CITY OF ALBUQUERQUE

Mr. Justin Ball
Remediation Oversight Section
Groundwater Quality Bureau
New Mexico Environment Department
121 Tijeras Ave. NE
Suite 1000
Albuquerque, NM 87102

January 27, 2021

RE: City of Albuquerque Los Angeles Landfill Half Two (2) 2020 Stage 2 Voluntary Abatement Plan Report

Dear Mr. Ball:

The City of Albuquerque (COA) Environmental Health Department (EHD) submits this 2nd **Half 2020** (H-02 2020) Monitoring Report to the New Mexico Environment Department (NMED) as a requirement of the Stage 2 Voluntary Abatement Plan (S2VAP).

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Ground Water Analytical Results

As of H-02 2020, two monitoring wells were initially over S2VAP Remedial Action Objectives. Monitoring wells LALF03 had a concentration of 7.0 µg/l for Tetrachloroethene and GWEX2 had a concentration of 5.8 µg/l for Tetrachloroethene during the August 2020 sampling event. Monitoring Wells LALF03 and GWEX2 were subsequently resampled and tested in November 2020 and only one well remained over S2VAP Remedial Action Objectives (LALF03 had a concentration of 6.5 µg/l for Tetrachloroethene, GWEX2 had a concentration of 3.6 µg/l for Tetrachloroethene).

Monitoring Well LALF03 is located in the South Eastern portion of the Los Angeles Landfill. Several wells are downgradient of LALF03 including LALF09, LALF10, LALF22, LALF23, GWEX4, and LALF24. EHD monitors all of these wells on a biannual basis and believes that it will be able to detect if there is an increase in PCE throughout the well network.

Analytical results from the following monitoring wells were above the Water Quality Control Commission standards for manganese: GWEX2 (0.35 mg/l August 2020, 0.68 mg/l November 2020), LALF01 (1.5 mg/l), LALF07 (0.49 mg/l), LALF09 (0.23 mg/l), LALF10 (0.24 mg/l), LALF11 (0.85 mg/l), LALF13 (0.31 mg/l), LALF14 (1.4 mg/l), LALF16 (2.6 mg/l, LALF18 (1.3 mg/l), and LALF19 (0.25 mg/l).

As previously stated in the June 2018 Abatement Plan Modification Proposal, data from LALF15 indicate a sulfate richer aquifer, aerobic conditions, and potentially impacted by upgradient nitrate concentrations. Of interest is the presence of manganese in this upgradient well. Typically, manganese is not present in groundwater when aerobic conditions exist with elevated nitrate concentrations. It is likely that LALF15 is affected by upgradient river valley anoxic conditions that have transported dissolved manganese and a non-oxidized form of nitrogen. When this transported water reaches aerobic conditions, as seen in LALF15 due to the higher dissolved oxygen concentrations, the nitrogen is oxidized to nitrate while the dissolved manganese remains in solution and has not reached highly oxygenated conditions capable of precipitation.

Analytical results from the following monitoring wells were above the Water Quality Control Commission standards for iron: GWEX2 (4.1 mg/l), GWEX4 (1.1 mg/l).

Analytical results from monitoring well LALF06 was equal to the Water Quality Control Commission standards for nickel of 0.2 mg/l.

Analytical results from monitoring well LALF05 was above the Water Quality Control Commission standards for Nitrogen, Nitrate. The well had a concentration of 14 mg/l.

All other wells sampled were below all S2VAP standards and all NMED Groundwater Quality Standards.

Groundwater Level Monitoring Requirements Revision

Due to the COVID-19 pandemic COA, EHD requested that groundwater level monitoring requirements for LALF be changed from monthly to quarterly. On March 13, 2020, Justin Ball, Team Leader NMED GWQB, approved the change in groundwater level monitoring for the duration of the outbreak.

Based on the revision of the groundwater level monitoring requirements water level readings were measured and recorded for July, August, and November 2020.

Groundwater elevations are reported in Table 5 and the groundwater elevation contours are reported in Figure 6 – Figure 8.

Soil Vapor Testing

In accordance with Section 4.2 and Table 10 of the modified S2VAP soil vapor probes M20 and M21 were sampled on September 28, 2020. The samples were analyzed for VOCs using EPA method TO-15.

The probe samples were below all Residential NMED Soil Screening Levels (NMSSL). Several chemical compounds were detected but none were over the Residential NMSSLs. All analytical detections are reported in Table 6.

Source Zone Capture Monitoring

In accordance with Section 4.2 and Table 10 of the modified S2VAP the Soil Vapor Extraction System (SVE) and Landfill Gas Extraction and Destruction System (Flare) were sampled on September 28, 2020. The samples were analyzed for VOCs using EPA method TO-15. All analytical detections are reported in Table 7.

The analytical results were used to calculate the estimated removal of chlorinated alkenes from the waste prism as well as from the vadose zone below and in the proximity of LALF. In calculating the removal, the average flow rate of each system from July 1, 2020 through December 31, 2020 was used. The average flow rate for the Flare was 246.8 CFM and the average flow rate for the SVE was 550.4 CFM.

In H-02 2020 it is estimated that the Flare and SVE combined to remove 136.16 pounds of Chlorinated Alkenes (Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, Vinyl chloride, trans-1,2-Dichloroethene, and Methylene chloride) from the source zone. The mass of Chlorinated Alkenes Removed from the Source Zone by the Flare and SVE is reported in Table 8.

Soil Vapor Well Sampling

In accordance with Section 4.2 and Table 10 of the modified S2VAP the 20 SVE wells were sampled on September 28, 2020. The samples were analyzed for VOCs using EPA method TO-15. All analytical detections are reported in Table 9.

First order Degradation Rates Update

In accordance with Section 5.1 of the modified S2VAP the first order degradation rates for LALF09, LALF10, LALF12, and GWEX4 were updated. This first order attenuation rate method used is from an EPA issued paper that explains when and how to apply these rate constant calculations to MNA studies (Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies, EPA, 2002). This is the same methodology that was used in the S2VAP modification proposal from June 2018.

The concentration versus time attenuation rate constant for LALF09 began with an initial PCE concentration of 10 µg/l in February 2010. The rate constant provides the slope of the best fit logarithmic line of 0.1319 with a good regression fit of 0.9026. LALF09 has been below 5 µg/l since November 6, 2015. The calculations and plot can be found in Figure 9.

The concentration versus time attenuation rate constant for LALF-10 began with an initial PCE concentration of 15 µg/l in February 2010. The rate constant provides the slope of the best fit logarithmic line of 0.1674 with a good regression fit of 0.9671. LALF10 has been below 5 µg/l since August 14, 2017. The calculations and plot can be found in Figure 10.

The concentration versus time attenuation rate constant for LALF-12 began with an initial PCE concentration of 8.5 µg/l in February 2010. The rate constant provides the slope of the best fit logarithmic line of 0.2199 with a good regression fit of 0.9594. LALF10 has been below 5 µg/l since November 7, 2012. The calculations and plot can be found in Figure 11.

The concentration versus time attenuation rate constant for GWEX4 began with an initial PCE concentration of 11 µg/l in May 2014. This value represents the highest value for GWEX4. The rate constant provides the slope of the best fit logarithmic line of 0.2204 with a regression fit of 0.8131. GWEX4 has been below 5 µg/l since February 7, 2019. The calculations and plot can be found in Figure 12.

Microbial Bioanalysis and Compound Specific Isotope Analysis

During a March 13, 2020 phone conversation with Justin Ball, Team Leader NMED GWQB, we discussed that based on H-01 2020 sampling results and other previous sampling results that the chlorinated solvent levels in groundwater monitoring wells LALF09, LALF10, LALF12, GWEX2, and GWEX4 were all below the regulatory standard for these compounds. LALF12 in particular was and continues to be either non-detect of near the detection limits for all of the chlorinated compounds. Many of the wells are non-detect or near the detection limits for Dichloroethene, Trichloroethene, and Vinyl Chloride. Based on previous and current results it was becoming increasingly difficult to have Compound Specific Isotope Analysis conducted on these samples since significant detections are required in order for the lab to conduct this analysis.

It was further discussed that since LALF09, LALF10, LALF12, GWEX2, and GWEX4 were all below the regulatory standard for these compounds in H-01 2020 and previous sampling events that Microbial Bioanalysis was also becoming unnecessary to conduct. The lack of chlorinated solvents in these wells was leading to a great decrease in the microbial populations in the wells.

Based on the March 13, 2020 phone conversation Microbial Bioanalysis and Compound Specific Isotope Analysis were not conducted in H-02 2020.

Updates/Highlights for H-02 2020 LALF S2VAP:

Pursuant to and in accordance with the approved S2VAP:

- 26 wells were sampled and reported in Table 1;
    - GWEX2, LALF03, and LALF24 were sampled quarterly during H-02 2020.
    - This is the last time that LALF24 will be sampled on a quarterly basis as the upcoming Q1 2021 sampling event will satisfy condition 6 of the S2VAP conditional approval which stated *"The additional downgradient groundwater monitor well shall be sampled on a quarterly basis for two years before shifting to a semi-annual basis."*
- Constituents of concern (CoC), are reported in Table 2;
- Water quality field parameters are reported in Table 3;
- Inorganic monitoring results are reported in Table 4;
- Groundwater elevations are reported in Table 5 and
- Groundwater monitoring wells and CoC concentrations are reported in Figures 1-5.
    - The August 2020 sampling event was used for the creation of these maps.

