



**PROPOSED LEAKING UNDERGROUND STORAGE TANK  
(LUST) RELEASE CASE CLOSURE EVALUATION SUMMARY**

**LUST Case File # 0392.04 - .07  
Facility ID # 0-006261  
Yuma County**

**Shell #10  
11235 South Fortuna Road  
Yuma, Arizona 85367-5626**

*Background:*

The site is located at the southeastern corner of South Fortuna Road and South Frontage Road in Yuma. The site is currently an active gas/diesel service station with a fast food restaurant. The site has been an active gas station since 1985 and is currently owned and operated by ARS-Fresno LLC. Five (5) underground storage tanks (USTs) were installed in 1985. These original USTs were removed in 2015 and replaced with two (2) 20,000 gallon compartmented USTs. One of the USTs has a compartment storing diesel fuel. Gasoline is stored in the three remaining UST compartments.

Releases 0392.01 through .03 were discovered/confirmed in the 1980's and mid-1990's. The releases were reported to impact soil only and were associated with the diesel fuel dispensers, although release .01 was closed one month after it was opened (its release area is unspecified). Releases .02 and .03 were investigated and closed in 2004 and 1998, respectively.

Releases 0392.04 to .07 were all confirmed in February and August 2015 during preparation for and removal of the original UST system. Releases 0392.04, .05, and .07 are associated with the tanks within the tank basin and release 0392.06 is associated with gasoline dispenser 1 and 2.

ECI Environmental Services (ECI) was hired by ARS – Fresno LLC to perform corrective actions at the site.

Below is a bullet point summary of major events at the site:

- 9/2014 – Cracks observed in two (2) of the USTs through tank tightness testing and video inspections
- 12/2014 – 5 soil borings advanced adjacent to tank basin
- 01/2015 – two (2) angle borings advanced to beneath the tank basin. Resulted in the 0392.04 and .05 releases being confirmed.
- 08/2015 – UST system removed. Resulted in the 0392.06 and .07 releases being confirmed.
- 08/2015 – Soil in the UST basin excavated down to 20 feet below ground surface (bgs).
- 08/2015 – Soil sample @ 4 feet bgs at the gasoline dispenser (0392.06 release) indicated “non-detect” for all analytes (EPA Method 8260 for Volatile Organic Compounds (VOCs) analysis).

- 10/2015 – Four (4) soil borings and (1) monitoring well (MW) installed.
- 03/2016 – Three (3) additional monitoring wells installed.
- 06/2016 – Four (4) additional monitoring wells installed.
- 11/2016 through 02/2020 – Thirteen (13) groundwater monitoring/sampling events.
- 11/2016 through 03/2018 – SVE system operations (7 groundwater monitoring events post-SVE operations).
- 09/2017 – ADEQ approves Site Characterization.
- 02/25/2020 – Confirmation soil boring.

*Characterization of the groundwater plume:*

Based on groundwater sample analysis, benzene, toluene, ethylbenzene, and total xylenes (BTEX) were the only chemicals of concern (COCs) found to be above AWQS during the investigation phase of corrective actions. MW-3, the down gradient well, did have exceedances of benzene during the first year after well installation. Some of the perimeter wells only showed exceedances of benzene in the first two sampling events after well installation in 2016. After remedial system operations began, the benzene concentrations dropped to below the Aquifer Water Quality Standards (AWQS) in those perimeter wells and have remained that way through the post-remediation groundwater sampling period.

Currently, only one (1) well, the West Soil Vapor Recovery Well (WSVRW), a source area well, has exceedances of a COC. Benzene is the only COC that has been above AWQS since December 12, 2017. The February 20, 2020 groundwater sampling event detailed that WSVRW had a benzene concentration of 30.9 µg/l. No other wells at the site have exhibited any COCs above AWQS since December 12, 2017.

Groundwater elevations collected during this project present a variable, but predominantly west groundwater flow with a gradual gradient currently of approximately 0.005 feet per foot. Groundwater elevations were measured from all the monitoring wells on February 25, 2020. The groundwater depth has remained consistent at about ~145 feet bgs throughout the project.

*Groundwater plume stability:*

Data collected over the last seven quarters, since June 2018, detail that the COC plume is localized to the former tank basin area. WSVRW is the remaining well that exhibits a COC above AWQS (see tables at end of document). No other wells at the site have exhibited any COCs above AWQS since December 12, 2017. Data indicates that the SVE remedial system effectively removed the source of groundwater contamination.

*Natural Attenuation:*

Natural attenuation processes include diffusion, dispersion, sorption, volatilization, and biodegradation. A decreasing trend in VOC concentrations in groundwater has been established, which supports that natural attenuation is occurring. The chart located below details post-remediation COC attenuation of the only well associated with this LUST site having a COC above AWQS (e.g., WSVRW). No other wells at the site have exhibited any COCs above AWQS since December 12, 2017.

*Threatened or impacted drinking water wells:*

Results of an April 7, 2020 search of the Arizona Department of Water Resources (ADWR) electronic database for registered wells within an approximate one-half mile radius of the subject site is summarized below.

The results of the search indicate that there are 65 registered wells within the search area. A review of the results indicates the presence of one (1) groundwater supply well that is detailed as irrigation water use. The irrigation well (ADWR registration #55-231298) is screened from 20 feet to 300 feet bgs. This irrigation well is located ~1500 feet to the south-southeast of the site, which is cross-gradient to up-gradient with respect to the release area. Based on laboratory analytical results of groundwater samples collected by ECI Environmental Services since June 2018, the lateral extent of dissolved phase benzene is consistently limited to the immediate vicinity of the release area at WSVRW and has not migrated off-site.

