Private Wells and Monitoring Wells Groundwater Sampling Field Report
August 2015 Field Sampling Event

Moses Lake Wellfield Superfund Site
Moses Lake, Washington

Field Investigation:
17-20 August 2015
Report Prepared:
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By: Technical Services Branch

US Army Corps of Engineers®
Seattle District

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1.0 BACKGROUND AND OBJECTIVE OF INVESTIGATION

1.1 BACKGROUND

The Moses Lake Wellfield Superfund Site is located between the Grant County Airport and the City of Moses Lake, Washington. The Site includes the former Larson Air Force Base (LAFB) property, Port of Moses Lake property and adjacent private properties affected by Site groundwater contamination. The Site is listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 National Priorities List (NPL) for Uncontrolled Hazardous Waste Sites.

The Moses Lake Wellfield Superfund Site is an area of approximately 15 square miles, which includes the former LAFB, commercial facilities, and residences. The former LAFB occupied approximately 9,607 acres three miles northwest of the City of Moses Lake. The United States Air Force was active at the site from 1942 until 1966. During 1988 and 1989, the Washington State Department of Health confirmed the presence of trichloroethylene (TCE) above the Federal Maximum Contaminant Level (MCL) in three City of Moses Lake municipal wells and two Skyline community wells. The Seattle District, US Army Corps of Engineers (USACE) completed a Remedial Investigation (RI) phase in 2003. Appendix A of this report shows the general location map and a site map.

During the course of the RI, several private wells were tested and found to be contaminated with TCE. In 2001, the USACE contracted installation of carbon filtration units – known as whole house filter systems (WHF) - at five of those wells. Several years of groundwater monitoring data has been evaluated since the original WHF systems were installed.

The final results of the Phase I RI released in a report in March 1993 indicated that TCE was consistently found in shallow alluvial and upper basalt (*a*-basalt) groundwater in the central area of the former base.

On October 14, 1992, the affected areas of the former LAFB and off-site down gradient areas, termed the "Moses Lake Wellfield Contamination", were listed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 for Uncontrolled Hazardous Waste Sites. The former LAFB property is one part of the Moses Lake Wellfield Superfund Site; the site also includes the contaminant plume.

Chemical results from 1993 and 1994 combined with historical data indicated that TCE occurred in the central and southern portion of the former LAFB in alluvial and *a*-basalt groundwater. In 2004, USACE confirmed TCE contamination in the next lower basalt aquifer (c-basalt). As of 1995, the data suggest that more than one source may have contributed TCE to the alluvial and *a*-basalt groundwater in the central portion of the former LAFB.

In 1998, URS Greiner completed a sampling round of private water wells and wells for Class A and Class B water systems east, south and southwest of the previously known TCE plume. There were eight detections of TCE during this study. Four wells that were previously outside the plume extent were found to be above the detection limit.

1.2 Groundwater Sampling Event Summary and Objectives

In coordination with the US Environmental Protection Agency (USEPA) Region 10, two USACE environmental field teams deployed to conduct the August 2015 Moses Lake Wellfield groundwater sampling event during a single mobilization. The events described in this report involve USACE field teams verifying sample point locations; discussion of sampling techniques; recording groundwater observations; collecting groundwater samples; and shipping those samples by overnight delivery for laboratory analysis. Environmental sampling team members responsible for the August 2015 field event were Joseph Marsh, Katie Garon, Karah Haskins, and Jacob Williams.

All of the work described in this report was accomplished in accordance with the Moses Lake Wellfield Superfund Site Quality Assurance Project Plan. In addition, the teams followed the guidance presented in: the Seattle District, USACE Safety and Health Plan; USACE Safety Manual EM 385-1-1; Seattle District, USACE, Sampling Standard Operating Procedures (SOP).

The private wells and monitoring wells designated for sampling are displayed on a map found at Appendix A. These wells have been selected based on their down-gradient locations relative to the inferred flow direction of TCE-contaminated groundwater and validated sampling analytical data from previous monitoring events.

Two environmental field teams deployed to the Site and collected groundwater samples from 17 private well systems, and 28 monitoring wells during the August 2015 sampling event as summarized below:

Team 1: Joseph Marsh and Katie Garon collected groundwater samples from 4 monitoring wells fitted with dedicated bladder pumps, and 10 monitoring wells fitted with laboratory-filled passive diffusion bag samplers. Team 1 also collected static water level data from all other designated project monitoring wells in coordination with team 2. These activities were conducted between 17 and 20 August 2015.

Team 2: Karah Haskins and Jacob Williams collected groundwater samples from nine private whole-house filter systems, five private well systems and 14 monitoring wells fitted with passive diffusion bags. In coordination with team 1, they also collected static water level data in designated project monitoring wells as required. These activities were conducted between 17 and 19 August 2015.

The objectives of groundwater sampling at Moses Lake are to: 1) collect representative samples from designated private well systems and monitoring wells yielding data of known and sufficient quality to evaluate TCE concentrations and define existing TCE plumes; 2) to assure compliance with the requirements of USEPA; and 3) to make critical project - specific decisions based on the evaluated data.

2.0 DESCRIPTION OF WORK

2.1 Activities Prior to the August 2015 Groundwater Sampling Event

The USACE project team worked to collect signatures on Department of the Army Right of Entry forms as required before conducting the well sampling on private, city or county government property. For most properties, previously signed Right of Entry forms were still valid. For all properties designated for sample collection, owners (and renters if applicable) were contacted to coordinate sample collection times during the scheduled field sampling week. Many of the owners allowed the sampling teams to work on their property while they were not at home. At some of the properties, home owners or well system managers had to unlock pump houses and open valves for the sampling teams – requiring prior coordination.

Prior to conducting sampling activities at each location, both teams verified the address or well location and map location matched, and that the Right of Entry form had been signed prior to arriving at each sampling location.

Each team was responsible for identifying potential health and safety hazards at each sampling location. If a hazard is verified at a private well sampling location, an alternate hose bib connected to the same water source may be selected in a safer area of the subject property. In the case of hazardous monitoring well conditions, the well may be situated in an active construction zone requiring the cancellation of sampling at that well until the next scheduled sampling event.

Also for private well sampling, the field team was tasked with determining the most appropriate cold-water tap or other sample port as close to each wellhead as practical. At each location, the team worked to collect water samples from the same sample point selected during previous sampling events to ensure consistent results. The team was briefed that groundwater samples would not be collected from taps delivering chlorinated, aerated, softened or filtered water.

2.2 Private Well Sampling Procedures

During the August 2015 groundwater sampling event, samples were collected from a total of 14 private wells consisting of: five private well system hose bibs (WP-04, WP-27, WP-125, WP-131, WP-167, and WP-168), and nine WHF systems (WP-14, WP-70, WP-83, WP-86, WP-121, WP-123, WP-124, WP-125, and WP-129).

USACE (in cooperation with USEPA) has determined private well and WHF groundwater purging shall to consist of: allowing water flow at the sampling port at a rate of approximately 0.5 to 1 gallon per minute (gpm), while measuring the temperature of the water stream with a digital thermometer every two minutes until stabilization is achieved. These procedures follow the general principles of the New Hampshire private well system water sampling guidance.

During purging, the flow rate at each location was verified by graduated cylinder. While purging continued, the field team monitored the surrounding area and flowing water for unusual observations and odors as purge water was captured in a five gallon bucket. They recorded the start time of the purging in the field logbook immediately after opening each hose bib sample point and establishing the flow rate. While one team member used the digital thermometer to measure water temperatures, the other recorded the temperatures every two minutes until the parameters stabilized.

Upon reaching stabilization, the approximate total purged volume was recorded in the project field book along with any other significant observations. The team then conducted the sample collection activities.

Prior to collecting a water sample, the team reduced the flow rate at each tap to approximately 150 to 200 ml/min. to minimize sample water turbulence and aeration. Prior to sample collection at each private well system, the samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All groundwater samples were collected in pre-cleaned certified containers obtained from the analytical laboratory.

All sample containers were filled with water directly from each tap – forming a meniscus at the top of each vial to provide zero headspace samples as required. Sample point location and components of each plumbing system were noted to assist in data interpretation. A photographic record of each sample point was made by the team. In addition, each team placed handle tags (indicating that water samples were taken by USACE on that date and time) on the front doors of homes sampled if nobody was home during sample collection. A photo was taken of the handle tag and front of house in that case for the project files.

After the sample containers are filled, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time are placed on the containers. The samples are then packaged in bubble wrap bags and plastic zipper type bags, placed into pre-iced sample shipping coolers and prepared for shipment as described in Section 3.0. All sampling teams worked to ensure each property was left just as they found it with no damage done, and any doors or gates closed as required.

2.3 Whole House Filter Sampling Procedures

In coordination with USEPA and affected Moses Lake area homeowners, granular activated carbon (GAC) water filters have been installed in private well systems showing TCE results of 3.5 µg/l or greater. Each GAC filter system consists of two lightweight composite GAC filter tanks (acting as lead and lag filters), associated piping, bag filters (to prevent GAC particles from entering the household plumbing system), pressure gauges and valved/regulated sample collection ports.

As described previously, groundwater samples were collected from nine WHF systems (WP-14, WP-70, WP-83, WP-86, WP-121, WP-123, WP-124, WP-125, and WP-129). During this August

2015 sampling event. Each system was purged according to the revised private well sampling SOP consisting of allowing water flow at a hose bib nearest the wellhead at a rate of approximately 0.5 to 1 gpm, while measuring the temperature of the water stream with a digital thermometer every two minutes until stabilization is achieved. Purge flow rates averaged approximately 0.5 gpm as measured with graduated cylinder, and purged water at each location was captured in a five gallon bucket to verify purged volumes. During purging, continuous temperature readings were recorded using a digital thermometer until water temperature stabilization was achieved. Once water temperature had stabilized, the hose bib was closed, and the field team prepared to collect samples from the pre-determined WHF sample ports (labeled “A” for the lead inlet port, “B” for the lead outlet port, and “C” for the lag outlet port).

WHF sample collection consists of opening each designated sample port valve fully to allow the maximum restricted flow rate of approximately 150 to 200 ml/min to flow into a capture bucket for a few seconds to ensure organic matter or air bubbles have been flushed out of the system. Restrictors have been placed on the sampling lines to provide a smooth, non-turbulent stream at a low-flow rate to minimize loss of volatiles that may be present in the water stream. Next, the sampling team immediately fills three pre-preserved VOA vials to zero headspace. New Nitrile gloves were donned before collecting samples at each port. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface away from the shed or pump house GAC filter location after the samples were collected.

After filling the sample containers, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time were placed on each container and the container was placed in a plastic zipper bag. The bagged sample vials were placed into bubble wrap bags. Finally, the filled sample containers were placed into pre-iced shipping coolers to begin sample cooling to the required 4° centigrade sample preservation temperature prior to shipment to the analytical laboratory. One set of trip blanks were required and included per sample shipping cooler.

2.4 Monitoring Well Sampling Procedures

2.4.1 Monitoring Well Sampling Using Dedicated Bladder Pumps

Moses Lake monitoring well groundwater purging and sampling was performed in accordance with the Seattle District’s Low-Flow Ground Water Purging and Sampling SOP, prepared in March 1999 and revised on 1 Sep 2009. Data generated during purging were recorded on the MicroPurge/Low-Flow Sampling Log forms (Appendix C).

The team verified each monitoring well location and identification number with project maps and tables. They verified work can proceed safely in the vicinity of moving vehicular traffic, heavy industry, and other hazards as required. The team used a pry bar, socket wrench or pinhead hex wrench as needed to open each flush mount monitoring well cover plate, and a Masterlock #485 padlock key for the standard “stick-up” well completions. Prior to purging each well, the depth to static water level in each well was measured and checked periodically to monitor draw down as a guide to flow rate adjustment (no greater than 0.4 foot drawdown is permitted to prevent sampling stagnant casing water).

Purging operations at each well commenced once the following equipment was prepared: the MP20 MicroPurge® Controller equipped with an adjustable pressure regulator was connected to the Well Wizard® bladder pumps via air line and quick connect fittings. Another air line was quick-connected to a pressurized CO_2 cylinder to drive the pump. Pump flow rates were then adjusted during a "pre-purge" period to maximize withdrawal rates and minimize excessive drawdown in each well. The evacuated pre-purge volume at each well was intended to flush out a bladder pump and tubing volume prior to monitoring stabilization parameters. Finally, a QED MicroPurge® basics MP20 Flow Cell was connected to the pump's discharge line at ground surface to measure established stabilization parameters (pH, specific conductivity, temperature, DO, ORP, and turbidity).

Depth to water measurements during purging were monitored and recorded to verify that minimal drawdown occurred. A graduated measuring cup was used to determine the volume purged. Generally, acceptable low-flow rates are no greater than 500 milliliters per minute (ml/min.), and are typically closer to 400 ml/min. for the Well Wizard® bladder pump systems, depending upon the amount of water level drawdown detected during pumping at each well. Purge data was recorded on the micropurge logs every two minutes.

Low-flow purging continued until three consecutive measurements of the stabilization parameters met stabilization requirements.

Stabilization parameter requirements for all private well and bladder pump monitoring wells are as follows:

Temperature	+/- 0.2 ºC
Specific Conductivity	+/- 0.020 millisiemens/centimeter (mS/cm)
DO	+/- 0.2 milligrams/liter (mg/l)
pH	+/- 0.2 units
ORP	+/- 20 millivolts (mV)

At each monitoring well, groundwater sample collection would begin immediately after achieving stabilization of water quality parameters during low flow purging.

Prior to sample collection, the samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All groundwater samples were collected in pre-cleaned certified containers obtained from the analytical laboratory.

All sample containers were filled immediately following purging by disconnecting the flow-through cell from the pump tubing system, and capturing water directly from the discharge end of the tubing. All sample containers were carefully filled at a low-flow rate to minimize agitation. During sample collection, significant physical observations were recorded in the Micropurge/Low-Flow Sampling Log data forms and project field book as needed.

After filling the sample containers, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time were placed on each container and the container was placed in a plastic zipper bag. The bagged sample vials were placed into bubble wrap bags. Finally, the filled sample containers were placed into pre-iced shipping coolers to begin sample cooling to the required 4° centigrade sample preservation temperature prior to shipment to the analytical laboratory. One set of trip blanks were required and included per sample shipping cooler.

At the conclusion of groundwater sampling at each well, the flush mount well covers were bolted closed and stick up well caps padlocked.

