



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

LUST Case File # 2839.01
Facility ID # 0-002473
Navajo County

Hatch's Corner Gas
404 Navajo Boulevard
Holbrook, Arizona 86025

Background:

The site is located at the northeast corner of the intersection of Navajo Boulevard and East Buffalo Street in Holbrook, Arizona. The site is currently an active convenience store (Hatch's Corner Gas) with retail gasoline and diesel sales. According to information obtained from review of the ADEQ LUST file and reported by Tierra Dynamic Incorporated (TDI) as contractor to the UST owner/operator [Hensley's Inc.], the site has been utilized for fuel sales since at least the 1950's. The installation date of the first underground storage tank (UST) system is undetermined but was reportedly removed in 1982. The location of the first generation of USTs is unclear, but a second set of USTs was installed in 1982 at the same general location as the current USTs. The second UST system was removed in June 1993 and consisted of three 6,000-gallon gasoline USTs and one 500-gallon used oil UST. ADEQ assigned LUST File No. 2839.01 to the second generation UST system owned and operated by Hensley's Inc. The third and current UST system was installed in June 1993 and consists of one 5,000 and one 10,000-gallon UST which reportedly store diesel and gasoline, respectively. The previous site owner reported that a fourth UST system was located south of the current fueling canopy and that these USTs were filled with dirt in 1957. No information regarding the number, size and substances stored in these USTs was available in the LUST file.

TDI supervised site characterization activities to investigate the extent and degree of impacted media associated with ADEQ LUST File No. 2839.01. These investigations included the installation of three groundwater monitor wells (MW-1, MW-2 and MW-3) in August 1997.

Removal or control of the source of contamination:

TDI designed and installed a vapor extraction (VE) remediation system and operated VE and multiphase extraction equipment (MPE) at the site to remove subsurface contamination. ATC Group Services LLC (ATC) also conducted VE remediation after TDI was no longer working on the project. Collective cleanup activities utilizing up to 20 remediation wells were performed at various time periods between April 2006 and November 2016 at the site. Based on performance data collected during the MPE and VE system operations, a calculated total mass of volatile fuel hydrocarbons (VFH) removed from underground contamination was documented as 97,973 pounds. Assuming an average density of 6.2 pounds per gallon, this amount represented approximately 15,800 gallons of fuel removed from the subsurface. Thermal and catalytic oxidation was used in conjunction with MPE and VE to treat extracted VFH prior to discharge into the atmosphere. VE operations ceased in 2016 due to a decreasing trend in influent VFH

concentrations, indicating that a practical limit of remediation with the remediation well network had been reached.

Between October 29 and November 4, 2019, ATC supervised the excavation of tetraethyl lead (TEL) impacted soil in the vicinity of soil borings CB-2, SB-1, SB-2 and SB-3. The irregularly-shaped excavation measured approximately 34 feet long and 21 feet wide at its maximum areal extent and 12 to 14 feet deep. The excavation boundaries were limited by the presence of the active fuel dispenser to the northeast and Arizona Department of Transportation Right-of-Way and sidewalk along Navajo Boulevard to the west. A total of 14 soil samples were collected at the base (six samples at depths of 12 to 14 feet bgs), sidewalls (five samples at depths of 12 or 13 feet bgs), and corners (three samples at 12 or 13 feet bgs) of the excavation. The soil samples were analyzed for TEL using Environmental Protection Agency Method 8270C- SIM. TEL was detected at concentrations above its minimum laboratory method detection limit at the northwest sidewall of the excavation (EX-NW-SW-12, 0.014 mg/kg), the northeast central base of the excavation (EX-NE-CE-B-12, 0.015 mg/kg) and the south sidewall of the excavation (EX-S-SW-12, 0.023 mg/kg). These detected TEL concentrations are below their respective ADEQ established Non-Residential Soil Remediation Level (nrSRL) but above the ADEQ established Residential Soil Remediation Level (rSRL). A total of 417.48 tons of excavated soil was transported under manifest to the Waste Management Painted Desert Landfill in Joseph City, Arizona. The excavation was backfilled with a corresponding amount of imported aggregate base fill soil which was emplaced and compacted within the excavation. Surface cover was restored with four-inch thick wire mesh reinforced concrete.