The landfill gas system at LALF is optimized through a procedure known as balancing. The landfill gas system at LALF is balanced on a bi-weekly basis. The balancing of the landfill gas system ensures that landfill gas generated from the landfill is contained and not moving off-site it also ensures that ambient air is not being introduced into the landfill as this could potentially lead to a landfill gas fire.

The EHD will continue monitoring the groundwater, landfill gas, and vadose zone at the Los Angeles Landfill per the S2VAP. The staff is continuously improving operations to assure compliance with the requirements of NMED.

If you have any questions regarding any aspect of the project, please feel free to contact me at 505.768.2669 or krziegler@cabq.gov.

Sincerely,

Ken R. Ziegler
Senior Environmental Health Scientist
Environmental Health Department

Cc: John Hale, PNM Reeves Station (electronic report)
Carey Slater, American Gypsum Company (electronic report)
Diane Agnew, Albuquerque Bernalillo County Water Utility Authority (electronic report)
File

Table 1
H02 2020 Groundwater Wells Sampled

Location ID	Sample ID	Sample Date	Sample Type
AGPROD	AGPROD-20200824-W-N	8/24/2020	Normal
GWEX2	GWEX2-20200824-W-N	8/24/2020	Normal
	GWEX2-20201110-W-N	11/10/2020	Normal
GWEX4	GWEX4-20200824-W-N	8/24/2020	Normal
LALF01	LALF01-20200824-W-N	8/24/2020	Normal
LALF03	LALF03-20200818-W-N	8/18/2020	Normal
	LALF03-20201110-W-N	11/10/2020	Normal
LALF04	LALF04-20200818-W-N	8/18/2020	Normal
LALF05	LALF05-20200818-W-N	8/18/2020	Normal
LALF06	LALF06-20200818-W-N	8/18/2020	Normal
LALF07	LALF07-20200818-W-N	8/18/2020	Normal
LALF08	LALF08-20200819-W-N	8/19/2020	Normal
LALF09	LALF09-20200819-W-N	8/19/2020	Normal
LALF10	LALF10-20200819-W-N	8/19/2020	Normal
LALF11	LALF11-20200819-W-N	8/19/2020	Normal
LALF12	LALF12-20200824-W-N	8/24/2020	Normal
LALF13	LALF13-20200818-W-N	8/18/2020	Normal
LALF14	LALF14-20200818-W-N	8/18/2020	Normal
LALF15	LALF15-20200818-W-N	8/18/2020	Normal
LALF16	LALF16-20200818-W-N	8/18/2020	Normal
LALF17	LALF17-20200819-W-N	8/19/2020	Normal
LALF18	LALF18-20200819-W-N	8/19/2020	Normal
LALF19	LALF19-20200824-W-N	8/24/2020	Normal
LALF20	LALF20-20200819-W-N	8/19/2020	Normal
LALF21	LALF21-20200819-W-N	8/19/2020	Normal
LALF22	LALF22-20200819-W-N	8/19/2020	Normal
LALF23	LALF23-20200819-W-N	8/19/2020	Normal
LALF24	LALF24-20200824-W-N	8/24/2020	Normal
	LALF24-20201110-W-N	11/10/2020	Normal

Table 2
H02 2020 Groundwater Monitoring Analytical Results

		Location ID and Sample Date			
		AGPROD	GWEX2	GWEX2	GWEX4
Chemical Name	Unit	8/24/2020	8/24/2020	11/10/2020	8/24/2020
1,1-Dichloroethene	ug/l	<0.065	1.40	<0.065	0.26
Chloride	mg/l	12.00	45.00	45.00	32.00
cis-1,2-Dichloroethene	ug/l	<0.195	<0.195	<0.195	0.60
Methylene chloride	ug/l	<0.20	<0.20	<0.20	<0.20
Tetrachloroethene	ug/l	<0.180	**5.80**	3.60	1.90
Total Dissolved Solids	mg/l	280.00	360.00	400.00	502.00
trans-1,2-Dichloroethene	ug/l	<0.245	<0.245	<0.245	<0.245
Trichloroethene	ug/l	<0.10	0.26	<0.10	0.79
Vinyl chloride	ug/l	<0.10	<0.10	<0.10	<0.10

Notes: Non-detects are shown as less than half the detection limit
µg/L = micrograms per liter
mg/L = milligrams per liter
Items in Red and Bold are above Standard

Table 2
H02 2020 Groundwater Monitoring Analytical Results

		LALF01	LALF03	LALF03	LALF04	LALF05	LALF06
Chemical Name	Unit	8/24/2020	8/18/2020	11/10/2020	8/18/2020	8/18/2020	8/18/2020
1,1-Dichloroethene	ug/l	0.33	0.26	<0.065	0.57	<0.065	<0.065
Chloride	mg/l	68.00	35.00	38.00	47.00	74.00	71.00
cis-1,2-Dichloroethene	ug/l	1.80	0.67	<0.195	0.56	<0.195	<0.195
Methylene chloride	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethene	ug/l	2.40	**7.00**	**6.50**	1.60	0.40	1.40
Total Dissolved Solids	mg/l	764.00	402.00	413.00	656.00	808.00	588.00
trans-1,2-Dichloroethene	ug/l	<0.245	<0.245	<0.245	<0.245	<0.245	<0.245
Trichloroethene	ug/l	1.20	1.30	1.50	0.80	0.49	0.26
Vinyl chloride	ug/l	0.74	<0.10	<0.10	<0.10	<0.10	<0.10

Notes: Non-detects are shown as less than half the detection limit
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Table 2
H02 2020 Groundwater Monitoring Analytical Results

		LALF07	LALF08	LALF09	LALF10	LALF11	LALF12	LALF13
Chemical Name	Unit	8/18/2020	8/19/2020	8/19/2020	8/19/2020	8/19/2020	8/24/2020	8/18/2020
1,1-Dichloroethene	ug/l	<0.065	<0.065	<0.065	0.37	<0.065	0.23	0.23
Chloride	mg/l	44.00	20.00	31.00	37.00	76.00	24.00	100.00
cis-1,2-Dichloroethene	ug/l	<0.195	<0.195	0.77	0.78	<0.195	<0.195	<0.195
Methylene chloride	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethene	ug/l	<0.180	<0.180	3.30	3.20	<0.180	0.63	0.36
Total Dissolved Solids	mg/l	682.00	401.00	627.00	690.00	821.00	547.00	708.00
trans-1,2-Dichloroethene	ug/l	<0.245	<0.245	<0.245	<0.245	<0.245	<0.245	<0.245
Trichloroethene	ug/l	<0.10	<0.10	1.50	1.30	<0.10	<0.10	0.28
Vinyl chloride	ug/l	<0.10	<0.10	0.46	<0.10	<0.10	<0.10	<0.10

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mg/L = milligrams per liter
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Table 2
H02 2020 Groundwater Monitoring Analytical Results

		LALF14	LALF15	LALF16	LALF17	LALF18	LALF19	LALF20
Chemical Name	Unit	8/18/2020	8/18/2020	8/18/2020	8/19/2020	8/19/2020	8/24/2020	8/19/2020
1,1-Dichloroethene	ug/l	<0.065	<0.065	<0.065	0.47	<0.065	<0.065	<0.065
Chloride	mg/l	45.00	62.00	43.00	44.00	51.00	20.00	47.00
cis-1,2-Dichloroethene	ug/l	<0.195	0.97	<0.195	<0.195	0.51	<0.195	<0.195
Methylene chloride	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethene	ug/l	<0.180	2.40	0.40	0.56	0.52	<0.180	<0.180
Total Dissolved Solids	mg/l	615.00	711.00	676.00	628.00	560.00	438.00	684.00
trans-1,2-Dichloroethene	ug/l	<0.245	<0.245	<0.245	<0.245	<0.245	<0.245	<0.245
Trichloroethene	ug/l	<0.10	0.80	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl chloride	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

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Table 2
H02 2020 Groundwater Monitoring Analytical Results

		LALF21	LALF22	LALF23	LALF24	LALF24
Chemical Name	Unit	8/19/2020	8/19/2020	8/19/2020	8/24/2020	11/10/2020
1,1-Dichloroethene	ug/l	<0.065	<0.065	<0.065	0.37	<0.065
Chloride	mg/l	48.00	37.00	24.00	75.00	74.00
cis-1,2-Dichloroethene	ug/l	<0.195	<0.195	<0.195	0.51	<0.195
Methylene chloride	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethene	ug/l	<0.180	<0.180	<0.180	<0.180	<0.180
Total Dissolved Solids	mg/l	713.00	631.00	526.00	766.00	756.00
trans-1,2-Dichloroethene	ug/l	<0.245	<0.245	<0.245	<0.245	<0.245
Trichloroethene	ug/l	<0.10	<0.10	<0.10	1.30	1.30
Vinyl chloride	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10

Notes: Non-detects are shown as less than half the detection limit
µg/L = micrograms per liter
mg/L = milligrams per liter
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Table 3
H02 2020 Groundwater Monitoring Field Parameters

