TECHNICAL SUPPORT DOCUMENT

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

LUST Case File #1082.01 and .02 Facility ID #0-003625 Yavapai County

Canyon Service Center 34400 South Old Black Canyon Highway Black Canyon City, AZ 85324

Background:

izona Department

The site is located at 34400 South Old Black Canyon Highway in Black Canyon City, approximately 40 miles north of Phoenix. The site appeared un-occupied during a site visit on August 11, 2022. The site did have business signage for both High Desert Auto and Federated Auto Parts. The site is mainly covered with concrete, and the canopy over the former dispenser island remains.

The Underground Storage Tank (UST) system consisted of a 10,000-gallon steel UST and a 4,000-gallon steel UST with associated delivery piping and two dispenser islands. These two USTs were reportedly installed in the 1960s. The USTs were owned/operated by GIPA, Inc.

A system release occurred prior to 1990 and involved a leak in the coupler connecting the pump of the 10,000-gallon UST to the delivery lines. The leak was detected, repaired and reported to ADEQ in January 1990. Leaking UST release # 1082.01 was assigned on January 8, 1990. A second leak was detected on December 14, 1990, associated with the piping system connecting the tanks to the dispensers. It is assumed that at that time, this leak was never reported to ADEQ. However, during this time, ADEQ's Emergency Response Unit identified seepage of petroleum hydrocarbons on the south bank of the Agua Fria River. ADEQ's contractor removed approximately 200 cubic yards of hydrocarbon impacted soil and transported it off-site for disposal. The contractor also dug an interceptor trench parallel to the river bank to prevent any additional contamination from getting into the river.

Site activities included site characterization between April 1990 and 1998. A *Site Characterization Report* was approved in 2010. A *Corrective Action Plan* dated July 2000 was submitted to the ADEQ. The report explored various remedial technologies at the site, but successfully recommended the installation of oxygen release compounds ($ORC^{(R)}$) as a slurry into multiple borings planned at three locations along the length of the dissolved phase plume.

The State Assurance Fund which was being utilized to fund the cleanup activities at this site expired in June 2010. The CAP was approved in October 2010. Furthermore, due to site access issues, work on



the site was halted between February 2011 and October 2019. In 2020, the site came into the Preapproval Program, with ADEQ's State Lead Program providing project management. On April 23, 2020, Terracon, as contractor to the State Lead program, assumed responsibility of site activities. On May 26, 2020, the existing shed partially covering one of the USTs was demolished, prior to the commencement of UST permanent closure and other remediation activities. A second leaking UST # 1082.02 was assigned on July 21, 2020, during the UST removal activities conducted in June 2020.

Removal or Control of the Source of Contamination

Free-product gasoline has been observed in monitoring well MW-3 since June 13, 1990. A pneumatic product recovery system was installed in late 1992 at MW-3. A total of 107.07 gallons of fuel was removed from MW-3 between March and May 1993. Between December 1997 and August 1998, approximately 20,700 pounds of gasoline hydrocarbons were removed by soil vapor extraction (SVE). Hand-bailing during this time recovered approximately 184 gallons of gasoline hydrocarbons.

Between 2000 and 2001, a shallow trench was dug south of MW-1 and ORC[®] was added to it. MW-1 is located off-site towards the south bank of the Agua Fria River.

Between 2008 and 2009, multiple multi-phase extraction (MPE) events were conducted at MW-3 to remove free product.

On May 26, 2020, four gallons of free product were removed from the existing on-site groundwater monitoring well MW-3. On May 29, 2020, a free product removal well (FP-1) was installed near the existing USTs. No free product was encountered in the well and it was subsequently abandoned.

On June 11 and 12, 2020, the two USTs were removed from the site. During the tank removal process, staining and odors were noted on the USTs, at the soil-bedrock interface underlying the tanks and in the excavation sidewalls. The entire UST basin was over-excavated laterally down to the bedrock interface and to the extents possible (40 feet by 30 feet by 11 feet deep). Post-excavation soil samples were collected and analyzed for Volatile Organic Compounds (VOCs), poly aromatic hydrocarbons (PAHs) and tetra-ethyl lead (TEL). No VOCs, PAHs, or TEL was reported exceeding any applicable regulatory standard or Release Confirmation Level. The excavated soil was containerized for disposal off-site as non-regulated petroleum-contaminated soil (PCS).

