

## PROPOSED LEAKING UST (LUST) CASE CLOSURE

The Arizona Department of Environmental Quality (ADEQ) is considering closure of the following leaking underground storage tank (LUST) cases:

**LUST Case File #: 5204.01**  
**Facility ID # 0-008147**  
**Pinal County**

**Former Ernie's Station**  
**265 W. Coolidge Avenue**  
**Coolidge, Arizona 85128**

The former Ernie's Station is located at the southeast corner of South 3<sup>rd</sup> Street and West Coolidge Avenue (265 W. Coolidge Avenue) in Coolidge. This former service station is currently being used as a car wash facility. A release was reported to ADEQ during removal of gasoline underground storage tanks (USTs) in 2000 located east side of the building. A 550 gallon used oil UST located south side of the building was also removed during this time. The contamination eventually reached groundwater. Initial site investigation included soil borings and the installation of five monitoring wells. Contamination in soil and groundwater was primarily limited to the nearby source area with high levels of benzene, 1,2-dichloroethane (1, 2-DCA) and ethylene dibromide (EDB). 1,2-DCA and EDB are lead scavengers which indicate a leaded gasoline release.

The property owner requested the State Lead Unit's assistance in December 2001 to perform corrective action. Remediation included operation of an ozone sparging and soil vapor extraction (SVE) system beginning in March 2011. Due to decrease in groundwater level, five additional deeper sparge wells were installed in January 2013. Soil samples collected during the installation showed residual presence of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (TMBs) and naphthalene at 30 and 75 feet below ground surface (bgs). A higher flow air compressor was brought to operation replacing the ozone sparging system in December 2013. The remediation system was shut down in May 2015 based on low contaminant recovery. Approximately 46,182 pounds of total volatile fuel hydrocarbons were removed from the subsurface.

Based on the soil properties analyses, soil in the former tank pit at a depth of 5 feet bgs is sandy loam and native soil at a depth of 75 feet bgs (representative of native soil above groundwater) is loam to clay loam. The groundwater flow direction is approximately northwest. The depth to groundwater is approximately 80 feet bgs.

Groundwater data has been collected since July 2002. Several volatile organic compounds (VOCs) historically have been present at concentrations that exceed the applicable regulatory standards. To complement the ozone sparging and SVE, three rounds of PersulfOx™ injections were done to remediate the groundwater. These injections were done between 2014 and the end of 2015. Post injection groundwater sampling indicated VOC concentrations were reduced to below applicable regulatory standards (in most cases to non-detect) in all wells but monitoring well (MW) MW-3 as of March 2015.

A site specific risk assessment and detailed file/information search were also completed. Benzene, 1,2-DCA and EDB analytical groundwater results in MW-3 remain above applicable regulatory standards.

Based upon the results of remedial activities and site specific information, the above-referenced LUST site is eligible for alternative LUST closure under Arizona Revised Statutes (A.R.S.) §49-1005(E). Arizona Administrative Code (A.A.C.) R18-12-263.04 allows case closure of a LUST site with groundwater contamination above the Arizona Aquifer Water Quality Standards (AWQS) or Tier 1 Standards. ADEQ has considered the results of a site specific assessment and the rule specific criteria below:

1. *Threatened or impacted drinking water wells:* According to the Arizona Department of Water Resources (ADWR) records, there are no threatened or impacted drinking water wells within ¼ mile of the site. The nearest drinking water well is The nearest production well (55-616606) is owned by the Arizona Water Company and is located between ½ and 1 mile to the northeast of the site. The well is drilled to a depth of 1105 feet bgs. The well is screened between 584 and 1099 feet bgs. The VOC contamination found in MW-3 is not a threat to this production well, since MW-3 is drawing water from a perched layer of water several hundred feet above the screened interval of this drinking water well.
2. *Other exposure pathways:* The deeper contaminated soil was actively remediated. The only chemicals of concern reported over an applicable regulatory standard were 1,2,4 and 1,3,5-trimethylbenzene (TMBs), and naphthalene between 30 and 70 feet bgs. The vapor intrusion risk to indoor air was determined to be acceptable based on soil vapor data collected and modeled using the Johnson and Ettinger model (on-line screening version) by ADEQ. Incidental dermal contact with the groundwater is considered *de minimis* risk. In a ¼ mile receptor survey, there are no sensitive receptors like schools, day care centers or hospitals. The Main Street Park is located at 203 W. Coolidge Avenue, but the contaminated groundwater is not accessible to persons visiting the park.
3. *Groundwater plume stability:* Groundwater plume stability is demonstrated by the remaining VOC contamination present over a regulatory standard in groundwater is limited to MW-3, near the onsite source area. Groundwater monitoring wells and their respective sampling results in the other monitoring wells indicate that the plume is delineated and decreasing in areal extent.
4. *Characterization of the groundwater plume:* Monitoring wells were installed and collection of VOCs and/or polyaromatic hydrocarbons (PAHs) samples has taken place since 2002. Dissolved-phase petroleum hydrocarbons have been characterized. Three rounds of PersulfOx™ injections were done between 2014 and the end of 2015. Post injection sampling indicated the VOC concentrations were reduced to below AWQS (in most cases to non-detect) in all wells but MW-3. May 2016 was the last time all five monitoring wells were sampled. Four of the five monitoring wells had no contamination present detected over laboratory reporting limits. MW-3 was sampled in November 2016 for VOCs only, since no PAHs had been previously detected. The sampling results showed benzene, 1,2-DCA and EDB concentrations still exceeded the AWQS in MW-3 only. This well is on site located nearest to the source. The highest benzene concentration was 26,000 µg/L in February 2008 and it is currently 116 µg/L. The highest 1,2-DCA concentration was 4,200 µg/L in April 2011 and it is currently 410 µg/L. The highest EDB concentration was 900 µg/L in June 2011 and it is currently 31.5 µg/L.

5. *Natural Attenuation:* Brown and Caldwell evaluated the natural attenuation of benzene, 1,2-DCA, and EDB using BIOSCREEN. For benzene, the results of the Instantaneous Model Centerline Output indicate that the maximum extent of the benzene plume should be within 9 feet downgradient from MW-3. The property line is approximately 90 feet downgradient (to the northwest) from MW-3, so this would indicate that the benzene plume would not be off site. Source zone concentrations of benzene were modeled to be below the AWQS within 120 years. The Centerline Output for the Instantaneous Model shows the 1,2-DCA plume extending less than 9 feet and the source well concentration being reduced to below the AWQS within 125 years. EDB results were similar to the 1,2-DCA. The Instantaneous Model indicated that the plume is not expected to extend beyond 9 feet and that the source well concentrations would be expected to attenuate to less than the AWQS within 10 years. The results indicate that it is not expected that the groundwater plume will extend beyond the property line and that natural attenuation is expected to result in the reduction of concentrations with time.
6. *Removal or control of the source of contamination:* Source control has been completed by the removal of the UST system in 2000. The secondary source of hydrocarbons remaining in soil and groundwater has been effectively removed or reduced through the use of multiple remedial technologies. Approximately 46,182 pounds of total volatile fuel hydrocarbons were removed from the subsurface by the ozone sparging/SVE remedial system. Three rounds of PersulfOx™ injections were done between 2014 and the end of 2015 to further reduce groundwater VOC concentrations.
7. *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 completed at this site allow for the maximum beneficial use of the site, while being reasonable, necessary and cost effective.
8. *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 for MW-3

Date	Benzene AWQS is 5 µg/L	1,2-DCA AWQS is 5 µg/L	EDB AWQS is 0.5 µg/L	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Depth to water (feet)
8/3/2005	6,100	530	<200	--	--	--
2/3/2006	17,400	<4.00	407	--	--	--
6/12/2007	12,000	1,700	<20	--	--	--
2/15/2008	26,000	3,300	420	--	--	81.95
11/2/2010	24,000	3,300	440	--	--	74.62
9/20/2011	19,000	2,800	570	85.9	0.09	77.15
9/4/2012	13,000	960	340	60.5	0.09	81.19
9/17/2013	6,200/5,900	<500	<500	-174.5	0.50	82.67
ISCO	--	--	--	--	--	--
12/3/2014	520	160	50	395.2	1.75	84.44
ISCO	--	--	--	--	--	--
3/17/2015	<1.0/1.1	<1.0/<1.0	<1.0/<1.0	451.5	0.08	84.37