		Field Dissolved Oxygen	Field Specific Conductivity	Field Eh Redox potential
Location ID	Sample Date	mg/L	µS/cm	mv
AGPROD	8/24/2020	6.45	387.00	162.40
GWEX2	8/24/2020	1.49	666.00	-118.80
GWEX2	11/10/2020	0.92	558.00	-25.70
GWEX4	8/24/2020	3.45	782.00	15.60
LALF01	8/24/2020	4.62	1111.00	184.30
LALF03	8/18/2020	4.49	605.00	193.90
LALF03	11/10/2020	5.63	515.00	193.20
LALF04	8/18/2020	4.65	755.00	200.80
LALF05	8/18/2020	9.76	1125.00	141.50
LALF06	8/18/2020	4.96	897.00	78.20
LALF07	8/18/2020	6.24	455.60	222.30
LALF08	8/19/2020	5.89	548.00	-112.60
LALF09	8/19/2020	1.59	796.00	-35.00
LALF10	8/19/2020	6.42	930.00	2.40
LALF11	8/19/2020	1.52	1119.00	168.40
LALF12	8/24/2020	1.62	759.00	83.00
LALF13	8/18/2020	8.99	871.00	208.30
LALF14	8/18/2020	4.96	1020.00	230.10
LALF15	8/18/2020	3.86	1003.00	174.50
LALF16	8/18/2020	1.17	970.00	66.50
LALF17	8/19/2020	7.72	880.00	88.50
LALF18	8/19/2020	1.06	715.00	231.40
LALF19	8/24/2020	2.57	597.00	-13.70
LALF20	8/19/2020	6.55	883.00	172.90
LALF21	8/19/2020	4.56	964.00	164.80
LALF22	8/19/2020	5.35	534.00	-45.00
LALF23	8/19/2020	1.65	757.00	-89.50
LALF24	8/24/2020	6.96	581.00	87.70
LALF24	11/10/2020	6.05	775.00	-42.20

Notes:
mg/L = milligrams per liter
mV = millivolts
pH = hydrogen ion concentration, log scale
µS/cm = microSiemens per centimeter
NTU = Nephelometric Turbidity Units
* = No sample analyzed

Table 3
H02 2020 Groundwater Monitoring Field Parameters

		Field pH	Field Temperature	Field Turbidity
Location ID	Sample Date	pH	°C	NTU
AGPROD	8/24/2020	8.09	20.60	1.52
GWEX2	8/24/2020	7.68	25.90	54.20
GWEX2	11/10/2020	7.74	18.00	23.90
GWEX4	8/24/2020	7.44	19.50	15.60
LALF01	8/24/2020	7.35	25.20	28.40
LALF03	8/18/2020	7.64	24.80	2.05
LALF03	11/10/2020	7.55	15.10	19.10
LALF04	8/18/2020	7.65	22.50	2.61
LALF05	8/18/2020	7.59	23.70	4.75
LALF06	8/18/2020	7.31	25.60	95.20
LALF07	8/18/2020	7.63	20.50	1.48
LALF08	8/19/2020	7.93	20.80	2.53
LALF09	8/19/2020	7.65	19.50	1.37
LALF10	8/19/2020	7.51	20.90	0.47
LALF11	8/19/2020	7.53	23.20	2.38
LALF12	8/24/2020	7.73	22.30	6.34
LALF13	8/18/2020	7.63	18.40	10.10
LALF14	8/18/2020	7.29	19.80	19.90
LALF15	8/18/2020	7.56	22.40	3.07
LALF16	8/18/2020	7.39	25.70	0.86
LALF17	8/19/2020	7.40	22.20	0.97
LALF18	8/19/2020	7.20	18.40	1.21
LALF19	8/24/2020	7.94	21.10	2.82
LALF20	8/19/2020	7.70	21.00	1.47
LALF21	8/19/2020	7.67	22.20	1.08
LALF22	8/19/2020	7.70	21.30	0.76
LALF23	8/19/2020	7.88	22.70	1.50
LALF24	8/24/2020	7.70	21.80	4.96
LALF24	11/10/2020	7.89	16.40	2.31

Notes:
mg/L = milligrams per liter
mV = millivolts
pH = hydrogen ion concentration, log scale
µS/cm = microSiemens per centimeter
NTU = Nephelometric Turbidity Units
* = No sample analyzed

Table 4
H02 2020 Groundwater Monitoring Analytical Results: Inorganics

		Arsenic	Bicarbonate	Calcium
Location ID	Date	mg/l	mg/l	mg/l
AGPROD	8/24/2020	0.0031	130.4	55
GWEX2	8/24/2020	0.00011	155	43
GWEX2	11/10/2020	0.00011	166.5	65
GWEX4	8/24/2020	0.00086	223	70
LALF01	8/24/2020	0.0055	321.2	140
LALF03	8/18/2020	0.0023	215.2	74
LALF03	11/10/2020	0.0019	203.1	78
LALF04	8/18/2020	0.0021	277.8	140
LALF05	8/18/2020	0.0025	212.2	150
LALF06	8/18/2020	0.0014	233.9	100
LALF07	8/18/2020	0.0028	270.5	130
LALF08	8/19/2020	0.0015	183.3	79
LALF09	8/19/2020	0.0013	294.8	120
LALF10	8/19/2020	0.0018	307	130
LALF11	8/19/2020	0.0025	229.9	140
LALF12	8/24/2020	0.002	225	110
LALF13	8/18/2020	0.0039	111.2	130
LALF14	8/18/2020	0.0021	248	130
LALF15	8/18/2020	0.0058	252	130
LALF16	8/18/2020	0.0022	292.2	140
LALF17	8/19/2020	0.0022	230.7	120
LALF18	8/19/2020	0.002	208.1	93
LALF19	8/24/2020	0.0021	199	85
LALF20	8/19/2020	0.0021	257.8	120
LALF21	8/19/2020	0.0025	264.4	130
LALF22	8/19/2020	0.0023	259.9	110
LALF23	8/19/2020	0.0021	258.5	99
LALF24	8/24/2020	0.0023	182	150
LALF24	11/10/2020	0.0022	182	160

Items in Red and Bold are above Standard

Notes: Non-detects are shown as less than half the detection limit

mg/L = milligrams per liter

* Samples collected but not analyzed by lab

Table 4
H02 2020 Groundwater Monitoring Analytical Results: Inorganics

	Carbonate	Chloride	Magnesium	Nitrogen, Nitrate (As N)	Nitrogen, Nitrite (As N)
Location ID	mg/l	mg/l	mg/l	mg/l	mg/l
AGPROD	170	12	7.6	0.01	0.007
GWEX2	160	45	13	0.28	0.035
GWEX2	220	45	15	0.05	0.035
GWEX4	220	32	10	1.2	0.035
LALF01	450	68	23	0.8	0.035
LALF03	230	35	9.9	0.34	0.036
LALF03	240	38	10	0.69	0.035
LALF04	420	47	18	0.78	0.007
LALF05	460	74	20	**14**	0.007
LALF06	330	71	17	5.3	0.035
LALF07	390	44	17	6.9	0.21
LALF08	240	20	11	0.01	0.007
LALF09	370	31	16	0.21	0.007
LALF10	390	37	17	1.6	0.007
LALF11	460	76	24	0.12	0.007
LALF12	320	24	14	0.04	0.007
LALF13	390	100	16	5	0.053
LALF14	400	45	19	0.52	0.007
LALF15	380	62	14	8.9	0.007
LALF16	440	43	22	0.01	0.007
LALF17	380	44	18	6.4	0.13
LALF18	300	51	17	**0.51**	0.039
LALF19	260	20	11	0.01	0.007
LALF20	380	47	17	5.4	0.084
LALF21	410	48	18	6.3	0.029
LALF22	340	37	15	5.1	0.007
LALF23	310	24	14	0.8	0.13
LALF24	470	75	21	8.3	0.007
LALF24	480	74	21	7.8	0.007

Items in Red and Bold are al

Notes: Non-detects are shown as less than half the detection limit

mg/L = milligrams per liter

* Samples collected but not analyzed by lab

Table 4
H02 2020 Groundwater Monitoring Analytical Results: Inorganics

	Potassium	Sodium	Total Dissolved Solids	Manganese
Location ID	mg/l	mg/l	mg/l	mg/l
AGPROD	2.9	18	280	0.061
GWEX2	5.5	47	360	**0.35**
GWEX2	5.1	51	400	**0.68**
GWEX4	14	43	502	0.034
LALF01	7.7	64	764	**1.5**
LALF03	8.9	41	402	0.0014
LALF03	8.7	36	413	0.00029
LALF04	6.1	56	656	0.09
LALF05	8.7	78	808	0.0034
LALF06	7.8	63	588	0.031
LALF07	7.3	66	682	**0.49**
LALF08	4.5	31	401	0.077
LALF09	5.4	52	627	**0.23**
LALF10	6.9	68	690	**0.24**
LALF11	7.2	76	821	**0.85**
LALF12	6.4	39	547	0.14
LALF13	7.1	55	708	**0.31**
LALF14	6	45	615	**1.4**
LALF15	10	77	711	0.076
LALF16	6	49	676	**2.6**
LALF17	5.9	52	628	0.016
LALF18	5.9	60	560	**1.3**
LALF19	5.1	29	438	**0.25**
LALF20	9.7	63	684	0.014
LALF21	6.9	68	713	0.00029
LALF22	6.9	57	631	0.0016
LALF23	7.7	46	526	0.14
LALF24	6	44	766	0.00029
LALF24	6	48	756	0.00029

Items in Red and Bold are al

Notes: Non-detects are shown as less than half the detection limit

mg/L = milligrams per liter

* Samples collected but not analyzed by lab

Table 5
H02 2020 Groundwater Elevations (Feet)

