# **TECHNICAL SUPPORT DOCUMENT**

### PROPOSED UNDERGROUND STORAGE TANK (UST) RELEASE CASE CLOSURE EVALUATION SUMMARY

LUST Case File #4234.01 Facility ID #0-008665 Maricopa County Amerigas (former Shell Station #176059) 25102 West Monroe Avenue Buckeye, AZ 85326

#### <u>Background</u>

rizona Department

The Site is situated at the northwest corner of the intersection of Monroe Avenue (MC85) and Miller Road (1st Street) in Buckeye. According to the Initial Site Characterization Report (90-Day Report), the subject Site was a former Shell service station (#176059). Reports indicate the three USTs were installed by Shell Oil Company in 1958 and then closed in place with sand sometime before 1971. The Site is currently operating as an Amerigas propane fueling facility. Amerigas Propane LP conducted site assessment activities on October 13, 1995 as part of a property transfer from Petrolane, Inc. Soil samples were obtained from four soil borings in the vicinity of the UST basin, and two soil borings near a former dispenser island at the Site. Hydrocarbons were detected above applicable soil screening levels (SSCLs) at a depth of 30 feet below ground surface (bgs) in two soil samples located at the south end of the UST basin. The substance released was reported to be gasoline and the amount released was reported as unknown. ADEQ subsequently issued Leaking UST (LUST) number #4243.01. A 14-day letter was completed and submitted to ADEO in November 1995 from the Property Owner, Petrolane. The letter indicated that Petrolane did not use the USTs. A review of ADEQ files indicated that, from December 1995 until Shell received the April 2, 2012 letter from ADEQ stating Shell was the UST owner/operator, no additional investigations were conducted at the Site.

A site assessment was conducted by URS (contractor to Shell) in January 2013. The three USTs that were closed "in-situ" were visually inspected through the USTs' fill ports which resulted in the discovery that two of the three USTs contained a small amount of product with the third being empty.

Fifteen (15) soil borings were installed at the site between 1995 and 2020 for the purpose of site assessment and characterization. No soil (vadose zone) impacts were observed in any of the borings until reaching the groundwater interface at approximately 30 ft bgs. URS continued quarterly groundwater monitoring activities at the Site until GES assumed management of the project in February 2015. GES conducted groundwater monitoring sampling events on April 20, July 21, and October 13, 2015. These three sampling events indicated that the chemicals of concern (COC) concentrations in all Site wells were rising progressively. GES submitted a *Site* 



*Characterization Report* (SCR) and Closure Request in July of 2016. The report indicated that although groundwater impacts were present beneath the site, all potential onsite sources had been assessed and results suggest that they did not contribute to the current groundwater impacts. ADEQ denied the SCR and closure request, based on not enough evidence supporting an off-site contributing source.

The SCR identified a potential offsite source: a confirmed release at the property of 112 East Monroe Avenue (400 feet east), the Former Leeland Friendly Shopper (Former Leeland's), LUST case #2738.01, .05, & .06. The LUST cases associated with the Former Leeland's were closed in 2009, under A.A.C. R18-12-263.04. Based on the data reviewed in the closure report, it does not appear that the groundwater impacts were adequately delineated to the west side of the property, in the direction of the AmeriGas LUST site.

GES oversaw a passive soil vapor survey (PSVS) in November 2017 as part of the *Corrective Action Completion Report* (CACR) *Addendum*, submitted in March 2018 to address the denial of closure due to insufficient characterization of the release. Fifteen (15) PSVS samplers were installed including seven (7) samplers installed onsite and eight (8) samplers installed offsite along the western and southern property boundaries of the two (2) properties located across North 1<sup>st</sup> Street, 104 and 112 East Monroe Avenue. The analytical results of this PSVS exhibited total petroleum hydrocarbons (TPH) above laboratory reporting limits in all 15 samples. More COCs were detected at higher concentrations in offsite sample locations than on-site sample locations. In a letter from ADEQ dated July 22, 2019, ADEQ denied the closure of LUST Case #4243.01 again, stating the PSVS sampling results were inconclusive and due to the groundwater hydraulic gradient being predominantly south since the 1990s that the westward mitigation of COCs was unlikely.