5/13/2015	37.4/42/6	29.9/34.8	2.34/2.86	463.2	8.33	85.58
7/20/2015	70.3/71.2	140/144	11.8/<20	523.9	7.86	86.02
11/5/5/2015	647/625	499/485	40.2/40.2	252.2	1.69	85.80
1/18/2016	0.563/0.608	<1.0/<1.0	<1.0/<1.0	590.8	29.36	85.35
3/17/2016	4.56/5.91	22.3/36.9	1.87/1.58	556.4	3.24	85.78
5/16/2016	51.8/56.2	182/196	11.5/11.8	400.00	2.85	86.90
8/10/2016	130/119	241/222	26.3/25.9	328.0	3.80	88.59
11/3/2016	66/116	312/410	17.3/31.5	199.9	3.75	88.49

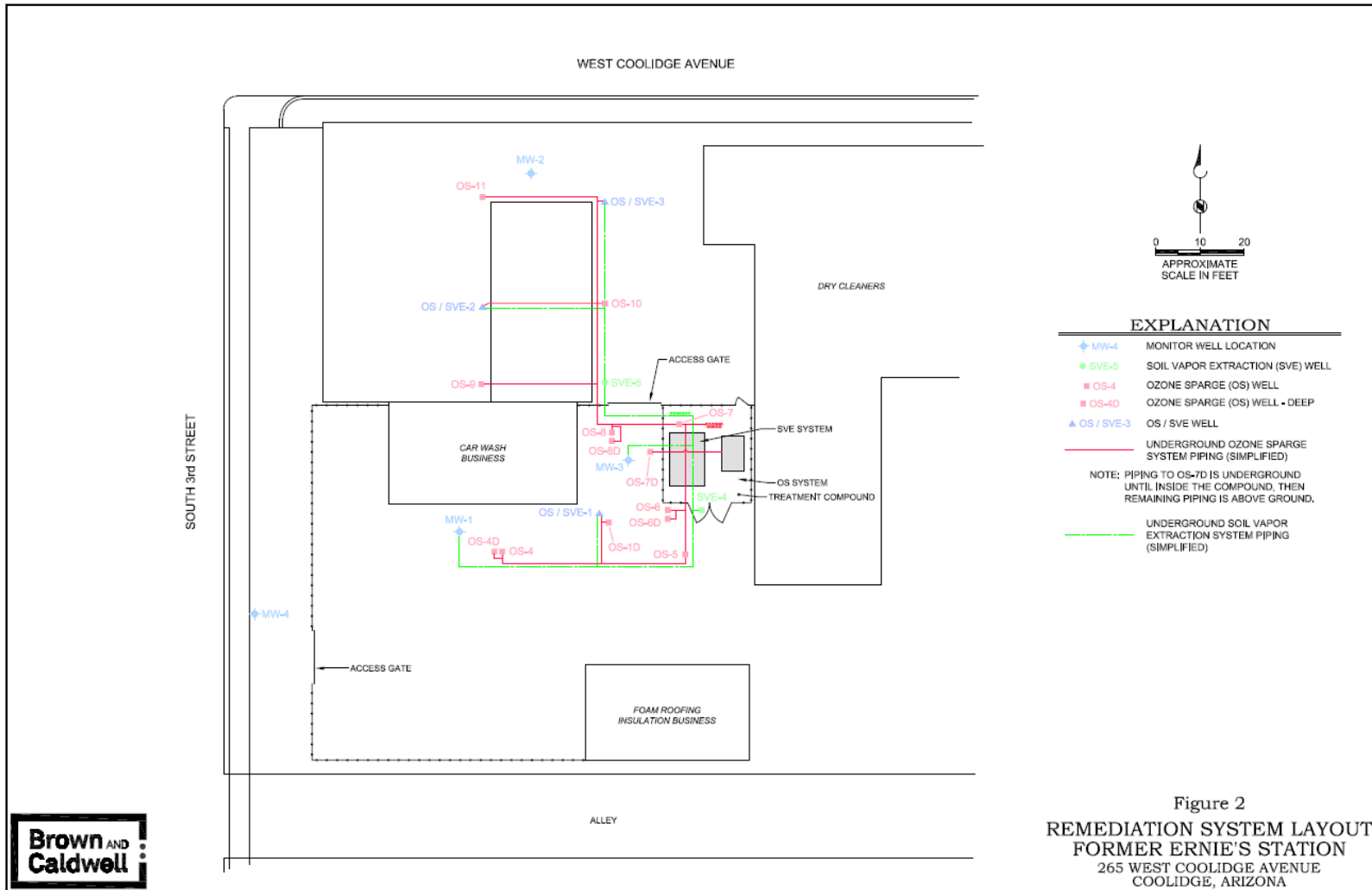
Site specific information concerning this closure is available for review during normal business hours at the ADEQ Records Center <http://www.azdeq.gov/function/assistance/records.html>, 1110 W. Washington St., Suite 140, Phoenix, AZ 85007. ADEQ welcomes comments on the proposed LUST case closure. Please call the Records Center at 602-771-4380 to schedule an appointment. A 30-day public comment period is in effect **commencing April 3, 2017 and ending May 3, 2017**. Comments should be submitted in writing to the Arizona Department of Environmental Quality, Waste Programs Division, and Attention: Samar Bhuyan, 1110 W. Washington Street, Phoenix, AZ 85007.