The upper fine-grained zone consists of alluvium and some windblown sand. Little water is pumped from the upper zone. However, irrigated areas lay within the zone making it important to groundwater recharge and discharge. The upper fine-grained zone ranges from 70 to 240 feet thick with an average depth of approximately 100 feet bgs. The Colorado River is the City of Yuma's main water source for treatment and distribution for potable use.

According to ADWR rules, any new or replacement well located at or near the LUST site would need to meet the criteria of A.A.C. R12-15-1302 (B) (3).

*Other exposure pathways:*

Exposure pathways associated with ingestion and dermal exposure routes are not an issue at this site. Soils at the release area were excavated down to 20 feet bgs and disposed off-site at a registered landfill. There are no remaining COCs above residential soil remediation levels (rSRLs) associated with these releases above 20 feet below ground surface.

The nearest residential properties are single family homes located approximately 520 feet, 1100 feet, 1700 feet, and 2000 feet to the southeast, southwest, northwest, and northeast of the site, respectively. There are no schools, day care facilities, or senior care centers located within one-half mile of the site. The groundwater contamination is limited to on-site and will not impact any sensitive receptors.

*Removal or control of the source of contamination:*

**Excavation** – On September 21-23, 2015, soil was excavated to a depth of approximately 20 feet bgs from beneath the locations of the three former gasoline USTs in the western portion of the former tank basin. Approximately 1050 tons of soil were excavated and transported to South Yuma County Landfill for disposal.

**Soil Vapor Extraction (SVE)** – The soil column at the site are uniformly sands with gravel starting at 30 feet bgs and reaching below the water table. These types of soil are conducive to SVE remedial operations.

SVE operations began on November 10, 2016. Two wells, ESVRW (named DPE1 on table below) and WSVRW (named DPE2 on table below), are both located within the former UST pit and were utilized for the SVE operations. Both wells were screened from 25 feet bgs to below the groundwater table. The system was shut-down permanently on March 15, 2018. Throughout its run-time, the SVE system removed COC vapors from the subsurface throughout the soil column. The table provided below details decreasing vapor concentrations in collected SVE system samples as SVE operations progressed through time.

Of particular note from the table below, are the vapor samples collected on October 11, 2017. Those samples were collected after almost four (4) months of down-time for the SVE system. The vapor concentrations are approximately 25 and 80 times less than the November 11, 2016 system start-up samples. The samples indicated that the SVE system was being effective in removing contaminants from the subsurface soils.

**TABLE 1**  
**Summary of Vapor Sample Results (µg/L)**

Sample ID	Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	124 TMB	MTBE	
DPE1	11/10/16	172,000	984	22,000	1,610	4,990	148	ND	
	11/23/16	172,000	2,440	17,800	1,340	4,460	102	ND	
	12/1/16	94,000	1,180	9,970	700	2,134	36.2	ND	
	12/21/16	110,000	2,080	16,600	1,620	4,080	ND	ND	
	3/2/17	65,000	920	11,000	860	3,430	270	ND	
	4/21/17	9,800	48	1,300	230	940	92	ND	
	5/30/17	4,900	3.7	410	320	1,570	220	7.3	
	Sys. Shut Down	6/18/17	1,080	1.1	103	44	188	11	ND
Sys. Restart	10/11/17	6,700	0.76	260	140	390	120	ND	
	1/5/18	130	ND	12	5.5	19.5	0.90	ND	
	DPE2	11/10/16	450,000	2,900	42,000	4,300	12,800	307	ND
DPE2	11/23/16	151,000	2,200	17,200	1,450	4,970	169	ND	
	12/1/16	72,000	712	7,420	672	1,960	26.6	ND	
	12/21/16	130,000	2,280	23,200	2,300	5,400	ND	ND	
	3/2/17	114,000	1,500	15,800	1,700	5,750	190	ND	
	4/21/17	11,000	55	1,600	290	1,080	74	ND	
	5/30/17	2,900	5.8	170	130	710	190	8.0	
	Sys. Shut Down	6/18/17	672	1.2	37	13	62	5.3	ND
	Sys. Restart	10/11/17	5,400	1.1	190	72	280	160	ND
1/5/18		310	ND	21	14	57	2.8	ND	

Note: Vapor samples were tested for volatile organics by EPA Test Method 8260B full scan. No other VOC detected by analysis.

DPE Remediation System was shut down from June 18 to October 11, 2017

µg/L - Microgram per Liter

TPHg - Total Petroleum Hydrocarbon - Gasoline C4-C12

TMB - Trimethylbenzene

MTBE - Methyl tert-butyl ether

ND - None detected

A confirmation soil boring, located adjacent to groundwater well MW-1 and vapor extraction wells VEW1 and VEW-2 (within the former tank excavation), were drilled and sampled on February 25, 2020. The results verified that COCs in soils are all below residential soil remediation levels (rSRLs). Soil samples were collected every 10 feet starting at 20 feet bgs to 148 feet bgs.

**Requirements of A.R.S. §49-1005(D) and (E):**

The results of the corrective action completed at the site assure protection of public health, welfare and the environment, to the extent practicable. The clean-up activities competed at this

site allow for the maximum beneficial use of the site, while being reasonable, necessary and cost effective.