Characterization of the groundwater plume:

Hensley's is one of the multiple old Route 66 (Navajo Boulevard) LUST sites in Holbrook where there is comingling of fuel-related plumes stemming from each site's groundwater contamination. The contamination from Hensley's likely comingling with a down gradient, closed LUST site # 5173.01 and .02 (Nakai Art Center). Nakai Art Center was closed under the alternative groundwater closure rule (Arizona Administrative Code R18-12-263.04) for benzene, and 1,2-dichloroethane (1,2-DCA) exceeding established Aquifer Water Quality Standards (AWQS) in 2015.

Historically and recently (since August 2015) the presence of dissolved phase compounds exceeding their respective AWQS at the Hensley's site has been limited to benzene, methyl tert-butyl ether (MTBE) and/or 1,2-DCA at wells MW-1 or MW-3. Phase-separated hydrocarbons have not been observed at groundwater monitor wells since monitoring was initiated in August 1997 at the site.

The most recent groundwater sampling events for analysis of VOCs were conducted in August 2015, November 2015, February 2016, February 2017 and March 2018. The groundwater samples collected at monitor wells MW-1, MW-2 and MW-3 on February 2, 2017 were prepared for additional laboratory analysis of dissolved phase ethylene dibromide using EPA Method 504.1, polynuclear aromatic hydrocarbons (PAH) using EPA Method 8270C SIM and TEL using the McCampbell Analytical Inc. (MAI) Organic Lead Method. Based on the most recent groundwater sampling event (March 28, 2018), the current chemicals of concern (COC) in groundwater associated with LUST File No. 2839.01 are MTBE and 1,2-DCA.

Based on groundwater elevation data collected on 20 occasions between August 28, 1997 and March 28, 2019, the average calculated flow direction is west on a bearing of 281 degrees and under an average calculated hydraulic gradient of 0.026 foot per foot. The groundwater flow direction and gradient were calculated by performing a three-point graphical solution using the water table elevations determined in groundwater monitor wells MW-1, MW-2 and MW-3. Depth-to-groundwater has varied between 4.37 feet (well MW-1; November 20, 2007) and 15.25 feet (well MW-2; March 28, 2018) below the top of each well casing.

ATC discontinued groundwater sampling after March 2018 because COC concentration trends were well-established, and data was consistent and stable. At that point, the focus of activities changed to address the remaining soil contamination known to exist at the site.

Groundwater plume stability:

In order to evaluate the dissolved phase MTBE and 1,2-DCA plume stabilities at groundwater monitor wells MW-1 and MW-3, respectively, ATC analyzed the data collected during up to 28 groundwater monitoring/sampling events conducted between August 1997 and March 2018 using the Mann-Kendall Statistical Method. The Mann-Kendall analysis was run using an applied Microsoft Excel spreadsheet developed by GSI Environmental Inc. which utilizes up to 40 data inputs to generate an output trend. The trend is categorized as “Increasing”, “Probably Increasing”, “Decreasing”, “Probably Decreasing”, “Stable” or “No Trend”. The most recent (March 2018) groundwater sampling data indicates that concentrations of MTBE and 1,2-DCA exceed ADEQ established Tier 1 Cleanup Standards or AWQS at the locations of groundwater monitor wells MW-1 and MW-3, respectively. The Mann-Kendall Statistical Method analysis indicates that the concentration of dissolved phase MTBE is decreasing at MW-1 and the 1,2-DCA trend at well MW-3 is characterized as stable.

Natural Attenuation:

Natural attenuation processes include diffusion, dispersion, sorption, volatilization, and biodegradation. A decreasing trend in VOC concentrations in groundwater has been established, which supports that natural attenuation is occurring. Hydrologic and geochemical data can be used to indirectly demonstrate the type(s) of natural attenuation processes.