If sufficient public interest is demonstrated during the public comment period, ADEQ will announce and hold a public meeting. ADEQ will respond to written comments following the public comment period. For more information on this notice, please contact Samar Bhuyan at (602) 771-4252 or at [sjb@azdeq.gov](mailto:sjb@azdeq.gov).

Copies of the cited statutes and rules can be found at: <http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49>, and [http://www.azsos.gov/public\\_services/Title\\_18/18-12.htm](http://www.azsos.gov/public_services/Title_18/18-12.htm)

ADEQ will take reasonable measures to provide access to department services to individuals with limited ability to speak, write, or understand English and/or to those with disabilities. Requests for language interpretation services or for disability accommodations must be made at least 48 hours in advance by contacting: 7-1-1 for TDD; (602) 771-2215 for Disability Accessibility; or Ian Bingham, Title VI Nondiscrimination Coordinator at (602) 771-4322 or [idb@azdeq.gov](mailto:idb@azdeq.gov).

ADEQ tomará medidas razonables para proveer acceso a los servicios del departamento para personas con capacidad limitada para hablar, escribir o entender Inglés y / o para las personas con discapacidad. Las solicitudes de servicios de interpretación del lenguaje o de alojamiento de discapacidad deben hacerse por lo menos 48 horas de antelación poniéndose en contacto con Ian Bingham, Title VI Nondiscrimination Coordinator al (602) 771-4322 o [idb@azdeq.gov](mailto:idb@azdeq.gov).