On January 25, 2021, monitoring well MW-3 and VW-1 were abandoned in preparation of the excavation around the area of monitoring well MW-3. Between January 26 through March 5, 2021, an excavation of approximately 20 feet by 20 feet by 10 feet deep occurred. Confirmation soil samples were collected at the soil-bedrock interface and analyzed for VOCs and PAHs. None of the samples had concentrations that exceeded applicable regulatory standards except for sample SW-10 (1,2-4 trimethylbenzene). Based on the reach of the excavator, the excavation continued to bedrock to approximately 26 ft below ground surface (ft bgs). The contaminated soil at location SW-10 was over-excavated. Approximately 1,077 tons of soil and bedrock were stockpiled, sampled and transported to a disposal facility. As groundwater entered the excavation, it was pumped out into a frac-tank and transported to a licensed disposal facility after completion of the excavation activities.



At approximately 26 ft bgs, the reach of the excavator, 800 pounds of RegenOx[®] was spread evenly across the excavation floor with the excavator bucket followed by a layer of ORC[®] (900 pounds), 5 feet of pea gravel and another layer of approximately 900 pounds of ORC[®] at approximately 20 ft bgs. Two temporary injection wells MW-3RA and MW-3RB were installed to 20 ft bgs with 10 feet of screened casing. The temporary injection wells were to provide access to the formation for potential future groundwater treatments, if necessary.

The excavation was extended laterally approximately 43 ft by 32 ft to remove additional impacted soils. Additional soil confirmation samples were collected and no VOCs or PAHs were reported over applicable regulatory standards. The entire excavation was backfilled with pea gravel to 10 ft bgs, followed by a geo-fabric layer and aggregate base, to ground surface. The upper five feet of aggregate base was compacted in 12-inch horizontal lifts and compaction tested to a uniform density of not less than 95 percent.

Characterization of the Groundwater Plume

Black Canyon City is located within the geologic province known as the Transition Zone. This province separates the Colorado Plateau to the north and the Basin and Range province to the south and west. The Transition Zone is composed of volcanic belts characterized by closely spaced, steep block-faulted mountains, which are separated by narrow valleys. Specifically, Black Canyon City is in the Prescott Volcanic Belt. The physiography of the mountains displays the same northwest trend as most of the Basin and Range, but elevations are generally higher.

The site geology consists mostly of volcanic ash and an unconsolidated Quaternary boulder/ cobble terrace gravel, and a silty clay. Overlying the volcanic ash unit is a Quaternary-age boulder/ cobble terrace gravel. Finally, overlying this unit is a silty clay unit, a fairly recent Quaternary-age brown, silty clay exhibiting high plasticity. Correlation of drilling information and surface geology shows that the site is situated on a buried ridge of the volcanic ash that trends northeast to southwest

The site topography is relatively flat with a natural shallow northerly gradient. The Agua Fria River, located to the north of the site, flows approximately $\frac{1}{2}$ mile towards the west, and then bends to the south. Storm drainage flows in the northerly direction towards the Agua Fria River.

To characterize the groundwater contamination from the initial release number in January 1990, MW-1 through MW-4 were installed beginning on April 30, 1990. Additional monitoring wells (MW-5 through MW-8 were installed in October 1992. In March 1994, MW-4A was installed to replace MW-4 due to MW-4 being improperly screened, and new wells MW-9 and MW-10. In May 1996, VW-9 was converted to MW-11. Historic groundwater sampling was conducted quarterly between October 1992 and December 1997. In July 2001, MW-12 and MW-13 were installed.

On July 27, 2020, two confirmation soil borings/ temporary monitoring wells (VSB1 and VSB2) were advanced to approximately 20 to 25 ft bgs to satisfy the *90- Day Report*. Soil samples collected showed



no VOCs or PAHs detected over laboratory method detection limits. These borings were converted to temporary monitoring wells and grab groundwater samples were collected from these monitoring wells. The groundwater samples showed exceedances of benzene and methyl tertiary butyl ether (MTBE) above the Arizona Aquifer Water Quality Standard (AWQS) and Tier 1 Corrective Action Standard, respectively.

