	28.11	--	3,524.58
								12/8/2017	--	28.09	--	3,524.60
								3/19/2018	--	27.80	--	3,524.89
								12/5/2018	--	28.03	--	3,524.66
								4/24/2019	--	27.84	--	3,524.85
								12/9/2019	--	27.80	--	3,524.89
								4/7/2020	--	27.92	--	3,524.77
								9/22/2020	--	28.03	--	3,524.66
MW-02-06	9/29/1992	23.90	4	3,548.3	11 - 21	2.52	3,550.82	5/20/2013	19.25	19.30	0.05	3,531.55
								10/15/2013	10.55	11.00	0.45	3,540.13
								5/14/2014	20.50	20.85	0.35	3,530.22
								10/14/2014	11.75	12.20	0.45	3,538.94
								4/21/2015	18.30	18.60	0.30	3,532.43
								12/8/2015	Sheen	16.11	Sheen	3,534.71
								4/11/2016	Sheen	15.79	Sheen	3,535.03
Note: Sheen is consistent and reproducible with multiple probes								12/12/2016	17.65	17.66	0.01	3,533.17
								4/17/2017	21.62	21.63	0.01	3,529.20
								10/25/2017	19.68	20.16	0.48	3,531.00
								12/8/2017	--	20.15	--	3,530.67
								3/13/2018	20.94	21.35	0.41	3,523.18
								3/19/2018	--	20.91	--	3,529.91
								12/4/2018	20.37	20.62	0.25	3,530.38
								4/24/2019	21.33	21.94	0.61	3,529.31
								8/30/2019	21.10	22.18	1.08	3,529.07
								12/9/2019	--	19.97	--	3,530.85
								4/6/2020	--	21.43	--	3,529.39
								9/22/2020	--	22.05	--	3,528.77
MW-02-07	10/5/1992	63.80	4	3,544.2	53 - 63	2.80	3,547.00	5/20/2013	--	58.00	--	3,489.00
								10/15/2013	--	60.40	--	3,486.60
								5/14/2014	--	61.70	--	3,485.30
								10/14/2014	--	59.05	--	3,487.95
								4/21/2015	--	62.00	--	3,485.00

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								12/8/2015		Dry		
								4/11/2016		Dry		
								12/12/2016	--	61.95	--	3,485.05
								4/17/2017		Dry		
								10/25/2017		Dry		
								12/8/2017		Dry		
								3/19/2018		Dry		
								12/4/2018		Dry		
								4/24/2019		Dry		
								12/7/2019		Well Plugged		
MW-02-09	10/7/1992	43.97	4	3,543.5	30 - 40	3.02	3,546.52	5/20/2013	34.00	38.45	4.45	3,511.19
								10/15/2013	34.55	37.70	3.15	3,511.03
								5/14/2014	34.60	39.15	4.55	3,510.56
								10/14/2014	34.82	38.90	4.08	3,510.48
								4/21/2015	34.92	38.80	3.88	3,510.44
								12/8/2015	35.70	37.90	2.20	3,510.16
								4/11/2016	35.35	36.81	1.46	3,510.73
								12/13/2016	35.70	38.65	2.95	3,509.94
								4/17/2017	35.80	38.60	2.80	3,509.88
								10/25/2017	35.81	38.79	2.98	3,509.82
								12/8/2017	36.30	36.59	0.29	3,510.13
								3/13/2018	36.32	39.09	2.77	3,509.37
								3/19/2018	36.29	37.15	0.86	3,509.97
								12/4/2018	37.61	37.91	0.30	3,508.82
								4/24/2019	36.30	36.53	0.23	3,510.15
								8/30/2019	36.33	36.58	0.25	3,510.10
								12/9/2019	36.35	36.60	0.25	3,509.92
								4/6/2020	36.34	36.45	0.11	3,510.07
								9/22/2020	36.35	36.60	0.25	3,510.10
MW-02-10	9/29/1992	72.90	4	3,545.4	65 - 75	3.00	3,548.40	5/20/2013	63.96	**	>10	--
								10/15/2013	66.10	72.40	6.30	3,480.41*
								5/14/2014	68.35	>72.9	>4.55	<3,475.50
								10/14/2014	64.72	>72.9	>8.15	<3,475.50
								4/21/2015	67.25	>72.9	>5.65	<3,475.50
								12/8/2015	67.05	>72.9	>5.85	<3,475.50
								4/11/2016	67.47	>72.9	>5.43	<3,475.50
								12/12/2016	68.90	>72.9	>4.00	<3,472.70
								4/17/2017	69.98	>72.9	>2.92	<3,475.70
								10/25/2017	71.35	>72.9	>1.55	<3,475.70
								12/8/2017	70.95	>72.9	>1.95	<3,475.70
								3/13/2018	72.49	72.55	0.06	3,475.85
								3/19/2018	72.52	72.59	0.07	3,475.81
								12/4/2018	72.85	74.15	1.30	3,475.16
								4/24/2019		Dry		
								12/9/2019		Dry		
								4/6/2020	72.31	72.77	0.46	3,475.63
								9/22/2020	74.29	74.31	0.02	3,474.10
MW-02-11	9/29/1992	23.42	4	3,544.0	10 - 20	2.79	3,546.79	5/20/2013	21.78	21.90	0.12	3,524.97*
								10/15/2013	18.25	18.30	0.05	3,528.52*
								5/14/2014	22.45	22.50	0.05	3,523.64*
								10/14/2014	17.29	17.35	0.06	3,528.80*
								4/21/2015	--	19.54	--	3,527.25
								12/8/2015	--	18.80	--	3,527.99
								4/11/2016	--	20.59	--	3,526.20
								12/12/2016	--	21.00	--	3,525.79

Table 1
Monitor Well Completion and Gauging Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well Information								Groundwater Data				
Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								4/17/2017	--	21.45	--	3,525.34
								10/25/2017	--	21.38	--	3,525.41
								12/8/2017	--	22.10	--	3,524.69
								3/13/2018	22.93	23.23	0.30	3,523.56
								3/19/2018	22.90	**	**	3,546.79
								12/4/2018	21.77	22.40	0.63	3,524.83
								4/24/2019	23.17	--	--	--
								12/9/2019	21.96	**	--	
								4/6/2020	Dry			
								9/22/2020	Dry			
MW-02-12	10/1/1992	85.85	4	3,540.3	70 - 80	3.02	3,543.32	5/20/2013	--	66.84	--	3,476.48
								10/15/2013	--	67.80	--	3,475.52
								5/14/2014	--	70.00	--	3,473.32
								10/14/2014	--	67.25	--	3,476.07
								4/21/2015	--	68.10	--	3,475.22
								12/8/2015	--	68.25	--	3,475.07
								4/11/2016	--	68.42	--	3,474.90
								12/12/2016	--	69.10	--	3,474.22
								4/17/2017	--	70.66	--	3,472.66
								10/25/2017	--	71.35	--	3,471.97
								12/8/2017	--	71.68	--	3,471.64
								3/13/2018	--	72.45	--	3,470.87
								3/19/2018	--	72.54	--	3,470.78
								12/4/2018	72.94	81.01	8.07	3,467.96
								4/24/2019	74.36	74.43	0.07	3,468.94
								12/9/2019	71.35	71.38	0.03	3,471.94
								4/7/2020	72.00	72.07	0.07	3,471.25
								9/22/2020	73.59	73.81	0.22	3,469.66
MW-02-13	10/7/1992	50.05	4	3,542.7	36 - 46	2.89	3,545.59	5/20/2013	43.80	47.42	3.62	3,500.70
								10/15/2013	43.82	47.40	3.58	3,500.70
								5/14/2014	45.91	47.38	1.47	3,499.24
								10/14/2014	41.40	47.25	5.85	3,502.44
								4/21/2015	45.00	46.80	1.80	3,500.05
								12/8/2015	44.75	46.90	2.15	3,500.20
								4/11/2016	44.72	47.07	2.35	3,500.17
								12/13/2016	45.30	47.02	1.72	3,499.77
								4/17/2017	45.20	47.05	1.85	3,499.84
								10/25/2017	46.37	47.13	0.76	3,498.99
								12/8/2017	47.00	47.07	0.07	3,498.57
								3/13/2018	46.91	48.11	1.20	3,498.32
								3/19/2018	46.83	47.35	0.52	3,498.60
								12/4/2018	46.68	46.87	0.19	3,498.85
								4/24/2019	47.28	47.84	0.56	3,498.14
								8/30/2019	47.64	47.85	0.21	3,498.13
								12/9/2019	47.67	47.68	0.01	3,497.91
								4/7/2020	47.50	47.58	0.08	3,498.01
								9/22/2020	47.45	47.53	0.08	3,498.12
MW-02-14	10/5/1992	78.80	4	3,541.3	63 - 73	3.23	3,544.53	5/20/2013	59.47	60.35	0.88	3,484.80
								10/15/2013	60.15	60.85	0.70	3,484.17
								5/14/2014	61.60	62.20	0.60	3,482.75
								10/14/2014	59.30	61.20	1.90	3,484.66
								4/21/2015	61.25	62.00	0.75	3,483.06
								12/8/2015	61.35	61.70	0.35	3,483.08
								4/11/2016	61.38	61.80	0.42	3,483.02
								12/13/2016	61.31	61.90	0.59	3,483.04

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Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well Information								Groundwater Data				
Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								4/17/2017	61.30	61.80	0.50	3,483.08
								10/25/2017	64.47	64.95	0.48	3,479.92
								12/8/2017	64.79	64.82	0.03	3,479.73
								3/13/2018	65.55	65.69	0.14	3,478.94
								3/19/2018	65.82	65.90	0.08	3,478.69
								12/4/2018	66.67	66.92	0.25	3,477.79
								4/24/2019	--	67.94	--	3,476.59
								8/30/2019	67.45	68.00	0.55	3,476.53
								12/9/2019	64.57	64.58	0.01	3,479.95
								4/7/2020	65.30	65.34	0.04	3,479.19
								9/22/2020	65.19	65.23	0.04	3,479.30
MW-02-15	10/2/1992	75.95	4	3,540.2	60 - 70	3.09	3,543.29	5/20/2013	--	61.04	--	3,482.25
								10/15/2013	--	61.50	--	3,481.79
								5/14/2014	--	62.75	--	3,480.54
								10/14/2014	--	60.71	--	3,482.58
								4/21/2015	--	62.25	--	3,481.04
								12/8/2015	--	62.21	--	3,481.08
								4/11/2016	--	62.31	--	3,480.98
								12/13/2016	67.31	67.41	0.10	3,475.95
								4/17/2017	64.32	64.60	0.28	3,478.89
								10/25/2017	64.88	65.08	0.20	3,478.35
								12/8/2017	64.69	65.00	0.31	3,478.51
								3/13/2018	65.69	68.76	3.07	3,476.68
								3/19/2018	65.71	68.31	2.60	3,476.80
								12/4/2018	66.03	70.24	4.21	3,476.00
								4/24/2019	68.00	68.37	0.37	3,475.18
								8/30/2019	69.13	69.51	0.38	3,474.04
								12/9/2019	64.59	65.51	0.92	3,477.78
								4/6/2020	65.66	65.89	0.23	3,477.40
								9/22/2020	67.30	67.50	0.20	3,475.93
MW-02-16	9/30/1992	86.10	4	3,541.0	70 - 80	3.24	3,544.24	5/20/2013	--	67.25	--	3,476.99
								10/15/2013	--	67.90	--	3,476.34
								5/14/2014	--	70.00	--	3,474.24
								10/14/2014	--	67.58	--	3,476.66
								4/21/2015	--	68.56	--	3,475.68
								12/8/2015	--	68.50	--	3,475.74
								4/11/2016	--	68.66	--	3,475.58
								12/12/2016	72.15	72.89	0.74	3,471.87
								4/17/2017	70.50	72.13	1.63	3,473.25
								10/25/2017	70.91	72.65	1.74	3,472.81
								12/8/2017	71.74	71.75	0.01	3,472.50
								3/13/2018	72.10	72.34	0.24	3,472.07
								3/19/2018	72.30	72.50	0.20	3,471.88
								12/4/2018	72.30	72.42	0.12	3,471.90
								4/24/2019	73.24	73.48	0.24	3,470.93
								8/30/2019	73.22	74.00	0.78	3,470.41
								12/9/2019	--	71.02	--	3,473.22
								4/7/2020	--	71.65	--	3,472.59
								9/22/2020	Sheen	72.89	Sheen	3,471.35
MW-02-18	10/7/1992	39.80	4	3,542.7	26 - 36	3.00	3,545.70	5/20/2013	--	20.65	--	3,525.05
								10/15/2013	--	17.15	--	3,528.55
								5/14/2014	--	21.25	--	3,524.45
								10/14/2014	--	15.35	--	3,530.35
								4/21/2015	--	18.35	--	3,527.35
								12/8/2015	--	17.75	--	3,527.95

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Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								4/11/2016	--	19.63	--	3,526.07
								12/12/2016	--	19.95	--	3,525.75
								4/17/2017	--	20.32	--	3,525.38
								10/25/2017	--	20.49	--	3,525.21
								12/8/2017	--	21.24	--	3,524.46
								3/13/2018	--	21.90	--	3,523.80
								3/19/2018	--	21.95	--	3,523.75
								12/4/2018	--	20.82	--	3,524.88
								4/24/2019	--	22.34	--	3,523.36
								12/10/2019	--	21.50	--	3,524.20
								4/6/2020	--	22.48	--	3,523.22
								9/22/2020	--	23.08	--	3,522.62
MW-03	12/20/1991	63.30	4	3,552.4	69 - 89	2.90	3,555.30	5/20/2013	--	72.62	--	3,482.68
								10/15/2013	--	75.90	--	3,479.40
								5/14/2014	77.30	77.32	0.02	3,477.99*
								10/14/2014	--	75.12	--	3,480.18
								4/21/2015	--	76.35	--	3,478.95
								12/8/2015	--	76.28	--	3,479.02
								4/11/2016	--	76.60	--	3,478.70
								12/12/2016	--	77.40	--	3,477.90
								4/17/2017	--	79.63	--	3,475.67
								10/25/2017	--	79.45	--	3,475.85
								12/8/2017	--	80.54	--	3,474.76
								3/13/2018	82.65	83.06	0.41	3,472.24
								3/19/2018	--	82.90	--	3,555.30
								12/4/2018	--	82.75	--	3,472.55
								4/25/2019	84.11	84.13	0.02	3,471.17
								12/9/2019	--	79.14	--	3,476.16
								4/6/2020	--	81.52	--	3,473.78
								9/22/2020	83.60	83.64	0.04	3,471.69
MW-03-01	5/3/1994	73.40	4	3,539.9	50 - 70	2.66	3,542.56	5/20/2013	--	57.50	--	3,485.06
								10/15/2013	58.10	58.70	0.60	3,484.28
								5/14/2014	59.20	60.70	1.50	3,482.91
								10/14/2014	57.07	57.15	0.08	3,485.47
								4/21/2015	59.65	60.20	0.55	3,482.75
								12/8/2015	59.66	61.00	1.34	3,482.50
								4/11/2016	58.53	58.75	0.22	3,483.96
								12/13/2016	58.26	58.36	0.10	3,484.27
								4/17/2017	58.20	58.30	0.10	3,484.33
								10/25/2017	61.51	61.76	0.25	3,480.98
								12/8/2017	61.70	61.77	0.07	3,480.84
								3/13/2018	62.87	64.40	1.53	3,479.23
								3/19/2018	62.90	63.17	0.27	3,479.58
								12/4/2018	--	64.12	--	3,479.39
								4/24/2019	--	65.15	--	3,478.44
								12/9/2019	--	61.38	--	3,481.18
								4/6/2020	65.30	65.34	0.04	3,477.22
								9/22/2020	--	64.49	--	3,478.07
MW-03-02	5/4/1994	105.75	4	3,538.6	60 - 100	2.48	3,541.08	5/20/2013	68.75	69.10	0.35	3,472.23
								10/15/2013	65.80	69.00	3.20	3,474.32
								5/14/2014	69.80	70.40	0.60	3,471.10
								10/14/2014	67.40	68.20	0.80	3,473.44
								4/21/2015	68.75	68.95	0.20	3,472.27
								12/8/2015	68.75	69.20	0.45	3,472.20
								4/11/2016	68.97	69.32	0.35	3,472.01

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								12/12/2016	68.65	69.33	0.68	3,472.23
								4/17/2017	70.16	71.14	0.98	3,470.63
								10/25/2017	70.65	70.89	0.24	3,470.36
								12/8/2017	--	71.03	--	3,470.05
								3/13/2018	--	71.40	--	3,469.68
								3/19/2018	--	71.32	--	3,469.76
								12/4/2018	--	71.00	--	3,470.08
								4/24/2019	--	73.31	--	3,467.77
								12/9/2019	--	71.33	--	3,469.75
								4/6/2020	--	71.04	--	3,470.04
								9/22/2020	--	72.29	--	3,468.79
MW-03-03	5/4/1994	85.40	4	3,542.3	55 - 80	2.42	3,544.72	5/20/2013	--	71.30	--	3,473.42
								10/15/2013	--	71.65	--	3,473.07
								5/14/2014	--	72.90	--	3,471.82
								10/14/2014	--	71.30	--	3,473.42
								4/21/2015	--	71.40	--	3,473.32
								12/8/2015	--	71.70	--	3,473.02
								4/11/2016	--	71.81	--	3,472.91
								12/12/2016	--	72.20	--	3,472.52
								4/17/2017	--	73.29	--	3,471.43
								10/25/2017	--	74.84	--	3,469.88
								12/8/2017	--	73.90	--	3,470.82
								3/13/2018	--	74.39	--	3,470.33
								3/19/2018	--	74.47	--	3,470.25
								12/4/2018	74.63	75.03	0.40	3,469.97
								4/24/2019	75.21	75.67	0.46	3,469.37
								12/9/2019	74.03	74.43	0.40	3,470.29
								4/6/2020	Sheen	74.10	Sheen	3,470.62
								9/22/2020	74.95	75.12	0.17	3,469.72
MW-03-04	5/4/1994	117.50	4	3,555.7	65 - 110	2.75	3,558.45	5/20/2013	78.12	78.42	0.30	3,480.24
								10/15/2013	81.55	81.95	0.40	3,476.78
								5/14/2014	83.35	84.25	0.90	3,474.83
								10/14/2014	81.80	82.25	0.45	3,476.52
								4/21/2015	82.35	82.55	0.20	3,476.04
								12/8/2015	82.70	82.95	0.25	3,475.68
								4/11/2016	83.43	83.08	0.35	3,475.62
								12/12/2016	83.55	84.20	0.65	3,474.71
								4/17/2017	84.90	86.92	2.02	3,472.94
								10/25/2017	85.89	87.57	1.68	3,472.06
								12/8/2017	--	85.96	--	3,472.49
								3/13/2018	--	86.79	--	3,471.66
								3/19/2018	--	86.59	--	3,471.86
								12/4/2018	--	87.69	--	3,470.76
								4/24/2019	--	88.15	--	3,470.30
								8/30/2019	88.23	88.45	0.22	3,470.00
								12/9/2019	--	70.90	--	3,487.55
								4/6/2020	Sheen	86.85	Sheen	3,471.60
								9/22/2020	--	87.97	--	3,470.48
MW-04	12/21/1991	62.59	4	3,547.8	45 - 60	3.19	3,550.99	5/20/2013	52.03	52.10	0.07	3,498.94
								10/15/2013	53.25	53.45	0.20	3,497.68
								5/14/2014	57.80	58.30	0.50	3,493.04
								10/14/2014	53.00	53.25	0.25	3,497.92
								4/21/2015	56.90	57.55	0.65	3,493.90
								12/8/2015	53.55	54.20	0.65	3,497.25
								4/11/2016	52.97	53.75	0.78	3,497.79

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								12/12/2016	52.86	53.65	0.79	3,497.89
								4/17/2017	57.45	58.33	0.88	3,493.28
								10/25/2017	53.83	54.60	0.77	3,496.93
								12/8/2017		Dry		
								3/13/2018		Dry		
								3/19/2018		Dry		
								12/4/2018	--	52.95	--	3,498.04
								4/24/2019	58.00	59.85	1.85	3,491.14
								12/10/2019	54.77	55.03	0.26	3,495.96
								4/6/2020		Dry		
								9/22/2020		Dry		
MW-05	12/22/1991	95.30	4	3,540.6	71 - 96	3.17	3,543.77	5/20/2013	--	66.73	--	3,477.04
								10/15/2013	--	67.60	--	3,476.17
								5/14/2014	--	69.70	--	3,474.07
								10/14/2014	--	67.00	--	3,476.77
								4/21/2015	--	68.02	--	3,475.75
								12/8/2015	--	68.20	--	3,475.57
								4/11/2016	--	68.22	--	3,475.55
								12/12/2016	--	68.92	--	3,474.85
								4/17/2017	--	70.49	--	3,473.28
								10/25/2017	--	70.92	--	3,472.85
								12/8/2017	--	76.68	--	3,467.09
								3/13/2018	--	72.90	--	3,470.87
								3/19/2018	--	72.24	--	3,471.53
								12/4/2018	--	72.29	--	3,471.48
								4/24/2019	--	73.42	--	3,470.35
								12/9/2019	--	71.02	--	3,472.75
								4/7/2020	--	71.86	--	3,471.91
								9/22/2020	--	73.15	--	3,470.62
MW-06	12/22/1991	76.90	4	3,541.8	30 - 50	2.70	3,544.50	5/20/2013	42.48	46.30	3.82	3,500.87
								10/15/2013	41.68	46.80	5.12	3,501.28
								5/14/2014	44.70	47.00	2.30	3,499.11
								10/14/2014	39.60	43.70	4.10	3,503.67
								4/21/2015	42.80	44.90	2.10	3,501.07
								12/8/2015	43.05	46.45	3.40	3,500.43
								4/11/2016	43.59	46.52	2.93	3,500.03
								12/13/2016	43.78	46.31	2.53	3,499.96
								4/17/2017	43.85	46.30	2.45	3,499.92
								10/25/2017	44.76	46.00	1.24	3,499.37
								12/8/2017	45.90	45.91	0.01	3,498.60
								3/13/2018	46.12	47.45	1.33	3,497.98
								3/19/2018	46.06	47.45	1.39	3,498.02
								12/4/2018	44.86	46.15	1.29	3,499.25
								4/24/2019	46.08	46.69	0.61	3,498.24
								8/30/2019	47.35	47.46	0.11	3,497.47
								12/9/2019	46.52	46.53	0.01	3,497.97
								4/7/2020	46.02	46.15	0.13	3,498.35
								9/22/2020	46.62	46.76	0.14	3,497.84
MW-07	12/22/1991	26.35	4	3,546.0	11 - 26	0.49	3,546.49	5/20/2013	--	4.30	--	3,542.19
								10/15/2013	--	8.05	--	3,538.44
								5/14/2014	--	8.10	--	3,538.39
								10/14/2014	--	7.30	--	3,539.19
								4/21/2015	--	7.90	--	3,538.59
								12/8/2015	--	6.00	--	3,540.49
								4/11/2016	--	5.61	--	3,540.88

Table 1
Monitor Well Completion and Gauging Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well Information								Groundwater Data				
Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								12/12/2016	--	8.88	--	3,537.61
								4/17/2017	--	7.98	--	3,538.51
								10/25/2017	--	8.63	--	3,537.86
								12/8/2017	--	8.95	--	3,537.54
								3/19/2018	--	9.68	--	3,536.81
								12/4/2018	--	8.72	--	3,537.77
								4/24/2019	--	8.88	--	3,537.61
								12/9/2019	--	8.88	--	3,537.61
								4/7/2020	--	8.80	--	3,537.69
								9/21/2020	--	9.52	--	3,536.97
MW-08	12/29/1991	88.95	4	3,540.5	69 - 89	3.23	3,543.73	5/20/2013	--	66.07	--	3,477.66
								10/15/2013	--	66.45	--	3,477.28
								5/14/2014	--	68.15	--	3,475.58
								10/14/2014	--	65.95	--	3,477.78
								4/21/2015	--	67.10	--	3,476.63
								12/8/2015	--	67.25	--	3,476.48
								4/11/2016	--	67.36	--	3,476.37
								12/12/2016	--	67.23	--	3,476.50
								4/17/2017	--	67.20	--	3,476.53
								10/25/2017	--	70.02	--	3,473.71
								12/8/2017	--	70.43	--	3,473.30
								3/13/2018	--	71.22	--	3,472.51
								3/19/2018	--	71.11	--	3,472.62
								12/4/2018	--	72.03	--	3,471.70
								4/24/2019	--	73.09	--	3,470.64
								12/9/2019	--	70.91	--	3,472.82
								4/6/2020	--	71.02	--	3,472.71
								9/22/2020	--	72.59	--	3,471.14
MW-09	12/29/1991	75.80	4	3,540.4	52 - 72	2.42	3,542.82	5/20/2013	--	56.50	--	3,486.32
								10/15/2013	57.25	57.55	0.30	3,485.48
								5/14/2014	58.50	59.32	0.82	3,484.07
								10/14/2014	55.90	57.95	2.05	3,486.31
								4/21/2015	58.70	60.80	2.10	3,483.49
								12/8/2015	58.85	59.60	0.75	3,483.75
								4/11/2016	58.47	59.66	1.19	3,483.99
								12/13/2016	58.28	59.74	1.46	3,484.10
								4/17/2017	58.28	59.70	1.42	3,484.11
								10/25/2017	61.65	63.44	1.79	3,480.63
								12/8/2017	61.81	63.35	1.54	3,480.55
								3/13/2018	62.96	64.56	1.60	3,479.38
								3/19/2018	63.01	64.69	1.68	3,479.31
								12/4/2018	64.14	64.18	0.04	3,478.67
								4/24/2019	--	65.70	--	3,477.12
								12/9/2019	--	61.88	--	3,480.94
								4/6/2020	--	62.50	--	3,480.32
								9/22/2020	--	64.79	--	3,478.03
MW-10	7/28/2008	53.24	4	3,541.8	15 - 50	2.64	3,544.44	5/20/2013	45.55	51.60	6.05	3,497.08
								10/15/2013	47.55	52.00	4.45	3,495.56
								5/14/2014	50.70	52.30	1.60	3,493.26
								10/14/2014	47.40	51.10	3.70	3,495.93
								4/21/2015	48.05	50.95	2.90	3,495.52
								12/8/2015	48.70	53.00	4.30	3,494.45
								4/11/2016	44.81	52.62	7.81	3,497.29
								12/13/2016	50.40	52.61	2.21	3,493.38
								4/17/2017	50.51	52.60	2.09	3,493.30

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Eddy County, New Mexico

Well Information								Groundwater Data				
Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								10/25/2017	50.76	52.69	1.93	3,493.10
								12/8/2017	--	52.83	--	3,491.61
								3/13/2018	52.63	53.31	--	3,491.13
								3/19/2018	52.64	52.88	0.24	3,491.73
								12/4/2018	52.64	52.66	0.02	3,491.79
								4/24/2019	52.91	--	--	--
								12/9/2019	52.73	**	--	--
								4/6/2020	H2S Present in Well			
								9/22/2020	52.26	52.44	0.18	3,492.13
MW-11	7/29/2008	58.98	4	3,540.2	21 - 56	2.53	3,542.73	5/20/2013	--	56.10	--	3,486.63
								10/15/2013	--	57.00	--	3,485.73
								5/14/2014	58.30	58.98	0.68	3,484.22
								10/14/2014	56.00	56.20	0.20	3,486.67
								4/21/2015	58.60	58.98	0.38	3,484.01
								12/8/2015	58.40	58.98	0.58	3,484.15
								4/11/2016	58.38	58.41	0.03	3,484.34
								12/13/2016	Sheen	58.33	Sheen	3,484.40
								4/17/2017	58.40	58.55	0.15	3,484.29
								10/25/2017	--	58.47	--	3,484.26
								12/8/2017	--	58.51	--	3,484.22
								3/13/2018	--	58.74	--	3,483.99
								3/19/2018	--	58.55	--	3,484.18
								12/4/2018	--	58.60	--	3,484.13
								4/24/2019	--	58.86	--	3,483.87
								12/9/2019	--	58.93	--	3,483.80
								4/6/2020	Dry			
								9/22/2020	Dry			
MW-12	7/29/2008	74.11	4	3,522.6	36 - 71	2.65	3,525.25	5/20/2013	--	62.00	--	3,463.25
								10/15/2013	--	61.20	--	3,464.05
								5/14/2014	--	62.78	--	3,462.47
								10/14/2014	--	60.95	--	3,464.30
								4/21/2015	--	59.80	--	3,465.45
								12/8/2015	--	60.45	--	3,464.80
								4/11/2016	--	59.99	--	3,465.26
								12/12/2016	--	60.40	--	3,464.85
								4/17/2017	--	61.00	--	3,464.25
								10/25/2017	--	62.31	--	3,462.94
								12/8/2017	--	62.79	--	3,462.46
								3/13/2018	--	63.50	--	3,461.75
								3/19/2018	--	63.27	--	3,461.98
								12/4/2018	--	64.20	--	3,461.05
								4/24/2019	--	64.61	--	3,460.64
								4/7/2020	--	64.20	--	3,461.05
								9/22/2020	--	64.80	--	3,460.45
MW-13	7/29/2008	88.64	4	3,558.5	50 - 85	2.90	3,561.40	5/20/2013	--	71.88	--	3,489.52
								10/14/2013	--	83.00	--	3,478.40
								5/14/2014	81.10	>88.64	> 7.54	<3,472.76*
								10/13/2014	--	84.65	--	3,476.75
								4/20/2015	--	86.03	--	3,475.37
								12/7/2015	83.00	>88.64	> 5.64	<3,472.76*
								4/11/2016	*	86.03		
								12/12/2016	--	86.80	--	3,474.60
								4/17/2017	Dry			
								10/24/2017	Dry			
								12/8/2017	Dry			

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Eddy County, New Mexico

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Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								3/19/2018		Dry		
								12/3/2018		Dry		
								4/23/2019		Dry		
								12/10/2019		Dry		
								4/6/2020		Dry		
								9/21/2020		Dry		
MW-14	7/30/2008	72.50	4	3,517.7	33 - 68	2.62	3,520.32	5/20/2013	61.52	61.54	0.02	3,458.79*
								10/14/2013	--	60.61	--	3,459.71
								5/14/2014	62.23	62.28	0.05	3,458.08*
								10/13/2014	57.80	60.80	3.00	3,461.62*
								4/20/2015	--	59.55	--	3,460.77
								12/7/2015	Sheen	59.50	Sheen	3,460.82
								4/11/2016	--	60.08	--	3,460.24
								12/12/2016	--	59.38	--	3,460.94
								4/17/2017	59.52	59.68	0.16	3,460.75
								10/24/2017	61.42	61.53	0.11	3,458.87
								12/8/2017	62.00	62.12	0.12	3,458.28
								3/13/2018	63.80	64.02	0.22	3,456.45
								3/19/2018	--	64.30	--	3,456.02
								12/3/2018	63.15	65.37	2.22	3,456.50
								4/24/2019	66.29	67.64	1.35	3,453.63
								8/30/2019	66.28	66.54	0.26	3,457.71
								12/10/2019	63.24	63.51	0.27	3,456.81
								4/6/2020	64.13	64.87	0.74	3,455.45
								9/21/2020	65.55	65.70	0.15	3,454.73
MW-15	7/30/2008	80.20	4	3,559.7	42 - 77	2.75	3,562.45	5/20/2013	--	67.30	--	3,495.15
								10/14/2013	--	66.52	--	3,495.93
								5/14/2014	--	67.75	--	3,494.70
								10/13/2014	--	65.65	--	3,496.80
								4/20/2015	--	67.30	--	3,495.15
								12/7/2015	--	64.70	--	3,497.75
								4/11/2016	--	67.26	--	3,495.19
								12/12/2016	--	67.16	--	3,495.29
								4/17/2017	--	67.58	--	3,494.87
								10/24/2017	--	67.24	--	3,495.21
								12/8/2017	--	67.34	--	3,495.11
								3/19/2018	--	67.55	--	3,494.90
								12/3/2018	--	67.73	--	3,494.72
								4/23/2019	--	66.18	--	3,496.27
								12/9/2019	--	65.03	--	3,497.42
								4/6/2020	--	67.43	--	3,495.02
								9/21/2020	--	65.64	--	3,496.81
MW-16	6/24/2009	117.39	4	3,582.6	80 - 115	2.86	3,585.46	5/20/2013	--	111.70	--	3,473.76
								10/14/2013	--	112.30	--	3,473.16
								5/14/2014	--	114.10	--	3,471.36
								10/13/2014	--	113.85	--	3,471.61
								4/20/2015	--	112.45	--	3,473.01
								12/7/2015	--	114.25	--	3,471.21
								4/11/2016	--	114.72	--	3,470.74
								12/12/2016	--	115.30	--	3,470.16
								4/17/2017	--	115.72	--	3,469.74
								10/24/2017	--	116.79	--	3,468.67
								12/8/2017	--	116.85	--	3,468.61
								3/19/2018	--	116.83	--	3,468.63
								12/4/2018	--	116.90	--	3,468.56

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								4/24/2019	--	116.86	--	3,468.60
								12/9/2019	--	116.86	--	3,468.60
								4/6/2020	--	116.89	--	3,468.57
								9/21/2020	--	116.85	--	3,468.61
MW-17	6/23/2009	101.60	4	3,568.0	60 - 95	2.84	3,570.84	5/20/2013	--	93.36	--	3,477.48
								10/15/2013	--	93.00	--	3,477.84
								5/14/2014	--	95.61	--	3,475.23
								10/14/2014	--	95.15	--	3,475.69
								4/20/2015	--	95.80	--	3,475.04
								12/7/2015	--	96.45	--	3,474.39
								4/11/2016	--	95.34	--	3,475.50
								12/12/2016	--	96.60	--	3,474.24
								4/17/2017	--	97.72	--	3,473.12
								10/24/2017	--	97.75	--	3,473.09
								12/8/2017	--	95.92	--	3,474.92
								3/19/2018	--	98.21	--	3,472.63
								12/4/2018	--	97.05	--	3,473.79
								4/23/2019	--	98.58	--	3,472.26
								12/9/2019	--	98.23	--	3,472.61
								4/6/2020	--	98.10	--	3,472.74
								9/21/2020	--	98.28	--	3,472.56
MW-18	6/24/2009	56.53	4	3,529.7	33 - 53	2.93	3,532.63	5/20/2013	--	50.95	--	3,481.68
								10/14/2013	Sheen	50.50	Sheen	3,482.13
								5/14/2014	--	51.31	--	3,481.32
								10/13/2014	--	51.79	--	3,480.84
								4/20/2015	--	51.02	--	3,481.61
								12/7/2015	--	52.21	--	3,480.42
								4/11/2016	--	51.57	--	3,481.06
								12/12/2016	--	50.90	--	3,481.73
								4/17/2017	--	52.12	--	3,480.51
								10/24/2017	--	53.91	--	3,478.72
								12/8/2017	--	53.89	--	3,478.74
								3/19/2018	--	53.61	--	3,479.02
								12/5/2018	--	57.61	--	3,475.02
								4/23/2019	--	55.69	--	3,476.94
								12/9/2019	--	55.07	--	3,477.56
								4/6/2020	--	54.26	--	3,478.37
								9/21/2020	--	55.49	--	3,477.14
MW-19	6/17/2009	79.42	4	3,540.6	41 - 76	2.74	3,543.34	5/20/2013	67.10	71.15	4.05	3,475.03
								10/15/2013	67.00	71.10	4.10	3,475.11
								5/14/2014	62.75	73.30	10.55	3,477.43
								10/14/2014	66.50	70.10	3.60	3,475.76
								4/21/2015	66.00	72.45	6.45	3,475.41
								12/7/2015	65.50	68.60	3.10	3,476.91
								4/11/2016	67.24	69.66	2.42	3,475.37
								12/13/2016	65.78	68.00	2.22	3,476.89
								4/17/2017	68.00	70.41	2.41	3,474.62
								10/25/2017	69.85	71.30	1.45	3,473.06
								12/8/2017	71.97	72.10	0.13	3,471.33
								3/13/2018	72.56	72.85	0.29	3,470.69
								3/19/2018	72.54	72.75	0.21	3,470.74
								12/4/2018	73.89	74.05	0.16	3,469.40
								4/24/2019	74.87	75.03	0.16	3,468.42
								8/30/2019	75.37	75.63	0.26	3,467.82
								12/9/2019	--	73.70	--	3,469.64

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								4/6/2020	--	73.19	--	3,470.15
								9/22/2020	74.41	74.42	0.01	3,468.93
MW-20	6/18/2009	79.39	4	3,538.7	41 - 76	2.77	3,541.47	5/20/2013	71.02	71.05	0.03	3,470.44*
								10/15/2013	70.40	70.45	0.05	3,471.05*
								5/14/2014	71.50	72.00	0.50	3469.82*
								10/14/2014	--	69.90	--	3,471.57
								4/21/2015	--	70.90	--	3,470.57
								12/7/2015	Sheen	70.71	Sheen	3,470.76
								4/11/2016	--	70.93	--	3,470.54
								12/12/2016	--	71.00	--	3,470.47
								4/17/2017	--	71.91	--	3,469.56
								10/25/2017	--	72.13	--	3,469.34
								12/8/2017	--	72.59	--	3,468.88
								3/13/2018	--	73.20	--	3,468.27
								3/19/2018	--	72.96	--	3,468.51
								12/4/2018	--	73.73	--	3,467.74
								4/24/2019	--	74.50	--	3,466.97
								12/9/2019	--	72.57	--	3,468.90
								4/7/2020	--	73.00	--	3,468.47
								9/22/2020	--	74.21	--	3,467.26
MW-21	6/18/2009	81.48	4	3,540.2	43 - 78	2.95	3,543.15	5/20/2013	66.65	67.65	1.00	3,476.20
								10/15/2013	67.40	68.60	1.20	3,475.39
								5/14/2014	69.23	70.50	1.27	3,473.54
								10/14/2014	66.80	67.92	1.12	3,476.01
								4/21/2015	67.55	68.60	1.05	3,475.29
								12/7/2015	67.80	68.80	1.00	3,475.05
								4/11/2016	67.71	68.83	1.12	3,475.10
								12/12/2016	67.80	69.41	1.61	3,474.87
								4/17/2017	70.60	71.78	1.18	3,472.20
								10/25/2017	69.50	71.10	1.60	3,473.17
								12/8/2017	70.97	70.98	0.01	3,472.18
								3/13/2018	72.10	74.90	2.80	3,470.21
								3/19/2018	72.10	72.45	0.35	3,470.95
								12/4/2018	68.26	77.83	9.57	3,472.02
								8/30/2019	74.00	74.30	0.30	3,475.55
								12/9/2019	66.68	66.73	0.05	3,476.42
								4/7/2020	69.27	69.53	0.26	3,473.62
								9/22/2020	72.63	73.45	0.82	3,470.27
MW-22	6/19/2009	41.07	4	3,542.9	13 - 38	2.97	3,545.87	5/20/2013	--	20.90	--	3,524.97
								10/15/2013	--	17.40	--	3,528.47
								5/14/2014	--	21.51	--	3,524.36
								10/14/2014	--	15.55	--	3,530.32
								4/21/2015	Sheen	18.60	Sheen	3,527.27
								12/7/2015	--	17.95	--	3,527.92
								4/11/2016	--	19.77	--	3,526.10
								12/12/2016	--	20.18	--	3,525.69
								4/17/2017	--	20.36	--	3,525.51
								10/25/2017	--	20.51	--	3,525.36
								12/8/2017	--	21.23	--	3,524.64
								3/13/2018	--	22.15	--	3,523.72
								3/19/2018	--	22.22	--	3,523.65
								12/4/2018	--	21.60	--	3,523.65
								4/25/2019	--	22.61	--	3,524.27
								12/9/2019	--	21.36	--	3,524.51
								4/6/2020	--	22.60	--	3,523.27

Table 1
Monitor Well Completion and Gauging Summary
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Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								9/22/2020	--	23.15	--	3,522.72
MW-23	6/19/2009	85.74	4	3,539.2	49 - 84	3.01	3,542.21	5/20/2013	--	72.71	--	3,469.50
								10/14/2013	--	72.72	--	3,469.49
								5/14/2014	--	74.70	--	3,467.51
								10/13/2014	--	72.37	--	3,469.84
								4/20/2015	--	71.98	--	3,470.23
								12/7/2015	--	72.65	--	3,469.56
								4/11/2016	--	72.94	--	3,469.27
								12/12/2016	--	72.95	--	3,469.26
								4/17/2017	--	74.02	--	3,468.19
								10/24/2017	--	75.11	--	3,467.10
								12/8/2017	--	76.81	--	3,465.40
								3/13/2018	--	77.51	--	3,464.70
								3/19/2018	--	77.67	--	3,464.54
								12/4/2018	--	78.33	--	3,463.88
								4/23/2019	78.83	78.92	0.09	3,463.29
								8/30/2019	79.38	79.40	0.02	3,462.81
								12/9/2019	77.90	78.00	0.10	3,464.21
								4/6/2020	Sheen	78.04	Sheen	3,464.17
								9/21/2020	78.71	78.81	0.10	3,463.47
MW-24	9/28/2011	36	2	3,526.9	19 - 33	2.24	3,529.10	5/30/2012	--	29.69	--	3,499.41
								9/24/2012	--	33.00	--	3,496.10
								5/14/2014	--	29.50	--	3,499.60
								10/13/2014	--	21.69	--	3,507.41
								4/20/2015	--	24.92	--	3,504.18
								12/7/2015	--	24.50	--	3,504.60
								4/11/2016	--	24.89	--	3,504.21
								12/12/2016	--	22.10	--	3,507.00
								4/17/2017	--	23.65	--	3,505.45
								10/24/2017	--	27.38	--	3,501.72
								12/8/2017	--	29.50	--	3,499.60
								3/13/2018	--	N/D	--	N/D
								12/4/2018	--	32.53	--	3,496.57
								4/24/2019	--	34.90	--	3,494.20
								12/9/2019	--	28.06	--	3,501.04
								4/6/2020	--	31.90		3,497.20
								9/21/2020	--	34.69	--	3,494.41
EB-01	3/29/2004	37.05	1	3,491.5	33 - 38	0.65	3,492.15	5/20/2013	Dry			
								10/14/2013	Dry			
								5/14/2014	Dry			
								10/13/2014	Dry			
								4/20/2015	Dry			
								12/7/2015	Dry			
								4/11/2016	Dry			
								12/12/2016	Dry			
								4/17/2017	Dry			
								10/24/2017	Dry			
								12/8/2017	Dry			
								3/13/2018	Dry			
								12/4/2018	Dry			
								4/23/2019	Dry			
								12/9/2019	Dry			
								4/6/2020	Dry			
								9/21/2020	Dry			

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Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
EB-02	3/29/2004	57.47	2	3,522.6	35 - 55	2.74	3,525.34	5/20/2013	Sheen	42.05	Sheen	3,483.29
								10/14/2013	--	42.45	--	3,482.89
								5/14/2014	--	42.72	--	3,482.62
								10/13/2014	--	43.40	--	3,481.94
								4/20/2015	--	43.70	--	3,481.64
								12/7/2015	--	44.16	--	3,481.18
								4/11/2016	--	44.02	--	3,481.32
								12/12/2016	--	44.00	--	3,481.34
								4/17/2017	--	44.13	--	3,481.21
								10/24/2017	--	44.85	--	3,480.49
								12/8/2017	--	44.90	--	3,480.44
								3/13/2018	--	N/D	--	N/D
								12/5/2018	--	45.07	--	3,480.27
								4/23/2019	--	45.02	--	3,480.32
								12/9/2019	--	45.17	--	3,480.17
								4/6/2020	--	45.25	--	3,480.09
								9/21/2020	--	46.03	--	3,479.31
EB-03	3/30/2004	69.84	2	3,517.8	46 - 66	3.25	3,521.05	5/20/2013	61.32	61.36	0.04	3,459.72
								10/14/2013	Sheen	60.78	Sheen	3,460.27
								5/14/2014	61.65	61.69	0.04	3,459.39
								10/13/2014	--	58.95	--	3,462.10
								4/20/2015	Sheen	60.75	Sheen	3,460.30
								12/7/2015	60.80	61.60	0.80	3,460.01
								4/11/2016	60.85	61.95	1.10	3,459.87
								12/12/2016	60.80	61.20	0.40	3,460.13
								4/17/2017	60.85	61.35	0.50	3,460.05
								10/24/2017	60.91	61.09	0.18	3,460.09
								12/8/2017	61.05	61.10	0.05	3,459.99
								3/13/2018	63.69	64.07	0.38	3,457.25
								12/3/2018	60.87	60.88	0.01	3,460.18
								4/24/2019	65.30	65.74	0.44	3,455.62
								8/30/2019	66.94	67.43	0.49	3,453.93
								12/10/2019	60.83	60.91	0.08	3,460.14
								4/6/2020	Sheen	62.28	Sheen	3,458.77
								9/21/2020	64.87	64.89	0.02	3,456.17
EB-04	3/31/2004	53.91	2	3,505.3	31 - 51	3.08	3,508.38	5/20/2013	Sheen	52.63	Sheen	3,455.75
								10/14/2013	--	52.70	--	3,455.68
								5/14/2014		Dry		
								10/13/2014		Dry		
								4/20/2015	--	50.81	--	3,457.57
								12/7/2015		Dry		
								4/11/2016		Dry		
								12/12/2016		Dry		
								4/17/2017		Dry		
								10/24/2017		Dry		
								12/8/2017		Dry		
								3/13/2018		Dry		
								12/5/2018		Dry		
								4/23/2019		Dry		
								12/10/2019		Dry		
								4/6/2020		Dry		
								9/21/2020		Dry		
EB-05	3/31/2004	57.93	2	3,523.7	44 - 54	2.91	3,526.61	5/20/2013	Sheen	50.15	Sheen	3,476.46
								10/14/2013	--	49.92	--	3,476.69
								5/14/2014	--	50.65	--	3,475.96

Table 1
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Well ID	Date Drilled	Total Depth (TOC)	Well Dia. (Inches)	Surface Elevation (AMSL)	Screen Interval (BGS)	Casing Stickup (Feet)	TOC Elevation (AMSL)	Date Gauged	Depth to Product (Feet)	Depth to Water (Feet)	Product Thickness (Feet)	Corrected Water Elevation (AMSL)
								10/13/2014	--	51.00	--	3,475.61
								4/20/2015	--	50.41	--	3,476.20
								12/7/2015	--	51.10	--	3,475.51
								4/11/2016	--	50.66	--	3,475.95
								12/12/2016	--	50.50	--	3,476.11
								4/17/2017	--	51.06	--	3,475.55
								10/24/2017	--	52.13	--	3,474.48
								12/8/2017	--	53.05	--	3,473.56
								3/13/2018	--	N/D	--	N/D
								12/5/2018	--	53.25	--	3,473.36
								4/23/2019	--	53.42	--	3,473.19
								12/10/2019	--	53.57	--	3,473.04
								4/6/2020	--	52.75	--	3,473.86
								9/21/2020	--	53.38	--	3,473.23
EB-06	3/31/2004	75	1	3,555.6	72 - 82	1.03	3,556.63	5/20/2013	--	73.45	--	3,483.18
								10/14/2013	Sheen	73.04	Sheen	3,483.59
								5/14/2014	--	73.98	--	3,482.65
								10/13/2014	--	74.70	--	3,481.93
								4/20/2015	--	73.80	--	3,482.83
								12/7/2015	--	75.28	--	3,481.35
								4/11/2016	--	74.76	--	3,481.87
								12/12/2016	--	73.76	--	3,482.87
								4/7/2017	--	75.07	--	3,481.56
								10/24/2017	--	76.00	--	3,480.63
										Well Obstructed		
EB-07	4/1/2004	56.08	2	3,501.3	43 - 53	2.67	3,503.97	5/20/2013	--	53.92	--	3,450.05
								10/15/2013	--	54.58	--	3,449.39
								5/14/2014		Dry		
								10/13/2014	--	47.90	--	3,456.07
								4/20/2015	--	49.19	--	3,454.78
								12/7/2015	--	50.00	--	3,453.97
								4/11/2016	--	50.00	--	3,453.97
								12/12/2016	--	49.85	--	3,454.12
								4/17/2017	--	50.02	--	3,453.95
								10/24/2017	--	50.41	--	3,453.56
								12/8/2017	--	50.83	--	3,453.14
								3/13/2018	--	N/D	--	N/D
								12/5/2018	--	51.11	--	3,452.86
								4/23/2019	--	51.48	--	3,452.49
								12/9/2019		Dry		
								4/6/2020		Dry		
								9/21/2020		Dry		
EB-08	4/2/2004	86.22	2	3,533.8	66 - 81	3.27	3,537.07	5/20/2013	71.20	73.60	2.40	3,465.15
								10/14/2013	70.90	73.20	2.30	3,465.48
								5/14/2014	72.55	74.90	2.35	3,463.82
								10/13/2014	69.50	72.00	2.50	3,466.82
								4/20/2015	70.00	71.70	1.70	3,466.56
								12/7/2015	71.00	72.10	1.10	3,465.74
								4/11/2016	71.61	72.70	1.09	3,465.13
								12/12/2016	70.55	71.75	1.20	3,466.16
								4/17/2017	71.48	72.60	1.12	3,465.25
								10/24/2017	73.77	74.87	1.10	3,465.20

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								12/8/2017	73.39	73.40	0.01	3,463.68
								3/13/2018	74.44	74.91	0.47	3,462.49
								12/4/2018	73.50	74.35	0.85	3,463.32
								4/24/2019	75.52	76.36	0.84	3,461.30
								8/30/2019	76.86	78.00	1.14	3,459.66
								12/10/2019	75.17	75.35	0.18	3,461.72
								4/6/2020	74.59	74.73	0.14	3,462.34
								9/21/2020	78.46	78.69	0.23	3,458.54
P-01	12/29/2005	54.60	2	3,527.9	40 - 50	2.31	3,530.21	5/20/2013	Sheen	50.87	Sheen	3,479.34
								10/14/2013	--	50.85	--	3,479.36
								5/14/2014	--	50.95	--	3,479.26
								10/13/2014	--	50.82	--	3,479.39
								4/20/2015	--	50.93	--	3,479.28
								12/7/2015	Sheen	50.95	Sheen	3,479.26
								4/11/2016	--	50.89	--	3,479.32
								12/12/2016	--	50.85	--	3,479.36
								4/17/2017	--	51.02	--	3,479.19
								10/24/2017	--	53.40	--	3,476.81
								12/8/2017	--	50.94	--	3,479.27
								3/13/2018	--	N/D	--	N/D
								12/5/2018	--	50.86	--	3,479.35
								4/23/2019	--	50.85	--	3,479.36
								12/10/2019	--	50.89	--	3,479.32
								4/6/2020	--	50.88	--	3,479.33
								9/21/2020	--	50.92	--	3,479.29
P-02	12/27/2005	27.45	2	3,542.3	19.5 - 22.5	2.43	3,544.73	5/20/2013	--	22.70	--	3,522.03
								10/14/2013	--	20.92	--	3,523.81
								5/14/2014	--	22.15	--	3,522.58
								10/13/2014	--	18.80	--	3,525.93
								4/20/2015	--	21.14	--	3,523.59
								12/7/2015	--	20.55	--	3,524.18
								4/11/2016	--	21.44	--	3,523.29
								12/12/2016	--	21.06	--	3,523.67
								4/17/2017	--	21.09	--	3,523.64
								10/24/2017	--	21.58	--	3,523.15
								12/8/2017	--	21.87	--	3,522.86
								3/13/2018	--	N/D	--	N/D
								12/4/2018	--	21.70	--	3,523.03
								4/24/2019	--	22.24	--	3,522.49
								12/9/2019	--	20.65	--	3,524.08
								4/6/2020	--	21.79	--	3,522.94
								9/21/2020		22.28		3,522.45
P-03	12/27/2005	78.65	2	3,534.4	58 - 78	2.43	3,536.83	5/20/2013	--	72.72	--	3,464.11
								10/14/2013	--	56.39	--	3,480.44
								5/14/2014	--	73.91	--	3,462.92
								10/13/2014	--	40.70	--	3,496.13
								4/20/2015	--	56.65	--	3,480.18
								12/7/2015	--	44.93	--	3,491.90
								4/11/2016	--	52.22	--	3,484.61

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								12/12/2016	--	40.50	--	3,496.33
								4/17/2017	--	69.50	--	3,467.33
								10/24/2017	--	78.82	--	3,458.01
								12/8/2017	--	75.03	--	3,461.80
								3/13/2018	--	N/D	--	N/D
								12/4/2018	--	74.39	--	3,462.44
								4/26/2019	--	74.36	--	3,462.47
								12/10/2019	--	73.82	--	3,463.01
								4/6/2020	--	74.45	--	3,462.38
								9/21/2020	--	74.67	--	3,462.16
P-04	12/28/2005	61.65	2	3,513.5	51 - 61	2.27	3,515.77	5/20/2013	Dry			
								10/14/2013	Dry			
								5/14/2014	--	56.80	--	3,458.97
								10/13/2014	--	59.30	--	3,456.47
								4/20/2015	--	60.40	--	3,455.37
								12/7/2015	Dry			
								4/11/2016	Dry			
								12/12/2016	Dry			
								4/17/2017	Dry			
								10/24/2017	Dry			
								12/8/2017	Dry			
								3/13/2018	Dry			
								12/4/2018	Dry			
								4/23/2019	Dry			
								12/10/2019	Dry			
								4/6/2020	Dry			
								9/21/2020	Dry			
P-05	12/28/2005	47.35	2	3,504.9	35 - 45	2.58	3,507.48	5/20/2013	--	47.34	--	3,460.14
								10/14/2013	--	47.30	--	3,460.18
								5/14/2014	--	47.30	--	3,460.18
								10/13/2014	--	47.30	--	3,460.18

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								4/20/2015	--	47.00	--	3,460.48
								12/7/2015	--	47.14	--	3,460.34
								4/11/2016	--	47.30	--	3,460.18
								12/12/2016	--	47.35	--	3,460.13
								4/17/2017	--	47.33	--	3,460.15
								10/24/2017	Dry			
								12/8/2017	Dry			
								3/13/2018	--	N/D	--	N/D
								12/4/2018	--	47.34	--	3,460.14
								4/24/2019	Dry			
								12/10/2019	Dry			
								4/6/2020	Dry			
								9/21/2020	Dry			
AS-1								11/17/2017	62.40	62.44	0.04	--
								12/7/2017	63.55	63.66	0.11	--
								12/4/2018	59.28	61.13	1.85	--
								4/16/2020	H2S Present in Well			
								9/22/2020	H2S Present in Well			