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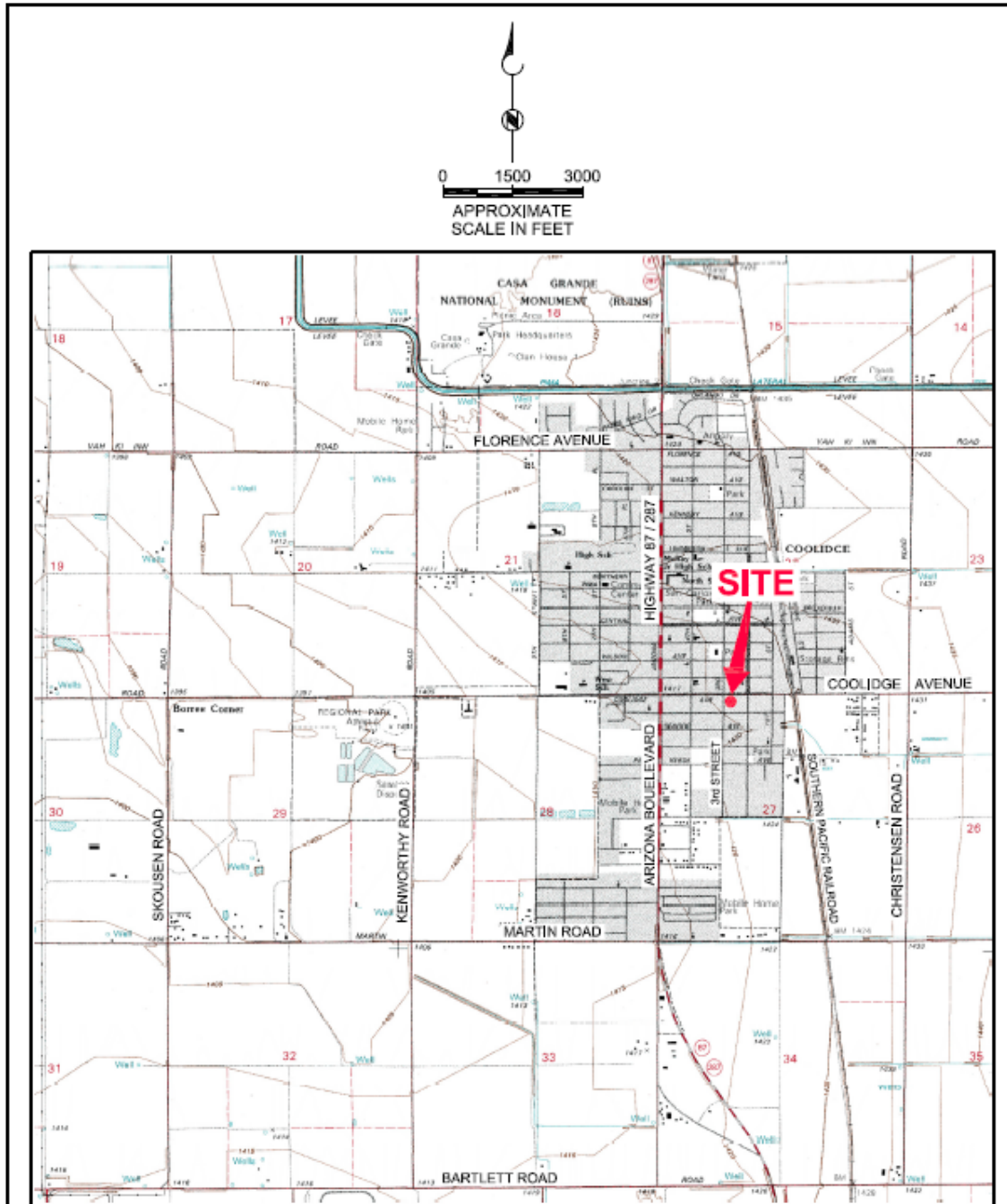


Figure 1  
VICINITY MAP  
FORMER ERNIE'S STATION  
265 WEST COOLIDGE AVENUE  
COOLIDGE, ARIZONA

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**ADEQ**  **Memorandum**  
Arizona Department  
of Environmental Quality

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**Date:** March 16, 2017  
**To:** LUST File  
**From:** Debi Goodwin, Sr. Risk Assessor  
UST-LUST Section  
**Subject:** Tier 3 Risk Assessment  
Ernie's Station  
Facility No. 0-008147 LUST No. 5204.01

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**Background**

The former Ernie's Station is located at the southeast corner of South 3<sup>rd</sup> Street and West Coolidge Avenue (265 W. Coolidge Avenue) in Coolidge. This former service station is currently being used as a car wash facility. A release was reported to ADEQ during removal of gasoline underground storage tanks (USTs) in 2000 located east side of the building. A 550 gallon used oil UST located south side of the building was also removed during this time. The contamination eventually reached groundwater. Initial site investigation included soil borings and the installation of five (5) monitoring wells. Contamination in soil and groundwater was primarily limited to the nearby source area with high levels of benzene, 1, 2-DCA and EDB. 1,2-DCA and EDB are lead scavengers which indicate a leaded gasoline release.