Location ID	July	August	November
GWEX2	4954.65	4955.23	4955.04
GWEX4	4953.04	4953.35	4953.14
LALF01	4964.14	4964.45	4964.29
LALF03	4955.55	4955.65	4955.52
LALF04	4956.93	4957.01	4956.89
LALF05	4962.22	4962.50	4962.45
LALF06	4955.69	4955.95	4955.82
LALF07	4959.43	4959.53	4959.40
LALF08	4957.27	4957.36	4957.16
LALF09	4951.92	4952.06	4951.68
LALF10	4954.79	4955.04	4954.97
LALF11	4992.66	4992.96	4992.78
LALF12	4951.88	4952.11	4952.08
LALF13	4960.22	4960.34	4960.21
LALF14	4956.49	4956.56	4956.39
LALF15	4975.39	4975.65	4975.69
LALF16	4955.36	4955.64	4955.49
LALF17	4955.38	4955.66	4955.50
LALF18	4953.39	4953.68	4953.56
LALF19	4949.29	4949.55	4949.14
LALF20	4956.86	4957.07	4957.02
LALF21	4952.99	4953.13	4952.77
LALF22	4950.33	4950.51	4950.25
LALF23	4949.79	4949.96	4949.53
LALF24	4943.50	4943.58	4942.94
REEVES1	4939.68	4939.99	4939.48
REEVES2	4942.13	4942.54	4942.18
REEVES3	4943.36	4943.56	4943.15
REEVES4	4940.13	4940.31	4939.67
REEVES5	4950.13	4950.48	4950.30
REEVES6	4947.26	4947.61	4947.39

Table 6
Soil Vapor Probes M20 and M21 Sampling Analytical Detections

			M20	M21
Analyte	**CAS #**	**Unit**	**9/28/2020**	**9/28/2020**
1,2,4-Trimethylbenzene	95-63-6	ug/m3	4.5	5.4
1,3,5-Trimethylbenzene	108-67-8	ug/m3	1.6	2
1,4-Dichlorobenzene	106-46-7	ug/m3	2.2	4.2
2-BUTANONE (MEK)	78-93-3	ug/m3	ND	4.4
2-Propanol	67-63-0	ug/m3	5.3	ND
4-Ethyltoluene	622-96-8	ug/m3	2.8	3.6
ACETONE	67-64-1	ug/m3	14	16
BROMODICHLOROMETHANE	75-27-4	ug/m3	1.8	ND
CARBON DISULFIDE	75-15-0	ug/m3	3	7.6
CHLOROFORM	67-66-3	ug/m3	3.2	ND
CHLOROMETHANE	74-87-3	ug/m3	1.2	13
cis-1,2-Dichloroethene	156-59-2	ug/m3	1.4	ND
Cyclohexane	110-82-7	ug/m3	0.75	ND
DICHLORODIFLUOROMETHANE	75-71-8	ug/m3	32	5.6
Ethanol	64-17-5	ug/m3	63	30
Ethylbenzene	100-41-4	ug/m3	8.8	9.3
Freon 113	76-13-1	ug/m3	ND	4.8
Freon 114 Dichlorotetrafluoroethane	76-14-2	ug/m3	2.7	ND
m,p-Xylene	179601-23-1	ug/m3	15	15
Methylene chloride	75-09-2	ug/m3	8.5	1.2
n-Hexane	110-54-3	ug/m3	3.9	ND
ORTHO-XYLENE (1,2-Dimethylbenzene)	95-47-6	ug/m3	4.3	4.3
Propene	115-07-1	ug/m3	ND	0.94
Tetrachloroethene	127-18-4	ug/m3	18	14
Tetrahydrofuran	109-99-9	ug/m3	1.2	1
Toluene	108-88-3	ug/m3	11	250
TPH	TPH	ug/m3	ND	1200
Trichloroethene	79-01-6	ug/m3	ND	4.5
TRICHLOROFLUOROMETHANE (FREON 11)	75-69-4	ug/m3	5.4	2
Vinyl chloride	75-01-4	ug/m3	1.2	ND

ND=Non detect

Table 7
SVE and Flare Analytical Detections

Chemical Name	CAS #	Unit	FLARESTATION	SVEINLET
			9/28/2020	9/28/2020
1,1,1-Trichloroethane	71-55-6	ug/m3	17	5.9
1,1-DICHLOROETHANE	75-34-3	ug/m3	460	260
1,1-Dichloroethene	75-35-4	ug/m3	69	100
1,2,4-Trimethylbenzene	95-63-6	ug/m3	4900	370
1,2-Dichlorobenzene	95-50-1	ug/m3	220	ND
1,2-Dichloropropane	78-87-5	ug/m3	ND	360
1,3,5-Trimethylbenzene	108-67-8	ug/m3	2300	170
1,4-Dichlorobenzene	106-46-7	ug/m3	3000	280
2,2,4-Trimethylphentane	540-84-1	ug/m3	1100	210
2-BUTANONE (MEK)	78-93-3	ug/m3	5000	ND
2-Propanol	67-63-0	ug/m3	14000	9
4-Ethyltoluene	622-96-8	ug/m3	4500	220
4-METHYL-2-PENTANONE	108-10-1	ug/m3	1000	ND
ACETONE	67-64-1	ug/m3	6300	100
Benzene	71-43-2	ug/m3	850	140
CARBON DISULFIDE	75-15-0	ug/m3	68	4.7
CHLOROETHANE	75-00-3	ug/m3	110	7.3
CHLOROMETHANE	74-87-3	ug/m3	22	ND
cis-1,2-Dichloroethene	156-59-2	ug/m3	3100	250
Cyclohexane	110-82-7	ug/m3	1600	150
DICHLORODIFLUOROMETHANE	75-71-8	ug/m3	4600	430
Ethanol	64-17-5	ug/m3	38000	90
Ethylbenzene	100-41-4	ug/m3	9400	290
Freon 113	76-13-1	ug/m3	130	170
Freon 114 Dichlorotetrafluoroethane	76-14-2	ug/m3	1300	190
Heptane	25339-56-4	ug/m3	2300	390
ISOPROPYLBENZENE	98-82-8	ug/m3	ND	250
m,p-Xylene	79601-23-1	ug/m3	16000	410
Methyl T-Butyl Ether (MTBE)	1634-04-4	ug/m3	14	6.4
Methylene chloride	75-09-2	ug/m3	910	72
NAPHTHALENE	91-20-3	ug/m3	180	6.9
n-Hexane	110-54-3	ug/m3	1800	300
ORTHO-XYLENE (1,2-Dimethylbenzene)	95-47-6	ug/m3	4800	400
Propene	115-07-1	ug/m3	3400	ND
Tetrachloroethene	127-18-4	ug/m3	16000	500
Tetrahydrofuran	109-99-9	ug/m3	2900	240
Toluene	108-88-3	ug/m3	23000	410
TPH	TPH	ug/m3	450000	22000
trans-1,2-Dichloroethene	156-60-5	ug/m3	220	56
Trichloroethene	79-01-6	ug/m3	3000	380
TRICHLOROFLUOROMETHANE (FREON 1	75-69-4	ug/m3	160	52
Vinyl chloride	75-01-4	ug/m3	5800	690

ND=Non detect

Table 8
H02 2020
Mass of Chlorinated Alkenes Removed from the Source Zone by the Flare and SVE

Location		Flare	SVE
Average Flow	CFM	246.8	550.4
Tetrachloroethene	ug/m3	16000.0	500.0
Tetrachloroethene	lbs	**65.3**	**4.5**
Trichloroethene	ug/m3	3000.0	380.0
Trichloroethene	lbs	**12.2**	**3.5**
cis-1,2-Dichloroethene	ug/m3	3100.0	250.0
cis-1,2-Dichloroethene	**lbs**	**12.6**	**2.3**
Vinyl chloride	ug/m3	5800.0	690.0
Vinyl chloride	**lbs**	**23.7**	**6.3**
trans-1,2-Dichloroethene	ug/m3	220.0	56.0
trans-1,2-Dichloroethene	**lbs**	**0.9**	**0.5**
Methylene chloride	ug/m3	910.0	72.0
Methylene chloride	**lbs**	**3.7**	**0.7**
Total	**lbs**	**118.4**	**17.7**

	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl chloride	trans-1,2-Dichloroethene	Methylene chloride
	lbs	lbs	lbs	lbs	lbs	lbs
Total (lbs)	**69.83**	**15.70**	**14.92**	**29.94**	**1.41**	**4.37**
Total Chlorinated Alkenes (lbs)	**136.16**					

lbs = pounds
CFM=Cubic Feet per minute
ug/m3= micrograms per cubic meter
1 ug/m3 = 6.23x10-11 lbs/ft3

