

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 #: 0144.01
Facility ID # 0-007016
Yuma County

former Unocal 306461
505 S. Gila Street
Yuma, Arizona 85364

The facility was operated by Unocal from 1910 to 1970. From 1971 to 1973 an independent distributor operated the facility. Sellers Petroleum Products, Inc. operated from 1973 to 1991. The facility ceased operation in 1991, and has remained vacant. The facility operated eight above ground storage tanks (ASTs), two 5,000 gallon underground storage tanks (USTs) and one 12,000 gallon UST. The two 5,000 gallon USTs were reportedly removed in 1984 or 1985. The 12,000 gallon UST was removed in June 1995. The LUST release was assigned in 2001.

The current property owner, Chevron Environmental Management Company (CEMC) began site characterization and remedial activities in 1995 and continued through 2015. Site activities included the installation of soil borings and monitoring wells. At one time there were approximately 47 monitoring wells. Free product recovery began in 1995. The Tier 2 risk assessment submittal estimates that 23,550 gallons of free product were recovered. No free product has been seen in any of the monitoring wells since 2009. 157,902 gallons of groundwater containing hydrocarbons was removed using a total fluids treatment system which operated between 2002 and 2006; and 150 cubic yards of petroleum contaminated soil was removed from the area of the 12,000 gallon UST in 1995. A Soil Vapor Extraction (SVE) system operated between 2002 and 2006. Approximately 67,012 pounds of gasoline range organics were removed during SVE operations.

A site specific risk assessment and detailed file/information search were also completed. Benzene analytical groundwater results in MW-1 and MW-11 remain above AWQS. 1,2-DCA analytical groundwater results in MW-1 remain above AWQS.

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 ADWR records, there are no drinking water wells within ¼ mile downgradient of the site. There are two registered domestic use wells located cross gradient 2500 feet of the site. There are no municipal drinking water wells within ½ mile of the site.

2. *Other exposure pathways:* Soil samples collected between 5 and 10 feet had no VOC contamination present over an applicable regulatory standard, so dermal contact and ingestion are not complete exposure pathways. Soil contamination found at 14 and 15 feet was in the saturated zone, not in the vadose zone. The groundwater contamination was evaluated for vapor intrusion risk using the GW-SCREEN of the Johnson and Ettinger. The vapor intrusion risk was determined to be acceptable. This shallow groundwater is not a source of potable water for the City of Yuma. Incidental dermal contact with the groundwater is considered *de minimis* risk. There are no surface water, agricultural or ecological receptors within ¼ mile of the site.
3. *Groundwater plume stability:* Groundwater plume stability is demonstrated by the remaining VOC contamination present over a regulatory standard in groundwater is limited to on-site MW-1 and MW-11. Groundwater monitoring wells and their respective sampling results at the property boundaries indicate that the plume is delineated and decreasing in areal extent. Dissolved-phase benzene is limited to on-site wells MW-1 and MW-11 and the historic concentrations are trending downward and are expected to attenuate to below the AWQS in 0.38 and 4.63 years respectively. Dissolved-phase 1,2-DCA is limited to on-site well MW-1 (source well) and the historic concentrations are trending downward and it is expected to attenuate below the AWQS in approximately 3.01 years. This is based on the Tier 2 risk evaluation. The depth to groundwater is approximately 14 to 16 feet below ground surface. In MW-1, the VOC contamination is in the smear zone, so as the depth to groundwater decreases, the VOC concentration increases. All of these factors indicate that the groundwater plume is stable.
4. *Characterization of the groundwater plume:* Monitoring wells were installed and collection of volatile organic compounds (VOCs) samples has taken place since 1988. Dissolved-phase petroleum hydrocarbons have been characterized and the only VOCs remaining over AWQS are benzene and 1,2-DCA in MW-1 at 7.6 µg/L and 15 µg/L respectively. Benzene was also detected in MW-11 at 8.3 µg/L in groundwater data collected in September 2015.
5. *Natural Attenuation:* Natural attention can be demonstrated by decreasing VOC concentrations below AWQS in all of the monitoring wells except for MW-1. Field parameters indicate the Oxidation Reduction Potential is negative, the dissolved oxygen values are low along with low sulfate concentrations which indicate a reducing or anaerobic environment which will degrade the VOC contamination. Modeling of the groundwater contamination using Bioscreen was included in the Tier 2 risk assessment. The Bioscreen showed that the no degradation model indicates the benzene solute plume will travel 60 feet from MW-1 in 20 years with the leading edge having a concentration of 5 µg/L. The first order decay model indicates the plume will travel approximately 30 feet from MW-1 with a concentration of 1µg/L. The instantaneous reaction model indicates benzene will not be detected in groundwater 30 feet form MW-1.
6. *Removal or control of the source of contamination:* LNAPL, contaminated groundwater and the secondary source of hydrocarbons remaining in soil has been effectively removed through the use of multiple remedial technologies. Source control has been completed by the removal of USTs in in 1984 or 1985 and another UST removed in 1995. Remedial activities removed 23,550 gallons of LNAPL; 67,012 pounds of vapor-phase hydrocarbons; 157,902 gallons of groundwater containing hydrocarbons; and 150 cubic yards of petroleum contaminated soil.