The property owner requested for State Lead's assistance in December 2001 to perform corrective action. Remediation included operation of an air sparging and a soil vapor extraction (AS/SVE) system beginning in March 2011. Eleven (11) wells were connected as groundwater sparging wells and 5 wells were connected as SVE wells to the above ground remediation equipment. Due to decrease in groundwater level, five (5) additional deeper sparge wells were installed in January 2013. The remediation system was shut down in May 2015 based on low contaminant recovery. Approximately 46,182 pounds of total volatile fuel hydrocarbons were removed from the subsurface.

**Purpose**

Current data provided by the State Lead Unit's Contractor, Brown & Caldwell, and all other available site information has been used by ADEQ to determine whether remaining levels of contaminants at the site are adequately protective of human health and the environment.

**Risk Assessment**

**Soil**

Site characterization soil data indicated contamination in the unsaturated zone extended from 40 feet bgs to groundwater prior to remediation. To evaluate the progress of remediation of vadose zone soil after two years of SVE system operation, soil samples were collected while drilling OS-7D. The selection of OS-7D for soil sampling was based on its proximity to the source area, east of monitor well MW-3. Soil samples were collected every 10 feet from 10 feet bgs to groundwater. However, no recovery at 70 feet bgs resulted in collection of a soil sample at 75 feet bgs. The last soil sample was collected at 80 feet bgs, with groundwater encountered at approximately 85 feet bgs.

Soil samples were analyzed for volatile organic compounds (VOCs) and the sample with the highest VOC concentration was also analyzed for polycyclic aromatic hydrocarbons (PAHs). Analytical results indicated that

1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene concentrations exceed the rSRL between 30 and 75 feet bgs. Naphthalene was also detected at a concentration in excess of the residential SRL in the soil sample collected at 40 feet bgs. No PAHs were detected. The 10 foot sample was non-detect for 1,2-DCA and EDB, so no analysis was done for tetraethyl lead.

Based on the soil properties analyses, soil in the former tank pit at a depth of 5 feet bgs is sandy loam and native soil at a depth of 75 feet bgs (representative of native soil above groundwater) is loam to clay loam.

#### Groundwater

The groundwater flow direction is approximately northwest. The depth to groundwater is approximately 80 feet bgs. Comparing this shallower groundwater to the information in the Modeling Report suggests that the impacted groundwater beneath the Site represents a localized perched zone and may not be the main aquifer within the UAU. The groundwater levels and flow direction of the perched zone would be directly influenced by seasonal irrigation patterns of surrounding farms. The lateral extent and continuity of the clay sequence and associated perched zone is not known.

Three rounds of PersulfOx™ injections were done between 2014 and the end of 2015. Post injection sampling indicated the VOC concentrations were reduced to below AWQS (in most cases to non-detect) in all wells but MW-3.

May 2016 was the last time all five monitoring wells were sampled. Four of the five monitoring wells had no contamination present detected over laboratory reporting limits. The only well with VOC contamination present over applicable regulatory standards is MW-3. MW-3 was sampled in November 2016 for VOCs, since no PAHs had been previously detected. The sampling results showed benzene, 1,2-DCA and EDB concentrations still exceeded the AWQS in MW-3 only. This well is on site located nearest to the source. The highest benzene concentration was 26,000 µg/L in February 2008 and it is currently 116 µg/L. The AWQS for benzene is 5 µg/L. The highest 1,2-DCA concentration was 4,200 µg/L in April 2011 and it is currently 410 µg/L. The AWQS for benzene is 5 µg/L. The highest EDB concentration was 900 µg/L in June 2011 and it is currently 31.5 µg/L. The AWQS for EDB is 0.5 µg/L.

The VOC contamination will continue to degrade under aerobic groundwater conditions which is indicated by the dissolve oxygen (DO) concentration exceeding 0.5 mg/L. However, if the groundwater becomes anaerobic, the 1,2-DCA will break down under these conditions.