Notes: Wells drilled Eades Drilling, Atkins Engineering and Scarborough Drilling. Wells completed with Schedule 40 threaded PVC except EB-06 (completed with 1-inch poly tubing)
All values are in feet, unless otherwise noted.
Survey datum based upon NAD 1927/NAVD 1929
BGS - below ground surface
TOC - top of casing
AMSL: Feet above mean sea level
* Groundwater corrected for LNAPL thickness assuming 0.70 specific gravity.
** Emulsion observed in well
>: LNAPL observed over entire screen interval

LNAPL Thickness of Select Monitoring Wells

Date	AS-01	EB-03	EB-08	MW-02-06	MW-02-09	MW-02-10	MW-02-11	MW-02-12	MW-02-13	MW-02-14	MW-02-15	MW-02-16	MW-03	MW-03-01	MW-03-02	MW-03-03	MW-03-04	MW-04	MW-06	MW-07	MW-09	MW-10	MW-11	MW-13	MW-14	MW-19	MW-20	MW-21	MW-23
02/12/2007								**	1.45																				
02/13/2007																					0.94								
03/26/2007		0.31						0.40								0.01	0.13												
03/27/2007					3.57	10.52			0.98	0.38									1.35		0.37								
06/18/2007		0.14			0.17	5.64	1.25	**	3.15	0.45			0.49			--	0.83	1.05	0.17		0.28								
09/17/2007		0.35			3.06	6.28	1.20	**	3.13	0.49			1.07		**	--	1.16	*	0.07		0.49								
12/10/2007		0.39			3.40	5.04	0.51	**	3.10	0.66			1.18			--	0.91	1.96	0.19		**								
03/10/2008																													
03/11/2008		2.52			0.82	1.92	3.00	**	2.21	0.48			2.64		**	--	0.97	2.37	0.91		1.63								
07/31/2008																						25.42	18.88						
09/15/2008		0.43			8.83	8.78	0.55	**	Sheen	0.56			3.05	15.49	**	0.01	0.79	5.09	13.39	0.11	0.23	0.66	19.27		0.29				
03/09/2009		0.94			3.89	8.30	**	**	3.17	0.28			2.67	10.69	**	Sheen	0.82	4.65	7.34	0.30	0.06	16.86	14.86		1.65				
07/13/2009														11.16						Sheen					1.19				
07/14/2009		1.67				8.78		**							**		0.83	5.80			0.09	5.61	15.40			5.35	17.29	0.20	
09/14/2009		1.92			11.42	9.10	0.65	0.15	9.33				3.00	11.10	**	0.02	0.79	9.40	11.50	*	0.12	20.74	0.82		0.75	7.45		0.40	0.16
03/29/2010		3.02		0.23	3.11	5.11	0.63	0.10	3.64	1.15			3.17	4.31	0.19	0.19	0.77	0.19	10.23	0.44	0.25	10.60	7.91		0.01	4.10	0.36	8.62	0.18
09/13/2010		0.64		1.80	2.22	3.25	0.75	0.01	5.63	0.95			4.22	2.24	0.03	0.02	1.56	1.97	9.30	0.02	**	8.46	4.83		0.14	6.42	0.48	4.89	
03/14/2011				0.51			0.49								0.04	0.01				0.01	0.22								
03/15/2011		0.65	0.02						3.95	0.62			1.93	1.88			1.56	1.73	6.67			7.92	4.14	0.01	0.15	7.5	0.50	2.29	
03/16/2011																													
10/11/2011				0.42					5.27				2.37	1.60	0.04		1.53	2.92	10.07		0.62								
05/30/2012		--	2.45	0.25	2.95	7.38	0.11		6.33	0.62			0.38	1.68	0.10		0.52	0.45	8.87		0.32	8.15	2.50			4.14	0.52	1.07	
09/24/2012		0.15	4.11	0.13	3.31	7.27	0.08	0.02	4.13	0.85			0.21	1.18	0.63	0.02	0.08	0.09	6.86		0.37	5.48							
09/25/2012																							0.17			3.02	0.50	1.09	
05/20/2013		0.04	2.40	0.05	4.45	10.00	0.12		3.62	0.88					0.35		0.30	0.07	3.82			6.05			0.02	4.05	0.03	1.00	
10/14/2013			2.30																						--				
10/15/2013				0.45	3.15	6.30	0.05		3.58	0.70			0.60	3.20			0.40	0.20	5.12		0.30	4.45				4.1	0.05	1.20	
05/14/2014		0.04	2.35	0.35	4.55	4.55	0.05		1.47	0.60			0.02	1.50	0.60		0.90	0.50	2.30		0.82	1.60	0.68	7.54	0.05	10.55	0.50	1.27	
10/13/2014		--	2.50																						3.00				
10/14/2014		--		0.45	4.08	8.18	0.06		5.85	1.90				0.08	0.80		0.45	0.25	4.10		2.05	3.70	0.20			3.6		1.12	
04/20/2015		--	1.70																										
04/21/2015		--		0.30	3.88	5.65			1.80	0.75				0.55	0.20		0.20	0.65	2.10		2.10	2.90	0.38			6.45		1.05	
12/04/2015		--																							Sheen				
12/07/2015		0.80	1.10																					5.64		3.1	Sheen	1.00	
12/08/2015		--			2.20	5.85			2.15	0.35				1.34	0.45		0.25	0.65	3.40		0.75	4.30	0.58						
04/11/2016		1.1	1.09		1.46	5.43			2.35	0.42				0.22	0.35		0.35	0.78	2.93		1.19	7.81	0.03			2.42		1.12	
12/12/2016		0.40	1.20	0.01		4.00						0.74			0.68		0.65	0.79										1.61	
12/13/2016		--			2.95				1.72	0.59	0.10			0.10					2.53		1.46	2.21	Sheen			2.22			
04/17/2017		0.50	1.12	0.01	2.80	2.92			1.85	0.50	0.28	1.63		0.10	0.98		2.02	0.88	2.45		1.42	2.09	0.15	Dry	0.16	2.41		1.18	
10/24/2017		0.18																						Dry	0.11				
10/25/2017		--		0.48	2.98	1.55			0.76	0.48	0.20	1.74		0.25	0.24		1.68	0.77	1.24		1.79	1.93				1.45		1.60	
11/17/2017	0.04	0.13			0.22	1.35			0.90	0.05	0.05	0.02		0.03			Sheen	0.06	0.13		0.84	0.23				0.07			
12/08/2017	0.11	0.05	0.01		0.29	1.95			0.07	0.03	0.31	0.01		0.07				Dry	0.01		1.54			Dry	0.12	0.13		0.01	
03/13/2018		0.38	0.47	0.41	2.77	0.06	0.30		1.20	0.14	3.07	0.24	0.41	1.53				Dry	1.33		1.60	0.68			0.22	0.29		2.80	
03/19/2018					0.86	0.07	0.52		0.52	0.08	2.60	0.20		0.27				Dry	1.39		1.68	0.24		Dry		0.21		0.35	
08/05/2018	5.29									0.78				1.65							3.60	2.83							
08/07/2018					0.30				0.30		1.70	0.30							0.70										
08/23/2018	8.49	0.1		0.62	0.66					0.57	2.15	0.15		1.19	0.03				1.84		*	0.95	*		0.39	0.14		6.10	
08/29/2018	5.2																				*	0.29	*						
09/05/2018																					*	**							
09/13/2018	2.79								0.47		2.25			*					1.30		*		*						
09/18/2019	1.42				0.59				0.45	0.00	2.34			*					1.25		0.23		*						
09/27/2018	1.4				0.00				0.32	0.00	2.95								1.44		0.22	0.02	*						
10/03/2018	1.45				0.32				0.34	0.17	3.10								1.4										
10/09/2018	1.07				0.69				0.42	0.13	3.22								1.59										
10/16/2018	2.69				0.00				0.30	0.79	2.68								1.11										
11/01/2018	7.98				0.33				0.55	1.38	3.41								1.16			3.09	*						
11/02/2018										0.18												3.09							
11/08/2018																						3.09	*						
11/09/2018					0.22				0.59		3.49	0.28							1.23										
11/20/2018											0.97																		
11/21/2018					0.27				0.73	0.39		0.25							1.31				*						
11/30/2018					0.27																	3.09	*						
12/03/2018		0.01																						Dry	2.22	0.16			
12/04/2018	1.85		0.85	0.25	0.30	1.30	0.63	8.07	0.19	0.25	4.21	0.12			0.40	0.40			1.29		0.04	0.02						9.57	
12/05/2018																													
12/07/2018					0.30									***									*						
12/21/2018									0.49	0.20	3.81	0.32		***					1.39		*								
12/28/2018									0.52	0.92	3.85	0.36							1.38		*								
01/04/2019									*		4.08	0.26							0.41		***								
01/10/2019											3.90								0.11		***					0.16			
01/11/2019					0.30																								
01/16/2019									**		*								0.11		***	***							
01/24/2019									**		*	0.13				0.59			0.12		***							7.25	
01/31/2019									0.31		*	0.42							0.27		***	***							
02/06/2019									**			0.24							0.27			**							
02/13/2019						Dry	0.63		**	0.07	**	0.26						**	0.15			***							
02/20/2019	0.03			0.68			0.76	7.84	**	0.08		0.10			0.01	0.62		**	0.11			**						6.16	7.39
02/26/2019									**	0.02												**							
03/15/2019					0.03				**	**	0.04								0.27			**	Dry						

LNAPL Thickness of Select Monitoring Wells

Date	AS-01	EB-03	EB-08	MW-02-06	MW-02-09	MW-02-10	MW-02-11	MW-02-12	MW-02-13	MW-02-14	MW-02-15	MW-02-16	MW-03	MW-03-01	MW-03-02	MW-03-03	MW-03-04	MW-04	MW-06	MW-07	MW-09	MW-10	MW-11	MW-13	MW-14	MW-19	MW-20	MW-21	MW-23
03/22/2019	0.01				0.11		0.48	6.35	0.13	**	0.07								0.47			**	Dry						
04/23/2019		0.44	0.84	0.61	0.23	Dry	0.25	0.07	0.56		0.37	0.24	0.02		0.46	0.46		1.85	0.61			Dry		Dry	1.35	0.16			0.91
06/21/2019					0.4				1.85	0.70									0.80			Dry				0.1			
06/30/2019										0.20	0.34											1.19	Dry						
06/30/2019																					0.07								
07/24/2019		0.49	0.98	1.00	1.17	Dry	Dry		1.62	1.17	0.48	0.26	0.2					0.35	0.93			0.09	Dry		2.39			*	*
08/30/2019		0.49	1.14	1.08	0.25				0.21	0.05	0.38	0.78					0.22		0.11						0.26	0.26		0.30	0.02
10/07/2019		--	0.46		0.7				0.03	0.00		Sheen			Sheen				0.19		0.01	Sheen	0.01		0.09			0.92	--
11/07/2019		0.02	0.01		0.25				0.36	0.01	0.23	0.01	0.01		0.62				0.01			0.01	Dry		6.02			7.38	0.01
11/22/2019		0.01	0.01	0.44	0.13			0.01	0.02	0.01	0.23	0.01	3.37		0.01		0.01		0.02		0.01	0.99	**		0.16			7.83	0.12
12/02/2019		Sheen	0.53						0.45										0.22			--	Dry		0.01			8.25	0.01
12/09/2019		0.08	0.18		0.25	Dry	1.46	0.03	0.01	0.01	0.92				0.40	0.40		0.26	0.01			Dry		Dry	0.2			0.27	0.10
01/03/2020		0.01	0.28	0.01	0.24	**	0.13		0.04	Sheen	0.16	Sheen	Sheen	Sheen	Sheen	0.34		0.26	0.11		Sheen	Sheen	Dry		0.08	Sheen	Sheen	0.64	0.1
02/11/2020		Sheen	Sheen		0.17	0.81	Dry		0.09	Sheen	0.21	Sheen	Sheen	Sheen	Sheen		0.01	Dry	0.18		Sheen	0.02			0.03		Sheen	0.22	0.07
03/19/2020		Sheen	0.2	Sheen	0.21				0.18	Sheen	0.22	Sheen		Sheen		Sheen	Sheen	Dry	0.97			***			0.11			0.91	0.15
04/16/2020		Sheen	0.14		0.11	0.46	Dry				0.23			0.04		Sheen	Sheen	Dry	0.13			***	Dry		0.74				Sheen
04/17/2020								0.07	0.08	0.04																		0.26	
05/01/2020		--	0.2		0.14	0.81		0.05	0.1	Sheen	0.12			Sheen		0.04		Dry	0.10			***	Dry		0.03			0.56	0.01
05/29/2020		0.06	0.06		0.33	0.21		0.22	0.06		0.08					0.01		****				0.02	Dry		0.33			0.1	0.09
06/05/2020	0.57	Sheen	0.03		0.19	0.29		0.21	0.02		Sheen		0.01	Sheen		Sheen		Dry	0.02			0.01	Dry	Dry	0.01			0.13	0.06
06/12/2020	0.46	0.04	0.09		0.21	0.34	Dry	0.08	0.01	Sheen	0.13			0.01		Sheen		Dry	0.04			0.02	Sheen	Dry	0.01	0.02		0.24	0.09
06/26/2020	0.17	--	0.06		0.09	0.05		Sheen	0.07	Sheen	0.08		0.04		Sheen	Sheen		Sludge	0.01			0.02	Sludge		0.01	0.02		0.07	0.02
07/10/2020	0.08	Sheen	0.02		0.14	0.11	Sludge	Sheen	0.13	Sheen	0.11		0.04			0.01		Sludge	0.04		Sheen	0.05	Dry	Dry	Sheen	0.02		0.17	Sheen
07/17/2020	Sheen	Sheen	Sheen		0.11	0.13	Sludge	0.06	0.13		0.07		0.03			Sheen		Sludge	0.05		Sheen	0.10	Dry	Dry		0.04		0.14	0.02
07/24/2020	0.02	0.05			0.14	0.17	Dry	0.04	0.13	Sheen	0.13		0.06			0.04		Dry	0.14			0.02	Dry	Dry	0.04	0.01		0.26	0.03
07/31/2020	0.05	--	0.05	0.01	0.16	0.19	Sludge	0.04	0.13		0.14		0.04			0.05		Sludge	0.20			0.06	Sludge	Dry	0.02	0.02		0.30	0.02
08/07/2020	0.05	--	0.01		0.11	0.24	Sludge	0.08	0.07	Sheen	0.11		0.04		0.01	0.08		Dry	0.21			0.13	Dry	Dry	0.01	0.01		0.15	0.03
08/14/2020	0.02	--	0.08		0.16	0.29	Dry	0.09	0.12	Sheen	0.09		0.03			0.10		Sludge	0.22			0.10	Sludge	Dry	0.02	Sheen		0.07	0.04
08/28/2020	Sheen	Sheen	0.12		0.18	0.32	Sludge	0.14	0.11	Sheen	0.15		0.05			0.18		Dry	0.14		Sheen	0.20	Dry	Dry	0.03	0.04		0.15	0.06
09/11/2020	Sheen	Sheen	0.11		0.18	0.33	Dry	0.17	0.1	Sheen	0.14		0.03			0.15		***	0.08			0.19			0.02	0.02		0.45	0.02
09/18/2020	Sheen	Sheen	0.12		0.18	0.43	Dry	0.19	0.02	0.01	0.13		0.02			0.18		Dry	0.11			0.17			0.02	***		0.59	0.03
09/21/2020		0.02	0.25																					Dry	0.15				
09/22/2020	2.25				0.25	0.02	Dry	0.22	0.08		0.2	Sheen	Sheen			0.17		Dry	0.14			0.18	Dry			0.01		0.82	0.1
10/02/2020	Sheen	0.06	0.1		0.19	Dry	Dry	0.21	0.07	0.01	0.14		0.02		Sheen	0.22		Dry	0.08			0.16			0.02	0.02		0.84	0.01
10/23/2020	Dry	0.05	0.25		0.08	0.10	Sludge	0.01	0.06	0.02	0.17		0.31		Sheen	0.07		Dry				0.01				0.01		0.07	0.05
11/06/2020	Sheen	0.04	0.21		0.01	0.15	Sludge	0.02		0.02	0.19		0.29		Sheen	0.05		Dry	0.01			0.02			0.01	0.01		0.11	Sheen
11/20/2020	Dry	0.08	0.33		0.09	Dry	Sludge	0.03		0.02	0.18		0.21		0.01	0.05		Sludge	0.01			0.05			0.03	0.01		0.28	0.05
12/17/2020	Dry	0.1	0.24		0.06	Dry	Sludge	0.05	0.04	0.01	0.1		0.13		Sheen	0.06		Dry				0.02			0.11	Sheen		0.02	0.97
01/08/2021	Dry	0.15	0.39		0.01	Dry		0.02		0.29	0.12		0.09		0.01	0.09		Dry	0.01			0.03			Sheen	Sheen		0.23	0.01
01/22/2021	Dry	0.12	0.24		0.09	Dry		0.01	0.01	0.01	0.14		0.11		0.01	0.16			0.01			0.03			0.03	0.01		0.31	Sheen
02/22/2021	Dry	0.22	0.15		0.12	Dry		0.03		0.01	0.21		0.03		0.01	0.31			0.02			0.01			0.03	0.02		0.05	0.02
03/08/2021	Dry	0.23	0.15		0.13	Dry		0.01	0.01	0.01	0.23		0.15		0.01	0.31			0.01			0.02			0.05	0.02		0.01	0.01

Notes:

* Extraction

** Emulsion

*** H2S present - no reading

Table 4
Groundwater General Inorganics Analytical Data Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--		--	--	--	--	--	--	--	**250**	**600**	**1,000**
MW-02	5/22/2013	--	--	--	--	--	--	--	--	124	**1,670**	**2,900**
	10/17/2013	626	89.8	20.5	106	289	<25.0	<25.0	289	150	**1,860**	**2,910**
	5/14/2014	Insufficient Water for Sample Collection										
	10/15/2014	643	75.5	18.9	120	234			234	112	**1,560**	**2,960**
	4/23/2015	521	105	20.3	120	227	<20.0	<20.0	227	136	**1,800**	**2,750**
	12/8/2015	540	114	20.8	120	276	<20.0	<20.0	276	125	**1,650**	**3,020**
	4/13/2016	580	76.9	21.2	114	204	<20.0	<20.0	204	113	**1,740**	**3,060**
	12/14/2016	577	79.0	10.7	87.8	206	<20.0	<20.0	206	103	**1,670**	**2,770**
	4/18/2017	603	80.5	11.9	109	216	<20.0	<20.0	216	170	**1,790**	**2,770**
	10/25/2017	584	140.0	9.33	96.3	114	<20.0	<20.0	114	107	**1,810**	**3,190**
	3/20/2018	645	138.0	10.50	110	--	--	--	--	122	**1,870**	**3,080**
	12/5/2018	570	158	11	97	112	<20.0	<20	112	97	**2020**	**3100**
	4/25/2019	561	133	10.3	102	154	<10.0	<10.0	154	111	**1,850**	**3,190**
	12/10/2019	449	606	9.10	108	<20.0	<20.0	<20.0	<20.0	173	**5,200**	**7,390**
	04/08/2020	Insufficient Water for Sample Collection										
MW-03	5/23/2013	--	--	--	--	--	--	--	--	140	**1,680**	**3,190**
	10/16/2013	597	85.1	13.2	139	605	<50.0	<50.0	605	175	**1,340**	**2,830**
	5/15/2014	LNAPL Present, No Sample Collected										
	10/15/2014	588	92.2	15.4	147	663	<10.0	<10.0	663	132	**1,180**	**2,860**
	4/22/2015	428	98.0	11.3	110	563	<20.0	<20.0	563	118	**1,110**	**2,460**
	12/9/2015	475	92.7	12.3	112	627	<20.0	<20.0	627	104	**1,220**	**2,640**
	4/13/2016	481	95.1	12.4	107	585	<20.0	<20.0	585	123	**1,270**	**3,020**
	12/13/2016	573	61.7	17.6	110	699	<20.0	<20.0	699	119	**1,310**	**2,960**
	4/18/2017	585	62.6	15.8	115	586	<20.0	<20.0	586	95.2	**1,300**	**2,530**
	10/25/2017	612	64.4	14.9	105	612	<20.0	<20.0	612	89.7	**1,380**	**2,920**
	12/5/2018	615	79	12	107	507	<20.0	<20	507	105	**1690**	**3030**
	4/25/2019	574	81.7	11.9	109	369	<10.0	<10.0	369	113	**1,500**	**3,010**
	12/11/2019	701	86.9	12.2	114	815	<20.0	<20.0	815	114	**1,480**	**3,480**
	04/08/2020	686	72.8	12.4	111	656	<20.0	<20.0	656	99.6	**1,400**	**3,030**

Table 4
Groundwater General Inorganics Analytical Data Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--	--	--	--	--	--	--	--	--	**250**	**600**	**1,000**
MW-08	5/22/2013	--	--	--	--	--	--	--	--	**278**	**1,610**	**3,180**
	10/16/2013	431	103	8.37	246	479	<12.5	<12.5	479	235	**1,240**	**2,460**
	5/14/2014	538	120	7.54	279	451	<10.0	<10.0	451	**261**	**1,630**	**2,490**
	10/15/2014	517	125	7.98	316	465	<10	<10	465	**253**	**1,390**	**3,080**
	4/23/2015	432	125	7.21	295	447	<20.0	<20.0	447	**261**	**1,560**	**2,770**
	12/8/2015	450	123	7.84	278	461	<20.0	<20.0	461	**274**	**1,550**	**3,060**
	4/13/2016	471	120	8.18	270	444	<20.0	<20.0	444	**329**	**1,700**	**3,320**
	12/14/2016	450	123	8.36	283	470	<20.0	<20.0	470	**325**	**1,460**	**2,970**
	4/18/2017	509	131	8.67	285	692	<20.0	<20.0	692	**339**	**1570**	**3020**
	10/25/2017	526	126	8.12	287	410	<20.0	<20.0	410	**355**	**1450**	**3300**
	3/20/2018	595	141	8.48	305	--	--	--	--	**386**	**1580**	**3310**
	12/5/2018	558	128	8.10	273	412	<20.0	<20	412	**453**	**1550**	**3480**
	4/25/2019	557	136	7.60	279	367	<20.0	<20.0	367	**464**	**1,640**	**3,600**
	12/10/2019	518	143	9.23	308	431	<20.0	<20.0	431	**520**	**1,410**	**3,410**
	04/07/2020	534	132	9.02	280	442	<20.0	<20.0	442	**524**	**1420**	**3370**
MW-12	5/22/2013	--	--	--	--	--	--	--	--	109	**2,230**	**3,770**
	10/16/2013	576	208	5.72	88.4	373	<12.5	<12.5	373	106	**1,950**	**3,290**
	5/14/2014	562	260	5.95	104	309	<10.0	<10.0	309	86	**2,340**	**2,470**
	10/15/2014	672	170	6.40	99.9	370	<10.0	<10.0	370	79	**1,690**	**3,470**
	4/22/2015	529	249	5.68	93.6	497	<20.0	<20.0	497	86.8	**2,090**	**3,650**
	12/9/2015	537	245	5.26	87.9	461	<20.0	<20.0	461	79.8	**1,970**	**3,590**
	4/12/2016	512	216	4.95	102	341	<20.0	<20.0	341	91.7	**2,130**	**3,330**
	12/14/2016	525	196	5.70	69.2	438	<20.0	<20.0	438	80.5	**1,820**	**3,420**
	4/18/2017	536	282	5.03	86.7	336	<20.0	<20.0	366	76.7	**2,370**	**3,520**
	10/25/2017	530	288	4.95	94.8	252	<20.0	<20.0	252	84.4	**2,340**	**3,000**
	3/20/2018	559	300	5.37	109	--	--	--	--	103	**2,320**	**3,680**
	12/5/2018	520	290	5.18	90	351	<20.0	<20	351	82	**2410**	**3980**
	4/26/2019	513	307	5.20	103	322	<10.0	<10.0	322	108	**2,260**	**3,820**
	12/10/2019	550	350	5.49	74.5	350	<20.0	<20.0	350	62	**2,450**	**4,190**
	04/08/2020	539	371	5.40	83.4	287	<20.0	<20.0	287	78.4	**2780**	**4230**

Table 4
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Frontier Field Services, LLC, Empire Abo Gas Plant
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Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--	--	--	--	--	--	--	--	--	**250**	**600**	**1,000**
MW-15	5/21/2013	--	--	--	--	--	--	--	--	**6,360**	**95,600**	**141,000**
	10/15/2013	451	2,810	104	3,490	423	<25.0	<25.0	423	**1,320**	**16,400**	**28,500**
	5/14/2014	Insufficient Water for Sample Collection										
	10/14/2014	542	1,560	56.7	2,010	281	<20.0	<20.0	281	**774**	**9,190**	**16,400**
	4/21/2015	424	4,940	173	6,280	881	<20.0	<20.0	881	**2,110**	**29,100**	**47,800**
	12/8/2015	428	5,870	201	7,560	747	<20.0	<20.0	747	**2,480**	**39,800**	**59,400**
	4/12/2016	425	4,600	162	5,940	608	<20.0	<20.0	608	**2,220**	**31,600**	**53,600**
	12/13/2016	405	3010	106	3940	430	<20.0	<20.0	430	**1,520**	**18,500**	**33,800**
	4/19/2017	494	8200	285	10500	969	<20.0	<20.0	969	**3,670**	**55000**	**80900**
	10/26/2017	469	6600	209	8820	838	<20.0	<20.0	838	**3,100**	**45000**	**78800**
	3/20/2018	521	6600	228	8640	--	--	--	--	**2,650**	**40200**	**60400**
	12/5/2018	491	7440	265	9660	983	<20.0	<20	983	**3,240**	**54000**	**84400**
	4/25/2019	463	8,130	277	11,000	1,440	<10.0	<10.0	1,440	**3,700**	**54,300**	**101,000**
	12/10/2019	533	351	13.2	441	149	<20.0	<20.0	149	245	**3,050**	**5,580**
	4/7/2020	485	6520	229	8580	811	<20.0	<20.0	811	**2,840**	**43,800**	**76,400**
MW-17	5/21/2013	--	--	--	--	--	--	--	--	158	**1,810**	**3,290**
	10/15/2013	612	118	9.29	140	334	<12.5	<12.5	334	170	**1,590**	**2,910**
	5/14/2014	Insufficient Water for Sample Collection										
	10/14/2014	650	144	8.75	140	316	<20.0	<20.0	316	148	**1,670**	**4,310**
	4/21/2015	517	156	7.41	140	328	<20.0	<20.0	328	166	**1,790**	**3,070**
	12/8/2015	497	189	7.42	128	314	<20.0	<20.0	314	133	**1,980**	**3,220**
	4/12/2016	541	165	7.45	124	319	<20.0	<20.0	319	153	**1,990**	**3,210**
	12/13/2016	504	191	7.13	118	306	<20.0	<20.0	306	146	**1,910**	**3,260**
	4/18/2017	531	298	7.28	117	268	<20.0	<20.0	268	**275**	**2630**	**3510**
	10/25/2017	498	361	7.37	103	245	<20.0	<20.0	245	110	**2580**	**6520**
	3/20/2018	497	457	8.18	103	--	--	--	--	100	**2870**	**4450**
	12/5/2018	457	448	7.08	91	254	<20.0	<20	254	109	**2890**	**4560**
	4/26/2019	452	488	7.04	103	257	<10.0	<10.0	257	94	**3,050**	**4,940**
	12/10/2019	497	514	7.87	116	246	<20.0	<20.0	246	91	**2,770**	**4,930**

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Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--	--	--	--	--	--	--	--	--	**250**	**600**	**1,000**
	04/07/2020	496	474	8.36	118	253	<20.0	<20.0	253	115	**3,230**	**5,030**
MW-18	5/20/2013	--	--	--	--	--	--	--	--	**734**	**1,610**	**3,660**
	10/15/2013	724	136	4.73	69.4	121	<12.5	<12.5	121	**606**	**1,470**	**3,130**
	5/13/2014	763	140	5.18	68.6	155	<10.0	<10.0	155	**585**	**1,580**	**2,490**
	10/14/2014	750	138	4.71	56.6	199	<20.0	<20.0	199	**408**	**1,470**	**3,850**
	4/21/2015	679	151	4.70	78.1	131	<20.0	<20.0	131	**691**	**1,550**	**3,830**
	12/8/2015	638	137	4.34	57.2	202	<20.0	<20.0	202	**385**	**1,720**	**3,100**
	4/12/2016	654	131	4.46	62.7	159	<20.0	<20.0	159	**584**	**1,690**	**3,630**
	12/13/2016	669	137	4.46	72.2	140	<20.0	<20.0	140	**617**	**1,530**	**4,190**
	4/19/2017	729	143	4.45	70.5	154	<20.0	<20.0	154	**644**	**1750**	**3580**
	10/25/2017	676	133	4.51	59.7	158	<20.0	<20.0	158	**429**	**1590**	**3220**
	3/21/2018	866	167	5.12	102.0	--	--	--	--	**576**	**1590**	**3190**
	12/5/2018	701	131	4.42	58.7	184	<20.0	<20	184	**578**	**1660**	**3160**
	4/26/2019	No Sample Collected										
	12/10/2019	719	141	4.61	69.5	197	<20.0	<20.0	197	**658**	**1,490**	**3,500**
	04/07/2020	678	125	4.36	55.1	130	<20.0	<20.0	130	**461**	**1,430**	**3,150**
MW-20	5/20/2013	LNAPL Present, No Sample Collected										
	10/15/2013	LNAPL Present, No Sample Collected										
	5/13/2014	LNAPL Present, No Sample Collected										
	10/15/2014	666	130	10.50	274	624	<10	<10	624	196	**1,680**	**3,830**
	4/22/2015	537	138	5.07	279	558	<20.0	<20.0	558	165	**1,900**	**3,470**
	12/8/2015	556	137	5.23	270	553	<20.0	<20.0	553	136	**2,020**	**3,280**
	4/12/2016	560	129	5.17	261	523	<20.0	<20.0	523	148	**2,150**	**3,750**
	12/14/2016	549	132	5.17	264	519	<20.0	<20.0	519	160	**1,900**	**3,350**
	4/18/2017	592	137	4.97	279	502	<20.0	<20.0	502	150	**1,760**	**3,370**
	10/25/2017	580	130	4.99	268	499	<20.0	<20.0	499	172	**1,850**	**3,500**
	3/20/2018	646	155	6.11	319	--	--	--	--	144	**2,050**	**3,550**
	12/5/2018	572	133	10.40	244	181	<20.0	<20	181	191	**2320**	**3780**
	4/26/2019	539	138	5.58	290	282	<10.0	<10.0	282	152	**2,100**	**3,780**

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Frontier Field Services, LLC, Empire Abo Gas Plant
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Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--	--	--	--	--	--	--	--	--	**250**	**600**	**1,000**
	12/11/2019	576	145	10.7	237	369	<20.0	<20.0	369	183	**1,990**	**3,650**
	04/08/2020	616	115	10.7	208	443	<20.0	<20.0	443	160	**1,950**	**3,480**
MW-22	5/23/2013	--	--	--	--	--	--	--	--	76.3	**1,790**	**3,450**
	10/16/2013	652	157	4.84	63.7	578	<12.5	<12.5	578	72.9	**1,630**	**3,120**
	5/15/2014	692	179	5.20	71	637	<10.0	<10.0	637	54.6	**1,870**	**2,060**
	10/15/2014	707	195	5.07	72.2	626	<10.0	<10.0	626	57.7	**1,580**	**3,640**
	4/22/2015	564	178	4.06	52.7	563	<20.0	<20.0	563	43.4	**1,750**	**3,280**
	12/9/2015	605	185	4.11	56.4	611	<20.0	<20.0	611	68.4	**1,650**	**3,310**
	4/13/2016	603	189	3.65	75.7	693	<20.0	<20.0	693	83.4	**2,010**	**4,160**
	12/13/2016	579	174	3.96	63.7	585	<20.0	<20.0	585	70.6	**1,660**	**3,320**
	4/18/2017	611	177	3.69	63.4	559	<20.0	<20.0	559	60.8	**1,720**	**3,290**
	10/25/2017	632	179	3.80	63.1	567	<20.0	<20.0	567	56.8	170	**3,450**
	3/20/2018	697	215	4.36	74.5	--	--	--	--	65.7	**1,840**	**3,580**
	12/5/2018	633	195	4.27	64	594	<20.0	<20	594	63.3	**1860**	**3470**
	4/25/2019	594	208	4.28	66.6	550	<10.0	<10.0	550	65	**1870**	**3,840**
	12/11/2019	611	230	4.83	70.7	549	<20.0	<20.0	549	106	**1,930**	**3,740**
	04/08/2020	621	217	5.39	63.9	572	<20.0	<20.0	572	75.2	**2,080**	**3,630**
MW-23	5/21/2013	--	--	--	--	--	--	--	--	**326**	**1,750**	**3,700**
	10/16/2013	591	129	6.36	169	548	<50.0	<50.0	548	**333**	**1,630**	**3,070**
	5/13/2014	650	138	7.38	191	454	<10.0	<10.0	545	**262**	**1,780**	**2,520**
	10/14/2014	743	167	8.46	210	622	<10.0	<10.0	622	237	**1,610**	**4,070**
	4/21/2015	565	163	7.00	205	577	<20.0	<20.0	577	245	**1,780**	**7,420**
	12/8/2015	586	138	6.78	178	499	<20.0	<20.0	499	198	**1,840**	**2,410**
	4/12/2016	630	134	6.85	178	538	<10.0	<10.0	538	219	**1,840**	**3,350**
	12/13/2016	564	128	6.80	160	541	<20	<20	541	246	**1,690**	**3,300**
	4/19/2017	627	142	6.40	181	531	<20	<20	531	206	**1600**	**3170**
	10/26/2017	664	160	6.9	169	653	<20.0	<20.0	653	225	**1790**	**3930**
	3/20/2018	757	157	7.7	186	--	--	--	--	180	**1720**	**3700**
	12/5/2018	628	151	7	160	489	<20.0	<20	489	179	**1940**	**3490**

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Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--		--	--	--	--	--	--	--	**250**	**600**	**1,000**
	4/26/2019	621	174	7.85	169	436	<10.0	<10.0	436	169	**2,080**	**3,880**
	12/10/2019	LNAPL Present, No Sample Collected										
	04/07/2020	654	190	8.98	158	563	<20.0	<20.0	563	183	**2,040**	**3,840**
MW-24	5/21/2013	No Sample Collected										
	10/16/2013	No Sample Collected										
	5/13/2014	Insufficient Water for Sample Collection										
	10/14/2014	682	405	7.21	78.6	781	<10.0	<10.0	781	79.2	**2,080**	**4,740**
	4/23/2015	592	304	3.8	83.4	1,370	<20.0	<20.0	1,370	90.1	**2,050**	**3,440**
	12/8/2015	578	293	3.61	73.7	817	<20.0	<20.0	817	84.9	**2,100**	**2,960**
	4/12/2016	598	280	3.77	72	805	<20.0	<20.0	805	88.7	**2,110**	**3,720**
	12/13/2016	586	280	3.82	69.2	776	<20.0	<20.0	776	92.3	**1,910**	**3,960**
	4/19/2017	589	306	4.37	86.3	731	<20.0	<20.0	731	107	**2020**	**3770**
	10/26/2017	649	291	3.78	81.1	803	<20.0	<20.0	803	89.2	**2060**	**4010**
	3/20/2018	668	291	2.90	86.0	--	--	--	--	84	**1760**	**3990**
	12/5/2018	580	270	2.73	87.4	987	<20.0	<20	987	93	**1820**	**3670**
	4/26/2019	No Sample Collected										
	12/10/2019	618	309	3.93	82.0	781	<20.0	<20.0	298	103	**2,050**	**4,000**
	04/07/2020	649	314	3.51	80.9	857	<20.0	<20.0	857	92.6	**2,080**	**4,190**
EB-02	5/20/2013	--	--	--	--	--	--	--	--	124	**2,140**	**3,680**
	10/15/2013	550	263	10.3	151	336	<12.5	<12.5	336	108	**2,200**	**3,340**
	5/13/2014	582	262	12	159	344	<10.0	<10.0	344	105	**2,400**	**2,600**
	10/14/2014	596	298	10.8	166	335	<20.0	<20.0	335	102	**2,100**	**4,210**
	4/21/2015	494	259	10.4	170	345	<20.0	<20.0	345	108	**2,250**	**4,190**
	12/8/2015	498	293	9.57	157	302	<20.0	<20.0	302	83.5	**2,850**	**3,990**
	4/12/2016	507	254	10.4	161	332	<20.0	<20.0	332	100	**2,420**	**3,810**
	12/13/2016	481	313	9.19	150	300	<20.0	<20.0	300	98.4	**2620**	**4290**
	4/19/2017	559	257	11.4	184	313	<20.0	<20.0	313	117	**2560**	**3990**
	10/25/2017	541	285	9.87	164	290	<20.0	<20.0	290	97.7	**2430**	**4120**
	3/20/2018	594	338	10.9	183	--	--	--	--	106	**2530**	**4020**

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Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--	--	--	--	--	--	--	--	--	**250**	**600**	**1,000**
	12/5/2018	522	308	9	156	298	<20.0	<20.0	298	99	**2430**	**3960**
	4/26/2019	511	314	9.14	163	286	<10.0	<10.0	286	104	**2,390**	**4,110**
	12/11/2019	528	288	10.2	177	286	<20.0	<20.0	286	140	**2,360**	**4,220**
	04/07/2020	537	294	9.79	161	284	<20.0	<20.0	284	110	**2,590**	**4,040**
EB-07	5/20/2013	--	--	--	--	--	--	--	--	140	**1,910**	**3,510**
	10/15/2013	Insufficient Water for Sample Collection										
	5/13/2014	Insufficient Water for Sample Collection										
	10/14/2014	733	111	4.28	147	379	<20.0	<20.0	379	234	**1,630**	**3,640**
	4/21/2015	574	117	3.57	123	365	<20.0	<20.0	365	209	**1,690**	**3,480**
	12/8/2015	Insufficient Water for Sample Collection										
	4/12/2016	Insufficient Water for Sample Collection										
	12/13/2016	564.0	109	3.18	95.6	254.0	<20	<20	254.0	184	**1,630**	**3,480**
	4/19/2017	594	117	3.03	102	231	<20.0	<20.0	231	148	**1,660**	**2,850**
	10/26/2017	601	128	3.34	97	231	<20.0	<20.0	231	159	**1,720**	**3,120**
	3/21/2018	629	126	3.24	101	--	--	--	--	132	**1,740**	**2,970**
	4/26/2019	549	173	3.50	97.5	259	<10.0	<10.0	259	158	**1,890**	**3,820**
	12/10/2019	Insufficient Water for Sample Collection										
	04/07/2020	Insufficient Water for Sample Collection										
P-02	5/21/2013	--	--	--	--	--	--	--	--	75.4	**2,020**	**3,540**
	10/16/2013	584	202	5.22	43.8	429	<12.5	<12.5	429	60.4	**1,750**	**2,880**
	5/15/2014	628	235	4.41	50.3	585	<10.0	<10.0	585	109	**1,890**	**2,300**
	10/14/2014	652	203	5.43	38.2	474	<20.0	<20.0	474	45.2	**1,730**	**3,670**
	4/21/2015	549	203	4.60	40.3	458	<20.0	<20.0	458	67.8	**1,860**	**3,360**
	12/8/2015	567	189	4.47	43.6	395	<20.0	<20.0	395	74.2	**1,930**	**3,030**
	4/12/2016	540	184	4.26	45.1	350	<20.0	<20.0	350	94	**2,090**	**3,420**
	12/13/2016	570	212	4.53	58.1	348	<20.0	<20.0	348	96.2	**1,850**	**3,340**
	4/19/2017	563	215	4.20	58.1	322	<20.0	<20.0	322	70.5	**1950**	**2,990**
	10/26/2017	584	227	4.62	61.5	342	<20.0	<20.0	342	82.1	**2050**	**3,790**
	3/20/2018	627	282	4.72	74.9	--	--	--	--	84.3	**2150**	**3,770**

Table 4
Groundwater General Inorganics Analytical Data Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--		--	--	--	--	--	--	--	**250**	**600**	**1,000**
	12/5/2018	556	248	4.96	60.4	396	<20.0	<20	396	80.2	**2020**	**3550**
	4/26/2019	546	254	4.58	62.1	369	<10.0	<10.0	369	77	**2,110**	**3,640**
	12/10/2019	584	212	4.73	53.9	373	<20.0	<20.0	373	111	**1,810**	**3,490**
	04/07/2020	581	232	4.67	59.2	384	<20.0	<20.0	384	86	**2,350**	**3,620**
P-05	5/21/2013	Insufficient Water for Sample Collection										
	10/16/2013	Insufficient Water for Sample Collection										
	5/13/2014	Insufficient Water for Sample Collection										
	10/14/2014	Insufficient Water for Sample Collection										
	4/21/2015	Insufficient Water for Sample Collection										
	12/8/2015	Insufficient Water for Sample Collection										
	4/12/2016	Insufficient Water for Sample Collection										
	12/13/2016	Insufficient Water for Sample Collection										
	4/19/2017	Dry										
	10/26/2017	Dry										
	3/20/2018	Dry										
	12/5/2018	Dry										
	4/26/2019	Dry										
	12/10/2019	Dry										
	04/07/2020	Dry										
QA/QC												
Dup-1 (MW-08)	4/7/2020	540	135	9.13	288	430	<20.0	<20.0	430	514	**1,410**	**3,350**
Dup-2 (MW-22)	04/08/2020	629	220	5.38	63.6	562	<20.0	<20.0	562	73.1	**2,030**	3,560
Dup-1 (EB-02)	09/22/2020											
Dup-2(MW-22)	09/22/2020											

Notes: Analysis performed by DHL Analytical, Round Rock, Texas

Table 4
Groundwater General Inorganics Analytical Data Summary
Frontier Field Services, LLC, Empire Abo Gas Plant
Eddy County, New Mexico

Well	Collection Date	Calcium	Magnesium	Potassium	Sodium	Alkalinity, Bicarbonate	Alkalinity, Carbonate	Alkalinity, Hydroxide	Alkalinity, Total	Chloride	Sulfate	Total Dissolved Solids
NMWQCC Standard (mg/L)	--		--	--	--	--	--	--	--	**250**	**600**	**1,000**

Alkalinity analyzed b EPA Method 310.0
Anions analyzed via EPA Method 300 by DHL Analytical Inc., Round Rock, Texas
TDS analyzed by EPA Method 160.1
All values reported in milligrams per liter (mg/L) equivelent to parts per million (ppm)
< - Indicates analyte concentration is less than method detection limit (MDL)
Blue and bold indicates analyte concentration exceeds Water Quality Control Commission (WQCC) domestic water water quality standard
P-05 Well for sample collection under modified program (October 23, 2017)

Table 5
AP-112
EcoVac Vapor and Liquid Recovery Summary
Empire Abo Gas Plant, Eddy County, New Mexico

Date	Vapor (Lbs)	Vapor (Gal)	Liquid (Gal)	Total Hydocarobons (Gal)	Water (Gal)	Well 1	Well 2	Well 3	Well 4
8/5/2019	89	14.6	0	14.6	408	MW-02-09	MW-02-13		
8/6/2019	227	37.5	90	127.5	111	MW-02-13	MW-06		
8/7/2019	248	40.9	20	60.9	118	MW-06			
8/8/2019	110	18.1	0	18.1	29	MW-10			
8/9/2019	115	19	0	19	125	MW-02-13	MW-06		
8/10/2019	17	2.8	30	32.8	69	MW-02-13	MW-14		
9/4/2019	99	16.4	41	57.4	110	MW-10	MW-02-13		
9/5/2019	123	20.2	20	40.2	432	MW-06	MW-02-09		
9/6/2019	75	12.4	20	32.4	266	MW-06	MW-03-04	MW-02-14	
9/7/2019	115	19	10	29	78	MW-02-15			
9/9/2019	45	7.4	21	28.4	21	MW-14	EB-03	EB-08	MW-10
9/10/2019	6	1.1	38	39.1	304	MW-02-16	MW-02-13		
9/11/2019	60	9.9	6	15.9	148	MW-06			
9/12/2019	97	16.1	24	40.1	69	MW-10			
9/13/2019	94	15.6	21	36.6	405	MW-06	MW-02-09		
9/14/2019	67	11	0	11	20	MW-02-06			
10/8/2019	33	5.4	26	31.4	836	MW-02-09	MW-02-13		
10/9/2019	60	9.8	28	37.8	395	MW-10	MW-02-09	MW-02-15	
10/10/2019	6	1.1	15	16.1	201	EB-08	MW-02-13	MW-14	
10/11/2019	30	4.9	10	14.9	750	MW-02-13	MW-06		
10/12/2019	24	4	27	31	100	MW-14	EB-03	EB-08	MW-10
10/14/2019	26	4.3	16	20.3	787	MW-06	MW-02-09		
10/15/2019	11	1.7	10	11.7	579	EB-08	MW-02-09	MW-02-15	
12/3/2019	25	4.1	46	50.1	290	MW-02-13	MW-06		
12/4/2019	153	25.3	16	41.3	125	MW-21			
12/5/2019	17	2.8	29	31.8	304	EB-08	MW-02-09	MW-02-15	
12/6/2019	94	15.6	12	27.6	151	MW-21			
12/7/2019	17	2.8	16	18.8	353	MW-02-13	MW-06		
12/8/2019	66	10.8	12	22.8	49	EB-08	MW-21		
1/7/2020	201	33.2	24	57.2	530	MW-02-13	MW-06		

Table 5
AP-112
EcoVac Vapor and Liquid Recovery Summary
Empire Abo Gas Plant, Eddy County, New Mexico

Date	Vapor (Lbs)	Vapor (Gal)	Liquid (Gal)	Total Hydocarobons (Gal)	Water (Gal)	Well 1	Well 2	Well 3	Well 4
1/8/2020	127	20.9	15	35.9	633	MW-02-15	MW-21		
1/9/2020	141	23.2	16	39.2	276	MW-02-12	MW-21		
1/10/2020	178	29.3	14	43.3	11	MW-04			
1/11/2020	10	1.7	10	11.7	311	MW-14	EB-03	MW-03-03	
1/13/2020	198	32.6	0	32.6	19	MW-04			
1/14/2020	53	8.5	0	8.5	178	MW-23			
1/15/2020	177	29.2	8	37.2	149	MW-02-10	MW-02-15		
1/16/2020	65	10.7	18	28.7	1002	MW-02-09	MW-02-13		
1/17/2020	76	12.5	0	12.5	174	MW-02-12	MW-21		
1/18/2020	78	12.9	0	12.9	17	MW-02-10	MW-02-11	MW-04	
1/20/2020	71	11.7	0	11.7	235	MW-23			
3/24/2020	39	6.5	15	21.5	524	MW-23			
3/25/2020	42	6.9	10	16.9	217	MW-02-12	MW-21		
3/26/2020	5.5	0.9	30	30.9	310	MW-02-10	MW-02-15		
3/27/2020	10	1.7	49	50.7	1592	MW-02-09			
3/28/2020	14	2.4	20	22.4	409	MW-02-13	MW-06		
3/30/2020	2.6	0.4	10	10.4	80	EB-08	MW-14	MW-23	
3/31/2020	4.2	0.7	15	15.7	177	MW-02-10	MW-21		
5/12/2020	36.8	6.1	10	16.1	181	MW-02-10	MW-21		
5/13/2020	30.1	5	0	5	238	MW-02-15	MW-21		
5/14/2020	18.1	3	15	18	1068	MW-02-09	MW-02-13		
5/15/2020	13.7	2.3	0	2.3	96	EB-08	MW-14	MW-23	
5/16/2020	36.2	6	10	16	183	MW-02-10	MW-21		
5/17/2020	21.7	3.6	10	13.6	257	MW-03-03	MW-10	AS-1	
5/18/2020	4.8	0.8	5	5.8	240	MW-02-13	MW-06		
6/16/2020	76.6	12.6	20	32.6	284	MW-02-12	MW-21		
6/17/2020	41.9	6.9	5	11.9	280	MW-21	MW-02-12	MW-10	AS-1
6/18/2020	58.3	9.6	0	9.6	222	MW-10	AS-1	MW-11	MW-03-01
6/19/2020	28.8	4.7	0	4.7	207	MW-11	MW-03-01	MW-09	MW-02-14
6/20/2020	15.9	2.6	0	2.6	213	MW-02-15	MW-06	MW-02-13	

Table 5
AP-112
EcoVac Vapor and Liquid Recovery Summary
Empire Abo Gas Plant, Eddy County, New Mexico

Date	Vapor (Lbs)	Vapor (Gal)	Liquid (Gal)	Total Hydocarobons (Gal)	Water (Gal)	Well 1	Well 2	Well 3	Well 4
6/21/2020	306.7	50.6	0	50.6	125	MW-02-10	MW-02-11	MW-04	
6/22/2020	7	1.2	0	1.2	287	MW-13	MW-23	EB-08	MW-14
6/23/2020	36.2	6	0	6	484	MW-03	MW-03-04	MW-22	MW-03-03
6/24/2020	57.3	9.5	0	9.5	519	MW-02-16	MW-03-02	MW-02-09	MW-02-10
6/25/2020	142.2	23.5	0	23.5	50	MW-03	MW-02-06	MW-02-11	
10/10/2020	93	15.3	0	15.3	45	MW-03			
10/11/2020	87.7	14.5	0	14.5	112	MW-02-10	MW-02-11	MW-04	
10/12/2020	89.5	14.8	20	34.8	127	MW-02-16	MW-21	MW-02-12	
10/13/2020	49.8	8.2	110	118.2	240	MW-03-02	MW-02-13	MW-06	
10/14/2020	37.2	6.1	0	6.1	188	MW-02-09	MW-10		
12/1/2020	124.6	20.6	16	36.6	9	MW-03	MW-02-11		
12/2/2020	401.3	66.2	0	66.2	0	MW-02-11			
12/3/2020	157.8	26	25	51	124	MW-02-10	MW-04	MW-21	MW-02-12
12/4/2020	18.3	3	5	8	133	MW-02-15	MW-06	MW-02-13	
12/5/2020	141.2	23.3	0	23.3	0	MW-10			
2/2/2021	611	100	0	100	0	MW-02-11			
2/3/2021	431.7	71.2	0	71.2	0	MW-02-11			
2/4/2021	587.4	101.9	5	106.9	69	MW-02-10	MW-04		
2/5/2021	125.1	20.6	44	64.6	101	EB-08	MW-23	MW-21	MW-02-12
2/6/2021	84.8	14	0	14	0	MW-10			
Total:	**7,614**	**1,260.20**	**1158**	**2,418.20**	**20,559**				

Figures

JWW

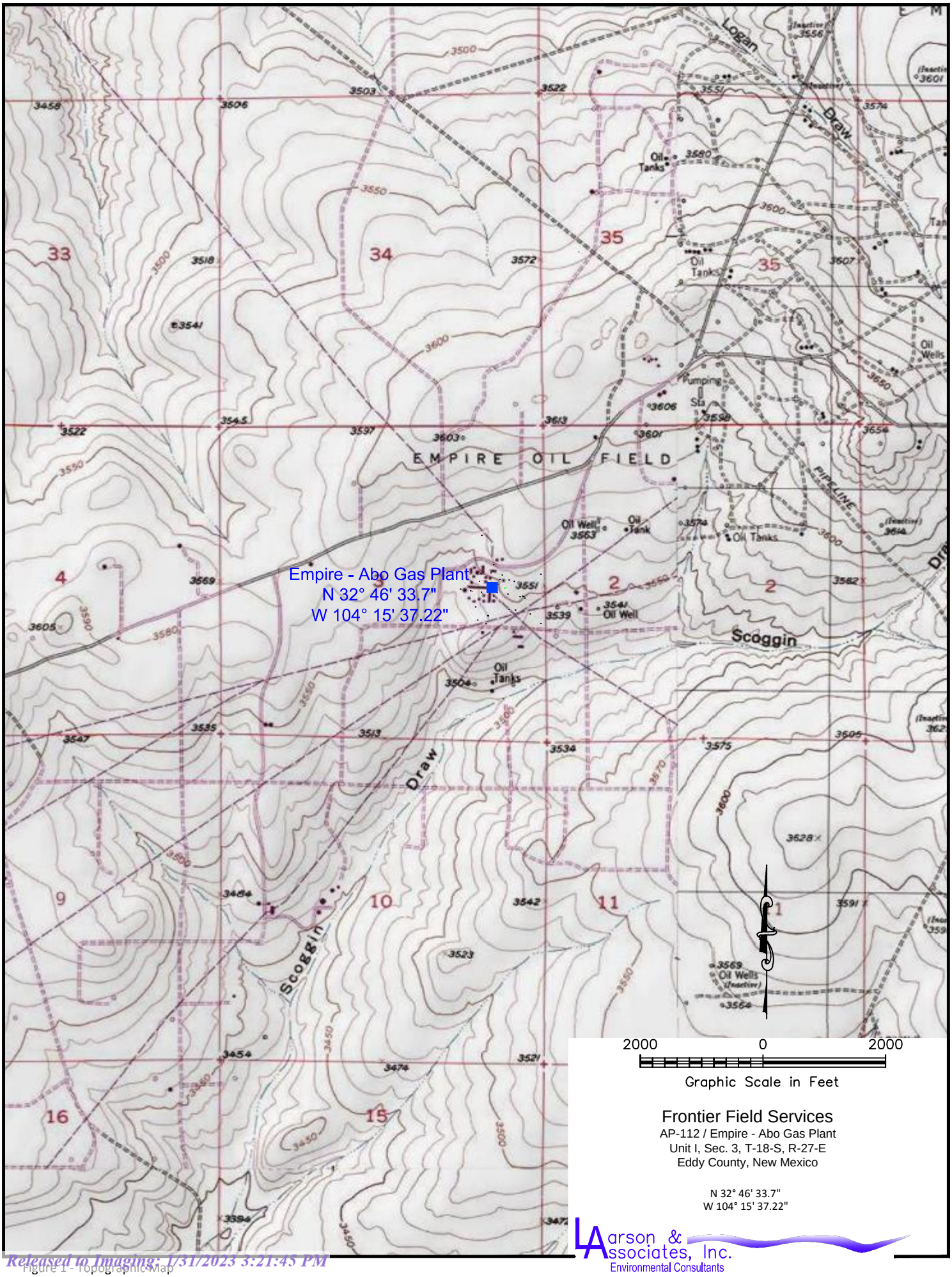


Figure 1 - Topographic Map

JWW

LEGEND

- MW-01 - Plugged And Abandoned Monitoring Well Location
- MW-03 - Monitoring Well Location
- P-01 - Piezometer (Fluid Level) Location
- EB-03 - Monitoring Well Location
- * - Water Level Corrected For Hydrocarbon Product In Well Using 0.70 Specific Gravity
- ** - Hydrocarbon Emulsion Present In Well
- ——x—— - Fence
- Draw
- Roads
- Property Line