On January 4, 2021, monitoring well MW-3 was aggressively redeveloped to remove residual free product attached to the inside and outside of the casing and within the sand pack until the monitoring well discharge water was free of turbidity and free product. During the same mobilization event, confirmation soil boring VSB-3 was advanced near the previously suspected dispenser release locations (PL1-5/D1-5) to assess the vertical extent of soil contamination. The wells were professionally surveyed on January 7, 2021. A groundwater monitoring event was conducted in January 2021, on 12 of the 14 wells in the network. MW-5 and MW-8 were dry at the time of the sampling event. This was the first time the monitoring well network was sampled, since 2002, due to the termination of the State Assurance Fund and access issues.

On March 8, 2021, monitoring well MW-3R was installed to replace MW-3, in approximately the same location in the former excavation area, to a depth of 40 feet. On April 13, 2021, the newly installed monitoring wells (MW-3R, MW-3RA and MW-3RB) were surveyed and an additional on-site monitoring well VW-3 was added because of dry conditions identified in MW-8. The monitoring well network (12 wells and 2 dry wells) were sampled in April, July, and October 2021 using low flow purging techniques, along with the collection of monitored natural attenuation (MNA) parameters.

The monitoring well network was sampled in January and April 2022, along with collection of geochemical parameters. The consistently high concentrations of nitrate were attributed to the septic systems in the area. It is noted that arsenic is also a common constituent in local groundwater due to the geology of the area.

The groundwater gradient is mostly towards the north-northwest, towards the Agua Fria River. Depth to water during the most recent groundwater sampling event in April 2022 ranged from 11.96 (MW-1) to 29.02 (MW-6) ft.

Groundwater Plume Stability

Mann-Kendall statistical trend analyses was conducted to observe benzene attenuation for monitoring wells MW-3R, VW-2, VW-3 and MW-1; and of MTBE attenuation for MW-3R, VW-2, VW-3, VW-8, MW-1, MW-12 and MW-13, using data collected since as early as 2020. The Mann-Kendall trend analysis shows a decreasing trend in concentrations of benzene in groundwater at the site, specifically in monitoring wells MW-3R and VW-3, the wells closest to the former UST tank basin. Monitoring well VW-2 shows no trend and monitoring well MW-1 shows "stable" trend, although the benzene concentrations in both wells have decreased since 2020. Monitoring well MW-1 showed a benzene concentration of 27,000 micrograms per liter (μ g/l) in October 1992, which reduced to 1.58 μ g/l during the sampling event conducted in April 2022.



The Mann-Kendall statistical trend analysis of MTBE concentrations in groundwater at the site generally show a decreasing trend, specifically in monitoring wells MW-3R, VW-2 and MW-12. Monitoring well VW-3 shows stable trend and monitoring wells MW-13, MW-1 and VW-8 show no trend. The results of the Mann-Kendall statistical analyses support that there has been a significant reduction in dissolved phase contaminant concentrations at the site since 2020.

Natural Attenuation

Monitored Natural Attenuation (MNA) parameters like temperature, pH, dissolved oxygen (DO), oxidation reduction potential (ORP) and specific conductance parameters including laboratory analysis for nitrates, sulfates, manganese, ferrous iron and methane were collected during the groundwater sampling events conducted quarterly at the site.

MNA parameters have been collected from the monitoring well network for several quarters. The temperature of the groundwater at the site appears to be in the appropriate range for the natural attenuation processes. The pH values of groundwater at the site are indicative of degradation, except monitoring well MW-3R, which indicates basic conditions and is likely due to the ORC[®] used in the excavation. Specific conductance is in the range sufficient for natural attenuation at the site, except monitoring well MW-3R, which again is likely due to the ORC[®] or reactions with the backfill material. DO values within the plume indicate aerobic biodegradation is occurring and conducive to natural attenuation., although the values are most likely skewed due to the addition of ORC[®]. Sulfates in the groundwater well within the plume appear to be available, and are being used for microbial attenuation where are groundwater wells outside the plume show no or minimal reduction in sulfates.