2.4.2 Monitoring Well Sampling Using Passive Diffusion Bags

Passive diffusion bags (PDBs) were been selected by the Moses lake Project Delivery Team as the most appropriate, cost-effective method for groundwater sample collection from Moses Lake monitoring wells lacking dedicated bladder pumps. The PDBs were purchased from ALS Environmental laboratory under license by the US Geological Survey and The General Electric Company, both co patent-holders. The 1 ¼" diameter low-density polyethylene PDBs were pre-filled with 220 ml or 330 ml of ASTM Type II certified, laboratory-grade, deionized water. Each filled PDB was then heat sealed by the laboratory prior to shipment to USACE via overnight delivery in hermetically sealed pouches.

USACE ensures a minimum of 14 days of PDB equilibration time before returning to the Moses Lake site for groundwater sample collection per established PDB guidance. During this event, both sampling teams worked to collect the PDB samples as described in Section 2.5.3. PDB retrieval and sampling consisted of the following procedures:

1. The team verified each monitoring well location and identification number with project maps and the sample matrix. They verified work can proceed safely in the vicinity of moving vehicular traffic as required. The PDBs were prepared over clean sheets of aluminum foil prior to being placed into each well. The team used a pry bar, socket wrench or pinhead hex wrench as needed to open each flush mount monitoring well cover plate, and a Masterlock #485 padlock key for the standard “stick-up” monitoring well completions. The team donned new Nitrile gloves for groundwater sample collection.

2. The team carefully hauled each weighted PDB to the surface using the nylon suspension line. The sampling team carefully cut the top corner off each PDB and filled each sample vial. The team filled each vial just to overflowing and maintained a reverse meniscus. There was no down time once the PDB has been brought to the surface until sample collection was complete at each well. Any residual sample water in the used PDBs was discharged to ground surface.

3. Each PDB represented a unique sample ID number based on the well ID (and sample interval if two PDBs are deployed into one well). With the exception of the MS/MSD, all QC samples were submitted "blind" to the laboratory using a separate unique sample ID number not labeled as duplicate or trip blank per USACE standard sampling procedure. One set of trip blanks were required and included per sample shipping cooler. An extra laboratory- prepared PDB was shipped to the site and was used for collection of the trip and field blanks at the direction of the USACE project chemist.

4. Once recovered and sampled the PDBs and suspension lines were be discarded as non-hazardous municipal waste. In addition, gloves, paper towels, bags, and other solid waste materials were disposed of as municipal waste. The PDBs and other solid waste material were placed into a large plastic garbage bag and tied securely prior to disposal. The stainless steel weights were decontaminated and returned to the Seattle District, USACE office.

5. Finally, the team securely capped and locked each monitoring well riser and cover plate when finished.

2.5 Sampling Event Activities and Observations

2.5.1 Team 1 Monitoring Well Bladder Pump Sampling

Groundwater sample collection commenced immediately after achieving stabilization of water quality parameters during low flow purging at each well using dedicated bladder pump systems as described previously. The team worked from the far north end of the Site, moving to the far south end sampling each designated well as it was encountered. The project well maps and sample matrix were used to ensure samples were collected at the correct locations. The team used one 15 lb. compressed CO_2 cylinder acquired from Oxarc in Moses Lake to drive the pump systems, airlines, pump controllers, and flow cells to conduct the sampling of dedicated bladder pumps.

During the August 2015 sampling event, Team 1collected groundwater samples from a pre-determined set of four monitoring wells fitted with dedicated bladder pumps: 91BW04, 92BW01, 99BW10, and 99BW18.

Even though a right of entry permit has been signed, and verbal or written permission granted to collect samples at each designated monitoring well, the sampling team always attempted to contact the property owner for each monitoring well location before beginning the field sampling activities.

During this sampling event, Port Security Manager Greg Becken arranged for airport fire department personnel to escort sampling team 1 to conduct the water level measurements on airport property during the morning of 18 August 2015. Water levels were measured in the following airport wells: 00BW12, 91AW16, 00BW03, 00BW02, 00BW11, 91AW15, 91BW02, 00BW08, 00BW06, and 91AW13. Static water levels were measured in all other project monitoring wells before completing the sampling event.

Other than property owner notifications, no special access procedures were required for any of the other bladder pump monitoring wells sampled during this event.

Prior to sample collection, the samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All sample containers were filled immediately following low-flow purging by disconnecting the flow-through cell from the pump tubing system, and capturing pumped groundwater directly from the discharge end of the pump tubing. During sample collection, physical observations were recorded in the Micropurge/Low-Flow Sampling Log data forms.

Stabilization of water quality parameters during purging occurred within three to four readings (6 to 8 minutes) during this event. Measured temperatures ranged from 16.24°C at well 91BW04 to 21.6°C at well 99BW18. Specific conductivity ranged from 0.35mS/cm (well 99BW10) to 0.51 ms/cm (well 92BW01). Dissolved oxygen measurements ranged from 4.94 ppm (well 91BW04) to 7.50 ppm (well 92BW01). PH values varied slightly from 6.55 units (well 99BW18) to 7.24 units (well 91BW04). Oxygen reduction potential ranged from 288 mV (well 91BW04) to 400 mV (well 92BW01).

Significant Observations Made During Team 1 Bladder Pump Sampling

Team 1 experienced temperatures ranging from the 80's to the low 90's with significant forest fire smoke drifting across the project site from regional wildfires.

Static water level drawdown was observed and controlled by lowering the pumping rate during purging at well 99BW18.

No other significant observations were made during this event.

2.5.2 Team 2 Private Well System Sampling

While environmental field team 1 worked independently on their set of wells, Team 2 collected samples at their own pre-assigned set of nine whole house filter well system sample ports, five private well system hose bibs, and 14 PDB monitoring wells requiring sampling and/or PDB installation for the next sampling event.

During the period of 17-19 August 2014, Team 2 collected groundwater samples from the following nine private well systems with whole house filters installed: WP-14, WP-70, WP-83, WP-86, WP-121, WP-123, WP-124, WP-125, and WP-129. During that same time period, they collected groundwater samples from the following five private well systems: WP-04, WP-27, WP-131, WP-167, and WP-168.

All required 40 ml VOA sample vials were obtained from Vendor ESS by the USACE contract lab ARI, and delivered to USACE pre-preserved with maleic and ascorbic acid.

Trip blanks were sent inside each sample shipping cooler delivered to the analytical lab.

Even though a right of entry permit has been signed, and verbal or written permission granted to collect samples at each designated location, the sampling team always attempted to contact the owner or resident at each private well location before beginning the field sampling activities. Upon arrival at each private well property designated for sample collection, the team verified they were at the correct address using maps, notes, and the sampling matrix, and verified through field documentation they were ready to collect samples at the correct sampling point (hose bib, or suitable water discharge port nearest to the wellhead.

Per modified SOP, sampling point valves were opened, and water allowed to flow at approximately 0.5 gpm into a capture bucket. Next, water temperature readings were measured every two minutes until stabilization was achieved. During the August sampling event, water temperature stabilization ranged from 6 to 12 minutes elapsed purging time with most locations reaching stabilization within six minutes as shown in Table 1 below.

Table 1: Private Well Stabilized Water Temperatures and Purge Times

Well Location ID	Stable Temp. °C	Total Purge Time (Minutes)
WP-04	16.4	6
WP-14	15.4	6
WP-27	15.3	6
WP-70	17.6	6
WP-83	16.4	10
WP-86	18.1	12
WP-121	18.2	6
WP-123	17.1	12
WP-124	19.3	8
WP-125	17.2	6
WP-129	19.4	6
WP-131	16.8	6
WP-167	16.3	6
WP-168	23.0	8

Upon achieving stabilization, the final stabilized readings were entered into the project field book. Prior to collecting a water sample, the flow rate at each tap was reduced to approximately 100 to 200 ml/min. to minimize sample aeration and turbulence. The sampling team donned new Nitrile gloves prior to sample collection at each residence. In the case of the WHF sample ports, restrictors on the sample ports provided a stream of sample water at approximately 150 to 200 ml/min. All sample containers were be filled with water directly from each tap – forming a meniscus at the top of each vial to provide zero headspace samples as required. A photographic record of each sample point was made by the team.

Significant observations made during Private Well/WHF Sampling

Team 2 experienced temperatures ranging from the 80's to the low 90's with significant forest fire smoke drifting across the project site from regional wildfires.

The sampling team had to stay clear of an unrestrained dog in the backyard at WP-124.

Door handle tags were attached to the front doors at WP-86 and WP-167 where the resident was not at home during sample collection activities. As mentioned previously, the door handle tags are intended to inform the residents that a sample had been collected by the USACE team while they were away from home, and provide them with a point of contact and phone number if they had any questions or concerns. Photos of the handle tags are maintained in USACE project files.

No other significant observations were made during this event.

2.5.3 Passive Diffusion Bag Sampling and Deployment

Both USACE environmental field teams split up the effort of PDB sample collection and the deployment of new pre-filled PDBs in a pre-determined set of 24 monitoring wells during the August 2015 event.

The selected PDB wells were: 02-BW01; 04-BW09; 04-CW05; 04-CW07; 12-BW02; 12-BW03; 12-BW04; 12-BW05; 12-BW06; 12-BW07; 12-BW08; 12-CW01; 12-CW02; 12-CW03; 12-CW04; 12-CW05; 12-EX01; 12-EX02; 14BW01, 14BW02, 14BW03, 14EX03, 14EX04, and 14EX05.

All required 40 ml VOA sample vials were obtained from Vendor ESS by the USACE contract lab ARI, and delivered to USACE pre-preserved with maleic and ascorbic acid.

The teams first verified each monitoring well location and identification number with project maps and the sample matrix. The teams also verified that work could proceed safely in the vicinity of moving vehicular traffic or other physical, biological, or environmental hazards that may have been present near each monitoring well.

Each team member donned new Nitrile gloves for groundwater sample collection at each well. Once the wells were unlocked and opened, one team member lifted the well riser plug and began hauling the PDB vertically to the surface.

Once each PDB was raised to the surface, the sampling team worked together to carefully cut the top corner off each bag using decontaminated steel scissors. Next, one person held the open sample vials and the other carefully and slowly tilted the bags - open side down - toward each open sample vial. The pre-preserved vials were filled just to overflowing to maintain a reverse meniscus. Then the vials were immediately capped making sure there were no bubbles or headspace per standard VOC sampling procedure. This entire sampling process can be completed within one minute to minimize loss of volatiles while preventing introduction of contaminants into the water from surface sources. After all required vials were filled; any residual sample water remaining in the used PDBs was discharged to ground surface. Therefore, no Investigation-derived waste (IDW) water was generated during this sampling event.

The sampling teams continued use of protective mesh PDB sleeves in wells with steel risers due to a greater potential for damage to the PDB membranes (monitoring wells 12EX01, 12EX02, 14EX03, 14EX04, and 14EX05).

Once recovered and sample water removed, the PDBs and suspension lines were discarded as non-hazardous municipal waste. In addition, gloves, paper towels, bags, and other solid waste materials were disposed of as municipal waste. The PDBs and other solid waste material were placed into a large plastic garbage bag and tied securely prior to disposal. The stainless steel weights were decontaminated and reused during the deployment of the new pre-filled PDBs for the next sampling event.

After collecting water samples from the PDBs, the teams deployed PDB assemblies into the same set of 24 monitoring wells selected for groundwater sampling.

Two sizes of PDBs were ordered: The bags consisted of the standard 220 ml size, and a larger 330 ml bag selected to accommodate primary and field duplicate samples where required. In some wells, two 330 ml PDBs were connected in tandem and lowered to the mid-screen depth to accommodate primary, field duplicate, and MS/MSD sample volumes as required. Two PDBs were installed at two mid-screen depths if a designated well had two screened intervals (as found in wells 04CW07, 12BW03, and 12BW04). All PDBs and stainless steel anchor weights were purchased from ALS Environmental, and shipped to the District office by UPS overnight delivery.

Following the established PDB deployment procedures, both environmental team members worked together using a table of Moses Lake monitoring well logs to determine the number of required weights, length of nylon suspension line, and number of PDBs required at each designated well. Wells deeper than 200 feet generally required two steel weights to allow proper PDB positioning. Each team member donned a new pair of Nitrile gloves prior to working on PDB assemblies at each well. Steel weights, suspension lines, and PDBs were quickly assembled on a strip of clean aluminum foil on the tailgate of the sampling vehicle. The prepared assembly of PDB, suspension lines, and weights was lowered into place at each well within 10 to 15 minutes to reduce the possibility of contaminants entering the diffusion bags during deployment.

At each specific well, the team lowered the weight into the well first, followed by the suspension line and PDB. The team worked to keep the assembly centered within the well casing as they slowly lower it to the well bottom. When the team felt the weight hit well bottom, they pulled up the line approximately one foot and tied it off securely to the casing plug or well cap. This method ensured the PDB would always be centered at the mid-well screen depth. Finally, the well cap was locked, or the cover plate secured with locking bolts depending on type of well encountered – stick up or flush mount.

All laboratory-filled PDBs arrived at the USACE office in good condition prior to field deployment. Each PDB was packed in groups of 10 into sealed foil pouches to prevent inadvertent contamination until deployment into the designated monitoring wells. No specific difficulties or problems were noted during PDB deployment.

Significant Observations Made During Passive Diffusion Bag Sampling
Team 2 experienced temperatures ranging from the 80’s to the low 90’s with significant forest fire smoke drifting across the project site from regional wildfires.

Numerous rust particles were observed on the PDBs and PDB suspension lines installed in wells 14EX03 and 14EX04.

Hornets were observed at well 14BW01.

No other significant observations were made during this event.

3.0 Investigation-Derived Waste

No investigation-derived waste was generated during this sampling event. All residual PDB water or purged well water was transferred directly to ground surface on each property away from the sample collection point.

4.0 SAMPLE PACKAGING AND DELIVERY

As mentioned in the narrative of each sampling event, groundwater samples were packaged in shipping coolers on ice and under chain of custody for hand-delivery to the USACE contract laboratory Analytical Resources, Inc. at the conclusion of the sampling event.