300 0 300

Graphic Scale in Feet

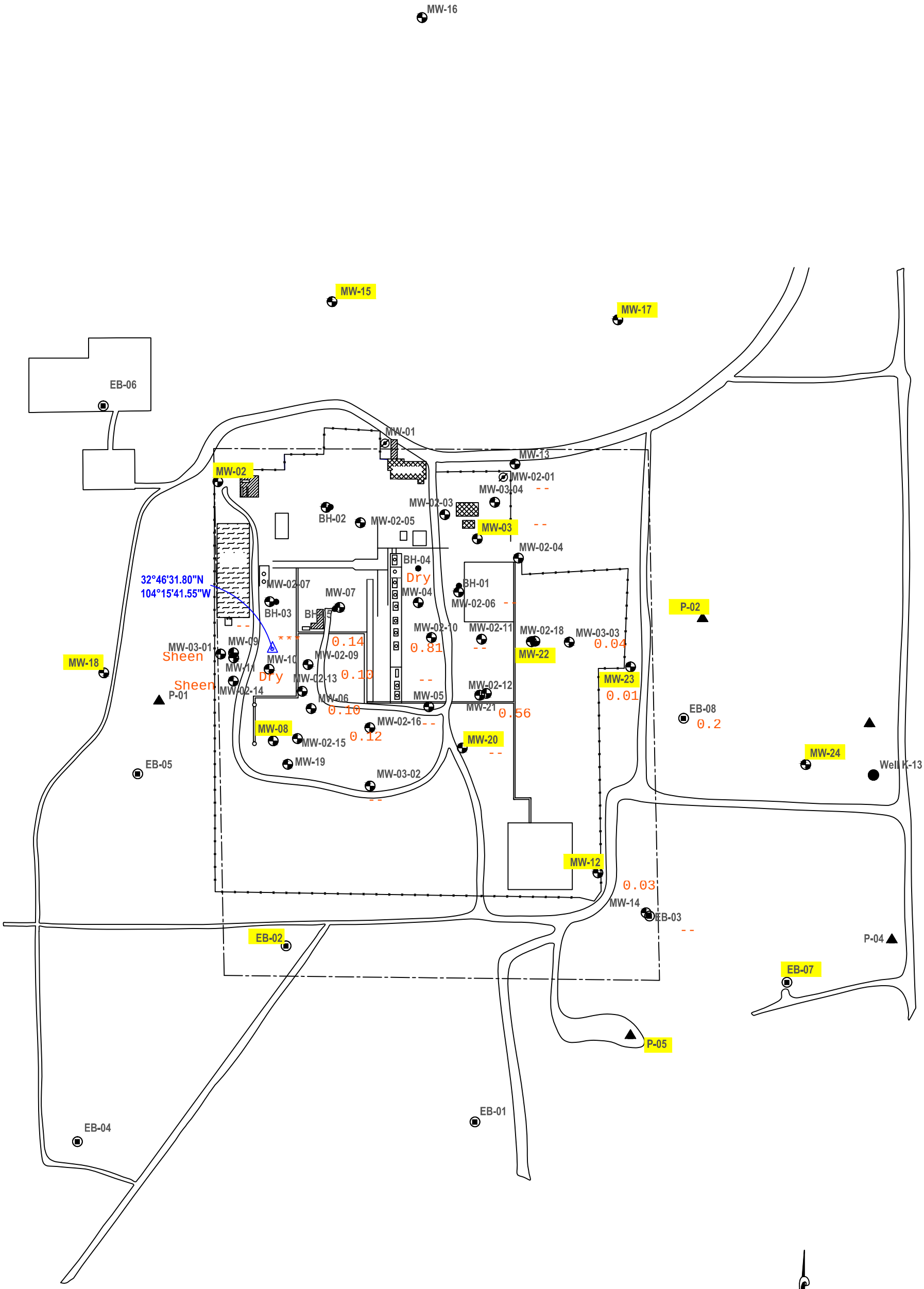
FRONTIER FIELD SERVICES, LLC

EMPIRE - ABO GAS PLANT
SECTION 3, T-18-S, R-27-E
EDDY COUNTY, NEW MEXICO

Larson & Associates, Inc.
Environmental Consultants

Figure 2 Aerial Map

Figure 3 - Facility Drawing



Legend

MW-10	- Monitoring Well Location and Apparent LNAPL Thickness, Feet
MW-01	- Plugged and Abandoned Monitoring Well
EB-03	- Monitoring Well Location and Apparent LNAPL Thickness, Feet
P-03	- Piezometer (Fluid Level) Location
	- Proposed Test Well Location
N/S	- Not Sampled
*	- Hydrocarbon Product Present in Well
**	- Insufficient Water for Sample

	Fence
	Property Line
	Draw
	Road

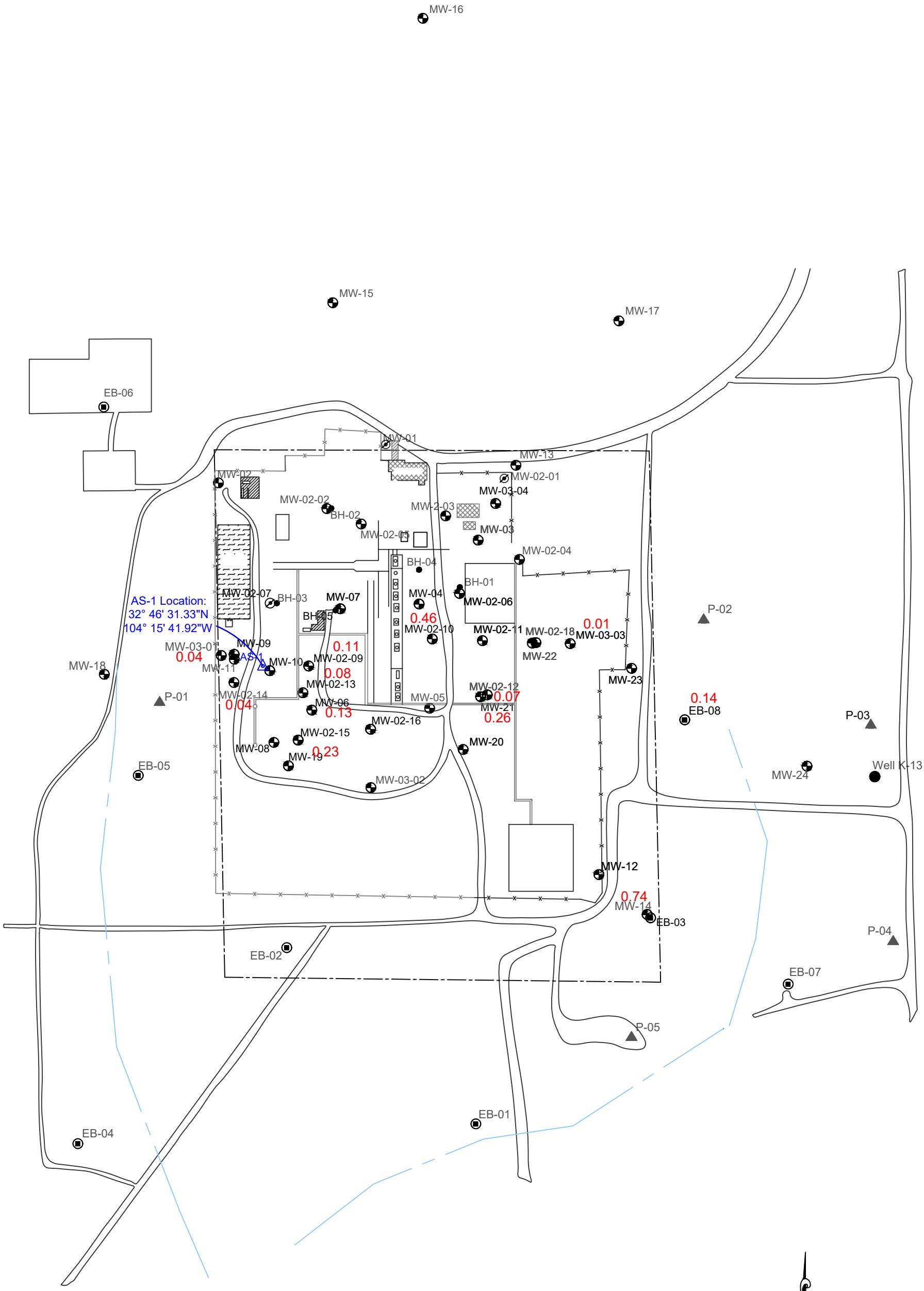
300 0 300

Graphic Scale in Feet

Frontier Field Services, LLC
AP - 112 / Empire - Abo Gas Plant
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 3 - Facility Drawing



Legend

0.13 MW-06 - Monitoring Well Location and Apparent LNAPL Thickness, Feet, April 6-7, 2020

- Plugged and Abandoned Monitoring Well

EB-03 - Monitoring Well Location and Apparent LNAPL Thickness, Feet, April 6-7, 2020

P-03 - Piezometer (Fluid Level) Location

- Test Well Location

* - Hydrocarbon Emulsion (No Water) in Well

Fence

Property Line

Draw

Road

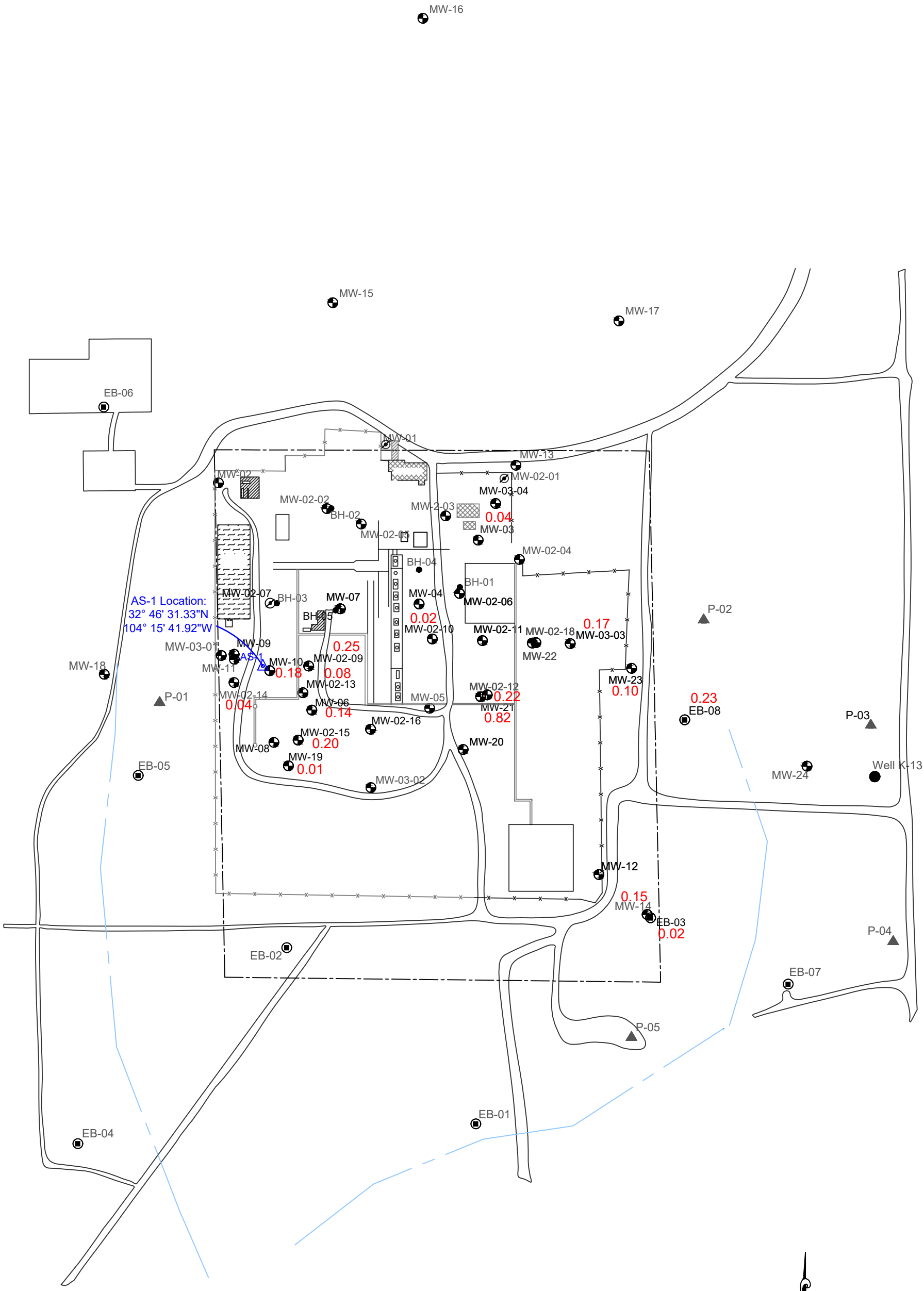
300 0 300

Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Gas Plant
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 4a - Apparent LNAPL Thickness Map, April 6-7, 2020



Legend

0.14 MW-06 - Monitoring Well Location and Apparent LNAPL Thickness, Feet, September 21-22, 2020

- Plugged and Abandoned Monitoring Well

0.02 EB-03 - Monitoring Well Location and Apparent LNAPL Thickness, Feet, September 21-22, 2020

P-03 - Piezometer (Fluid Level) Location

- Test Well Location

* - Hydrocarbon Emulsion (No Water) in Well

Fence

Property Line

Draw

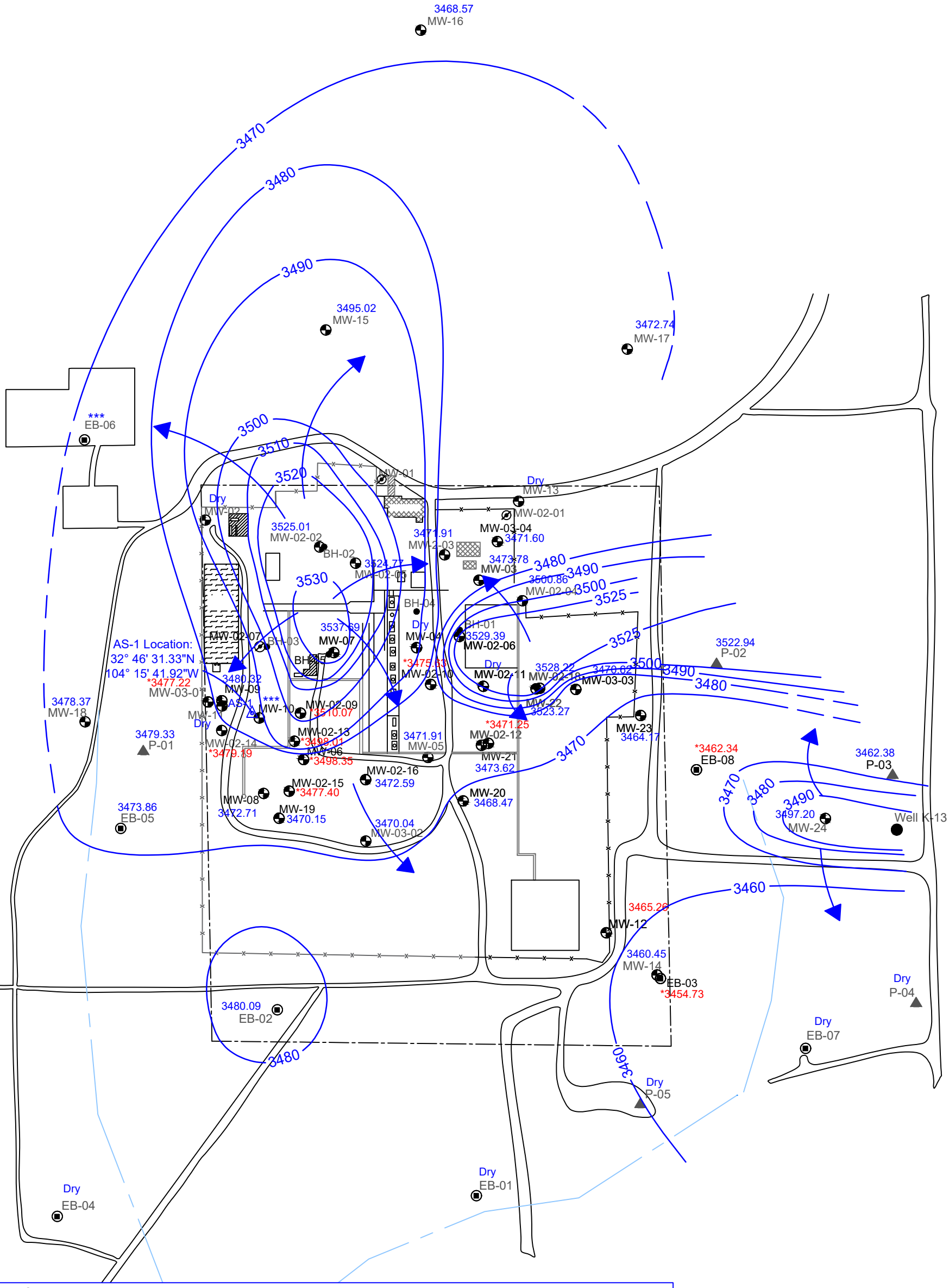
Road

300 0 300
Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Gas Plant
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 4b - Apparent LNAPL Thickness Map, September 21-22, 2020



Legend

- 3490 — Contour of Groundwater Potentiometric Surface Elevation, feet AMSL, April 6-7, 2020
- Groundwater Flow Direction
- 3478.37 MW-18 — Monitoring Well Location and Groundwater Potentiometric Surface Evelvation, feet AMSL, April 6-7, 2020
- MW-01 — Plugged and Abandoned Monitoring Well
- 3480.09 EB-02 — Monitoring Well Location and Groundwater Potentiometric Surface Elevation, feet AMSL, April 6-7, 2020
- 3522.94 P-02 — Piezometer (Fluid Level) Location and Groundwater Potentiometric Surface Elevation, feet AMSL, April 6-7, 2020
- Test Well Location
- N/S — Not Sampled
- * — Hydrocarbon Product Present in Well
- ** — H2S Present in Well
- *** — Well Obstructed

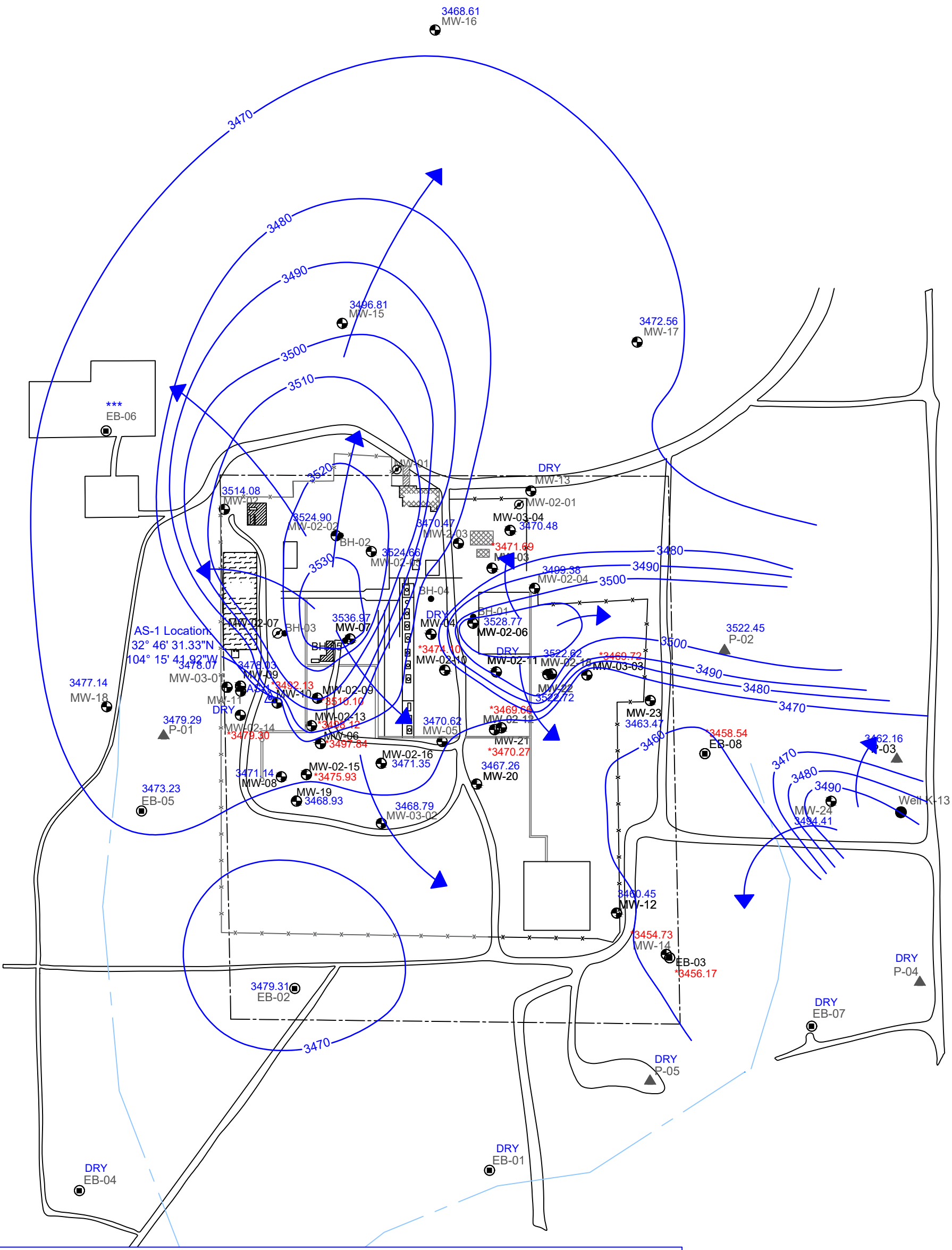
Fence
Property Line
Draw
Road

300 0 300
Graphic Scale in Feet

Frontier Field Services, LLC
AP - 112 / Empire - Abo Compressor Station
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 5a- Groundwater Potentiometric Surface Map, April 6-7, 2020



Legend

- 3490 — Contour of Groundwater Potentiometric Surface Elevation, feet AMSL, September 21-22, 2020
- Groundwater Flow Direction
- 3477.14 MW-18 — Monitoring Well Location and Groundwater Potentiometric Surface Evelvation, feet AMSL, September 21-22, 2020
- MW-01 — Plugged and Abandoned Monitoring Well
- 3479.31 EB-02 — Monitoring Well Location and Groundwater Potentiometric Surface Elevation, feet AMSL, September 21-22, 2020
- 3522.45 P-02 — Piezometer (Fluid Level) Location and Groundwater Potentiometric Surface Elevation, feet AMSL, September 21-22, 2020
- Test Well Location
- N/S — Not Sampled
- * — Hydrocarbon Product Present in Well
- ** — H2S Present in Well
- *** — Well Obstructed

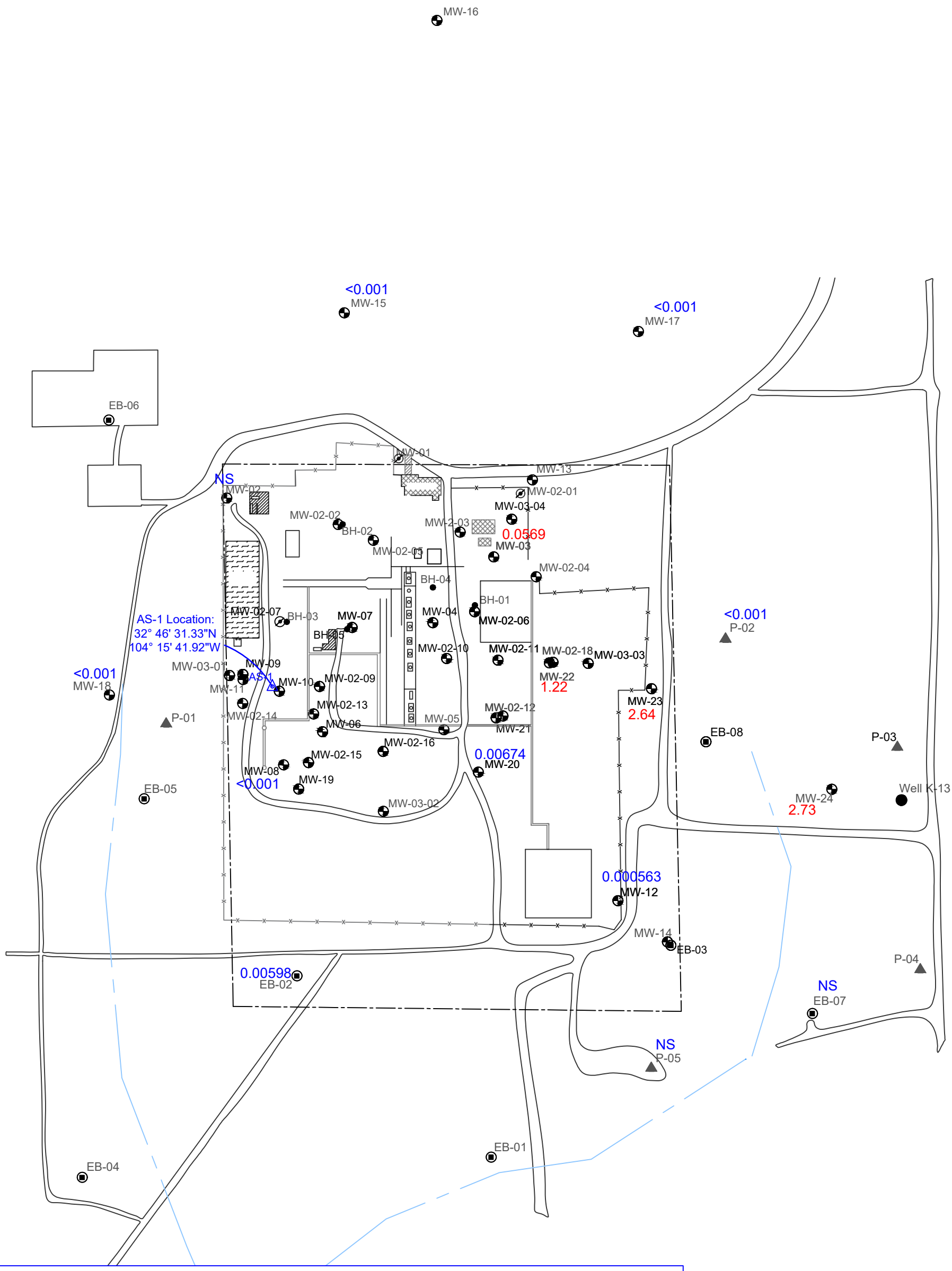
Fence
Property Line
Draw
Road

300 0 300
Graphic Scale in Feet

Frontier Field Services, LLC
AP - 112 / Empire - Abo Compressor Station
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 5b- Groundwater Potentiometric Surface Map, September 21-22, 2020



Legend

<0.001
MW-08 - Monitoring Well Location and and Dissolved Benzene Concentration in Groundwater, mg/L, April 6-8, 2020

MW-01 - Plugged and Abandoned Monitoring Well

0.00598
EB-02 - Monitoring Well Location and and Dissolved Benzene Concentration in Groundwater, mg/L, April 6-8, 2020

P-02 - Piezometer (Fluid Level) Location and Dissolved Benzene Concentration in Groundwater, mg/L, April 6-8, 2020

- Test Well Location

< - Concentration Below Method Reporting Limit

N/S - No Sample

Red: Exceeds WACC Human Health Standard: 0.01 mg/L

Fence

Property Line

Draw

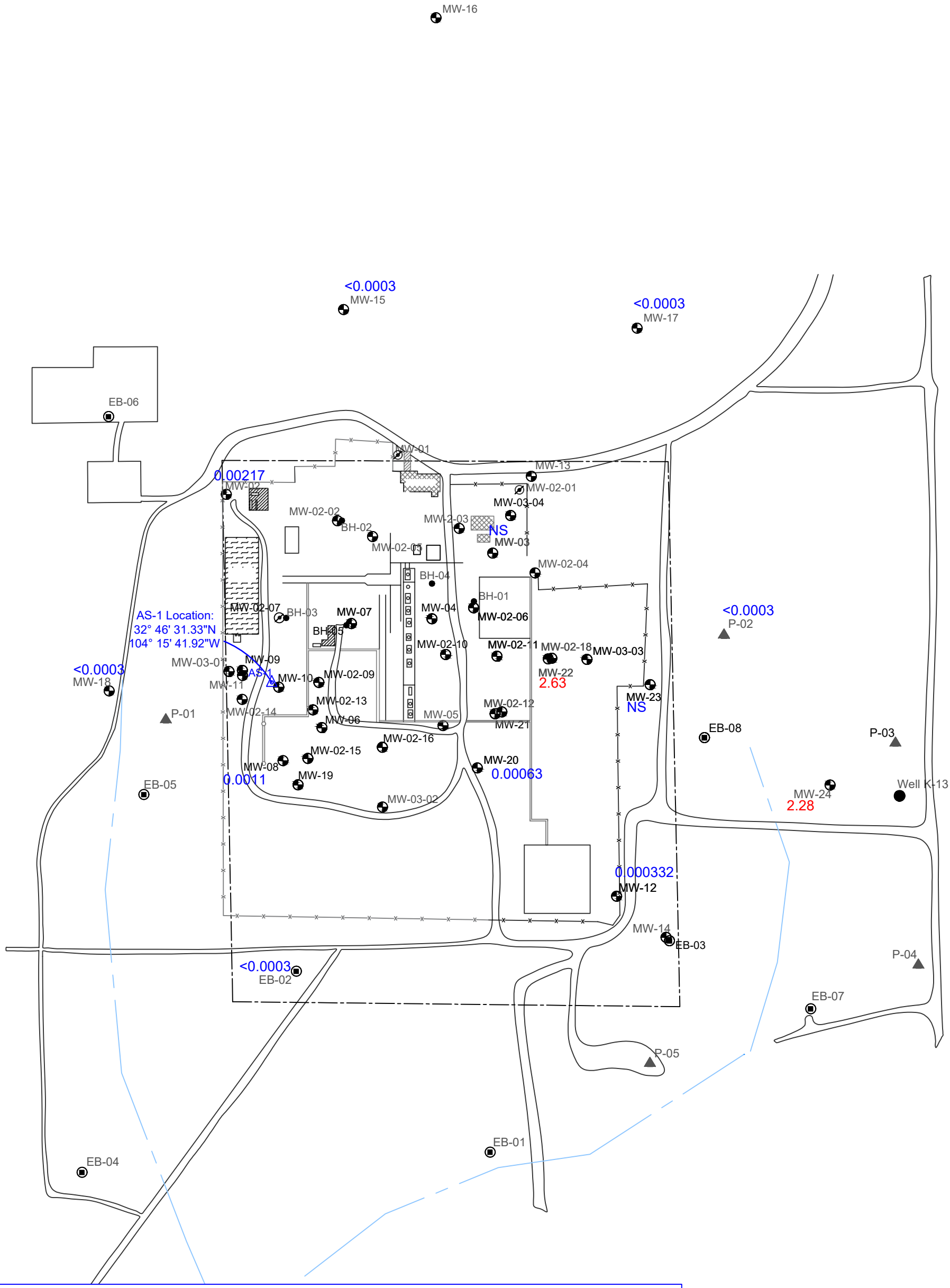
Road

300 0 300
Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Compressor Station
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 6a - Benzene Concentration in Groundwater Map, April 6-8, 2020



Legend

2.63 MW-22 - Monitoring Well Location and and Dissolved Benzene Concentration in Groundwater, mg/L, September 21-23, 2020

- Plugged and Abandoned Monitoring Well

EB-07 - Monitoring Well Location and and Dissolved Benzene Concentration in Groundwater, mg/L, September 21-23, 2020

P-02 ▲ - Piezometer (Fluid Level) Location and Dissolved Benzene Concentration in Groundwater, mg/L, September 21-23, 2020

- Test Well Location

< - Concentration Below Method Reporting Limit

N/S - No Sample

* - Hydrocarbon Product in Well - No Sample

Red: Exceeds WACC Human Health Standard: 0.01 mg/L

Fence

Property Line

Draw

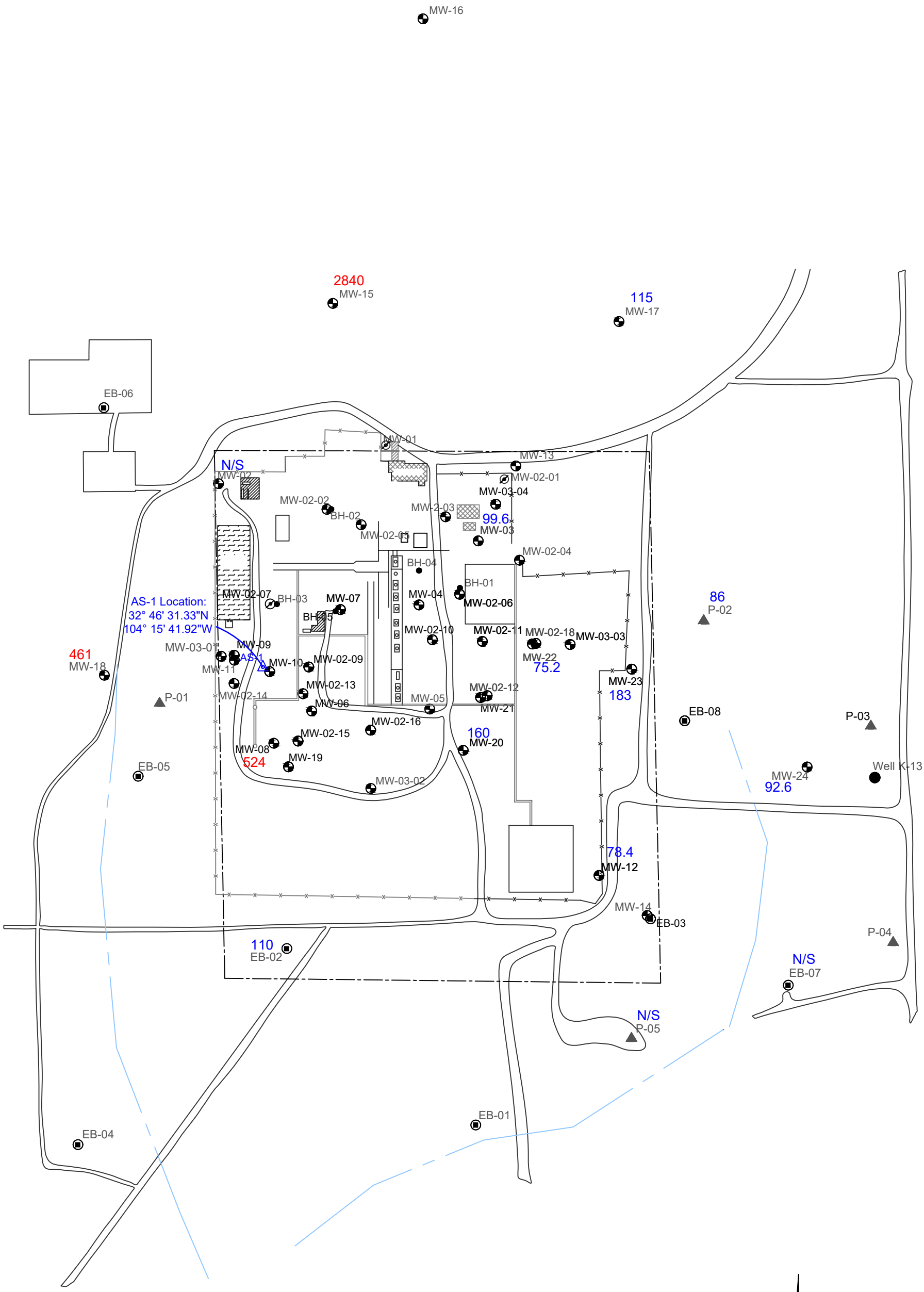
Road

300 0 300
Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Compressor Station
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 6b - Benzene Concentration in Groundwater Map, September 21-23, 2020



Legend

524 MW-08 - Monitoring Well Location and Chloride Concentration in Groundwater, mg/L, April 6-8, 2020

- Plugged and Abandoned Monitoring Well

110 EB-02 - Monitoring Well Location and Chloride Concentration in Groundwater, mg/L, April 6-8, 2020

86 P-02 - Piezometer (Fluid Level) Location and Chloride Concentration in Groundwater, mg/L, April 6-8, 2020

- Test Well Location

N/S - No Sample

Red: Exceeds NMWQCC Domestic Water Quality Standard: 250 mg/L

Fence

Property Line

Draw

Road

300 0 300

Graphic Scale in Feet

Aka Energy Group, LLC

AP - 112 / Empire - Abo Compressor Station

Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E

Eddy County, New Mexico

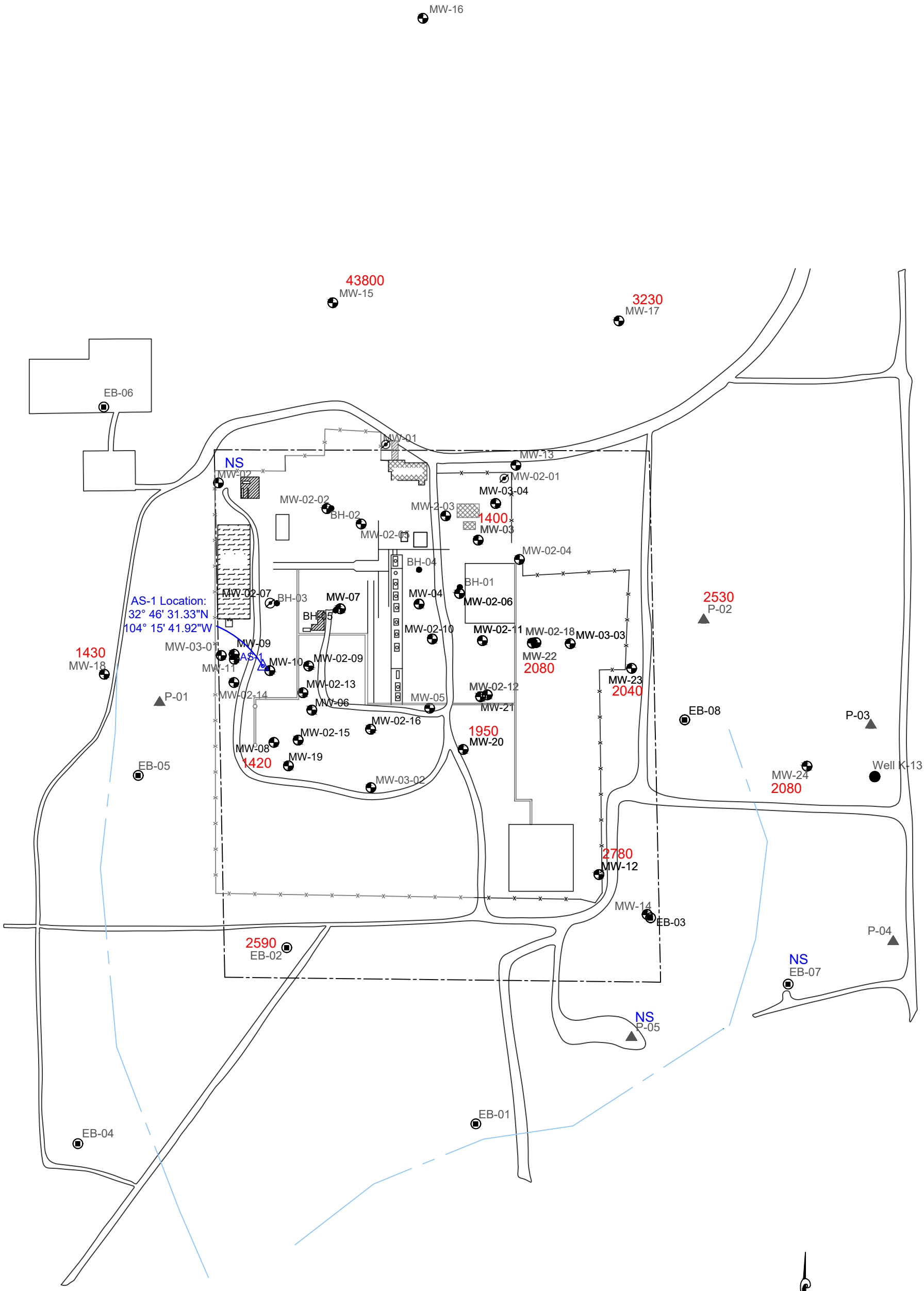
32° 46' 33.7"N

104° 15' 37.22"W

Larson & Associates, Inc.

Environmental Consultants

Figure 7 - Chloride Concentration in Groundwater, April 6-8, 2020



Legend

1420 MW-08 - Monitoring Well Location and Sulfate Concentration in Groundwater, mg/L, April 6-8, 2020

- Plugged and Abandoned Monitoring Well

2590 EB-02 - Monitoring Well Location and Sulfate Concentration in Groundwater, mg/L, April 6-8, 2020

2530 P-02 - Piezometer (Fluid Level) Location and Sulfate Concentration in Groundwater, mg/L, April 6-8, 2020

- Test Well Location

N/S - No Sample

Red- Exceeds NMWQCC Domestic Water Quality Standard: 600 mg/L

Fence

Property Line

Draw

Road

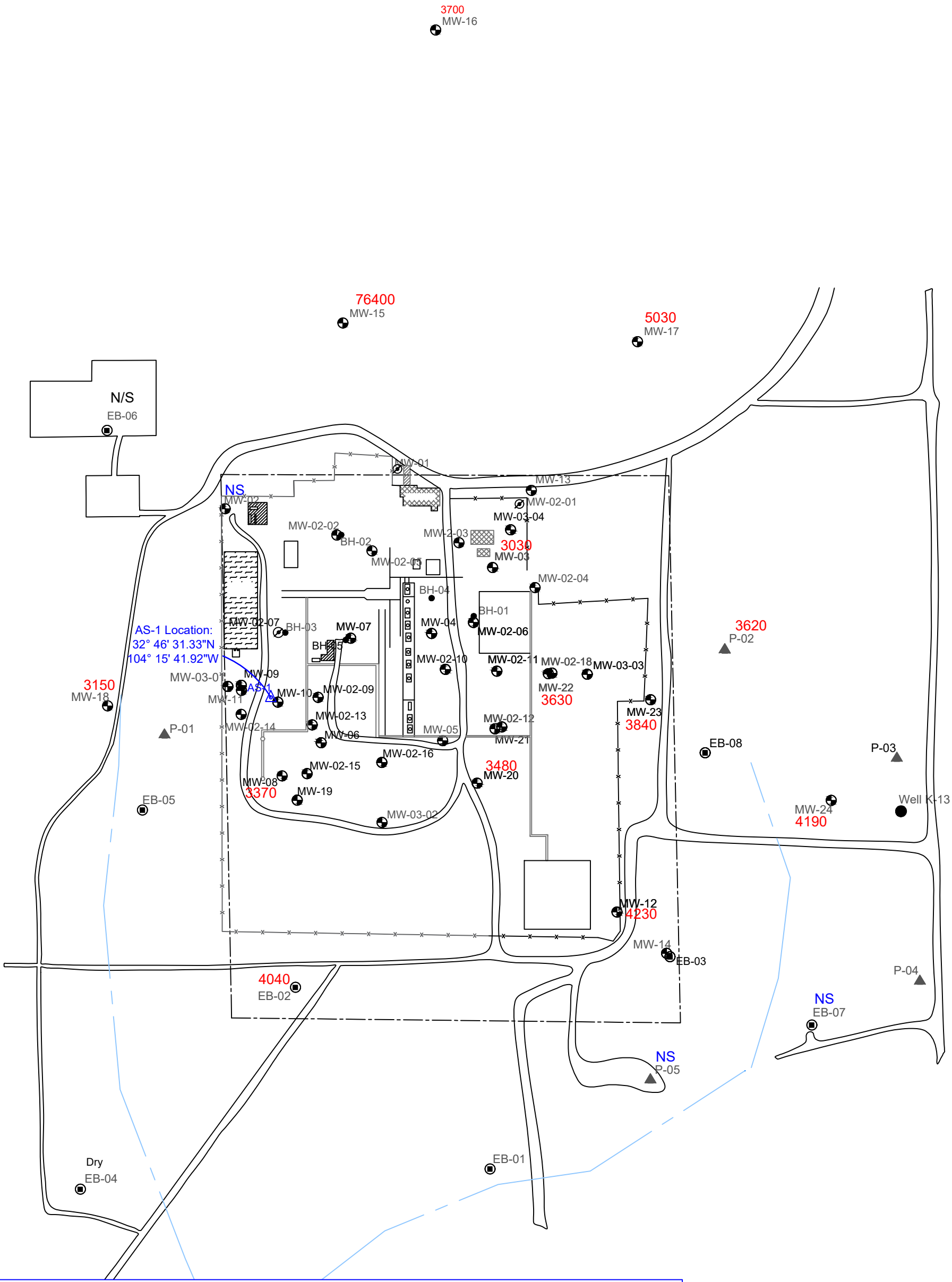
300 0 300

Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Gas Plant
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 8 - Sulfate Concentrations in Groundwater, April 6-8, 2020



Legend

- 5000 — Contour of TDS Concentration in Groundwater, mg/L, April 6-8, 2020
- 3150 MW-18 — Monitoring Well Location and TDS Concentration in Groundwater, mg/L, April 6-8, 2020
- MW-01 — Plugged and Abandoned Monitoring Well
- 4040 EB-02 — Monitoring Well Location and TDS Concentration in Groundwater, mg/L, April 6-8, 2020
- 3620 P-02 — Piezometer (Fluid Level) Location and TDS Concentration in Groundwater, mg/L, April 6-8, 2020
- Test Well Location
- N/S — Not Sampled - Well Obstructed
- * — Hydrocarbon Product Present in Well

RED: Exceeds NMWQCC Domestic water Quality Standard: 1,000 mg/L

- Fence
- Property Line
- Draw
- Road

300 0 300
Graphic Scale in Feet

Aka Energy Group, LLC
AP - 112 / Empire - Abo Compressor Station
Unit I, (NE/4, SE/4)- 18 - S, R - 27 - E
Eddy County, New Mexico
32° 46' 33.7"N
104° 15' 37.22"W

Larson & Associates, Inc.
Environmental Consultants

Figure 9 - TDS Concentration in Groundwater, April 6-8, 2020

Appendix A

NMOSE Communications

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
SANTA FE

Scott A. Verhines, P.E.
State Engineer

CONCHA ORTIZ Y PINO BLDG.
POST OFFICE BOX 25102
130 SOUTH CAPITOL
SANTA FE, NEW MEXICO 87504-5102
(505) 827-6091
FAX: (505) 827-3806

March 8, 2013

Permit Number: Evaluation of Empire Abo Gas Processing Plant remediation Plan

Larson and Associates Inc
Attn: Jeremy J. C. Cannady
507 North Marienfeld, Suite 202
Midland Texas 79701

GREETINGS:

The Hydrology evaluation for the remediation plan you submitted concerning the Empire Abo Gas Processing station concluded there was mounded water under the plant and the planned pumping would not cause effects to the Pecos River. You may proceed with the plan and can submit an application to appropriate and any necessary well permits if required.

Sincerely,

Tim Williams

Tim Williams
Carlsbad Basin Watermaster
Water Resource Allocation Program
Water Rights Division
District II Office of the State Engineer
1900 West Second Street
Roswell New Mexico 88201

MEMORANDUM
OFFICE OF THE STATE ENGINEER
Hydrology Bureau

DATE: March 5, 2013

TO: Tim Williams, Carlsbad Basin Watermaster

FROM: Alan Cuddy, Hydrology Bureau AJC

THROUGH: Mike Johnson, Chief, Hydrology Bureau MJ

SUBJECT: Hydrologic Analysis of Empire Abo Gas Plant Remediation

Introduction

The Empire Abo Gas Plant is a natural gas processing plant that separates alkanes from natural gas. The plant is approximately nine miles east-southeast of Artesia, NM in T18S, R27E, Section 3 (Figure 1). An abatement plan (Larson & Associates, 2013) proposes to pump 36.32 acre-feet/year (afy) of contaminated groundwater for 5.52 years from beneath the plant for remediation. The water will be treated and injected in a disposal well.

This analysis evaluates the impacts on water levels near the plant and impacts to the Pecos River as a result of the remediation efforts.

Hydrogeology

The hydrology near the Plant has been described by Larson & Associates (2013). The plant site is underlain anhydrite, gypsum and salts of the Tansill Formation, part of the Artesia Group, extending approximately 60 to 70 feet below the surface. The Tansill Formation is underlain by red mudstones, shales and clays of the Yates Formation.

Historically, groundwater is reported to have moved to the south-southwest near the plant. Currently, depths to water near the plant range from about 15 to 65 feet. The water table appears to be mounded beneath the plant as a result of water leaks from the facility. As a result of the mound, groundwater flows in all directions away from the plant. The height of the mound, based on Figures 8a and 8b from Larson & Associates (2013), appears to be approximately 40 to 50 feet above the regional water levels.

Groundwater beneath the plant contains high total dissolved solids (TDS) concentrations, ranging from about 3,000 to 500,000 mg/L. Light, non-aqueous phase liquid (LNAPL) was also found under the plant at thicknesses up to nearly nine feet.

A pumping test was conducted at the plant and the data were presented in Larson & Associates (2013). Well MW-9 was pumped for 72 hours and water levels were measured in four observation wells (MW-03-01, MW-11, MW-02-14 and MW-10). A distance-drawdown plot was prepared for this analysis from the test data (Figure 2). Well MW-11 dried up during the test and was not used in the data interpretation. A transmissivity of 267 gallons per day/foot and a hydraulic conductivity of 1.28 feet/day were estimated from the test data.

A specific yield of 0.03 was used for the sedimentary rocks in this analysis.

The proposed abatement system will consist of 10 extraction wells at the plant. The wells will be constructed with 50 feet of screen, of which 25 feet will be below water. The wells will be pumped for 5.52 years at a combined rate of 36.32 afy. Water will be treated and injected in a permitted disposal well. It is assumed that there will be no hydraulic effects from the injected water.

River Depletion Analysis

The river depletion analysis was performed by calculating the effects of pumping at the plant using the Hydrology Bureau's Glover-Balmer program. The groundwater system is believed to be in communication with the Pecos River, which lies approximately 3.4 miles west of the plant (Figure 1).

Specific inputs to the Glover-Balmer program are described below.

Transmissivity. A hydraulic conductivity in the vicinity of the plant was estimated at 1.28 ft/day based on the pump test conducted at the plant. A 25-foot saturated thickness is planned for the remediation wells. The saturated thickness multiplied by the hydraulic conductivity results in a transmissivity of approximately 32 ft^2/day.

Specific Yield. A specific yield of 0.03 was estimated for the sedimentary rocks in which the remediation wells will be completed.

Pumping Rate. A constant pumping rate of 36.32 afy for 5.52 years was used based on the proposed abatement plan.

Distance to River. The distance to the nearest point on the Pecos River is approximately 3.4 miles.

Boundaries. Because there is no no-flow boundary in the vicinity of the well, the no-flow boundary, required by the Glover-Balmer program, was set at a distance of 50 miles from the river to minimize the effect of the boundary.

The depletions on flows in the Pecos River are shown on Figure 3. The maximum depletion occurs approximately 140 years after the start of the remediation pumping and occurs at a rate of approximately 0.22 afy.

The calculated depletion of 0.22 afy is relative to current conditions. The presence of the groundwater mound under the plant has increased the hydraulic gradient towards the Pecos River and thus increased groundwater flow into the river. The remediation pumping is expected to cause drawdowns in the vicinity of the plant of up to 36 feet, enough to nearly offset the presence of the mound, thus returning groundwater levels back to their approximate original configuration. As a result, no new depletions to the Pecos River are expected in excess of natural conditions. The proposed depths of the extraction wells of 25 feet below the water-LNAPL interface may be insufficient to lower the mound to natural conditions.

Drawdown Analysis

The OSE has no records of active wells within two miles of the plant. Drawdown for a hypothetical well located two miles from the plant was calculated with the Theis equation. Inputs to the Theis equation were generally the same as those for the Glover-Balmer inputs; however, the units were different. The Theis inputs were:

Transmissivity = 239 gallons/day/foot

Specific Yield = 0.03

Pumping Rate = 22.5 gallons per minute

Distance to Well = 10,560 feet

The maximum drawdown two miles away from the plant is slightly more than 0.3 feet and occurs approximately 75 years after remediation pumping starts (Figure 4). A drawdown of this magnitude is not expected to cause wells greater than two miles from the plant to become inoperable.