ATC analyzed the biodegradation and transport of dissolved phase MTBE and 1,2-DCA down gradient of wells MW-1 and MW-3, respectively, using BIOSCREEN Version 1.4. BIOSCREEN was not used to analyze impacts directly down gradient of MW-2 because no VOCs above AWQS have been detected in samples collected from MW-2 since June of 2013. The BIOSCREEN software is programmed into a Microsoft Excel workbook and was developed for the Air Force Center for Environmental Excellence. The software uses a combination of site specific data and assumed values to simulate contaminant transport and attenuation through biodegradation. The software allows the user to analyze a groundwater plume under one of three assumptions regarding the rate of natural attenuation: No Decay, First-Order Decay or Instantaneous Decay. According to the EPA BIOSCREEN Natural Attenuation Decision Support System User’s Manual, the First-Order Decay Model is most appropriate for petroleum hydrocarbon contamination. ATC utilized the BIOSCREEN Model to determine the maximum theoretical extent of the dissolved phase MTBE and 1,2-DCA plumes relative to wells MW-1

and MW-3 located near the northwest and southwest boundaries of the site. These wells were treated as the release source area and it was assumed that the source concentration of each analyte is equal to the dissolved phase concentrations reported at each well during the most recent (March 2018) groundwater sampling event. Using the first-order decay rate assumption, the BIOSCREEN Model predicts that MTBE will be detected at concentrations exceeding its ADEQ established Tier 1 Cleanup Standard of 94 micrograms per liter ($\mu\text{g/L}$) 200 feet down gradient of monitor well MW-1 in 30 years. The model also predicts 1,2-DCA will be detected at concentrations exceeding its ADEQ established AWQS of 5 $\mu\text{g/L}$ approximately 10 feet down gradient of monitor well MW-3 in about 30 years.

Threatened or impacted drinking water wells:

On February 28, 2019, ATC conducted a search of the Arizona Department of Water Resources (ADWR) electronic database for registered wells within an approximate one-half mile radius of the site. The results of the search indicate that there are 417 registered wells within the search area. Further review of the individual well records indicates supply wells are within one-half mile of the site between approximately 0.25 and 0.35 miles to the south (#55-627249, #55-627250) and northwest (#55-610748). The two supply wells to the south are owned by the ATSF Railroad and were registered for industrial/domestic use. The wells were drilled in 1927 to a depth of 139 feet. The supply well to the northwest was drilled in 1976 to a depth of 200 feet bgs, for domestic use at 961 1st Avenue. This well is not down gradient from the LUST site, and is not considered a threatened well.

According to the Consumer Confidence Report for Calendar Year 2018 prepared by the City of Holbrook (2019) utilizing the ADEQ template, the City of Holbrook provides municipal potable water extracted from three wells located on McLaws Road. Three municipal wells owned by the City of Holbrook are in the vicinity of McLaws Road and located approximately 2 miles southwest of the site.

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

Other exposure pathways:

On March 2, 2016, ATC advanced two progress soil borings (CB-1 and CB-2) as near as practicable to ADEQ LUST File No. 2839.01 (CB-1) and the location of the highest historical benzene concentration (CB-2) as determined by site assessments conducted by TDI. Each boring was advanced using direct-push drilling equipment to a depth of 13 feet bgs in accordance with ATC's Standard Operating Procedure. Soil sample collection was attempted at approximate five-foot depth intervals and samples were prepared for laboratory analysis of VOCs using EPA Method 8260B and TEL using MAI Organic Pb Method. VOCs and TEL were not detected at concentrations above their respective, if established, ADEQ rSRL in the soil sample collected at CB-1 at 13 feet bgs. Soil sample collection at depths of five and 10 feet bgs was unsuccessful due to the presence of pea gravel backfill within the UST basin. A soil sample collected at CB-2 at 10 feet bgs contained TEL (0.19 milligram per kilogram [mg/kg]), at a concentration above its ADEQ established rSRL. Benzene and/or TEL were detected at concentrations above their respective ADEQ rSRL at 10 and/or 15 feet bgs.