#### **Removal or Control of the Source of Contamination**

In August 2014, URS supervised the removal of the three USTs while collecting soil samples from the UST pit area and associated product line trench. Prior to pulling the tanks, the remaining fluid in the tanks were removed and a representative sample of product from each tank was collected for forensic analysis. During UST removal in 2014, all USTs, piping, and dispensers appeared to be in good condition (i.e., exhibiting no holes, cracks, etc.). Analytical results from the confirmation soil samples collected beneath the USTs, piping, and former dispensers indicated no COCs above their respective laboratory reporting limits, with the exception of one piping sample (L4). The detections were of several polyaromatic hydrocarbons (PAHs) and reported just above the laboratory reporting limit and well below any applicable residential Soil Remediation Levels (rSRLs).

#### Characterization of the Groundwater Plume

The alluvial basin in which the Site is located is commonly referred to as the West Salt River Valley sub-basin. The Arizona Department of Water Resources (ADWR) has designated that the sub-basin lies within the Phoenix Active Management Area. The sediments within the West Salt River sub-basin may range up to several thousand feet in thickness and are commonly subdivided into three major water-



bearing units: The Upper, Middle, and Lower. The Upper Unit is composed predominantly of gravel, sands, and silt.

Soils underlying the Site consist of clayey and silty sands and gravels to a depth of approximately 50 feet bgs. No soil contaminants of concern were detected in the vadose zone at concentrations exceeding rSRLs. CoC detections in soil are within the capillary fringe and likely reflective of groundwater impacts. Currently the depth to groundwater at the Site ranges between approximately 32 to 37 feet bgs. Historically groundwater gradients have been to the south; however, the gradients have been very small ranging between 0.0012 to 0.0018 ft/ft. If considering significant digits throughout the gradient calculations, then the gradients would be 0.00 ft/ft, suggesting the water table is essentially flat. Since the water table is mostly flat, then it is very possible that off-site impacts could migrate west and onto the Site.

Groundwater monitoring has been conducted at the Site since 2013 though a monitoring well network consisting of seven (7) onsite monitoring wells. Benzene, ethylbenzene, and to a lesser extent toluene, have consistently been detected above their respective Arizona Aquifer Water Quality (AWQS) in all wells for all sampling events. Additionally, free product is regularly detected in the wells along the south side of the Site (namely MW-5 and MW-6). Shell/GES has made several attempts since acquiring the Site in 2015, to gain access to surrounding offsite properties to install additional monitoring wells to further characterize the dissolved impacts at the Site. Copies of the letters requesting access, delivery receipts for both sets of letters, parcel info for each offsite property, and a completed ADEQ Off-Site Access Documentation Form were provided to ADEQ. Per Arizona Revised Statute (A.R.S.) §49-1022, Shell has made reasonable attempts to gain access to adjacent properties in order to install additional monitoring wells to first properties to characterize the dissolved impacts at the Site, as such the groundwater impacts at the Site should be considered characterized.

There are several automotive repair facilities upgradient/cross gradient of the Subject Property. However, no registered USTs are at those locations. Shell/GES believe that the impacts observed in groundwater at the Site are emanating from the previously closed LUST case located approximately 400 feet due east. Historically, at that site the maximum benzene in groundwater was measured at 16,000 micrograms per liter (µg/L) on the western property boundary, without any further wells to the west. Further, the down-gradient well used for delineating the toe-edge of the plume was approximately 550 ft south, which GES considers too far from the impacts to be representative. It should be noted that the lack of characterizing wells, closer to the Former Leeland's was due to the lack of property access. In regards to the closure of Former Leeland's, ADEQ stated in their January 6, 2009 closure letter "There is a possibility of groundwater contamination beneath the property at 104 East Monroe Avenue." As part of the site closure, ADEQ conducted soil gas sampling at 104 East Monroe and found detections of benzene, toluene, ethylbenzene, and total xylenes (BTEX). They state in the closure letter regarding these findings that, "These results suggest that the groundwater contamination plume associated with the Former Leeland Friendly Shopper site may have extended beneath the property located at 104 East Monroe Avenue". Town of Buckeye staff understand that ADEQ contacted the property owner and offered to conduct additional investigation activities to determine if groundwater was contaminated beneath this property, but the property owner did not respond."