Methanogenesis appears to be active in monitoring well MW-1 and plume monitoring wells VW-2 and VW-3. The MNA parameters from ORP, nitrate, ferrous iron and manganese in groundwater at the site, are somewhat inconsistent inside and outside the plume area. In general, natural attenuation parameter results for wells within the plume compared to values indicative of degradation and relative to the non-plume wells, indicate that in-situ degradation and aerobic degradation have been occurring and is ongoing and conductive to natural attenuation. However, the process is very slow, due to the limited nutrient supply.

Nitrate concentrations consistently exceed the AWQS in the groundwater samples collected from offsite monitoring wells (MW-6 and MW-7), however, septic systems in the area are likely responsible for the high nitrate concentrations.

Other Exposure Pathways

The site is surrounded by commercial properties to the north, east and south of the site and Ann Black Street to the west of the site, which has residential properties towards the west. There are no schools, or hospitals within a 0.5-mile radius of the site.



The Agua Fria River is a 120-mile-long intermittent stream which flows generally south from 20 miles east-northeast of Prescott to Lake Pleasant. The site is located approximately 850 feet south of the Agua Fria River. When there is precipitation causing surface water flow, the River near the site flows to the west, after which it bends and flows to the south.

In April 1993, groundwater samples were collected from the River and analyzed for total petroleum hydrocarbons and VOCs. No detections were reported over AWQS.

Off-site monitoring wells MW-1, MW-12 and MW-13 lie downgradient of the site, and to the south of the south bank of the River. In 2021 over-excavation of contaminated soil at the source area, and the addition of amendments to treat residual petroleum hydrocarbon in surrounding soil was completed. The groundwater data collected post remediation indicates that concentrations in these wells are below their respective AWQS and Tier 1 Corrective Action Standards. Off-site monitoring well MW-8, which lies west (cross gradient), between the site and the Agua Fria River (to the west approximately ¹/₂ mile), has always had VOC concentrations below laboratory detection limits, until it went dry in 2002.

A soil vapor survey was conducted in April 2022, due to the presence of soil contamination over applicable regulatory standards, found in subsurface soils near MW-3 during over-excavation activities. Five shallow permanent gas probes (SGP-1 through SGP-5) were installed at the site. The probes were allowed to equilibrate for 24 hours prior to sample collection using 1-liter SummaTM canisters. Prior to soil gas sample collection, each soil gas implant was tested for leaks using a shroud filled with helium tracer gas. Additionally, 1,1-Difluoroethane was also used as a leak tracer compound. In addition to the collection of five soil gas samples, a duplicate, an equipment blank (using nitrogen) and an ambient air sample (upwind) were also collected. Upon sample collection, the SummaTM canisters were submitted for laboratory testing of VOCs in air by EPA Method TO-15.

Terracon compared the reported concentrations of contaminants of concern (CoC) to the EPA's Resident Air Regional Screening Levels dated May 2022. In order to evaluate the cumulative risk of all CoCs, the maximum concentration of each chemical that exceeds $1/10^{\text{th}}$ of the EPA Resident Ambient Air Regional Screening Levels table was modeled using the EPA on-line version of the Johnson and Ettinger (J&E) Model. The cumulative cancer risk of 7.98 x10⁻⁷ is below the target risk of 1x10⁻⁶. Furthermore, the Hazard Index of 0.15713 is below the non-cancer target risk of 1. The J&E model results appear to confirm that there is no elevated risk associated with the vapor intrusion pathway from the subsurface soil contamination left at the site. As previously mentioned, a geo-fabric liner was also placed in excavation area at a depth of 10 feet bgs, which will also impede soil vapor migration.

Threatened or Impacted Drinking Water Wells

There are two regulated water companies in Black Canyon City: The Black Canyon Water Improvement District and the Coldwater Canyon Water Company (Coldwater Canyon 1, 2 and 3). These water companies serve over 2,000 people in this rural community. A review of the ADEQ Safe Drinking Water Database indicates the Black Canyon Water Improvement District (AZ0413051) wells were last sampled in April 2022. The results from the last three monitoring events (2022, 2021, 2020) were reviewed, and these wells did not have concentrations of VOCs above laboratory reporting levels.