On April 27, 2017, ATC returned to the site to further assess that area by advancing one soil boring (CB-2A) adjacent to CB-2 for collection of soil samples for PAH analysis and three lateral soil borings (SB-1, SB-2 and SB-3) for VOC and TEL analysis. Laboratory analytical results did not indicate concentrations of PAH above their respective, if established, ADEQ rSRL at boring CB-2A. However, laboratory analytical results of soil samples collected at five and 10 feet bgs at the lateral soil borings indicated concentrations of benzene, TEL and/or 1,2,4-trimethylbenzene (1,2,4-TMB) above established rSRLs. The Tier 1 exceedances were subject to evaluation of the ingestion and dermal contact exposure pathways due to their shallow depth. The evaluation was performed utilizing the appropriate equations for child and adult resident exposure scenarios as presented in the EPA Risk Assessment Guidance for Superfund (RAGS): Part B, Chapter 3 Calculation of Risk-Based Preliminary Remediation Goals, December 1991 and EPA RAGS Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July 2004, respectively. While the model outputs for the ingestion and dermal exposure pathways indicate risk presented at greater than 10^{-6} and 1 for cancer and non-cancer respectively, it is noted that these exposure pathways are incomplete as the impacted soil is present at depths of 10 to 15 feet bgs under concrete surface cover and is therefore inaccessible. It should be noted that between October 29 and November 4, 2019, ATC supervised the excavation of this impacted soil in the vicinity of soil borings CB-2, SB-1, SB-2 and SB-3.

Concurrent with the progress soil sampling conducted March 2, 2016, ATC supervised the installation of seven permanent soil vapor probes (SV-1 through SV-5, SV-7 and SV-8). Each soil vapor probe was completed to a depth of five feet bgs and allowed to equilibrate for a minimum of eight hours following construction before being purged of three probe volumes and sampled in accordance with ATC's Standard Operating Procedure on March 3, 2016. The seven primary soil vapor samples and the appropriate QA/QC samples were analyzed for VOC using EPA Method TO-15. These data were utilized to evaluate the inhalation pathway and vapor intrusion potential into current or hypothetical site buildings using the EPA on-line version of the Johnson and Ettinger (J&E) Model. The J&E Model indicated Excess Lifetime Cancer Risk (ELCR) and Hazard Index (HI) values above the acceptable respective risk thresholds of 1.0×10^{-6} and 1. The primary soil vapor samples (SV1 through SV-5, SV-7 and SV-8) were also subject to laboratory analysis for fixed gases (carbon dioxide, methane, nitrogen and oxygen) using EPA Method 3C since the site is an active service station.

Soil vapor samples were collected at soil vapor probes SV-1, SV-2 and SV-3 again on February 2, 2017. These samples and QA/QC samples were analyzed for VOC using EPA Method TO-15. The highest detected VOC concentrations exceeded those during the previous (March 3, 2016) soil vapor sampling event. As such, a Tier 3 Risk Assessment evaluation using the J&E Model was not performed. Soil vapor sample collection was attempted at probes SV-2 and SV-3 on April 27, 2017. Sample collection at SV-2 was negated by the presence of water in the SV-2 vapor probe. A sample was collected at SV-3, though a high vacuum condition was noted during sampling. Due to the inability to collect viable, representative samples at each of these locations, temporary soil vapor probes SV-2T and SV-3T were advanced using the direct push drilling method to a depth of five feet bgs and within five feet of SV-2 and SV-3, respectively. The samples collected at SV-2T, SV-3T and SV-3 and QA/QC samples were analyzed for VOC using EPA Method TO-15. The data collected at SV-2T and SV-3T were utilized to separately

evaluate the inhalation pathway and vapor intrusion potential into current or hypothetical site buildings at each of those locations using the J&E Model. The evaluation for SV-2T using the J&E Model indicates (for the chemicals evaluated) a “low fit” ELCR of 8.312×10^{-7} and HI of 0.016. The Tier 3 Risk Assessment evaluation for SV-3T indicates a “low fit” ELCR of 7.178×10^{-7} and HI of 0.007. These calculated values are below the target ELCR of 1×10^{-6} and HI of 1, and indicate an acceptable level of vapor intrusion risk into hypothetical, concrete slab on-grade onsite buildings used for residential purposes at each location.