*Other information that is pertinent to the LUST case closure approval:*

The facility and LUST files were reviewed for information regarding prior cleanup activities, prior site uses and operational history of the UST system prior to removal.

Groundwater data tables:

WSVRW (Source area remedial well- approximately 10 feet southwest of MW-1)  
Total Depth: 155 feet. Screened: 25 to 155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
11.10.2016	SVE start-up	
03.15.2018	SVE shut-down	
12.11.2018	299	144.60
03.27.2019	188	144.06
06.20.2019	153	143.90
10.24.2019	101	144.28
02.01.2020	30.9	143.85

ESVRW (Source area remedial well- approximately 10 feet northwest of MW-1)  
Total Depth: 155 feet. Screened: 25 to 155 feet.

Date	Benzene AWQS is 5.0 ug/L	Depth to Water (feet)
11.10.2016	SVE start-up	
03.15.2018	SVE shut-down	
12.11.2018	0.84	144.60
03.27.2019	0.56	144.93
06.20.2019	<0.40	143.85
10.24.2019	<0.40	144.00
02.01.2020	<0.30	143.80

MW-1 (Source area well)  
Total Depth: 155 feet. Screened: 135 to 155 feet.

Date	Benzene AWQS is 5.0 ug/L	Depth to Water (feet)
03.10.2016	4940	143.50
06.04.2016	1960	143.89
11.10.2016	950	144.42
11.10.2016	SVE start-up	
03.02.2017	468	
06.07.2017	13.2	144.41

09.08.2017	2.0	144.75
12.12.2017	1.3	144.98
03.07.2018	3.9	144.93
03.15.2018	SVE shut-down	
06.05.2018	1.4	144.95
09.28.2018	1.9	145.20
12.11.2018	0.83	144.85
03.27.2019	0.90	144.29
06.20.2019	<0.40	144.15
10.24.2019	1.2	144.28
02.01.2020	0.86	144.10

MW-3 (Down gradient well)  
Total Depth: 155 feet. Screened: 135 to 155 feet.

Date	Benzene AWQS is 5.0 ug/L	Depth to Water (feet)
03.10.2016	772	144.78
06.04.2016	1150	145.19
11.10.2016	SVE start-up	
11.10.2016	1180	145.77
03.02.2017	6.5	146.50
06.07.2017	0.94	146.31
09.08.2017	0.74	146.35
12.12.2017	0.46	146.31
03.07.2018	<0.30	146.35
03.15.2018	SVE shut-down	
06.05.2018	<0.30	146.35
09.27.2018	<0.40	146.55
12.11.2018	<0.40	146.25
02.25.2020	Not analyzed	146.11

MW-4 (cross gradient)  
Total Depth: 155 feet. Screened: 125 to 155 feet.

Date	Benzene AWQS is 5.0 ug/L	Depth to Water (feet)
03.10.2016	379	144.05
06.24.2016	512	144.34
11.10.2016	SVE start-up	
11.10.2016	231	145.00
03.01.2017	109	Not measured
06.07.2017	0.51	144.85
09.09.2017	1.8	145.25
12.12.2017	2.5	145.41
03.07.2018	1.2	145.44
03.15.2018	SVE shut-down	

06.05.2018	0.66	145.45
09.27.2018	1.1	145.63
12.11.2018	1.5	145.35
02.25.2020	Not analyzed	145.21

MW-5 (up gradient well)  
Total Depth: 155 feet. Screened: 125-155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
06.24.2016	0.67	144.47
11.10.2016	SVE start-up	
11.09.2016	<0.47	144.77
03.01.2017	<0.30	Not measured
06.06.2017	<0.30	146.73
09.08.2017	<0.30	145.25
12.12.2017	<0.30	145.55
03.06.2018	<0.30	145.45
03.15.2018	SVE shut-down	
06.05.2018	<0.30	145.54
09.27.2018	<0.40	145.76
12.11.2018	<0.40	145.41
02.25.2020	Not analyzed	145.18

MW-6 (Perimeter well)  
Total Depth: 155 feet. Screened: 125 to 155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
06.24.2016	146	143.74
11.10.2016	SVE start-up	
11.09.2016	11.5	144.68
03.01.2017	2.2	Not measured
06.06.2017	<0.30	147.29
09.08.2017	<0.30	145.25
12.12.2017	<0.30	144.78
03.06.2018	<0.30	144.70
03.15.2018	SVE shut-down	
06.05.2018	<0.30	144.75
10.24.2018	<0.40	144.97
12.11.2018	<0.40	144.71
02.25.2020	Not analyzed	144.44

MW-7 (Perimeter well)  
Total Depth: 155 feet. Screened: 125 to 155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
06.23.2016	13.5	143.74
11.10.2016	SVE start-up	
11.09.2016	153	145.37
03.02.2017	0.74	Not measured
06.06.2017	<0.30	147.63
09.07.2017	<0.30	144.55
12.12.2017	<0.30	144.86
03.06.2018	<0.30	144.75
03.15.2018	SVE shut-down	
06.05.2018	<0.30	144.80
09.27.2018	<0.40	145.03
12.11.2018	<0.40	145.75
02.25.2020	Not analyzed	145.49

MW-8 (Perimeter well)  
Total Depth: 155 feet. Screened: 135 to 155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
06.23.2016	44.1	144.71
11.10.2016	SVE start-up	
11.10.2016	<0.47	145.28
03.01.2017	0.92	Not measured
06.06.2017	<0.30	147.42
09.08.2017	<0.30	145.50
12.12.2017	<0.30	145.88
03.07.2018	<0.30	145.84
03.15.2018	SVE shut-down	
06.04.2018	<0.30	145.79
09.27.2018	<0.40	146.05
12.11.2018	<0.40	145.74
02.25.2020	Not analyzed	145.41

MW-9 (Perimeter well- most down gradient to the west)  
Total Depth: 155 feet. Screened: 135 to 155 feet.