Coldwater Canyon 3 (AZ0413202) is comprised of two wells which were last sampled for VOCs in February 2021. No VOCs were reported over laboratory reporting limits. This water system is routinely sampled for arsenic, nitrates and Coliform bacteria. VOCs are analyzed every three years.

Terracon reviewed the wells within a ¹/₄ mile radius of the site in the Arizona Department of Water Resources (ADWR) database. Thirty-two (32) monitoring wells and one well listed as 'other' are listed within the ¹/₄ mile radius search. The 32 monitoring wells are owned by ADEQ and are related to the remediation activities at the site. One 'exempt' well owned by Coldwater Canyon 3, is approximately 0.15 miles southeast (upgradient) of the subject site. This well (55-586436) was drilled in November 2001 to a depth of 105 feet and screened between 40 and 100 feet.

ADEQ expanded the search for water wells within a ½ mile radius of the site. The wells within a ½ mile radius of the site included 85 listed wells, of which, 32 are monitoring wells referenced in the previous paragraph. Forty-three (43) of the remaining wells are listed as 'exempt' wells, owned by private owners, while 9 of these wells are 'non-exempt' wells. The Black Canyon Water Improvement District owns two wells within the 0.5-mile boundary of the site. The first well (55-593903) is located approximately 0.40 miles cross gradient of the site. The well was drilled in 2003 to a depth of 60 feet and screened between 20 and 60 feet. The second well (55-617479 aka Big John #2) is located approximately 0.28 miles north (downgradient) of the site at Palm Lane Drive and the Old Black Canyon Highway. This well was drilled in 1974 to an approximate depth of 62 feet and screened between 29 and 53 feet. This well is located north of the Agua Fria River, and is located up-hill from the site, as verified by the ADEQ site visit conducted on August 11, 2022. A Notice of Intent to drill was recently submitted to ADWR for well 55-236956 to be located 0.33 miles north and downgradient of the site. Black Canyon Water Improvement District will drill this new well to a depth of 80 feet, in the coming months.

One of the registered 'non-exempt' wells is owned by the Black Canyon Community Association (55-593904), and is located north of the Agua Fria River at the Black Canyon Heritage Park. The well is not a regulated potable water well. This well is approximately 160 ft deep and screened from 40 to 160 feet.

ADEQ verified the presence of a residential neighborhood located to the northeast and east of the site that included many small mobile home parks. Water meter boxes were visible for most addresses. For the addresses that may have private domestic wells, the topography is very hilly with a steep incline away from the Old Black Canyon Highway where the site is located, (west to east), and towards the Agua Fria River (north to south). The geology north of the river and to the east of the site eliminates the area from being sensitive receptors.

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 - Arizona Water Quality Standard

NA - Not Available

MTBE – Methyl Tertiary Butyl Ether

MW-4 – Concentrations below detections from installation in 1990 through 1994, when it was last sampled.

MW-4A - Concentrations below detections from 1994 through 1998, when it was last sampled.

MW-8 – Concentrations below detections from installation in 1992, through 2002, when it was last sampled. Well is located up gradient off site.

MW-9 - Concentrations below detections from installation in 1994, through 1998, when it was last sampled.