Given the points above, it is likely that some contaminant mass remains beneath 112 West Monroe Avenue and 104 West Monroe Avenue properties. Given that no UST has been present at the 104 West Monroe Avenue property, it is likely that the impacts migrated west from the Former Leeland's property. That being the case, then it is also plausible that the dissolved impacts moved further west to impact the southern and eastern portions of the Site. This evidenced by the Site wells that historically have contained free product and the highest dissolved concentrations (MW-4, MW-5, MW-6, and MW-7), located along the southern edge of the Site nearest the utility corridor and, in the case of MW-6 and MW-7, closest to the Former Leeland's and 104 West Monroe Avenue (Wild West Cowboy Steakhouse).

Groundwater concentrations beneath the Subject Property appear to have increased over time, although concentrations within the on-site plume appear to be decreasing/stable near the source and demonstrate no trend to the east (cross gradient). Given that no impacts in the vadose zone have ever been identified at the Site, this would suggest that the impacts from the more impacted wells are migrating north-northwest due to the flat groundwater gradient.

A large utility corridor runs along the north side of Monroe Avenue and reaches further west beyond the Site and further east than 112 West Monroe Avenue, providing a pathway for COCs to travel. Further, this utility corridor runs nearest to the most impacted wells on the site (MW-5, MW-6, and MW-7).

GES and Resilient Drilling mobilized August 4 and 5, 2022 to conduct a second PSVS to broaden the coverage from the first PSVS by extending further east to Second Street, north to Butler Avenue, and south to the southside of Monroe Avenue. The additional coverage would help further assess the impacts observed near 104 Monroe Avenue during the first PSVS. GES collected soil vapor samples from 49 discreet locations. GES personnel returned to the Site on August 9 and 10, 2022 to collect the samplers. The samples were shipped to AGI in Newark, Delaware on August 15, 2022 and received by AGI personnel on August 16, 2022. Samples were analyzed for soil gas concentrations of volatile organic compounds (VOCs) utilizing a modified Environmental Protection Agency (EPA) Method 8260.

The highest concentration observed in the second PSVS for toluene, ethylbenzene, and xylenes was located along Butler Avenue, north of the 102 and 112 Monroe Avenue. TPH results between the two (2) events did correlate well in both location and concentration. Specifically, the area around 104 Monroe Avenue. It should be noted that access was not granted for 104 West Monroe and so the samplers were placed in public right-of-way surrounding the property. Based on TPH results from the second PSVS, the sample locations surrounding 104 Monroe Avenue continued to exhibit high concentrations when compared to the first event, specifically on the northwest and southeast corners of the property, and also along the west side of the 112 Monroe Avenue extending north into Butler Avenue.

Lastly, there was a localized yet high TPH concentrations observed onsite in two (2) adjacent sample locations. This area had not previously been assessed during the first PSVS, areas that were assessed in both PSVS's had relatively consistent TPH concentrations. The sample locations are located northeast of



the former UST infrastructure at the site by approximately 50 feet. It is worth nothing that this area is where propane trucks park after filling to check in and out of the on-site office. Therefore, the impacts observed at these locations may be attributed to the current operations opposed to the former UST operation. Further, URS installed a boring, SB-3 near this location in 2013 and collected soil samples from five (5) ft to 35 ft bgs, for which analytical results were below laboratory detection limits for all samples.

#### Groundwater Plume Stability

GES conducted a trend analysis of benzene concentrations in MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, and MW-7 using the GSI Mann-Kendall Toolkit for Constituent Trend Analysis. Results of the analysis indicate that benzene concentrations exhibit a "probably decreasing" trend in MW-5. MW-1, MW-2, and MW-3 show an "increasing" trend. The "stable" exhibited in MW-4 and MW-6 is likely due to the fluctuating benzene concentrations. The "no trend" in MW-7 is likely due to shorter sampling history.

It is worth noting that the highest dissolved concentrations and free product occurrences on Site have been limited to the wells in the southeast corner of the property (MW-5, MW-6, and MW-7), in the direction of the suspected offsite source. Concurrently, an increase in benzene concentrations have been observed in wells to the north (MW-1, MW-2, and MW-3), which are hydraulically upgradient from the more impacted wells. Given that no source material was ever found in the vadose zone it is reasonable to assume the increasing trends are likely due to impacts emanating from the wells exhibiting free product and higher concentrations. This would seem to support the fact that the groundwater gradient at the Site is flat, since impacts observed in the down-gradient wells are beginning to impact the upgradient wells.