All sample shipping coolers were prepared for laboratory delivery in the following manner: Each cooler was lined (sides and bottom) with plastic “bubble-wrap” sheets for shock absorption. A large 30-gallon plastic garbage bag was then placed into the cooler to contain the sample water in the event of container breakage during shipment to the laboratories. The glass sample vials were labeled, placed into plastic zip-seal bags, and placed into foam shipping blocks or bubble-wrap bags for shock protection. All the samples were placed in the shipping coolers as indicated on the corresponding chain of custody forms. Gallon size plastic zipper bags of cubed ice bags were placed between and on top of the samples in each cooler to ensure maintenance of the required four degrees centigrade (plus/minus two degrees) sample preservation temperature. The completed chain of custody (COC) forms were placed in gallon size plastic zipper bags and taped to the inside of each cooler lid. Two custody seals were affixed to the outside of each cooler. The custody seals were placed so that the coolers could not be opened without breaking the seals. Each cooler was then securely sealed with fiber tape. The field team ensured drain plugs were securely taped inside and out to prevent possible water leakage.

All sample coolers and sample containers were accounted for at the contract laboratory following each shipment.

5.0 LABORATORY ANALYSIS

Chemical analyses performed on the samples were as follows: VOCs (Method 524.3).

6.0 DECONTAMINATION PROCEDURES

PDB weights, flow cells and associated tubing, water level indicator meters, and water volume measurement containers used by each team were decontaminated at the end of the project with an Alconox®-water solution followed by triple rinsing using distilled water in the USACE Geology Laboratory.

7.0 PROTECTION LEVEL

All sampling activities were conducted under Worker Protection Level D. For this project, personnel protective equipment included reflective safety vests, safety splash protection glasses, Nitrile gloves, and safety steel toe boots. New pairs of Nitrile gloves were donned prior to handling acid-preserved sample containers and between each unique private well sample point or monitoring well.

End of Field Sampling Report

APPENDIX A

Site and Well Location Maps
(Available in USACE Files)

APPENDIX B

Field Sampling Photos

PROJECT: Moses Lake Wellfield Superfund Site – August 2015 Groundwater Sampling.

150818-99BW10-02

Equipment setup during low flow purging at well 99BW10.

150819-12EX01-01

Sheet 1 of 2

PDB sampler with protective mesh sleeve removed from well 12EX01
for sample collection.

Photographer: Joseph Marsh

150817-12EX02-01

PDB retrieval for sample collection at 12EX02.

150819-WP83-01

(b) (6)

Monitoring water temperature from yard hydrant near wellhead – WP-82.

Photographer: Marsh/Haskins

APPENDIX C

Field Notes
(Micropurge Logs Available in USACE Files)

Location ______ Date 17-20AUG15

Project / Client Moses Lake Wellfield

August 2015 Team 1 Sample table

Team 1: Joseph Marsh, Katie Garvey

SAMPLE ID	2015 DATE	TIME	VOCs	Notes
15MLW0818N91BW04	8-18	1340	3	
15MLW0818N92BW01	8-18	1135	3	
15MLW0818N99BW10	8-18	1535	9	extra vol for MS/MSD
15MLW0818D99BW10	8-18	1550	3	Field dupe
15MLW0818N99BW18	8-18	1438	3	
15MLW0819N048W09	8-19	1001	3	
15MLW0819N09CW05	8-19	1342	3	
15MLW0819N12BW09A	8-19	1438	3	
15MLW0819N12BW09B	8-19	1441	3	
15MLW0819N12BW05	8-19	1314	3	
15MLW0819PDTB02	8-19	1503	3	
15MLW0819TB03	8-19	0800	2	2 vials for T.B.
15MLW0819N12BW07	8-19	1124	9	extra vol. for MS-MSD
15MLW0819D12BW07	8-19	1140	3	Field dupe
15MLW0819N12CW03	8-19	1413	3	
15MLW0818N12CW04	8-18	1710	3	
15MLW0819N14BW03	8-19	0907	3	
15MLW0819N12EX01	8-19	1040	9	extra vol. for MS MSD
15MLW0819D12EX01	8-19	1055	~~9~~ 3	Field dupe
15MLW0819N14EX05	8-19	0830	3	
15MLW0819TB04	8-19	1600	2	

Location ______ Date ______

Project / Client ______

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Location Moses Lake, WA Date 8-17-15
Project / Client Moses Lake Wellfield Superfund
Field Notes

8-17-15

1215 - Arrive on site, prep for field work
SWL readings from monitoring wells
1238 99 BW-16 = ~~125.0~~ 125.09'
Top of pump cap
91 AW-14 = 124.40'
top of pvc
04 CW-01 = 173.94'
04 BW-04 = 139.33'
1320 00 BW-09 = 73.51'
00 BW-04 = 65.77'
1355 04 BW-01 = 67.35'
needs new J-plug
01 BW-01 = 68.10'
00 BW-05 = 67.23'
1420 00 BW-07 = 71.12'
00 BW-01 = 47.17'
city wells { MW-4 = 61.82' (Yellow Jackets)
MW-2 = 61.21'
02 BW-02 = 66.81'
99 AW-08 = 67.32
99 BW-15 = 67.51
91 AW-17 - 118.68 (Wasps!)
by water tower, need small pad lock

Location Date 8-17-15
Project / Client Moses Lake Wellfield
Field Notes continued

1627 04 CW-02 = 175.78' sticky lock
04 BW-05 = 131.62' sticky lock
99 BW-12 = 114.22'
99 BW-14 = 54.30' sample ~~next to~~ tubing broken,
also has sample tubing from another agency
AW next to 99 BW-14, water level not measured. Hornet nest inside casing
99 BW-09 = 85.93'

8-18-2015
0655 - Calibrated Flow cell - all readings in Normal range - NO issues.
- Arrive @ OXARC to pick up CO_2 cylinder
0800 - arrive @ airport, no one available to escort us, left our cell # so they can call when maintenance arrives
0823 - arrive @ 92 BW-01 for 1st bladder sample
0840 - Going to meet fire depart. @ airport.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Location ______ Date 8-18 to 8-19-15

Project / Client Moses Lake Wellfield
August 2015
Field Notes cont.

04 CW-07 = ~~100~~ 161.0'
Diffusion bag in well (on matrix)

1651 @ 12 CW-04 ('15 PDB sample)
1 bag goes into well
SWL = 104.47'
Sample time: 17:10
end of day: 17:30 — [signature]

8-19-15
*First trip blank = 0800 time
0815 In the field @ 14 EX-05
SWL @ top of steel riser = 85.93'
rusty floating particles (coated water level meter)
sample time = 0830
0840 Deploying New PDB (220ml) in Mesh sleeve – 2 weights.
Close-lock well
@ 14 BW-03
SWL = 85.95'
sample time = 0901
0910 deploying new PDB (220 ml)
– 1 weight
close + lock well.

Location ______ Date 8-19-15

Project / Client Moses Lake Wellfield
August 2015
Field Notes cont.

0953: 04 BW-09 (flushmount)
SWL = 83.25'
1001 = PDB sample time (one 220 ml PDB)
one 220 ml PDB installed per SOP.
1015 PDB deployed.
close + lock well.

1027 @ 12 EX-01
SWL = (no notch?) 87.71'
1040 = ~~FD~~ PDB sample time. FD =
• replaced anchor line + 2 weights
1105 = bag deployed. lock + closed.
@ 12-BW-07
SWL = 87.71'
sample time = 1124 FD Time = 1140
one PDB deployed @ 1147
locked + closed well.

1306 @ 12 BW-05
SWL = 88.31'
Sample time = 1314
1 PDB deployed @ 1325
well closed + locked.

Location ____ Date 8-19-15

Project / Client Moses Lake Wellfield

Field Notes cont.

~~01~~ @ 04 CW-05

SWL = 102.08'

Sample time: 1342

2 330 ml PDB deployed @ 1355

closed + locked well.

@ 12 CW-03

SWL = 110.90'

Sample time: 1413

1425, one PDB deployed.

Closed + locked well.

@ 12 BW-04

1431 - SWL = 99.03'

3 weights, 18' between bags.

2 220 ml PDBs.

Sample time upper (A) = 1438

" " lower (B) = 1441

1455 ~~1500~~ - 2 PDB deployed, 18' apart.

1500 - Taking PDB blank.

Sample time = 1503

2nd trip blank prepared - Time: 1600

Note - trip blanks prepared by lab in clear glass vials

Location Moses Lake Wellfield Date 8-19-15

Project / Client Field Notes cont.

8-19-15

1548: Back to SWL

91 AW-09 = 89.50'

└ Bladder pump installed

└ bottom of concrete pad has been dug out by gophers (see photos)

04 CW-03 = 162.47'

1600 - 99 BW 01 = 90.44'

~~1610~~ - 99 AW 01 = 90.28'

91 AW-07 = 89.70'

91 BW-03 = 90.20'

1628 - 00 AW-12 = 77.24'

└ needs a 4" J plug

00 BW-15 = 77.30'

└ Black widow!

92 BW-02 = 81.51'

12 BW-01 = 83.17'

1705 - 00 AW-14 = 82.33'

└ no J plug. (4")

00 BW-13 = 82.95'

Sprayed Hinge

1730 end of day

[signature]

Location ______ Date 8-2015

Project / Client Moses Lake Wellfield
August 2015 Monitoring well team 1

8-20-15

08:15 - 00 BW-16 = 143.11'
00 AW-13 = 121.45'
12 CW-02 = 168.38'
↳ has a PDB in the well, check against other teams notes.
12 BW-03 = 129.19'
↳ has a PDB in the well.
08:45 00 BW-10 = 154.97'
04 CW-08 = 161.29'
↳ has a PDB in well.
@ Hendricks Farm
0901 99 BW-11 = 65.50'
99 AW-04 = 40.31'
↳ need a plug for the water hole. (Blue plastic QED W.L. plug)

0930 - Depart Site for ARI with 2 sample Coolers.
1330 - Dropped off 2 coolers at ARI with GW Samples under COC.
1400 Return to D.O. - project complete

Location ______ Date ______

Project / Client ______

BLANK

Location ______ Date ______

Project / Client ______

Sample ID	2015 Date	Time	VOC	notes
15MLW0817N02BW01	8/17	1247	9	
15MLW0817002BW01	8/17	1300	3	
" 0817N04CW07A	8/17	1310	3	
0817N04CW07B	8/17	1320	3	
0817N12EX02	8/17	1400	3	
0817N14EX04	8/17	1500	3	
0817N14BW02	8/17	1520	3	
0817N12CW01	8/17	1632	3	
0817N12BW02	08/17	1652	3	
0818N12CW02	08/18	0740	3	
0818N12BW03	08/18	0800	3	
0818N12BW03B	08/18	0810	3	
0818NWP27	08/18	0840	3	
0818NWP8A	08/18	0948	3	

Location ______ Date ______

Project / Client ______

Sample ID	2015 Date	Time	VOC	Notes
0818NWP[illegible]1A1	08/18	1110	3	
0818NWP129A1	08/18	1140	3	
0818NWP70A1	08/18	1202	3	
0818N12CW05	08/18	1242	3	
0818N12BW06	08/18	1302	3	
0818NWP04	08/18	1339	3	
0818NWP131	08/18	1415	3	
0818NWP123A1	08/18	1440	3	
0818NWP123B1	08/18	1445	3	
0818NWP123C1	08/18	1450	3	
0818NWP124A1	08/18	1500	9	MS/MSD
0818DWP124A1	08/18	1510	3	

Location ______ Date ______

Project / Client ______

Sample ID	2015 Date	Time	VOC	Notes
0818NWP125A1	08/18	1530	3	
0818NWP125B1	08/18	1540	3	
0818NWP125C1	08/18	1550	3	
0817N12BW08	08/17	1600	3	
0819N14BW01	08/19	0810	3	
0819N14EX03	08/19	0840	3	
0819NWP83A1	08/19	0930	3	
0819NWP14A1	08/19	0950	3	
0819NWP167	08/19	1030	9	
0819DWP167	08/19	1040	3	

Location Moses Lake Date
Project / Client

O2BW01, 1231

Water level 138.42'
Normal MS/MSD 1247
Field duplicate 1300

04CW07, 1315

water level 161.17

Normal A 1310
1320

12EX02, 1350
water level: 121.55

Normal 1400
water in casing cement
rust on bag per usual

12BW08 bolt is stuck no access

Location Date
Project / Client

14EX04 1456
smelled smoke
Water Level: 107.50 in air
sample time 1500
rust on rope & bag

~~14BW02~~

Water level: 107.31
Sample time 1520

12BW08 1553

Water level 121.39
Sample time 1600

replaced Corps bolt w/ regular

12CW01 1620

Water level 150.22
Sample time 1632

Need Long Bolts

Location Date

Project / Client

12BW02 1647

Water Level 118.70

Sample time 1652

12CW02 0730

Water level: 168.78

sample time 0740

12BW03

water level: 129.13

sample time ~~0755~~

Dual PDB sample time

A: 0800

B: 0810

WP-27 arrived 0820

sample time 0840

temp	15.3	15.3	15.3	15.3
time	0	2	4	6

purged 3 gal

Location Date

Project / Client

04CW08

water level 163.88

WP-86 0924

No one home door tag

time	0	2	4	6	8	10	12
temp	20.3	20.4	20.3	18.8	18.2	18.2	18.1

totalizer 496419.3

purged 10 gal

Sample Time 0948

WP-121 1100

time	0	2	4	6
temp	19.5	18.3	18.2	18.2

Totalizer: 43252.5

Total purged 6 gal 1110

sampletime

Location ______ Date ______

Project / Client ______

WP-129

Time	0	2	4	6	8
Temp	19.4	19.3	19.3	19.4	

totalizer 69631.0
sample time 1140

WP-70

Totalizer 186147.6

Time	0	2	4	6
Temp	17.7	17.8	17.6	17.6

purged 5gal

Sample Time 1202

12CW05

water in casing

water level 154.85
sample Time 1242

Location ______ Date ______

Project / Client ______

12BW06

Water level: 118.42
sample time 1302
water in casing

WP-04

Time	0	2	4	6
Temp	16.4	16.4	16.4	16.4

sample time 1339

WP-131

Time	0	2	4	6
Temp	16.0	16.8	16.8	16.8

Purged 15 gal before taking temp then purged 5 gal

Sample Time 1415

Location ______ Date ______

Project / Client ______

WP-123

Time	0	2	4	6
Temp	17.3	17.1	17.3	17.1

purged 15 gal

Totalizer 151681.0

A 1440
B 1445
C 1450

WP-124

Beware OF DOG
purged from side of house

time	0	2	4	6
TeMP	19.1	19.3	19.1	19.3

Field dupe & MS/MSD N:1500
D:1510

Totalizer 217219.5

Purged 10 gal

Location ______ Date ______

Project / Client ______

WP-125

Totalizer 085415.2

Time	0	2	4	6
temp	17.4	17.2	17.2	17.2

A: 1530
B 1540
C 1550

14BW01 0800

Water level 94.20'
Sample Time 0810
bee spray used

14EX05

water level: 94.51
Sample time 0840

Location Date

Project / Client

WP-83

Water was running first

Totalizer 16534960

Time	0	2	4	6	8	10
Temp	18.2	17.8	17.5	16.4	16.4	16.4

A port only sample time 0930

purged 5 gal

WP-14

water was running

Totalizer 1277992.0

time	0	2	4	6
Temp	15.4	15.4	15.4	15.4

Aport sampling time 0950

purged 8 gal

Location Date

Project / Client

WP-167 MS/MSD/FD

left door tag

Time	0	2	4	6
Temp	15.2	15.9	16.1	16.3

purged 10 gal first before temp

Then purged another 20

N: 1030

FD: 1040

WP-168

Time	0	2	4	6	8
Temp	21.7	21.9	23.0	23.0	23.0

Sample Time 1050

Private Wells and Monitoring Wells Groundwater Sampling Field Report
November 2015 Field Sampling Event

Moses Lake Wellfield Superfund Site
Moses Lake, Washington

Field Investigation:
16-19 November 2015
Report Prepared:
January 2016

By: Technical Services Branch

US Army Corps
of Engineers ®
Seattle District

TABLE OF CONTENTS

APPENDICES

1.0 BACKGROUND AND OBJECTIVE OF INVESTIGATION

1.1 BACKGROUND

The Moses Lake Wellfield Superfund Site is located between the Grant County Airport and the City of Moses Lake, Washington. The Site includes the former Larson Air Force Base (LAFB) property, Port of Moses Lake property and adjacent private properties affected by Site groundwater contamination. The Site is listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 National Priorities List (NPL) for Uncontrolled Hazardous Waste Sites.