Date	Benzene AWQS is 5.0 µg/L	Depth to Water (feet)
06.23.2016	1.8	145.16
11.10.2016	SVE start-up	
11.09.2016	<0.47	145.58
03.01.2017	<0.30	Not measured
06.06.2017	<0.30	147.89

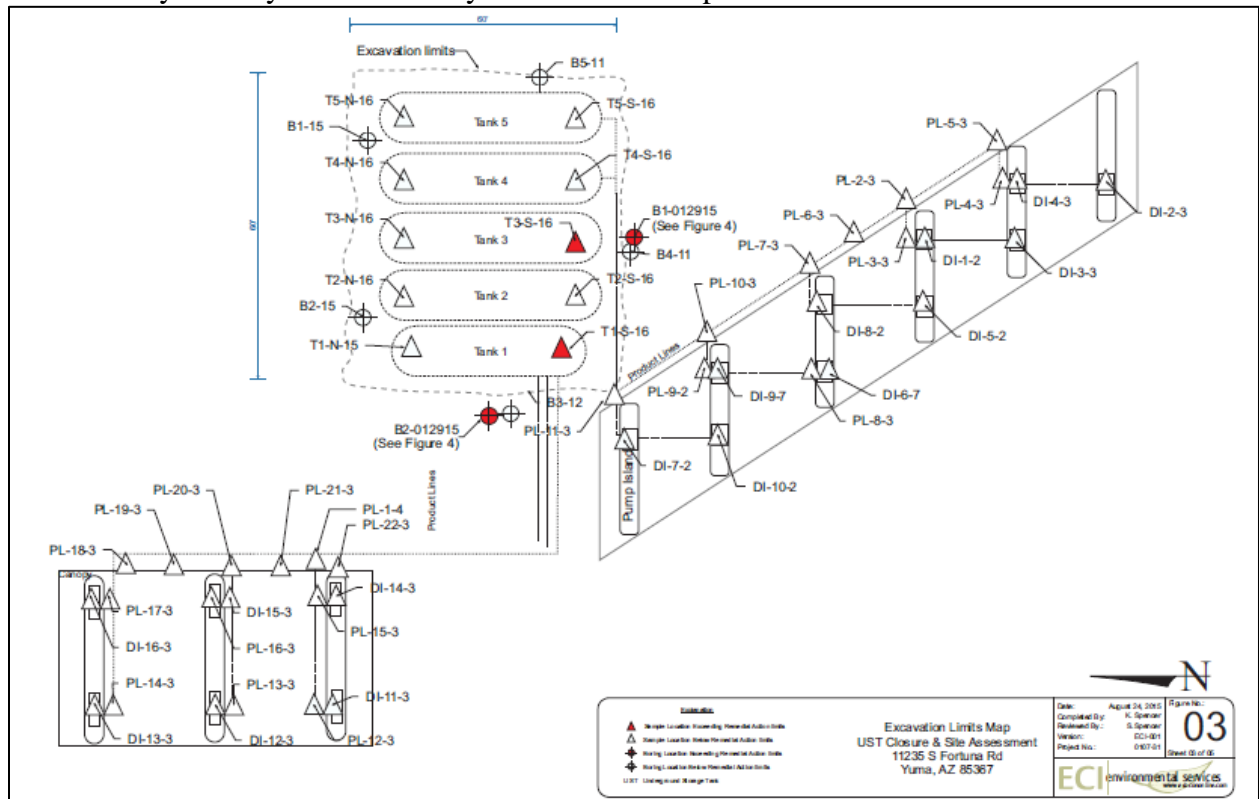


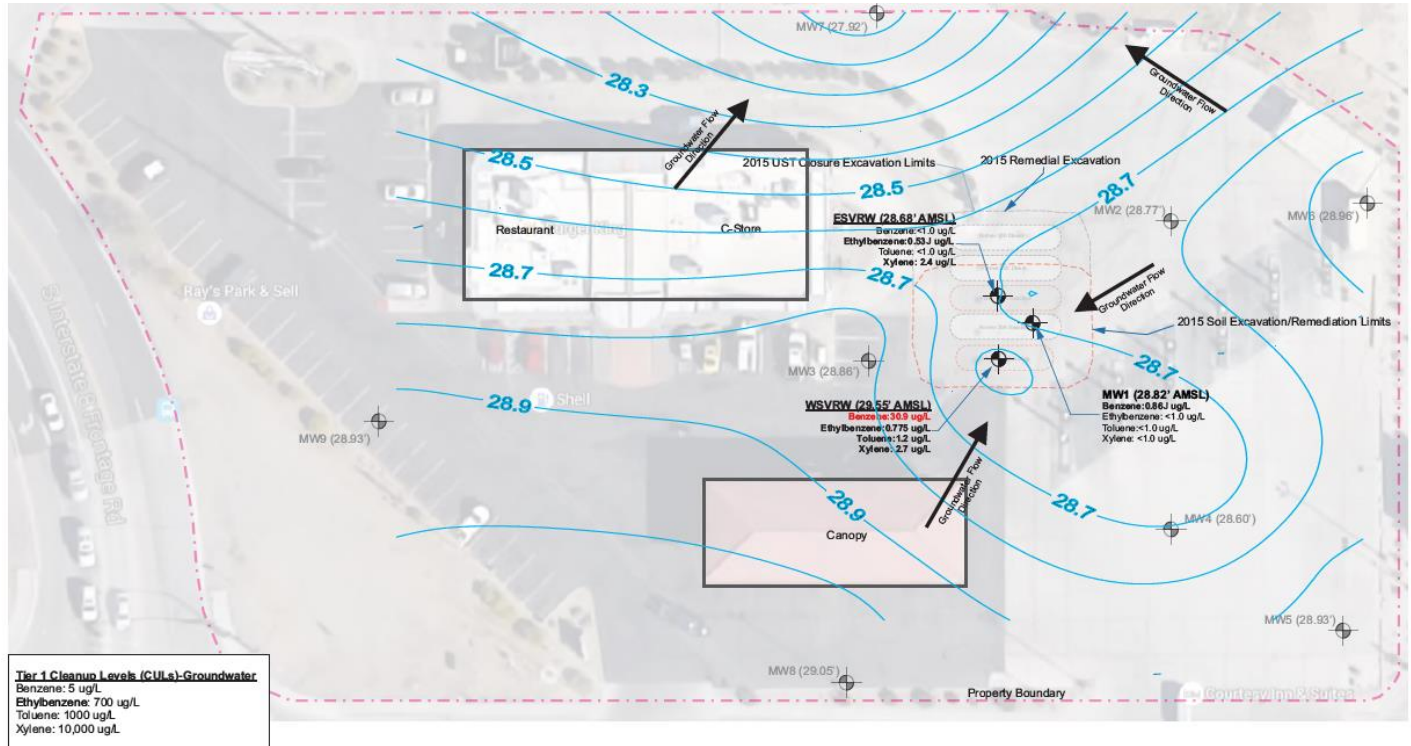
09.07.2017	<0.30	146.00
12.12.2017	<0.30	146.30