Table 9
Annual SVE Wells Analytical Detections

Analyte	CAS #	Unit	SVE-01D 9/28/2020	SVE-01S 9/28/2020	SVE-02D 9/28/2020	SVE-02S 9/28/2020	SVE-03D 9/28/2020	SVE-03S 9/28/2020	SVE-04D 9/28/2020	SVE-04S 9/28/2020	SVE-05D 9/28/2020	SVE-05S 9/28/2020	SVE-06D 9/28/2020
1,1,1-Trichloroethane	71-55-6	ug/m3	2.8	35	ND	ND	1.2	ND	ND	ND	ND	ND	3.1
1,1,2-Trichloroethane	79-00-5	ug/m3	2.3	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND
1,1-DICHLOROETHANE	75-34-3	ug/m3	710	970	910	2300	60	170	420	210	ND	600	220
1,1-Dichloroethene	75-35-4	ug/m3	970	150	3500	78	110	33	89	49	ND	89	29
1,2,4-Trimethylbenzene	95-63-6	ug/m3	2.7	170	14	990	ND	0.99	35	2600	14	490	13
1,2-Dichlorobenzene	95-50-1	ug/m3	ND	ND	ND	ND	ND	14	1.7	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	ug/m3	4	53	ND	ND	ND	0.97	10	ND	ND	ND	1.3
1,2-Dichloropropane	78-87-5	ug/m3	92	740	58	660	5.3	47	270	1600	4.4	2200	25
1,3,5-Trimethylbenzene	108-67-8	ug/m3	2.7	210	10	820	ND	ND	13	1100	5.9	350	5.3
1,3-DICHLOROBENZENE	541-73-1	ug/m3	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	ug/m3	14	380	25	1300	ND	7.3	39	820	4.7	880	10
1,4-Dioxane	123-91-1	ug/m3	ND	ND	ND	ND	ND	ND	1.8	43	ND	ND	ND
2,2,4-Trimethylphentane	540-84-1	ug/m3	7.9	710	14	1200	1.4	ND	ND	780	3.7	1100	ND
2-BUTANONE (MEK)	78-93-3	ug/m3	ND	ND	ND	ND	ND	ND	21	ND	ND	ND	ND
2-HEXANONE	591-78-6	ug/m3	ND	ND	ND	ND	ND	ND	9.2	ND	ND	ND	ND
2-Propanol	67-63-0	ug/m3	ND	ND	ND	80	4.2	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	622-96-8	ug/m3	1.6	92	ND	270	ND	ND	23	1900	8.3	ND	8.9
4-METHYL-2-PENTANONE	108-10-1	ug/m3	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND
ACETONE	67-64-1	ug/m3	12	75	75	1800	24	14	50	160	9.1	180	12
Benzene	71-43-2	ug/m3	9.9	280	13	720	1.4	6.9	16	810	2.8	720	3.2
BROMODICHLOROMETHANE	75-27-4	ug/m3	ND	ND	ND	ND	ND	2.8	ND	ND	ND	ND	2.2
CARBON DISULFIDE	75-15-0	ug/m3	ND	ND	ND	42	ND	ND	ND	ND	ND	41	ND
Chlorobenzene	108-90-7	ug/m3	1.4	ND	ND	ND	ND	0.94	ND	ND	ND	ND	ND
CHLOROETHANE	75-00-3	ug/m3	ND	38	ND	27	ND	ND	ND	51	ND	25	ND
CHLOROFORM	67-66-3	ug/m3	21	ND	ND	ND	3.6	37	19	ND	ND	ND	11
CHLOROMETHANE	74-87-3	ug/m3	ND	ND	ND	ND	1.1	ND	1.4	ND	0.71	ND	ND
cis-1,2-Dichloroethene	156-59-2	ug/m3	160	3000	110	810	14	78	350	2600	7.2	7900	77
Cyclohexane	110-82-7	ug/m3	28	1500	79	2000	2.9	42	16	4400	8.1	1800	2.8
DICHLORODIFLUOROMETHANE	75-71-8	ug/m3	340	4400	3000	3200	270	180	250	5300	1000	7000	410
Ethanol	64-17-5	ug/m3	18	99	120	60	130	50	59	270	30	82	38
Ethylbenzene	100-41-4	ug/m3	2.3	160	ND	580	ND	ND	50	8700	44	120	17
Freon 113	76-13-1	ug/m3	2300	940	5200	1900	740	310	120	ND	ND	100	180
Freon 114 Dichlorotetrafluoroethane	76-14-2	ug/m3	23	460	630	1600	15	60	14	340	2.4	790	63
Heptane	25339-56-4	ug/m3	17	1200	24	2300	1.1	ND	3.9	1800	8.3	1800	2.2
ISOPROPYLBENZENE	98-82-8	ug/m3	ND	ND	ND	710	ND	ND	ND	ND	ND	470	ND
m,p-Xylene	179601-23-1	ug/m3	9.4	750	34	2700	ND	ND	95	5600	43	1800	35
Methyl T-Butyl Ether (MTBE)	1634-04-4	ug/m3	2.3	30	ND	19	ND	2.6	6.4	15	ND	36	ND
Methylene chloride	75-09-2	ug/m3	45	880	37	58	17	9.1	34	130	1.6	77	12
NAPHTHALENE	91-20-3	ug/m3	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND
n-Hexane	110-54-3	ug/m3	11	670	24	1600	4.9	5.5	3.7	1200	6.5	1500	ND
ORTHO-XYLENE (1,2-Dimethylbenzene)	95-47-6	ug/m3	3.2	250	ND	130	ND	ND	27	2900	10	130	9.4
Propene	115-07-1	ug/m3	26	840	ND	ND	ND	ND	ND	3800	15	ND	ND
Tetrachloroethene	127-18-4	ug/m3	630	5000	2600	1400	200	ND	1000	660	18	8600	550
Tetrahydrofuran	109-99-9	ug/m3	ND	ND	32	ND	2.2	ND	6.7	1300	5	ND	ND
Toluene	108-88-3	ug/m3	6.2	370	ND	160	2.6	2	84	14000	45	170	21
TPH	TPH	ug/m3	3300	140000	ND	110000	ND	1400	4500	420000	2400	200000	3000
trans-1,2-Dichloroethene	156-60-5	ug/m3	5.5	86	21	380	ND	ND	8.1	180	ND	310	3.6
Trichloroethene	79-01-6	ug/m3	420	960	1200	540	60	140	290	720	5.4	2300	160
RICHLOROFLUOROMETHANE (FREON 1	75-69-4	ug/m3	53	140	610	100	38	25	42	24	ND	200	160
Vinyl chloride	75-01-4	ug/m3	46	1100	140	2300	3.4	5.6	24	9200	21	12000	7.3