GES utilized a Groundwater Spatiotemporal Data Analysis Tool (GWSDAT) excel plugin to further analyze COC concentration trends in the dissolved phase at the Site. BTEX and methyl tertiary-butyl ether (MTBE) concentration data from January 2013 to February 2022 was entered into GWSDAT. The output is a series of maps showing concentration contours identified by a range of colors for specific dates and analytes. Based on the GWSDAT output, it appears that the bulk of the contaminant mass continues to straddle the southeast boundary of the Site. The output depicts an overall expanding plume of BTEX and MTBE since 2013, originating from the southeast corner of the site. Given that this is traveling upgradient towards the location of former UST area, the impacts on-site are unlikely to have originated from the Site.

#### Natural Attenuation

Natural attenuation is general term to account for numerous naturally occurring processes that impede contaminant migration and reduce concentrations. For petroleum hydrocarbons, these processes generally include diffusion, dispersion, sorption, volatilization, and biodegradation.



Comparison of BTEX degradation ratios (B+T/E+X) suggest groundwater plume aging similar to that at the cross gradient closed Leaking UST site. However, B/T+E+X ratios appear to be trending in the opposite direction than anticipated. This trend in volatile organic compound ratios may be influenced by anaerobic degradation affecting relative rates of decay.

#### **Other Exposure Pathways**

To evaluate the exposure pathway of indoor inhalation of COCs, GES utilized the online screening version of the Johnson & Ettinger (J&E) model. Consistent with A.A.C. R18-7-205 and 206, risk factors for COCs designated as human carcinogens and known carcinogens were compared to a residential standard of 10-6. Hazard quotients for all of the COCs were compared to a residential standard of one. The results of the online J&E model revealed that none of the petroleum COCs compound risk factors for human and known carcinogenic effects exceeded the standards for residential indoor inhalation (1 X 10-6 or 1, respectively). The results for chlorinated compound risk factors for human and known carcinogenic effects for human and known carcinogenic effects exceeded the standards for residential indoor inhalation (1 X 10-6 or 1, respectively). The results for chlorinated compound risk factors for human and known carcinogenic effects exceeded the standards for residential indoor inhalation (1 X 10-6 or 1, respectively). The results for chlorinated compound risk factors for human and known carcinogenic effects exceeded the standards for residential indoor inhalation (1 X 10-6 or (1) one, respectively). The total cumulative indoor inhalation risks for petroleum compounds were 3.95 X 10-7 or 3.42 X 10-2, respectively. These values are within the applicable risk standards.

No surface water bodies are present within one-quarter mile of the Site. The Buckeye Canal runs within one half mile up-gradient of the Site. At its nearest, it is approximately 1,210 feet north the former UST area.

The surrounding area includes commercial, industrial, and residential properties within <sup>1</sup>/<sub>4</sub> mile. There is no off-site soil contamination, so there are no impacts to nearby properties.

#### Threatened or Impacted Drinking Water Wells

A database of registered wells maintained by the Arizona Department of Water Resources (ADWR) currently identifies a total of 56 wells that may be present within one-quarter mile of the Site. All of the wells are identified as monitoring wells or geotechnical wells ("other") with the exception of one (1) non-exempt well and four (4) exempt wells. No public water supply wells were identified within one-quarter mile of the Site.

All of the wells are identified as monitoring wells or geotechnical wells ("other") with the exception of one (1) non-exempt well and four (4) exempt wells. The exempt and non-exempt wells belonging to Long Brother Farms are located outside of the <sup>1</sup>/<sub>4</sub> mile radius south of the Site and can be ruled out as sensitive receptors. The other three exempt wells are located upgradient or cross-gradient of the site and can also be ruled out as sensitive receptors.

ADEQ expanded the well search to ½ mile of the Site. ADWR listed 85 registered wells. There are 67 wells listed as 'other' or monitoring, two as 'non-exempt' and 16 as 'exempt'. The City has one well (#55-529216) between ¼ and ½ mile to the northeast of the Site. The well is 552 feet deep and in screened between 502 and 552 feet. According to the boring log, clays are present between 84 and 433



feet bgs, with sandstone, then solidified sands beneath it. The City also has an "exempt" well (55-800478) located due east of the Site between ¼ and ½ mile. There was no screened interval information on the ADWR imaged records. Roosevelt Irrigation District has one "exempt" well (#55-607388) located between ¼ and ½ mile to the southeast of the Site. The depth of the well is 448 feet bgs. ADWR had no additional information in the imaged records.