The Moses Lake Wellfield Superfund Site is an area of approximately 15 square miles, which includes the former LAFB, commercial facilities, and residences. The former LAFB occupied approximately 9,607 acres three miles northwest of the City of Moses Lake. The United States Air Force was active at the site from 1942 until 1966. During 1988 and 1989, the Washington State Department of Health confirmed the presence of trichloroethylene (TCE) above the Federal Maximum Contaminant Level (MCL) in three City of Moses Lake municipal wells and two Skyline community wells. The Seattle District, US Army Corps of Engineers (USACE) completed a Remedial Investigation (RI) phase in 2003. Appendix A of this report shows the general location map and a site map.

During the course of the RI, several private wells were tested and found to be contaminated with TCE. In 2001, the USACE contracted installation of carbon filtration units – known as whole house filter systems (WHF) - at five of those wells. Several years of groundwater monitoring data has been evaluated since the original WHF systems were installed.

The final results of the Phase I RI released in a report in March 1993 indicated that TCE was consistently found in shallow alluvial and upper basalt (*a*-basalt) groundwater in the central area of the former base.

On October 14, 1992, the affected areas of the former LAFB and off-site down gradient areas, termed the "Moses Lake Wellfield Contamination", were listed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 for Uncontrolled Hazardous Waste Sites. The former LAFB property is one part of the Moses Lake Wellfield Superfund Site; the site also includes the contaminant plume.

Chemical results from 1993 and 1994 combined with historical data indicated that TCE occurred in the central and southern portion of the former LAFB in alluvial and *a*-basalt groundwater. In 2004, USACE confirmed TCE contamination in the next lower basalt aquifer (c-basalt). As of 1995, the data suggest that more than one source may have contributed TCE to the alluvial and *a*-basalt groundwater in the central portion of the former LAFB.

In 1998, URS Greiner completed a sampling round of private water wells and wells for Class A and Class B water systems east, south and southwest of the previously known TCE plume. There were eight detections of TCE during this study. Four wells that were previously outside the plume extent were found to be above the detection limit.

1.2 Groundwater Sampling Event Summary and Objectives

In coordination with the US Environmental Protection Agency (USEPA) Region 10, two USACE environmental field teams deployed to conduct the November 2015 Moses Lake Wellfield groundwater sampling event during a single mobilization. The events described in this report involve USACE field teams verifying sample point locations; discussion of sampling techniques; recording groundwater observations; collecting groundwater samples; and shipping those samples by overnight delivery for laboratory analysis. Environmental sampling team members responsible for the November 2015 field event were Joseph Marsh, Matthew Brookshier, Karah Haskins, and Jacob Williams.

All of the work described in this report was accomplished in accordance with the Moses Lake Wellfield Superfund Site Quality Assurance Project Plan. In addition, the teams followed the guidance presented in: the Seattle District, USACE Safety and Health Plan; USACE Safety Manual EM 385-1-1; Seattle District, USACE, Sampling Standard Operating Procedures (SOP).

The private wells and monitoring wells designated for sampling are displayed on a map found at Appendix A. These wells have been selected based on their down-gradient locations relative to the inferred flow direction of TCE-contaminated groundwater and validated sampling analytical data from previous monitoring events.

The two environmental field teams deployed to the Site and collected groundwater samples from 15 private well systems, and 28 monitoring wells during the November 2015 sampling event as summarized below:

Team 1: Joseph Marsh and Matthew Brookshier collected groundwater samples from 4 monitoring wells fitted with dedicated bladder pumps, and 10 monitoring wells fitted with laboratory-filled passive diffusion bag samplers. Team 1 also collected static water level data from all other designated project monitoring wells in coordination with team 2. These activities were conducted between 16 and 19 November 2015.

Team 2: Karah Haskins and Jacob Williams collected groundwater samples from 10 private whole-house filter systems, 5 private well systems and 14 monitoring wells fitted with passive diffusion bags. In coordination with team 1, they also collected static water level data in designated project monitoring wells as required. These activities were conducted between 16 and 19 November 2015.

The objectives of groundwater sampling at Moses Lake are to: 1) collect representative samples from designated private well systems and monitoring wells yielding data of known and sufficient quality to evaluate TCE concentrations and define existing TCE plumes; 2) to assure compliance with the requirements of USEPA; and 3) to make critical project - specific decisions based on the evaluated data.

2.0 DESCRIPTION OF WORK

2.1 Activities Prior to the November 2015 Groundwater Sampling Event

The USACE project team worked to collect signatures on Department of the Army Right of Entry forms as required before conducting the well sampling on private, city or county government property. For most properties, previously signed Right of Entry forms were still valid. For all properties designated for sample collection, owners (and renters if applicable) were contacted to coordinate sample collection times during the scheduled field sampling week.

Prior to conducting sampling activities at each location, both teams verified the address or well location and map location matched, and that the Right of Entry form had been signed prior to arriving at each sampling location.

Each team was responsible for identifying potential health and safety hazards at each sampling location. If a hazard is verified at a private well sampling location, an alternate hose bib connected to the same water source may be selected in a safer area of the subject property. In the case of hazardous monitoring well conditions, the well may be situated in an active construction zone requiring the cancellation of sampling at that well until the next scheduled sampling event.

Also for private well sampling, the field team was tasked with determining the most appropriate cold-water tap or other sample port as close to each wellhead as practical. At each location, the team worked to collect water samples from the same sample point selected during previous sampling events to ensure consistent results. The team was briefed that groundwater samples would not be collected from taps delivering chlorinated, aerated, softened or filtered water.

2.2 Private Well Sampling Procedures

During the November 2015 groundwater sampling event, samples were collected from a total of 15 private wells consisting of: 5 private well system hose bibs (WP-27, WP-116, WP-131, WP-167, and WP-168), and 10 WHF systems (WP-14, WP-70, WP-83, WP-86, WP-119, WP-121, WP-123, WP-124, WP-125, and WP-129).

USACE (in cooperation with USEPA) has determined private well and WHF groundwater purging shall to consist of: allowing water flow at the sampling port at a rate of approximately 0.5 to 1 gallon per minute (gpm), while measuring the temperature of the water stream with a digital thermometer every two minutes until stabilization is achieved. These procedures follow the general principles of the New Hampshire private well system water sampling guidance.

During purging, the flow rate at each location was verified by graduated cylinder. While purging continued, the field team monitored the surrounding area and flowing water for unusual observations and odors as purge water was captured in a five gallon bucket. They recorded the start time of the purging in the field logbook immediately after opening each hose bib sample point and establishing the flow rate. While one team member used the digital thermometer to measure water temperatures, the other recorded the temperatures every two minutes until the parameters stabilized.

Upon reaching stabilization, the approximate total purged volume was recorded in the project field book along with any other significant observations. The team then conducted the sample collection activities.

Prior to collecting a water sample, the team reduced the flow rate at each tap to approximately 150 to 200 ml/min. to minimize sample water turbulence and aeration. The samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All groundwater samples were collected in pre-cleaned certified containers obtained from the analytical laboratory.

All sample containers were filled with water directly from each tap – forming a meniscus at the top of each vial to provide zero headspace samples as required. Sample point location and components of each plumbing system were noted to assist in data interpretation. A photographic record of each sample point was made by the team. In addition, each team placed handle tags (indicating that water samples were taken by USACE on that date and time) on the front doors of homes sampled if nobody was home during sample collection. A photo was taken of the handle tag and front of house in that case for the project files.

After the sample containers are filled, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time are placed on the containers. The samples are then packaged in bubble wrap bags and plastic zipper type bags, placed into pre-iced sample shipping coolers and prepared for shipment as described in Section 3.0. All sampling teams worked to ensure each property was left just as they found it with no damage done, and any doors or gates closed as required.

2.3 Whole House Filter Sampling Procedures

In coordination with USEPA and affected Moses Lake area homeowners, granular activated carbon (GAC) water filters have been installed in private well systems showing TCE results of 3.5 µg/l or greater. Each GAC filter system consists of two lightweight composite GAC filter tanks (acting as lead and lag filters), associated piping, bag filters (to prevent GAC particles from entering the household plumbing system), pressure gauges and valved/regulated sample collection ports.

As described previously, groundwater samples were collected from 10 WHF systems during this November 2015 sampling event. Each system was purged according to the revised private well sampling SOP consisting of allowing water flow at a hose bib nearest the wellhead at a rate of approximately 0.5 to 1 gpm, while measuring the temperature of the water stream with a digital thermometer every two minutes until stabilization is achieved. Purge flow rates averaged approximately 0.5 gpm as measured with graduated cylinder, and purged water at each location was captured in a five gallon bucket to verify purged volumes. During purging, continuous temperature readings were recorded using a digital thermometer until water temperature stabilization was achieved. Once water temperature had stabilized, the hose bib was closed, and the field team prepared to collect samples from the pre-determined WHF sample ports (labeled “A” for the lead inlet port, “B” for the lead outlet port, and “C” for the lag outlet port).

WHF sample collection consists of opening each designated sample port valve fully to allow the maximum restricted flow rate of approximately 150 to 200 ml/min to flow into a capture bucket for a few seconds to ensure organic matter or air bubbles have been flushed out of the system. Restrictors have been placed on the sampling lines to provide a smooth, non-turbulent stream at a low-flow rate to minimize loss of volatiles that may be present in the water stream. Next, the sampling team immediately fills three pre-preserved VOA vials to zero headspace. New Nitrile gloves were donned before collecting samples at each port. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface away from the shed or pump house GAC filter location after the samples were collected.

After filling the sample containers, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time were placed on each container and the container was placed in a plastic zipper bag. The bagged sample vials were placed into bubble wrap bags. Finally, the filled sample containers were placed into pre-iced shipping coolers to begin sample cooling to the required 4° centigrade sample preservation temperature prior to shipment to the analytical laboratory. One set of trip blanks were required and included per sample shipping cooler.

2.4 Monitoring Well Sampling Procedures

2.4.1 Monitoring Well Sampling Using Dedicated Bladder Pumps

Moses Lake monitoring well groundwater purging and sampling was performed in accordance with the Seattle District’s Low-Flow Ground Water Purging and Sampling SOP, prepared in March 1999 and revised on 1 Sep 2009. Data generated during purging were recorded on the MicroPurge/Low-Flow Sampling Log forms (Appendix C).

The team verified each monitoring well location and identification number with project maps and tables. They verified work can proceed safely in the vicinity of moving vehicular traffic, heavy industry, and other hazards as required. The team used a pry bar, socket wrench or pinhead hex wrench as needed to open each flush mount monitoring well cover plate, and a Masterlock #485 padlock key for the standard “stick-up” well completions. Prior to purging each well, the depth to static water level in each well was measured and checked periodically to monitor draw down as a guide to flow rate adjustment (no greater than 0.4 foot drawdown is permitted to prevent sampling stagnant casing water).

Purging operations at each well commenced once the following equipment was prepared: the MP20 MicroPurge® Controller equipped with an adjustable pressure regulator was connected to the Well Wizard® bladder pumps via air line and quick connect fittings. Another air line was quick-connected to a pressurized CO_2 cylinder to drive the pump. Pump flow rates were then adjusted during a "pre-purge" period to maximize withdrawal rates and minimize excessive drawdown in each well. The evacuated pre-purge volume at each well was intended to flush out a bladder pump and tubing volume prior to monitoring stabilization parameters. Finally, a QED MicroPurge® basics MP20 Flow Cell was connected to the pump's discharge line at ground surface to measure established stabilization parameters (pH, specific conductivity, temperature, DO, ORP, and turbidity).

Depth to water measurements during purging were monitored and recorded to verify that minimal drawdown occurred. A graduated measuring cup was used to determine the volume purged. Generally, acceptable low-flow rates are no greater than 500 milliliters per minute (ml/min.), and are typically closer to 400 ml/min. for the Well Wizard® bladder pump systems, depending upon the amount of water level drawdown detected during pumping at each well. Purge data was recorded on the micropurge logs every two minutes.

Low-flow purging continued until three consecutive measurements of the stabilization parameters met stabilization requirements.

Stabilization parameter requirements for all private well and bladder pump monitoring wells are as follows:

Temperature	+/- 0.2 ºC
Specific Conductivity	+/- 0.020 millisiemens/centimeter (mS/cm)
DO	+/- 0.2 milligrams/liter (mg/l)
pH	+/- 0.2 units
ORP	+/- 20 millivolts (mV)

At each monitoring well, groundwater sample collection would begin immediately after achieving stabilization of water quality parameters during low flow purging.