In addition MW-1, source well and the primary release location area, had a benzene concentration of 3,900 µg/L prior to any remedial activities in July 1988. Benzene concentrations have significantly decreased since that time. Currently benzene levels are at a maximum of 8.3 µg/L in MW-11. All monitoring wells except MW-1 and MW-11 have not had VOC contamination present over applicable regulatory standards since approximately 2010.

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 information: MW-1 (source well)

| Date | Benzene AWQS is 5 µg/L | 1,2-DCA AWQS is 5 µg/L | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/L) | Depth to water (Feet) |
|--------------|---------------------------|---------------------------|--|-------------------------------|--------------------------|
| Free Product | ---- | --- | --- | --- | --- |
| 6/2009 | 1,200 | 100 | | | 14.96 |
| 6/2010 | 1,200 | 25 | | | 14.69 |
| 6/2013 | 6.7 | 7.8 | | | 14.56 |
| 9/2013 | 26 | 7.5 | | | 14.00 |
| 12/2013 | 68 | 9.8 | | | 14.22 |
| 3/2014 | 1.7 | 4.8 | 155 | 6.6 | 15.70 |
| 9/2015 | 7.6 | 15 | -247 | 2.80 | 14.86 |

Groundwater information: MW-11

| Date | Benzene AWQS is 5 µg/L | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/L) | Depth to water (Feet) |
|--------------|---------------------------|--|----------------------------|--------------------------|
| 6/1987 | 360 | | | 14.48 |
| Free Product | --- | --- | --- | --- |
| 6/2008 | 390 | | | 14.68 |
| 6/2009 | 820 | | | 14.47 |
| 6/2010 | 670 | | | 14.22 |
| 6/2013 | 23 | | | 14.10 |
| 9/2013 | 25 | | | 13.46 |
| 12/2013 | 34 | | | 13.72 |
| 3/2014 | 12 | -231 | 1.27 | 14.32 |
| 9/2015 | 8.3 | -217 | 2.75 | 14.38 |