According to the City of Buckeye webpage, the City currently relies almost entirely on groundwater from 35 active wells. In addition to pumping limitations required by the ADWR, the City also recharges the aquifer with reclaimed water. The City is planning to use a combination of groundwater and surface water supplies from Non-Indian Agricultural (NIA) Colorado River water. The City applied for this water in 2013. Delivery of this water began in 2022. After 2022 the annual volume of this NIA water could be reduced if the shortage declaration on the Colorado River is extended or worsens.

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

The results of the groundwater data from the site assure protection of public health, welfare and the environment, to the extent practicable, and 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.

#### Groundwater data tables:

AWQS – Aquifer Water Quality Standard Groundwater contamination emanating from off-site source(s)

Well ID	Date Sampled	Depth to water (feet)	Benzene AWQS is 5 µg/L	Ethylbenzene AWQS is 700 μg/L
	1/9/2013	32.32	22.6	700
	3/26/2013	332.33	739	865
MW-1	9/19/2013	34.47	14.4	7.7
	11/7/2013	33.64	11.3	10.8
Former dispenser	5/29/2014	35.27	49.2	44.7
island	10/13/2015	34.01	203	62.2
Screen: 25-40 ft. Depth: 40 ft.	10/10/2019	39.23* 0.20 ft. of free product	1,270	3,190
	2/28/2020	36.83	1,260	1,580
	5/21/2020	36.33	1,540	1,400
	8/6/2020	37.21	1,520	1,480



12/04/2020	36.08	1,210	2,010
2/19/2021	35.62	802	2,190
6/2/2021	36.45	999	2,570
2/16/2022	35.40	419	2,240

Well ID	Date Sampled	Depth to water (feet)	Benzene AWQS is 5 μg/L	Ethylbenzene AWQS is 700 μg/L	
	1/9/2013	32.02	144	2,180	
	3/26/2013	32.36	44.2	489	
	9/19/2013	34.53	53.3	18.5	
MW-2 Up-gradient Screen: 25-40 ft. Depth: 40 ft.	11/7/2013	33.68	93.0	35.0	
	5/29/2014	35.29	198	427	
	10/13/2015	34.07* 0.18 ft. of free product	165	331	
	10/10/2019	39.04	1,500	5,420	
	2/28/2020	36.88	1,740	3,000	
	5/21/2020	36.35	1,530	3,200	
	8/6/2020	37.25	737	2,330	
	12/04/2020	36.12	948	2,170	
	2/19/2021	35.64	Benzene AWQS is 5 μg/L     Ethylbenzene AWQS is 700 μg       144     2,180       44.2     489       53.3     18.5       93.0     35.0       198     427       f     165       1,500     5,420       1,740     3,000       1,530     3,200       737     2,330       948     2,170       680     2,670       595     1,920       625     1,650	2,670	
MW-2 Up-gradient Screen: 25-40 ft. Depth: 40 ft.	6/2/2021	36.48	595	1,920	
	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	35.43	625	1,650	

Well ID	Date Sampled Depth to wa (feet)		Benzene AWQS is 5 μg/L	Ethylbenzene AWQS is 700 μg/L
	1/9/2013	31.70	<50	2,450
	3/26/2013	31.93	11.0	603
	9/19/2013	34.08	2.3	133
MW-3 cross gradient Screen: 25-40 ft	11/7/2013	33.24	6.2	159
	5/29/2014	34.86	38.8	1,710
	10/13/2015	33.62	13.2	536
	2/28/2020	36.46	555	2,890
Depth: $40$ ft	5/21/2020	35.96	455	2,550
	8/6/2020	36.84	413	2,470
	12/04/2020	35.70	259	2,180
	2/19/2021	35.28	189	2,310
	6/2/2021	36.08	152	2,020
	2/16/2022	35.02	135	2,200