Brown and Caldwell evaluated the natural attenuation of benzene, 1,2-DCA, and EDB using BIOSCREEN. For benzene, the results of the Instantaneous Model Centerline Output indicate that the maximum extent of the benzene plume should be within 9 feet downgradient from MW-3. The property line is approximately 90 downgradient (NW) from MW-3, so this would indicate that the benzene plume would not be off site. Source zone concentrations of benzene were modeled to be below the AWQS within 120 years. The Centerline Output for the Instantaneous Model shows the 1,2-DCA plume extending less than 9 feet and the source well concentration being reduced to below the AWQS within 125 years. EDB results were similar to the 1,2-DCA. The Instantaneous Model indicated that the plume is not expected to extend beyond 9 feet and that the source well concentrations would be expected to attenuate to less than the AWQS within 10 years. The results indicate that it is not expected that the groundwater plume will extend beyond the property line and that natural attenuation is expected to result in the reduction of concentrations with time.

In a ¼ mile receptor survey, there are no domestic or production wells. There are no sensitive receptors like schools, day care centers or hospitals within ¼ mile. The Main Street Park is located at 203 W. Coolidge Avenue. The nearest production well (55-616606) is owned by the Arizona Water Company and is located between ½ and 1 mile to the northeast of the site. The well is drilled to a depth of 1105 feet bgs. The well is screened between



584 and 1099 feet bgs. There are no threatened or impacted supply wells from the groundwater contamination present in MW-3.

#### Soil Vapor

To evaluate the potential inhalation risk from the subsurface soil contamination eleven, shallow (5 feet) temporary soil vapor probes were installed in September 2014. The soil vapor samples were analyzed for VOCs by EPA Method TO-15 (did include the ADHS approved additional 31 compounds dated November 2011). Laboratory quality assurance (QA) and field QA measures are adequate for risk assessment data quality objectives.

A risk assessment was performed by ADEQ. Chemicals are eliminated from inclusion in the risk assessment if they are not present at levels above 1/10th of the EPA Regional Screening Level resident air table dated May 2014, levels below the laboratory reporting limit, were a common laboratory contaminant and found at levels less than 5 times the concentration found in the field (equipment) blank, or if insufficient toxicity data is available or the chemical is not listed in the chemical pull down list. The risk assessment generally includes an evaluation of the compounds of concern (CoCs) associated with the fuel release and a separate evaluation of any non-petroleum related compounds. The only CoCs were petroleum related. The High Indoor Air Prediction for the J&E simulation Results is used as the first comparison for a conservative approach. Typical residential parameters were used in the model. The indoor air exchange rate used was  $0.25 \text{ hr}^{-1}$  which is the model's default value.

Chemicals were modeled for both the excess lifetime cancer risk value (ELCR) and the hazard index (HI) or non-carcinogenic health hazard. The soil vapor data was modeled using the EPA on-line screening version of the Johnson and Ettinger (J&E) model forward calculation. The ELCR was  $1.3 \times 10^{-6}$  and the HI was 0.045. These values demonstrate no unacceptable risk posed by any remaining VOC contamination in the soil.

#### Conclusions and Recommendations

A.A.C. R-18-7-206(D) and A.A.C. R-18-12-263.01 allow for a site specific risk assessment. Under A.A.C. R-18-7-206(D), multiple contaminants, multiple pathways of exposure, uncertainty of exposure and sensitive populations are evaluated as part of a site specific risk assessment. Any residual petroleum related soil contamination that may be present is in the subsurface, so there isn't a risk posed by the dermal contact or ingestion exposure routes. The soil vapor survey demonstrates the inhalation exposure route shows an acceptable risk to the existing building or to any future residential construction over the release area. The groundwater data collected in November 2016 does show VOC contamination present over an applicable regulatory standard. There are no sensitive receptors impacted by the remaining contamination present in the subsurface soils or the groundwater.

Based on the data collected, it is recommended that LUST release 5204.01 be closed under A.A.C. R-18-12-263.04.

If you have any questions regarding this memo, please contact me at (602) 771-4453 or [dgl@azdeq.gov](mailto:dgl@azdeq.gov).