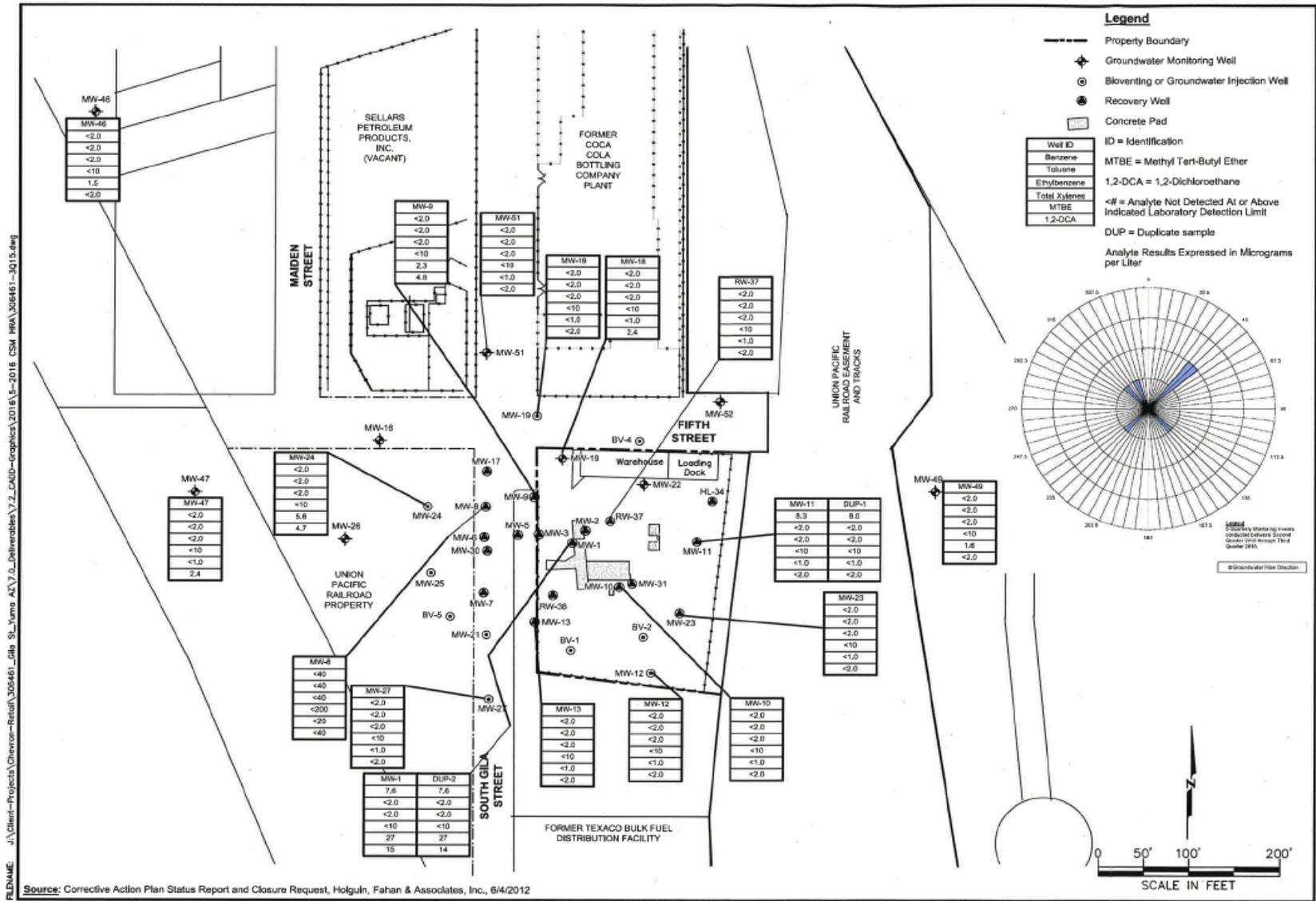
Site specific information concerning this closure is available for review during normal business hours at the ADEQ Records Center <http://www.azdeq.gov/function/assistance/records.html> , 1110 W. Washington St., Suite 140, Phoenix, AZ 85007. ADEQ welcomes comments on the proposed LUST case closure. Please call the Records Center at 602-771-4380 to schedule an appointment. A 30-day public comment period is in effect commencing **September 26, 2016** and ending **October 26, 2016**. Comments should be submitted in writing to the Arizona Department of Environmental Quality, Waste Programs Division, Attention: Debi Goodwin, 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 Debi Goodwin at 602-771-4453 or 800- 234-5677 ext. 771-4453 or at dg1@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