Dej		Date Sampled	Benzene	Ethylbenzene	MTBE	Toluene	Xylenes
Well ID	to Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	700	94	1000	10,000
	12.17	10/29/1992	27,000	2,800	NA	41,000	10,100
	11.75	4/22/1993	24,000	4,400	NA	46,000	15,700
	12.23	4/28/1994	19,000	3,900	NA	20,000	19,500
	12.42	4/14/1995	11,000	3,400	NA	6,300	16,700
	11.83	9/10/1996	7,600	3,500	NA	1,200	13,200
	11.53	9/9/1997	7,000	3,900	NA	1,200	11,600
	11.07	6/18/1998	52	2,600	NA	110	10,000
	NA	8/13/1999	2,200	2,900	NA	NA	3,100
MW-1 Deursemediant off	11.36	7/26/2001	1,700	2,600	190	39	4,297
site south of South	11.72	5/30/2002	1,300	2,500	140	21	1,919
bank of river		Ste	te Assuran	ce Fund ends Ju	ne 2010		
Screen: 5-15 ft.	NA	2/10/2020	3.4	1.2	27	170	10
Total Depth: 15 ft.		l	ST Perman	nent Closure Jun	e 2020		
	11.61	1/12/2021	4.89	128	37.1	171	7.69
	NA	4/13/2021	4.45	100	24.2	171	8.38
	1	Excavation at MW	-3 followed	with application	of Regen	Ox [®] and OR	? <i>C</i> [®]
	12.05	7/20/2021	6.65	83.1	33	1.58	86.2
	NA	10/19/2021	2.01	31.9	40.5	< 0.278	2.04
	11.55	1/18/2022	0.757	14.3	53.3	0.427	1.58
	11.96	4/20/2022	1.58	24.7	67.3	0.935	2.66



Well ID	Date Sampled		Benzene	MTBE		
	Depth to Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94		
	15.80	6/18/1998	50	NA		
	16.04	7/26/2001	5.1	360		
	16.75	5/30/2002	9.3	150		
MW-2 Deumene dient	State Assurance Fund ends June 2010					
Downgradient	NA	2/10/2020	< 0.0941	57		
Screen: 9-39 ft. Total Depth: 39 ft.	16.40	1/13/2021	< 0.0941	78.6		
	16.14	4/14/2021	< 0.0941	33.1		
	16.70	7/21/2021	< 0.0941	55.6		
	16.00	10/20/2021	< 0.0941	77.6		
	16.63	4/21/2022	< 0.0941	41.2		

D Well ID W	Depth	Date Sampled	Benzene	Ethylbenzene	MTBE	Toluene	Xylenes		
	to Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	700	94	1000	10,000		
	21.06	6/29/1990	15,000	13,000	NA	55,000	81,000		
MW 2		Not sampled due to Free Product 1992 - 1997							
IVI W-5		Si	tate Assurar	ice Fund ends Ju	ne 2010				
Source Screen: 0 30 ft			UST Perma	nent Closure Jun	e 2020				
Total Depth: 30 ft	NA	2/10/2020	22,000	17,000	3,200	4,500	19,000		
Total Depth: 39 ft.	10 12	1/14/2021	13,300/	3 120/ 3 590	1,670/	13,600/	13,000/		
	10.12	18.12 1/14/2021 13,800 3,420/ 3	3,420/ 3,380	1,790	14,400	14,000			
MW-3	January 25, 2021 Well Abandoned/ excavation area, Excavation followed with application of RegenOx® and ORC®								



	Depth to	Date Sampled Depth to		MTBE
Well ID	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94
	17.82	4/15/2021	1,270	1,110
MW-3R	18.18	7/21/2021	346/390	1,440/ 1,610
Source Screen: 10-40ft	17.18	10/20/2021	136/ 138	1,510/ 1,480
Total Depth: 40 ft.	17.49	1/19/2022	<2.35/<2.35	1,270/ 1,290
	17.98	4/21/2022	<2.35	1,200

	Date Sampled		Benzene	MTBE
Well ID	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94
	20.27	10/29/1992	< 0.39	< 0.39
	18.78	11/18/1993	< 0.39	< 0.39
	19.30	4/28/1994	< 0.15	< 0.15
MW-5 most downgradient off-	19.39	4/14/1995	<0.5	< 0.5
site on bank of River	20.51	9/10/1996	<0.5	< 0.5
(southeast of bridge),	20.73	9/9/1997	<0.5	< 0.5
Screen 8-38 ft, Total Depth: 38 ft.	19.30	7/26/2001	<0.50	< 0.50
	24.08	5/30/2002	<0.50	< 0.50
		2003 to 2020	not sampled	
	DRY	1/2021-4/21/2022	NA	NA