03.07.2018	<0.30	146.21
03.15.2018	SVE shut-down	
06.05.2018	<0.30	146.25
09.27.2018	<0.40	146.50
12.11.2018	<0.40	146.19
02.25.2020	Not analyzed	145.98

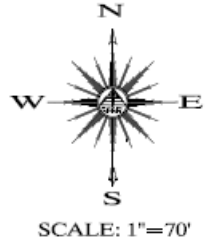
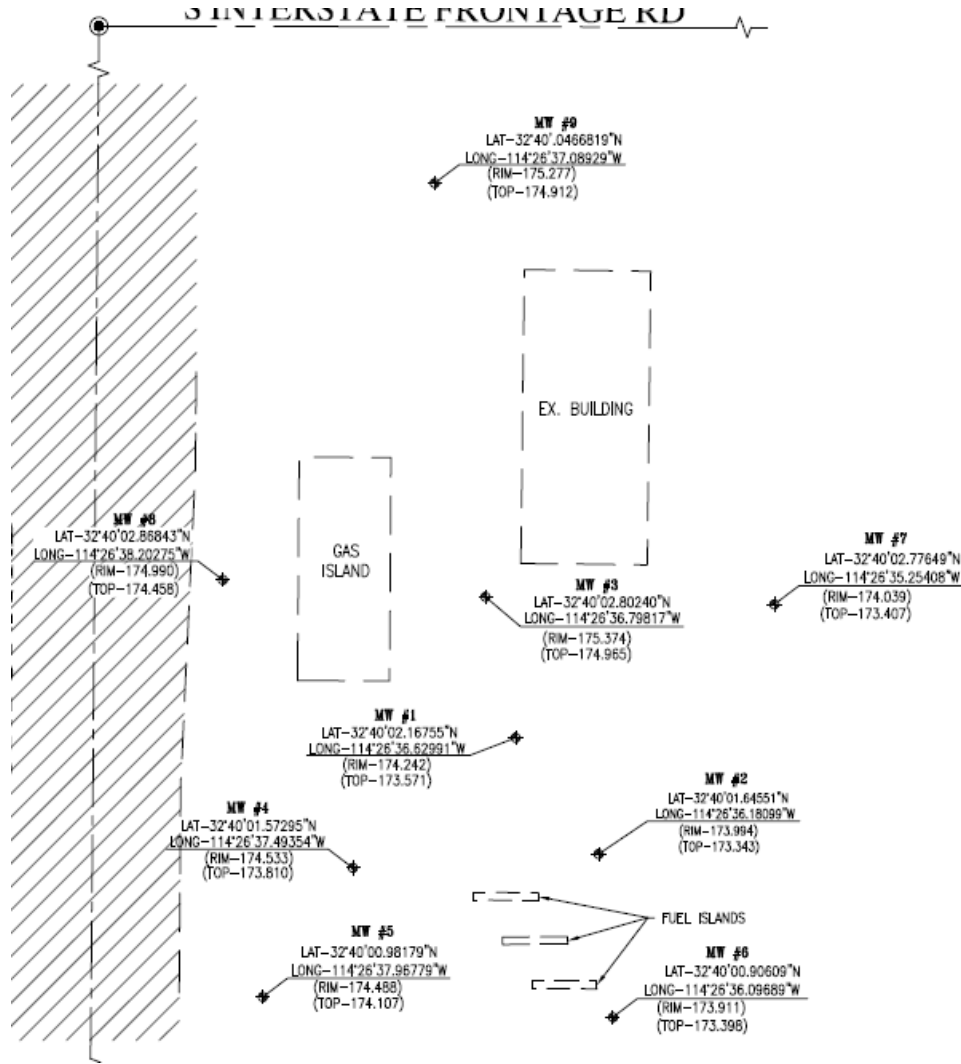
Site location map. 11235 South Fortuna Road, Yuma, AZ.