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|---|--|---------------------|-----------------------------|--------------------------------|
|  AECOM 1220 AVENIDA ACASO CAMARILLO, CALIFORNIA 93012 PHONE: 805.388.3775 FAX: 805.388.3577 WEB: HTTP://WWW.AECOM.COM | SITE LOCATION MAP Chevron Site No. 306461 (Former Unocal Bulk Plant No. 0896) 505 South Gila Street Yuma, Arizona | | | FIGURE NUMBER: 1 |
| | DRAWN BY: TQ | DATE: 10/19/2015 | PROJECT NUMBER: 60345228 | SHEET NUMBER: 1 of 1 |



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**THIRD QUARTER 2015
GROUNDWATER ANALYTICAL DATA MAP**

Chevron Site No. 306461
(Former Unocal Bulk Plant No. 0896)
505 South Gila Street
Yuma, Arizona

PROJECT NUMBER: 60493689
DATE: 5/11/2016

FIGURE NUMBER:
7

SHEET NUMBER:
1 of 1



Memorandum

Date: September 13, 2016

To: LUST File

From: Debi Goodwin, Risk Assessor
UST-LUST Section 

Subject: Tier 2 Risk Based Tier Evaluation
Chevron Site No. 306461 (Former Unocal Bulk Plant No. 0896)
F 0-007016 L 0144.01

Background

This commercial property (the Site) is located at 505 South Gila Street in Yuma. The Site is currently an abandoned bulk plant facility with an unoccupied office and warehouse. The facility was operated by Unocal from 1910 to 1970, by an independent distributor from 1971 to 1973, and by Sellers Petroleum Products, Inc. from 1973 to 1991. The facility ceased operations in 1991. The Site operated three USTs, and 13 ASTs. The USTs were removed in 1985 and 1995. ADEQ assigned LUST release number 0144.01 to (2) 5K gallon diesel fuel USTs in 1996. Chevron Environmental Management Company (CEMC) is the current property owner.

Historic site characterization activities occurred between 1985 and 2016. On and off-site monitoring wells were installed. Between 1985 and 2009, multiple remedial actions were conducted at the Site. These activities include a PSH recovery system, excavation of 150 cubic yards of impacted soils, an SVE system, bioventing, a total-fluids treatment system, thermal oxidizer, and a groundwater treatment system. Unocal obtained State Assurance Fund assistance for work done up to 2009. In 2014, all remedial equipment was removed from the Site.

Historic soil and groundwater contamination was present over applicable regulatory standards. LUST closure was requested in 2012, and in 2014. LUST closure was denied both times for not meeting the alternative groundwater rule requirements by having data gaps.

Purpose

CEMC and its contractor AECOM met with ADEQ in May 2015 for an informal appeal meeting over the LUST closure denial. In July 2015, ADEQ requested that CEMC conduct additional soil sampling in the area of the historic UST release, and also conduct an additional groundwater sampling event. CEMC submitted a *Periodic Site Status Report* received July 28, 2016 with a Tier 2 risk evaluation. It is the intention of CEMC that this submittal will satisfy the LUST closure criteria under R18-12-263.04.

The information described above and all available information was utilized by ADEQ to determine whether levels of contaminants at the site are adequately protective of human health and the environment.

Tier 2 Risk Assessment

Note: The submittal is actually a Tier 3 Risk Assessment instead of a Tier 2. A Tier 2 is used to calculate a site specific cleanup level.

Soil

Soil data has been collected since 1986. Four soil borings were installed in November 2015 to a depth of 14 to 15 feet bgs. The soil samples were analyzed for the 8260B full list, PAHs and organic lead. Benzene was detected over the rSRL at 15 feet bgs at two locations. These samples were actually collected in saturated zone beneath the vadose zone.

Groundwater

In September 2015, 17 wells were sampled. The samples were analyzed for VOCs by EPA Method 8260B (including the AZ extended list). Benzene was reported over the Aquifer Water Quality Standard in two wells (MW-1 and MW-11) and 1,2-DCA was reported over the Aquifer Water Quality Standard in MW-1.

The submittal states that there are no current receptors at the site, since it is vacant. A vapor intrusion evaluation was conducted for potential future receptors.