Well ID	Depth to	Date Sampled	Benzene	MTBE		
	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94		
	24.43	10/28/1992	< 0.39	NA		
	19.42	4/22/1993	< 0.39	NA		
	22.73	4/28/1994	< 0.15	NA		
	21.93	4/14/1995	< 0.5	NA		
	22.77	9/10/1996	< 0.5	NA		
MW-6	24.06	12/16/1997	<0.5	NA		
off-site	21.16	7/26/2001	< 0.50	<1.0		
Crossgradient- east	24.60	5/30/2002	< 0.50	<1.0		
Screen: 15-50 ft.	State Assurance Fund ends June 2010					
Total Depth: 50 ft.	27.58	1/13/2021	< 0.0941	< 0.101		
	28.45	4/14/2021	< 0.0941	< 0.101		
	29.94	7/19/2021	< 0.0941	< 0.101		
	27.57	10/18/2021	< 0.0941	< 0.101		
	27.80	1/17/2022	< 0.0941	< 0.101		
	29.02	4/18/2022	< 0.0941	< 0.101		

Well ID	Depth to	Date Sampled	Benzene	MTBE		
	water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94		
	19.30	10/29/1992	< 0.39	NA		
	17.37	4/22/1993	< 0.39	NA		
	17.62	4/28/1994	< 0.15	NA		
	18.88	7/14/1995	3.0	NA		
	19.85	9/10/1996	< 0.5	NA		
	20.45	9/9/1997	< 0.5	NA		
	20.26	7/26/2001	< 0.50	<1.0		
Screen: 15 50 ft	22.51	5/30/2002	< 0.50	<1.0		
Total Depth: 50 ft	State Assurance Fund ends June 2010					
Total Deptil. 50 ft.	22.75	1/11/2021	< 0.0941	< 0.101		
	18.77	4/14/2021	< 0.0941	< 0.101		
	20.72	7/19/2021	< 0.0941	< 0.101		
	20.97	10/18/2021	< 0.0941	<0.101		
	20.62	1/17/2022	< 0.0941	< 0.101		
	19.48	4/18/2022	< 0.0941	< 0.101		



W-II ID	Depth to	Date Sampled	Benzene	Ethylbenzene	MTBE
wen 1D	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	700	94
	34.49	4/28/1994	0.6	< 0.20	NA
	34.04	9/10/1996	< 0.5	< 0.5	NA
	35.58	3/4/1997	< 0.5	< 0.5	NA
	36.44	6/18/1998	< 0.5	< 0.5	NA
MW-10	19.14	7/26/2001	< 0.5	< 0.5	2.5
Crossgradient, on-	18.86	5/3/2002	< 0.50	< 0.50	<1.0
Sile to NW Screen: 0.30 ft	22.75	1/11/2021	< 0.0941	< 0.137	< 0.101
Total Depth: 39 ft.	24.24	4/14/2021	< 0.0941	< 0.137	< 0.101
	25.37	7/19/2021	< 0.0941	< 0.137	< 0.101
	26.21	10/18/2021	< 0.0941	< 0.137	< 0.101
	27.07	1/17/2022	< 0.0941	< 0.137	< 0.101
	27.62	4/18/2022	< 0.0941	< 0.137	< 0.101

Well ID	Date Sampled Depth to		Benzene	MTBE		
	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94		
	NA	9/10/1996	6.6	NA		
	18.89	12/16/1997	< 0.5	NA		
	17.91	6/18/1998	< 0.5	NA		
	18.13	7/26/2001	< 0.50	57		
	19.45	5/30/2002	< 0.50	250		
MW-11	State Assurance Fund ends June 2010					
(formerly VW-9)	12.69	2/10/2020	< 0.0941	51		
off-site crossgradient	UST Permanent Closure June 2020					
to NE	18.35	1/12/2021	< 0.0941	53.2		
Screen: 15-50 ft.	Excavation at MW-3 followed with application of RegenOx [®]					
Total Depth: 50 ft.	and ORC [®]					
	18.40	4/13/2021	< 0.0941	< 0.328		
	18.07	7/20/2021	< 0.0941	<0.101		
	18.21	10/19/2021	<0.0941	<0.101		
	18.63	1/18/2022	<0.0941	8.91		
	18.70	4/20/2022	<0.0941	24.1		