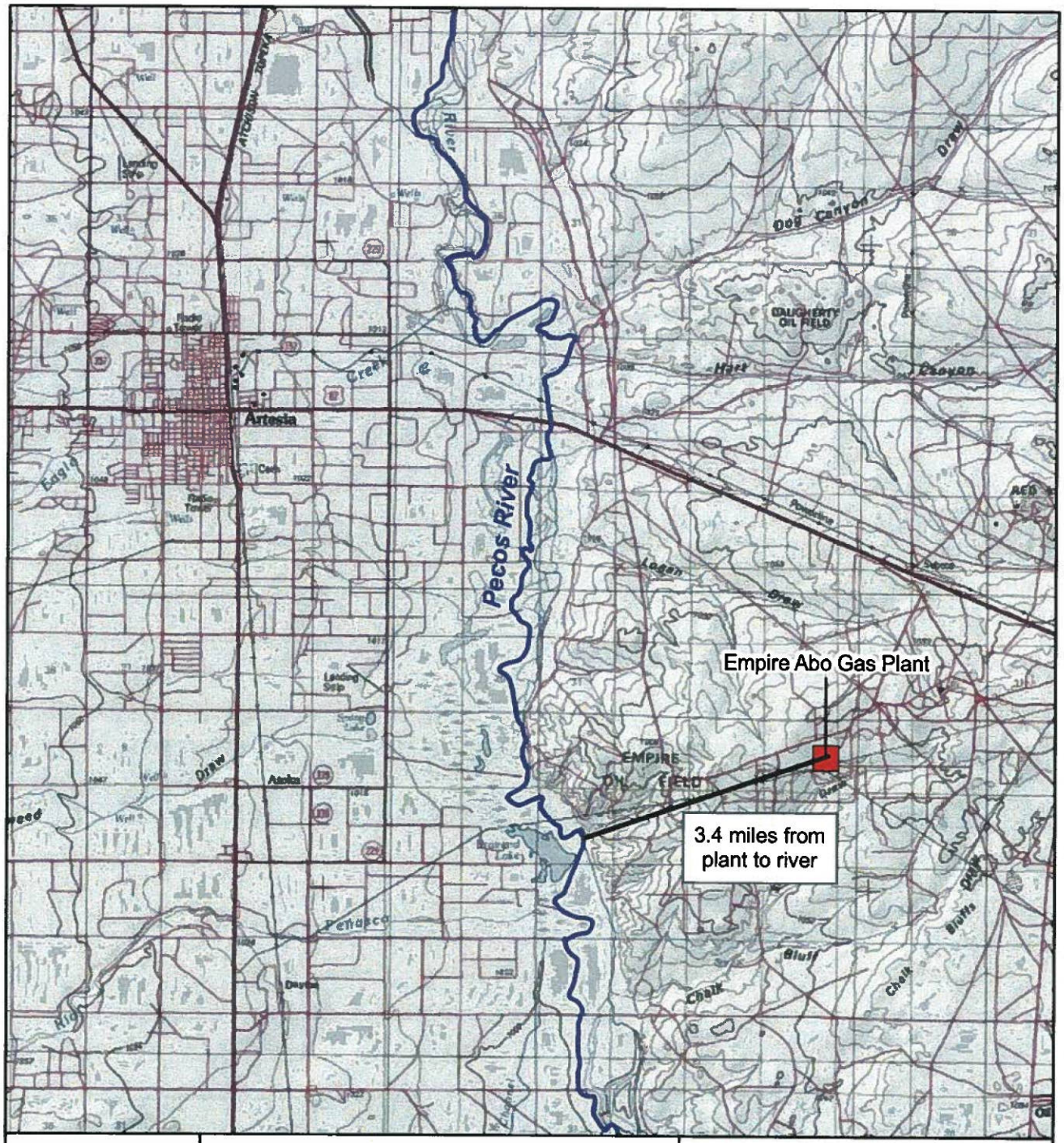
Conclusions

1. Remediation pumping is expected to return groundwater levels closely to natural conditions. Thus, no new depletions to the Pecos River are expected.

2. Drawdowns resulting from remediation pumping are not expected to cause wells to become inoperable.

References

Larson & Associates, Inc., 2013. Groundwater Abatement Plan, Empire Abo Gas Plant, Eddy County, New Mexico AP-112. Consultant's Report prepared for Frontier Field Services, LLC, dated January 15, 2013.



EMPIRE ABO GAS PLANT

FIGURE 1

LOCATION OF THE EMPIRE ABO GAS PLANT

Office of the State Engineer
Hydrology Bureau

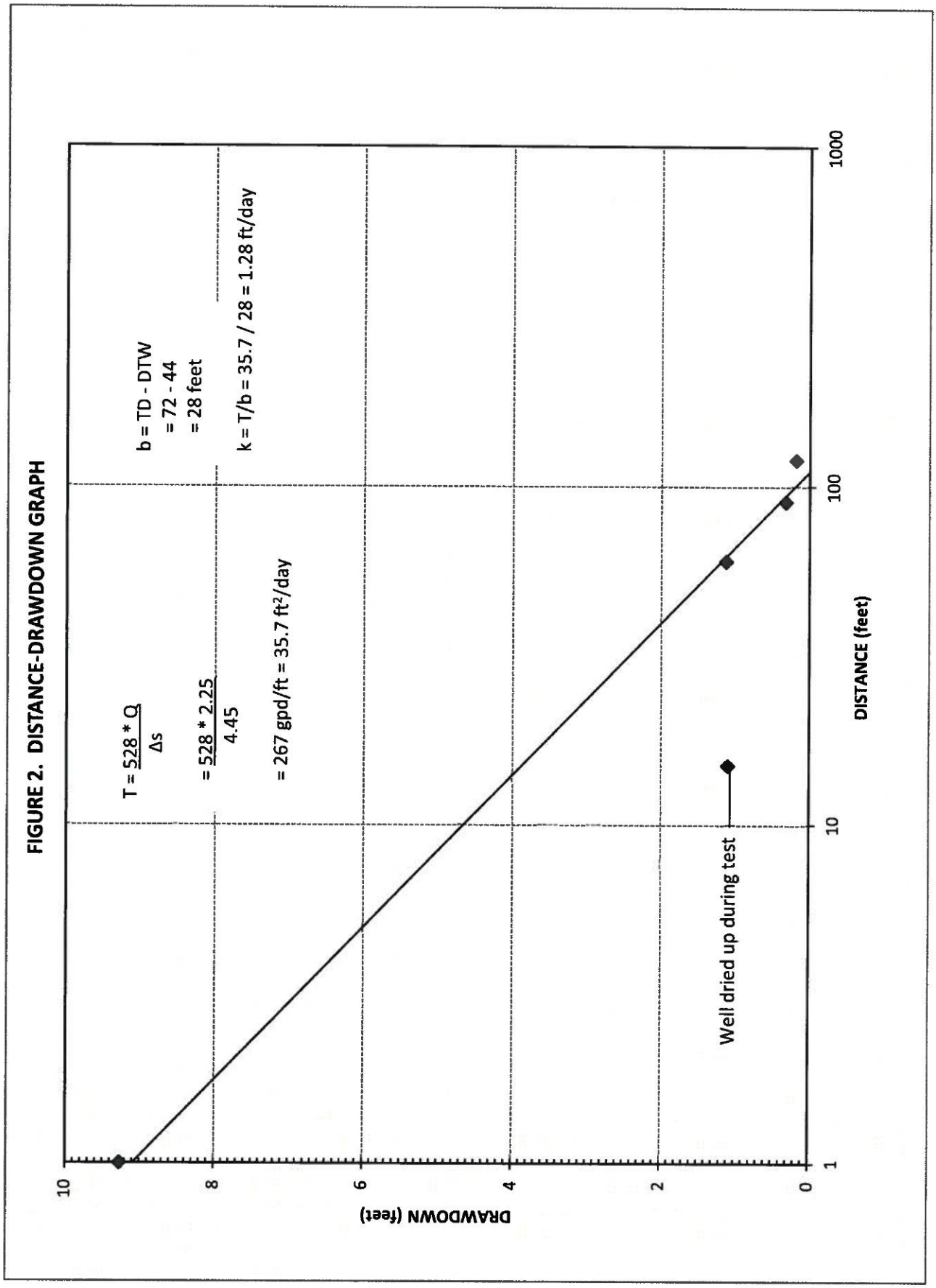


FIGURE 2. DISTANCE-DRAWDOWN GRAPH
T = 528 * Q / Δs
= 528 * 2.25 / 4.45
= 267 gpd/ft = 35.7 ft²/day
b = TD - DTW
= 72 - 44
= 28 feet
k = T/b = 35.7 / 28 = 1.28 ft/day
Well dried up during test
DRAWDOWN (feet)
DISTANCE (feet)
0
2
4
6
8
10
1
10
100
1000

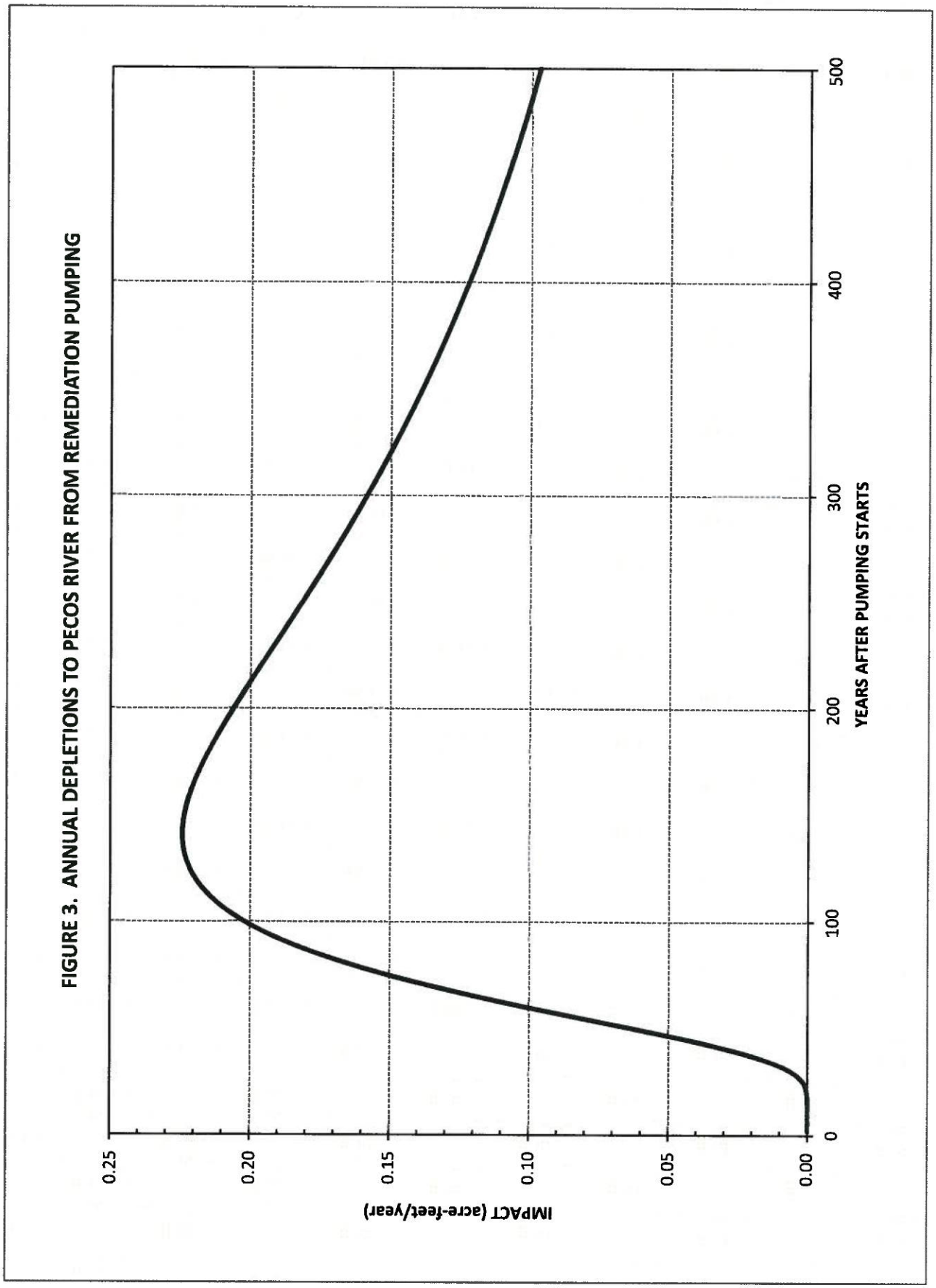


FIGURE 3. ANNUAL DEPLETIONS TO PECOS RIVER FROM REMEDIATION PUMPING
IMPACT (acre-feet/year)
0.25
0.20
0.15
0.10
0.05
0.00
0
100
200
300
400
500
YEARS AFTER PUMPING STARTS

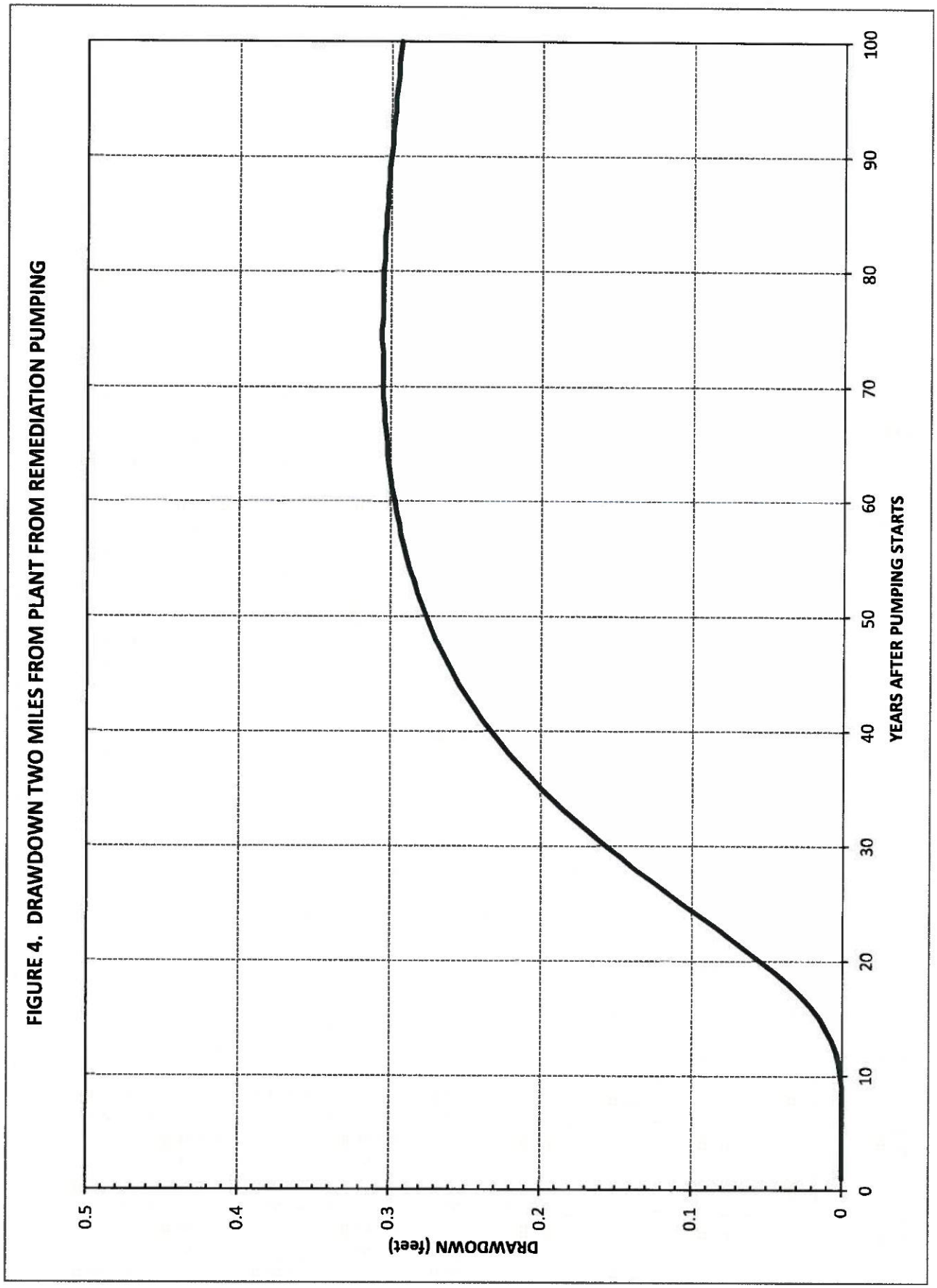
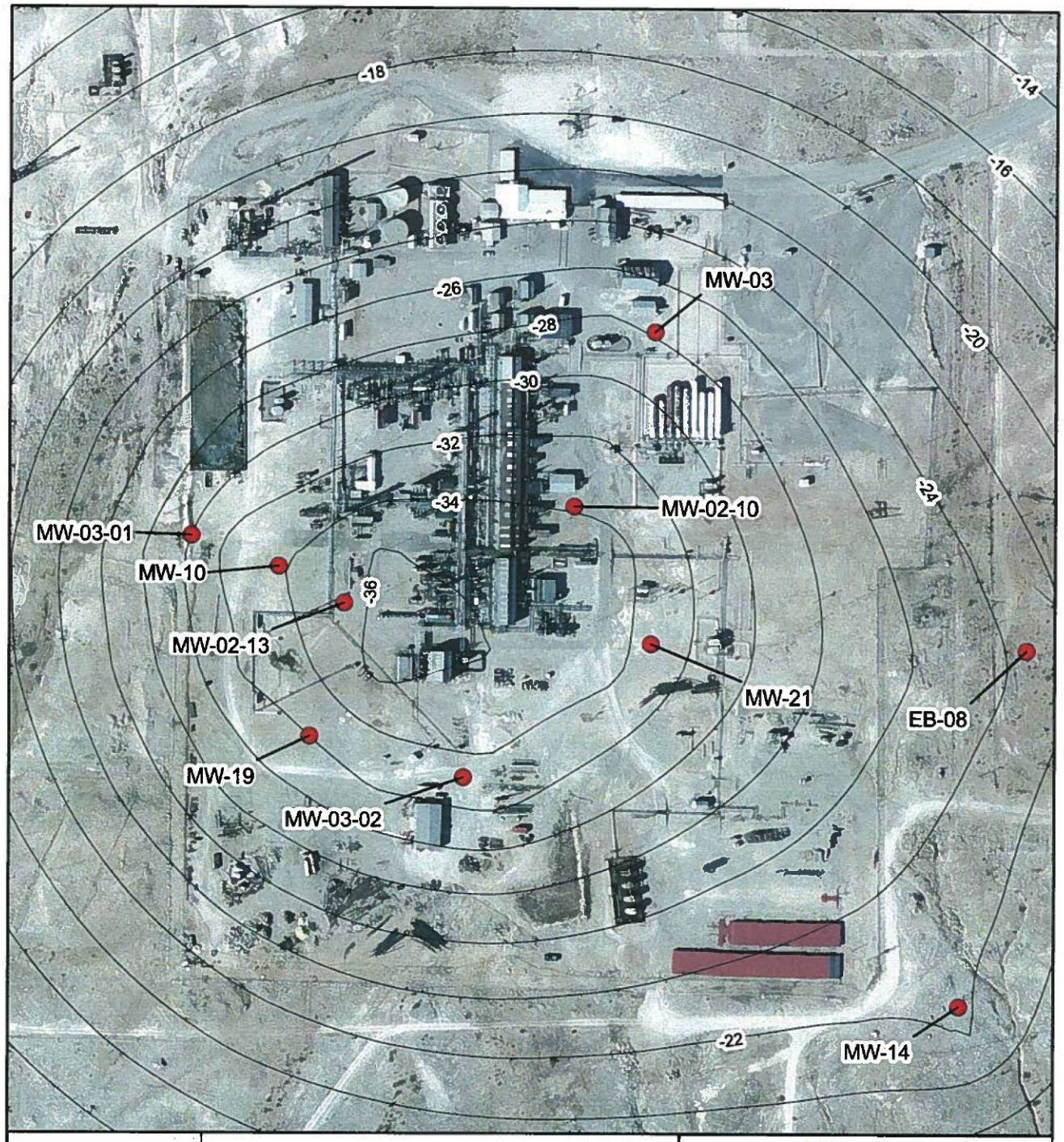


FIGURE 4. DRAWDOWN TWO MILES FROM PLANT FROM REMEDIATION PUMPING
DRAWDOWN (feet)
0.5
0.4
0.3
0.2
0.1
0
YEARS AFTER PUMPING STARTS
0
10
20
30
40
50
60
70
80
90
100



Office of the State Engineer
Interstate Stream Commission

Proposed Extraction Well

Calculated Water Level Decline

0 50 100 200

Feet

EMPIRE ABO GAS PLANT

FIGURE 5

CALCULATED WATER LEVEL DECLINE RESULTING FROM REMEDIATION PUMPING

Office of the State Engineer
Hydrology Bureau

Appendix B

NMOCD Communications

From: Billings, Bradford, EMNRD
To: Mark Larson; Bratcher, Mike, EMNRD
Cc: Stahnke, Graham; Rachel Owen; Robert Basom
Subject: RE: [EXT] Re: Modification to Routine Groundwater Monitoring Parameter List, AKA Energy LLC, Empire Abo Gas Plant (AP-112), Eddy County, New Mexico
Date: Monday, May 06, 2019 2:56:09 PM

5/6/2109

All Parties,

Regarding alteration of groundwater sampling as outlined in below section submitted by Larson Environmental:

The changes are specified below are approved.

Please keep this communication for your records, as NO paper copy will follow. The oil Conservation Division (OCD) appreciates you efforts.

Sincerely,

Bradford Billings
EMNRD/OCD
Santa Fe

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

From: Mark Larson <Mark@laenvironmental.com>
Sent: Friday, May 3, 2019 2:55 PM
To: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us>
Cc: Stahnke, Graham <gstahnke@sugf.com>; Rachel Owen <rowen@laenvironmental.com>; Robert Basom <RBasom@laenvironmental.com>
Subject: [EXT] Re: Modification to Routine Groundwater Monitoring Parameter List, AKA Energy LLC, Empire Abo Gas Plant (AP-112), Eddy County, New Mexico

Hello Bradford,
Per our discussion, AKA Energy (AKA), a wholly owned entity of Southern Ute Indian Tribe Growth

From: Billings, Bradford, EMNRD [Bradford.Billings@state.nm.us]
Sent: Monday, October 23, 2017 2:24 PM
To: Mark Larson; 'Stahnke, Graham'
Cc: Carson Hughes
Subject: RE: Empire Abo Plant Groundwater Abatement (AP-112)

Hello,

Re: AP-112

Following review of recent submittal for AKA energy Group, by Larson & Associates, Inc., the following:

Request for wells on the Empire Abo site, as outlined in October 2017 submittal, that were requested to be taken off of routine sampling, not abandoned, is approved. Please keep me informed on the movement relative to expected sparge/vent testing.

Thank you for your efforts. Please keep this email by way of approval for your records. If there are additional requests, let me know.

Sincerely,

Bradford Billings
EMNRD/OCD
Santa Fe

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Monday, October 9, 2017 4:10 PM
To: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; 'Stahnke, Graham' <gstahnke@sugf.com>
Cc: Carson Hughes <chughes@laenvironmental.com>
Subject: Re: Empire Abo Plant Groundwater Abatement (AP-112)

Bradford,
Per our conference call on May 15, 2017, AKA Energy Group, LLC, has requested Larson & Associates, Inc. (LAI) to prepare the attached letter for submittal to the OCD. The letter proposes to reduce the number of monitoring wells for semiannual groundwater monitoring and conducting pilot tests (SVE and air sparge) at the Empire Abo Plant, in Eddy County, New Mexico. We propose begin collecting groundwater samples from the proposed monitoring wells beginning with the next semiannual event scheduled for October 24 – 27, 2017. The air sparge pilot well will be installed in November 2017 followed by the SVE pilot test. A date for the air sparge pilot test will be set following completion of the SVE test and system installation. Please contact Graham Stahnke at (970) 764-6484 or gstahnke@sugf.com or me if you have questions.
Mark

From: Mark Larson
Sent: Wednesday, May 03, 2017 12:01 PM
To: 'Billings, Bradford, EMNRD'; 'Stahnke, Graham'
Subject: Re: Empire Abo Plant Groundwater Abatement (AP-112)

Brad,
I called your office and left a voice message requesting a convenient time for a conference call to discuss the Abatement Plan for the Frontier Empire Abo Plant (AP-112)? Graham Stahnke with Southern Ute Growth Fund (SUGF), which owns AKA Energy, LLC., would like to be on the call. Please let me know a convenient date/time for you.
Respectfully,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 205
Midland, Texas 79701
Office – 432-687-0901
Cell – 432- 556-8656
Fax – 432-687-0456
mark@laenvironmental.com

"Serving the Permian Basin Since 2000"

From: Griswold, Jim, EMNRD [Jim.Griswold@state.nm.us]
Sent: Tuesday, August 21, 2012 4:25 PM
To: Mark Larson
Cc: Brown, Fran; Prentiss, John; dfeather@akaenergy.com
Subject: RE: Groundwater Remediation Pilot Testing Work Plan, Frontier Field Services, LLC, Empire Abo Gas Plant, Eddy County, New Mexico, August 13, 2012

Mark,

I have reviewed the groundwater extraction and high vacuum pilot testing workplan dated Aug. 13th you developed for the Empire Abo Gas Plant. This plan is approved and you may proceed immediately. Please retain a copy of this email for your files as no hardcopy will be sent. I look forward to reviewing the eventual test evaluation report. Good luck.

Jim Griswold
Senior Hydrologist
EMNRD/Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505.476.3465
email: jim.griswold@state.nm.us

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Thursday, August 16, 2012 6:14 AM
To: VonGonten, Glenn, EMNRD; Griswold, Jim, EMNRD
Cc: Brown, Fran; Prentiss, John; dfeather@akaenergy.com
Subject: Re: Groundwater Remediation Pilot Testing Work Plan, Frontier Field Services, LLC, Empire Abo Gas Plant, Eddy County, New Mexico, August 13, 2012

Dear Mr. Von Gonten,
On August 15, 2012, Larson & Associates, Inc. (LAI), on behalf of Frontier Field Services, LLC (Frontier) delivered the referenced work plan to the New Mexico Oil Conservation Division (OCD) in Santa Fe, New Mexico. This is a request for your approval to implement he work plan for conducting groundwater remediation pilot testing at the Empire Abo Gas Plant located in Eddy County ,New Mexico. Please contact me if you have questions.
Sincerely,

Mark J. Larson, P.G.
President/Sr. Project Manager
507 N. Marienfeld St., Suite 200
Midland, Texas 79701
(432) 687-0901 (O)
(432) 556-8656 (C)

Larson & Associates, Inc.
Environmental Consultants

From: Billings, Bradford, EMNRD
To: Mark Larson
Cc: "gstahnke@sugf.com"
Subject: RE: Empire Abo Plant (AP-112) Soil Remediation Report/Deferral Request
Date: Wednesday, December 30, 2020 10:37:19 AM

12/30/2020

Mr. G. Stahnke – SUGF/AKA Energy Group
Mr. M. Larson – LE Environmental

RE: Empire Abo Gas Plant Soil Remediation Report of November 6, 2020 – AP-112

To All,

Following detailed review of the above mentioned report, the following:

1. The Oil Conservation Division (OCD) concurs with report evaluation that soil remediation as outlined in approved work plan for 0n-site areas identified as EA-02, EA-03, EA-05 and EA-07 is completed and no additional soils work is needed in these specific areas.
2. The areas identified as EA-12 (with specific locations therein) and EA-13 (again with specific internal locations) as requested in the associated report in title are approved for remedial deferral of soils. These areas will be remediated at time of plant closure or until such time as these specific locations can be accessed for clean-up efforts.

OCD wants to thank you for your efforts and a well detailed report on a convoluted circumstance. As well as for your patience on timing for OCD review.

Please keep this electronic communication for your records, as NO paper copy will follow. The OCD appreciates your efforts on behalf of this issue. If there are any questions please contact this office. Otherwise please initiate work plan as soon as practicable.

Sincerely,

Bradford Billings
EMNRD/OCD
Santa Fe

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations

Appendix C

Laboratory Reports

April 20, 2020

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX: (432) 687-0456

Order No.: 2004082

RE: Empire ABO

Dear Mark Larson:

DHL Analytical, Inc. received 14 sample(s) on 4/10/2020 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-19-24

Table of Contents

№ 1007

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 4/9/20 PAGE 1 OF 1
PO#: LAB WORK ORDER#: 2004082
PROJECT LOCATION OR NAME: Empire ABO
LAI PROJECT #: 06-0144-06 COLLECTOR: DS/EC/RN
Data Reported to:

TRRP report? ☐ Yes ☒ No
TIME ZONE: Time zone/State: MST / NM

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESSERVED	ANALYSES: BTEX ☒ MTBE ☐	TRPH 418.1 ☐	TPH 1005 ☐ TPH 1006 ☐	GASOLINE MOD 8015 ☐	DIESEL - MOD 8015 ☐	OIL - MOD 8015 ☐	VOC 8260 ☐	SVOC 8270 ☐	PAH 8270 ☐ HOLDPAH ☐	8081 PESTICIDES ☐	8151 HERBICIDES ☐	8082 PCBS ☐	TBLP - METALS (RCRA) ☐ TCLP VOC ☐	TCLP - PEST ☐ HERB ☐ Semi-VOC ☐	TOTAL METALS (RCRA) ☐ OTHER LIST ☐	LEAD - TOTAL ☐ D.W. 200.8 ☐ TCLP ☐	RCI ☐ TOX ☐ FLASHPOINT ☐	TDS ☒ TSS ☐ % MOISTURE ☐	pH ☐ HEXAVALENT CHROMIUM ☐ CYANIDE ☐	EXPLOSIVES ☐ PECHLORATE ☐	CHLORIDE ☐ ANIONS ☐ ALKALINITY ☐	Anions & Cations	FIELD NOTES
DUP-1	01	4/7/20	1000	W	5	X			X																		X				X			
MW-8	02	"	1025	"	"	"			"																		"				"			
MW-15	03		1115																															
MW-17	04		1200																															
D-02	05		1240																															
MW-23	06		1255																															
MW-24	07		1340																															
EB-02	08		1417																															
MW-18	09	"	1500																															
MW-22	10	4/8/20	0850																															
DUP-2	11		0855																															
MW-3	12		0910																															
MW-20	13		0940																															
MW-12	14	"	1000	"	"	"			"																		"				"			
TOTAL			14																															

RELINQUISHED BY:(Signature) Dan Dalton DATE/TIME 4/9/20 1700 RECEIVED BY: (Signature) LSO
RELINQUISHED BY:(Signature) LSO DATE/TIME 4.10.20 8:27 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)
LABORATORY: 3

TURN AROUND TIME
NORMAL ☒
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 1.3/1.2 THERM#: 78
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☐ CARRIER BILL # LSO
☐ HAND DELIVERED

LSO

WWW.LSO.COM
Questions? Call 800-800-8984

Airbill No. LSO0BYGP

LSO0BYGP

1. To: Print Name (Person): John Dulant Phone (Important): 512-305-2122
Company Name: DHL Analytical
Street Address (No P.O. Box or P.O. Box Zip Code Deliveries): 2600 Double Creek Dr.
Suite / Floor:
City: Round Rock State: TX Zip: 78664

2. From: Print Name (Person): . Phone (Important): 432-687-0901
Company Name: LARSON & ASSOCIATES
Street Address: 507 NORTH MARIENFELD
Suite / Floor: 205
City: MIDLAND State: TX Zip: 79701

3. Service: Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online.

- [X] **LSO Priority Overnight*** By 10:30 a.m. to most cities
- [ ] **LSO Early Overnight*** By 8:30 a.m. select cities
- [ ] **LSO Economy Next Day*** By 3 p.m. to most cities
- [ ] **LSO 2nd Day***
- [ ] **LSO Ground**
- [ ] **LSO Saturday***
- [ ] Other _____

*Check commitment times and availability at www.lso.com

Assumed LSO Priority Overnight service unless otherwise noted.

- [ ] Deliver Without Delivery Signature (See Limits of Liability below)

Release Signature

L 22 x W 16 x H 10

4. Package: Weight: 40

Your Company's Billing Reference Information

Ship Date: (mm/dd/yy) 04 / 09 / 20

5. Payment:

FOR DRIVER USE ONLY

Driver Number 10776
- [ ] Check here if LSO Supplies are used with LSO Ground Service.

Pick-up Location 01
Date: 4-9-20
Time: 5:08
City Code: AUS

ILLEGIBLE HANDWRITING ON AIRBILL MAY DELAY TRANSIT TIMES OR RESULT IN NON-DELIVERY. LIMIT OF LIABILITY: We are not responsible for claims in excess of $100 for any reason unless you: 1) declare a greater value (not to exceed $25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. "Signature Required" service is only available when printing a label online at LSO.com. **NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. Packaging provided by LSO is for EXPRESS USE ONLY – NEVER TO BE USED FOR LSO GROUND Service. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY.** See LSO Service Guide for further details.

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322 (error)

CUSTODY SEAL

DATE 4/8/20

SIGNATURE

DHL ANALYTICAL

LSO

WWW.LSO.COM
Questions? Call 800-800-8984

Airbill No. LSO0BYGQ

LSO0BYGQ

1. To: Print Name (Person): John DuPont Phone (Important): 512-388-8222

Company Name: DHL Analytical

Street Address (No P.O. Box or P.O. Box Zip Code Deliveries): 300 Double Creek Dr

Suite / Floor:

City: Round Rock State: TX Zip: 78664

2. From: Print Name (Person): . Phone (Important): 432-697-0901

Company Name: LARSON & ASSOCIATES

Street Address: 507 NORTH MARIENFELD

Suite / Floor: 205

City: MIDLAND State: TX Zip: 79701

3. Service: Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online.

- [X] **LSO Priority Overnight*** By 10:30 a.m. to most cities
- [ ] **LSO Early Overnight*** By 8:30 a.m. select cities
- [ ] **LSO Economy Next Day*** By 3 p.m. to most cities
- [ ] **LSO 2nd Day***
- [ ] **LSO Ground**
- [ ] **LSO Saturday***
- [ ] Other

*Check commitment times and availability at www.lso.com

Assumed LSO Priority Overnight service unless otherwise noted.

- [ ] Deliver Without Delivery Signature (See Limits of Liability below)

Release Signature

L 22 x W 16 x H 18

4. Package: Weight: 40

Your Company's Billing Reference Information:

Ship Date: (mm/dd/yy) 04 / 09 / 20

5. Payment:

FOR DRIVER USE ONLY

Driver Number 107676

- [ ] Check here if LSO Supplies are used with LSO Ground Service.

Pick-up Location

Date: 4-9-20

Time: 5:00

City Code:

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ILLEGIBLE HANDWRITING ON AIRBILL MAY DELAY TRANSIT TIMES OR RESULT IN NON-DELIVERY. LIMIT OF LIABILITY: We are not responsible for claims in excess of $100 for any reason unless you: 1) declare a greater value (not to exceed $25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. "Signature Required" service is only available when printing a label online at LSO.com. **NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. Packaging provided by LSO is for EXPRESS USE ONLY – NEVER TO BE USED FOR LSO GROUND Service. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY.** See LSO Service Guide for further details.

Wrkn 66

CUSTODY SEAL

DATE 4/8/20

SIGNATURE

DHL ANALYTICAL

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Larson & Associates** Date Received: **4/10/2020**

Work Order Number **2004082** Received by: **JH**

Checklist completed by: _____ 4/10/2020 Reviewed by _____ 4/10/2020
Signature | Date | Initials | Date

Carrier name: LSO Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**1.3** °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Page 1 of 1

DHL Analytical, Inc. **Date:** *20-Apr-20*

CLIENT: Larson & Associates
Project: Empire ABO
Lab Order: 2004082

CASE NARRATIVE

Sample was analyzed using the methods outlined in the following references:

Method SW8260D - Volatile Organics Analysis
Method E300 - Anions Analysis
Method SW6020B - Dissolved Metals Analysis
Method M2320 B - Alkalinity Analysis
Method M2540C - Total Dissolved Solids Analysis

LOG IN

The samples were received and log-in performed on 4/10/2020. A total of 14 samples were received and analyzed. The samples arrived in good condition and were properly packaged. The samples were collected in Mountain Standard time-zone.

VOLATILE ORGANICS ANALYSIS

For Volatile Organics Analysis, the recovery of Benzene for the Matrix Spike Duplicate (2004082-08 MSD) was below the method control limits. This is flagged accordingly in the QC Summary Report. This compound was within method control limits in the associated LCS/MS. No further corrective action was taken.

For Volatile Organics Analysis, the recovery of surrogate Dibromofluorobenzene for the Sample MW-3 and the Matrix Spike Duplicate (2004082-08 MSD) was outside of the method control limits. These are flagged accordingly in the Analytical Data Report and the QC Summary Report. The remaining surrogates for these samples were within method control limits. No further corrective action was taken.

ANIONS ANALYSIS

For Anions Analysis, for Batch 95907, the recovery of Sulfate for the Matrix Spike and Matrix Spike Duplicate(s) (2004092-03 and 2004091-03 MS/MSD) was below the method control limits. These are flagged accordingly in the QC Summary Report. This anion was within method control limits in the associated LCS. No further corrective action was taken.

DISSOLVED METALS ANALYSIS

For Dissolved Metals Analysis, the recoveries of up to two analytes for the Matrix Spike and Matrix Spike Duplicate (2004082-13 MS/MSD) were above the method control limits. These are flagged accordingly in the QC Summary Report. These analytes were within method control limits in the associated LCS. No further corrective action was taken.

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT: Larson & Associates
Project: Empire ABO
Lab Order: 2004082

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2004082-01	Dup-1		04/07/20 10:00 AM	4/10/2020
2004082-02	MW-8		04/07/20 10:25 AM	4/10/2020
2004082-03	MW-15		04/07/20 11:15 AM	4/10/2020
2004082-04	MW-17		04/07/20 12:00 PM	4/10/2020
2004082-05	P-02		04/07/20 12:40 PM	4/10/2020
2004082-06	MW-23		04/07/20 12:55 PM	4/10/2020
2004082-07	MW-24		04/07/20 01:40 PM	4/10/2020
2004082-08	EB-02		04/07/20 02:17 PM	4/10/2020
2004082-09	MW-18		04/07/20 03:00 PM	4/10/2020
2004082-10	MW-22		04/08/20 08:50 AM	4/10/2020
2004082-11	Dup-2		04/08/20 08:55 AM	4/10/2020
2004082-12	MW-3		04/08/20 09:10 AM	4/10/2020
2004082-13	MW-20		04/08/20 09:40 AM	4/10/2020
2004082-14	MW-12		04/08/20 10:00 AM	4/10/2020

DHL Analytical, Inc.

20-Apr-20

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2004082-01A	Dup-1	04/07/20 10:00 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
	Dup-1	04/07/20 10:00 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-01B	Dup-1	04/07/20 10:00 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	Dup-1	04/07/20 10:00 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-01C	Dup-1	04/07/20 10:00 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	Dup-1	04/07/20 10:00 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	Dup-1	04/07/20 10:00 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-02A	MW-8	04/07/20 10:25 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-02B	MW-8	04/07/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-8	04/07/20 10:25 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-02C	MW-8	04/07/20 10:25 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-8	04/07/20 10:25 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-8	04/07/20 10:25 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-03A	MW-15	04/07/20 11:15 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-03B	MW-15	04/07/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-15	04/07/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-15	04/07/20 11:15 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-03C	MW-15	04/07/20 11:15 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-15	04/07/20 11:15 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-15	04/07/20 11:15 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-15	04/07/20 11:15 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-04A	MW-17	04/07/20 12:00 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-04B	MW-17	04/07/20 12:00 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-17	04/07/20 12:00 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-04C	MW-17	04/07/20 12:00 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-17	04/07/20 12:00 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-17	04/07/20 12:00 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-05A	P-02	04/07/20 12:40 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2004082-05B	P-02	04/07/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	P-02	04/07/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-05C	P-02	04/07/20 12:40 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	P-02	04/07/20 12:40 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	P-02	04/07/20 12:40 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-06A	MW-23	04/07/20 12:55 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
	MW-23	04/07/20 12:55 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-06B	MW-23	04/07/20 12:55 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-23	04/07/20 12:55 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-06C	MW-23	04/07/20 12:55 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-23	04/07/20 12:55 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-23	04/07/20 12:55 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-07A	MW-24	04/07/20 01:40 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-07B	MW-24	04/07/20 01:40 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-24	04/07/20 01:40 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-07C	MW-24	04/07/20 01:40 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-24	04/07/20 01:40 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-24	04/07/20 01:40 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-08A	EB-02	04/07/20 02:17 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-08B	EB-02	04/07/20 02:17 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	EB-02	04/07/20 02:17 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-08C	EB-02	04/07/20 02:17 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	EB-02	04/07/20 02:17 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	EB-02	04/07/20 02:17 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-09A	MW-18	04/07/20 03:00 PM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-09B	MW-18	04/07/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-18	04/07/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-09C	MW-18	04/07/20 03:00 PM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2004082-09C	MW-18	04/07/20 03:00 PM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-18	04/07/20 03:00 PM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-10A	MW-22	04/08/20 08:50 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-10B	MW-22	04/08/20 08:50 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-22	04/08/20 08:50 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-10C	MW-22	04/08/20 08:50 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-22	04/08/20 08:50 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-22	04/08/20 08:50 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-11A	Dup-2	04/08/20 08:55 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-11B	Dup-2	04/08/20 08:55 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	Dup-2	04/08/20 08:55 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-11C	Dup-2	04/08/20 08:55 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	Dup-2	04/08/20 08:55 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	Dup-2	04/08/20 08:55 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-12A	MW-3	04/08/20 09:10 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
	MW-3	04/08/20 09:10 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-12B	MW-3	04/08/20 09:10 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-3	04/08/20 09:10 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-12C	MW-3	04/08/20 09:10 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-3	04/08/20 09:10 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-3	04/08/20 09:10 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-13A	MW-20	04/08/20 09:40 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989
2004082-13B	MW-20	04/08/20 09:40 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-20	04/08/20 09:40 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-13C	MW-20	04/08/20 09:40 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-20	04/08/20 09:40 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-20	04/08/20 09:40 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889
2004082-14A	MW-12	04/08/20 10:00 AM	Aqueous	SW5030C	Purge and Trap Water GC/MS	04/17/20 09:08 AM	95989

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2004082-14B	MW-12	04/08/20 10:00 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
	MW-12	04/08/20 10:00 AM	Aqueous	SW3005A	Aq Prep Metals: Dissolved	04/14/20 09:06 AM	95923
2004082-14C	MW-12	04/08/20 10:00 AM	Aqueous	M2320 B	Alkalinity Preparation	04/15/20 09:07 AM	95939
	MW-12	04/08/20 10:00 AM	Aqueous	E300	Anion Preparation	04/13/20 09:35 AM	95907
	MW-12	04/08/20 10:00 AM	Aqueous	M2540C	TDS Preparation	04/10/20 01:15 PM	95889

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2004082-01A	Dup-1	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 05:46 PM	GCMS5_200417A
	Dup-1	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	50	04/17/20 11:23 AM	GCMS5_200417A
2004082-01B	Dup-1	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:38 PM	ICP-MS4_200415A
	Dup-1	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:10 AM	ICP-MS5_200415A
2004082-01C	Dup-1	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 11:54 AM	TITRATOR_200415A
	Dup-1	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 12:38 PM	IC2_200413A
	Dup-1	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-02A	MW-8	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 01:47 PM	GCMS5_200417A
2004082-02B	MW-8	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:40 PM	ICP-MS4_200415A
	MW-8	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:12 AM	ICP-MS5_200415A
2004082-02C	MW-8	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 12:35 PM	TITRATOR_200415A
	MW-8	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 12:54 PM	IC2_200413A
	MW-8	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-03A	MW-15	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 02:11 PM	GCMS5_200417A
2004082-03B	MW-15	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:42 PM	ICP-MS4_200415A
	MW-15	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	500	04/15/20 12:44 PM	ICP-MS4_200415A
	MW-15	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:14 AM	ICP-MS5_200415A
2004082-03C	MW-15	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 12:57 PM	TITRATOR_200415A
	MW-15	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 01:10 PM	IC2_200413A
	MW-15	Aqueous	E300	Anions by IC method - Water	95907	500	04/13/20 05:45 PM	IC2_200413A
	MW-15	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-04A	MW-17	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 02:34 PM	GCMS5_200417A
2004082-04B	MW-17	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:16 AM	ICP-MS5_200415A
	MW-17	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:46 PM	ICP-MS4_200415A
2004082-04C	MW-17	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 01:09 PM	TITRATOR_200415A
	MW-17	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 01:26 PM	IC2_200413A
	MW-17	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-05A	P-02	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 02:58 PM	GCMS5_200417A

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2004082-05B	P-02	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:48 PM	ICP-MS4_200415A
	P-02	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:19 AM	ICP-MS5_200415A
2004082-05C	P-02	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 01:27 PM	TITRATOR_200415A
	P-02	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 01:42 PM	IC2_200413A
	P-02	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-06A	MW-23	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	10	04/17/20 11:47 AM	GCMS5_200417A
	MW-23	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	50	04/17/20 06:57 PM	GCMS5_200417A
2004082-06B	MW-23	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:50 PM	ICP-MS4_200415A
	MW-23	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:21 AM	ICP-MS5_200415A
2004082-06C	MW-23	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 01:39 PM	TITRATOR_200415A
	MW-23	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 01:58 PM	IC2_200413A
	MW-23	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-07A	MW-24	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	50	04/17/20 12:11 PM	GCMS5_200417A
2004082-07B	MW-24	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:52 PM	ICP-MS4_200415A
	MW-24	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:23 AM	ICP-MS5_200415A
2004082-07C	MW-24	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 01:55 PM	TITRATOR_200415A
	MW-24	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 02:14 PM	IC2_200413A
	MW-24	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-08A	EB-02	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 10:59 AM	GCMS5_200417A
2004082-08B	EB-02	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:54 PM	ICP-MS4_200415A
	EB-02	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:25 AM	ICP-MS5_200415A
2004082-08C	EB-02	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 02:08 PM	TITRATOR_200415A
	EB-02	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 02:30 PM	IC2_200413A
	EB-02	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-09A	MW-18	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 03:22 PM	GCMS5_200417A
2004082-09B	MW-18	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:27 AM	ICP-MS5_200415A
	MW-18	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 01:07 PM	ICP-MS4_200415A
2004082-09C	MW-18	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 02:16 PM	TITRATOR_200415A

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2004082-09C	MW-18	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 02:46 PM	IC2_200413A
	MW-18	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-10A	MW-22	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	20	04/17/20 12:35 PM	GCMS5_200417A
2004082-10B	MW-22	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 01:09 PM	ICP-MS4_200415A
	MW-22	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:40 AM	ICP-MS5_200415A
2004082-10C	MW-22	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 02:32 PM	TITRATOR_200415A
	MW-22	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 03:02 PM	IC2_200413A
	MW-22	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-11A	Dup-2	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	50	04/17/20 12:59 PM	GCMS5_200417A
2004082-11B	Dup-2	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 01:11 PM	ICP-MS4_200415A
	Dup-2	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:42 AM	ICP-MS5_200415A
2004082-11C	Dup-2	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 02:43 PM	TITRATOR_200415A
	Dup-2	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 04:38 PM	IC2_200413A
	Dup-2	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-12A	MW-3	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	50	04/17/20 01:23 PM	GCMS5_200417A
	MW-3	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	5	04/17/20 08:09 PM	GCMS5_200417A
2004082-12B	MW-3	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 01:13 PM	ICP-MS4_200415A
	MW-3	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:44 AM	ICP-MS5_200415A
2004082-12C	MW-3	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 02:57 PM	TITRATOR_200415A
	MW-3	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 04:54 PM	IC2_200413A
	MW-3	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-13A	MW-20	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 03:46 PM	GCMS5_200417A
2004082-13B	MW-20	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:05 AM	ICP-MS5_200415A
	MW-20	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 12:34 PM	ICP-MS4_200415A
2004082-13C	MW-20	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 03:06 PM	TITRATOR_200415A
	MW-20	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 05:10 PM	IC2_200413A
	MW-20	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A
2004082-14A	MW-12	Aqueous	SW8260D	8260 Water Volatiles by GC/MS	95989	1	04/17/20 04:10 PM	GCMS5_200417A

Lab Order: 2004082
Client: Larson & Associates
Project: Empire ABO

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2004082-14B	MW-12	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	50	04/15/20 01:15 PM	ICP-MS4_200415A
	MW-12	Aqueous	SW6020B	Metals-ICPMS (0.45µ filtered)	95923	1	04/15/20 11:46 AM	ICP-MS5_200415A
2004082-14C	MW-12	Aqueous	M2320 B	Alkalinity	95939	1	04/15/20 03:19 PM	TITRATOR_200415A
	MW-12	Aqueous	E300	Anions by IC method - Water	95907	50	04/13/20 05:29 PM	IC2_200413A
	MW-12	Aqueous	M2540C	Total Dissolved Solids	95889	1	04/10/20 03:30 PM	WC_200410A