ND=Non detect

Table 9
Annual SVE Wells Analytical Detections

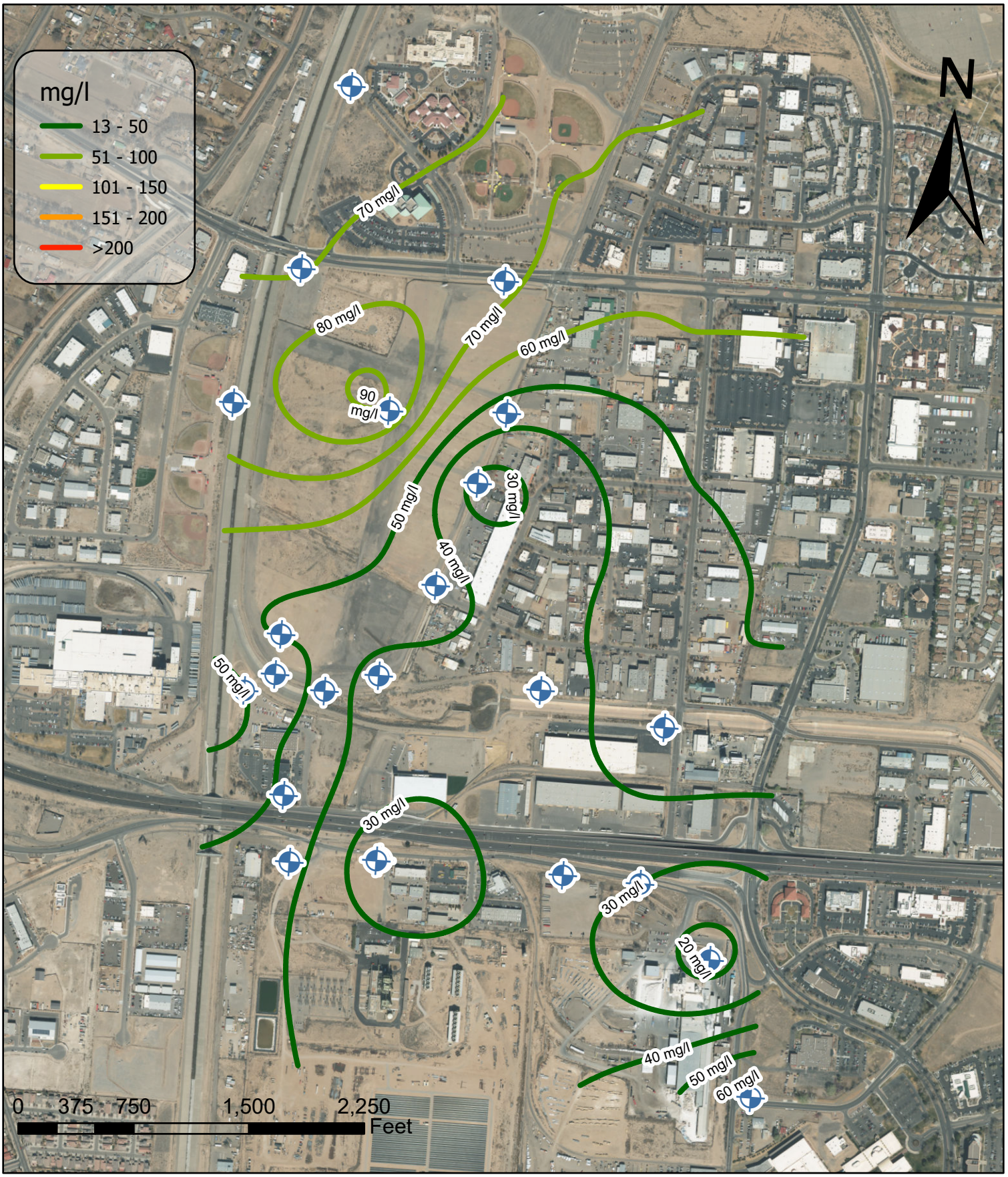
Analyte	CAS #	SVE-06S 9/28/2020	SVE-07D 9/28/2020	SVE-07S 9/28/2020	SVE-08D 9/28/2020	SVE-08S 9/28/2020	SVE-09D 9/28/2020	SVE-09S 9/28/2020	SVE-10D 9/28/2020	SVE-10S 9/28/2020
1,1,1-Trichloroethane	71-55-6	ND	ND	ND	ND	ND	38	ND	ND	ND
1,1,2-Trichloroethane	79-00-5	ND	ND	ND	2.6	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	75-34-3	100	110	150	130	350	58	21	6.8	40
1,1-Dichloroethene	75-35-4	1.8	89	34	7.2	ND	940	2.6	0.9	36
1,2,4-Trimethylbenzene	95-63-6	11	17	34	17	4700	11	11	13	49
1,2-Dichlorobenzene	95-50-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	1.4	2	ND	2.5	ND	ND	1	ND	3.9
1,2-Dichloropropane	78-87-5	38	65	560	13	960	6.9	42	ND	100
1,3,5-Trimethylbenzene	108-67-8	4.9	6	39	6.4	1800	ND	3.9	4.6	35
1,3-DICHLOROBENZENE	541-73-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	31	14	200	9.3	2600	14	7.2	2.3	230
1,4-Dioxane	123-91-1	ND	ND	ND	ND	ND	ND	ND	4.3	ND
2,2,4-Trimethylphentane	540-84-1	12	1.7	270	2.9	1000	ND	ND	ND	78
2-BUTANONE (MEK)	78-93-3	ND	ND	ND	ND	ND	ND	ND	6.3	ND
2-HEXANONE	591-78-6	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanol	67-63-0	ND	16	ND	ND	ND	ND	ND	23	12
4-Ethyltoluene	622-96-8	7.1	11	19	10	2800	7.3	6.8	7.5	30
4-METHYL-2-PENTANONE	108-10-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACETONE	67-64-1	13	29	52	10	ND	25	14	47	160
Benzene	71-43-2	3	1.8	120	1.6	950	ND	0.71	1.9	42
BROMODICHLOROMETHANE	75-27-4	5	ND	ND	ND	ND	ND	1.4	ND	ND
CARBON DISULFIDE	75-15-0	ND	ND	14	10	39	ND	ND	ND	5
Chlorobenzene	108-90-7	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROETHANE	75-00-3	ND	ND	ND	ND	63	ND	ND	ND	ND
CHLOROFORM	67-66-3	31	ND	ND	ND	ND	16	29	2.1	ND
CHLOROMETHANE	74-87-3	ND	1.1	ND	0.44	ND	ND	ND	1.9	1.2
cis-1,2-Dichloroethene	156-59-2	28	49	1200	23	60	10	28	ND	220
Cyclohexane	110-82-7	51	8.1	380	4	1300	ND	ND	1.4	80
DICHLORODIFLUOROMETHANE	75-71-8	100	200	1800	35	5900	620	54	15	370
Ethanol	64-17-5	37	68	120	40	130	140	36	95	75
Ethylbenzene	100-41-4	17	28	59	42	6600	31	24	14	82
Freon 113	76-13-1	12	4.2	ND	ND	40	36	ND	ND	5.6
Freon 114 Dichlorotetrafluoroethane	76-14-2	63	9.5	320	1.9	760	26	4.3	ND	160
Heptane	25339-56-4	4	4.6	360	3.3	2400	ND	1.2	0.96	73
ISOPROPYLBENZENE	98-82-8	ND	ND	140	7.7	2500	ND	ND	3.4	69
m,p-Xylene	179601-23-1	34	53	150	57	7500	41	34	27	200
Methyl T-Butyl Ether (MTBE)	1634-04-4	2.6	1.9	12	1.2	24	ND	2.4	ND	3.4
Methylene chloride	75-09-2	3.8	10	130	11	42	24	12	24	22
NAPHTHALENE	91-20-3	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Hexane	110-54-3	2.6	4	580	2.8	2000	13	ND	9.2	76
ORTHO-XYLENE (1,2-Dimethylbenzene)	95-47-6	11	16	21	14	5500	9.7	8.8	9.5	12
Propene	115-07-1	ND	ND	830	ND	2700	9.3	ND	3.3	ND
Tetrachloroethene	127-18-4	1200	360	3600	200	150	2500	210	30	1300
Tetrahydrofuran	109-99-9	ND	4.9	ND	4	3100	ND	2	3.6	ND
Toluene	108-88-3	26	49	43	19	4800	18	13	11	28
TPH	TPH	3100	2200	77000	2400	360000	ND	1700	1200	21000
trans-1,2-Dichloroethene	156-60-5	1.3	ND	90	1.4	390	ND	ND	ND	16
Trichloroethene	79-01-6	78	47	550	33	110	67	16	4	490
TRICHLOROFLUOROMETHANE (FREON 1	75-69-4	32	20	46	4.4	51	130	9.5	1.8	44
Vinyl chloride	75-01-4	4.8	9.2	1200	16	13000	25	0.86	0.61	280

ND=Non detect

Groundwater Monitoring Wells Sampled

Figure 1
LALF Monitoring Well Location Map
H02 2020 Groundwater Monitoring

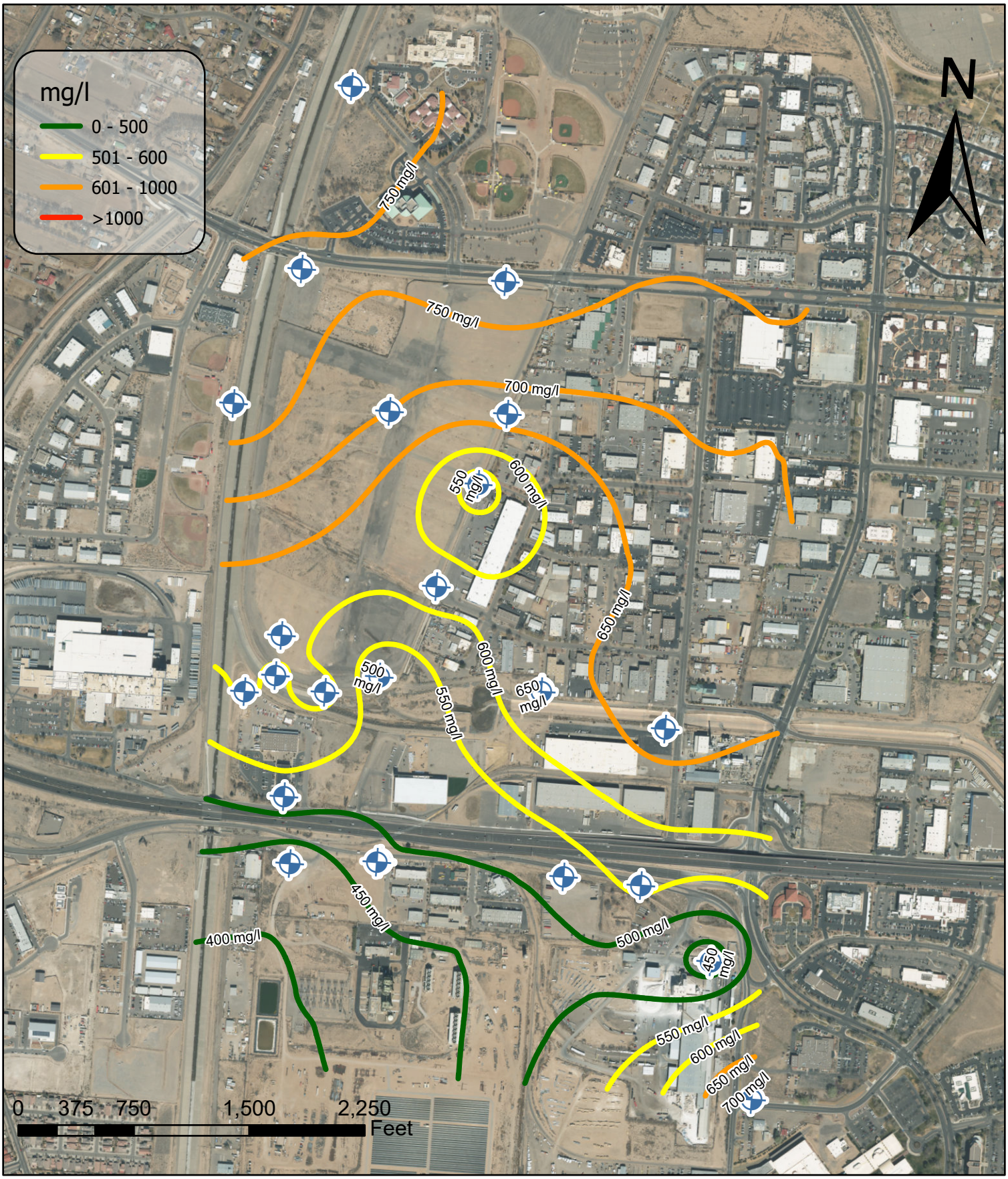
Source: COA EQuIS Database



Groundwater Monitoring Wells Sampled

Figure 2
LALF Chloride Concentration
H02 2020 Groundwater Monitoring

Source: COA EQuIS Database



Groundwater Monitoring Wells Sampled

Figure 3
LALF Total Dissolved Solids Concentration
H02 2020 Groundwater Monitoring

Source: COA EQuIS Database

Groundwater Monitoring Wells Sampled

Source: COA EQuIS Database

Figure 4
Trichloroethene Concentration
H02 2020 Groundwater Monitoring

Groundwater Monitoring Wells Sampled

Figure 5
Tetrachloroethene Concentration
H02 2020 Groundwater Monitoring

Source: COA EQuIS Database

Groundwater Level Wells

Figure 6
Groundwater Elevation Contours
July 2020
H02 2020 Groundwater Monitoring

Source: COA EQuIS Database

Groundwater Level Wells

Figure 7
Groundwater Elevation Contours
August 2020
H02 2020 Groundwater Monitoring