Well ID	Date Sampled	Depth to water (feet)	Benzene AWQS is 5 µg/L	Ethylbenzene AWQS is 700 μg/L
	9/19/2013	34.10	285	98.3
	11/7/2013	33.26	265	56.4
	5/29/2014	34.87	258	1,360
MW-4	10/13/2015	33.34	51.9	105
	10/10/2019	38.78 *0.13 ft. of product	377	3,640
Screen: 25-40 ft.	2/28/2020	36.48	270	3,170
Deptn: 40 ft.	5/21/2020	35.93	255	3,400
	8/6/2020	36.84	241	2,910
	12/04/2020	35.72	188	2,910
	2/19/2021	35.22	159	3,000
	6/2/2021	36.07	206	2,790
	2/16/2022	35.04	87.0	2,280

Well ID	Date Sampled	Depth to water (feet) Produc Thickne (ft.)		Benzene AWQS is 5 µg/L	Ethylbenzene AWQS is 700 μg/L	
	9/19/2013	33.48		3,850	2,000	
	11/7/2013	32.67		4,030	2,280	
	5/29/2014	34.16	0.01	5,470	3,920	
	10/13/2015	33.04		5,750	4,450	
MW-5	10/10/2019	37.91	0.87	5,270	3,710	
Screen: 25-40 ft.	2/28/2020	35.92	0.04	358	6,160	
Depth: 40 ft.	5/21/2020	35.34	0.01	5,710	3,970	
-	8/6/2020	36.18		3,540	4,700	
	12/04/2020	35.12		4,610	2,660	
	2/19/2021	34.62		3,770	2,430	
	6/2/2021	35.53	0.08	4,140	2,950	
	2/16/2022	34.50		3,190	2,370	



Well ID	Date Sampled	Depth to water (feet)	Product Thickness (ft.)	Benzene AWQS is 5 µg/L	Ethylbenzene AWQS is 700 μg/L
	9/19/2013	33.33		106	18.4
	11/7/2013	32.49		411	187
	5/29/2014	34.09		2,100	2,220
	10/13/2015	32.86		1,970	3,590
MW-6	10/10/2019	38.71	1.04	1,080	710
Screen: 25-40 ft.	2/28/2020	36.00	0.39	1,650	3,350
Depth: 40 ft.	5/21/2020	35.48	0.40	2,010	4,950
_	8/6/2020	36.30	0.34	1,560	3,290
	12/04/2020	34.88		1,680	3,140
	2/19/2021	34.61	0.21	1,470	1,890
	6/2/2021	35.47	0.23	1,630	3,320
	2/16/2022	34.33	0.08	1,630	3,800

Well ID	Date Sampled	Depth to water (feet)	Product Thickness (ft.)	Benzene AWQS is 5 µg/L	Ethylbenzene AWQS is 700 μg/L
	8/6/2020	34.47		477	2,190
MW-/	12/04/2020	33.36		647	3,400
Screen: $25-40$ ft.	2/19/2021	32.91		478	3,210
Depth: 40 ft.	6/2/2021	33.70		556	3,190
	2/16/2022	32.72	0.01	515	2,900



			GSI MAN for Con	N-KENDA stituent Tre	LL TOO nd Analy:	LKIT sis		
Evaluation Date	e: 18-Jul-22				Job I	0:3616013		
Facility Name	Buckeye				Constituen	t: Benzene		
Conducted B	y: Anya Kadlul	bowski		Co	incentration Unit	s: ua/L		
	- Delet ID.	M347-1	MW 2	M04/ 9	NUM 4	MW E	MIN C	104/7
San	npling Point ID:	MVV-1	MYY-2	MVV-S	MYV-4	MIV-0	M1V-6	MVV-/
Sampling Event	Sampling Date			BENZENE	CONCENTRAT	TION (ug/L)		
1	9-Jan-13	22.6	144	50				
2	26-Mar-13	739	44.2	11				
3	19-Sep-13	14.4	53.3	2.3	285	3850	106	
4	7-Nov-13	11.3	93	6.2	265	4030	411	
5	5-Mar-14	55	48.6	7.4	141	4990	1800	
6	29-May-14	49.2	198	38.8	258	5470	2100	
7	22-Oct-14	95.5	110	50	51.9	7760		
8	14-Jan-15	141	104	10	146	2620	5700	
9	20-Apr-15	140	387	17.1	51.7	4330	1780	
10	21-Jul-15	25.6	162	11.8	53.4	4700	2030	
11	13-Oct-15	203	165	13.2	98.5	5750	1970	
12	10-Oct-19	1270	1500		377	5270	1080	
13	28-Feb-20	1260	1740	555	270	358	1650	
14	21-May-20	1540	1530	455	255	5710	2010	
15	6-Aug-20	1520	737	413	241	3540	1560	477
16	4-Dec-20	1210	948	259	188	4610	1680	647
17	19-Feb-21	802	680	189	159	3770	1470	478
18	2-Jun-21	999	595	152	206	4140	1630	556
19	16-Feb-22	419	625	135	87	3190	1630	515
20								
Coefficie	nt of Variation:	1.09	1.11	1.33	0.52	0.45	0.73	0.13
Mann-Kend	all Statistic (S):	66	74	64	-16	-37	-29	2
Confidence Factor: Concentration Trend:		98.3%	99.2%	99.2%	72.9%	91.2%	87.4%	59.2%
		Increasing	Increasing	Increasing	Stable	Prob. Decreasing	Stable	No Trend
	10000							