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	Dup-1
Project:	Empire ABO	**Lab ID:**	2004082-01
Project No:	06-0144-06	**Collection Date:**	04/07/20 10:00 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	540	5.00	15.0		mg/L	50	04/15/20 12:38 PM
Dissolved Magnesium	135	5.00	15.0		mg/L	50	04/15/20 12:38 PM
Dissolved Potassium	9.13	0.100	0.300		mg/L	1	04/15/20 11:10 AM
Dissolved Sodium	288	5.00	15.0		mg/L	50	04/15/20 12:38 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 05:46 PM
Ethylbenzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 05:46 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 05:46 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 05:46 PM
Surr: 1,2-Dichloroethane-d4	99.0	0	72-119		%REC	1	04/17/20 05:46 PM
Surr: 4-Bromofluorobenzene	111	0	76-119		%REC	1	04/17/20 05:46 PM
Surr: Dibromofluoromethane	102	0	85-115		%REC	1	04/17/20 05:46 PM
Surr: Toluene-d8	106	0	81-120		%REC	1	04/17/20 05:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	514	15.0	50.0		mg/L	50	04/13/20 12:38 PM
Sulfate	1410	50.0	150		mg/L	50	04/13/20 12:38 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	430	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 11:54 AM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 11:54 AM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 11:54 AM
Alkalinity, Total (As CaCO3)	430	20.0	20.0		mg/L @ pH 4.54	1	04/15/20 11:54 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3350	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-8
Project:	Empire ABO	**Lab ID:**	2004082-02
Project No:	06-0144-06	**Collection Date:**	04/07/20 10:25 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	534	5.00	15.0		mg/L	50	04/15/20 12:40 PM
Dissolved Magnesium	132	5.00	15.0		mg/L	50	04/15/20 12:40 PM
Dissolved Potassium	9.02	0.100	0.300		mg/L	1	04/15/20 11:12 AM
Dissolved Sodium	280	5.00	15.0		mg/L	50	04/15/20 12:40 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 01:47 PM
Ethylbenzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 01:47 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 01:47 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 01:47 PM
Surr: 1,2-Dichloroethane-d4	96.7	0	72-119		%REC	1	04/17/20 01:47 PM
Surr: 4-Bromofluorobenzene	103	0	76-119		%REC	1	04/17/20 01:47 PM
Surr: Dibromofluoromethane	97.6	0	85-115		%REC	1	04/17/20 01:47 PM
Surr: Toluene-d8	106	0	81-120		%REC	1	04/17/20 01:47 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	524	15.0	50.0		mg/L	50	04/13/20 12:54 PM
Sulfate	1420	50.0	150		mg/L	50	04/13/20 12:54 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	442	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 12:35 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 12:35 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 12:35 PM
Alkalinity, Total (As CaCO3)	442	20.0	20.0		mg/L @ pH 4.54	1	04/15/20 12:35 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3370	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-15
Project:	Empire ABO	**Lab ID:**	2004082-03
Project No:	06-0144-06	**Collection Date:**	04/07/20 11:15 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	485	5.00	15.0		mg/L	50	04/15/20 12:42 PM
Dissolved Magnesium	6520	50.0	150		mg/L	500	04/15/20 12:44 PM
Dissolved Potassium	229	5.00	15.0		mg/L	50	04/15/20 12:42 PM
Dissolved Sodium	8580	50.0	150		mg/L	500	04/15/20 12:44 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:11 PM
Ethylbenzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:11 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 02:11 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:11 PM
Surr: 1,2-Dichloroethane-d4	98.6	0	72-119		%REC	1	04/17/20 02:11 PM
Surr: 4-Bromofluorobenzene	106	0	76-119		%REC	1	04/17/20 02:11 PM
Surr: Dibromofluoromethane	99.4	0	85-115		%REC	1	04/17/20 02:11 PM
Surr: Toluene-d8	105	0	81-120		%REC	1	04/17/20 02:11 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	2840	150	500		mg/L	500	04/13/20 05:45 PM
Sulfate	43800	500	1500		mg/L	500	04/13/20 05:45 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	811	10.0	20.0		mg/L @ pH 4.55	1	04/15/20 12:57 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.55	1	04/15/20 12:57 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.55	1	04/15/20 12:57 PM
Alkalinity, Total (As CaCO3)	811	20.0	20.0		mg/L @ pH 4.55	1	04/15/20 12:57 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	76400	1000	1000		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-17
Project:	Empire ABO	**Lab ID:**	2004082-04
Project No:	06-0144-06	**Collection Date:**	04/07/20 12:00 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	496	5.00	15.0		mg/L	50	04/15/20 12:46 PM
Dissolved Magnesium	474	5.00	15.0		mg/L	50	04/15/20 12:46 PM
Dissolved Potassium	8.36	0.100	0.300		mg/L	1	04/15/20 11:16 AM
Dissolved Sodium	118	5.00	15.0		mg/L	50	04/15/20 12:46 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:34 PM
Ethylbenzene	0.000318	0.000300	0.00100	J	mg/L	1	04/17/20 02:34 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 02:34 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:34 PM
Surr: 1,2-Dichloroethane-d4	97.8	0	72-119		%REC	1	04/17/20 02:34 PM
Surr: 4-Bromofluorobenzene	105	0	76-119		%REC	1	04/17/20 02:34 PM
Surr: Dibromofluoromethane	99.1	0	85-115		%REC	1	04/17/20 02:34 PM
Surr: Toluene-d8	109	0	81-120		%REC	1	04/17/20 02:34 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	115	15.0	50.0		mg/L	50	04/13/20 01:26 PM
Sulfate	3230	50.0	150		mg/L	50	04/13/20 01:26 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	253	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:09 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:09 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:09 PM
Alkalinity, Total (As CaCO3)	253	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:09 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	5030	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	P-02
Project:	Empire ABO	**Lab ID:**	2004082-05
Project No:	06-0144-06	**Collection Date:**	04/07/20 12:40 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	581	5.00	15.0		mg/L	50	04/15/20 12:48 PM
Dissolved Magnesium	232	5.00	15.0		mg/L	50	04/15/20 12:48 PM
Dissolved Potassium	4.67	0.100	0.300		mg/L	1	04/15/20 11:19 AM
Dissolved Sodium	59.2	5.00	15.0		mg/L	50	04/15/20 12:48 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:58 PM
Ethylbenzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:58 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 02:58 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 02:58 PM
Surr: 1,2-Dichloroethane-d4	99.4	0	72-119		%REC	1	04/17/20 02:58 PM
Surr: 4-Bromofluorobenzene	105	0	76-119		%REC	1	04/17/20 02:58 PM
Surr: Dibromofluoromethane	98.7	0	85-115		%REC	1	04/17/20 02:58 PM
Surr: Toluene-d8	104	0	81-120		%REC	1	04/17/20 02:58 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	86.0	15.0	50.0		mg/L	50	04/13/20 01:42 PM
Sulfate	2350	50.0	150		mg/L	50	04/13/20 01:42 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	384	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:27 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:27 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:27 PM
Alkalinity, Total (As CaCO3)	384	20.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:27 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3620	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-23
Project:	Empire ABO	**Lab ID:**	2004082-06
Project No:	06-0144-06	**Collection Date:**	04/07/20 12:55 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	654	5.00	15.0		mg/L	50	04/15/20 12:50 PM
Dissolved Magnesium	190	5.00	15.0		mg/L	50	04/15/20 12:50 PM
Dissolved Potassium	8.98	0.100	0.300		mg/L	1	04/15/20 11:21 AM
Dissolved Sodium	158	5.00	15.0		mg/L	50	04/15/20 12:50 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	2.64	0.0150	0.0500		mg/L	50	04/17/20 06:57 PM
Ethylbenzene	0.779	0.00300	0.0100		mg/L	10	04/17/20 11:47 AM
Toluene	0.0236	0.00600	0.0200		mg/L	10	04/17/20 11:47 AM
Total Xylenes	0.542	0.00300	0.0100		mg/L	10	04/17/20 11:47 AM
Surr: 1,2-Dichloroethane-d4	101	0	72-119		%REC	50	04/17/20 06:57 PM
Surr: 1,2-Dichloroethane-d4	94.6	0	72-119		%REC	10	04/17/20 11:47 AM
Surr: 4-Bromofluorobenzene	103	0	76-119		%REC	50	04/17/20 06:57 PM
Surr: 4-Bromofluorobenzene	102	0	76-119		%REC	10	04/17/20 11:47 AM
Surr: Dibromofluoromethane	98.5	0	85-115		%REC	50	04/17/20 06:57 PM
Surr: Dibromofluoromethane	96.5	0	85-115		%REC	10	04/17/20 11:47 AM
Surr: Toluene-d8	104	0	81-120		%REC	50	04/17/20 06:57 PM
Surr: Toluene-d8	103	0	81-120		%REC	10	04/17/20 11:47 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	183	15.0	50.0		mg/L	50	04/13/20 01:58 PM
Sulfate	2040	50.0	150		mg/L	50	04/13/20 01:58 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	563	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:39 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:39 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:39 PM
Alkalinity, Total (As CaCO3)	563	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 01:39 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3840	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-24
Project:	Empire ABO	**Lab ID:**	2004082-07
Project No:	06-0144-06	**Collection Date:**	04/07/20 01:40 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	649	5.00	15.0		mg/L	50	04/15/20 12:52 PM
Dissolved Magnesium	314	5.00	15.0		mg/L	50	04/15/20 12:52 PM
Dissolved Potassium	3.51	0.100	0.300		mg/L	1	04/15/20 11:23 AM
Dissolved Sodium	80.9	5.00	15.0		mg/L	50	04/15/20 12:52 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	2.73	0.0150	0.0500		mg/L	50	04/17/20 12:11 PM
Ethylbenzene	0.821	0.0150	0.0500		mg/L	50	04/17/20 12:11 PM
Toluene	<0.100	0.0300	0.100		mg/L	50	04/17/20 12:11 PM
Total Xylenes	0.331	0.0150	0.0500		mg/L	50	04/17/20 12:11 PM
Surr: 1,2-Dichloroethane-d4	94.6	0	72-119		%REC	50	04/17/20 12:11 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	50	04/17/20 12:11 PM
Surr: Dibromofluoromethane	95.6	0	85-115		%REC	50	04/17/20 12:11 PM
Surr: Toluene-d8	106	0	81-120		%REC	50	04/17/20 12:11 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	92.6	15.0	50.0		mg/L	50	04/13/20 02:14 PM
Sulfate	2080	50.0	150		mg/L	50	04/13/20 02:14 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	857	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:55 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:55 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:55 PM
Alkalinity, Total (As CaCO3)	857	20.0	20.0		mg/L @ pH 4.54	1	04/15/20 01:55 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4190	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	EB-02
Project:	Empire ABO	**Lab ID:**	2004082-08
Project No:	06-0144-06	**Collection Date:**	04/07/20 02:17 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	537	5.00	15.0		mg/L	50	04/15/20 12:54 PM
Dissolved Magnesium	294	5.00	15.0		mg/L	50	04/15/20 12:54 PM
Dissolved Potassium	9.79	0.100	0.300		mg/L	1	04/15/20 11:25 AM
Dissolved Sodium	161	5.00	15.0		mg/L	50	04/15/20 12:54 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	0.00598	0.000300	0.00100		mg/L	1	04/17/20 10:59 AM
Ethylbenzene	0.00262	0.000300	0.00100		mg/L	1	04/17/20 10:59 AM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 10:59 AM
Total Xylenes	0.00105	0.000300	0.00100		mg/L	1	04/17/20 10:59 AM
Surr: 1,2-Dichloroethane-d4	97.3	0	72-119		%REC	1	04/17/20 10:59 AM
Surr: 4-Bromofluorobenzene	104	0	76-119		%REC	1	04/17/20 10:59 AM
Surr: Dibromofluoromethane	98.6	0	85-115		%REC	1	04/17/20 10:59 AM
Surr: Toluene-d8	105	0	81-120		%REC	1	04/17/20 10:59 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	110	15.0	50.0		mg/L	50	04/13/20 02:30 PM
Sulfate	2590	50.0	150		mg/L	50	04/13/20 02:30 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	284	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:08 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:08 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:08 PM
Alkalinity, Total (As CaCO3)	284	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:08 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4040	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-18
Project:	Empire ABO	**Lab ID:**	2004082-09
Project No:	06-0144-06	**Collection Date:**	04/07/20 03:00 PM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	678	5.00	15.0		mg/L	50	04/15/20 01:07 PM
Dissolved Magnesium	125	5.00	15.0		mg/L	50	04/15/20 01:07 PM
Dissolved Potassium	4.36	0.100	0.300		mg/L	1	04/15/20 11:27 AM
Dissolved Sodium	55.1	5.00	15.0		mg/L	50	04/15/20 01:07 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 03:22 PM
Ethylbenzene	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 03:22 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 03:22 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 03:22 PM
Surr: 1,2-Dichloroethane-d4	99.6	0	72-119		%REC	1	04/17/20 03:22 PM
Surr: 4-Bromofluorobenzene	96.0	0	76-119		%REC	1	04/17/20 03:22 PM
Surr: Dibromofluoromethane	99.2	0	85-115		%REC	1	04/17/20 03:22 PM
Surr: Toluene-d8	107	0	81-120		%REC	1	04/17/20 03:22 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	461	15.0	50.0		mg/L	50	04/13/20 02:46 PM
Sulfate	1430	50.0	150		mg/L	50	04/13/20 02:46 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	130	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 02:16 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 02:16 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 02:16 PM
Alkalinity, Total (As CaCO3)	130	20.0	20.0		mg/L @ pH 4.52	1	04/15/20 02:16 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3150	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-22
Project:	Empire ABO	**Lab ID:**	2004082-10
Project No:	06-0144-06	**Collection Date:**	04/08/20 08:50 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	621	5.00	15.0		mg/L	50	04/15/20 01:09 PM
Dissolved Magnesium	217	5.00	15.0		mg/L	50	04/15/20 01:09 PM
Dissolved Potassium	5.39	0.100	0.300		mg/L	1	04/15/20 11:40 AM
Dissolved Sodium	63.9	5.00	15.0		mg/L	50	04/15/20 01:09 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	1.22	0.00600	0.0200		mg/L	20	04/17/20 12:35 PM
Ethylbenzene	0.280	0.00600	0.0200		mg/L	20	04/17/20 12:35 PM
Toluene	<0.0400	0.0120	0.0400		mg/L	20	04/17/20 12:35 PM
Total Xylenes	0.139	0.00600	0.0200		mg/L	20	04/17/20 12:35 PM
Surr: 1,2-Dichloroethane-d4	95.4	0	72-119		%REC	20	04/17/20 12:35 PM
Surr: 4-Bromofluorobenzene	105	0	76-119		%REC	20	04/17/20 12:35 PM
Surr: Dibromofluoromethane	98.2	0	85-115		%REC	20	04/17/20 12:35 PM
Surr: Toluene-d8	107	0	81-120		%REC	20	04/17/20 12:35 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	75.2	15.0	50.0		mg/L	50	04/13/20 03:02 PM
Sulfate	2080	50.0	150		mg/L	50	04/13/20 03:02 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	572	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:32 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:32 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:32 PM
Alkalinity, Total (As CaCO3)	572	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:32 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3630	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	Dup-2
Project:	Empire ABO	**Lab ID:**	2004082-11
Project No:	06-0144-06	**Collection Date:**	04/08/20 08:55 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	629	5.00	15.0		mg/L	50	04/15/20 01:11 PM
Dissolved Magnesium	220	5.00	15.0		mg/L	50	04/15/20 01:11 PM
Dissolved Potassium	5.38	0.100	0.300		mg/L	1	04/15/20 11:42 AM
Dissolved Sodium	63.6	5.00	15.0		mg/L	50	04/15/20 01:11 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	1.27	0.0150	0.0500		mg/L	50	04/17/20 12:59 PM
Ethylbenzene	0.280	0.0150	0.0500		mg/L	50	04/17/20 12:59 PM
Toluene	<0.100	0.0300	0.100		mg/L	50	04/17/20 12:59 PM
Total Xylenes	0.127	0.0150	0.0500		mg/L	50	04/17/20 12:59 PM
Surr: 1,2-Dichloroethane-d4	95.7	0	72-119		%REC	50	04/17/20 12:59 PM
Surr: 4-Bromofluorobenzene	105	0	76-119		%REC	50	04/17/20 12:59 PM
Surr: Dibromofluoromethane	98.1	0	85-115		%REC	50	04/17/20 12:59 PM
Surr: Toluene-d8	106	0	81-120		%REC	50	04/17/20 12:59 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	73.1	15.0	50.0		mg/L	50	04/13/20 04:38 PM
Sulfate	2030	50.0	150		mg/L	50	04/13/20 04:38 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	562	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:43 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:43 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:43 PM
Alkalinity, Total (As CaCO3)	562	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:43 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3560	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-3
Project:	Empire ABO	**Lab ID:**	2004082-12
Project No:	06-0144-06	**Collection Date:**	04/08/20 09:10 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	686	5.00	15.0		mg/L	50	04/15/20 01:13 PM
Dissolved Magnesium	72.8	5.00	15.0		mg/L	50	04/15/20 01:13 PM
Dissolved Potassium	12.4	0.100	0.300		mg/L	1	04/15/20 11:44 AM
Dissolved Sodium	111	5.00	15.0		mg/L	50	04/15/20 01:13 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	0.0569	0.00150	0.00500		mg/L	5	04/17/20 08:09 PM
Ethylbenzene	0.00344	0.00150	0.00500	J	mg/L	5	04/17/20 08:09 PM
Toluene	<0.0100	0.00300	0.0100		mg/L	5	04/17/20 08:09 PM
Total Xylenes	0.0204	0.00150	0.00500		mg/L	5	04/17/20 08:09 PM
Surr: 1,2-Dichloroethane-d4	115	0	72-119		%REC	5	04/17/20 08:09 PM
Surr: 4-Bromofluorobenzene	103	0	76-119		%REC	5	04/17/20 08:09 PM
Surr: Dibromofluoromethane	117	0	85-115	S	%REC	5	04/17/20 08:09 PM
Surr: Toluene-d8	106	0	81-120		%REC	5	04/17/20 08:09 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	99.6	15.0	50.0		mg/L	50	04/13/20 04:54 PM
Sulfate	1400	50.0	150		mg/L	50	04/13/20 04:54 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	656	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:57 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:57 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:57 PM
Alkalinity, Total (As CaCO3)	656	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 02:57 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3030	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-20
Project:	Empire ABO	**Lab ID:**	2004082-13
Project No:	06-0144-06	**Collection Date:**	04/08/20 09:40 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	616	5.00	15.0		mg/L	50	04/15/20 12:34 PM
Dissolved Magnesium	115	5.00	15.0		mg/L	50	04/15/20 12:34 PM
Dissolved Potassium	10.7	0.100	0.300		mg/L	1	04/15/20 11:05 AM
Dissolved Sodium	208	5.00	15.0		mg/L	50	04/15/20 12:34 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	0.00674	0.000300	0.00100		mg/L	1	04/17/20 03:46 PM
Ethylbenzene	0.00215	0.000300	0.00100		mg/L	1	04/17/20 03:46 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 03:46 PM
Total Xylenes	0.000982	0.000300	0.00100	J	mg/L	1	04/17/20 03:46 PM
Surr: 1,2-Dichloroethane-d4	98.2	0	72-119		%REC	1	04/17/20 03:46 PM
Surr: 4-Bromofluorobenzene	104	0	76-119		%REC	1	04/17/20 03:46 PM
Surr: Dibromofluoromethane	98.7	0	85-115		%REC	1	04/17/20 03:46 PM
Surr: Toluene-d8	105	0	81-120		%REC	1	04/17/20 03:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	160	15.0	50.0		mg/L	50	04/13/20 05:10 PM
Sulfate	1950	50.0	150		mg/L	50	04/13/20 05:10 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	443	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 03:06 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 03:06 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.52	1	04/15/20 03:06 PM
Alkalinity, Total (As CaCO3)	443	20.0	20.0		mg/L @ pH 4.52	1	04/15/20 03:06 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3480	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-12
Project:	Empire ABO	**Lab ID:**	2004082-14
Project No:	06-0144-06	**Collection Date:**	04/08/20 10:00 AM
Lab Order:	2004082	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
METALS-ICPMS (0.45µ FILTERED)		**SW6020B**					Analyst: **SP**
Dissolved Calcium	539	5.00	15.0		mg/L	50	04/15/20 01:15 PM
Dissolved Magnesium	371	5.00	15.0		mg/L	50	04/15/20 01:15 PM
Dissolved Potassium	5.40	0.100	0.300		mg/L	1	04/15/20 11:46 AM
Dissolved Sodium	83.4	5.00	15.0		mg/L	50	04/15/20 01:15 PM
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **BTJ**
Benzene	0.000563	0.000300	0.00100	J	mg/L	1	04/17/20 04:10 PM
Ethylbenzene	0.000649	0.000300	0.00100	J	mg/L	1	04/17/20 04:10 PM
Toluene	<0.00200	0.000600	0.00200		mg/L	1	04/17/20 04:10 PM
Total Xylenes	<0.00100	0.000300	0.00100		mg/L	1	04/17/20 04:10 PM
Surr: 1,2-Dichloroethane-d4	97.7	0	72-119		%REC	1	04/17/20 04:10 PM
Surr: 4-Bromofluorobenzene	110	0	76-119		%REC	1	04/17/20 04:10 PM
Surr: Dibromofluoromethane	99.0	0	85-115		%REC	1	04/17/20 04:10 PM
Surr: Toluene-d8	107	0	81-120		%REC	1	04/17/20 04:10 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	78.4	15.0	50.0		mg/L	50	04/13/20 05:29 PM
Sulfate	2780	50.0	150		mg/L	50	04/13/20 05:29 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	287	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 03:19 PM
Alkalinity, Carbonate (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 03:19 PM
Alkalinity, Hydroxide (As CaCO3)	<20.0	10.0	20.0		mg/L @ pH 4.53	1	04/15/20 03:19 PM
Alkalinity, Total (As CaCO3)	287	20.0	20.0		mg/L @ pH 4.53	1	04/15/20 03:19 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4230	50.0	50.0		mg/L	1	04/10/20 03:30 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *20-Apr-20*

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

The QC data in batch 95923 applies to the following samples: 2004082-01B, 2004082-02B, 2004082-03B, 2004082-04B, 2004082-05B, 2004082-06B, 2004082-07B, 2004082-08B, 2004082-09B, 2004082-10B, 2004082-11B, 2004082-12B, 2004082-13B, 2004082-14B

Sample ID: **MB-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:20:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	<0.300	0.300								

Sample ID: **MB-95888-FILTER** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:22:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	<0.300	0.300								

Sample ID: **LCS-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:24:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	4.91	0.300	5.00	0	98.3	80	120			

Sample ID: **LCSD-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:26:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	4.92	0.300	5.00	0	98.3	80	120	0.027	15	

Sample ID: **2004082-13B SD** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:36:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	621	75.0	0	616				0.826	20	
Magnesium	118	75.0	0	115				2.51	20	
Sodium	214	75.0	0	208				2.87	20	

Sample ID: **2004082-13B PDS** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:56:00 PM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	856	15.0	250	616	96.0	75	125			
Magnesium	352	15.0	250	115	94.8	75	125			
Sodium	451	15.0	250	208	97.0	75	125			

Qualifiers:				
	B	Analyte detected in the associated Method Blank	DF	Dilution Factor
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
	RL	Reporting Limit	S	Spike Recovery outside control limits
	J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **2004082-13B MS**	Batch ID: **95923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 12:58:00 PM**	Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	212	15.0	5.00	208	75.8	75	125			

Sample ID: **2004082-13B MSD**	Batch ID: **95923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_200415A**	Analysis Date: **4/15/2020 1:00:00 PM**	Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Sodium	213	15.0	5.00	208	102	75	125	0.610	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200415A

Sample ID: **ICV-200415** Batch ID: **R110030** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 10:32:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	2.56	0.300	2.50	0	102	90	110			
Dissolved Magnesium	2.37	0.300	2.50	0	94.7	90	110			
Dissolved Potassium	2.45	0.300	2.50	0	98.1	90	110			
Dissolved Sodium	2.47	0.300	2.50	0	98.8	90	110			

Sample ID: **CCV1-200415** Batch ID: **R110030** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 11:29:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	4.95	0.300	5.00	0	98.9	90	110			
Dissolved Sodium	4.81	0.300	5.00	0	96.2	90	110			

Sample ID: **CCV3-200415** Batch ID: **R110030** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 12:14:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	4.93	0.300	5.00	0	98.6	90	110			
Dissolved Magnesium	5.01	0.300	5.00	0	100	90	110			
Dissolved Potassium	5.01	0.300	5.00	0	100	90	110			
Dissolved Sodium	4.94	0.300	5.00	0	98.7	90	110			

Sample ID: **CCV4-200415** Batch ID: **R110030** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 1:02:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	4.88	0.300	5.00	0	97.5	90	110			
Dissolved Magnesium	4.98	0.300	5.00	0	99.7	90	110			
Dissolved Potassium	4.94	0.300	5.00	0	98.9	90	110			
Dissolved Sodium	4.90	0.300	5.00	0	97.9	90	110			

Sample ID: **CCV5-200415** Batch ID: **R110030** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_200415A** Analysis Date: **4/15/2020 1:19:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	5.04	0.300	5.00	0	101	90	110			
Dissolved Magnesium	5.05	0.300	5.00	0	101	90	110			
Dissolved Sodium	4.92	0.300	5.00	0	98.3	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200415A

The QC data in batch 95923 applies to the following samples: 2004082-01B, 2004082-02B, 2004082-03B, 2004082-04B, 2004082-05B, 2004082-06B, 2004082-07B, 2004082-08B, 2004082-09B, 2004082-10B, 2004082-11B, 2004082-12B, 2004082-13B, 2004082-14B

Sample ID: **MB-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 10:54:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	<0.300	0.300								
Dissolved Magnesium	<0.300	0.300								
Dissolved Potassium	<0.300	0.300								

Sample ID: **MB-95888-FILTER** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 10:57:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	<0.300	0.300								
Dissolved Magnesium	<0.300	0.300								
Dissolved Potassium	<0.300	0.300								

Sample ID: **LCS-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 10:59:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	4.89	0.300	5.00	0	97.7	80	120			
Dissolved Magnesium	4.87	0.300	5.00	0	97.5	80	120			
Dissolved Potassium	4.87	0.300	5.00	0	97.3	80	120			

Sample ID: **LCSD-95923** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 11:01:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	4.99	0.300	5.00	0	99.8	80	120	2.07	15	
Dissolved Magnesium	4.98	0.300	5.00	0	99.7	80	120	2.19	15	
Dissolved Potassium	4.96	0.300	5.00	0	99.3	80	120	1.98	15	

Sample ID: **2004082-13B SD** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 11:08:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	10.6	1.50	0	10.7				0.572	20	

Sample ID: **2004082-13B PDS** Batch ID: **95923** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200415A** Analysis Date: **4/15/2020 11:29:00 AM** Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	15.3	0.300	5.00	10.7	92.6	75	125			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200415A

Sample ID: **2004082-13B MS**	Batch ID: **95923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200415A**	Analysis Date: **4/15/2020 11:31:00 AM**	Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	630	0.300	5.00	623	146	75	125			S
Dissolved Magnesium	117	0.300	5.00	110	139	75	125			S
Dissolved Potassium	16.1	0.300	5.00	10.7	108	75	125			

Sample ID: **2004082-13B MSD**	Batch ID: **95923**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_200415A**	Analysis Date: **4/15/2020 11:33:00 AM**	Prep Date: **4/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	640	0.300	5.00	623	344	75	125	1.56	15	S
Dissolved Magnesium	116	0.300	5.00	110	124	75	125	0.647	15	
Dissolved Potassium	16.0	0.300	5.00	10.7	105	75	125	0.905	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200415A

Sample ID: **ICV-200415**	Batch ID: **R110029**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200415A**	Analysis Date: **4/15/2020 10:37:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	2.61	0.300	2.50	0	104	90	110			
Dissolved Magnesium	2.40	0.300	2.50	0	95.8	90	110			
Dissolved Potassium	2.45	0.300	2.50	0	98.0	90	110			

Sample ID: **CCV1-200415**	Batch ID: **R110029**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200415A**	Analysis Date: **4/15/2020 11:36:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Calcium	5.19	0.300	5.00	0	104	90	110			
Dissolved Magnesium	5.03	0.300	5.00	0	101	90	110			
Dissolved Potassium	5.12	0.300	5.00	0	102	90	110			

Sample ID: **CCV2-200415**	Batch ID: **R110029**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200415A**	Analysis Date: **4/15/2020 11:53:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Dissolved Potassium	5.09	0.300	5.00	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_200417A

The QC data in batch 95989 applies to the following samples: 2004082-01A, 2004082-02A, 2004082-03A, 2004082-04A, 2004082-05A, 2004082-06A, 2004082-07A, 2004082-08A, 2004082-09A, 2004082-10A, 2004082-11A, 2004082-12A, 2004082-13A, 2004082-14A

Sample ID: **LCS-95989** Batch ID: **95989** TestNo: **SW8260D** Units: **mg/L**
SampType: **LCS** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 10:11:00 AM** Prep Date: **4/17/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0209	0.00100	0.0232	0	89.9	81	122			
Ethylbenzene	0.0214	0.00100	0.0232	0	92.2	80	120			
Toluene	0.0216	0.00200	0.0232	0	93.1	80	120			
Total Xylenes	0.0654	0.00100	0.0696	0	94.0	80	120			
Surr: 1,2-Dichloroethane-d4	188		200.0		93.8	72	119			
Surr: 4-Bromofluorobenzene	198		200.0		99.2	76	119			
Surr: Dibromofluoromethane	188		200.0		94.0	85	115			
Surr: Toluene-d8	202		200.0		101	81	120			

Sample ID: **MB-95989** Batch ID: **95989** TestNo: **SW8260D** Units: **mg/L**
SampType: **MBLK** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 10:35:00 AM** Prep Date: **4/17/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.00100	0.00100								
Ethylbenzene	<0.00100	0.00100								
Toluene	<0.00200	0.00200								
Total Xylenes	<0.00100	0.00100								
Surr: 1,2-Dichloroethane-d4	188		200.0		94.0	72	119			
Surr: 4-Bromofluorobenzene	205		200.0		103	76	119			
Surr: Dibromofluoromethane	194		200.0		97.2	85	115			
Surr: Toluene-d8	212		200.0		106	81	120			

Sample ID: **2004082-06AMS** Batch ID: **95989** TestNo: **SW8260D** Units: **mg/L**
SampType: **MS** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 7:21:00 PM** Prep Date: **4/17/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	3.73	0.0500	1.16	2.64	93.5	81	122			
Ethylbenzene	1.85	0.0500	1.16	0.795	91.0	80	120			
Toluene	1.14	0.100	1.16	0	98.0	80	120			
Total Xylenes	3.88	0.0500	3.48	0.517	96.5	80	120			
Surr: 1,2-Dichloroethane-d4	10200		10000		102	72	119			
Surr: 4-Bromofluorobenzene	11300		10000		113	76	119			
Surr: Dibromofluoromethane	10200		10000		102	85	115			
Surr: Toluene-d8	9490		10000		94.9	81	120			

Sample ID: **2004082-06AMSD** Batch ID: **95989** TestNo: **SW8260D** Units: **mg/L**
SampType: **MSD** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 7:45:00 PM** Prep Date: **4/17/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_200417A

Sample ID: **2004082-06AMSD** Batch ID: **95989** TestNo: **SW8260D** Units: **mg/L**
SampType: **MSD** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 7:45:00 PM** Prep Date: **4/17/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	3.35	0.0500	1.16	2.64	61.1	81	120	10.6	20	S
Ethylbenzene	1.85	0.0500	1.16	0.795	91.0	80	120	0.021	20	
Toluene	1.14	0.100	1.16	0	98.3	80	120	0.356	20	
Total Xylenes	3.86	0.0500	3.48	0.517	96.1	80	120	0.393	20	
Surr: 1,2-Dichloroethane-d4	9890		10000		98.9	72	119	0	0	
Surr: 4-Bromofluorobenzene	9650		10000		96.5	76	119	0	0	
Surr: Dibromofluoromethane	7640		10000		76.4	85	115	0	0	S
Surr: Toluene-d8	9860		10000		98.6	81	120	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_200417A

Sample ID: **ICV-200417** Batch ID: **R110077** TestNo: **SW8260D** Units: **mg/L**
SampType: **ICV** Run ID: **GCMS5_200417A** Analysis Date: **4/17/2020 9:48:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0429	0.00100	0.0464	0	92.5	70	130			
Ethylbenzene	0.0435	0.00100	0.0464	0	93.6	70	130			
Toluene	0.0435	0.00200	0.0464	0	93.7	70	130			
Total Xylenes	0.134	0.00100	0.139	0	96.0	70	130			
Surr: 1,2-Dichloroethane-d4	192		200.0		95.9	72	119			
Surr: 4-Bromofluorobenzene	193		200.0		96.5	76	119			
Surr: Dibromofluoromethane	198		200.0		99.2	85	115			
Surr: Toluene-d8	199		200.0		99.6	81	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200413A

The QC data in batch 95907 applies to the following samples: 2004082-01C, 2004082-02C, 2004082-03C, 2004082-04C, 2004082-05C, 2004082-06C, 2004082-07C, 2004082-08C, 2004082-09C, 2004082-10C, 2004082-11C, 2004082-12C, 2004082-13C, 2004082-14C

Sample ID: **MB-95907** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 11:14:22 AM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<1.00	1.00								
Sulfate	<3.00	3.00								

Sample ID: **LCS-95907** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 11:30:21 AM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.34	1.00	10.00	0	93.4	90	110			
Sulfate	29.0	3.00	30.00	0	96.6	90	110			

Sample ID: **LCSD-95907** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 11:46:22 AM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.38	1.00	10.00	0	93.8	90	110	0.420	20	
Sulfate	29.0	3.00	30.00	0	96.6	90	110	0.002	20	

Sample ID: **2004091-03AMS** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 6:17:51 PM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	238	10.0	200.0	51.04	93.5	90	110			
Sulfate	2170	30.0	200.0	2158	7.22	90	110			S

Sample ID: **2004091-03AMSD** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 6:33:51 PM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	237	10.0	200.0	51.04	93.2	90	110	0.232	20	
Sulfate	2170	30.0	200.0	2158	6.72	90	110	0.046	20	S

Sample ID: **2004092-03AMS** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 7:05:50 PM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	230	10.0	200.0	31.40	99.4	90	110			
Sulfate	1110	30.0	200.0	953.4	79.0	90	110			S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200413A

Sample ID: **2004092-03AMSD** Batch ID: **95907** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200413A** Analysis Date: **4/13/2020 7:21:50 PM** Prep Date: **4/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	230	10.0	200.0	31.40	99.3	90	110	0.071	20	
Sulfate	1110	30.0	200.0	953.4	78.9	90	110	0.007	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200413A

Sample ID: **ICV-200413**	Batch ID: **R109985**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200413A**	Analysis Date: **4/13/2020 10:42:21 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	23.8	1.00	25.00	0	95.3	90	110			
Sulfate	75.1	3.00	75.00	0	100	90	110			

Sample ID: **CCV1-200413**	Batch ID: **R109985**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200413A**	Analysis Date: **4/13/2020 4:06:51 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.57	1.00	10.00	0	95.7	90	110			
Sulfate	29.4	3.00	30.00	0	98.0	90	110			

Sample ID: **CCV2-200413**	Batch ID: **R109985**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200413A**	Analysis Date: **4/14/2020 9:38:40 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.21	1.00	10.00	0	92.1	90	110			
Sulfate	29.3	3.00	30.00	0	97.6	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200415A

The QC data in batch 95939 applies to the following samples: 2004082-01C, 2004082-02C, 2004082-03C, 2004082-04C, 2004082-05C, 2004082-06C, 2004082-07C, 2004082-08C, 2004082-09C, 2004082-10C, 2004082-11C, 2004082-12C, 2004082-13C, 2004082-14C

Sample ID: **MB-95939** Batch ID: **95939** TestNo: **M2320 B** Units: **mg/L @ pH 4.32**
SampType: **MBLK** Run ID: **TITRATOR_200415A** Analysis Date: **4/15/2020 10:06:00 AM** Prep Date: **4/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	<20.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<20.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID: **LCS-95939** Batch ID: **95939** TestNo: **M2320 B** Units: **mg/L @ pH 4.13**
SampType: **LCS** Run ID: **TITRATOR_200415A** Analysis Date: **4/15/2020 10:11:00 AM** Prep Date: **4/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.9	20.0	50.00	0	106	74	129			

Sample ID: **2004082-01C-DUP** Batch ID: **95939** TestNo: **M2320 B** Units: **mg/L @ pH 4.54**
SampType: **DUP** Run ID: **TITRATOR_200415A** Analysis Date: **4/15/2020 12:14:00 PM** Prep Date: **4/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	442	20.0	0	430.3				2.68	20	
Alkalinity, Carbonate (As CaCO3)	<20.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	442	20.0	0	430.3				2.68	20	

Sample ID: **2004100-01E-DUP** Batch ID: **95939** TestNo: **M2320 B** Units: **mg/L @ pH 4.49**
SampType: **DUP** Run ID: **TITRATOR_200415A** Analysis Date: **4/15/2020 3:26:00 PM** Prep Date: **4/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	<20.0	20.0	0	0				0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200415A

Sample ID: ICV-200415	Batch ID: R110032	TestNo: M2320 B	Units: mg/L @ pH 4.35
SampType: ICV	Run ID: TITRATOR_200415A	Analysis Date: 4/15/2020 9:46:00 AM	Prep Date: 4/15/2020

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	22.1	20.0	0							
Alkalinity, Carbonate (As CaCO3)	77.9	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	98	102			

Sample ID: CCV1-2004015	Batch ID: R110032	TestNo: M2320 B	Units: mg/L @ pH 4.34
SampType: CCV	Run ID: TITRATOR_200415A	Analysis Date: 4/15/2020 2:21:00 PM	Prep Date: 4/15/2020

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	45.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	51.7	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.5	20.0	100.0	0	97.5	90	110			

Sample ID: CCV2-200415	Batch ID: R110032	TestNo: M2320 B	Units: mg/L @ pH 4.39
SampType: CCV	Run ID: TITRATOR_200415A	Analysis Date: 4/15/2020 3:31:00 PM	Prep Date: 4/15/2020

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	49.3	20.0	0							
Alkalinity, Carbonate (As CaCO3)	49.4	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.7	20.0	100.0	0	98.7	90	110			

Sample ID: CCV3-200415	Batch ID: R110032	TestNo: M2320 B	Units: mg/L @ pH 4.38
SampType: CCV	Run ID: TITRATOR_200415A	Analysis Date: 4/15/2020 6:54:00 PM	Prep Date: 4/15/2020

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	44.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	52.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0							
Alkalinity, Total (As CaCO3)	96.8	20.0	100.0	0	96.8	90	110			

Sample ID: CCV4-200415	Batch ID: R110032	TestNo: M2320 B	Units: mg/L @ pH 4.41
SampType: CCV	Run ID: TITRATOR_200415A	Analysis Date: 4/15/2020 7:55:00 PM	Prep Date: 4/15/2020

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	47.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	49.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<20.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.0	20.0	100.0	0	97.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2004082
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: WC_200410A

The QC data in batch 95889 applies to the following samples: 2004082-01C, 2004082-02C, 2004082-03C, 2004082-04C, 2004082-05C, 2004082-06C, 2004082-07C, 2004082-08C, 2004082-09C, 2004082-10C, 2004082-11C, 2004082-12C, 2004082-13C, 2004082-14C

Sample ID: **MB-95889** Batch ID: **95889** TestNo: **M2540C** Units: **mg/L**
SampType: **MBLK** Run ID: **WC_200410A** Analysis Date: **4/10/2020 3:30:00 PM** Prep Date: **4/10/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID: **LCS-95889** Batch ID: **95889** TestNo: **M2540C** Units: **mg/L**
SampType: **LCS** Run ID: **WC_200410A** Analysis Date: **4/10/2020 3:30:00 PM** Prep Date: **4/10/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	747	10.0	745.6	0	100	90	113			

Sample ID: **2004082-01C-DUP** Batch ID: **95889** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_200410A** Analysis Date: **4/10/2020 3:30:00 PM** Prep Date: **4/10/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3270	50.0	0	3350				2.42	5	

Sample ID: **2004082-02C-DUP** Batch ID: **95889** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_200410A** Analysis Date: **4/10/2020 3:30:00 PM** Prep Date: **4/10/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	3330	50.0	0	3365				1.05	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **Dup-1**
Lab ID Number: **2004082-01**

PARAMETER	RESULT	UNITS	METHOD
Calcium	540	mg/L	SW6020B
Magnesium	135	mg/L	SW6020B
Sodium	288	mg/L	SW6020B
Potassium	9.13	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.54	M2320 B
Bicarbonate	430	mg/L @ pH 4.54	M2320 B
Sulfate	1410	mg/L	E300
T-Alkalinity	430	mg/L @ pH 4.54	M2320 B
Hardness	1904	mg/L	SM 2340B
Chloride	514	mg/L	E300
TDS	3350	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	8.59
Calcium	26.95
Chloride	14.50
Magnesium	11.10
Potassium	0.23
Sodium	12.53
Sulfate	29.36
TOTAL ANIONS	52.4
TOTAL CATIONS	50.8
CATION/ANION (% DIFF)	-1.59
Calculated TDS	3111
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.08
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-8**
Lab ID Number: **2004082-02**

PARAMETER	RESULT	UNITS	METHOD
Calcium	534	mg/L	SW6020B
Magnesium	132	mg/L	SW6020B
Sodium	280	mg/L	SW6020B
Potassium	9.02	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.54	M2320 B
Bicarbonate	442	mg/L @ pH 4.54	M2320 B
Sulfate	1420	mg/L	E300
T-Alkalinity	442	mg/L @ pH 4.54	M2320 B
Hardness	1877	mg/L	SM 2340B
Chloride	524	mg/L	E300
TDS	3370	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	8.83
Calcium	26.65
Chloride	14.78
Magnesium	10.86
Potassium	0.23
Sodium	12.18
Sulfate	29.56
TOTAL ANIONS	53.2
TOTAL CATIONS	49.9
CATION/ANION (% DIFF)	-3.17
Calculated TDS	3120
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.08
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-15**
Lab ID Number: **2004082-03**

PARAMETER	RESULT	UNITS	METHOD
Calcium	485	mg/L	SW6020B
Magnesium	6520	mg/L	SW6020B
Sodium	8580	mg/L	SW6020B
Potassium	229	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.55	M2320 B
Bicarbonate	811	mg/L @ pH 4.55	M2320 B
Sulfate	43800	mg/L	E300
T-Alkalinity	811	mg/L @ pH 4.55	M2320 B
Hardness	28060	mg/L	SM 2340B
Chloride	2840	mg/L	E300
TDS	76400	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	16.20
Calcium	24.20
Chloride	80.11
Magnesium	536.18
Potassium	5.87
Sodium	373.21
Sulfate	911.93
TOTAL ANIONS	1010
TOTAL CATIONS	939
CATION/ANION (% DIFF)	-3.53
Calculated TDS	62860
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.22
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-17**
Lab ID Number: **2004082-04**

PARAMETER	RESULT	UNITS	METHOD
Calcium	496	mg/L	SW6020B
Magnesium	474	mg/L	SW6020B
Sodium	118	mg/L	SW6020B
Potassium	8.36	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	253	mg/L @ pH 4.53	M2320 B
Sulfate	3230	mg/L	E300
T-Alkalinity	253	mg/L @ pH 4.53	M2320 B
Hardness	3190	mg/L	SM 2340B
Chloride	115	mg/L	E300
TDS	5030	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	5.05
Calcium	24.75
Chloride	3.24
Magnesium	38.98
Potassium	0.21
Sodium	5.13
Sulfate	67.25
TOTAL ANIONS	75.5
TOTAL CATIONS	69.1
CATION/ANION (% DIFF)	-4.47
Calculated TDS	4568
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.10
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **P-02**
Lab ID Number: **2004082-05**

PARAMETER	RESULT	UNITS	METHOD
Calcium	581	mg/L	SW6020B
Magnesium	232	mg/L	SW6020B
Sodium	59.2	mg/L	SW6020B
Potassium	4.67	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.54	M2320 B
Bicarbonate	384	mg/L @ pH 4.54	M2320 B
Sulfate	2350	mg/L	E300
T-Alkalinity	384	mg/L @ pH 4.54	M2320 B
Hardness	2406	mg/L	SM 2340B
Chloride	86.0	mg/L	E300
TDS	3620	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	7.67
Calcium	28.99
Chloride	2.43
Magnesium	19.08
Potassium	0.12
Sodium	2.58
Sulfate	48.93
TOTAL ANIONS	59.0
TOTAL CATIONS	50.8
CATION/ANION (% DIFF)	-7.52
Calculated TDS	3505
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.03
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-23**
Lab ID Number: **2004082-06**

PARAMETER	RESULT	UNITS	METHOD
Calcium	654	mg/L	SW6020B
Magnesium	190	mg/L	SW6020B
Sodium	158	mg/L	SW6020B
Potassium	8.98	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	563	mg/L @ pH 4.53	M2320 B
Sulfate	2040	mg/L	E300
T-Alkalinity	563	mg/L @ pH 4.53	M2320 B
Hardness	2415	mg/L	SM 2340B
Chloride	183	mg/L	E300
TDS	3840	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	11.25
Calcium	32.63
Chloride	5.16
Magnesium	15.63
Potassium	0.23
Sodium	6.87
Sulfate	42.47
TOTAL ANIONS	58.9
TOTAL CATIONS	55.4
CATION/ANION (% DIFF)	-3.08
Calculated TDS	3516
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.09
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-24**
Lab ID Number: **2004082-07**

PARAMETER	RESULT	UNITS	METHOD
Calcium	649	mg/L	SW6020B
Magnesium	314	mg/L	SW6020B
Sodium	80.9	mg/L	SW6020B
Potassium	3.51	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.54	M2320 B
Bicarbonate	857	mg/L @ pH 4.54	M2320 B
Sulfate	2080	mg/L	E300
T-Alkalinity	857	mg/L @ pH 4.54	M2320 B
Hardness	2914	mg/L	SM 2340B
Chloride	92.6	mg/L	E300
TDS	4190	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	17.12
Calcium	32.39
Chloride	2.61
Magnesium	25.82
Potassium	0.09
Sodium	3.52
Sulfate	43.31
TOTAL ANIONS	63.0
TOTAL CATIONS	61.8
CATION/ANION (% DIFF)	-0.98
Calculated TDS	3648
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.15
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **EB-02**
Lab ID Number: **2004082-08**

PARAMETER	RESULT	UNITS	METHOD
Calcium	537	mg/L	SW6020B
Magnesium	294	mg/L	SW6020B
Sodium	161	mg/L	SW6020B
Potassium	9.79	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	284	mg/L @ pH 4.53	M2320 B
Sulfate	2590	mg/L	E300
T-Alkalinity	284	mg/L @ pH 4.53	M2320 B
Hardness	2552	mg/L	SM 2340B
Chloride	110	mg/L	E300
TDS	4040	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	5.67
Calcium	26.80
Chloride	3.10
Magnesium	24.18
Potassium	0.25
Sodium	7.00
Sulfate	53.92
TOTAL ANIONS	62.7
TOTAL CATIONS	58.2
CATION/ANION (% DIFF)	-3.70
Calculated TDS	3844
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.05
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-18**
Lab ID Number: **2004082-09**

PARAMETER	RESULT	UNITS	METHOD
Calcium	678	mg/L	SW6020B
Magnesium	125	mg/L	SW6020B
Sodium	55.1	mg/L	SW6020B
Potassium	4.36	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.52	M2320 B
Bicarbonate	130	mg/L @ pH 4.52	M2320 B
Sulfate	1430	mg/L	E300
T-Alkalinity	130	mg/L @ pH 4.52	M2320 B
Hardness	2208	mg/L	SM 2340B
Chloride	461	mg/L	E300
TDS	3150	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	2.60
Calcium	33.83
Chloride	13.00
Magnesium	10.28
Potassium	0.11
Sodium	2.40
Sulfate	29.77
TOTAL ANIONS	45.4
TOTAL CATIONS	46.6
CATION/ANION (% DIFF)	1.35
Calculated TDS	2818
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.12
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-22**
Lab ID Number: **2004082-10**

PARAMETER	RESULT	UNITS	METHOD
Calcium	621	mg/L	SW6020B
Magnesium	217	mg/L	SW6020B
Sodium	63.9	mg/L	SW6020B
Potassium	5.39	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	572	mg/L @ pH 4.53	M2320 B
Sulfate	2080	mg/L	E300
T-Alkalinity	572	mg/L @ pH 4.53	M2320 B
Hardness	2444	mg/L	SM 2340B
Chloride	75.2	mg/L	E300
TDS	3630	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	11.43
Calcium	30.99
Chloride	2.12
Magnesium	17.85
Potassium	0.14
Sodium	2.78
Sulfate	43.31
TOTAL ANIONS	56.9
TOTAL CATIONS	51.8
CATION/ANION (% DIFF)	-4.70
Calculated TDS	3348
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.08
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **Dup-2**
Lab ID Number: **2004082-11**

PARAMETER	RESULT	UNITS	METHOD
Calcium	629	mg/L	SW6020B
Magnesium	220	mg/L	SW6020B
Sodium	63.6	mg/L	SW6020B
Potassium	5.38	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	562	mg/L @ pH 4.53	M2320 B
Sulfate	2030	mg/L	E300
T-Alkalinity	562	mg/L @ pH 4.53	M2320 B
Hardness	2477	mg/L	SM 2340B
Chloride	73.1	mg/L	E300
TDS	3560	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	11.23
Calcium	31.39
Chloride	2.06
Magnesium	18.09
Potassium	0.14
Sodium	2.77
Sulfate	42.27
TOTAL ANIONS	55.6
TOTAL CATIONS	52.4
CATION/ANION (% DIFF)	-2.94
Calculated TDS	3302
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.08
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-3**
Lab ID Number: **2004082-12**

PARAMETER	RESULT	UNITS	METHOD
Calcium	686	mg/L	SW6020B
Magnesium	72.8	mg/L	SW6020B
Sodium	111	mg/L	SW6020B
Potassium	12.4	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	656	mg/L @ pH 4.53	M2320 B
Sulfate	1400	mg/L	E300
T-Alkalinity	656	mg/L @ pH 4.53	M2320 B
Hardness	2013	mg/L	SM 2340B
Chloride	99.6	mg/L	E300
TDS	3030	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	13.11
Calcium	34.23
Chloride	2.81
Magnesium	5.99
Potassium	0.32
Sodium	4.83
Sulfate	29.15
TOTAL ANIONS	45.1
TOTAL CATIONS	45.4
CATION/ANION (% DIFF)	0.33
Calculated TDS	2710
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.12
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-20**
Lab ID Number: **2004082-13**

PARAMETER	RESULT	UNITS	METHOD
Calcium	616	mg/L	SW6020B
Magnesium	115	mg/L	SW6020B
Sodium	208	mg/L	SW6020B
Potassium	10.7	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.52	M2320 B
Bicarbonate	443	mg/L @ pH 4.52	M2320 B
Sulfate	1950	mg/L	E300
T-Alkalinity	443	mg/L @ pH 4.52	M2320 B
Hardness	2012	mg/L	SM 2340B
Chloride	160	mg/L	E300
TDS	3480	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	8.85
Calcium	30.74
Chloride	4.51
Magnesium	9.46
Potassium	0.27
Sodium	9.05
Sulfate	40.60
TOTAL ANIONS	54.0
TOTAL CATIONS	49.5
CATION/ANION (% DIFF)	-4.30
Calculated TDS	3282
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.06
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

DHL ANALYTICAL
MINERAL BALANCE REPORT

Larson & Associates

Client Project Number: 06-0144-06
Location: Empire ABO
DHL Project Number: 2004082

Sample ID: **MW-12**
Lab ID Number: **2004082-14**

PARAMETER	RESULT	UNITS	METHOD
Calcium	539	mg/L	SW6020B
Magnesium	371	mg/L	SW6020B
Sodium	83.4	mg/L	SW6020B
Potassium	5.40	mg/L	SW6020B
Carbonate	0	mg/L @ pH 4.53	M2320 B
Bicarbonate	287	mg/L @ pH 4.53	M2320 B
Sulfate	2780	mg/L	E300
T-Alkalinity	287	mg/L @ pH 4.53	M2320 B
Hardness	2874	mg/L	SM 2340B
Chloride	78.4	mg/L	E300
TDS	4230	mg/L	M2540C

ANION-CATION BALANCE ACCEPTABLE? YES / NO

ANALYTE	*Meq/L*
T-Alkalinity	5.73
Calcium	26.90
Chloride	2.21
Magnesium	30.51
Potassium	0.14
Sodium	3.63
Sulfate	57.88
TOTAL ANIONS	65.8
TOTAL CATIONS	61.2
CATION/ANION (% DIFF)	-3.66
Calculated TDS	4000
TDS Ratio (Meas/Calc) (0.85 - 1.15)	1.06
TDS / Cond Ratio (0.55 - 0.85)	N/A

Comments: _____

Lab Rep Name/Signature: _____

Date: 04/20/20

Cation/Anion % Difference calculated per SM1030E.

October 02, 2020

Mark Larson
Larson & Associates
507 N. Marienfeld #205
Midland, TX 79701
TEL: (432) 687-0901
FAX (432) 687-0456

Order No.: 2009181

RE: Empire ABO

Dear Mark Larson:

DHL Analytical, Inc. received 14 sample(s) on 9/25/2020 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-20-25

Table of Contents

№1355

CHAIN-OF-CUSTODY

Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 200
Midland, TX 79701
432-687-0901

DATE: 9/24/20 PAGE 1 OF 1
PO#: LAB WORK ORDER#: 2009181
PROJECT LOCATION OR NAME: EMPIRE ABO
LAI PROJECT #: 06-0141-06 COLLECTOR: DS / TJ
Data Reported to:

TRRP report? ☐ Yes ☒ No
TIME ZONE: Time zone/State: MNT

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR OT=OTHER

Field Sample I.D.	Lab #	Date	Time	Matrix	# of Containers	PRESERVATION: HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESSERVED	ANALYSES: BTEX ☒ MTBE ☐	TRPH 418.1 ☐	TPH 1005 ☐	TPH 1006 ☐	GASOLINE MOD 8015 ☐	DIESEL - MOD 8015 ☐	OIL - MOD 8015 ☐	VOC 8260 ☐	SVOC 8270 ☐	PAH 8270 ☐	HOLDPAH ☐	8081 PESTICIDES ☐	8151 HERBICIDES ☐	8082 PCBS ☐	TBLP - METALS (RCRA) ☐	TCLP VOC ☐	TCLP - PEST ☐	HERB ☐	Semi-VOC ☐	TOTAL METALS (RCRA) ☐	OTHER LIST ☐	LEAD - TOTAL ☐	D.W. 200.8 ☐	TCLP ☐	RCI ☐	TOX ☐	FLASHPOINT ☐	TDS ☐	TSS ☐	% MOISTURE ☐	pH ☐	HEXAVALENT CHROMIUM ☐	CYANIDE ☐	EXPLOSIVES ☐	PECHLORATE ☐	CHLORIDE ☐	ANIONS ☐	ALKALINITY ☐	FIELD NOTES
EB-02	01	9/22/20	1310	W	3	X			X		X																																				
DUP	02	"	1420	W	3	X			X		X																																				
P-02	03	"	1340	W	3	X			X		X																																				
MW-15	04	"	1405	W	3	X			X		X																																				
DUP-1	05	"	1520	W	3	X			X		X																																				
MW-17	06	"	1425	W	3	X			X		X																																				
MW-18	07	"	1500	W	3	X			X		X																																				
MW-24	08	9/23/20	0845	W	3	X			X		X																																				
MW-08	09	"	0915	W	3	X			X		X																																				
DUP-2	10	"	1100 ~~0935~~	W	3	X			X		X																																				
MW-02	11	"	0935	W	3	X			X		X																																				
MW-20	12	"	0950	W	3	X			X		X																																				
MW-12	13	"	1040	W	3	X			X		X																																				
MW-22	14	"	1055	W	3	X			X		X																																				
~~MW~~																																														
TOTAL					42																																									

RELINQUISHED BY:(Signature) DS DATE/TIME 9/24/20 1400 RECEIVED BY: (Signature) LSO
RELINQUISHED BY:(Signature) LSO DATE/TIME 9/25/20 0905 RECEIVED BY: (Signature)
RELINQUISHED BY:(Signature) DATE/TIME RECEIVED BY: (Signature)

LABORATORY: DHL

3

TURN AROUND TIME
NORMAL ☒
1 DAY ☐
2 DAY ☐
OTHER ☐

LABORATORY USE ONLY:
RECEIVING TEMP: 3.5°C THERM#: 78
CUSTODY SEALS - ☐ BROKEN ☒ INTACT ☐ NOT USED
☒ CARRIER BILL # LSO
☐ HAND DELIVERED

129909 AL

LSO

WWW.LSO.COM
Questions? Call 800-800-8984

Airbill No. LSO0BYGU

LSO0BYGU

1. To:
Print Name (Person): John DuPont
Phone (Important): 512-355-3822
Company Name:
Street Address (No P.O. Box or P.O. Box Zip Code® Deliveries): 2300 Double Creek DR
Suite / Floor:
City: Round Rock State: TX Zip: 78664

2. From:
Print Name (Person): John White
Phone (Important): 432-687-0901
Company Name: LARSON & ASSOCIATES
Street Address: 507 NORTH MARIENFELD
Suite / Floor: 205
City: MIDLAND State: TX Zip: 79701

3. Service: Visit www.lso.com for availability of services to your destination and enjoy added features by creating your shipping label online.

- ☑ **LSO Priority Overnight*** By 10:30 a.m. to most cities
- ☐ **LSO Early Overnight*** By 8:30 a.m. select cities
- ☐ **LSO Economy Next Day*** By 3 p.m. to most cities
- ☐ **LSO 2nd Day***
- ☐ **LSO Ground**
- ☐ **LSO Saturday***
- ☐ Other _____

*Check commitment times and availability at www.lso.com

Assumed LSO Priority Overnight service unless otherwise noted.

☐ Deliver Without Delivery Signature (See Limits of Liability below)

Release Signature

L_____ x W_____ x H_____

4. Package: Weight: 40lbs

Your Company's Billing Reference Information:

Ship Date: (mm/dd/yy) 09 / 24 / 20

5. Payment:

FOR DRIVER USE ONLY

Driver Number _____
☐ Check here if LSO Supplies are used with LSO Ground Service.
Pick-up Location 3
Date: 9-24-20
Time: 3:15
City Code: AVS

ILLEGIBLE HANDWRITING ON AIRBILL MAY DELAY TRANSIT TIMES OR RESULT IN NON-DELIVERY. LIMIT OF LIABILITY: We are not responsible for claims in excess of $100 for any reason unless you: 1) declare a greater value (not to exceed $25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. "Signature Required" service is only available when printing a label online at LSO.com. **NO DELIVERY SIGNATURE WILL BE OBTAINED FOR LSO EARLY OVERNIGHT SERVICE. Packaging provided by LSO is for EXPRESS USE ONLY – NEVER TO BE USED FOR LSO GROUND Service. OVERSIZE RATES MAY APPLY. DELIVERY COMMITMENTS MAY VARY. ADDITIONAL FEES MAY APPLY.** See LSO Service Guide for further details.

CUSTODY SEA

DATE 9/24/20

SIGNATURE

L

DHL ANALYTICAL

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Larson & Associates** Date Received: **9/25/2020**

Work Order Number **2009181** Received by: **EL**

Checklist completed by: _____ 9/25/2020 Reviewed by JD 9/25/2020
Signature Date Initials Date

Carrier name: Courier

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.5 °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action: _____

Page 1 of 1

DHL Analytical, Inc. **Date:** *02-Oct-20*

CLIENT: Larson & Associates
Project: Empire ABO
Lab Order: 2009181

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition.