Prior to sample collection, the samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All groundwater samples were collected in pre-cleaned certified containers obtained from the analytical laboratory.

All sample containers were filled immediately following purging by disconnecting the flow-through cell from the pump tubing system, and capturing water directly from the discharge end of the tubing. All sample containers were carefully filled at a low-flow rate to minimize agitation. During sample collection, significant physical observations were recorded in the Micropurge/Low-Flow Sampling Log data forms and project field book as needed.

After filling the sample containers, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time were placed on each container and the container was placed in a plastic zipper bag. The bagged sample vials were placed into bubble wrap bags. Finally, the filled sample containers were placed into pre-iced shipping coolers to begin sample cooling to the required 4° centigrade sample preservation temperature prior to shipment to the analytical laboratory. One set of trip blanks were required and included per sample shipping cooler.

At the conclusion of groundwater sampling at each well, the flush mount well covers were bolted closed and stick up well caps padlocked.

2.4.2 Monitoring Well Sampling Using Passive Diffusion Bags

Passive diffusion bags (PDBs) were been selected by the Moses lake Project Delivery Team as the most appropriate, cost-effective method for groundwater sample collection from Moses Lake monitoring wells lacking dedicated bladder pumps. The PDBs were purchased from ALS Environmental laboratory under license by the US Geological Survey and The General Electric Company, both co patent-holders. The 1 ¼" diameter low-density polyethylene PDBs were pre-filled with 220 ml or 330 ml of ASTM Type II certified, laboratory-grade, deionized water. Each filled PDB was then heat sealed by the laboratory prior to shipment to USACE via overnight delivery in hermetically sealed pouches.

USACE ensures a minimum of 14 days of PDB equilibration time before returning to the Moses Lake site for groundwater sample collection per established PDB guidance. During this event, both sampling teams worked to collect the PDB samples as described in Section 2.5.3. PDB retrieval and sampling consisted of the following procedures:

1. The team verified each monitoring well location and identification number with project maps and the sample matrix. They verified work can proceed safely in the vicinity of moving vehicular traffic as required. The PDBs were prepared over clean sheets of aluminum foil prior to being placed into each well. The team used a pry bar, socket wrench or pinhead hex wrench as needed to open each flush mount monitoring well cover plate, and a Masterlock #485 padlock key for the standard “stick-up” monitoring well completions. The team donned new Nitrile gloves for groundwater sample collection.

2. The team carefully hauled each weighted PDB to the surface using the nylon suspension line. The sampling team carefully cut the top corner off each PDB and filled each sample vial. The team filled each vial just to overflowing and maintained a reverse meniscus. There was no down time once the PDB has been brought to the surface until sample collection was complete at each well. Any residual sample water in the used PDBs was discharged to ground surface.

3. Each PDB represented a unique sample ID number based on the well ID (and sample interval if two PDBs are deployed into one well). With the exception of the MS/MSD, all QC samples were submitted “blind” to the laboratory using a separate unique sample ID number not labeled as duplicate or trip blank per USACE standard sampling procedure. One set of trip blanks were required and included per sample shipping cooler. An extra laboratory- prepared

PDB was shipped to the site and was used for collection of the trip and field blanks at the direction of the USACE project chemist.

4. Once recovered and sampled the PDBs and suspension lines were be discarded as non-hazardous municipal waste. In addition, gloves, paper towels, bags, and other solid waste materials were disposed of as municipal waste. The PDBs and other solid waste material were placed into a large plastic garbage bag and tied securely prior to disposal. The stainless steel weights were decontaminated and returned to the Seattle District, USACE office.

5. Finally, the team securely capped and locked each monitoring well riser and cover plate when finished.

2.5 Sampling Event Activities and Observations

2.5.1 Team 1 Monitoring Well Bladder Pump Sampling

Groundwater sample collection commenced immediately after achieving stabilization of water quality parameters during low flow purging at each well using dedicated bladder pump systems as described previously. The team worked from the far north end of the Site, moving to the far south end sampling each designated well as it was encountered. The project well maps and sample matrix were used to ensure samples were collected at the correct locations. The team used one 15 lb. compressed CO_2 cylinder acquired from Oxarc in Moses Lake to drive the pump systems, airlines, pump controllers, and flow cells to conduct the sampling of dedicated bladder pumps.

During the November 2015 sampling event, Team 1collected groundwater samples from a pre-determined set of four monitoring wells fitted with dedicated bladder pumps: 91BW04, 92BW01, 99BW10, and 99BW18.

Even though a right of entry permit has been signed, and verbal or written permission granted to collect samples at each designated monitoring well, the sampling team always attempted to contact the property owner for each monitoring well location before beginning the field sampling activities.

During this sampling event, Port Security Manager Greg Becken provided terminal security area training to Mr. Marsh and Mr. Brookshier. Since Mr. Marsh had previously completed a background check, he was given a security badge so the team could pass through airport gates to inspect all monitoring wells within the restricted area without an escort. Mister Brookshier will be given a security badge at a later date. During the morning of 17 November 2015, water levels were measured in the following airport wells: 00BW12, 00BW03, 00BW02, 00BW11, 91BW02, 00BW08, and 00BW06. Static water levels were measured in all other project monitoring wells before completing the sampling event.

Other than property owner notifications, no special access procedures were required for any of the other bladder pump monitoring wells sampled during this event.

Prior to sample collection, the samplers donned protective eyewear and new, clean, Nitrile gloves to prevent exposure to contaminants and cross-contamination. All sample containers were filled immediately following low-flow purging by disconnecting the flow-through cell from the pump tubing system, and capturing pumped groundwater directly from the discharge end of the pump tubing. During sample collection, physical observations were recorded in the Micropurge/Low-Flow Sampling Log data forms.

Stabilization of water quality parameters during purging occurred within three to five readings (6 to 10 minutes) during this event. Measured temperatures ranged from 13.66°C at well 91BW04 to 15.06°C at well 92BW01. Specific conductivity ranged from 0.35mS/cm (well 99BW10) to 0.50 ms/cm (well 92BW01). Dissolved oxygen measurements ranged from 7.40 ppm (well 91BW04) to 10.0 ppm (well 92BW01). PH values varied slightly from 6.39 units (well 92BW01) to 7.22 units (well 91BW04). Oxygen reduction potential ranged from 67 mV (well 91BW04) to 96 mV (well 92BW01).

Significant Observations Made During Team 1 Bladder Pump Sampling

Team 1 experienced high winds and blinding dust storms making work difficult on 17 November 2015.

During water level measurements at well 91BW02, a petroleum odor was noted on the water meter cable that has not been detected previously (possibly due to reported active petroleum plume remediation activities conducted by contractor.

The property is for sale where flush-mounted well 04CW08 is located.

No other significant observations were made during this event.

2.5.2 Team 2 Private Well System Sampling

While environmental field team 1 worked independently on their set of wells, Team 2 collected samples at their own pre-assigned set of 10 whole house filter well system sample ports, five private well system hose bibs, and 14 PDB monitoring wells requiring sampling and/or PDB installation for the next sampling event.

During the period of 16-19 November 2015, Team 2 collected groundwater samples from the following 10 private well systems with whole house filters installed: WP-14, WP-70, WP-83, WP-86, WP-119, WP-121, WP-123, WP-124, WP-125, and WP-129. During that same time period, they collected groundwater samples from the following five private well systems: WP-27, WP-116, WP-131, WP-167, and WP-168.

All required 40 ml VOA sample vials were obtained from Vendor ESS by the USACE contract lab ARI, and delivered to USACE pre-preserved with maleic and ascorbic acid.

Trip blanks were sent inside each sample shipping cooler delivered to the analytical lab.

Upon arrival at each private well property designated for sample collection, the team verified they were at the correct address using maps, notes, and the sampling matrix, and verified through field documentation they were ready to collect samples at the correct sampling point (hose bib, or suitable water discharge port nearest to the wellhead. The team always attempted to contact the owner or resident at each private well location before beginning the field sampling activities.

Per modified SOP, sampling point valves were opened, and water allowed to flow at approximately 0.5 gpm into a capture bucket. Next, water temperature readings were measured every two minutes until stabilization was achieved. During the November sampling event, water temperature stabilization ranged from 4 to 8 minutes elapsed purging time with most locations reaching stabilization within six minutes as shown in Table 1 below.

Table 1: Private Well Stabilized Water Temperatures and Purge Times

Well Location ID	Stable Temp. °C	Total Purge Time (Minutes)
WP-14	17.8	6
WP-27	15.1	6
WP-70	13.9	6
WP-83	14.3	6
WP-86	13.0	6
WP-116	15.9	6
WP-119	na	na
WP-121	11.3	4
WP-123	10.2	6
WP-124	13.6	6
WP-125	15.8	6
WP-129	13.7	8
WP-131	13.5	4
WP-167	13.9	6
WP-168	17.2	6

Upon achieving stabilization, the final stabilized readings were entered into the project field book. Prior to collecting a water sample, the flow rate at each tap was reduced to approximately 100 to 200 ml/min. to minimize sample aeration and turbulence. The sampling team donned new Nitrile gloves prior to sample collection at each residence. In the case of the WHF sample ports, restrictors on the sample ports provided a stream of sample water at approximately 150 to 200 ml/min. All sample containers were be filled with water directly from each tap – forming a meniscus at the top of each vial to provide zero headspace samples as required. A photographic record of each sample point was made by the team.

Significant observations made during Private Well/WHF Sampling

Team 2 experienced high winds and blinding dust storms making work difficult on 17 November 2015.

The sampling team had to (b) (6) [redacted] WP-131. Samples were collected from the front yard spigot (b) (6) [redacted]

(b) (6) [redacted] at WP-83.

No other significant observations were made during this event.

2.5.3 Passive Diffusion Bag Sampling and Deployment

Both USACE environmental field teams split up the effort of PDB sample collection and the deployment of new pre-filled PDBs in a pre-determined set of 24 monitoring wells during the November 2015 event.

The selected PDB wells were: 02-BW01; 04-BW09; 04-CW05; 04-CW07; 12-BW02; 12-BW03; 12-BW04; 12-BW05; 12-BW06; 12-BW07; 12-BW08; 12-CW01; 12-CW02; 12-CW03; 12-CW04; 12-CW05; 12-EX01; 12-EX02; 14BW01, 14BW02, 14BW03, 14EX03, 14EX04, and 14EX05.

All required 40 ml VOA sample vials were obtained from Vendor ESS by the USACE contract lab ARI, and delivered to USACE pre-preserved with maleic and ascorbic acid.

The teams first verified each monitoring well location and identification number with project maps and the sample matrix. The teams also verified that work could proceed safely in the vicinity of moving vehicular traffic or other physical, biological, or environmental hazards that may have been present near each monitoring well.

Each team member donned new Nitrile gloves for groundwater sample collection at each well. Once the wells were unlocked and opened, one team member lifted the well riser plug and began hauling the PDB vertically to the surface.

Once each PDB was raised to the surface, the sampling team worked together to carefully cut the top corner off each bag using decontaminated steel scissors. Next, one person held the open sample vials and the other carefully and slowly tilted the bags - open side down - toward each open sample vial. The pre-preserved vials were filled just to overflowing to maintain a reverse meniscus. Then the vials were immediately capped making sure there were no bubbles or headspace per standard VOC sampling procedure. This entire sampling process can be completed within one minute to minimize loss of volatiles while preventing introduction of contaminants into the water from surface sources. After all required vials were filled; any residual sample water remaining in the used PDBs was discharged to ground surface. Therefore, no Investigation-derived waste (IDW) water was generated during this sampling event.

The sampling teams continued use of protective mesh PDB sleeves in wells with steel risers due to a greater potential for damage to the PDB membranes (monitoring wells 12EX01, 12EX02, 14EX03, 14EX04, and 14EX05).

Once recovered and sample water removed, the PDBs and suspension lines were discarded as non-hazardous municipal waste. In addition, gloves, paper towels, bags, and other solid waste materials were disposed of as municipal waste. The PDBs and other solid waste material were placed into a large plastic garbage bag and tied securely prior to disposal. The stainless steel weights were decontaminated and reused during the deployment of the new pre-filled PDBs for the next sampling event.

After collecting water samples from the PDBs, the teams deployed PDB assemblies into the same set of 24 monitoring wells selected for groundwater sampling.

Two sizes of PDBs were ordered: The bags consisted of the standard 220 ml size, and a larger 330 ml bag selected to accommodate primary and field duplicate samples where required. In some wells, two 330 ml PDBs were connected in tandem and lowered to the mid-screen depth to accommodate primary, field duplicate, and MS/MSD sample volumes as required. Two PDBs were installed at two mid-screen depths if a designated well had two screened intervals (as found in wells 04CW07, 12BW03, and 12BW04). All PDBs and stainless steel anchor weights were purchased from ALS Environmental, and shipped to the District office by UPS overnight delivery.

Following the established PDB deployment procedures, both environmental team members worked together using a table of Moses Lake monitoring well logs to determine the number of required weights, length of nylon suspension line, and number of PDBs required at each designated well. Wells deeper than 200 feet generally required two steel weights to allow proper PDB positioning. Each team member donned a new pair of Nitrile gloves prior to working on PDB assemblies at each well. Steel weights, suspension lines, and PDBs were quickly assembled on a strip of clean aluminum foil on the tailgate of the sampling vehicle. The prepared assembly of PDB, suspension lines, and weights was lowered into place at each well within 10 to 15 minutes to reduce the possibility of contaminants entering the diffusion bags during deployment.

At each specific well, the team lowered the weight into the well first, followed by the suspension line and PDB. The team worked to keep the assembly centered within the well casing as they slowly lower it to the well bottom. When the team felt the weight hit well bottom, they pulled up the line approximately one foot and tied it off securely to the casing plug or well cap. This method ensured the PDB would always be centered at the mid-well screen depth. Finally, the well cap was locked, or the cover plate secured with locking bolts depending on type of well encountered – stick up or flush mount.

All laboratory-filled PDBs arrived at the USACE office in good condition prior to field deployment. Each PDB was packed in groups of 10 into sealed foil pouches to prevent inadvertent contamination until deployment into the designated monitoring wells. No specific difficulties or problems were noted during PDB deployment.

Significant Observations Made During Passive Diffusion Bag Sampling

Numerous rust particles were observed on the PDBs and PDB suspension lines installed in wells 14EX03 and 14EX04.

No other significant observations were made during this event.