#### Notes:

1. At least four independent sampling events per well are required for calculating the trend. Methodology is valid for 4 to 40 samples.

 Confidence In Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≥0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.</li>
Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifal, C.J. Newell, and J.R. Gonzales, Ground Water, 41(3):355-367, 2003.

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COA	CAB	CAA	DBB	DOAR	DAB	DAA :	C. B.	CBA'	CAB	CAA	DBB	DBA	DeB
CBD	CACI	CAD	DBC	DBD	DAC	DAD	Vaccine Manor	ČĘD	CAC	Die Par	DBC P	DBD	DAC
CCA CO	CDB CDB CDC	CDA CDA	DCB W Pat W Euro	DCA	DDB		C B ANY HOC		VCDB CI	CDA	D <b>o</b> B <sup>2</sup>	DeA	D.B Deseine
CCD	CDC		bee	W.	Base line, I	id	W	Coronado	BIVO P	nauxi utk Union	Pacific		DUC
BBA	BAB	BAA	ABB	ABA	AAB	AAA	BBB	180A	ora BOB	n AB <b>o</b> A	ABB	A	A
BBD	BAC	BAD	ABC	ABD	AAC	A0 -A0	tB <b>b</b> C i Mano	ar BoD	BéC Wa	BAO BoD te on	N/ABC		Cor.20
BOA	Bas	BDA	ACB	A.A	ADE	0	BCR BCR Z B	BēA Northern	BDB	BDA-	en ACB	A.A.A	A•
в	BDC	BOD	A	A	ADC Ionroe A	ve. Buc	eve cAri	BCD zona 85	BOC 366an tor	EBDD Z	FACE	eli A <b>o</b> D	AD(
СВА	CAB	CAA	DBB	DBA	0	DAA		CHA E Jacks			LD.	DeA	DAR
CBD,	C C	CAD	a fDBC	BO DBD	DAC	DAD	CBC		nten Ave CAC to		DBC	DBD	DAG
I Alla	CDB	CDA	DCB k	DIDEA	Park DDB	ide k D • A	CCB	CCA	CDB	CDA Mahone	DCB Ave	DCA	MRR
CCD CCD CDr	CDC W Miles	CDD la Dr	DCC	DCD	DDC	DDD	Earl Ec	CO CCD	CDC	CDD	ESa D€Ĉ <sup>ai</sup>	d DoD	Dec W Fi
BBA	вев	BOA	ABB	ABA	AAB		вев	B	BAB	BéA	AB	'AoA	A
0	ВА	0	AB	0	A	10	В	B0	Back	A0	A	30	
BBD	BAC	BAD	ABC	ABD	AAC	AAD	BBC	BBD	BAC	B∳D	ABC	ABD	AAC
B0		PDA	ACD.	ACA	RioSe	nderg	RCR	BCA	RDR	REA	ACR	ACA	00_
BLA	BDB	BDA	ACB	ALA	ADB	ADA 0	BCB	60	BI	00	ACD	50	
BCD	BDC	BDD	ACC	ACD	ADC	AD	BCC	BCD	BOC	BDD	ACC	ACD	ADO
vember	15, 2022	2								-	1:18,05	6	

## 1/4 Mile Well Search - Former Shell Station #176059

Well\_Registry 
Township

City Boundaries

Section

City of Buckeye, AZ, Bureau of Land Management, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METUNASA, EPA, USDA

0.4

0

0.2

Arizona Department of Water Resources

+

0.8 km