	Denth to	Date Sampled Benzene		Ethylbenzene	MTBE			
Well ID	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (μg/l)	5	700	94			
	17.18	7/26/2001	700	2000	140			
	UST Permanent Closure June 2020							
	24.95	1/12/2021	0.383	0.437	119			
MW-12 downgradient well	Excavation at MW-3 followed with application of RegenOx [®] and ORC [®]							
Screen: 10-40 ft.	27.47	4/13/2021	< 0.0941	< 0.137	144			
Total Depth: 40 ft.	29.39	7/20/2021	< 0.0941	< 0.137	115			
	27.05	10/19/2021	< 0.0941	<0.137	112			
	27.59	1/18/2022	< 0.0941	<0.137	112			
	27.68	4/20/2022	< 0.0941	< 0.137	62.8			

	Donth to Water	Date Sampled	Benzene	MTBE
Well ID	(ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94
	16.65	7/26/2001	79	960
	19.37	5/30/2002	5.8	570
MW-13	18.90	1/12/2021	< 0.0941	227
downgradient well	18.83	4/13/2021	< 0.0941	173
Near MW-12 Screen: 10-40 ft. Total Depth: 40 ft.	20.04	7/20/2021	< 0.0941	145
	18.96	10/19/2021	< 0.0941	239
	19.00	1/18/2022	< 0.0941	223
	19.30	4/20/2022	< 0.0941	220



Well ID	Date Sampled		Benzene	MTBE			
	Depth to Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94			
	NA	8/13/1999	8,800	980			
	State Assurance Fund ends June 2010						
	18.01	01/14/2021	360	2,310			
VW-2 onsite - east Crossgradient	Excavation followed with application of RegenOx® and ORC®						
Screen: 9-39 ft.	18.99	4/15/2021	1.89	1,140			
Total Depth: 39 ft.	18.78	7/21/2021	2.43	1,070			
	17.92	10/20/2021	8.33	1,150			
	18.37	1/19/2022	5.33	952			
	18.80	4/21/2022	6.09	571			

Well ID	Donth to	Date Sampled	Benzene	Ethylbenzene	MTBE 94				
	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	700					
VW-3	NA	8/13/1999	2,600	1,300	1,500				
	State Assurance Fund ends June 2010								
	17.43	01/13/2021	1,980	913	5,420				
	Excavation followed with application of RegenOx [®] and ORC [®]								
Screen: 9-25 ft.	17.51	4/15/2021	412	339	2,040				
Total Depth: 25 ft.	18.88	7/21/2021 438		281	2,420				
	17.86	10/20/2021	394	228	2,480				
	17.84	1/19/2022	314	214	2,120				
	18.21	4/21/2022	138/146	79.5/ 89.1	1,050/ 1,050				



	Denth to	Date Sampled	Benzene	MTBE	
Well ID	Water (ft)	AWQS/ Tier 1 Corrective Action Standard (µg/l)	5	94	
	20.00	8/13/1999	530	700	
VW-8	16.22	01/13/2021	3.94	78.8	
off-site	16.31	4/14/2021	0.325	69.1	
Downgradient	16.77	7/20/2021	0.112	73.5	
Total Depth: 23	16.06	10/19/2021	2.31	85.1	
ft.	16.20	1/17/2022	0.346	77.7	
	16.62	4/21/2022	< 0.0941	77.7	



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 Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, Ground Water, 41(3):355-367, 2003.

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EXHIBI Q S • Center • #0-003625 anyon Highway zona 85324 WELL Б Ш ADEQ Monitoring Well Cadastral: A-08-02 03BCB ወ cilitv ш C ဟ ð മ РÖ ÚST ВR ADEQ US 34400 South C Black Cont MAP OF GWSI Domestic Well Cadastral: A-08-02 03B00 \square and GWSI Domestic Well Cadastral: A-08-02 03BCD 65207154 65207154 shown 08/27 as Ν DM ЦШ N Z זר 150 300 APPROXIMATE SCALI

Registry of Wells in AZ (0.5 miles)



August 24, 2022



1:18,056 0 0.13 0.25 0.5 mi ├ + + + + + + + + + 0 0.2 0.4 0.8 km

County of Yavapai, Bureau of Land Management, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, EPA, USDA