The nearest residential properties are single family homes located approximately 350 feet northeast and northwest of the site. Three schools, two daycare facilities and two senior care centers are located between 750 feet and one-half mile of the site. No additional schools, daycare facilities, hospitals or nursing homes were observed within a one-half mile radius of the site.

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.

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

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

Groundwater data tables:

MW-1

Total Depth: 30 feet. Screened 5-30 feet.

Date	Benzene AWQS is 5.0 ug/L	1,2-DCA AWQS is 5.0 ug/L	MTBE Tier 1 Standard 94 ug/L	Depth to Water (feet)
August 1997	29,000	540	Not analyzed	10.03
June 1998	8,700	260	4,800	10.52
July 1999	8,500	310	3,900	10.47
July 2000	8,100	210	920	10.96
July 2001	5,100	250	3,000	10.99
February 2003	2,400	180	2,600	10.91
September 2004	920	170	1,700	11.87
April 2006 SVE start				
May 2007	2.9	120	980	9.68
August 2007	3,000	<50	270	9.50
November 2007	8,100	<100	340	4.37
December 2007- May 2013	Not sampled	Not sampled	Not sampled	Not measured
January 2008				

SVE stop				
June 2013	450	63	680	11.13
November 2013 SVE start				
April 2014	120/120	35/36	310/380	12.65
January 2015 SVE stop				
August 2015	273/279	14.6/14.6	321/210	13.60
November 2015	18.4/15.6	<1.00/<1.00	36.0/34.3	13.18
February 2016	10.7/11.1	1.28/1.33	57.5/59.4	13.08
February 2017	5.02	<1.00	30.2	13.52
March 2018	<5.00/<5.00	<5.00/<5.00	273/269	13.86