2015 UST system layout and UST system closure sample locations



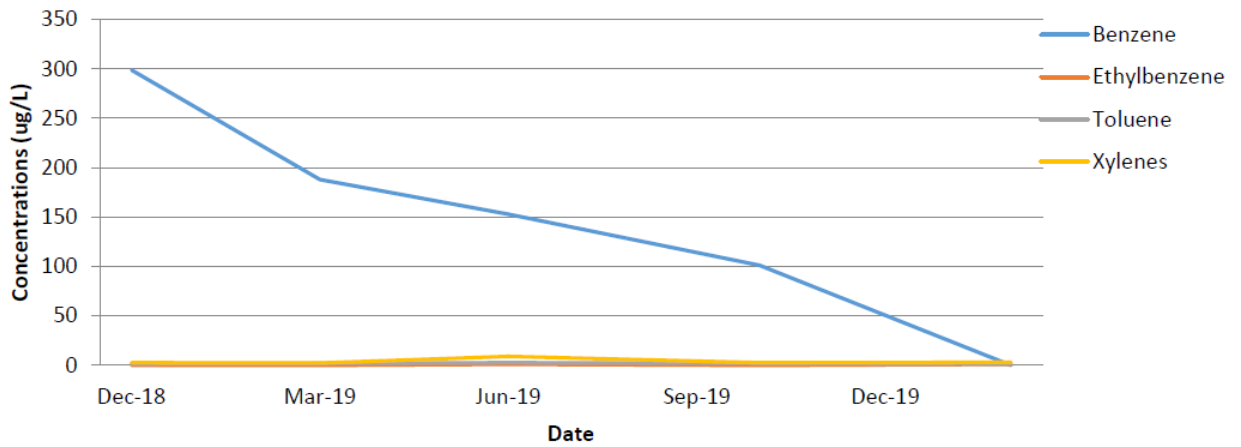




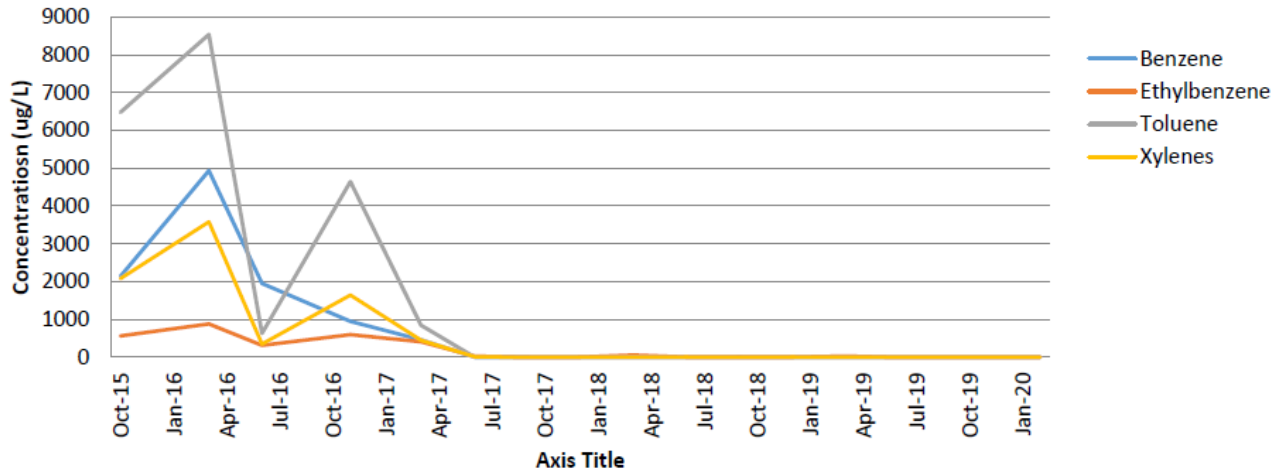
*Naheh K. Edais*  
Registered Professional Engineer (Civil)  
CERTIFICATE NO. 26844  
NAJEH K. EDAIS  
Date Signed 07/05/16  
ARIZONA, U.S.A.  
EXPIRES .....3/31/17