3.0 Investigation-Derived Waste

No investigation-derived waste was generated during this sampling event. All residual PDB water or purged well water was transferred directly to ground surface on each property away from the sample collection point.

4.0 SAMPLE PACKAGING AND DELIVERY

As mentioned in the narrative of each sampling event, groundwater samples were packaged in shipping coolers on ice and under chain of custody for overnight shipment to the USACE contract laboratory Analytical Resources, Inc. during the course of the sampling event.

All sample shipping coolers were prepared for laboratory delivery in the following manner: Each cooler was lined (sides and bottom) with plastic "bubble-wrap" sheets for shock absorption. A large 30-gallon plastic garbage bag was then placed into the cooler to contain the sample water in the event of container breakage during shipment to the laboratories. The glass sample vials were labeled, placed into plastic zip-seal bags, and placed into foam shipping blocks or bubble-wrap bags for shock protection. All the samples were placed in the shipping coolers as indicated on the corresponding chain of custody forms. Gallon size plastic zipper bags of cubed ice bags were placed between and on top of the samples in each cooler to ensure maintenance of the required four degrees centigrade (plus/minus two degrees) sample preservation temperature. The completed chain of custody (COC) forms were placed in gallon size plastic zipper bags and taped to the inside of each cooler lid. Two custody seals were affixed to the outside of each cooler. The custody seals were placed so that the coolers could not be opened without breaking the seals. Each cooler was then securely sealed with fiber tape. The field team ensured drain plugs were securely taped inside and out to prevent possible water leakage.

The laboratory was informed of the sample delivery and ensured the samples were properly accepted and checked in upon receipt the following morning after the sample containers were shipped. All sample coolers and sample containers were accounted for at the contract laboratory following each shipment.

5.0 LABORATORY ANALYSIS

Chemical analyses performed on the samples were as follows: VOCs (Method 524.3).

6.0 DECONTAMINATION PROCEDURES

PDB weights, flow cells and associated tubing, water level indicator meters, and water volume measurement containers used by each team were decontaminated at the end of the project with an Alconox®-water solution followed by triple rinsing using distilled water in the USACE Geology Laboratory.

7.0 PROTECTION LEVEL

All sampling activities were conducted under Worker Protection Level D. For this project, personnel protective equipment included reflective safety vests, safety splash protection glasses, Nitrile gloves, and safety steel toe boots. New pairs of Nitrile gloves were donned prior to handling acid-preserved sample containers and between each unique private well sample point or monitoring well.

End of Field Sampling Report

APPENDIX A

Site and Well Location Maps
(Available in USACE Files)

APPENDIX B

Field Sampling Photos

PROJECT: Moses Lake Wellfield Superfund Site – November 2015 Groundwater Sampling.

151116-00BW14-01

With utility cover removed, Matthew Brookshier prepares to collect a water level reading at well 00BW14.

151116-00BW09-01

Well site 00BW09 showing new lift equipment parked close to the monitoring well.

Photographer: Joseph Marsh

PROJECT: Moses Lake Wellfield Superfund Site – November 2015 Groundwater Sampling.

151118-12EX01-01

Matthew Brookshier prepares a new pre-filled PDB for deployment in well 12EX01.

151119-99BW11-01

Matthew Brookshier opening the flush-mounted well cover at 99BW11 for water level readings in the vicinity of antique farm equipment.

Photographer: Joseph Marsh [redacted]

APPENDIX C

Field Notes
(Micropurge Logs Available in USACE Files)

SEATTLE DISTRICT, USACE

ENVIRONMENTAL SAMPLING

FIELD LOG BOOK

Project: MOSES LAKE WELLFIELDS

MONITORING WELL SAMPLING

Book 5

FY14-
FY15

Rite in the Rain®

ALL-WEATHER

ENVIRONMENTAL
FIELD BOOK

№ 550F

NOV-2014
EVENT

Project: Moses Lake Wellfield
November 2015 Groundwater sampling

Team: Joseph Marsh
Matt Brookshier

SAMPLING TABLE

WELL	SAMPLE ID	(2015) DATE	TIME	VOCs (524.3) 3 x 40ml VOA w/ mal. Ascorbic Acid	
91BW04	15MLW1117N91BW04	11-17	~~1054~~ 1254	9	MS/MSD
91BW04	15MLW1117D91BW04	11-17	~~1112~~ 1300	3	F.D.
92BW01	15MLW1117N92BW01	11-17	1059	3	
99BW10	15MLW1117N99BW10	11-17	1430	3	
99BW18	15MLW1117N99BW18	11-17	1350	3	
Trip Blank	15MLW1117TB04	11-17	1500	2	

All samples on this page shipped in cooler A1 for delivery to ARI

Moses Lake Wellfield
November 2015 sampling Event

Sample Table Continued...

WELL	SAMPLE TIME	(2015) DATE	TIME	VOCs 524.3	
12CW04	15MLW1118N12CW04	11-18	0830	3	
14EX05	15MLW1118N14EX05	11-18	1127	3	
14BW03	15MLW1118N14BW03	11-18	1109	3	
04BW09	15MLW1118N04BW09	11-18	1022	3	
12EX01	15MLW1118N12EX01	11-18	0958	3	
12BW07	15MLW1118N12BW07	11-18	0945	3	
12BW05	15MLW1118N12BW05	11-18	0848	3	
04CW05	15MLW1118N04CW05	11-18	0914	9	MS/MSD
04CW05	15MLW1118D04CW05	11-18	0928	3	
12CW03	15MLW1118N12CW03	11-18	1237	3	
12BW04A	15MLW1118N12BW04A	11-18	1251	3	
12BW04B	15MLW1118N12BW04B	11-18	1254	3	
POB Trip Blank	15MLW1118PDTB02	11-18	1300	3	
Trip blank	15MLW1118TB07	11-18	1255	2	
Field Blank (If Needed)	15MLW1118FB03	—	—	~~3~~	

All samples on this page shipped in Cooler A2 for delivery to ARI.

Moses Lake Wellfield November 2015
Field Notes

Team: Joseph Marsh 11-16-15
Matt Brookshier

1242
~~1142~~ onsite – Static water levels

99BW16 = 124.61'
91AW14 = 123.89'
04BW04 = ~~139~~ 138.85'
04CW01 = 165.0'
04CW02 = 166.51'
04BW05 = 130.79'
91AW17 = 118.50'
99BW12 = 113.37'
04BW01 = 65.59'
01BW07 = 66.34'
00BW05 = 65.51'
00BW14 = 57.34' → Add offset of ~~2.5~~ 2.15"
00BW01 = 47.77'
00BW07 = 69.71'
1435 ~~1335~~ 00BW04 = 64.15' Next to reference Vault
00BW09 = 71.60'

WP-86 ~~[illegible]~~ residents have not been alerted to our visit

02BW02 = 69.21'
99AW-08 = 64.54
99BW15 = 69.94'

99BW14 = 57.63'

*Talked to (b) (6) - ok to work JM

Moses Lake Wellfield
NOV. 2015 11-16-15 to 11-17-15

1551 99BW-10 = 73.17'
Church 00BW10 = 138.63'

Back to Genie to measure survey pt. 15" even to monument well 00BW04 4 5/8" top of PVC.

1700 end of Day.

JM

11-17-15

~~Arrive on site near~~

0730 – start with buying 2 Bags 10 Lbs ea. Ice. Mob to water level readings.
Picked up 1 ~~10~~ 15 Lb. CO_2 at OXARC.

0818 04BW06 = 105.87'
91BW03 = 89.90'
04CW03 = 145.05'
99BW01 = 90.05'
99AW01 = 89.57'
91AW07 = 88.99'
00AW11 = 83.98'

0930 Badging at Port security office for Airport unescorted entry

1030 - Setup at 92BW01 for sampling. dedicated Bladder pump. pre purging, then micropurge to Stability.

1059 = Sample time, close + lock well

SWL 92BW02 = 88.02' 1115 hrs.

- Lunch

1225 - Mob. to 91BW04

pre purging ~~to Stability~~ then Micropurge to Stability.

1254 = Sample time (P)

1308 = Sample time (FD)

Close + lock well. Mob. to next well

SWL @ 99AW09 = 97.73'

setup @ 99BW18 - prepurging ~~to Stability~~ Micropurge to Stability

1350 = Sample time, close + lock well

1410 Mob. to 99BW10 Prepurging then micropurge to Stability.

High winds today - Blowing dust.

1430 = Sample time.

Close + lock well

SWL @ 02BW01 = 130.97'

(PDB installed)

SWL @ 04CW07 = 147.42'

(PDB installed)

11-18-15 Marsh + Brookshier

0730 Buying 2 ea 10 lb Ice at Safeway

0755 - Return used CO_2 bottle to OXARC

12CW04 101.71' SWL

one PDB - one sample - new

1 PDB installed (220ml)

0830 = Sample time close + lock well

mob. to 12BW05 89.64' SWL.

one PDB pulled - samples collected

1 PDB installed (220ml)

0848 = Sample time, close + lock well

Mob to 04CW05 SWL = 99.54'

pull dual 330ml Bags.

0914 Primary time Sample

0928 FD Time replace one 220ml PDB per plan - Close + lock well

Moses Lake Wellfield

11-18-2015

Mob. to 12BW07 SWL = 89.10'
Pull one PDB, deploy one 220ml PDB
0945 = Sample time, close + lock well

Mob to 12EX01 SWL = 89.06'
pull one PDB - deploy one 220ml PDB
0958 = sample time, close + lock well

Mob. to 04BW09 SWL = 84.93'
pull one PDB - install one New 220ml bag
1022 = Sample time
close + lock well

-Break-
Mob. to 14BW03 SWL = 87.29'
Pull one PDB + replace with ~~one 220ml~~ 2 330ml Bags
1109 = Sample time, close/lock well.
Mob to 14EX05 SWL = 87.22'
pull one PDB + replace with one 220ml
1127 = Sample time, Close + lock well

1145-1215 Lunch
1230 - mob. to 12BW04 SWL = 99.28'
Pull A + B Bags
replace with same
1251 "A" Sample time, close + lock well.
1254 "B" Sample time.

Moses Lake Wellfield 11-18-15

Mob. to 12CW03 SWL = 108.54'
pull one PDB replace with one 220
1237 = Sample time close + lock well
Mob to Fedex
~~water~~
Cooler A2 Shipped with today's Samples
Water levels Airport wells

1353	00BW12	81.68'	
	00BW03	84.52'	
	00BW02	86.07	
	00BW11	93.20'	
	00BW08	91.82'	
	91BW02	93.20'	→ Petroleum Odor (chemical)
	00BW06	149.02'	
	12BW01	84.99'	
	00BW13	84.60'	
	00BW15	79.70'	
	04CW04	127.52'	
	04BW07	125.02'	
	00BW16	136.23'	

1600 - end of day

[signature]

Mozes Lake Wellfield 11-19-15
Team 1 Notes

0730 Depart hotel for water level readings. 2 left for this (b) (6) [redacted] event.

04CW08 = 145.09'
New bolt added to lid (PDB installed)

99BW11 = 54.09' (b) (6) [redacted] added to lid
dedicated B.P. well

Project: Moses Lake Wellfield
Groundwater Sampling

Book 7

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ALL-WEATHER
ENVIRONMENTAL
FIELD BOOK
№ 550F

FY 15/16 MAY 2015 Thru

TEAM 2

Location Moses lake Date 11/16/15
Project / Client Nov. Sampling
Haskins, Williams

Sample ID	2015 Date	Time	VOCs	Notes
15MLWIIIW02BWC1	11/16	1245	3	
N04CW07A	11/16	1305	3	
N04CW07B	11/16	1320	3	
N12EX02	11/16	1400	~~3~~ 9	MS/MSD
D12EX02	11/16	1420	3	
NWP27	11/17	0830	3	Fix date
N12CW01	11/17	0900	3	
N12BW02	11/17	0930	3	install
N12BW06	11/17	0950	3	2-3 30 bags
N12CW05	11/17	1020	3	
N12CW02	11/17	1040	3	
~~KQ~~TB05	11/17	–	2	
PDTB01	11/17	1130	3	

Tracking shipment 8055 1111 8710

Location Moses lake Date
Project / Client Nov. Sampling 2015

Sample ID	2015 Date	Time	VOCs	Notes
N12BW08	11/16	1450	~~3~~ 9	
D12BW08	11/16	1510	3	
NWP86A1	11/17	1240	3	
NWP129A1	11/17	1315	3	
NWP129B1	11/17	1310	3	
NWP129C1	11/17	1305	3	
NWP123A1	11/17	1340	3	
NWP123B1	11/17	1345	3	
NWP123C1	11/17	1350	3	
NWP125A1	11/17	1410	3	
NWP125B1	11/17	1415	3	
NWP125C1	11/17	1420	3	
NWP116	11/17	1440	3	
~~NWL~~ TB06				

Location: Moses Lake Date

Project / Client: Nov. 2015 Sampling

Sampling ID	2015 Date	Time	VOC	Notes
• NWP124A1	11/17	1500	3	
• NWP124B1	11/17	1505	3	
• NWP124C1	11/17	1510	3	
• N12BW03A	11/18	0810	3	
• N12BW03B	11/18	0815	3	
• N14BW02	11/18	0835	3	
• N14EX04	11/18	0900	3	
• N14BW01	11/18	0930	3	
• N14EX03	11/18	0945	3	
~~NWP70A1~~	~~11/18~~	~~1115~~	~~3~~	
• NWP119A1	11/17	1525	3	
• NWP119B1	11/17	1530	3	
• NWP119C1	11/17	1535	3	
~~NWP04~~	~~11/18~~		~~9~~	~~MS/MSD~~
~~DWP04~~	~~11/18~~		~~3~~	
~~NWP131~~	~~11/19~~		~~3~~	
⁚ NWP121A1	11/19	0845	9	MS/MSD
• DWP121A1	11/19	0840	3	
TB	11/19		2	—

Location: Moses Lake Date: 11/16

Project / Client: Haskins, Williams

02BW01
WL: 130.02
Sample time 1245

04CW07
WL: 147.23
Sample time A 1305
B 1320

12EX02
WL: 117.14
sample: N 1400
D 1420

12BW08
WL: 117.03
sample: N: 1450
D: 1510

Location Moses Lake Date 11/7

Project / Client

WP-27 0820

Time				
Temp	15.1	15.1	15.1	15.1

Sample time: 0830
purged ~2 gal

12CW01
WL: 135.75
Sample: 0900

12BW02
WL: 113.93
Sample 0930

12BW06
WL: 115.43
Sample 0950
Install 2 330bags

12CW05
WL: 141.05
Sample 1020

Location Moses Lake Date 11/17

Project / Client

12CW02
WL: 154.69
Sample 1040

WP-86 0521982.0

Time	0	2	4	6
temp	13.0	13.0	13.0	13.0

Purged: 7 gal
sample ~~A~~ A part: 1240

(b) (6)
[redacted]

WP-129

Time	0	2	4	6	8
Temp	13.0	13.6	13.7	13.7	13.7

purged from front of house. purged ~6 gal

Total 854~~4~~4.0

A: 1315
B: 1310
C: 1305

Project / Client

Cee

WP-123

Time	0	2	4	6
Temp	10.2	10.2	10.4	10.2

purged 15 gal before timing
totalizer 186156.5

A 1340
B 1345
C 1350

WP-125

Time	0	2	4	6
Temp	15.8	15.8	15.9	15.8

totalizer 198061.9
water was in use when we got here.