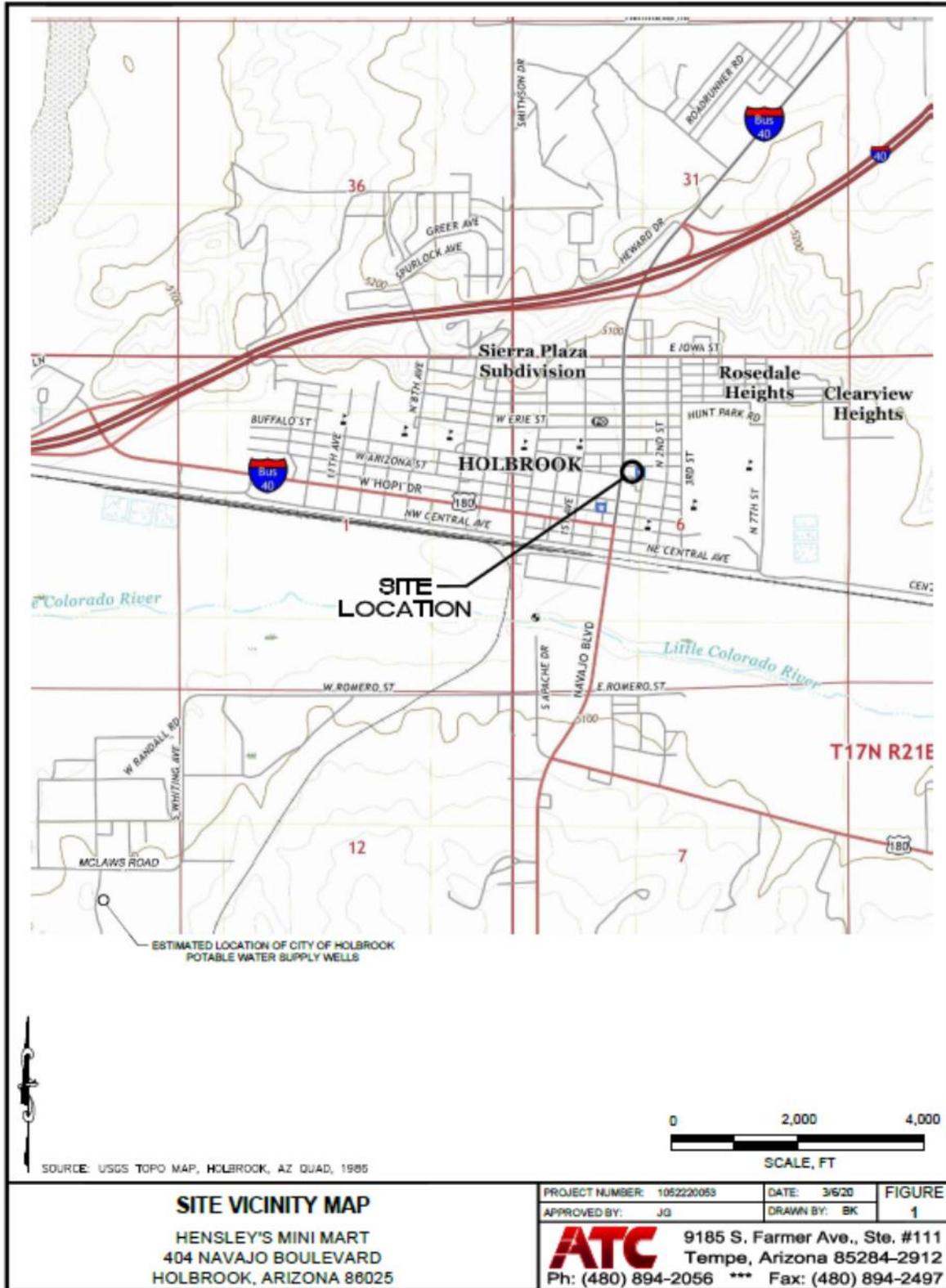
MW-2

Total depth of well 30 feet. Screened 5-30 feet.

Date	Benzene AWQS is 5.0 ug/L	1,2-DCA AWQS is 5.0 ug/L	MTBE Tier 1 Standard 94 ug/L	Depth to Water (feet)
August 1997	1,200	250	Not analyzed	11.44
June 1998	460	120	750	11.95
July 1999	9.1	54	500	12.01
July 2001	2.6	50	260	12.09
September 2004	<0.50	30	150	12.95
April 2006 SVE start				
May 2007	<1.0	18	120	12.65
August 2007	<1.0	18	82	12.90
November 2007	<1.0	21	120	13.02
December 2007- May 2013	Not sampled	Not sampled	Not sampled	various
January 2008 SVE stop				
June 2013	<1.0	3.5	14	14.17
November 2013 SVE start				
April 2014	<1.0	4.1	13	13.97
January 2015 SVE stop				
August 2015	<1.00	<1.00	1.15	14.44
November 2015	<1.00	<1.00	<1.00	14.52
February 2016	<1.00	<1.00	<1.00	14.44
February 2017	<1.00	<1.00	<1.00	14.81
March 2018	<1.00	<1.00	<1.00	15.25

MW-3
Total Depth: 30 feet. Screened 5-30 feet.

Date	Benzene AWQS is 5.0 ug/L	1,2-DCA AWQS is 5.0 ug/L	MTBE Tier 1 Standard 94 ug/L	Depth to Water (feet)
August 1997	<0.5	9	Not analyzed	10.55
June 1998	<0.5	13	27	10.91
July 1999	<1	5.5	14	11.02
July 2001	<0.5	3.9	4.8	11.10
February 2003	<0.50	2.4	2.2	11.00
September 2004	<0.50	3.0	<2.0	12.03
April 2006 SVE start				
July 2006	<0.50	4.5	2.2	12.47
May 2007	<1.0	3.3	1.8	11.70
August 2007	<1.0	3.0	<1.0	12.00
November 2007	<1.0	4.5	2.3	12.06
December 2007- May 2013	Not sampled	Not sampled	Not sampled	various
January 2008 SVE stop				
June 2013	<1.0	47	46	13.21
November 2013 SVE start				
April 2014	<1.0	15	13	12.99
January 2015 SVE stop[
August 2015	<1.00	14.7	13.8	13.55
November 2015	<1.00	18.8	22.4	13.65
February 2016	<1.00	10.9	10.4	13.52
February 2017	<1.00/<1.00	9.20/8.98	16.7/16/6	13.94
March 2018	<1.00	6.08	14.6	14.31



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