**FORTUNA RD SHELL #10  
11235 S. FORTUNA RD. YUMA AZ  
MONITORING WELLS LOCATION**

### WSVEW - BTEX Concentrations vs. Time



### MW1 - BTEX Concentrations vs. Time



### MW3 - BTEX Concentrations vs. Time

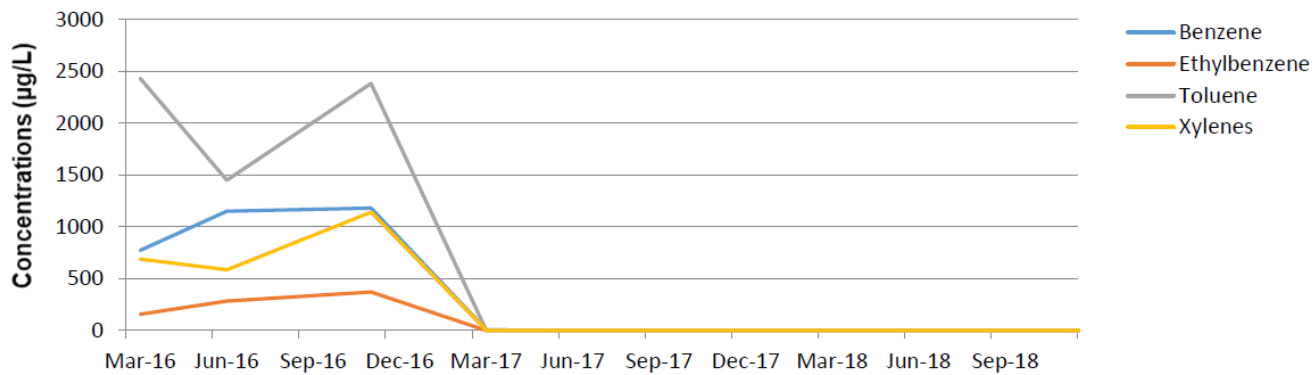
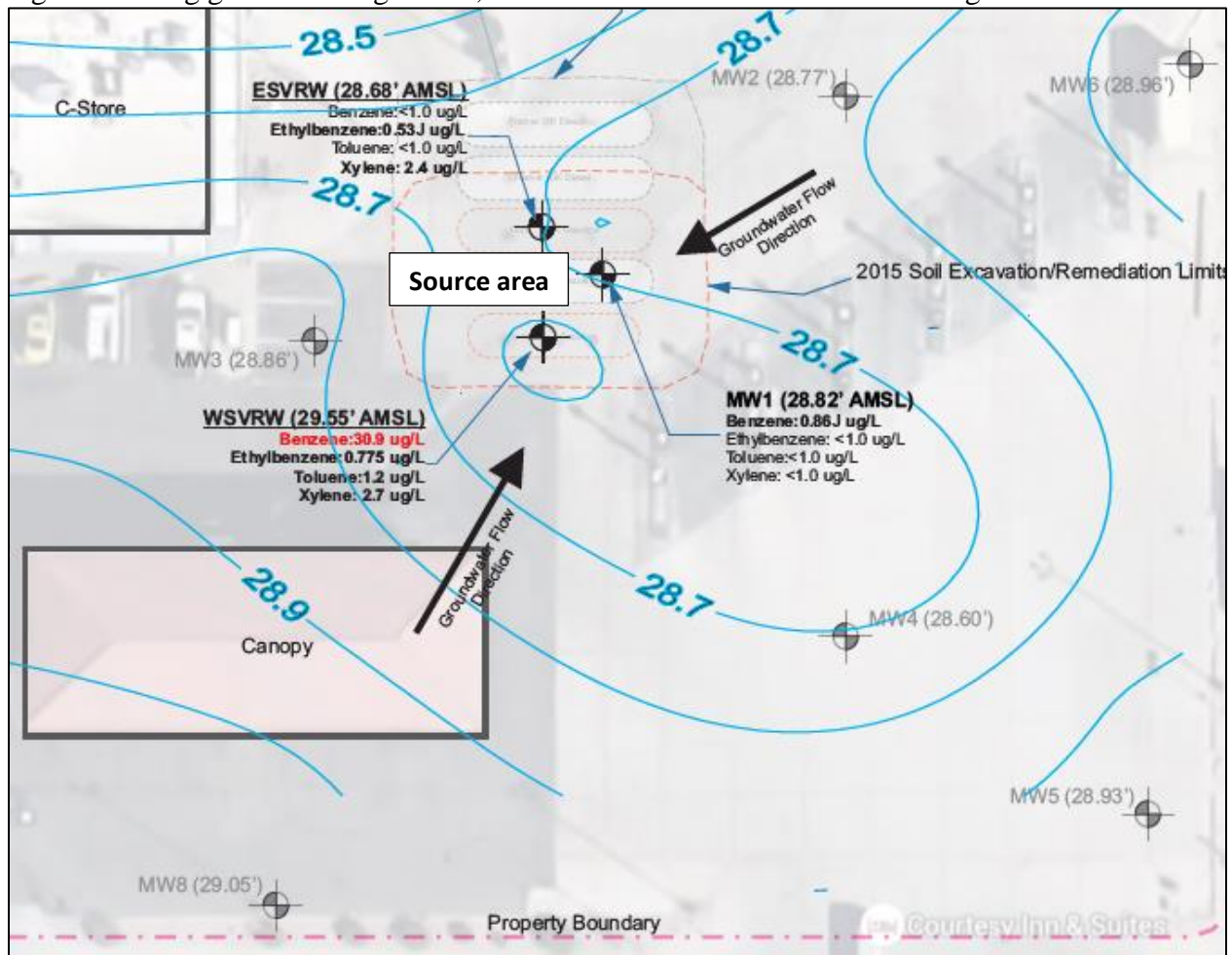