Source: COA EQuIS Database

Groundwater Level Wells

Figure 8
Groundwater Elevation Contours
November 2020
H02 2020 Groundwater Monitoring

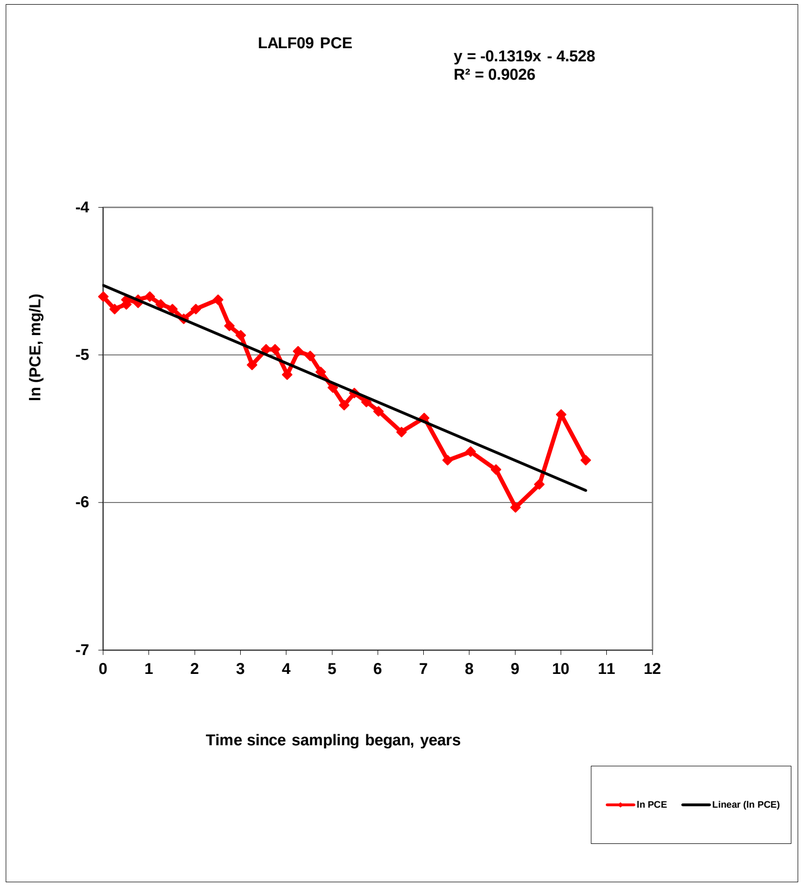
Source: COA EQuIS Database

First-Order Decay Rate Calculation
for Monitored Natural Attenuation

Facility Name:

LALF09

Sampling Date	PCE LALF09 mg/L	PCE LALF09 (ug/l)	ln PCE LALF09 mg/L	Elapsed time since 2/5/10 years
2/5/2010	**0.010**	10	**-4.605**	**0.00**
5/7/2010	**0.009**	9.2	**-4.689**	**0.25**
8/9/2010	**0.010**	9.5	**-4.656**	**0.51**
8/9/2010	**0.010**	9.8	**-4.625**	**0.51**
11/9/2010	**0.010**	9.6	**-4.646**	**0.76**
11/9/2010	**0.010**	9.8	**-4.625**	**0.76**
2/11/2011	**0.010**	10	**-4.605**	**1.02**
5/11/2011	**0.010**	9.5	**-4.656**	**1.26**
8/11/2011	**0.009**	9.2	**-4.689**	**1.51**
11/8/2011	**0.009**	8.6	**-4.756**	**1.76**
2/14/2012	**0.009**	9.2	**-4.689**	**2.03**
8/10/2012	**0.010**	9.8	**-4.625**	**2.51**
11/8/2012	**0.008**	8.2	**-4.804**	**2.76**
2/7/2013	**0.008**	7.7	**-4.867**	**3.01**
5/7/2013	**0.006**	6.3	**-5.067**	**3.25**
8/27/2013	**0.007**	7	**-4.962**	**3.56**
11/8/2013	**0.007**	7	**-4.962**	**3.76**
2/11/2014	**0.006**	5.9	**-5.133**	**4.02**
5/9/2014	**0.007**	6.9	**-4.976**	**4.26**
8/14/2014	**0.007**	6.7	**-5.006**	**4.52**
11/7/2014	**0.006**	6	**-5.116**	**4.76**
2/10/2015	**0.005**	5.4	**-5.221**	**5.02**
5/12/2015	**0.005**	4.8	**-5.339**	**5.27**
7/31/2015	**0.005**	5.2	**-5.259**	**5.49**
11/6/2015	**0.005**	4.9	**-5.319**	**5.75**
2/9/2016	**0.005**	4.6	**-5.382**	**6.02**
8/10/2016	**0.004**	4	**-5.521**	**6.52**
2/9/2017	**0.004**	4.4	**-5.426**	**7.02**
8/14/2017	**0.003**	3.3	**-5.714**	**7.53**
2/13/2018	**0.004**	3.5	**-5.655**	**8.03**
9/4/2018	**0.003**	3.1	**-5.776**	**8.58**
2/7/2019	**0.002**	2.4	**-6.032**	**9.01**
8/15/2019	**0.003**	2.8	**-5.878**	**9.53**
2/5/2020	**0.005**	4.5	**-5.404**	**10.01**
8/19/2020	**0.003**	3.3	**-5.714**	**10.54**
ISL	***0.005***	***5***	***-5.298317367***	



Formula

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

where:

t = Time to achieve cleanup levels, years

C_{CL} = Cleanup level for contaminant of concern, mg/L

C_o = Initial concentration of contaminant of concern, mg/L

k_{point} = First-order decay rate constant at one monitoring point, years^{-1}
= slope of the line, y

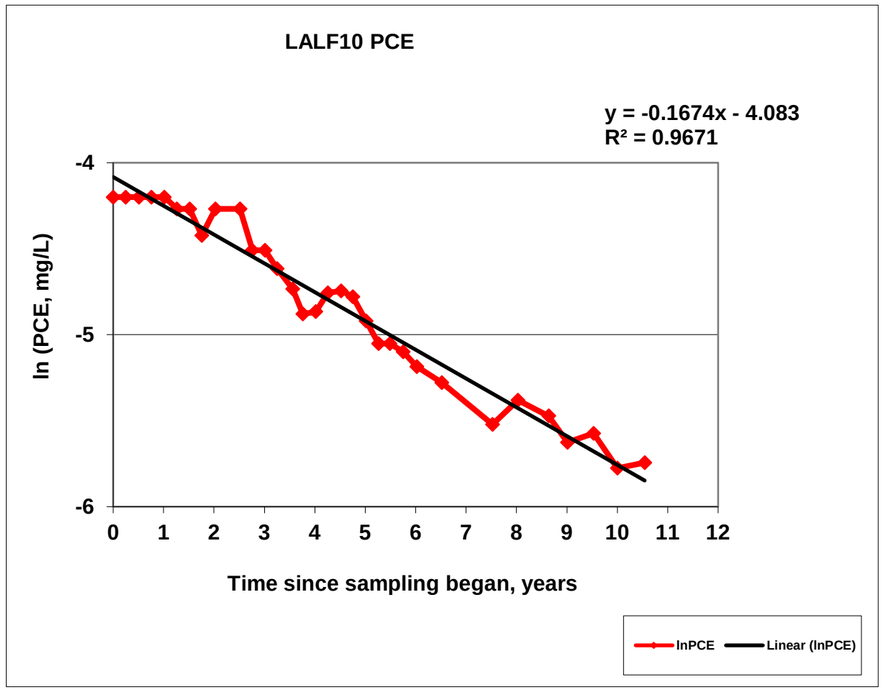
Solutions

LALF09			
Enter C_{CL}	⇨	**0.005**	
Enter C_o	⇨	**0.01**	
Enter k_{point}	⇨	**0.1319**	
Time to reach cleanup level		**5.3**	**years**

First-Order Decay Rate Calculation
for Monitored Natural Attenuation

Facility Name: **LALF10**

Sampling Date	PCE LALF10 mg/L	PCE LALF10 (ug/l)	ln PCE LALF10 mg/L	Elapsed time since 2/5/10 years
2/5/2010	**0.015**	15	**-4.200**	**0.00**
5/7/2010	**0.015**	15	**-4.200**	**0.25**
8/9/2010	**0.015**	15	**-4.200**	**0.51**
11/9/2010	**0.015**	15	**-4.200**	**0.76**
2/11/2011	**0.015**	15	**-4.200**	**1.02**
5/11/2011	**0.014**	14	**-4.269**	**1.26**
8/12/2011	**0.014**	14	**-4.269**	**1.52**
11/8/2011	**0.012**	12	**-4.423**	**1.76**
2/14/2012	**0.014**	14	**-4.269**	**2.03**
8/10/2012	**0.014**	14	**-4.269**	**2.51**
11/8/2012	**0.011**	11	**-4.510**	**2.76**
2/7/2013	**0.011**	11	**-4.510**	**3.01**
5/7/2013	**0.010**	9.9	**-4.615**	**3.25**
8/27/2013	**0.009**	8.8	**-4.733**	**3.56**
11/8/2013	**0.008**	7.6	**-4.880**	**3.76**
2/11/2014	**0.008**	7.7	**-4.867**	**4.02**
5/9/2014	**0.009**	8.6	**-4.756**	**4.26**
8/14/2014	**0.009**	8.7	**-4.744**	**4.52**
11/7/2014	**0.008**	8.4	**-4.780**	**4.76**
2/10/2015	**0.007**	7.3	**-4.920**	**5.02**
5/12/2015	**0.006**	6.4	**-5.051**	**5.27**
7/31/2015	**0.006**	6.4	**-5.051**	**5.49**
11/6/2015	**0.006**	6.1	**-5.099**	**5.75**
2/12/2016	**0.006**	5.6	**-5.185**	**6.02**
8/10/2016	**0.005**	5.1	**-5.279**	**6.52**
8/14/2017	**0.004**	4	**-5.521**	**7.53**
2/13/2018	**0.005**	4.6	**-5.382**	**8.03**
9/24/2018	**0.004**	4.2	**-5.473**	**8.64**
2/7/2019	**0.004**	3.6	**-5.627**	**9.01**
8/15/2019	**0.004**	3.8	**-5.573**	**9.53**
2/5/2020	**0.003**	3.1	**-5.776**	**10.01**
8/19/2020	**0.003**	3.2	**-5.745**	**10.54**
ISL		***0.005***	***5***	***-5.298317367***