For Volatiles analysis samples MW-24 and MW-22 were diluted prior to analysis due to the nature of the samples (historical data)

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	EB-02
Project:	Empire ABO	**Lab ID:**	2009181-01
Project No:	06-0141-06	**Collection Date:**	09/22/20 01:10 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 06:57 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 06:57 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 06:57 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 06:57 PM
Surr: 1,2-Dichloroethane-d4	110	0	72-119		%REC	1	09/29/20 06:57 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	09/29/20 06:57 PM
Surr: Dibromofluoromethane	96.1	0	85-115		%REC	1	09/29/20 06:57 PM
Surr: Toluene-d8	97.5	0	81-120		%REC	1	09/29/20 06:57 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	DUP
Project:	Empire ABO	**Lab ID:**	2009181-02
Project No:	06-0141-06	**Collection Date:**	09/22/20 02:20 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:21 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:21 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 07:21 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:21 PM
Surr: 1,2-Dichloroethane-d4	111	0	72-119		%REC	1	09/29/20 07:21 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	09/29/20 07:21 PM
Surr: Dibromofluoromethane	95.7	0	85-115		%REC	1	09/29/20 07:21 PM
Surr: Toluene-d8	98.1	0	81-120		%REC	1	09/29/20 07:21 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	P-02
Project:	Empire ABO	**Lab ID:**	2009181-03
Project No:	06-0141-06	**Collection Date:**	09/22/20 01:40 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:46 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:46 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 07:46 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 07:46 PM
Surr: 1,2-Dichloroethane-d4	111	0	72-119		%REC	1	09/29/20 07:46 PM
Surr: 4-Bromofluorobenzene	99.6	0	76-119		%REC	1	09/29/20 07:46 PM
Surr: Dibromofluoromethane	95.4	0	85-115		%REC	1	09/29/20 07:46 PM
Surr: Toluene-d8	97.4	0	81-120		%REC	1	09/29/20 07:46 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-15
Project:	Empire ABO	**Lab ID:**	2009181-04
Project No:	06-0141-06	**Collection Date:**	09/22/20 02:05 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:10 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:10 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 08:10 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:10 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	09/29/20 08:10 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	09/29/20 08:10 PM
Surr: Dibromofluoromethane	96.8	0	85-115		%REC	1	09/29/20 08:10 PM
Surr: Toluene-d8	97.5	0	81-120		%REC	1	09/29/20 08:10 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	DUP-1
Project:	Empire ABO	**Lab ID:**	2009181-05
Project No:	06-0141-06	**Collection Date:**	09/22/20 03:20 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:34 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:34 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 08:34 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:34 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	09/29/20 08:34 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	09/29/20 08:34 PM
Surr: Dibromofluoromethane	95.2	0	85-115		%REC	1	09/29/20 08:34 PM
Surr: Toluene-d8	97.4	0	81-120		%REC	1	09/29/20 08:34 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-17
Project:	Empire ABO	**Lab ID:**	2009181-06
Project No:	06-0141-06	**Collection Date:**	09/22/20 02:25 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:58 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:58 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 08:58 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 08:58 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	09/29/20 08:58 PM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	1	09/29/20 08:58 PM
Surr: Dibromofluoromethane	95.9	0	85-115		%REC	1	09/29/20 08:58 PM
Surr: Toluene-d8	98.3	0	81-120		%REC	1	09/29/20 08:58 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-18
Project:	Empire ABO	**Lab ID:**	2009181-07
Project No:	06-0141-06	**Collection Date:**	09/22/20 03:00 PM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 09:22 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 09:22 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 09:22 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 09:22 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	09/29/20 09:22 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	09/29/20 09:22 PM
Surr: Dibromofluoromethane	96.4	0	85-115		%REC	1	09/29/20 09:22 PM
Surr: Toluene-d8	98.0	0	81-120		%REC	1	09/29/20 09:22 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-24
Project:	Empire ABO	**Lab ID:**	2009181-08
Project No:	06-0141-06	**Collection Date:**	09/23/20 08:45 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	2.28	0.00600	0.0200		mg/L	20	09/30/20 12:34 AM
Ethylbenzene	0.367	0.00600	0.0200		mg/L	20	09/30/20 12:34 AM
Toluene	<0.0120	0.0120	0.0400		mg/L	20	09/30/20 12:34 AM
Total Xylenes	0.169	0.00600	0.0200		mg/L	20	09/30/20 12:34 AM
Surr: 1,2-Dichloroethane-d4	109	0	72-119		%REC	20	09/30/20 12:34 AM
Surr: 4-Bromofluorobenzene	99.5	0	76-119		%REC	20	09/30/20 12:34 AM
Surr: Dibromofluoromethane	94.4	0	85-115		%REC	20	09/30/20 12:34 AM
Surr: Toluene-d8	98.3	0	81-120		%REC	20	09/30/20 12:34 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-08
Project:	Empire ABO	**Lab ID:**	2009181-09
Project No:	06-0141-06	**Collection Date:**	09/23/20 09:15 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	0.00110	0.000300	0.00100		mg/L	1	09/29/20 10:10 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 10:10 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 10:10 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 10:10 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	09/29/20 10:10 PM
Surr: 4-Bromofluorobenzene	102	0	76-119		%REC	1	09/29/20 10:10 PM
Surr: Dibromofluoromethane	95.9	0	85-115		%REC	1	09/29/20 10:10 PM
Surr: Toluene-d8	98.2	0	81-120		%REC	1	09/29/20 10:10 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	DUP-2
Project:	Empire ABO	**Lab ID:**	2009181-10
Project No:	06-0141-06	**Collection Date:**	09/23/20 11:00 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	0.000934	0.000300	0.00100	J	mg/L	1	09/29/20 10:34 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 10:34 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 10:34 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 10:34 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	09/29/20 10:34 PM
Surr: 4-Bromofluorobenzene	102	0	76-119		%REC	1	09/29/20 10:34 PM
Surr: Dibromofluoromethane	95.8	0	85-115		%REC	1	09/29/20 10:34 PM
Surr: Toluene-d8	98.6	0	81-120		%REC	1	09/29/20 10:34 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-02
Project:	Empire ABO	**Lab ID:**	2009181-11
Project No:	06-0141-06	**Collection Date:**	09/23/20 09:35 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	0.00217	0.000300	0.00100		mg/L	1	09/29/20 10:58 PM
Ethylbenzene	0.000417	0.000300	0.00100	J	mg/L	1	09/29/20 10:58 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 10:58 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 10:58 PM
Surr: 1,2-Dichloroethane-d4	112	0	72-119		%REC	1	09/29/20 10:58 PM
Surr: 4-Bromofluorobenzene	99.7	0	76-119		%REC	1	09/29/20 10:58 PM
Surr: Dibromofluoromethane	95.1	0	85-115		%REC	1	09/29/20 10:58 PM
Surr: Toluene-d8	97.2	0	81-120		%REC	1	09/29/20 10:58 PM

Qualifiers:					
	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-20
Project:	Empire ABO	**Lab ID:**	2009181-12
Project No:	06-0141-06	**Collection Date:**	09/23/20 09:50 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	0.000625	0.000300	0.00100	J	mg/L	1	09/29/20 11:22 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 11:22 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 11:22 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 11:22 PM
Surr: 1,2-Dichloroethane-d4	113	0	72-119		%REC	1	09/29/20 11:22 PM
Surr: 4-Bromofluorobenzene	99.6	0	76-119		%REC	1	09/29/20 11:22 PM
Surr: Dibromofluoromethane	96.1	0	85-115		%REC	1	09/29/20 11:22 PM
Surr: Toluene-d8	97.5	0	81-120		%REC	1	09/29/20 11:22 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-12
Project:	Empire ABO	**Lab ID:**	2009181-13
Project No:	06-0141-06	**Collection Date:**	09/23/20 10:40 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	0.000332	0.000300	0.00100	J	mg/L	1	09/29/20 11:46 PM
Ethylbenzene	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 11:46 PM
Toluene	<0.000600	0.000600	0.00200		mg/L	1	09/29/20 11:46 PM
Total Xylenes	<0.000300	0.000300	0.00100		mg/L	1	09/29/20 11:46 PM
Surr: 1,2-Dichloroethane-d4	110	0	72-119		%REC	1	09/29/20 11:46 PM
Surr: 4-Bromofluorobenzene	100	0	76-119		%REC	1	09/29/20 11:46 PM
Surr: Dibromofluoromethane	96.1	0	85-115		%REC	1	09/29/20 11:46 PM
Surr: Toluene-d8	98.1	0	81-120		%REC	1	09/29/20 11:46 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *02-Oct-20*

CLIENT:	Larson & Associates	**Client Sample ID:**	MW-22
Project:	Empire ABO	**Lab ID:**	2009181-14
Project No:	06-0141-06	**Collection Date:**	09/23/20 10:55 AM
Lab Order:	2009181	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
8260 WATER VOLATILES BY GC/MS		**SW8260D**					Analyst: **SNM**
Benzene	2.63	0.00600	0.0200		mg/L	20	09/30/20 12:10 AM
Ethylbenzene	0.713	0.00600	0.0200		mg/L	20	09/30/20 12:10 AM
Toluene	<0.0120	0.0120	0.0400		mg/L	20	09/30/20 12:10 AM
Total Xylenes	0.362	0.00600	0.0200		mg/L	20	09/30/20 12:10 AM
Surr: 1,2-Dichloroethane-d4	109	0	72-119		%REC	20	09/30/20 12:10 AM
Surr: 4-Bromofluorobenzene	101	0	76-119		%REC	20	09/30/20 12:10 AM
Surr: Dibromofluoromethane	94.8	0	85-115		%REC	20	09/30/20 12:10 AM
Surr: Toluene-d8	98.3	0	81-120		%REC	20	09/30/20 12:10 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc. **Date:** *02-Oct-20*

CLIENT: Larson & Associates
Work Order: 2009181
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_200929B

The QC data in batch 98043 applies to the following samples: 2009181-01A, 2009181-02A, 2009181-03A, 2009181-04A, 2009181-05A, 2009181-06A, 2009181-07A, 2009181-08A, 2009181-09A, 2009181-10A, 2009181-11A, 2009181-12A, 2009181-13A, 2009181-14A

Sample ID: **LCS-98043** Batch ID: **98043** TestNo: **SW8260D** Units: **mg/L**
SampType: **LCS** Run ID: **GCMS5_200929B** Analysis Date: **9/29/2020 4:32:00 PM** Prep Date: **9/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0261	0.00100	0.0232	0	112	81	122			
Ethylbenzene	0.0248	0.00100	0.0232	0	107	80	120			
Toluene	0.0260	0.00200	0.0232	0	112	80	120			
Total Xylenes	0.0745	0.00100	0.0696	0	107	80	120			
Surr: 1,2-Dichloroethane-d4	213		200.0		107	72	119			
Surr: 4-Bromofluorobenzene	194		200.0		97.2	76	119			
Surr: Dibromofluoromethane	194		200.0		97.2	85	115			
Surr: Toluene-d8	190		200.0		95.0	81	120			

Sample ID: **MB-98043** Batch ID: **98043** TestNo: **SW8260D** Units: **mg/L**
SampType: **MBLK** Run ID: **GCMS5_200929B** Analysis Date: **9/29/2020 5:20:00 PM** Prep Date: **9/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	<0.000300	0.00100								
Ethylbenzene	<0.000300	0.00100								
Toluene	<0.000600	0.00200								
Total Xylenes	<0.000300	0.00100								
Surr: 1,2-Dichloroethane-d4	216		200.0		108	72	119			
Surr: 4-Bromofluorobenzene	202		200.0		101	76	119			
Surr: Dibromofluoromethane	189		200.0		94.3	85	115			
Surr: Toluene-d8	194		200.0		97.1	81	120			

Sample ID: **2009176-01AMS** Batch ID: **98043** TestNo: **SW8260D** Units: **mg/L**
SampType: **MS** Run ID: **GCMS5_200929B** Analysis Date: **9/30/2020 12:58:00 AM** Prep Date: **9/29/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0227	0.00100	0.0232	0	98.0	81	122			
Ethylbenzene	0.0213	0.00100	0.0232	0	91.7	80	120			
Toluene	0.0224	0.00200	0.0232	0	96.7	80	120			
Total Xylenes	0.0638	0.00100	0.0696	0	91.6	80	120			
Surr: 1,2-Dichloroethane-d4	216		200.0		108	72	119			
Surr: 4-Bromofluorobenzene	193		200.0		96.7	76	119			
Surr: Dibromofluoromethane	193		200.0		96.5	85	115			
Surr: Toluene-d8	189		200.0		94.6	81	120			

Qualifiers:				
	B	Analyte detected in the associated Method Blank	DF	Dilution Factor
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
	RL	Reporting Limit	S	Spike Recovery outside control limits
	J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Larson & Associates
Work Order: 2009181
Project: Empire ABO

ANALYTICAL QC SUMMARY REPORT

RunID: GCMS5_200929B

Sample ID: **2009176-01AMSD** Batch ID: **98043** TestNo: **SW8260D** Units: **mg/L**
SampType: **MSD** Run ID: **GCMS5_200929B** Analysis Date: **9/30/2020 1:22:00 AM** Prep Date: **9/29/2020**

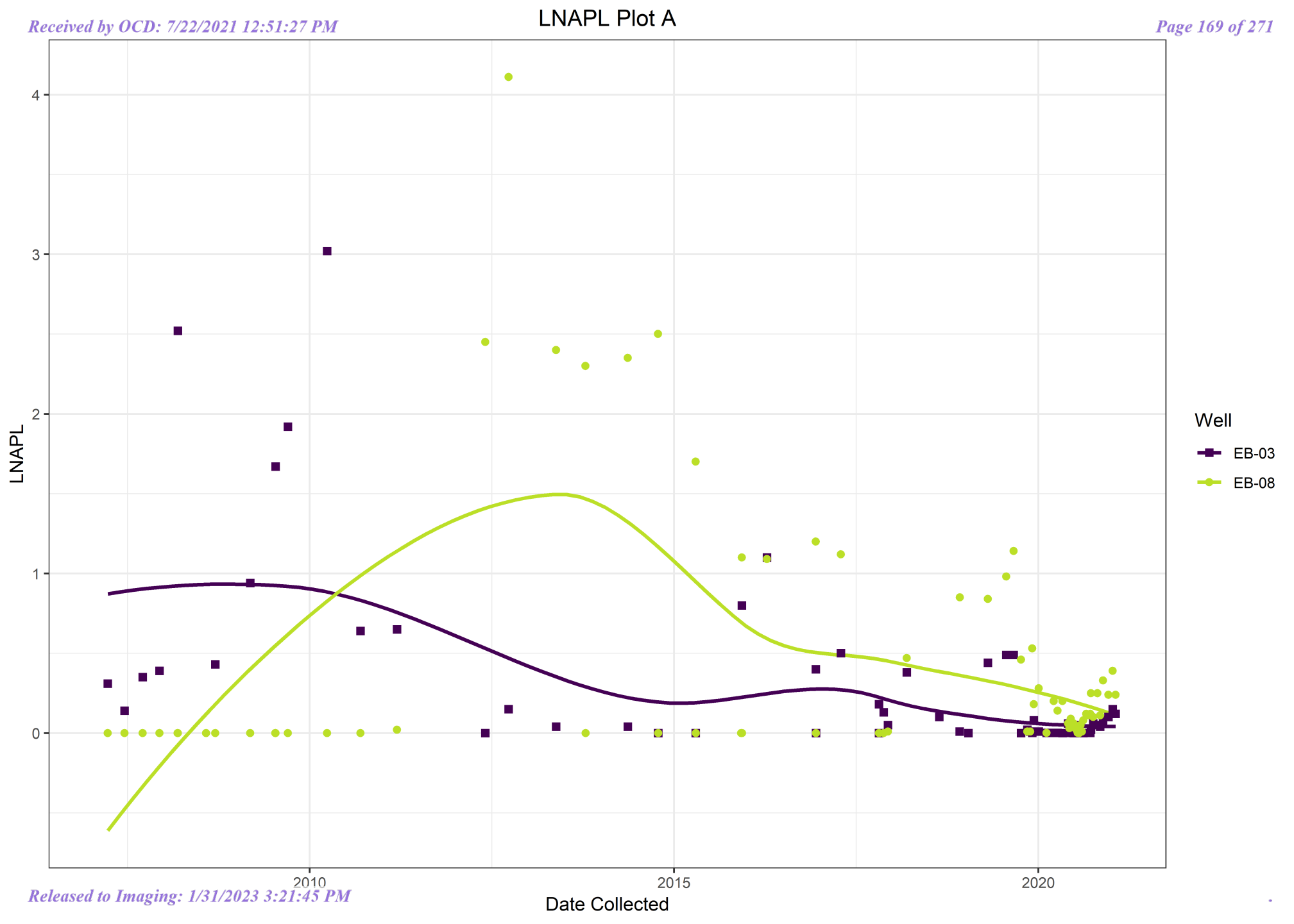
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.0225	0.00100	0.0232	0	97.0	81	122	0.990	20	
Ethylbenzene	0.0212	0.00100	0.0232	0	91.3	80	120	0.457	20	
Toluene	0.0222	0.00200	0.0232	0	95.6	80	120	1.14	20	
Total Xylenes	0.0629	0.00100	0.0696	0	90.4	80	120	1.32	20	
Surr: 1,2-Dichloroethane-d4	215		200.0		108	72	119	0	0	
Surr: 4-Bromofluorobenzene	195		200.0		97.4	76	119	0	0	
Surr: Dibromofluoromethane	192		200.0		96.1	85	115	0	0	
Surr: Toluene-d8	190		200.0		95.0	81	120	0	0	

Qualifiers:

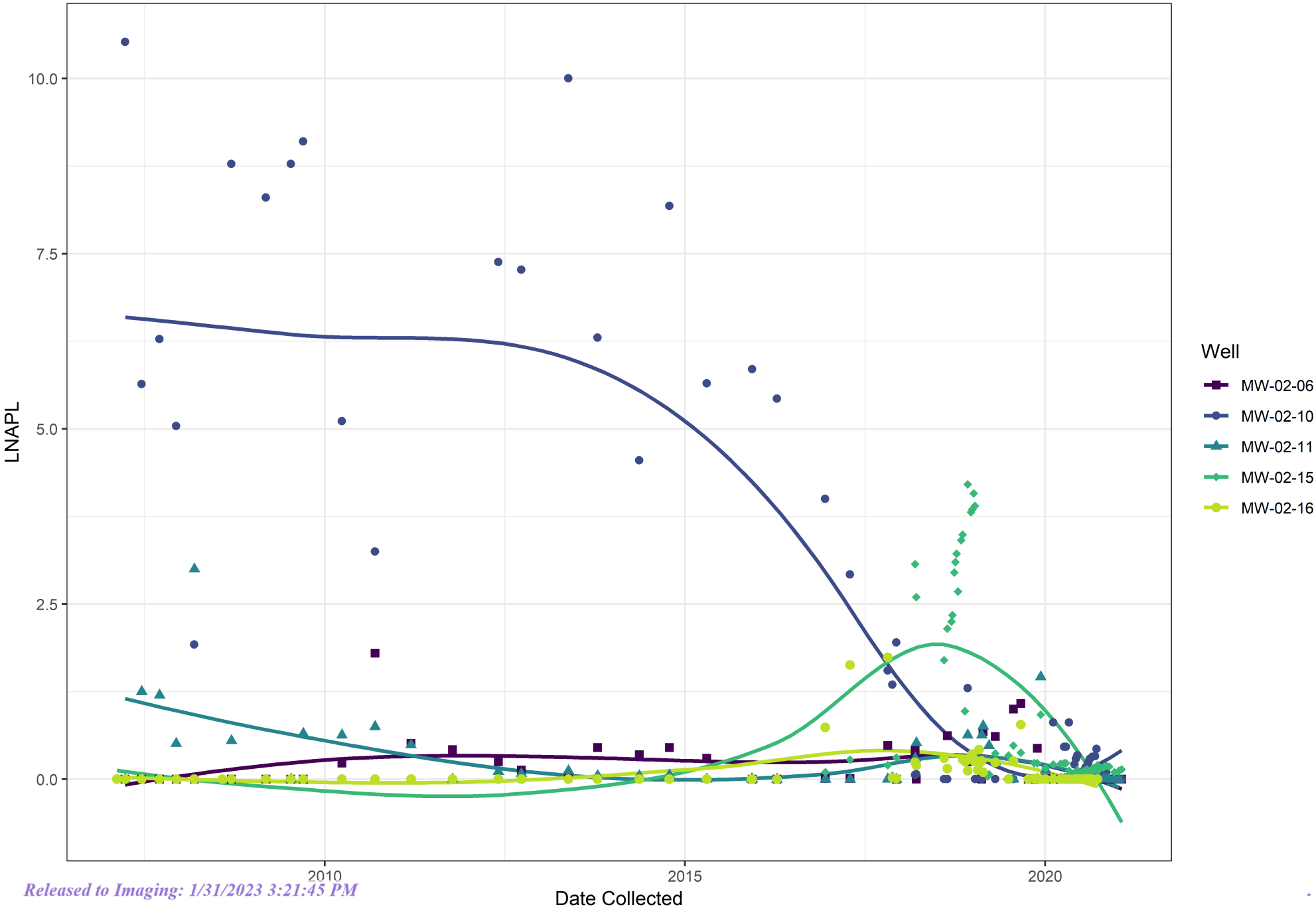
B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

Appendix D

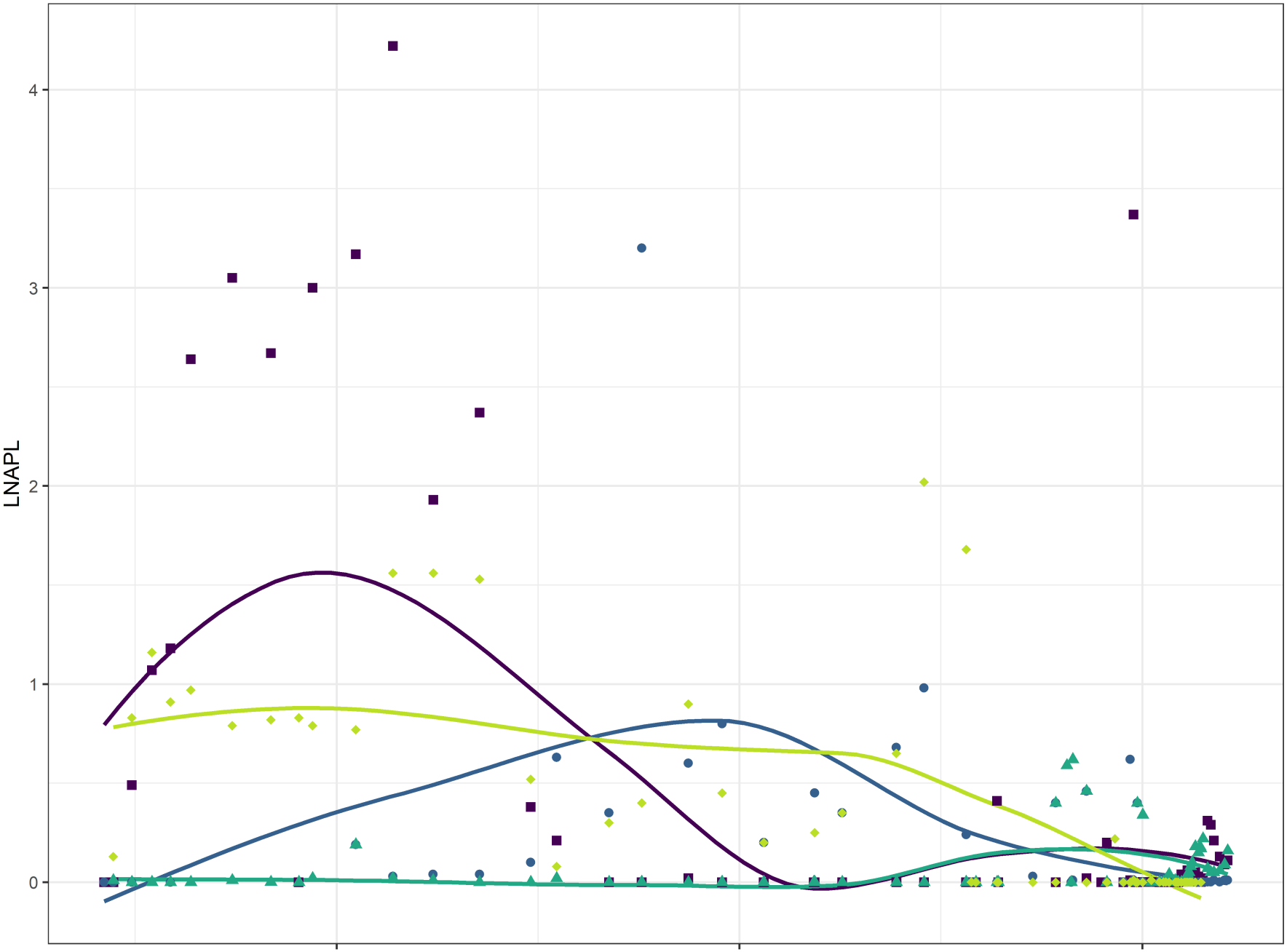
Control Charts


LNAPL Plot A
LNAPL
4
3
2
1
0
2010
2015
2020
Date Collected
Well
EB-03
EB-08

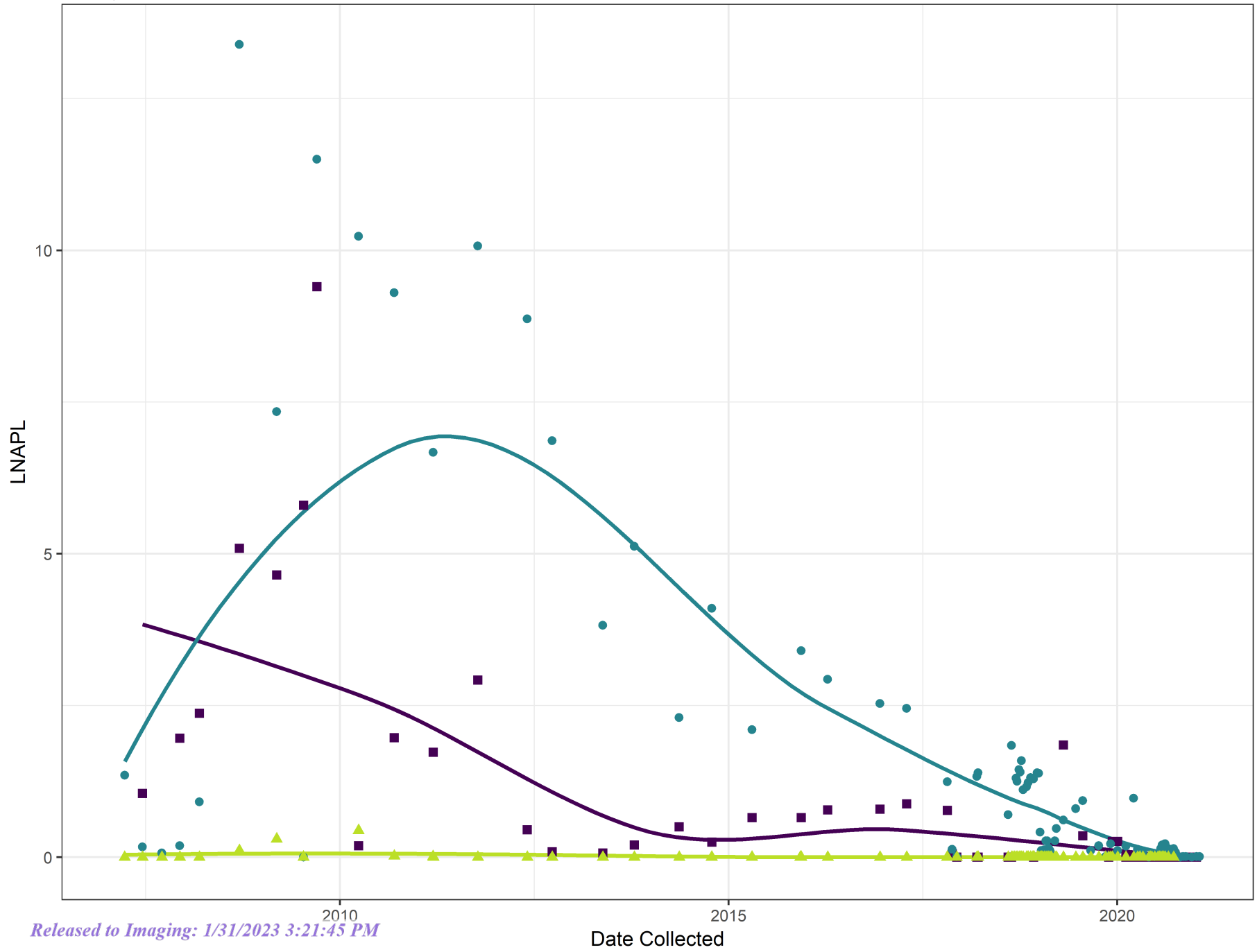
LNAPL Plot B


LNAPL
10.0
7.5
5.0
2.5
0.0
2010
2015
2020
Date Collected
Well
MW-02-06
MW-02-10
MW-02-11
MW-02-15
MW-02-16

LNAPL Plot C


LNAPL
4
3
2
1
0
2010
2015
2020
Date Collected
Well
MW-03
MW-03-02
MW-03-03
MW-03-04

LNAPL Plot D


LNAPL
10
5
0
2010
2015
2020
Date Collected
Well
MW-04
MW-06
MW-07

LNAPL Plot E

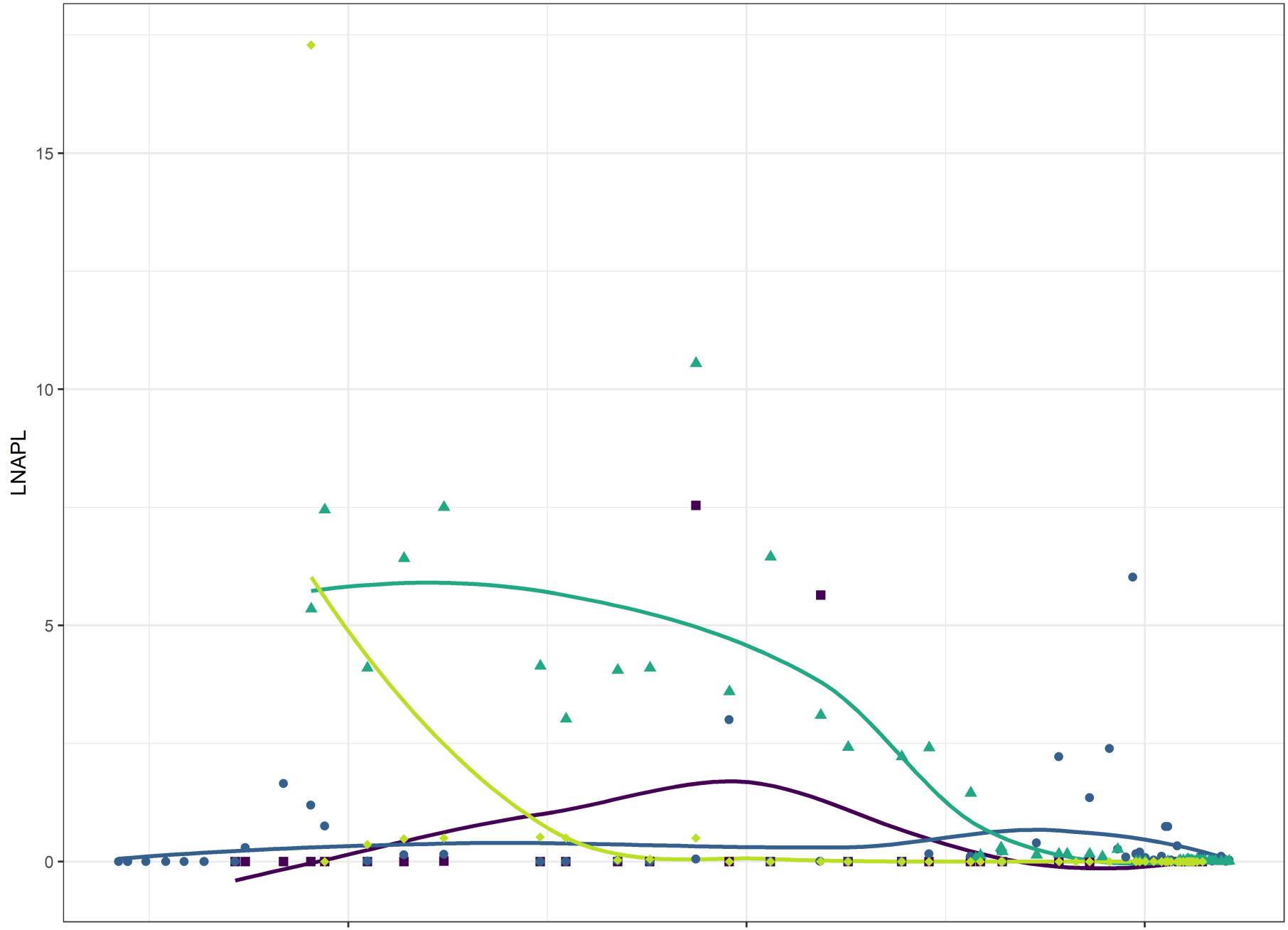

LNAPL
15
10
5
0
2010
2015
2020
Date Collected
Well
MW-13
MW-14
MW-19
MW-20

Chart B

Staging Area A

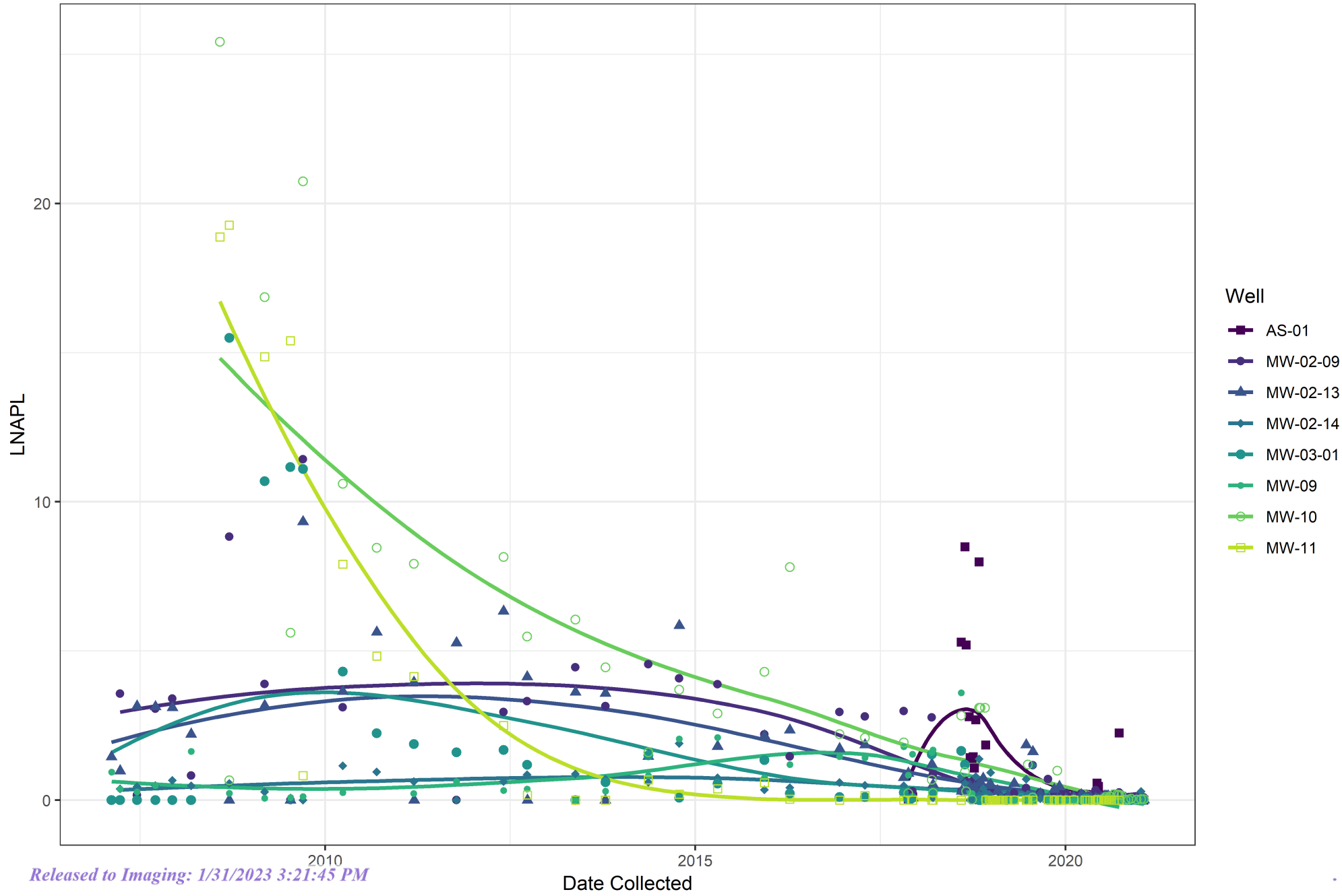
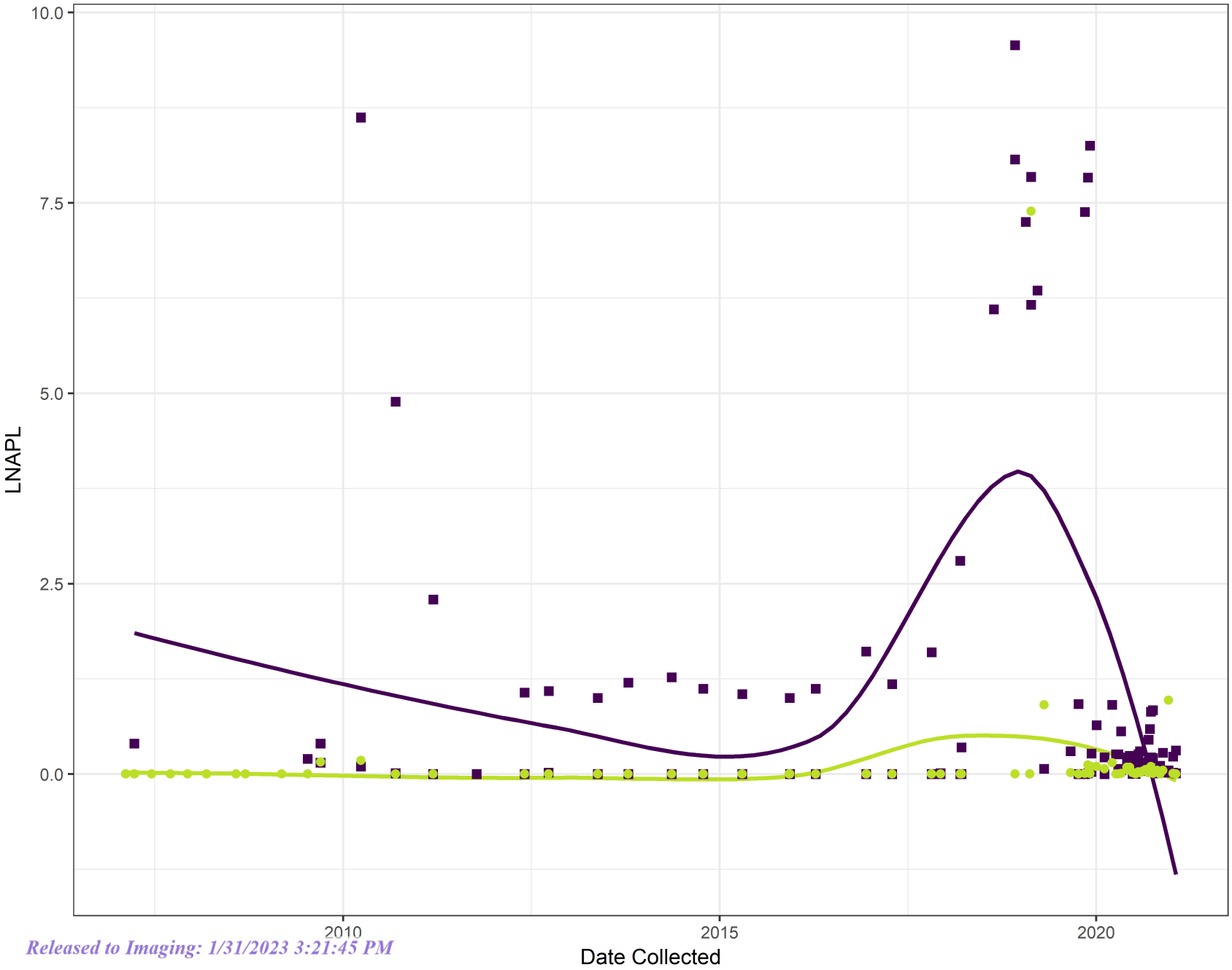
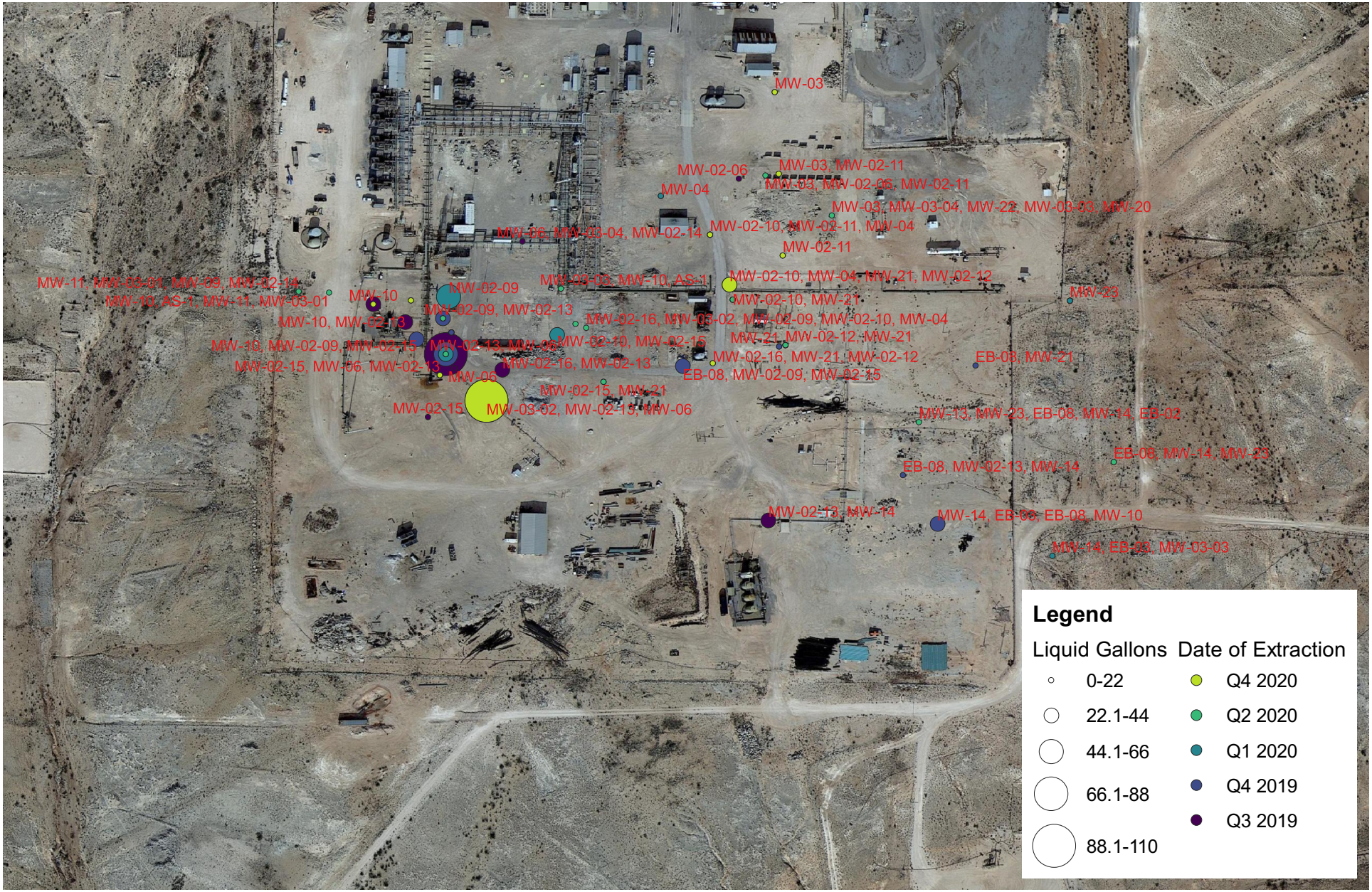


Chart C

Staging Area B



Extraction Over Time, Liquid Gallons



Note: Extractions from multiple wells are depicted at the center point between these wells (the midpoint between MW-03 and MW-02-11, for example).

Appendix E

EcoVac Reports

ECOVAC SERVICES
The World Leader in Mobile Dual-Phase/Multi-Phase Extraction
Patented SURFAC®/COSOLV®/ISCO-EFR®
Treatability Testing/Research and Development

August 22, 2019

Mr. Mark Larson
President
Larson & Associates, Inc.
507 N Marienfeld St #205
Midland, Texas 79701-4356
Mark@laenvironmental.com

Subject: **Enhanced Fluid Recovery (EFR®) Report**
AKA Energy
Former Empire Abo Gas Processing Plant
Eddy County
Artesia, New Mexico

Dear Mr. Larson:

Please find attached the data summary for the EFR® remediation conducted at the subject site on August 05 thru 10, 2019. The EFR® remediation was implemented in wells MW-02-09, MW-02-13, MW-06, MW-10, and MW-14. EFR® is a mobile multi-phase/dual-phase extraction technology shown to be effective for mass removal of hydrocarbons in the soils/groundwater.

August 05, 2019

EFR® was performed for 3 hours at well MW-02-09, and for 4 hours at well MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-09 and MW-02-13, at a thickness of 0.39' and 0.57', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 89 pounds of petroleum hydrocarbons (approximately 14.6 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 05, 2019.

The hydrocarbon removal rate varied from a high of 37.2 pounds per hour at the beginning of the MW-02-13 event, to a low of 0.2 pounds per hour in the middle of the MW-02-09 event. The

hydrocarbon removal rate was very low during the MW-02-09 event, and was high throughout the MW-02-13 event. The removal rate decreased during the MW-02-13 event, and was variable during the MW-02-09 event.

Vapor concentrations varied from a high of 60,000 parts per million by volume (PPM_V) at the beginning of the MW-02-13 event, to a low of 380 PPM_V in the middle of the MW-02-09 event. The concentration was very low throughout the MW-02-09 event, and high throughout the MW-02-13 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	27 to 28 inches of mercury
MW-02-09	5 to 6 inches of mercury
MW-02-13	9 to 10 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-09	-1.44 feet	Extraction Well
MW-02-13	-1.28 feet	Extraction Well

Groundwater Extraction

A total of 408 gallons of fluid were extracted from the well during this 7-hour event. The fluids were off-loaded to an aboveground tank on-site.

August 06, 2019

EFR® was performed for 4 hours at well MW-02-13, and for 4.5 hours at well MW-06 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-13 and MW-06, at a thickness of 0.28' and 0.58', respectively, prior to conducting this EFR® event. SPH was only detected in well MW-06, at a thickness of 0.03', upon conclusion of this event.

A calculated total of 227 pounds of petroleum hydrocarbons (approximately 37.5 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 06, 2019. In addition, 90 gallons of liquid phase gas was gauged in the truck at the end of extraction on August 06, 2019. The liquid phase was from August 5 & 6, 2019, probably from wells MW-02-13 and MW-06.

The hydrocarbon removal rate varied from a high of 40.5 pounds per hour near the end of the MW-06 event, to a low of 12.4 pounds per hour at the beginning of the MW-02-13 event. The hydrocarbon removal rate was high during the MW-02-13 event, and was very high throughout the MW-06 event. The removal rate was relatively steady during the MW-02-13 event, and increased slightly during the MW-06 event.

Vapor concentrations varied from a high of 60,000 parts per million by volume (PPM_V) near the end of the MW-06 event, to a low of 20,000 PPM_V at the beginning of the MW-02-13 event. The concentration was high throughout the MW-02-13 event, and very high throughout the MW-06 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	25 to 28 inches of mercury
MW-02-13	8 to 10 inches of mercury
MW-06	20 to 24 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-13	-0.84 feet	Extraction Well
MW-06	-3.95 feet	Extraction Well

Groundwater Extraction

A total of 111 gallons of fluid were extracted from the well during this 8.5-hour event. The fluids were off-loaded to an aboveground tank on-site.

August 07, 2019

EFR® was performed for 7.75 hours at well MW-06 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-06, at a thickness of 0.05', prior to conducting this EFR® event. SPH was not detected in well MW-06 upon conclusion of this event.

A calculated total of 248 pounds of petroleum hydrocarbons (approximately 40.9 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 07, 2019. In addition, 20 gallons of liquid phase gas from MW-06 was gauged in the truck at the end of extraction on August 07, 2019.

The hydrocarbon removal rate varied from a high of 40.2 pounds per hour near the beginning of the event, to a low of 23.3 pounds per hour at the beginning of the event. The hydrocarbon removal rate was very high during throughout the MW-06 event. The removal rate was relatively steady during the MW-06 event.

Vapor concentrations varied from a high of 62,000 parts per million by volume (PPM_V) near the beginning of the event, to a low of 36,000 PPM_V at the beginning of the event. The concentration was very high throughout the MW-06 event.

The vacuum reading recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	26 to 28 inches of mercury
MW-06	20 to 25 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-3.44 feet	Extraction Well

Groundwater Extraction

A total of 118 gallons of fluid were extracted from the well during this 7.75-hour event. The fluids were off-loaded to an aboveground tank on-site.

August 08, 2019

EFR® was performed for 9.0 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-10, at a thickness of 0.44', prior to conducting this EFR® event. SPH was not detected in well MW-10 upon conclusion of this event.

A calculated total of 110 pounds of petroleum hydrocarbons (approximately 18.1 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 08, 2019.

The hydrocarbon removal rate varied from a high of 20.3 pounds per hour near the beginning of the event, to a low of 7.1 pounds per hour near the middle of the event. The hydrocarbon removal rate was high throughout the MW-10 event. The removal rate decreased initially, then increased during the MW-10 event.

Vapor concentrations varied from a high of 72,000 parts per million by volume (PPM_V) near the beginning of the event, to a low of 36,000 PPM_V in the middle, and at the end of the event. The concentration was very high throughout the MW-10 event.

The vacuum reading recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	21 to 30 inches of mercury
MW-10	5 to 9 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-10	-0.36 feet	Extraction Well

Groundwater Extraction

A total of 29 gallons of fluid were extracted from the well during this 9.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

August 09, 2019

EFR® was performed for 2 hours at well MW-06, and for 7.0 hours at wells MW-06 and MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-06 and MW-02-13, at a thickness of 0.05' and 0.05', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 115 pounds of petroleum hydrocarbons (approximately 19.0 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 09, 2019.

The hydrocarbon removal rate varied from a high of 26.8 pounds per hour near the beginning of the MW-06 event, to a low of 5.9 pounds per hour at the end of the MW-06 and MW-02-13 event. The hydrocarbon removal rate was high during the MW-06 event, and was initially high throughout the MW-06 and MW-02-13 event.

Vapor concentrations varied from a high of 70,000 parts per million by volume (PPM_V) in the middle of the MW-06 event, to a low of 14,000 PPM_V at the end of the MW-06 and MW-02-13 event. The concentration was very high throughout the MW-06 event, and high throughout the MW-06 and MW-02-13 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	29 inches of mercury
MW-06	12 to 16 inches of mercury
MW-02-13	16 to 18 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-3.50 feet	Extraction Well
MW-02-13	-0.47 feet	Extraction Well

Groundwater Extraction

A total of 125 gallons of fluid were extracted from the well during this 9.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

August 10, 2019

EFR® was performed for 2 hours at well MW-14, and for ~3.0 hours at well MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-14 and MW-02-13, at a thickness of 2.37' and 0.02', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 17 pounds of petroleum hydrocarbons (approximately 2.8 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on August 10, 2019. In addition, 30 gallons of liquid phase gas was gauged in the truck upon completion of the MW-14 event.

The hydrocarbon removal rate varied from a high of 8.1 pounds per hour at the beginning of the MW-14 event, to a low of 0.6 pounds per hour at the end of the MW-14 event. The hydrocarbon removal rate was low during both events.

Vapor concentrations varied from a high of 16,000 parts per million by volume (PPM_V) at the beginning of the MW-14 event, to a low of 1,000 PPM_V in the middle of the MW-14, and in the middle of the MW-02-13 event. The concentration was relatively low during both events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	23 to 29 inches of mercury
MW-14	0 inches of mercury
MW-02-13	13 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-14	-1.34 feet	Extraction Well
MW-02-13	-0.12 feet	Extraction Well

Groundwater Extraction

A total of 69 gallons of fluid were extracted from the well during this ~5.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

Hydrocarbon Mass Removal Summary

A significant amount of hydrocarbon mass in vapor form and liquid form was removed during this 6-day event. The following table summarizes the hydrocarbon mass removal totals.

Table: Hydrocarbon Mass Removal Summary

	Hydrocarbon Mass Extraction				
Wells	Date	Vapor lbs.	Vapor Equivalent Gallons	Liquid gallons	**Total Gallons**
MW-02-09 MW-02-13	08/05/19	89	14.6	(see below*)	**14.6**
MW-02-13 MW-06	08/06/19	227	37.5	90*	**127.5**
MW-06	08/07/19	248	40.9	20	**60.9**
MW-10	08/08/19	110	18.1	0	**18.1**
MW-06 MW-02-13	08/09/19	115	19.0	0	**19.0**
MW-14 MW-02-13	08/10/19	17	2.8	30	**32.8**
	Totals:	806	132.9	140	**272.9**

Note:

* - combined 08/05/19 and 08/06/19

CONCLUSIONS

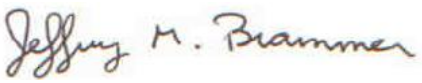
1. A significant amount of hydrocarbon mass was removed via vapor extraction 806 lbs. equivalent to 132.9 gallons), in addition to 140 gallons of liquid phase gasoline.
2. A significant mass of hydrocarbon appeared to be in the area of MW-10, MW-02-13, and MW-06.
3. Vapor concentrations remained high throughout the event(s), except on August 10, 2019, in wells MW-14 and MW-02-13.
4. A significant amount (30 gallons), and proportion (75%) of liquid hydrocarbon was extracted from MW-14 on August 10, 2019.
5. A total of 860 gallons of fluids (720 gallons of water and 140 gallons of liquid phase gas) was extracted and off-loaded to an on-site tank.

RECOMMENDATIONS

EcoVac will mobilize to the site on September 3, 2019, and start a second phase of extraction on September 04, 2019.

Thank you for this opportunity to team with Larson & Associates, Inc. in serving the environmental needs of your clients. We look forward to working with you again in the future to provide innovative and cost effective environmental solutions at this and other sites.