A 1410
B 1415
C 1420

WP-116

Time	0	2	4	6
Temp	15.9	15.9	15.9	15.9

Project / Client

owner stated (b) (6) had been watering lawn for a few hours.
purged ~3 gal

Sample 1440

WP-124 totalizer 0237056.1

Time	0	2	4	6
Temp	13.6	13.4	13.6	13.6

purged from side of house
purged 10 gal.
A 1500
B 1505
C 1510

WP-119
No purge wind was bad
ran C for a minute to stabilize temp
167767.1

A 1525
B 1530
C 1535

Project / Client

12BW03

WL: 126.74'
A 0810
B 0815

14EX04 rust on rope & bag

sample 0900

14BW02

WL: 106.01
Sample 0835

14BW01
WL: 95.01
sample 0930
small bubbles on inside of bag

14EX03

WL: 95.26
Sample 0945

Project / Client

WP-70

Time	0	2	4	6
Temp	14.0	13.8	13.9	13.9

purged ~3gal
some fertilizer smell

~~total~~ totalize 205250.0
Sample time: 1115

WP 83 Totalizer: 1,790463.2

Time	0	2	4	6
Temp	14.2	14.3	14.3	14.3

(b) (6) [redacted]

purged ~10gal

Got RCE

 Location Moses Lake Date

Project / Client

WP-14

Time	0	2	4	6
Temp	17.8	17.8	17.5	17.8

Sample N 1400
P 1410

Total: 1459533.1

WP-167

Time	0	2	4	6
Temp	13.8	13.8	13.9	13.9

Sample time 1440

purged 10 gal first then
Started timing
then purged 10 more

WP-168

Time	0	2	4	6
Temp	17.2	17.2	17.2	17.2

~ 5 gal

Sample 1500

 Location Date

Project / Client

took Equip Blank through
hose ~~with~~ after WP-168
EB01

WP-121 Totalizer 57441.1

Time	0	2	4	6
Temp	11.2	11.2	11.3	

Regular
FD AD 0840
A 0845
B 0900
C 0850

WP-131
(b) (6) [redacted] took
Sample from front of house
(b) (6) [redacted]

Time	0	2	4	6
Temp	14.7	13.6	13.5	

purged 10 gal before
timing
Time 0920

Location ______ Date ______

Project / Client ______

Sample ID	(2015) Date	Time	Voc	Notes
NWP70A1	11/18	1115	3	
NWP 83A1	11/18	1330	3	
NWP 14A1	11/18	1400	9	
DWP 14A1	11/18	1410	3	
NWP 16A	11/18	1440	3	
NWP 16B	11/18	1500	3	
EB01	11/18	1510	3	
NWP 121B1	11/19	900	3	
NWP 121C1	11/19	850	3	
NWP 131	11/19	920	3	
TB02	11/19	–	2	

Location ______ Date ______

Project / Client ______

APPENDIX B – Comprehensive 2015 Analytical Results

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
Monitoring Well																		
00AW11	14MLW1119N00AW11	N	11/19/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	1.70 R	0.20 R							
00AW11	15MLW0225N00AW11	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.33	0.20 U							
00AW11	15MLW0509N00AW11	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.17	0.20 U							
00AW12	15MLW0505N00AW12	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00AW13	14MLW1120N00AW13	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00AW13	15MLW0226N00AW13	N	2/26/2015									1.0 U						
00AW13	15MLW0510N00AW13	N	5/10/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00AW14	15MLW0505N00AW14	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW01	14MLW1116N00BW01	N	11/16/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW01	15MLW0505D00BW01	FD	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW01	15MLW0505N00BW01	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW02	14MLW1118N00BW02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.24	0.20 U							
00BW02	15MLW0224N00BW02	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.22	0.20 U							
00BW02	15MLW0506N00BW02	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
00BW03	14MLW1118N00BW03	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW03	15MLW0506N00BW03	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW04	15MLW0504N00BW04	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW05	14MLW1116N00BW05	N	11/16/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW05	15MLW0505N00BW05	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW06	14MLW1118N00BW06	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW06	15MLW0224D00BW06	FD	2/24/2015										0.0300 U	0.00396 J	0.0439	0.0404	0.0100 U	0.0101 J
00BW06	15MLW0224N00BW06	N	2/24/2015										0.0300 U	0.00332 J	0.0412	0.0384	0.0100 U	0.00897 J
00BW06	15MLW0507N00BW06	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.11 J	0.20 U							
00BW07	14MLW1116N00BW07	N	11/16/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW07	15MLW0504N00BW07	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW08	15MLW0507N00BW08	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW09	14MLW1117N00BW09	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW09	15MLW0504N00BW09	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW10	14MLW1119N00BW10	N	11/19/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R							
00BW10	15MLW0511N00BW10	N	5/11/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW11	14MLW1118N00BW11	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW11	15MLW0224N00BW11	N	2/24/2015									1.0 U						
00BW11	15MLW0506N00BW11	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW12	14MLW1118N00BW12	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	19.1	0.20 U							
00BW12	15MLW0224N00BW12	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.5	0.20 U							
00BW12	15MLW0506D00BW12	FD	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	15.6	0.20 U							
00BW12	15MLW0506N00BW12	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	17.1	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
00BW13	14MLW1120N00BW13	N	11/20/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R							
00BW13	15MLW0509N00BW13	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW14	14MLW1117N00BW14	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW14	15MLW0505N00BW14	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW15	14MLW1119N00BW15	N	11/19/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.27 R	0.20 R	1.82 R	0.20 R							
00BW15	15MLW0225N00BW15	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U	1.97	0.20 U							
00BW15	15MLW0509N00BW15	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U	1.84	0.20 U							
00BW16	14MLW1120N00BW16	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
00BW16	15MLW0226N00BW16	N	2/26/2015									1.0 U						
00BW16	15MLW0510N00BW16	N	5/10/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
01BW01	14MLW1116N01BW01	N	11/16/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
01BW01	15MLW0505N01BW01	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
02BW01	14MLW1119N02BW01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.2	0.20 U							
02BW01	15MLW0225N02BW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	12.2	0.20 U							
02BW01	15MLW0506N02BW01	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	10.9	0.20 U							
02BW01	15MLW0817D02BW01	FD	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.0	0.20 U							
02BW01	15MLW0817N02BW01	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.2	0.20 U							
02BW01	15MLW1116N02BW01	N	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.5	0.20 U							
02BW02	14MLW1117D02BW02	FD	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
02BW02	14MLW1117N02BW02	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
02BW02	15MLW0508N02BW02	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW01	14MLW1121N04BW01	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW01	15MLW0504D04BW01	FD	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW01	15MLW0504N04BW01	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW04	14MLW1117N04BW04	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.44	0.20 U							
04BW04	15MLW0223N04BW04	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.43	0.20 U							
04BW04	15MLW0504N04BW04	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.35	0.20 U							
04BW05	14MLW1117N04BW05	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.53	0.20 U							
04BW05	15MLW0223N04BW05	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.69	0.20 U							
04BW05	15MLW0504N04BW05	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.24	0.20 U							
04BW06	14MLW1117N04BW06	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	2.82	0.20 U	14.5	0.20 U							
04BW06	15MLW0223N04BW06	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	2.72	0.20 U	13.4	0.20 U							
04BW06	15MLW0504N04BW06	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	2.51	0.20 U	11.8	0.20 U							
04BW07	14MLW1117N04BW07	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW07	15MLW0504N04BW07	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04BW09	14MLW1119N04BW09	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	35.6	0.20 U							
04BW09	15MLW0225N04BW09	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	32.6	0.20 U							
04BW09	15MLW0505N04BW09	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.6	0.20 U							
04BW09	15MLW0819N04BW09	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	25.1	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
04BW09	15MLW1118N04BW09	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	29.0	0.20 U							
04CW01	14MLW1117N04CW01	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.56	0.20 U							
04CW01	15MLW0223N04CW01	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.61	0.20 U							
04CW01	15MLW0504N04CW01	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.62	0.20 U							
04CW02	14MLW1117N04CW02	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04CW02	15MLW0504N04CW02	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04CW03	14MLW1117N04CW03	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.19	0.20 U							
04CW03	15MLW0223N04CW03	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.90	0.20 U							
04CW03	15MLW0504N04CW03	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.15 J	0.20 U	2.37	0.20 U							
04CW04	14MLW1117N04CW04	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.41	0.20 U							
04CW04	15MLW0223D04CW04	FD	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.49	0.20 U							
04CW04	15MLW0223N04CW04	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.42	0.20 U							
04CW04	15MLW0504N04CW04	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.38	0.20 U							
04CW05	14MLW1119N04CW05	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.07	0.20 U							
04CW05	15MLW0224N04CW05	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.79	0.20 U							
04CW05	15MLW0505N04CW05	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.17	0.20 U							
04CW05	15MLW0819N04CW05	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.37	0.20 U							
04CW05	15MLW1118D04CW05	FD	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.83	0.20 U							
04CW05	15MLW1118N04CW05	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.29	0.20 U							
04CW07	14MLW1119N04CW07A	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	6.27	0.20 U							
04CW07	14MLW1119N04CW07B	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.20	0.20 U							
04CW07	15MLW0225N04CW07A	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	7.16	0.20 U							
04CW07	15MLW0225N04CW07B	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.82	0.20 U							
04CW07	15MLW0506N04CW07A	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.14	0.20 U							
04CW07	15MLW0506N04CW07B	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.29	0.20 U							
04CW07	15MLW0817N04CW07A	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.46	0.20 U							
04CW07	15MLW0817N04CW07B	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.60	0.20 U							
04CW07	15MLW1116N04CW07A	N	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	6.47	0.20 U							
04CW07	15MLW1116N04CW07B	N	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	6.79	0.20 U							
04CW08	14MLW1120N04CW08	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04CW08	15MLW0506D04CW08	FD	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
04CW08	15MLW0506N04CW08	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
12BW01	14MLW1121N12BW01	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
12BW01	15MLW0505N12BW01	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
12BW02	14MLW1118N12BW02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.57	0.20 U							
12BW02	15MLW0224N12BW02	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.02	0.20 U							
12BW02	15MLW0506N12BW02	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	7.99	0.20 U							
12BW02	15MLW0817N12BW02	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.02	0.20 U							
12BW02	15MLW1117N12BW02	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.93	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
12BW03	14MLW1118D12BW03B	FD	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.60	0.20 U							
12BW03	14MLW1118N12BW03A	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.94	0.20 U							
12BW03	14MLW1118N12BW03B	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.64	0.20 U							
12BW03	15MLW0223N12BW03A	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.86	0.20 U							
12BW03	15MLW0223N12BW03B	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.66	0.20 U							
12BW03	15MLW0504N12BW03A	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.07	0.20 U							
12BW03	15MLW0504N12BW03B	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.45	0.20 U							
12BW03	15MLW0818N12BW03A	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.21	0.20 U							
12BW03	15MLW0818N12BW03B	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.56	0.20 U							
12BW03	15MLW1118N12BW03A	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.62	0.20 U							
12BW03	15MLW1118N12BW03B	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.55	0.20 U							
12BW04	14MLW1118D12BW04A	FD	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20.3	0.20 U							
12BW04	14MLW1118N12BW04A	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20.8	0.20 U							
12BW04	14MLW1118N12BW04B	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.4	0.20 U							
12BW04	15MLW0224N12BW04A	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	19.9	0.20 U							
12BW04	15MLW0224N12BW04B	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.2	0.20 U							
12BW04	15MLW0505N12BW04A	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	16.5	0.20 U							
12BW04	15MLW0505N12BW04B	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	17.0	0.20 U							
12BW04	15MLW0819N12BW04A	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.6	0.20 U							
12BW04	15MLW0819N12BW04B	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.0	0.20 U							
12BW04	15MLW1118N12BW04A	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	24.0	0.20 U							
12BW04	15MLW1118N12BW04B	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.5	0.20 U							
12BW05	14MLW1119N12BW05	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	106	0.20 U							
12BW05	15MLW0224N12BW05	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	98.3	0.20 U							
12BW05	15MLW0506N12BW05	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	68.7	0.20 U							
12BW05	15MLW0819N12BW05	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	77.0	0.20 U							
12BW05	15MLW1118N12BW05	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	89.3	0.20 U							
12BW06	14MLW1118N12BW06	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.14	0.20 U							
12BW06	15MLW0223N12BW06	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.97	0.20 U							
12BW06	15MLW0506N12BW06	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.67	0.20 U							
12BW06	15MLW0818N12BW06	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.56	0.20 U							
12BW06	15MLW1117N12BW06	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.23	0.20 U							
12BW07	14MLW1119N12BW07	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	71.2	0.20 U							
12BW07	15MLW0225N12BW07	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	65.0	0.20 U							
12BW07	15MLW0505N12BW07	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	51.4	0.20 U							
12BW07	15MLW0819D12BW07	FD	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	65.5	0.20 U							
12BW07	15MLW0819N12BW07	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	54.0	0.20 U							
12BW07	15MLW1118N12BW07	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	69.7	0.20 U							
12BW08	14MLW1118N12BW08	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.49	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
12BW08	15MLW0224N12BW08	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.78	0.20 U							
12BW08	15MLW0506N12BW08	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.00	0.20 U							
12BW08	15MLW0817N12BW08	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.34	0.20 U							
12BW08	15MLW1116D12BW08	FD	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	10.5	0.20 U							
12BW08	15MLW1116N12BW08	N	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.77 J+	0.20 U							
12CW01	14MLW1118N12CW01	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.58	0.20 U							
12CW01	15MLW0224N12CW01	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.70	0.20 U							
12CW01	15MLW0506N12CW01	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.29	0.20 U							
12CW01	15MLW0817N12CW01	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.24	0.20 U							
12CW01	15MLW1117N12CW01	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.43	0.20 U							
12CW02	14MLW1118N12CW02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
12CW02	15MLW0223N12CW02	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.36	0.20 U							
12CW02	15MLW0504N12CW02	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
12CW02	15MLW0818N12CW02	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.25	0.20 U							
12CW02	15MLW1117N12CW02	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.39	0.20 U							
12CW03	14MLW1118N12CW03	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
12CW03	15MLW022N12CW03	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.37	0.20 U							
12CW03	15MLW0505N12CW03	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
12CW03	15MLW0819N12CW03	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
12CW03	15MLW1118N12CW03	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.42	0.20 U							
12CW04	14MLW1119D12CW04	FD	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.70	0.20 U							
12CW04	14MLW1119N12CW04	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.68	0.20 U							
12CW04	15MLW0224D12CW04	FD	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.67	0.20 U							
12CW04	15MLW0224N12CW04	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.62	0.20 U							
12CW04	15MLW0506N12CW04	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.58	0.20 U							
12CW04	15MLW0818N12CW04	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.49	0.20 U							
12CW04	15MLW1118N12CW04	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.50	0.20 U							
12CW05	14MLW1118N12CW05	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.81	0.20 U							
12CW05	15MLW0223N12CW05	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.88	0.20 U							
12CW05	15MLW0506N12CW05	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.82	0.20 U							
12CW05	15MLW0818N12CW05	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.74	0.20 U							
12CW05	15MLW1117N12CW05	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.71	0.20 U							
12EX01	14MLW1119N12EX01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.34	0.20 U	4.01	0.20 U							
12EX01	15MLW0225N12EX01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.47	0.20 U	7.99	0.20 U							
12EX01	15MLW0505N12EX01	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.48	0.20 U	7.37	0.20 U							
12EX01	15MLW0819D12EX01	FD	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.26	0.20 U	3.02	0.20 U							
12EX01	15MLW0819N12EX01	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U	3.14	0.20 U							
12EX01	15MLW1118N12EX01	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U	3.86	0.20 U							
12EX02	14MLW1118N12EX02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.33	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
12EX02	15MLW0224N12EX02	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.24	0.20 U							
12EX02	15MLW0506D12EX02	FD	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.01	0.20 U							
12EX02	15MLW0506N12EX02	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.40	0.20 U							
12EX02	15MLW0817N12EX02	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.23	0.20 U							
12EX02	15MLW1116D12EX02	FD	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.68	0.20 U							
12EX02	15MLW1116N12EX02	N	11/16/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.68	0.20 U							
14BW01	14MLW1119N14BW01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	58.4	0.20 U							
14BW01	15MLW0225N14BW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	58.8	0.20 U							
14BW01	15MLW0506N14BW01	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	44.3	0.20 U							
14BW01	15MLW0819N14BW01	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	63.6	0.20 U							
14BW01	15MLW1118N14BW01	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	56.3	0.20 U							
14BW02	14MLW1118N14BW02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	23.3	0.20 U							
14BW02	15MLW0224N14BW02	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	22.0	0.20 U							
14BW02	15MLW0506N14BW02	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20.5	0.20 U							
14BW02	15MLW0817N14BW02	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	19.5	0.20 U							
14BW02	15MLW1118N14BW02	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	22.8	0.20 U							
14BW03	14MLW1119N14BW03	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	10.7	0.20 U							
14BW03	15MLW0225N14BW03	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.3	0.20 U							
14BW03	15MLW0505N14BW03	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.73	0.20 U							
14BW03	15MLW0819N14BW03	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	9.05	0.20 U							
14BW03	15MLW1118N14BW03	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	12.1	0.20 U							
14EX03	14MLW1119N14EX03	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U	41.2	0.20 U							
14EX03	15MLW022N14EX03	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.29	0.20 U	39.5	0.20 U							
14EX03	15MLW0506N14EX03	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	36.4	0.20 U							
14EX03	15MLW0819N14EX03	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.30	0.20 U	34.3	0.20 U							
14EX03	15MLW1118N14EX03	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.41	0.20 U	38.8	0.20 U							
14EX04	14MLW1118D14EX04	FD	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.8	0.20 U							
14EX04	14MLW1118N14EX04	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	20.1	0.20 U							
14EX04	15MLW0224D14EX04	FD	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	17.8	0.20 U							
14EX04	15MLW0224N14EX04	N	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.8	0.20 U							
14EX04	15MLW0506N14EX04	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	15.4	0.20 U							
14EX04	15MLW0817N14EX04	N	8/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.7	0.20 U							
14EX04	15MLW1118N14EX04	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	19.8	0.20 U							
14EX05	14MLW1119N14EX05	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.19	0.20 U							
14EX05	15MLW0225N14EX05	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.33	0.20 U							
14EX05	15MLW0505N14EX05	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.06	0.20 U							
14EX05	15MLW0819N14EX05	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.77	0.20 U							
14EX05	15MLW1118N14EX05	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	4.15	0.20 U							
91AW01	15MLW0223N91AW01	N	2/23/2015									1.0 U						