The shallow groundwater in these monitoring wells is not used as potable drinking water. An ADWR database search conducted by AECOM shows there are no domestic or public drinking water wells located within ¼ mile downgradient of the characterized groundwater plume.

Conclusions and Recommendations

Soil

Under A.A.C. R18-7-206(D), multiple contaminants, multiple pathways of exposure, uncertainty of exposure and sensitive populations are evaluated as part of a site specific risk assessment. The petroleum related soil contamination is present between 0 and 15 feet, where groundwater is encountered. There isn't a risk posed by the dermal or ingestion exposure routes since the shallower soil samples indicated no contamination present over an applicable regulatory standard. For the VOC contamination present in B-2-15 and B-4-14, the only potential exposure route is inhalation from vapor intrusion since benzene exceeded a regulatory standard within the smear zone.

Section 6.3 of attachment 2 discusses the USEPA recommended 6 foot vertical separation distance between petroleum hydrocarbon impacts in soil and an overlying building foundation, basement or slab if the benzene concentration meets the ≤ 10 mg/Kg. Arizona does not follow this guidance based on numerous sites that meet this contamination criteria, but still fail the Johnson and Ettinger Model (on-line screening version) for vapor intrusion.

The 95th percentile upper confidence limit on the arithmetic mean was used in the risk assessment. The ProUCL outputs were not included in the submittal to support the information shown on Table 1. It is not known why a site-wide benzene evaluation was compared to the nrSRL and a separate evaluation of the former UST area was compared to the rSRL for benzene. All LUST closures unless a DEUR is recorded, are done using rSRLs. The LUST closure should be based on the data collected from the 01441.01 release area. Since the highest concentration of benzene is found in the smear zone, it is not understood why this interpretation of the soil was done.

Groundwater

Groundwater data collected in September 2015 was used in the GW-SCREEN model of the Johnson and Ettinger. The maximum concentration of chemicals (benzene, 1,2-DCA and MTBE) were used in the model. The model was used to estimate soil gas concentrations. It is noted that ADEQ would model shallow groundwater data using the EPA's on-line version [forward calculation] of the Screening Level Johnson and Ettinger Model. This version provides both the cancer risk (ELCR) and the hazard risk (HI) values for each chemical of concern. The model allows for groundwater data to be used, but soil vapor data is the preferred data for modeling.

In Appendix H, only the GW-SCREEN output for benzene was provided. The output screen for 1,2-DCA should have also been provided. It was not necessary to model the MTBE data since the maximum concentration is below the Tier 1 standard.

The risk calculations demonstrate no unacceptable risk to potential future receptors from indoor air inhalation exposures to the chemicals of concern.

For alternative groundwater closure, several criteria under R 18-12-263.04 must be met. The contamination has been characterized and analytical data supports that the plume is stable and localized on-site. The groundwater was remediated and the VOCs concentrations have significantly declined. The modeled groundwater data shows that there is no unacceptable vapor intrusion risk due to the soil (smear zone) and groundwater contamination left in place. The water that is impacted by VOC contamination over an applicable regulatory standard is not used as a potable water source.

Natural attenuation parameters have been assessed. The September 2015 data indicates that a negative oxidation-reduction potential (ORP) and low dissolve oxygen provides evidence of anaerobic biodegradation is occurring at the two source wells (MW-1 and MW-11). MW-1 also has the lowest sulfate concentration than in the wells located outside of the dissolved phase plume. This also indicates reducing conditions in the groundwater at the source. Benzene is readily degraded under reducing and anaerobic conditions. 1,2-DCA will also continue to degrade, but at a slower rate than the benzene.

A Bioscreen Natural Attenuation Decision Support System (Bioscreen) evaluation was also conducted using the September 2015 groundwater data. All simulations run demonstrate the plume is biodegrading on-site fairly close to the source areas according to the model output provided in Appendix G.

It is recommended that LUST release 0144.01 be closed under R18-12-263.04.

If there any questions regarding this memo, please contact me at dq1@azdeq.gov, or 771-4453.