Sincerely,
EcoVac Services



Jeffrey M. Brammer, PG
Western Regional Manager, Hydrogeologist

Attachments:

1. Field Data Sheets

ATTACHMENT 1

FIELD DATA SHEETS

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/05/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-09	MW-02-13							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	9:15														
MW-02-09	9:30	27	5								2,000	2100	103	1.2	0.3
	9:45	27	5								1,000	2300	113	0.6	0.2
	10:00	27	5								800	2300	113	0.5	0.1
	10:15	27	5								380	2200	108	0.2	0.1
	10:45	27	5								500	2300	113	0.3	0.2
	11:15	27	5								3,000	2300	113	1.9	1.0
	12:15	27	6								1,200	2400	118	0.8	0.8
	12:30														
MW-02-13	12:45	28		8							60,000	2200	108	37.2	9.3
	13:00	28		9							54,000	2200	108	33.5	8.4
	13:15	28		9							54,000	2400	118	36.5	9.1
	13:30	28		9							46,000	2400	118	31.1	7.8
	14:00	28		10							36,000	2400	118	24.3	12.2
	14:30	28		10							26,000	2400	118	17.6	8.8
	15:30	28		10							24,000	2500	123	16.9	16.9
	16:30	28		10							20,000	2400	118	13.5	13.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-09	4"		36.28	36.67	0.39	-	37.78	0.00	-1.44
MW-02-13	4"		47.23	47.80	0.57	-	48.60	0.00	-1.28

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-09	0 (closed)	36'/35'	Hydrocarbons (vapor):	89	pounds
Truck Operator:	Brammer	MW-02-13	0 (closed)	47'/48'/49'	Hydrocarbons (liquid):		gallons
Truck No.:	150				Total Hydrocarbons:	14.6	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	408	gallons

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Pump Information	
Time:	9:15-16:30
# Pumps:	2
RPMs:	1,000

Notes :
1. At 9:15 raised the stinger 1'
2. At 14:30 lowered stinger 1', at 15:30 lowered an additon 1'
3. Emulsion in truck at the end of the day, gauge 08/06/19

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/06/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-13	MW-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:20														
MW-02-13	7:35	25	8								20,000	2200	108	12.4	3.1
44 gals	7:50	26	9								24,000	2300	113	15.5	3.9
	8:05	26	9								24,000	2300	113	15.5	3.9
	8:20	26	9								24,000	2400	118	16.2	4.1
	8:50	26	9								28,000	2400	118	18.9	9.5
	9:20	26	9								26,000	2400	118	17.6	8.8
	10:20	27	10								26,000	2400	118	17.6	17.6
	11:20	27	10								22,000	2400	118	14.9	14.9
	11:30														
MW-06	11:45	28		20							40,000	2300	113	25.9	6.5
67 gals	12:00	28		23							40,000	2400	118	27.0	6.8
	12:15	28		24							38,000	2400	118	25.7	6.4
	12:30	28		24							36,000	2400	118	24.3	6.1
	13:00	28		24							56,000	2400	118	37.8	18.9
	13:30	28		24							54,000	2400	118	36.5	18.2
	14:30	28		24							60,000	2400	118	40.5	40.5
	15:30	28		24							58,000	2400	118	39.2	39.2
	16:00	28		24							56,000	2400	118	37.8	18.9

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-13	4"		48.01	48.29	0.28	-	48.89	0.00	-0.84
MW-06	4"		46.72	47.30	0.58	50.75	50.78	0.03	-3.95
MW-02-09	4"		36.70	36.79	0.09				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-13	0 (closed)	50'	Hydrocarbons (vapor):	227	pounds
Truck Operator:	Brammer	MW-06	0 (closed)	48'	Hydrocarbons (liquid):	90.0	gallons
Truck No.:	150				Total Hydrocarbons:	127.5	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	111	gallons

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Pump Information	
Time:	7:20-16:00
# Pumps:	2
RPMs:	1,000

Notes :
1. 90 gallons of liquid phase NAPL from 08/05 & 06/19, measured am 08/07/19

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/07/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-06								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	6:35														
MW-06	6:50	26	20								36,000	2300	113	23.3	5.8
	7:15														
MW-06	7:30	28	23								62,000	2300	113	40.2	10.0
"	7:45	28	23								60,000	2350	115	39.7	9.9
"	8:00	28	23								56,000	2350	115	37.1	9.3
"	8:15	28	23								54,000	2300	113	35.0	8.7
"	8:45	28	23								48,000	2200	108	29.7	14.9
"	9:15	28	24								50,000	2200	108	31.0	15.5
"	10:15	28	24								46,000	2200	108	28.5	28.5
"	10:45	28	25								60,000	2200	108	37.2	18.6
"	11:15	28	25								52,000	2200	108	32.2	16.1
"	12:15	28	25								48,000	2200	108	29.7	29.7
"	13:15	28	25								48,000	2400	118	32.4	32.4
"	14:45	28	25								50,000	2300	113	32.4	48.6

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-06	4"		48.59	48.64	0.05	-	52.04	0.00	-3.44
MW-02-13	4"		48.41	48.54	0.13				
MW-02-09	4"		36.52	36.62	0.10				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-06	0 (closed)	50'/53'	Hydrocarbons (vapor):	248	pounds
Truck Operator:	Brammer				Hydrocarbons (liquid):	20.0	gallons
Truck No.:	150				Total Hydrocarbons:	60.9	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	118	gallons

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Pump Information	
Time:	6:35-14:45
# Pumps:	2
RPMs:	1,000

Notes :
1. Gauged truck for product first task of morning, 90 gallons of the 519 gallons in the truck is liquid phase NAPL
2. lowered stinger at 10:20 to 53'

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/08/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-10								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:05														
MW-10	7:35	21	8								66,000	1000	49	18.6	4.6
"	7:50	23	9								72,000	1000	49	20.3	5.1
"	8:05	23	9								60,000	900	44	15.2	3.8
"	8:35	23	9								60,000	700	34	11.8	5.9
"	9:05	23	9								52,000	700	34	10.2	5.1
"	10:05	23	9								44,000	700	34	8.7	8.7
"	11:05	23	9								43,000	700	34	8.5	8.5
"	12:05	23	9								36,000	700	34	7.1	7.1
"	12:35	25	5								38,000	1500	74	16.1	8.0
"	13:05	25	5								44,000	1500	74	18.6	9.3
"	14:05	25	6								40,000	1300	64	14.6	14.6
"	15:05	25	6								38,000	1300	64	13.9	13.9
"	16:05	30	7								36,000	1500	74	15.2	15.2

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-10	4"		52.34	52.78	0.44	-	52.77	0.00	-0.36
MW-02-14	4"		67.73	67.80	0.07				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-10	0 (closed)	54'
Truck Operator:	Brammer			
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	110	pounds
Hydrocarbons (liquid):		gallons
Total Hydrocarbons:	18.1	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	29	gallons

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Pump Information	
Time:	7:05-16:55
# Pumps:	2
RPMs:	1,000

Notes :
Second pump added at 12:05

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/09/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:25	Inlet	MW-06	MW-02-13							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-06	7:40	29	12								54,000	1300	64	19.8	4.9
"	7:55	29	13								68,000	1300	64	24.9	6.2
"	8:10	29	14								68,000	1400	69	26.8	6.7
"	8:25	29	14								70,000	1300	64	25.6	6.4
"	8:55	29	14								60,000	1300	64	22.0	11.0
"	9:25	29	15								66,000	1300	64	24.2	12.1
MW-06 &	9:55	29	15	17							56,000	1300	64	20.5	10.2
MW-02-13	10:25	29	15	17							46,000	1300	64	16.8	8.4
"	11:25	29	15	18							30,000	1300	64	11.0	11.0
"	12:25	29	15	17							22,000	1400	69	8.7	8.7
"	13:25	29	15	16							20,000	1500	74	8.4	8.4
"	14:25	29	15	17							18,000	1500	74	7.6	7.6
"	15:25	29	15	17							18,000	1500	74	7.6	7.6
	16:25	29	16	17							14,000	1500	74	5.9	5.9

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-06	4"		48.58	48.63	0.05	-	52.09	0.00	-3.50
MW-02-13	4"	~50	48.43	48.48	0.05	-	48.91	0.00	-0.47
MW-02-09	4"		36.34	36.49	0.15				
MW-10	4"		-	52.44	0.00				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-06	0 (closed)	53'	Hydrocarbons (vapor):	115	pounds
Truck Operator:	Brammer	MW-02-13	0 (closed)	50'	Hydrocarbons (liquid):		gallons
Truck No.:	150				Total Hydrocarbons:	19.0	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	125	gallons

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Pump Information	
Time:	7:25-16:25
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 08/10/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-14	MW-02-13							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:35														
MW-14	7:50	29	0								16,000	1800	88	8.1	2.0
"	8:05	29	0								2,000	1900	93	1.1	0.3
"	8:20	25	0								1,200	2700	132	0.9	0.2
"	8:35	25	0								1,000	2700	132	0.8	0.2
"	9:05	24	0								1,600	2600	127	1.2	0.6
"	9:35	23	0								1,200	1800	88	0.6	0.3
	10:10														
MW-02-13	10:25	28		13							4,000	2600	127	2.9	0.7
"	10:40	28		13							8,000	3000	147	6.8	1.7
"	10:55	28		13							1,000	2700	132	0.8	0.2
"	11:10	28		13							4,000	2600	127	2.9	0.7
"	11:40	28		13							8,000	2600	127	5.9	2.9
"	12:10	28		13							10,000	2500	123	7.0	3.5
"	13:00	28		13							6,000	2500	123	4.2	3.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-14	4"		65.76	68.13	2.37	-	67.46	0.00	-1.34
EB-03	2"		65.68	66.14	0.46	65.70	66.17	0.47	-0.02
MW-02-13	4"		48.51	48.53	0.02	-	48.63	0.00	-0.12
MW-10	4"		-	52.49	0.00				
MW-06	4"		-	50.22	0.00				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-14	0 (closed)	68'/69'
Truck Operator:	Brammer	MW-02-13	0 (closed)	50'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	17	pounds
Hydrocarbons (liquid):	30.0	gallons
Total Hydrocarbons:	32.8	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	69	gallons

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Pump Information	
Time:	7:35-13:00
# Pumps:	2
RPMs:	1,000

Notes :

1. extracted pure condensate from start to 7:35, then emulsion until 9:05, lowered stinger at 9:05 and extracted mostly water, 30 gals of product and 16 gallons of water from MW-14
2. gauged a significant vacuum in EB-03 during extraction from MW-14

ECOVAC SERVICES
The World Leader in Mobile Dual-Phase/Multi-Phase Extraction
Patented SURFAC®/COSOLV®/ISCO-EFR®
Treatability Testing/Research and Development

September 19, 2019

Mr. Mark Larson
President
Larson & Associates, Inc.
507 N Marienfeld St #205
Midland, Texas 79701-4356
Mark@laenvironmental.com

Subject: **Enhanced Fluid Recovery (EFR®) Report**
September 04 thru 14, 2019
AKA Energy
Former Empire Abo Gas Processing Plant
Eddy County
Artesia, New Mexico

Dear Mr. Larson:

Please find attached the data summary for the EFR® remediation conducted at the subject site on September 04 thru 14, 2019. The EFR® remediation was implemented in wells MW-06, MW-10, MW-14, MW-19, MW-02-06, MW-02-09, MW-02-13, MW-02-14, MW-02-15, MW-02-16, EB-03, EB-08, and MW-03-04. EFR® is a mobile multi-phase/dual-phase extraction technology shown to be effective for mass removal of hydrocarbons in the soils/groundwater.

September 04, 2019

EFR® was performed for 4 hours at well MW-10, and for 4 hours at well MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-10 and MW-02-13, at a thickness of 0.22' and 0.17', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 99 pounds of petroleum hydrocarbons (approximately 16.4 equivalent gallons of gas) in vapor concentrations, in addition to 41 gallons of liquid phase gas, were removed during this EFR® event on September 04, 2019.

The hydrocarbon removal rate varied from a high of 24.5 pounds per hour at the beginning of the MW-10 event, to a low of 4.5 pounds per hour in the middle of the MW-02-13 event. The hydrocarbon removal rate was relatively low during the MW-02-13 event, and was high throughout the MW-10 event. The removal rate decreased during the MW-10 event, and was variable during the MW-02-13 event.

Vapor concentrations varied from a high of 58,000 parts per million by volume (PPM_V) at the beginning of the MW-10 event, to a low of 10,000 PPM_V in the middle of the MW-02-13 event. The concentration was very high throughout the MW-10 event, and high throughout the MW-02-13 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 to 29 inches of mercury
MW-10	4 inches of mercury
MW-02-13	11 to 16 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-10	-0.21 feet	Extraction Well
MW-02-13	-0.27 feet	Extraction Well

Groundwater Extraction

A total of 110 gallons of fluids were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 05, 2019

EFR® was performed for 6 hours at well MW-06, and for 2 hours at well MW-02-09 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-09, at a thickness of 0.23', prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 123 pounds of petroleum hydrocarbons (approximately 20.2 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 05, 2019. In addition, 20 gallons of liquid phase gas was gauged in the truck after the event.

The hydrocarbon removal rate varied from a high of 22.3 (appears to be an anomalous reading) pounds per hour near the middle of the MW-02-09 event, to a low of 4.8 pounds per hour at the end of the MW-02-09 event. The hydrocarbon removal rate was high during the MW-06 event, and was low during the MW-02-09 event, except for the one anomalous reading. The removal rate was increased during the MW-06 event, and was relatively steady during the MW-02-09 event, except for the one anomalous reading at 14:15.

Vapor concentrations varied from a high of 56,000 parts per million by volume (PPM_V) near the end of the MW-06 event, to a low of 10,000 PPM_V for most of the MW-02-09 event. The concentration was very high throughout the MW-06 event, and high throughout the MW-02-09 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 to 30 inches of mercury
MW-06	8 to 16 inches of mercury
MW-02-09	8 to 9 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-4.78 feet	Extraction Well
MW-02-09	-0.67 feet	Extraction Well

Groundwater Extraction

A total of 432 gallons of fluids were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 06, 2019

EFR® was performed for 4 hours at well MW-02-06, for 1 hour at well MW-03-04, and for 3 hours at well MW-02-14 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-06 and MW-02-14, at a thickness of 1.01' and 1.0', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 75 pounds of petroleum hydrocarbons (approximately 12.4 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on September 06, 2019. In addition, 20 gallons of liquid phase gas was gauged in the truck at the end of the event.

The hydrocarbon removal rate varied from a high of 39.4 pounds per hour near the beginning of the MW-02-06 event, to a low of 0.1 pounds per hour at the end of the MW-02-14 event. The hydrocarbon removal rate was high during the MW-02-06 event, and low during the MW-03-04 and MW-02-14 events. The removal rate decreased during the MW-02-06 event, and was relatively steady during the MW-03-04 and MW-02-14 events.

Vapor concentrations varied from a high of greater than 100,000 parts per million by volume (PPM_V) at the beginning of the MW-02-06 event, to a low of 200 PPM_V at the end of the MW-02-14 event. The concentration was very high throughout the MW-02-06 event, and low during the MW-03-04 and MW-02-14 events.

The vacuum reading recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 to 29 inches of mercury
MW-02-06	16 to 18 inches of mercury
MW-03-04	4 inches of mercury
MW-02-14	8 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-06	-1.68 feet	Extraction Well
MW-03-04	0.04 feet	Extraction Well
MW-02-14	-1.29 feet	Extraction Well

Groundwater Extraction

A total of 266 gallons of fluids were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 07, 2019

EFR® was performed for 2 hours at well MW-02-15, and for 6 hours at well MW-02-06 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-15, at a thickness of 0.37', prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 115 pounds of petroleum hydrocarbons (approximately 18.0 equivalent gallons of gas) in vapor concentrations, in addition to 10 gallons of liquid phase gas, were removed during this EFR® event on September 07, 2019.

The hydrocarbon removal rate varied from a high of 22.3 pounds per hour near the beginning of the MW-02-06 event, to a low of 0.9 pounds per hour at the end of the MW-02-15 event. The hydrocarbon removal rate was high throughout the MW-02-06 event, and was low during the MW-02-15 event. The removal rate decreased during both events.

Vapor concentrations varied from a high of 44,000 parts per million by volume (PPM_V) near the beginning of the MW-02-06 event, to a low of 1,800 PPM_V at the end of the MW-02-15 event. The concentration was very high throughout the MW-02-06 event, and was low during the MW-02-15 event.

The vacuum reading recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 inches of mercury
MW-02-06	18 inches of mercury
MW-02-15	6 to 9 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-06	-0.43 feet	Extraction Well
MW-02-15	0.11 feet	Extraction Well

Groundwater Extraction

A total of 78 gallons of fluids were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 09, 2019

EFR® was performed for 2 hours at wells MW-14 and EB-03, for 1.25 hours at well EB-08, and for 4.25 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-14, EB-03, EB-08, and MW-10, at a thickness of 0.15', 0.44', 1.15', and 0.03', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 45 pounds of petroleum hydrocarbons (approximately 7.4 equivalent gallons of gasoline) in vapor concentrations, in addition to 21 gallons of liquid phase gas, were removed during this EFR® event on September 09, 2019.

The hydrocarbon removal rate varied from a high of 13.4 pounds per hour at the beginning of the MW-10 event, to a low of 0.6 pounds per hour at the end of the EB-08 event. The hydrocarbon removal rate was relatively high during the MW-10 event, and low during the other two events.

Vapor concentrations varied from a high of 38,000 parts per million by volume (PPM_V) at the beginning of the MW-10 event, to a low of 800 PPM_V during the EB-08 event. The concentration was high throughout the MW-10 event, and low during the other two events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	25 to 28 inches of mercury
MW-14	4 inches of mercury
EB-03	2 inches of mercury
EB-08	5 to 13 inches of mercury
MW-10	3 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-14	-0.52 feet	Extraction Well
EB-03	-2.13 feet	Extraction Well
EB-08	0.63 feet	Extraction Well
MW-10	0.18 feet	Extraction Well

Groundwater Extraction

A total of 21 gallons of fluids were extracted from the well during this 7.5-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 10, 2019

EFR® was performed for 2 hours at well MW-02-16, and for 6.0 hours at well MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-02-16 and MW-02-13, at a thickness of 0.20’ and 0.08’, respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 6 pounds of petroleum hydrocarbons (approximately 1.1 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 10, 2019. In addition, 38 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 3.1 pounds per hour at the beginning of the MW-02-16 event, to a low of 0.4 pounds per hour during the MW-02-13 event. The hydrocarbon removal rate was relatively low during both events.

Vapor concentrations varied from a high of 7,400 parts per million by volume (PPM_V) at the beginning of the MW-02-16 event, to a low of 1,000 PPM_V during the MW-02-13 event. The concentration was relatively low during both events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 inches of mercury
MW-02-16	15 to 16 inches of mercury
MW-02-13	20 to 25 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-16	-3.42 feet	Extraction Well
MW-02-13	-1.39 feet	Extraction Well

Groundwater Extraction

A total of 304 gallons of fluids were extracted from the well during this 8.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 11, 2019

EFR® was performed for 2 hours at well MW-19, and for 7.0 hours at well MW-06 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-19, at a thickness of 0.11', prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 60 pounds of petroleum hydrocarbons (approximately 9.9 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 11, 2019. In addition, 6 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 9.9 pounds per hour during the MW-06 event, to a low of 0.4 pounds per hour during the MW-19 event. The hydrocarbon removal rate was relatively low during the MW-19 event, and relatively high during the MW-06 event.

Vapor concentrations varied from a high of 28,000 parts per million by volume (PPM_V) during the beginning of the MW-06 event, to a low of 900 PPM_V at the beginning of the MW-19 event. The concentration was relatively low during the MW-19 event, and relatively high during the MW-06 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 to 29 inches of mercury
MW-19	19 inches of mercury
MW-06	17 to 25 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-4.09 feet	Extraction Well
MW-19	0.34 feet	Extraction Well

Groundwater Extraction

A total of 148 gallons of fluids were extracted from the well during this 8.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 12, 2019

EFR® was performed for 8.5 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were not detected in well MW-10 prior to, or upon conclusion of this event.

A calculated total of 97 pounds of petroleum hydrocarbons (approximately 16.1 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 12, 2019. In addition, 24 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 17.7 pounds per hour near the beginning event, to a low of 6.3 pounds per hour at the end of the event. The hydrocarbon removal rate was relatively high during the event.

Vapor concentrations varied from a high of 42,000 parts per million by volume (PPM_V) near the beginning of the event, to a low of 18,000 PPM_V at the end of the event. The concentration was high during the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	28 to 30 inches of mercury
MW-10	12 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-10	-0.56 feet	Extraction Well

Groundwater Extraction

A total of 69 gallons of fluids were extracted from the well during this 8.5-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 13, 2019

EFR® was performed for 2 hours at well MW-02-09, and for 7.5 hours at well MW-06 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-02-09 and MW-06, at a thickness of 0.15' and 0.03', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 94 pounds of petroleum hydrocarbons (approximately 15.6 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 13, 2019. In addition, 21 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 16.8 pounds per hour during the MW-06 event, to a low of 0.4 pounds per hour during the MW-02-09 event. The hydrocarbon removal rate was relatively low during the MW-02-09 event, and relatively high during the MW-06 event.

Vapor concentrations varied from a high of 34,000 parts per million by volume (PPM_V) during the MW-06 event, to a low of 800 PPM_V at the beginning of the MW-02-09 event. The concentration was relatively low during the MW-02-09 event, and relatively high during the MW-06 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	30 inches of mercury
MW-02-09	19 to 20 inches of mercury
MW-06	23 to 28 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-2.32 feet	Extraction Well
MW-02-09	-0.80 feet	Extraction Well

Groundwater Extraction

A total of 405 gallons of fluids were extracted from the well during this 8.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

September 14, 2019

EFR® was performed for 5 hours at well MW-02-06 for this event. Separate-phase hydrocarbons (SPH) were not detected in well MW-02-06 prior to, or upon conclusion of this event.

A calculated total of 67 pounds of petroleum hydrocarbons (approximately 11.0 equivalent gallons of gas) in vapor concentrations were removed during this EFR® event on September 12, 2019.

The hydrocarbon removal rate varied from a high of 14.4 pounds per hour, to a low of 11.7 pounds per hour during the event. The hydrocarbon removal rate was relatively high during the event.

Vapor concentrations varied from a high of 36,000 parts per million by volume (PPM_V), to a low of 26,000 PPM_V during the event. The concentration was high throughout the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	30 inches of mercury
MW-02-06	20 to 21 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-06	3.21 feet	Extraction Well

Groundwater Extraction

A total of 20 gallons of fluids were extracted from the well during this 5-hour event. The fluids were off-loaded to an aboveground tank on-site.

Remediation Progress

Significant hydrocarbon (gas) removal appears to be occurring from the EFR® extraction events. The following illustrates three examples of the ongoing reductions:

1. Hydrocarbon Mass Removal
2. Reduction in Extraction Vapor Concentrations
3. Groundwater Quality/Visual Appearance

Hydrocarbon Mass Removal Summary

A significant amount of hydrocarbon mass in vapor form and liquid form was removed during this 10-day event. The following table summarizes the hydrocarbon mass removal totals.

Table: Hydrocarbon Mass Removal Summary

	Hydrocarbon Mass Extraction				
Wells	Date	Vapor lbs.	Vapor Equivalent Gallons	Liquid gallons	**Total Gallons**
MW-10 MW-02-13	09/04/19	99	16.4	41	**57.4**
MW-06 MW-02-09	09/05/19	123	20.2	20	**40.2**
MW-02-06 MW-03-04 MW-02-14	09/06/19	75	12.4	20	**32.4**
MW-02-15 MW-02-06	09/07/19	115	19.0	10	**29.0**
MW-14, EB03 EB-08 MW-10	09/09/19	45	7.4	21	**28.4**
MW-02-16 MW-02-13	09/10/19	6	1.1	38	**39.1**
MW-19					

MW-06	09/11/19	60	9.9	6	**15.9**
MW-10	09/12/19	97	16.1	24	**40.1**
MW-02-09 MW-06	09/13/19	94	15.6	21	**36.6**
MW-02-06	09/14/19	67	11.0	0	**11.0**
	Totals:	781	129.1	201	**330.1**

Reduction in Extraction Vapor Concentrations

Extraction vapor concentrations are recorded regularly during the individual extraction events. The flowing table summarizes the high and low concentrations from three wells. The data indicates a reduction in vapor concentration as the extraction has progressed. A lower vapor concentration generally indicates a lower hydrocarbon mass in the area of extraction.

Table: Extraction Vapor Concentrations Reduction

Well	Date	Concentration PPMv	
		High	Low
MW-02-13	08/05/19	60,000	20,000
	08/06/19	28,000	22,000
	08/10/19	10,000	1,000
	09/10/19	1,400	1,000
MW-10	08/08/19	72,000	36,000
	09/12/19	42,000	18,000
MW-06	08/06/19	60,000	36,000
	08/07/19	62,000	36,000
	09/13/19	34,000	28,000

Groundwater Quality/Visual Appearance

A reduction in hydrocarbon mass can be seen in the fluid extracted from the wells. Product thicknesses are decreasing and in some wells no longer is measured. The following photos of extraction from MW-10 represent this ongoing reduction in mass, seen during extraction. On August 08, 2019, a significant percentage of the flow was product/emulsion. On September 09, 2019, the product color changed to black due to more water and less emulsification. On September 10, 2019, the extraction fluids appeared to be mostly water.

MW-10, August 08, 2019

September 10, 2019

September Event Strategy

The September event continued to remove hydrocarbon mass from an apparent source zone, in the area of monitor wells MW-10, MW-02-13, and MW-06. In addition, all wells that have had recorded product thicknesses in the past, were extracted from, to get an understanding of the nature of the product, and the hydrocarbon mass in these areas. This data will assist with future extraction from these areas. Most of the wells appear to have product thicknesses due to groundwater flow into these areas (see the photo of MW-02-15 below). During extraction vapor concentrations are typically lower, and the product is removed relatively quickly. Gauging of these wells during the October event, will show how much product may be in these areas.

MW-02-15

CONCLUSIONS

1. A significant amount of hydrocarbon mass was removed via vapor extraction 781 lbs. equivalent to 129.1 gallons), in addition to 201 gallons of liquid phase gasoline.
2. Extraction vapor concentrations are decreasing, indicating removal/reduction of hydrocarbon mass in the areas of extraction.

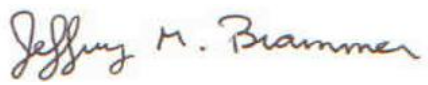
3. Free product thicknesses are decreasing in the wells where multiple days of extraction has occurred.
4. Visual observation of the extracted fluids indicates a reduction in hydrocarbon mass/product, as the extracted fluids are showing a higher water to product ratio, in some cases a majority of water.
5. A total of 1,853 gallons of fluids (1,652 gallons of water and 201 gallons of liquid phase gas) was extracted and off-loaded to an on-site tank.

RECOMMENDATIONS

EcoVac proposes to mobilize to the site on October 6, 2019, and start a second phase of extraction on October 07, 2019.

Thank you for this opportunity to team with Larson & Associates, Inc. in serving the environmental needs of your clients. We look forward to working with you again in the future to provide innovative and cost effective environmental solutions at this and other sites.

Sincerely,
EcoVac Services



Jeffrey M. Brammer, PG
Western Regional Manager, Hydrogeologist

Attachments:

1. Field Data Sheets

ATTACHMENT 1

FIELD DATA SHEETS

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/04/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-10	MW-02-13							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	8:00														
MW-10	8:15	28	4								58,000	1500	74	24.5	6.1
(69 gals)	8:30	28	4								54,000	1500	74	22.8	5.7
	8:45	28	4								56,000	1500	74	23.7	5.9
	9:00	28	4								54,000	1500	74	22.8	5.7
	9:30	28	4								48,000	1500	74	20.3	10.1
	10:00	28	4								44,000	1500	74	18.6	9.3
	11:00	28	4								36,000	1500	74	15.2	15.2
	12:00	28	4								36,000	1500	74	15.2	15.2
MW-02-13	12:15	29		11							18,000	1250	61	6.3	1.6
(41 gals)	12:30	29		15							16,000	1250	61	5.6	1.4
	12:45	29		16							16,000	1250	61	5.6	1.4
	13:00	29		16							16,000	1500	74	6.8	1.7
	13:15	29		16							14,000	1500	74	5.9	1.5
	13:45	29		16							10,000	1600	78	4.5	2.3
	14:15	29		16							12,000	1600	78	5.4	2.7
	15:15	29		16							20,000	1500	74	8.4	8.4
	16:00	29		16							16,000	1500	74	6.8	5.1

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-10	4"		52.22	52.44	0.22	-	52.46	0.00	-0.21
MW-02-13	4"		47.55	47.72	0.17	-	47.85	0.00	-0.27
MW-06	4"		47.30	47.44	0.14	-			

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-10	0 (closed)	54'
Truck Operator:	Mosley	MW-02-13	0 (closed)	50'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	99	pounds
Hydrocarbons (liquid):	41.0	gallons
Total Hydrocarbons:	57.4	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	110	gallons

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405-895-9990

Pump Information	
Time:	8:00-16:00
# Pumps:	2
RPMs:	1,000

Notes :
1. At 13:15 lowered the stinger 3' in MW-02-13
2. Gauged tank am 08/05/19, had 41 gallons of liquid product

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/05/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-06	MW-02-09							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:15														
MW-06	7:30	28	8								20,000	1200	59	6.8	1.7
(117 gals)	7:45	28	12								38,000	1200	59	12.8	3.2
	8:00	28	12								40,000	1200	59	13.5	3.4
	8:15	28	14								44,000	1200	59	14.9	3.7
	8:45	28	15								50,000	1300	64	18.3	9.2
	9:15	28	15								56,000	1000	49	15.8	7.9
	10:15	28	15								50,000	1250	61	17.6	17.6
	11:15	28	16								50,000	1500	74	21.1	21.1
	12:15	28	16								48,000	1500	74	20.3	20.3
	13:15	28	16								48,000	1500	74	20.3	20.3
MW-02-09	13:30	28		8							10,000	1700	83	4.8	1.2
(315 gals)	13:45	30		8							10,000	1800	88	5.1	1.3
	14:00	30		8							10,000	2000	98	5.6	1.4
	14:15	30		8							44,000	1800	88	22.3	5.6
	14:45	30		8							10,000	1700	83	4.8	2.4
	15:15	30		9							10,000	1700	83	4.8	2.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-06	4"		-	47.40	0.00	-	52.18	0.00	-4.78
MW-02-09	4"		36.30	36.53	0.23	-	37.00	0.00	-0.67

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-06	0 (closed)	50'
Truck Operator:	Mosley	MW-02-09	0 (closed)	37'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	123	pounds
Hydrocarbons (liquid):	20.0	gallons
Total Hydrocarbons:	40.2	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	432	gallons

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Pump Information	
Time:	7:15-15:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/06/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:15	Inlet	MW-02-06	MW-03-04	MW-02-14						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-02-06	7:45	28	16								100,000	1400	69	39.4	9.9
(157 gals)	8:00	29	17								80,000	1500	74	33.8	8.4
	8:15	29	17								62,000	1500	74	26.2	6.5
	8:45	29	18								48,000	1400	69	18.9	9.5
	9:15	29	17								58,000	1000	49	16.3	8.2
	10:15	29	17								40,000	1300	64	14.6	14.6
	11:15	29	17								44,000	1300	64	16.1	16.1
MW-03-04	11:30	28		4							10,000	1000	49	2.8	0.7
(17 gals)	11:45	28		4							1,000	1500	74	0.4	0.1
	12:00	28		4							800	1300	64	0.3	0.1
	12:15	28		4							600	1300	64	0.2	0.1
	12:30	28			8						800	1500	74	0.3	0.1
MW-02-14	12:45	28			8						800	2000	98	0.5	0.1
(92 gals)	13:00	28			8						800	2000	98	0.5	0.1
	13:15	28			8						680	2500	123	0.5	0.1
	13:45	28			8						600	1500	74	0.3	0.1
	14:15	28			8						600	2000	98	0.3	0.2
	15:15	28			8						200	2000	98	0.1	0.1

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-06	4"		21.05	22.06	1.01	-	22.88	0.00	-1.68
MW-03-04	4"		-	88.48	0.00	-	88.44	0.00	0.04
MW-02-14	4"		67.08	68.08	1.00	-	68.52	0.00	-1.29

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-02-06	0 (closed)	23'
Truck Operator:	Mosley	MW-03-04	0 (closed)	90'
Truck No.:	150	MW-02-14	0 (closed)	79'
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	75	pounds
Hydrocarbons (liquid):	20.0	gallons
Total Hydrocarbons:	32.4	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	266	gallons

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Pump Information	
Time:	7:15-15:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/07/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-15	MW-02-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:15														
MW-02-15	7:30	28	9								10,000	2000	98	5.6	1.4
(38 gals)	7:45	28	7								8,000	1800	88	4.1	1.0
	8:00	28	8								2,600	1800	88	1.3	0.3
	8:15	28	6								2,400	1800	88	1.2	0.3
	8:45	28	7								2,000	1800	88	1.0	0.5
	9:15	28	7								1,800	1800	88	0.9	0.5
MW-02-06	9:30	28		18							38,000	1900	93	20.3	5.1
(40 gals)	9:45	28		18							42,000	1800	88	21.3	5.3
	10:00	28		18							44,000	1800	88	22.3	5.6
	10:15	28		18							40,000	1800	88	20.3	5.1
	10:45	28		18							36,000	2000	98	20.3	10.1
	11:15	28		18							38,000	2000	98	21.4	10.7
	12:15	28		18							42,000	1800	88	21.3	21.3
	13:15	28		18							32,000	1800	88	16.2	16.2
	14:15	28		18							30,000	1800	88	15.2	15.2
	15:15	28									32,000	1800	88	16.2	16.2

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-15	4"		69.08	69.45	0.37	-	69.03	0.00	0.11
MW-02-06	4"		-	22.75	0.00	-	23.18	0.00	-0.43

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-15	0 (closed)	71'	Hydrocarbons (vapor):	115	pounds
Truck Operator:	Mosley	MW-02-06	0 (closed)	24'	Hydrocarbons (liquid):	10.0	gallons
Truck No.:	150				Total Hydrocarbons:	29.0	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	78	gallons

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Pump Information	
Time:	7:15-15:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/09/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:15	Inlet	MW-14	EB-03	EB-08	MW-10					Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-14,EB-03	7:30	25	4	2							1,000	2500	123	0.7	0.2
	7:45	25	4	2							1,600	2500	123	1.1	0.3
	8:00	25	4	2							2,000	2500	123	1.4	0.4
	8:15	25	4	2							2,000	2500	123	1.4	0.4
	8:45	25	4	2							1,800	2500	123	1.3	0.6
	9:15	25	4	2							2,000	2500	123	1.4	0.7
	9:30														
EB-08	10:00	25			5						800	3000	147	0.7	0.3
	10:15	25			8						1,000	2500	123	0.7	0.2
	10:30	25			13						800	2500	123	0.6	0.1
	10:45	25			12						800	2500	123	0.6	0.1
	11:00														
MW-10	11:15	28				3					38,000	1250	61	13.4	6.7
	11:45	28				3					32,000	1000	49	9.0	4.5
	12:15	28				3					30,000	1000	49	8.4	4.2
	13:15	28				3					30,000	1000	49	8.4	8.4
	14:15	28				3					20,000	1500	74	8.4	8.4
	15:15	28				3					22,000	1500	74	9.3	9.3

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-14	4"		66.22	66.37	0.15	-	66.76	0.00	-0.52
EB-03	2"		65.90	66.34	0.44	-	68.10	0.00	-2.13
EB-08	2"		76.90	78.05	1.15	-	76.44	0.00	0.63
MW-10	4"		52.10	52.13	0.03	-	51.92	0.00	0.18

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-14	0 (closed)	69'	Hydrocarbons (vapor):	45	pounds
Truck Operator:	Mosley	EB-03	0 (closed)	68'	Hydrocarbons (liquid):	21.0	gallons
Truck No.:	150	EB-08	0 (closed)	79'	Total Hydrocarbons:	28.4	equiv. gals.
Vacuum Pumps:	Becker	MW-10	0 (closed)	53'	Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	21	gallons

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Pump Information	
Time:	7:15-15:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/10/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:15	Inlet	MW-02-16	MW-02-13							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-02-16	7:30	28	15								7,400	1500	74	3.1	0.8
(265 gals)	7:45	28	15								6,000	1500	74	2.5	0.6
	8:00	28	16								6,000	1800	88	3.0	0.8
	8:15	28	16								6,000	1800	88	3.0	0.8
	8:45	28	16								2,500	1800	88	1.3	0.6
	9:15	28	16								1,800	1800	88	0.9	0.5
MW-02-13	9:30	28		20							1,000	1500	74	0.4	0.1
(39 gals)	9:45	28		20							1,200	1500	74	0.5	0.1
	10:15	28		25							1,000	1250	61	0.4	0.2
	10:45	28		25							1,000	1250	61	0.4	0.2
	11:15	28		25							1,200	1250	61	0.4	0.2
	12:15	28		25							1,400	1250	61	0.5	0.5
	13:15	28		25							1,200	1250	61	0.4	0.4
	14:15	28		25							1,000	1250	61	0.4	0.4
	15:15	28		25							1,000	1250	61	0.4	0.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-16	4"		73.32	73.52	0.20	-	76.77	0.00	-3.42
MW-02-13	4"		47.80	47.88	0.08	-	49.20	0.00	-1.39
MW-02-09	4"		36.32	36.91	0.59				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-02-16	0 (closed)	75'
Truck Operator:	Mosley	MW-02-13	0 (closed)	50'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	6	pounds
Hydrocarbons (liquid):	38.0	gallons
Total Hydrocarbons:	39.1	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	304	gallons

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Pump Information	
Time:	7:15-15:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Winkler	Date: 09/11/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-19	MW-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:15														
MW-19	7:30	28	19								900	1500	74	0.4	0.1
(40 gals)	7:45	28	19								1,000	1250	61	0.4	0.1
	8:00	28	19								1,400	1250	61	0.5	0.1
	8:15	28	19								1,200	1250	61	0.4	0.1
	8:45	28	19								1,800	1250	61	0.6	0.3
	9:15	28	19								2,000	1250	61	0.7	0.4
MW-06	9:30	28		17							6,000	1250	61	2.1	0.5
(108 gals)	9:45	29		23							14,000	1250	61	4.9	1.2
	10:00	29		25							20,000	1250	61	7.0	1.8
	10:15	29		25							28,000	1250	61	9.9	2.5
	10:45	29		25							26,000	1250	61	9.2	4.6
	11:15	29		25							28,000	1000	49	7.9	3.9
	12:15	29		25							26,000	1000	49	7.3	7.3
	13:15	29		25							28,000	1100	54	8.7	8.7
	14:15	29		25							28,000	1100	54	8.7	8.7
	15:15	29		25							28,000	1250	61	9.9	9.9
	16:15	29		25							28,000	1250	61	9.9	9.9

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-09	4"		36.32	36.41	0.09				
MW-19	4"		75.32	75.43	0.11	-	75.00	0.00	0.34
MW-06	4"		-	47.93	0.00		52.02	52.02	-4.09

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-19	0 (closed)	77'
Truck Operator:	Mosley	MW-06	0 (closed)	53'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	60	pounds
Hydrocarbons (liquid):	6.0	gallons
Total Hydrocarbons:	15.9	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	148	gallons

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Pump Information	
Time:	7:15-16:15
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 09/12/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:30	Inlet	MW-10								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-10	7:45	28	12								32,000	1500	74	13.5	3.4
	8:00	28	12								42,000	1500	74	17.7	4.4
	8:15	28	12								40,000	1400	69	15.8	3.9
	8:30	28	12								40,000	1250	61	14.1	3.5
	9:00	28	12								38,000	1250	61	13.4	6.7
	9:30	30	12								30,000	1250	61	10.6	5.3
	10:30	30	12								30,000	1250	61	10.6	10.6
	11:30	30	12								32,000	1250	61	11.3	11.3
	12:30	30	12								30,000	1250	61	10.6	10.6
	13:30	30	12								30,000	1500	74	12.7	12.7
	14:30	30	12								26,000	1500	74	11.0	11.0
	15:30	30	12								26,000	1500	74	11.0	11.0
	16:00	30	12								18,000	1250	61	6.3	3.2

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-10	4"		-	52.12	0.00	-	52.68	0.00	-0.56
MW-02-14	4"		-	68.00	0.00				
MW-02-09	4"		36.45	36.60	0.15				
MW-06	4"		49.89	49.92	0.03				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-10	0 (closed)	54'
Truck Operator:	Brammer			
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	97	pounds
Hydrocarbons (liquid):	24.0	gallons
Total Hydrocarbons:	40.1	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	69	gallons

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Pump Information	
Time:	7:30-16:00
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 09/13/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-09	MW-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:20														
MW-02-09	7:35	30	19								800	1600	78	0.4	0.1
(317 gals)	7:50	30	20								1,800	1600	78	0.8	0.2
	8:05	30	20								1,800	1600	78	0.8	0.2
	8:20	30	20								2,000	1600	78	0.9	0.2
	8:50	30	20								2,200	1500	74	0.9	0.5
	9:20	30	20								2,000	1600	78	0.9	0.5
	9:30														
MW-06	9:45	30		23							30,000	1700	83	14.4	3.6
(88 gals)	10:00	30		23							28,000	1700	83	13.4	3.4
	10:15	30		27							34,000	1700	83	16.3	4.1
	10:30	30		27							34,000	1750	86	16.8	4.2
	11:00	30		27							32,000	1700	83	15.3	7.7
	11:30	30		27							32,000	1700	83	15.3	7.7
	12:30	30		28							30,000	1700	83	14.4	14.4
	13:30	30		28							34,000	1700	83	16.3	16.3
	14:30	30		28							28,000	1600	78	12.6	12.6
	16:00	30		28							30,000	1500	74	12.7	19.0

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-09	4"		36.45	36.60	0.15	-	37.27	0.00	-0.80
MW-06	4"		49.89	49.92	0.03	-	52.21	0.00	-2.32
MW-02-13	4"		48.58	48.60	0.02				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-02-09	0 (closed)	37'
Truck Operator:	Brammer	MW-06	0 (closed)	53'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	94	pounds
Hydrocarbons (liquid):	21.0	gallons
Total Hydrocarbons:	36.6	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	405	gallons

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Pump Information	
Time:	7:20-16:00
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 09/14/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-06								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	6:45														
MW-02-06	7:00	30	20								30,000	1700	83	14.4	3.6
	7:15	30	20								30,000	1500	74	12.7	3.2
	7:30	30	21								36,000	1600	78	16.2	4.1
	7:45	30	21								32,000	1600	78	14.4	3.6
	8:15	30	21								26,000	1600	78	11.7	5.9
	8:45	30	21								32,000	1600	78	14.4	7.2
	9:45	30	21								26,000	1700	83	12.4	12.4
	10:45	30	21								30,000	1700	83	14.4	14.4
	11:45	30	21								26,000	1700	83	12.4	12.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-06	4"		-	23.82	0.00	-	20.61	0.00	3.21

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-06	0 (closed)	22'/20'	Hydrocarbons (vapor):	67	pounds
Truck Operator:	Brammer				Hydrocarbons (liquid):	0.0	gallons
Truck No.:	150				Total Hydrocarbons:	11.0	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	20	gallons

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Pump Information	
Time:	6:45-11:45
# Pumps:	2
RPMs:	1,000

Notes :
1. Raised stinger to 20' after 8:15 reading

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October 21, 2019

Mr. Mark Larson
President
Larson & Associates, Inc.
507 N Marienfeld St #205
Midland, Texas 79701-4356
Mark@laenvironmental.com

Subject: **Enhanced Fluid Recovery (EFR®) Report**
AKA Energy
Former Empire Abo Gas Processing Plant
Eddy County
Artesia, New Mexico

Dear Mr. Larson:

Please find attached the data summary for the EFR® remediation conducted at the subject site on October 08 thru 15, 2019. The EFR® remediation was implemented in wells MW-02-09, MW-02-13, MW-02-15, MW-06, MW-10, MW-14, MW-19, and EB-08. EFR® is a mobile multi-phase/dual-phase extraction technology shown to be effective for mass removal of hydrocarbons in the soils/groundwater.

October 08, 2019

EFR® was performed for 5 hours at wells MW-02-13 and MW-06, and for 1 hour at well MW-02-09 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-09, MW-02-13, and MW-06, at a thickness of 0.70', 0.03', and 0.19', respectively, prior to conducting this EFR® event. SPH was only detected in extraction well MW-02-13, at a thickness of 0.04', upon conclusion of this event.

A calculated total of 33 pounds of petroleum hydrocarbons (approximately 5.4 equivalent gallons of gasoline) in vapor concentrations, in addition to 26 gallons of liquid phase hydrocarbons, were removed during this EFR® event on October 08, 2019.

MW-02-13 showing visual improvement in water quality

The hydrocarbon removal rate varied from a high of 7.6 pounds per hour during the MW-06 and MW-02-13 event, to a low of 0.9 pounds per hour during the MW-02-09 event. The hydrocarbon removal rate was low during the MW-02-09 event, and was relatively low throughout the MW-06 and MW-02-13 event.

Vapor concentrations varied from a high of 10,000 parts per million by volume (PPM_V) during the MW-06 and MW-02-13 event, to a low of 3,000 PPM_V during the MW-02-09 event. The concentrations were lower from these wells during this event as compared to previous events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	25 to 26 inches of mercury
MW-06	7 to 14 inches of mercury

MW-02-09	11 inches of mercury
MW-02-13	13 to 19 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-9.29 feet	Extraction Well
MW-02-09	-2.77 feet	Extraction Well
MW-02-13	-6.63 feet	Extraction Well

Groundwater Extraction

A total of 862 gallons of fluid (836 gallons of groundwater and 26 gallons of liquid phase gas) were extracted from the well during this 6-hour event. The fluids were off-loaded to an aboveground tank on-site.

October 09, 2019

EFR® was performed for 1 hour at well MW-02-09, for 3 hours at well MW-02-15, and for 4 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-09 and MW-02-15, at a thickness of 0.18' and 1.32', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 60 pounds of petroleum hydrocarbons (approximately 9.8 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 09, 2019. In addition, 28 gallons of liquid phase gas was gauged in the truck from this extraction.

The hydrocarbon removal rate varied from a high of 13.0 pounds per hour at the beginning of the MW-10 event, to a low of 1.9 pounds per hour at the end of the MW-02-09 event. The hydrocarbon removal rate was relatively low from the three wells. The removal rate decreased during the three events.

Vapor concentrations varied from a high of 22,000 parts per million by volume (PPM_V) at the beginning of the MW-10 event, to a low of 4,600 PPM_V at the end of the MW-02-09 event. The concentration was relatively high throughout the three events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 to 25 inches of mercury
MW-02-09	10 inches of mercury

MW-02-15	5 to 6 inches of mercury
MW-10	4 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-09	-0.48 feet	Extraction Well
MW-02-15	-1.37 feet	Extraction Well
MW-10	0.09 feet	Extraction Well

Groundwater Extraction

A total of 423 gallons of fluid (395 gallons of groundwater and 28 gallons of liquid phase gas) were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

October 10, 2019

EFR® was performed for 1.5 hours at well EB-08, for 1.5 hours at well MW-14, and for 5.75 hours at well MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in well EB-08, MW-14, and MW-02-13, at a thickness of 0.55', 0.04', and 0.08', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 6 pounds of petroleum hydrocarbons (approximately 1.1 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 10, 2019. In addition, 15 gallons of liquid phase gas was gauged in the truck after extraction on October 10, 2019.

The hydrocarbon removal rate varied from a high of 3.6 pounds per hour near the end of the EB-08 event, to a low of 0.2 pounds per hour near the beginning of the MW-02-13 event. The hydrocarbon removal rate was relatively low during the three events. The removal rate increased during the EB-08 event, and was relatively steady during the MW-14 and MW-02-13 events.

Vapor concentrations varied from a high of 5,800 parts per million by volume (PPM_V) at the end of the EB-08 event, to a low of 500 PPM_V near the beginning of the MW-02-13 event. The concentration was relatively low throughout the three events.

The vacuum reading recorded during this EFR® event from the monitor wells is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	18 to 25 inches of mercury

EB-08	17 to 18 inches of mercury
MW-14	7 inches of mercury
MW-02-13	7 to 10 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	0.28 feet	Extraction Well
MW-14	1.10 feet	Extraction Well
MW-02-13	-2.88 feet	Extraction Well

Groundwater Extraction

A total of 216 gallons of fluid (201 gallons of groundwater and 15 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

October 11, 2019

EFR® was performed for 2.0 hours at well MW-19, for 2.0 hours at well MW-02-15, and for 5 hours at wells MW-02-13 and MW-06 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-19, MW-02-15, MW-02-13, and MW-06, at a thickness of 0.03', 0.10', 0.04', and 0.04', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 30 pounds of petroleum hydrocarbons (approximately 4.9 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 11, 2019. In addition, 10 gallons of liquid phase gas was gauged in the truck after extraction on October 11, 2019.

The hydrocarbon removal rate varied from a high of 12.2 pounds per hour at the end of the MW-19 event, to a low of 0.2 pounds per hour near the beginning of the MW-02-15 event. The hydrocarbon removal rate was relatively low throughout the MW-02-15 and MW-02-13/MW-06 events, and was elevated throughout the MW-19 event. The removal rate increased during the MW-19 event, and remained relatively steady throughout the MW-02-15 and MW-02-13/MW-06 events.

Vapor concentrations varied from a high of 24,000 parts per million by volume (PPM_V) toward the end of the MW-19 event, to a low of 620 PPM_V near the beginning of the MW-02-15 event. The concentration was very high throughout the MW-19 event, and relatively low throughout the MW-02-15 and MW-02-13/MW-06 events.

The vacuum reading recorded during this EFR® event from the monitor wells is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 to 25 inches of mercury
MW-19	12 to 13 inches of mercury
MW-02-15	5 to 7 inches of mercury
MW-02-13	15 to 17 inches of mercury
MW-06	7 to 12 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-19	1.37 feet	Extraction Well
MW-02-15	-1.53 feet	Extraction Well
MW-02-13	-1.37 feet	Extraction Well
MW-06	-7.02 feet	Extraction Well

Groundwater Extraction

A total of 760 gallons of fluid (750 gallons of groundwater and 10 gallons of liquid phase gas) were extracted from the well during this 9.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

October 12, 2019

EFR® was performed for 1.5 hours at well MW-14, for 1.5 hours at well EB-08, and for 6.0 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-14 and EB-08, at a thickness of 0.01' and 0.18', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 24 pounds of petroleum hydrocarbons (approximately 4.0 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 12, 2019. In addition, 27 gallons of liquid phase gas was gauged in the truck after extraction on October 12, 2019.

The hydrocarbon removal rate varied from a high of 9.3 pounds per hour at the end of the EB-08 event, to a low of 0.6 pounds per hour at the end of the MW-14 event. The hydrocarbon removal rate was elevated during the EB-08 and MW-10 events, and was relatively low throughout the MW-14 event.

Vapor concentrations varied from a high of 22,000 parts per million by volume (PPM_V) at the end of the EB-08 event, to a low of 1,400 PPM_V at the end of the MW-14 event. The concentration was elevated throughout the MW-10 and EB-08 events, and was low throughout the MW-14 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	23 to 24 inches of mercury
MW-14	2 to 3 inches of mercury
EB-08	15 inches of mercury
MW-10	4 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-14	1.64 feet	Extraction Well
EB-08	0.54 feet	Extraction Well
MW-10	0.27 feet	Extraction Well

Groundwater Extraction

A total of 127 gallons of fluid (100 gallons of groundwater and 27 gallons of liquid phase gas) were extracted from the well during this 9.0-hour event. The fluids were off-loaded to an aboveground tank on-site.

October 14, 2019

EFR® was performed for 2 hours at well EB-08, for 1.5 hours at well MW-02-09, and for 5.0 hours at well MW-02-13 with MW-06 added the final 2.0 hours, for this event. Separate-phase hydrocarbons (SPH) were detected in wells EB-08, MW-02-09, and MW-06, at a thickness of 0.21', 0.16', and 0.10', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 26 pounds of petroleum hydrocarbons (approximately 4.3 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 14, 2019. In addition, 16 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 13.5 pounds per hour at the end of the EB-08 event, to a low of 0.4 pounds per hour at the beginning of the MW-02-13 event. The

hydrocarbon removal rate was elevated from EB-08, and relatively low during the other two events.

Vapor concentrations varied from a high of 32,000 parts per million by volume (PPM_V) at the end of the EB-08 event, to a low of 720 PPM_V at the beginning of the MW-02-13 event. The concentration was high from EB-08, and relatively low during the other two events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	21 to 25 inches of mercury
EB-08	14 inches of mercury
MW-02-09	5 to 6 inches of mercury
MW-02-13	6 to 13 inches of mercury
MW-06	8 to 12 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	-0.25 feet	Extraction Well
MW-02-09	-0.95 feet	Extraction Well
MW-02-13	-1.94 feet	Extraction Well
MW-06	-4.33 feet	Extraction Well

Groundwater Extraction

A total of 803 gallons of fluid (787 gallons of groundwater and 16 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

October 15, 2019

EFR® was performed for 2.5 hours at well EB-08, for 1.0 hour at well MW-02-09, and for 4.0 hours at well MW-02-15, for this event. Separate-phase hydrocarbons (SPH) were detected in wells EB-08, MW-02-09, and MW-02-15, at a thickness of 0.04', 0.10', and 0.17', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

MW-02-15 showing emulsified liquid gas phase

A calculated total of 11 pounds of petroleum hydrocarbons (approximately 1.7 equivalent gallons of gasoline) in vapor concentrations were removed during this EFR® event on October 15, 2019. In addition, 10 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 6.2 pounds per hour in the middle of the EB-08 event, to a low of 0.2 pounds per hour during the MW-02-09 and MW-02-15 events. The hydrocarbon removal rate was elevated from EB-08, and relatively low during the other two events.

Vapor concentrations varied from a high of 26,000 parts per million by volume (PPM_V) at the end of the EB-08 event, to a low of 800 PPM_V at the end of the MW-02-09 event. The concentration was high from EB-08, and relatively low during the other two events.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 inches of mercury
EB-08	16 inches of mercury
MW-02-09	8 inches of mercury
MW-02-15	14 to 16 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	-0.63 feet	Extraction Well
MW-02-09	-0.92 feet	Extraction Well
MW-02-15	-2.63 feet	Extraction Well

Groundwater Extraction

A total of 589 gallons of fluid (579 gallons of groundwater and 10 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

Hydrocarbon Mass Removal Summary

A significant amount of hydrocarbon mass in vapor form and liquid form was removed during this 7-day event. The following table summarizes the hydrocarbon mass removal totals.

Table: Hydrocarbon Mass Removal Summary

	Hydrocarbon Mass Extraction				
Wells	Date	Vapor lbs.	Vapor Equivalent Gallons	Liquid gallons	**Total Gallons**
MW-06 MW-02-13 MW-02-09	10/08/19	33	5.4	26	**31.4**
MW-02-09 MW-02-15 MW-10	10/09/19	60	9.8	28	**37.8**
EB-08 MW-14 MW-02-13	10/10/19	6	1.1	15	**16.1**
MW-19 MW-02-15					

MW-02-13 MW-06	10/11/19	30	4.9	10	**14.9**
MW-14 EB-08 MW-10	10/12/19	24	4.0	27	**31.0**
EB-08 MW-02-09 MW-02-13 MW-06	10/14/19	26	4.3	16	**20.3**
EB-08 MW-02-09 MW-02-15	10/15/19	11	1.7	10	**11.7**
	Totals:	190	31.2	132	**163.2**

CONCLUSIONS

1. A significant amount of hydrocarbon mass was removed via vacuum extraction (190 lbs., equivalent to 31.2 gallons), in addition to 132 gallons of liquid phase gasoline.
2. Extraction vapor concentrations have decreased significantly at all wells.
3. Free phase liquid gas thicknesses have decreased significantly in all wells.
4. A total of 3,780 gallons of fluids (3,648 gallons of water and 132 gallons of liquid phase gas) was extracted and off-loaded to an on-site tank.