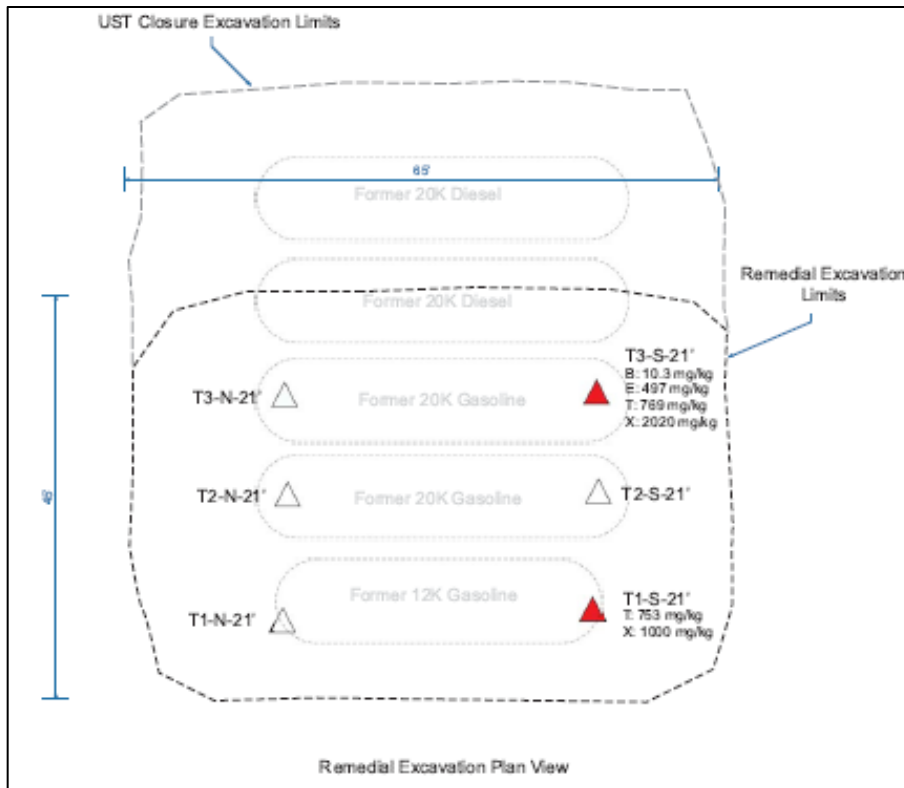
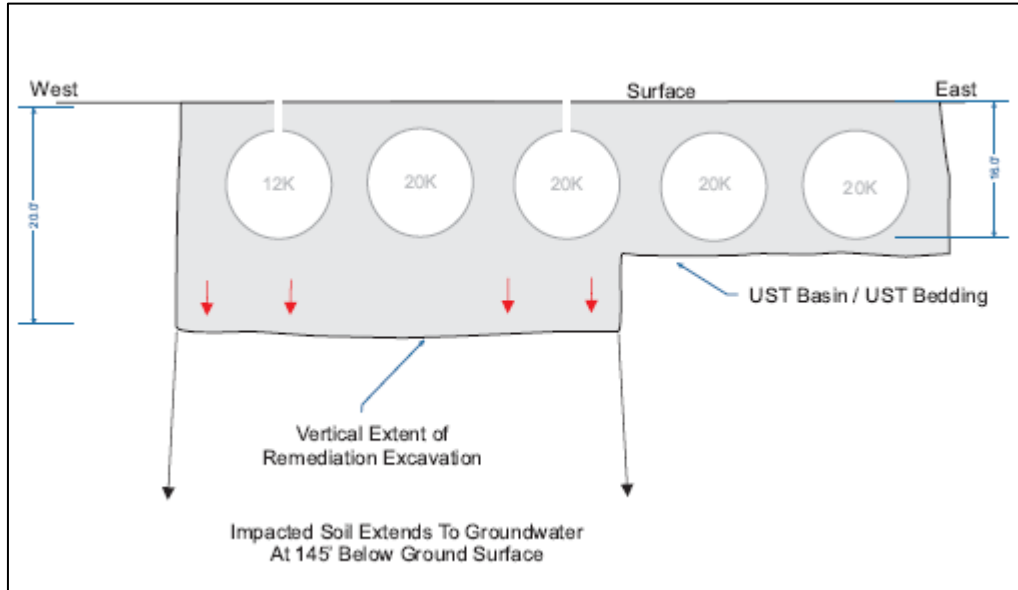
Figure showing groundwater gradient, remedial well locations and monitoring well locations







### Remedial Excavation Figures



Sample ID	Sample Depth (Feet bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	1,2,4-Trimethylbenzene (mg/kg)	1,3,5-Trimethylbenzene (mg/kg)
CB1-20	20	<0.019	0.441	<0.049	<0.050	<0.057	<0.051	<0.049
CB1-30	30	<0.021	0.316	<0.060	<0.056	<0.064	<0.058	<0.055
CB1-40	40	<0.020	0.454	<0.057	<0.053	<0.060	<0.055	<0.052
CB1-50	50	<0.019	0.232	<0.056	<0.052	<0.059	<0.054	<0.051
CB1-60	60	<0.017	0.227	<0.050	<0.046	<0.053	<0.048	<0.045
CB1-70	70	<0.017	0.166 J	<0.048	<0.044	<0.051	<0.046	<0.044
CB1-80	80	<0.018	0.201	<0.051	<0.047	<0.054	<0.049	<0.046
CB1-90	90	<0.019	0.426	<0.053	<0.049	<0.056	<0.051	<0.048
CB1-100	100	<0.019	0.299	<0.055	<0.051	<0.058	<0.053	<0.050