Formula

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

where:

t = Time to achieve cleanup levels, years

C_{CL} = Cleanup level for contaminant of concern, mg/L

C_o = Initial concentration of contaminant of concern, mg/L

k_{point} = First-order decay rate constant at one monitoring point, $years^{-1}$

= slope of the line, y

Solutions

LALF10 PCE			
Enter C_{CL}	⇨	**0.005**	
Enter C_o	⇨	**0.015**	
Enter k_{point}	⇨	**0.1674**	
Time to reach cleanup level		**6.6**	**years**

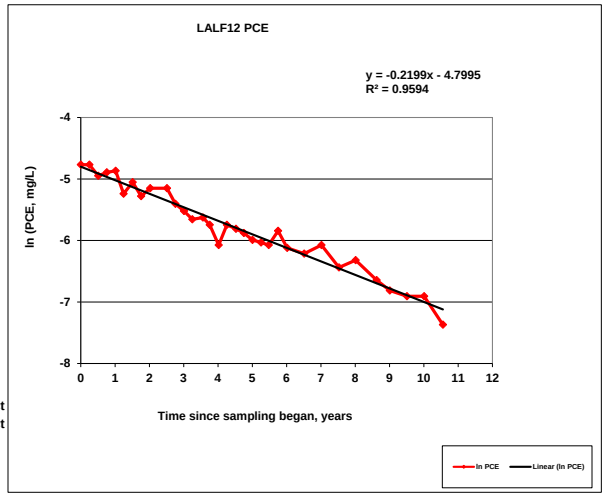
First-Order Decay Rate Calculation for Monitored Natural Attenuation

Facility Name:

LALF12

Sampling Date	PCE LALF12 mg/L	PCE LALF12 (ug/l)	ln PCE LALF12	Elapsed time since 2/5/10
2/5/2010	**0.009**	8.5	**-4.768**	**0.00**
5/7/2010	**0.009**	8.5	**-4.768**	**0.25**
8/9/2010	**0.007**	7.1	**-4.948**	**0.51**
11/9/2010	**0.008**	7.5	**-4.893**	**0.76**
2/10/2011	**0.008**	7.7	**-4.867**	**1.02**
5/6/2011	**0.005**	5.3	**-5.240**	**1.25**
8/11/2011	**0.006**	6.4	**-5.051**	**1.51**
11/8/2011	**0.005**	5.1	**-5.279**	**1.76**
2/13/2012	**0.006**	5.8	**-5.150**	**2.02**
8/9/2012	**0.006**	5.8	**-5.150**	**2.51**
11/7/2012	**0.005**	4.5	**-5.404**	**2.76**
2/7/2013	**0.004**	4	**-5.521**	**3.01**
5/7/2013	**0.004**	3.5	**-5.655**	**3.25**
8/27/2013	**0.004**	3.6	**-5.627**	**3.56**
11/8/2013	**0.003**	3.2	**-5.745**	**3.76**
2/11/2014	**0.002**	2.3	**-6.075**	**4.02**
5/9/2014	**0.003**	3.2	**-5.745**	**4.26**
8/14/2014	**0.003**	3	**-5.809**	**4.52**
11/7/2014	**0.003**	2.8	**-5.878**	**4.76**
2/6/2015	**0.003**	2.5	**-5.991**	**5.01**
5/8/2015	**0.002**	2.4	**-6.032**	**5.26**
7/28/2015	**0.002**	2.3	**-6.075**	**5.48**
11/5/2015	**0.003**	2.9	**-5.843**	**5.75**
2/9/2016	**0.002**	2.2	**-6.119**	**6.02**
8/8/2016	**0.002**	2	**-6.215**	**6.51**
2/9/2017	**0.002**	2.3	**-6.075**	**7.02**
8/14/2017	**0.002**	1.6	**-6.438**	**7.53**
2/8/2018	**0.002**	1.8	**-6.320**	**8.01**
9/19/2018	**0.001**	1.3	**-6.645**	**8.62**
2/6/2019	**0.001**	1.1	**-6.812**	**9.01**
8/8/2019	**0.001**	1	**-6.908**	**9.51**
2/6/2020	**0.001**	1	**-6.908**	**10.01**
8/24/2020	**0.001**	0.63	**-7.370**	**10.56**
ISL	***0.005***	***5***	***-5.298***	

Non Detect
Non Detect



Formula

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

where:

t = Time to achieve cleanup levels, years

C_{CL} = Cleanup level for contaminant of concern, mg/L

C_o = Initial concentration of contaminant of concern, mg/L

k_{point} = First-order decay rate constant at one monitoring point, years^{-1}

= slope of the line, y

Solutions

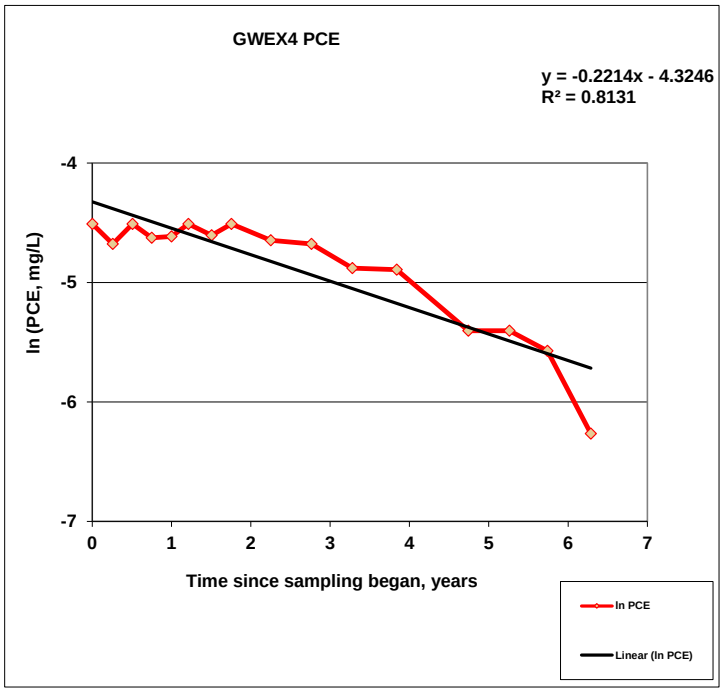
LALF12			
Enter C_{CL}	⟹	**0.005**	
Enter C_o	⟹	**0.009**	
Enter k_{point}	⟹	**0.2199**	
Time to reach cleanup level		**2.7**	**years**

First-Order Decay Rate Calculation for Monitored Natural Attenuation

Facility Name:

GWEX-4 2014-2020

Sampling Date	PCE GWEX-4 mg/L	PCE GWEX-4 (ug/l)	ln PCE GWEX-4 mg/L	Elapsed time since 5/13/04 years
5/13/2014	**0.011**	11	**-4.510**	**0.00**
8/15/2014	**0.009**	9.3	**-4.678**	**0.26**
11/14/2014	**0.011**	11	**-4.510**	**0.51**
2/10/2015	**0.010**	9.8	**-4.625**	**0.75**
5/12/2015	**0.010**	9.9	**-4.615**	**1.00**
7/29/2015	**0.011**	11	**-4.510**	**1.21**
11/13/2015	**0.010**	10	**-4.605**	**1.51**
2/12/2016	**0.011**	11	**-4.510**	**1.75**
8/11/2016	**0.010**	9.6	**-4.646**	**2.25**
2/14/2017	**0.009**	9.3	**-4.678**	**2.76**
8/22/2017	**0.008**	7.6	**-4.880**	**3.28**
3/14/2018	**0.008**	7.5	**-4.893**	**3.84**
2/7/2019	**0.005**	4.5	**-5.404**	**4.74**
8/15/2019	**0.005**	4.5	**-5.404**	**5.26**
2/6/2020	**0.004**	3.8	**-5.573**	**5.74**
8/24/2020	**0.002**	1.9	**-6.266**	**6.29**
ISL		***0.005***	***5***	***-5.298317367***
Tier 1 SL		***0.3***	***300***	***-1.203972804***



Formula

$t = -[\ln(C_{CL}/C_o)] / k_{point}$

where:

t = Time to achieve cleanup levels, years

C_{CL} = Cleanup level for contaminant of concern, mg/L

C_o = Initial concentration of contaminant of concern, mg/L

k_{point} = First-order decay rate constant at one monitoring point, $years^{-1}$

= slope of the line, y

Solutions

GWEX-4 PCE				
Enter C_{CL}	⇨	**0.005**		
Enter C_o	⇨	**0.011**		
Enter k_{point}	⇨	**0.2214**		
Time to reach cleanup level			**3.6**	**years**