RECOMMENDATIONS

EcoVac will mobilize to the site on December 3, 2019, and start a fourth phase of extraction on December 04, 2019.

Thank you for this opportunity to team with Larson & Associates, Inc. in serving the environmental needs of your clients. We look forward to working with you again in the future to provide innovative and cost effective environmental solutions at this and other sites.

Sincerely,
EcoVac Services

Jeffrey M. Brammer, PG
Western Regional Manager, Hydrogeologist

Attachments:

1. Field Data Sheets

ATTACHMENT 1

FIELD DATA SHEETS

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/08/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-06	MW-02-13	MW-02-09						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	11:00														
MW-06	11:15	25	7	13							7,200	2750	135	5.6	1.4
MW-02-13	11:30	25	7	13							10,000	2700	132	7.6	1.9
	12:00	26	7	13							10,000	2700	132	7.6	3.8
	13:00	26	7	13							10,000	2700	132	7.6	7.6
	14:00	26	13	13							7,800	2600	127	5.7	5.7
	15:00	26	14	19							9,000	2600	127	6.6	6.6
	16:00	26		19							6,000	2400	118	4.1	4.1
MW-02-09	16:30	25			11						7,000	1000	49	2.0	1.0
	17:00	25			11						3,000	1100	54	0.9	0.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-06	4"		38.77	38.96	0.19	-	48.09	0.00	-9.29
MW-02-09	4"		33.02	33.72	0.70	-	35.89	0.00	-2.77
MW-02-13	4"		41.77	41.80	0.03	48.40	48.44	0.04	-6.63
MW-02-15	4"		67.15	68.47	1.32				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-06	0 (closed)	40'
Truck Operator:	Brammer	MW-02-13	0 (closed)	34'
Truck No.:	150	MW-02-09	0 (closed)	45'
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	33	pounds
Hydrocarbons (liquid):	26.0	gallons
Total Hydrocarbons:	31.4	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	862	gallons

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Pump Information	
Time:	~~11:00-17:00~~
# Pumps:	2
RPMs:	1,000

Notes :
1. At 13:00 lowered the stinger to 38' in MW-06 and 43' in MW-02-13

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/09/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-09	MW-02-15	MW-10						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:30														
MW-02-09	7:45	24	10								8,400	1600	78	3.8	0.9
	8:00	24	10								10,000	1500	74	4.2	1.1
	8:30	24	10								4,600	1500	74	1.9	1.0
	8:45														
MW-02-15	9:00	25		5							16,000	2600	127	11.7	2.9
	9:15	25		5							14,000	2500	123	9.9	2.5
	9:45	25		5							10,000	2300	113	6.5	3.2
	10:45	25		5							6,200	2600	127	4.5	4.5
	11:45	25		6							9,000	2600	127	6.6	6.6
	12:00														
MW-10	12:30	24			4						22,000	2100	103	13.0	6.5
	13:00	24			4						20,000	2000	98	11.3	5.6
	14:00	24			4						16,000	2000	98	9.0	9.0
	15:00	24			4						14,000	2000	98	7.9	7.9
	16:00	24			4						14,000	2000	98	7.9	7.9

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-09	4"		35.84	36.02	0.18	-	36.35	0.00	-0.48
MW-02-15	4"		67.15	68.47	1.32	-	68.72	0.00	-1.37
MW-10	4"		-	48.17	0.00	-	48.08	0.00	0.09

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-09	0 (closed)	35'	Hydrocarbons (vapor):	60	pounds
Truck Operator:	Brammer	MW-02-15	0 (closed)	68'	Hydrocarbons (liquid):	28.0	gallons
Truck No.:	150	MW-10	0 (closed)	50'	Total Hydrocarbons:	37.8	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	423	gallons

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Pump Information	
Time:	7:30-16:00
# Pumps:	2
RPMs:	1,000

Notes :
342 gallons from MW-02-09 & MW-02-15

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/10/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:45	Inlet	EB-08	MW-14	MW-02-13						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
EB-08	8:00	25	17								5,000	1100	54	1.5	0.4
(27 gallons)	8:15	25	17								4,400	1100	54	1.4	0.3
	8:45	24	18								5,400	1800	88	2.7	1.4
	9:15	24	18								5,800	2200	108	3.6	1.8
	9:30														
MW-14	9:45	20		7							1,200	2300	113	0.8	0.2
(54 gallons)	10:00	20		7							700	1800	88	0.4	0.1
	10:30	20		7							600	1500	74	0.3	0.1
	11:00	20		7							800	1700	83	0.4	0.2
	11:15														
MW-02-13	11:30	18			7						1,000	1400	69	0.4	0.1
(135 gallons)	12:00	18			7						500	1300	64	0.2	0.1
	13:00	18			8						700	1400	69	0.3	0.3
	14:00	18			10						880	1500	74	0.4	0.4
	15:00	18			10						780	1700	83	0.4	0.4
	16:00	18			10						700	1600	78	0.3	0.3
	17:00	18			10						1,000	1500	74	0.4	0.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		77.63	78.18	0.55	-	77.43	0.00	0.28
MW-14	4"		63.50	63.54	0.04	-	62.41	0.00	1.10
MW-02-13	4"		45.41	45.49	0.08	-	48.30	0.00	-2.88
MW-02-09	4"		36.02	36.15	0.13				
MW-19	4"		74.24	74.29	0.05				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	EB-08	0 (closed)	78'
Truck Operator:	Mosley	MW-14	0 (closed)	64'
Truck No.:	150	MW-02-13	0 (closed)	47'
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	6	pounds
Hydrocarbons (liquid):	15.0	gallons
Total Hydrocarbons:	16.1	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	216	gallons

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Pump Information	
Time:	7:45-17:00
# Pumps:	2
RPMs:	1,000

Notes :
342 gallons from MW-02-09 & MW-02-15

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/11/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-19	MW-02-15	MW-02-13	MW-06					Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-19	8:00	24	13								22,000	1600	78	9.9	2.5
(98 gallons)	8:15	24	13								20,000	1600	78	9.0	2.3
	8:45	24	13								24,000	1700	83	11.5	5.7
	9:45	24	12								24,000	1800	88	12.2	12.2
	9:45														
MW-02-15	10:00	24		5							1,000	1500	74	0.4	0.1
(83 gallons)	10:15	24		7							620	1300	64	0.2	0.1
	10:45	24		7							840	1300	64	0.3	0.2
	11:45	24		7							1,400	1300	64	0.5	0.5
	11:45														
MW-02-13	12:00	24			15	7					2,400	2000	98	1.4	0.3
MW-06	12:15	25			16	8					2,000	2500	123	1.4	0.4
(579 gallons)	12:45	24			16	9					2,000	2300	113	1.3	0.6
	13:45	25			17	11					1,600	2300	113	1.0	1.0
	14:45	25			17	11					1,600	2400	118	1.1	1.1
	15:45	25			17	12					2,400	2400	118	1.6	1.6
	16:45	24			17	12					2,000	2400	118	1.4	1.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-19	4"		74.70	74.73	0.03	-	73.33	0.00	1.37
MW-02-09	4"		36.11	36.25	0.14				
MW-06	4"		43.66	43.70	0.04	-	50.69	0.00	-7.02
MW-02-13	4"		47.09	47.13	0.04	-	48.47	0.00	-1.37
MW-02-15	4"		66.97	67.07	0.10	-	68.51	0.00	-1.53

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-19	0 (closed)	75'	Hydrocarbons (vapor):	30	pounds
Truck Operator:	Mosley	MW-02-15	0 (closed)	68'	Hydrocarbons (liquid):	10.0	gallons
Truck No.:	150	MW-06	0 (closed)	44'	Total Hydrocarbons:	14.9	equiv. gals.
Vacuum Pumps:	Becker	MW-02-13	0 (closed)	48'	Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	760	gallons

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Pump Information	
Time:	7:45-16:45
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/12/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
Start Time:	7:15	Inlet	MW-14	EB-08	MW-10						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
MW-14	7:30	24	3								2,000	1500	74	0.8	0.2
(51 gallons)	7:45	24	2								1,600	1500	74	0.7	0.2
	8:15	24	2								1,400	1500	74	0.6	0.3
	8:45	24	2								1,400	1500	74	0.6	0.3
	8:45														
EB-08	9:00	24		15							3,000	1500	74	1.3	0.3
(25 gallons)	9:15	24		15							6,800	1300	64	2.5	0.6
	9:45	24		15							10,000	1400	69	3.9	2.0
	10:15	24		15							22,000	1500	74	9.3	4.6
	10:30														
MW-10	10:45	23			4						6,400	1600	78	2.9	0.7
(51 gallons)	11:00	23			4						7,200	1700	83	3.4	0.9
	11:30	23			4						6,000	1700	83	2.9	1.4
	12:30	23			4						5,200	1700	83	2.5	2.5
	13:30	23			4						5,000	1700	83	2.4	2.4
	14:30	23			4						4,800	1700	83	2.3	2.3
	15:30	23			4						4,600	1600	78	2.1	2.1
	16:30	23			4						3,800	1600	78	1.7	3.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		78.60	78.78	0.18	-	78.09	0.00	0.54
MW-14	4"		63.54	63.55	0.01	-	61.90	0.00	1.64
MW-10	4"		-	48.13	0.00	-	47.86	0.00	0.27

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	EB-08	0 (closed)	79'	Hydrocarbons (vapor):	24	pounds
Truck Operator:	Mosley	MW-14	0 (closed)	64'	Hydrocarbons (liquid):	27.0	gallons
Truck No.:	150	MW-10	0 (closed)	49'	Total Hydrocarbons:	31.0	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	127	gallons

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Pump Information	
Time:	7:15-16:30
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/14/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	EB-08	MW-02-09	MW-02-13	MW-06					Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:15														
EB-08	7:30	25	14								8,000	700	34	1.6	0.4
(36 gallons)	7:45	25	14								9,200	900	44	2.3	0.6
	8:15	25	14								30,000	1000	49	8.4	4.2
	9:15	25	14								32,000	1500	74	13.5	13.5
	9:30														
MW-02-09	9:45	24		5							10,000	1700	83	4.8	1.2
(362 gallons)	10:00	24		5							6,000	1700	83	2.9	0.7
	10:30	24		5							1,000	1800	88	0.5	0.3
	11:00	24		6							1,200	1700	83	0.6	0.3
	11:00														
MW-02-13	11:15	21			6						720	1900	93	0.4	0.1
	11:30	21			6						1,000	1700	83	0.5	0.1
	12:00	21			6						1,000	1600	78	0.5	0.2
	13:00	21			6						1,000	1600	78	0.5	0.5
MW-06	14:00	25			12	8					1,600	2500	123	1.1	1.1
	15:00	24			13	12					2,600	2000	98	1.5	1.5
(405 gallons)	16:00	24			13	12					3,000	1700	83	1.4	1.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		78.28	78.49	0.21	-	78.56	0.00	-0.25
MW-02-09	4"		36.20	36.36	0.16	-	37.17	0.00	-0.95
MW-02-13	4"		-	46.57	0.00	-	48.51	0.00	-1.94
MW-06	4"		46.44	46.54	0.10	-	50.78	0.00	-4.33
MW-02-15	4"		65.79	65.95	0.16				
MW-19	4"		-	73.90	0.00				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	EB-08	0 (closed)	79'	Hydrocarbons (vapor):	26	pounds
Truck Operator:	Mosley	MW-02-09	0 (closed)	37'	Hydrocarbons (liquid):	16.0	gallons
Truck No.:	150	MW-02-13	0 (closed)	47'	Total Hydrocarbons:	20.3	equiv. gals.
Vacuum Pumps:	Becker	MW-06	0 (closed)	48'	Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	803	gallons

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Pump Information	
Time:	7:15-16:00
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Vitovic	Date: 10/15/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	EB-08	MW-02-09	MW-02-15						Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:30														
EB-08	7:45	24	16								6,200	1500	74	2.6	0.7
(69 gallons)	8:00	24	16								9,200	1200	59	3.1	0.8
	8:30	24	16								22,000	1000	49	6.2	3.1
	9:30	24	16								22,000	750	37	4.6	4.6
	10:00	24	16								26,000	750	37	5.5	
	10:15														
MW-02-09	10:30	24		8							1,000	700	34	0.2	0.0
(275 gallons)	10:45	24		8							860	700	34	0.2	0.0
	11:15	24		8							800	700	34	0.2	0.1
	11:30														
MW-02-15	11:45	24			14						1,000	750	37	0.2	0.1
(245 gallons)	12:00	24			14						1,000	1100	54	0.3	0.1
	12:30	24			16						1,200	1000	49	0.3	0.2
	13:30	24			16						1,000	1200	59	0.3	0.3
	14:30	24			16						1,000	1200	59	0.3	0.3
	15:30	24			16						820	1000	49	0.2	0.2

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		78.65	78.69	0.04	-	79.29	0.00	-0.63
MW-02-09	4"		36.22	36.32	0.10	-	37.15	0.00	-0.91
MW-02-15	4"		65.84	66.01	0.17	-	68.50	0.00	-2.63
MW-23	4"		77.73	77.74	0.01				
MW-19	4"		73.91	73.92	0.01				
MW-08	4"		-	71.91	0.00				

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	EB-08	0 (closed)	80'
Truck Operator:	Mosley	MW-02-09	0 (closed)	38'
Truck No.:	150	MW-02-15	0 (closed)	67'
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	11	pounds
Hydrocarbons (liquid):	10.0	gallons
Total Hydrocarbons:	11.7	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	589	gallons

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Pump Information	
Time:	7:30-15:30
# Pumps:	2
RPMs:	1,000

Notes :

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December 10, 2019

Mr. Mark Larson
President
Larson & Associates, Inc.
507 N Marienfeld St #205
Midland, Texas 79701-4356
Mark@laenvironmental.com

Subject: **Enhanced Fluid Recovery (EFR®) Report**
December 02 through 08, 2019
AKA Energy
Former Empire Abo Gas Processing Plant
Eddy County
Artesia, New Mexico

Dear Mr. Larson:

Please find attached the data summary for the EFR® remediation conducted at the subject site on December 02 thru 08, 2019. The EFR® remediation was implemented in wells MW-02-13, MW-02-15, MW-06, MW-21, and EB-08. EFR® is a mobile multi-phase/dual-phase extraction technology shown to be effective for mass removal of hydrocarbons in the soils/groundwater.

December 02, 2019

EFR® was performed for 3.5 hours at well MW-02-15 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-02-15, at a thickness of 0.45' prior to conducting this EFR® event. SPH was not detected in well MW-02-15 upon conclusion of this event.

A calculated total of 2 pounds of petroleum hydrocarbons (approximately 0.2 equivalent gallons of hydrocarbon) in vapor concentrations, in addition to 56 gallons of liquid phase hydrocarbons, were removed during this EFR® event on December 02, 2019.

MW-02-15 showing removal of hydrocarbon

The hydrocarbon vapor extraction removal rate varied from a high of 0.6 pounds per hour, to a low of 0.3 pounds per hour, and was very low throughout the event.

Vapor concentrations varied from a high of 2,000 parts per million by volume (PPM_V) during the event, to a low of 1,000 PPM_V. The concentrations were relatively low during this event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 inches of mercury
MW-02-15	14 to 16 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-15	-0.53 feet	Extraction Well

Groundwater Extraction
A total of 265 gallons of fluid (209 gallons of groundwater and 56 gallons of liquid phase gas) were extracted from the well during this 3.5-hour event. The fluids were off-loaded to an aboveground tank on-site.

December 03, 2019

EFR® was performed for 8 hours at wells MW-06 and MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-06 and MW-02-13, at a thickness of 0.22' and 0.23', respectively, prior to conducting this EFR® event. SPH was only detected in well MW-02-13, at a thickness of 0.01', upon conclusion of this event.

A calculated total of 25 pounds of petroleum hydrocarbons (approximately 4.1 equivalent gallons of hydrocarbon) in vapor concentrations were removed during this EFR® event on December 03, 2019. In addition, 46 gallons of liquid phase gas was gauged in the truck from this extraction.

The hydrocarbon removal rate varied from a high of 6.3 pounds per hour, to a low of 2.0 pounds per hour during the event. The hydrocarbon removal rate was relatively low from the wells, and showed a bell curve trend during the event.

Vapor concentrations varied from a high of 22,000 parts per million by volume (PPM_V), to a low of 5,000 PPM_V during the event. The concentration was elevated throughout the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 to 25 inches of mercury
MW-06	13 to 21 inches of mercury
MW-02-13	12 to 15 inches of mercury

Groundwater Drawdown
Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-7.43 feet	Extraction Well
MW-02-13	-2.76 feet	Extraction Well

Groundwater Extraction
A total of 648 gallons of fluid (602 gallons of groundwater and 46 gallons of liquid phase gas) were extracted from the well during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

December 04, 2019

EFR® was performed for 8.0 hours at well MW-21 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-21, at a thickness of 8.25', prior to conducting this EFR® event. SPH was not detected in the well upon conclusion of this event.

A calculated total of 153 pounds of petroleum hydrocarbons (approximately 25.3 equivalent gallons of hydrocarbons) in vapor concentrations were removed during this EFR® event on December 04, 2019. In addition, 16 gallons of liquid phase gas was gauged in the truck after extraction.

MW-21 showing removal of hydrocarbon

The hydrocarbon removal rate varied from a high of 29.4 pounds per hour near the beginning of the event, to a low of 11.0 pounds per hour at the beginning of the event. The hydrocarbon removal rate was relatively high during the event. The removal rate increased slightly initially, then decreased slightly during the event.

Vapor concentrations varied from a high of 58,000 parts per million by volume (PPM_V) near the beginning of the event, to a low of 30,000 PPM_V at the beginning of the event. The concentration was relatively high throughout the event.

The vacuum reading recorded during this EFR® event from the monitor wells is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 inches of mercury
MW-21	4 to 10 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-21	-0.50 feet	Extraction Well

Groundwater Extraction

A total of 141 gallons of fluid (125 gallons of groundwater and 16 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

December 05, 2019

EFR® was performed for 4.0 hours at well MW-02-15, and for 4.0 hours at well EB-08 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-02-15 and EB-08, at a thickness of 0.20’ and 0.49’, respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 17 pounds of petroleum hydrocarbons (approximately 2.8 equivalent gallons of hydrocarbons) in vapor concentrations were removed during this EFR® event on December 05, 2019. In addition, 29 gallons of liquid phase gas was gauged in the truck after extraction.

The hydrocarbon removal rate varied from a high of 11.5 pounds per hour at the end of the EB-08 event, to a low of 0.6 pounds per hour for most of the MW-02-15 event. The hydrocarbon vapor removal rate was relatively low throughout the MW-02-15 event, and was elevated at the

end of the EB-08 event. The removal rate increased during the EB-08 event, and remained relatively steady throughout the MW-02-15 event.

Vapor concentrations varied from a high of 34,000 parts per million by volume (PPM_V) at the end of the EB-08 event, to a low of 1,400 PPM_V at the beginning of the MW-02-15 event. The concentration was very high at the end of the EB-08 event, and relatively low throughout the MW-02-15 event.

The vacuum reading recorded during this EFR® event from the monitor wells is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	24 inches of mercury
EB-08	14 to 17 inches of mercury
MW-02-15	13 to 15 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	-1.92 feet	Extraction Well
MW-02-15	-3.47 feet	Extraction Well

Groundwater Extraction

A total of 333 gallons of fluid (304 gallons of groundwater and 29 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

December 06, 2019

EFR® was performed for 9.0 hours at well MW-21 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-21 at a thickness of 0.06' prior to conducting this EFR® event. SPH was not detected in MW-21 upon conclusion of this event.

A calculated total of 94 pounds of petroleum hydrocarbons (approximately 15.6 equivalent gallons of hydrocarbons) in vapor concentrations were removed during this EFR® event on December 06, 2019. In addition, 12 gallons of liquid phase gas was gauged in the truck after extraction.

The hydrocarbon removal rate varied from a high of 14.9 pounds per hour at the beginning of the event, to a low of 6.6 pounds per hour at the end of the event. The hydrocarbon removal rate was elevated during the event.

Vapor concentrations varied from a high of 24,000 parts per million by volume (PPM_V) near the beginning of the event, to a low of 8,400 PPM_V at the end of the event. The concentration was elevated and decreased throughout the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	22 to 23 inches of mercury
MW-21	8 to 9 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-21	-1.49 feet	Extraction Well

Groundwater Extraction

A total of 163 gallons of fluid (151 gallons of groundwater and 12 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

December 07, 2019

EFR® was performed for 8 hours at wells MW-06 and MW-02-13 for this event. Separate-phase hydrocarbons (SPH) were detected in wells MW-06 and MW-02-13, at a thickness of 0.03' and 0.07', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 17 pounds of petroleum hydrocarbons (approximately 2.8 equivalent gallons of hydrocarbon) in vapor concentrations were removed during this EFR® event on December 07, 2019. In addition, 16 gallons of liquid phase gas was gauged in the truck from this extraction.

The hydrocarbon removal rate varied from a high of 3.4 pounds per hour, to a low of 1.5 pounds per hour during the event. The hydrocarbon removal rate was relatively low from the wells, and showed a decreasing trend during the event.

Vapor concentrations varied from a high of 6,000 parts per million by volume (PPM_V), to a low of 2,200 PPM_V during the event. The concentration was slightly elevated throughout the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	23 to 25 inches of mercury
MW-06	14 to 15 inches of mercury
MW-02-13	18 to 20 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-06	-4.38 feet	Extraction Well
MW-02-13	-1.09 feet	Extraction Well

Groundwater Extraction

A total of 369 gallons of fluid (353 gallons of groundwater and 16 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

December 08, 2019

EFR® was performed for 3.5 hours at well EB-08, and for 3.5 hours at well MW-21, for this event. Separate-phase hydrocarbons (SPH) were detected in wells EB-08 and MW-21, at a thickness of 0.11' and 0.15', respectively, prior to conducting this EFR® event. SPH was not detected in either well upon conclusion of this event.

A calculated total of 66 pounds of petroleum hydrocarbons (approximately 10.8 equivalent gallons of hydrocarbons) in vapor concentrations were removed during this EFR® event on December 08, 2019. In addition, 12 gallons of liquid phase gas was gauged in the truck upon completion of the event.

The hydrocarbon removal rate varied from a high of 22.0 pounds per hour at the end of the MW-21 event, to a low of 1.0 pounds per hour at the beginning of the EB-08 event. The hydrocarbon removal rate was elevated during the EB-08 event, and very elevated (high) during the MW-21 event.

Vapor concentrations varied from a high of 46,000 parts per million by volume (PPM_V) at the end of the MW-21 event, to a low of 2,000 PPM_V at the beginning of the EB-08 event. The concentration was high and increased from EB-08, and was very high and increased from MW-21.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	23 to 24 inches of mercury
EB-08	9 to 11 inches of mercury
MW-21	4 to 5 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	-0.94 feet	Extraction Well
MW-21	-2.85 feet	Extraction Well

Groundwater Extraction

A total of 61 gallons of fluid (49 gallons of groundwater and 12 gallons of liquid phase gas) were extracted from the well during this event. The fluids were off-loaded to an aboveground tank on-site.

Hydrocarbon Mass Removal Summary

A significant amount of hydrocarbon mass in vapor form and liquid form was removed during this 7-day event. The following table summarizes the hydrocarbon mass removal totals.

Table: Hydrocarbon Mass Removal Summary

	Hydrocarbon Mass Extraction				
Wells	Date	Vapor lbs.	Vapor Equivalent Gallons	Liquid gallons	**Total Gallons**
MW-02-15	12/02/19	2	0.2	56	**56.2**
MW-06 MW-02-13	12/03/19	25	4.1	46	**50.1**
MW-21	12/04/19	153	25.3	16	**41.3**
EB-08 MW-02-15	12/05/19	17	2.8	29	**31.8**
MW-21	12/06/19	94	15.6	12	**27.6**
MW-02-13 MW-06	12/07/19	17	2.8	16	**18.8**
EB-08 MW-21	12/08/19	66	10.8	12	**22.8**
	Totals:	374	61.6	187	**248.6**

CONCLUSIONS

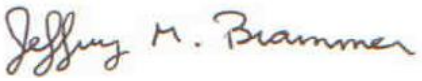
1. A significant amount of hydrocarbon mass was removed via vacuum extraction (374 lbs., equivalent to 61.6 gallons), in addition to 187 gallons of liquid phase gasoline.
2. Extraction vapor concentrations have decreased significantly at all wells, except MW-21, which was extracted from for the first time during this event.
3. Free phase liquid gas thicknesses have decreased significantly in all wells. Some wells are showing no free phase liquids.
4. A total of 1,980 gallons of fluids (1,793 gallons of water and 187 gallons of liquid phase gas) was extracted and off-loaded to an on-site tank.

RECOMMENDATIONS

EcoVac proposes mobilizing to the site on January 06, 2020, and start a fifth phase of extraction on January 07, 2020.

Thank you for this opportunity to team with Larson & Associates, Inc. in serving the environmental needs of your clients. We look forward to working with you again in the future to provide innovative and cost effective environmental solutions at this and other sites.

Sincerely,
EcoVac Services



Jeffrey M. Brammer, PG
Western Regional Manager, Hydrogeologist

Attachments:

1. Field Data Sheets

ATTACHMENT 1

FIELD DATA SHEETS

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/02/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-15								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	12:55														
MW-02-15	13:10	24	16								1,000	1000	49	0.3	0.1
	13:25	24	14								2,000	1100	54	0.6	0.2
	13:40	24	15								1,600	1100	54	0.5	0.1
	13:55	24	15								1,600	1100	54	0.5	0.1
	14:25	24	15								1,400	1250	61	0.5	0.2
	15:25	24	15								1,200	1000	49	0.3	0.3
	16:25	24	15								1,600	1000	49	0.5	0.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-15	4"		68.25	68.70	0.45	-	68.85	0.00	-0.53

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-15	0 (closed)	68'	Hydrocarbons (vapor):	2	pounds
Truck Operator:	Brammer				Hydrocarbons (liquid):	56.0	gallons
Truck No.:	150				Total Hydrocarbons:	56.2	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	265	gallons

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Pump Information	
Time:	~~12:55-16:25~~
# Pumps:	2
RPMs:	1,000

Notes :
Gauged wells all AM.

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/03/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-13	MW-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	9:10														
MW-02-13	9:40	24	12	13							9,000	1000	49	2.5	0.6
MW-06	10:10	24	12	15							6,400	1100	54	2.0	1.0
	11:10	24	13	17							7,600	1000	49	2.1	2.1
	12:10	24	14	19							22,000	1000	49	6.2	6.2
	13:10	24	14	19							16,000	1400	69	6.3	6.3
	14:10	24	15	20							5,000	1400	69	2.0	2.0
	15:10	24	15	20							5,000	1400	69	2.0	2.0
	16:10	24	15	21							7,600	1100	54	2.4	2.4
	17:10	25	15	21							8,200	1000	49	2.3	2.3

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-13	4"		45.80	46.03	0.23	48.59	48.60	0.01	-2.76
MW-06	4"		44.16	44.38	0.22	-	51.62	0.00	-7.43

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-02-13	0 (closed)	48'
Truck Operator:	Brammer	MW-06	0 (closed)	48'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	25	pounds
Hydrocarbons (liquid):	46.0	gallons
Total Hydrocarbons:	50.1	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	648	gallons

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Pump Information	
Time:	9:10-17:10
# Pumps:	2
RPMs:	1,000

Notes :
On-site at 7:30, battery dead on enginnes, went to town to buy a replacement.

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/04/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-21								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-21	8:00	24	6								30,000	1300	64	11.0	2.7
	8:15	24	6								44,000	1500	74	18.6	4.6
	8:30	24	7								58,000	1800	88	29.4	7.3
	8:45	24	7								52,000	1800	88	26.4	6.6
	9:15	24	5								50,000	1600	78	22.5	11.3
	9:45	24	5								50,000	1600	78	22.5	11.3
	10:45	24	5								46,000	1500	74	19.4	19.4
	11:45	24	5								46,000	1600	78	20.7	20.7
	12:45	24	4								48,000	1500	74	20.3	20.3
	13:45	24	10								30,000	1500	74	12.7	12.7
	14:45	24	10								42,000	1500	74	17.7	17.7
	15:45	24	10								44,000	1500	74	18.6	18.6

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-21	4"		68.85	77.10	8.25	-	70.59	0.00	-0.50

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-21	0 (closed)	72'	Hydrocarbons (vapor):	153	pounds
Truck Operator:	Vitovic				Hydrocarbons (liquid):	16.0	gallons
Truck No.:	150				Total Hydrocarbons:	41.3	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	141	gallons

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Pump Information	
Time:	7:45-15:45
# Pumps:	2
RPMs:	1,000

Notes :
Lowered stinger to 74' at 09:00, Raised stinger to 72' at 11:45
Lowered stinger to 75' at 13:10, Raised stinger to 72' at 14:25

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/05/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-15	EB-08							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-02-15	8:15	24	13								1,400	1400	69	0.6	0.1
	8:45	24	14								1,400	1500	74	0.6	0.3
	9:45	24	14								2,000	1000	49	0.6	0.6
	10:45	24	14								2,400	1000	49	0.7	0.7
	11:45	24	15								2,000	1000	49	0.6	0.6
	12:00														
EB-08	12:30	24		14							2,200	1100	54	0.7	0.3
	13:00	24		15							2,800	1000	49	0.8	0.4
	14:00	24		16							3,600	1000	49	1.0	1.0
	15:00	24		17							4,400	1200	59	1.5	1.5
	16:00	24		17							34,000	1200	59	11.5	11.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-15	4"		65.35	65.55	0.20	-	68.85	0.00	-3.47
EB-08	2"		73.51	74.00	0.49	-	75.50	0.00	-1.92

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-15	0 (closed)	66'	Hydrocarbons (vapor):	17	pounds
Truck Operator:	Vitovic	EB-08	0 (closed)	74'	Hydrocarbons (liquid):	29.0	gallons
Truck No.:	150				Total Hydrocarbons:	31.8	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	333	gallons

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Pump Information	
Time:	7:45-16:00
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/06/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-21								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-21	8:15	23	8								20,000	2500	123	14.1	3.5
	8:45	22	9								24,000	2200	108	14.9	7.4
	9:45	22	9								20,000	2200	108	12.4	12.4
	10:45	22	9								18,000	2500	123	12.7	12.7
	11:45	22	9								16,000	2400	118	10.8	10.8
	12:45	22	9								20,000	2300	113	13.0	13.0
	13:45	22	9								20,000	2500	123	14.1	14.1
	14:45														
	15:45	22	9								10,000	2500	123	7.0	7.0
	16:45	22	9								8,800	2800	137	6.9	6.9
	17:45	22	9								8,400	2800	137	6.6	6.6

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-21	4"		68.70	68.76	0.06	-	70.20	0.00	-1.49

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-21	0 (closed)	72'	Hydrocarbons (vapor):	94	pounds
Truck Operator:	Vitovic				Hydrocarbons (liquid):	12.0	gallons
Truck No.:	150				Total Hydrocarbons:	27.6	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	163	gallons

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Pump Information	
Time:	7:45-17:45
# Pumps:	2
RPMs:	1,000

Notes :
Truck was down from 14:30 to 15:30

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/07/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-13	MW-06							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-02-13	8:15	23	18	14							5,800	2100	103	3.4	0.9
MW-06	8:45	23	20	15							6,000	2000	98	3.4	1.7
	9:45	23	19	15							5,000	2000	98	2.8	2.8
	10:45	23	19	15							4,400	2000	98	2.5	2.5
	11:45	23	20	15							3,000	2000	98	1.7	1.7
	12:45	24	20	15							2,200	2500	123	1.5	1.5
	13:45	24	20	15							2,400	2700	132	1.8	1.8
	14:45	24	20	15							2,600	2800	137	2.0	2.0
	15:45	25	20	15							2,400	2800	137	1.9	1.9

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-13	4"		47.28	47.35	0.07	-	48.38	0.00	-1.09
MW-06	4"		45.60	45.63	0.03	-	49.98	0.00	-4.38

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth
Subcontractor:	EcoVac	MW-02-13	0 (closed)	48'
Truck Operator:	Vitovic	MW-06	0 (closed)	45'
Truck No.:	150			
Vacuum Pumps:	Becker			
Pump Type:	Twin LC-44s			
Tank Capacity (gal.):	2,894			
Stack I.D. (inches)	3.0			

Recovery/Disposal Information		
Hydrocarbons (vapor):	17	pounds
Hydrocarbons (liquid):	16.0	gallons
Total Hydrocarbons:	18.8	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	369	gallons

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Pump Information	
Time:	7:45-15:45
# Pumps:	2
RPMs:	1,000

Notes :

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Mosley	Date: 12/08/19

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	EB-08	MW-21							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:30														
EB-08	8:00	24	9								2,000	1700	83	1.0	0.2
	8:30	24	10								4,000	1900	93	2.1	1.1
	9:30	24	11								4,800	1700	83	2.3	2.3
	10:30	24	11								4,600	1800	88	2.3	2.3
	11:00	24	11								5,200	1800	88	2.6	1.3
	11:15														
MW-21	11:45	24		5							7,800	1800	88	4.0	2.0
	12:45	23		4							32,000	1700	83	15.3	15.3
	13:45	23		4							40,000	1700	83	19.1	19.1
	14:45	23		4							46,000	1700	83	22.0	22.0

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		74.39	74.50	0.11	-	75.35	0.00	-0.94
MW-21	4"		68.63	68.78	0.15	-	71.50	0.00	-2.85

Vacuum Truck Information	
Subcontractor:	EcoVac
Truck Operator:	Vitovic
Truck No.:	150
Vacuum Pumps:	Becker
Pump Type:	Twin LC-44s
Tank Capacity (gal.):	2,894
Stack I.D. (inches)	3.0

Well ID	Breather Port	Stinger Depth
EB-08	0 (closed)	74'
MW-21	0 (closed)	72'

Recovery/Disposal Information		
Hydrocarbons (vapor):	66	pounds
Hydrocarbons (liquid):	12.0	gallons
Total Hydrocarbons:	22.8	equiv. gals.
Molecular Weight Utilized:	36.3	g/mole
Disposal Facility:	On-Site	
Manifest Number:		
Total Liquids Removed:	61	gallons

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Pump Information	
Time:	7:30-14:45
# Pumps:	2
RPMs:	1,000

Notes :

From: Jeff Brammer
To: Mark Larson
Subject: RE: Empire Abo
Date: Tuesday, February 9, 2021 4:22:42 AM

Here are the totals for 2020.

Month	lbs. (vapor)	eq. gals. (vapor)	gals. (liquid)
January	1,374	226.4	105
March	117.3	19.5	149
May	161.5	26.8	50
June	770.9	127.2	25
October	357.2	58.9	130
December	843.2	139.1	46
	3,624.1	597.9	505

From: Mark Larson [mailto:Mark@laenvironmental.com]
Sent: Thursday, February 04, 2021 4:34 PM
To: Jeff Brammer <Jeff.Brammer@ecovacservices.com>
Subject: Re: Empire Abo

Hello Jeffery,
Would you please provide for 2020 (January through December) to following:

- Total volume (lbs/tons) of VOCs combusted
- Total volume (gallons) of liquid VOCs recovered.

Thank you,
Mark

ECOVAC SERVICES
The World Leader in Mobile Dual-Phase/Multi-Phase Extraction
Patented SURFAC®/COSOLV®/ISCO-EFR®
Treatability Testing/Research and Development

February 09, 2021

Mr. Mark Larson
President
Larson & Associates, Inc.
507 N Marienfeld St #205
Midland, Texas 79701-4356
Mark@laenvironmental.com

Subject: **Enhanced Fluid Recovery (EFR®) Report**
February 02 through 06, 2021
AKA Energy
Former Empire Abo Gas Processing Plant
Eddy County, Artesia, New Mexico

Dear Mr. Larson:

Please find attached the data summary for the EFR® remediation conducted at the subject site on February 02 thru 06, 2021. The EFR® remediation was implemented in numerous wells located inside the facility fence. EFR® is a mobile multi-phase/dual-phase extraction technology shown to be effective for mass removal of hydrocarbons in the soils/groundwater.

February 02, 2021

EFR® was performed for 8.0 hours at well MW-02-11 for this event. Separate-phase hydrocarbons (SPH) were not detected in well MW-02-11 as the well was dry prior to conducting this event, and upon conclusion of this event.

A calculated total of 611 pounds of petroleum hydrocarbons (approximately 100.8 equivalent gallons of hydrocarbon) in vapor concentrations were removed during this EFR® event on February 02, 2021.

The hydrocarbon vapor extraction removal rate varied from a high of 84.5 pounds per hour during the initial portion of the event, and at the end of the event, to a low of 50.7 pounds per hour at the very beginning of the event. The hydrocarbon removal rate was extremely high, and was slightly variable during the event.

Vapor concentrations varied from a high of greater than 100,000 parts per million by volume (PPM_V) throughout most of the event, to a low of 60,000 PPM_V at the very beginning of the

event. The concentrations were extremely high throughout the event, and were constant after the initial reading.

The range of vacuum readings recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	20 to 21 inches of mercury
MW-02-11	8 to 17 inches of mercury

Groundwater Drawdown

Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-11	dry	Extraction Well

Groundwater Extraction

A total of 0 gallons of fluid were extracted from the well during this 8.0-hour event.

February 03, 2021

EFR® was performed for 8.0 hours at well MW-02-11 for this event. Separate-phase hydrocarbons (SPH) were not detected in well MW-02-11 as the well was dry prior to conducting this event, and upon conclusion of this event.

A calculated total of 431.7 pounds of petroleum hydrocarbons (approximately 71.2 equivalent gallons of hydrocarbon) in vapor concentrations were removed during this EFR® event on February 03, 2021.

The hydrocarbon vapor extraction removal rate varied from a high of 84.5 pounds per hour at the beginning of the event, to a low of 42.2 pounds per hour at the end of the event. The hydrocarbon removal rate was extremely high, and decreased during the event.

Vapor concentrations varied from a high of greater than 100,000 parts per million by volume (PPM_V) at the beginning of the event, to a low of 50,000 PPM_V at the end of the event. The concentrations were extremely high throughout the event, and decreased during the event.

The range of vacuum readings recorded during this EFR® event from the monitor well is detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	21 to 23 inches of mercury
MW-02-11	16 inches of mercury

Groundwater Drawdown
Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-11	dry	Extraction Well

Groundwater Extraction
A total of 0 gallons of fluid were extracted from the well during this 8.0-hour event.

February 04, 2021

EFR® was performed for 8 hours at wells MW-02-10 and MW-04 for this event. Separate-phase hydrocarbons (SPH) were not detected in either well prior to conducting this EFR® event, as both wells were dry (mud in the bottom). SPH was not detected in either well upon conclusion of this event.

A calculated total of 587.4 pounds of petroleum hydrocarbons (approximately 101.9 equivalent gallons of hydrocarbon) in vapor concentrations, in addition to 5 gallons of liquid phase hydrocarbons, were removed during this EFR® event on February 04, 2021.

The hydrocarbon vapor extraction removal rate varied from a high of 84.5 pounds per hour near the beginning of the event, to a low of 56.3 pounds per hour at the end of the event. The hydrocarbon removal rate slightly decreased during the event, and was very high throughout the event.

Vapor concentrations varied from a high of greater than 100,000 parts per million by volume (PPM_V) at the beginning of the event, to a low of 76,000 PPM_V one hour into the event. The concentrations were high, and generally decreased during the event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	21 inches of mercury
MW-02-10	6 to 15 inches of mercury
MW-04	5 to 9 inches of mercury

Groundwater Drawdown
Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-02-10*	~0.98 feet	Extraction Well
MW-04*	>3.00 feet	Extraction Well

* - was initially dry

Groundwater Extraction
A total of 69 gallons of fluid was extracted from the wells during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

February 05, 2021

EFR® was performed for 2 hours at well EB-08, and for ~1.0 hour at MW-23, and for 4.75 hours at MW-21 and MW-02-12 for this event. Separate-phase hydrocarbons (SPH) were detected in wells EB-08, MW-21 and MW-02-12, at a thickness of 0.24', 0.35', and 0.01', respectively, prior to conducting this EFR® event. SPH was not detected in any well upon conclusion of this event.

A calculated total of 125.1 pounds of petroleum hydrocarbons (approximately 20.6 equivalent gallons of hydrocarbon) in vapor concentrations, in addition to 44 gallons of liquid phase hydrocarbons, were removed during this EFR® event on February 05, 2021.

The hydrocarbon vapor extraction removal rate varied from a high of 30.4 pounds per hour near the middle of the MW-21 and MW-02-12 event, to a low of 1.7 pounds per hour at the beginning of the MW-23 event.

Vapor concentrations varied from a high of 36,000 parts per million by volume (PPM_V) near the middle of the MW-02-12 and MW-21 event, to a low of 2,300 PPM_V at the beginning of the MW-23 event. The concentrations were high from MW-02-12 and MW-21, and were elevated from EB-08 and MW-23.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	23 to 24 inches of mercury
EB-08	13 inches of mercury
MW-23	12 inches of mercury
MW-21	7 inches of mercury
MW-02-12	10 to 16 inches of mercury

Groundwater Drawdown
Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
EB-08	0.18 feet	Extraction Well
MW-23	0.33 feet	Extraction Well
MW-21	-0.18 feet	Extraction Well
MW-02-12	2.82 feet	Extraction Well

Groundwater Extraction
A total of 101 gallons of fluid were extracted from the wells during this 8-hour event. The fluids were off-loaded to an aboveground tank on-site.

February 06, 2021

EFR® was performed for 6.0 hours at well MW-10 for this event. Separate-phase hydrocarbons (SPH) were detected in well MW-10, at a thickness of 0.03' prior to conducting this EFR® event. SPH was not detected in well MW-10 upon conclusion of this event.

A calculated total of 84.8 pounds of petroleum hydrocarbons (approximately 14.0 equivalent gallons of hydrocarbon) in vapor concentrations were removed during this EFR® event on February 06, 2021.

The hydrocarbon vapor extraction removal rate varied from a high of 56.3 pounds per hour at the beginning of the MW-10 event, to a low of 9.3 pounds per hour in the middle of the MW-10 event. The removal rate was high to elevated, throughout the MW-10 event.

Vapor concentrations varied from a high of greater than 100,000 parts per million by volume (PPM_V) at the beginning of the MW-10 event, to a low of 66,000 PPM_V in the middle of the event. The concentrations were very high throughout the MW-10 event.

The range of vacuum readings recorded during this EFR® event from the monitor wells are detailed in the attached EFR® Field Data Sheet and summarized below:

Extraction Well	Vacuum Readings
Truck	21 inches of mercury
MW-10	4 inches of mercury

Groundwater Drawdown
Groundwater levels were recorded during this event to assess the groundwater drawdown created by EFR®. The groundwater drawdown data is summarized below:

Monitor Well	Maximum Change	Well Type
MW-10	1.17 feet	Extraction Well

Groundwater Extraction
A total of 0 gallons of fluid were extracted from the well during this event.

Hydrocarbon Mass Removal Summary

A significant amount of hydrocarbon mass in vapor form and liquid form was removed during this 5-day event. The following table summarizes the hydrocarbon mass removal totals.

Table: Hydrocarbon Mass Removal Summary

	Hydrocarbon Mass Extraction				
Wells	Date	Vapor lbs.	Vapor Equivalent Gallons	Liquid gallons	**Total Gallons**
MW-02-11	02/02/21	611	100.8	0	**100.8**
MW-02-11	02/03/21	431.7	71.2	0	**71.2**
MW-02-10 MW-04	02/04/21	587.4	101.9	5	**106.9**
EB-08 MW-23 MW-21 MW-02-12	02/05/21	125.1	20.6	44	**64.6**
MW-10	02/06/21	84.8	14.0	0	**14.0**
	Totals:	1,840	308.5	49	**357.5**

Fluid Extraction

A total of 170 gallons of fluids (121 gallons of water and 49 gallons of liquid phase gas) was extracted and off-loaded to an on-site tank.

Thank you for this opportunity to team with Larson & Associates, Inc. in serving the environmental needs of your clients. We look forward to working with you again in the future to provide innovative and cost effective environmental solutions at this and other sites.

Sincerely,
EcoVac Services

Jeffrey M. Brammer

Jeffrey M. Brammer, PG
Western Regional Manager, Hydrogeologist

Attachments:

1. Field Data Sheets

ATTACHMENT 1

FIELD DATA SHEETS

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Brammer	Date: 02/02/2021

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-11								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	9:15														
MW-02-11	9:30	21	8								60,000	3000	147	50.7	12.7
	9:45	21	11								100,000	3000	147	84.5	21.1
	10:15	20	14								100,000	3000	147	84.5	42.2
	11:15	20	16								100,000	3000	147	84.5	84.5
	12:15	20	16								100,000	3000	147	84.5	84.5
	13:15	20	16								100,000	2500	123	70.4	70.4
	14:15	20	17								100,000	2500	123	70.4	70.4
	15:15	20	17								100,000	2500	123	70.4	70.4
	16:15	20	17								100,000	2500	123	70.4	70.4
	17:15	20	17								100,000	3000	147	84.5	84.5

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-11	4"	23.00	-	dry	0.00	-	dry	0.00	

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-11	cracked	23'	Hydrocarbons (vapor):	611.0	pounds
Truck Operator:	Mosley				Hydrocarbons (liquid):		gallons
Truck No.:	154				Total Hydrocarbons:	100.8	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	0	gallons

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Pump Information	
Time:	9:15-17:15
# Pumps:	2
RPMs:	1,000

Notes :
onsite 8:00

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Brammer	Date: 02/03/2021

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-11								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	8:15														
MW-02-11	8:30	23	16								100,000	3000	147	84.5	21.1
	8:45	23	16								100,000	3000	147	84.5	21.1
	9:15	22	16								90,000	3000	147	76.0	38.0
	10:15	22	16								70,000	3000	147	59.1	59.1
	11:15	21	16								70,000	3000	147	59.1	59.1
	12:15	21	16								62,000	3000	147	52.4	52.4
	13:15	21	16								60,000	3000	147	50.7	50.7
	14:15	22	16								54,000	3000	147	45.6	45.6
	15:15	22	16								50,000	3000	147	42.2	42.2
	16:15	22	16								50,000	3000	147	42.2	42.2

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-11	4"	23.00	-	dry	0.00	-	dry	0.00	

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-11	cracked	23'	Hydrocarbons (vapor):	431.7	pounds
Truck Operator:	Mosley				Hydrocarbons (liquid):		gallons
Truck No.:	154				Total Hydrocarbons:	71.2	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	0	gallons

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Pump Information	
Time:	8:15-16:15
# Pumps:	2
RPMs:	1,000

Notes :
onsite 8:00

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Brammer	Date: 02/04/2021

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-02-10	MW-04							Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	8:15														
MW-02-10	8:30	21	8	6							100,000	2500	123	70.4	17.6
MW-04	8:45	21	15	6							100,000	3000	147	84.5	21.1
	9:15	21	15	6							76,000	3000	147	64.2	32.1
	10:15	21	8	5							100,000	3000	147	84.5	84.5
	11:15	21	8	6							100,000	3000	147	84.5	84.5
	12:15	21	6	9							96,000	3000	147	81.1	81.1
	13:15	21	6	9							98,000	3000	147	82.8	82.8
	14:15	21	6	9							95,000	2500	123	66.9	66.9
	15:15	21	6	7							86,000	2500	123	60.5	60.5
	16:15	21	6	7							80,000	2500	123	56.3	56.3

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-02-10	4"	75.00	-	dry*	0.00	-	74.02	0.00	
MW-04	4"	65.00	-	dry**	0.00	-	59.26	0.00	

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-02-10	cracked	70'	Hydrocarbons (vapor):	587.4	pounds
Truck Operator:	Mosley	MW-04	cracked	63'	Hydrocarbons (liquid):	5.0	gallons
Truck No.:	154				Total Hydrocarbons:	101.9	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	69	gallons

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Pump Information	
Time:	8:15-16:15
# Pumps:	2
RPMs:	1,000

Notes :
* - approximately 73' to mud
** - approximately 63' to mud
onsite 8:00

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Brammer	Date: 02/05/2021

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	EB-08	MW-23	MW-21	MW-02-12					Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	8:30														
EB-08	8:45	24	13								2,600	2500	123	1.8	0.5
	9:00	24	13								3,400	2300	113	2.2	0.6
	9:30	24	13								4,200	2300	113	2.7	1.4
	10:30	24	13								3,800	2600	127	2.8	2.8
	10:35														
MW-23	10:45	23		12							2,300	2600	127	1.7	0.3
	11:00	23		12							3,000	2500	123	2.1	0.5
	11:30	23		12							3,800	2500	123	2.7	1.3
	11:45														
MW-02-12	12:00	24			7	16					6,800	2500	123	4.8	1.2
MW-21	12:30	24			7	16					30,000	2000	98	16.9	8.4
	13:30	24			7	10					34,000	3000	147	28.7	28.7
	14:30	24			7	10					35,000	3000	147	29.6	29.6
	15:30	24			7	10					36,000	3000	147	30.4	30.4
	16:30	24			7	10					30,000	2300	113	19.4	19.4

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
EB-08	2"		79.22	79.46	0.24	-	79.08	0.00	0.18
MW-23	4"		-	79.31	0.00	-	78.98	0.00	0.33
MW-21	4"		73.73	74.08	0.35	-	73.96	0.00	-0.18
MW-02-12	4"		73.97	73.98	0.01	-	71.15	0.00	2.82

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	EB-08	cracked	80'	Hydrocarbons (vapor):	125.1	pounds
Truck Operator:	Mosley	MW-23	cracked	80'	Hydrocarbons (liquid):	44.0	gallons
Truck No.:	154	MW-21	cracked	74'	Total Hydrocarbons:	64.6	equiv. gals.
Vacuum Pumps:	Becker	MW-02-12	cracked	74'	Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	101	gallons

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Pump Information	
Time:	8:30-16:30
# Pumps:	2
RPMs:	1,000

Notes :
onsite 8:00

EFR® FIELD DATA SHEET

Client: Larson & Associates	Facility: AKA Energy - Former Empire Abo Gas Plant	Event #
Facility Address : Eddy County, Artesia, NM	Technician: Brammer	Date: 02/06/2021

Extraction Well(s)	Time hh:mm	Extraction Well-head Vacuum (in. Hg)									Vacuum Truck Exhaust				
		Inlet	MW-10								Concentration PPM	Offgas Velocity FT/MIN	Flow Rate CFM	Removal Rate LBS/HR	Interval Removal LBS
Start Time:	7:45														
MW-10	8:00	21	4								100,000	2000	98	56.3	14.1
	8:15	21	4								100,000	2000	98	56.3	14.1
	8:45	21	4								100,000	400	20	11.3	5.6
	9:45	21	4								100,000	400	20	11.3	11.3
	10:45	21	4								78,000	450	22	9.9	9.9
	11:45	21	4								66,000	500	25	9.3	9.3
	12:45	21	4								70,000	500	25	9.9	9.9
	13:45	21	4								76,000	500	25	10.7	10.7

Well Gauging Data:			Before EFR® Event			After EFR® Event			Corr. DTW
Well No.	Diam.	TD (ft)	DTS (ft)	DTW (ft)	SPH (ft)	DTS (ft)	DTW (ft)	SPH (ft)	Change (ft)
MW-10	4"		52.53	52.56	0.03	-	51.36	0.00	1.17

Vacuum Truck Information		Well ID	Breather Port	Stinger Depth	**Recovery/Disposal Information**		
Subcontractor:	EcoVac	MW-10	cracked	52'	Hydrocarbons (vapor):	84.8	pounds
Truck Operator:	Mosley				Hydrocarbons (liquid):		gallons
Truck No.:	154				Total Hydrocarbons:	14.0	equiv. gals.
Vacuum Pumps:	Becker				Molecular Weight Utilized:	36.3	g/mole
Pump Type:	Twin LC-44s				Disposal Facility:	On-Site	
Tank Capacity (gal.):	2,894				Manifest Number:		
Stack I.D. (inches)	3.0				Total Liquids Removed:	0	gallons

ECOVAC SERVICES
www.ecovacservices.com
405-895-9990

Pump Information	
Time:	7:45-13:45
# Pumps:	2
RPMs:	1,000

Notes :

Appendix F

EPA Communications

From: Sales, James
To: Mark Larson
Subject: RE: Final PCB Remediation Plan, Empire Abo Gas Plant, Section 3 (NE/4, SE/4), Township 18 South Range 37 East, Eddy County, New Mexico
Date: Tuesday, February 4, 2020 11:25:46 AM

Hello. I have reviewed your plan and find it acceptable. You may proceed with your project. I didn't see the certification required under 761.61(a)(3)(E).

From: Mark Larson <Mark@laenvironmental.com>
Sent: Friday, January 24, 2020 2:53 PM
To: Sales, James <sales.james@epa.gov>
Cc: 'gstahnke@sugf.com' <gstahnke@sugf.com>
Subject: Re: Final PCB Remediation Plan, Empire Abo Gas Plant, Section 3 (NE/4, SE/4), Township 18 South Range 37 East, Eddy County, New Mexico

Dear Mr. Sales,
Larson & Associates, Inc., submits this final PCB remediation plan to EPA Region 6 on behalf of AKA Energy Group, LLC, a wholly owned subsidiary of Southern Ute Indian Tribe Growth Fund (SUGF) and former owner of the Empire Abo Gas Plant (Facility) located in Eddy County, New Mexico. If you have any questions or require additional information please contact Mr. Graham Stahnke with Aka Energy Group, LLC at (970) 759-5712 or email gstahnke@sugf.com or me using contact information below.
Respectfully,

Mark J. Larson, P.G.
President/Sr. Hydrogeologist
507 N. Marienfeld St., Suite 202
Midland, Texas 79701
Office – 432-687-0901
Cell – 432- 556-8656
Fax – 432-687-0456
mark@laenvironmental.com

Larson & Associates, Inc.
Environmental Consultants

"Serving the Permian Basin Since 2000"

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 37532

CONDITIONS

Operator:	OGRID:
Aka Energy Group, LLC 125 Mercado St, Suite 201 Durango, CO 80301	330743
	Action Number: 37532
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See app ID 145697 for most updated status.	1/31/2023