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
91AW07	15MLW0225N91AW07	N	2/25/2015									1.0 U						
91AW07	15MLW0505D91AW07	FD	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.43	0.20 U							
91AW07	15MLW0505N91AW07	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.43	0.20 U							
91AW09	15MLW0508N91AW09	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
91AW13	15MLW0224N91AW13	N	2/24/2015										0.0300 U	0.00300 U	0.0100 U	0.0488	0.0100 U	0.00700 U
91AW14	15MLW0504N91AW14	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.30	0.20 U							
91AW15	15MLW0224D91AW15	FD	2/24/2015									1.0 U						
91AW15	15MLW0224N91AW15	N	2/24/2015									1.0 U						
91AW15	15MLW0506N91AW15	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91AW16	15MLW0506N91AW16	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91AW17	15MLW0505N91AW17	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.15 J	0.20 U							
91BW01	15MLW0223N91BW01	N	2/23/2015									1.0 U						
91BW02	14MLW1118N91BW02	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91BW02	15MLW0507D91BW02	FD	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91BW02	15MLW0507N91BW02	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91BW03	14MLW1119N91BW03	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	35.0	0.20 U							
91BW03	15MLW0225N91BW03	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	31.3	0.20 U							
91BW03	15MLW0508N91BW03	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	27.9	0.20 U							
91BW04	14MLW1120N91BW04	N	11/20/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.17 R	0.20 R							
91BW04	15MLW0226N91BW04	N	2/26/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 J	0.20 U							
91BW04	15MLW0509N91BW04	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
91BW04	15MLW0818N91BW04	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U							
91BW04	15MLW1117D91BW04	FD	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 J	0.20 U							
91BW04	15MLW1117N91BW04	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U							
92BW01	14MLW1119D92BW01	FD	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.5	0.20 U							
92BW01	14MLW1119N92BW01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	23.2	0.20 U							
92BW01	15MLW0225N92BW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	21.4	0.20 U							
92BW01	15MLW0509N92BW01	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	19.1	0.20 U							
92BW01	15MLW0818N92BW01	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	18.8	0.20 U							
92BW01	15MLW1117N92BW01	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.12 J	0.20 U	22.2	0.20 U							
92BW02	14MLW1119N92BW02	N	11/19/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.68 R	0.20 R	7.07 R	0.20 R							
92BW02	15MLW0225D92BW02	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.81	0.20 U	7.67	0.20 U							
92BW02	15MLW0225N92BW02	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.92	0.20 U	7.88	0.20 U							
92BW02	15MLW0509N92BW02	N	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.83	0.20 U	7.06	0.20 U							
99AW01	14MLW1119N99AW01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.85	0.20 U							
99AW01	15MLW0225N99AW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.55	0.20 U							
99AW01	15MLW0508N99AW01	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.51	0.20 U							
99AW04	14MLW1121N99AW04	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99AW04	15MLW0227N99AW04	N	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
99AW08	15MLW0508N99AW08	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99AW09	14MLW1120N99AW09	N	11/20/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.33 R	0.20 R	4.09 R	0.20 R							
99AW09	15MLW0226D99AW09	FD	2/26/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.20	0.20 U							
99AW09	15MLW0226N99AW09	N	2/26/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.22	0.20 U							
99AW09	15MLW0510N99AW09	N	5/10/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.89	0.20 U							
99BW01	14MLW1119N99BW01	N	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	32.6	0.20 U							
99BW01	15MLW0225D99BW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	31.4	0.20 U							
99BW01	15MLW0225N99BW01	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	33.2	0.20 U	1.0 U						
99BW01	15MLW0508N99BW01	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	29.4	0.20 U							
99BW09	14MLW1118N99BW09	N	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW09	15MLW0507D99BW09	FD	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW09	15MLW0507N99BW09	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW10	14MLW1120N99BW10	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	13.5	0.20 U							
99BW10	15MLW0226N99BW10	N	2/26/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	13.4	0.20 U							
99BW10	15MLW0511N99BW10	N	5/11/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.4	0.20 U							
99BW10	15MLW0818D99BW10	FD	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.5	0.20 U							
99BW10	15MLW0818N99BW10	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11.2 J+	0.20 U							
99BW10	15MLW1117N99BW10	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	14.1	0.20 U							
99BW11	14MLW1121N99BW11	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW11	15MLW0511N99BW11	N	5/11/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW12	14MLW1117D99BW12	FD	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.34	0.20 U							
99BW12	14MLW1117N99BW12	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.39	0.20 U							
99BW12	15MLW0223N99BW12	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U							
99BW12	15MLW0507N99BW12	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U							
99BW14	14MLW1117D99BW14	FD	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW14	14MLW1117N99BW14	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW14	15MLW0507N99BW14	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
99BW15	14MLW1117N99BW15	N	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	1.98	0.20 U	7.87	0.20 U							
99BW15	15MLW0223D99BW15	FD	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.93	0.20 U	7.89	0.20 U							
99BW15	15MLW0223N99BW15	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.97	0.20 U	8.06	0.20 U							
99BW15	15MLW0508N99BW15	N	5/8/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.85	0.20 U	7.18	0.20 U							
99BW16	15MLW0223N99BW16	N	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.41	0.20 U							
99BW16	15MLW0504N99BW16	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.37	0.20 U							
99BW18	14MLW1120N99BW18	N	11/20/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	36.6 R	0.20 R							
99BW18	15MLW0226N99BW18	N	2/26/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.99	0.20 U							
99BW18	15MLW0510N99BW18	N	5/10/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.02	0.20 U							
99BW18	15MLW0818N99BW18	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	6.75	0.20 U							
99BW18	15MLW1117N99BW18	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	8.42	0.20 U							
MW-2	15MLW0505NMW2	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	**Sample Name**	**Sample Type**	**Sample Date**															
MW-4	15MLW0505NMW4	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
Private Wells with Whole House Filters																		
WP-119 (Influent)	15MLW1117NWP119A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.16 J	0.20 U	3.54	0.20 U							
WP-119 (Mid)	15MLW1117NWP119B1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-119 (Effluent)	15MLW1117NWP119C1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-121 (Influent)	14MLW1120NWP121A1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.06	0.20 U							
WP-121 (Mid)	14MLW1120NWP121B1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-121 (Effluent)	14MLW1120NWP121C1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-121 (Influent)	15MLW0226NWP121A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.14 J	0.20 U	3.54	0.20 U							
WP-121 (Influent)	15MLW0504NWP121A1	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.85	0.20 U							
WP-121 (Influent)	15MLW0818NWP121A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	4.40	0.20 U							
WP-121 (Influent)	15MLW1119DWP121A1	FD	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	3.66	0.20 U							
WP-121 (Influent)	15MLW1119NWP121A1	N	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	3.43	0.20 U							
WP-121 (Mid)	15MLW1119NWP121B1	N	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-121 (Effluent)	15MLW1119NWP121C1	N	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Influent)	14MLW1120NWP123A1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.31	0.20 U	2.70	0.20 U							
WP-123 (Mid)	14MLW1120NWP123B1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Effluent)	14MLW1120NWP123C1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Influent)	15MLW0226NWP123A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.43	0.20 U	2.57	0.20 U							
WP-123 (Mid)	15MLW0226NWP123B1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Effluent)	15MLW0226NWP123C1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Influent)	15MLW0507NWP123A1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.25	0.20 U	2.77	0.20 U							
WP-123 (Mid)	15MLW0507NWP123B1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Effluent)	15MLW0507NWP123C1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Influent)	15MLW0818NWP123A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	3.01	0.20 U							
WP-123 (Mid)	15MLW0818NWP123B1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Effluent)	15MLW0818NWP123C1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Influent)	15MLW1117NWP123A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.40	0.20 U	3.19	0.20 U							
WP-123 (Mid)	15MLW1117NWP123B1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-123 (Effluent)	15MLW1117NWP123C1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-124 (Influent)	14MLW1120NWP124A1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	1.05	0.20 U	4.25	0.20 U							
WP-124 (Mid)	14MLW1120NWP124B1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-124 (Effluent)	14MLW1120NWP124C1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-124 (Influent)	15MLW0226NWP124A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.09	0.20 U	3.78	0.20 U							
WP-124 (Influent)	15MLW0506NWP124A1	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.74	0.20 U	3.49	0.20 U							
WP-124 (Influent)	15MLW0818DWP124A1	FD	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.75	0.20 U	3.12	0.20 U							
WP-124 (Influent)	15MLW0818NWP124A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.72	0.20 U	3.25	0.20 U							
WP-124 (Influent)	15MLW1117NWP124A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.04	0.20 U	4.36	0.20 U							
WP-124	15MLW1117NWP124B1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
WP-124 (Effluent)	15MLW1117NWP124C1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125	14MLW1121NWP125	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.83	0.20 U	3.52	0.20 U							
WP-125	15MLW0226DWP125	FD	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.76	0.20 U	3.27	0.20 U							
WP-125	15MLW0226NWP125	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.77	0.20 U	3.58	0.20 U							
WP-125 (Influent)	15MLW0507DWP125A1	FD	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.61	0.20 U	2.42	0.20 U							
WP-125 (Influent)	15MLW0507NWP125A1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.62	0.20 U	2.68	0.20 U							
WP-125 (Mid)	15MLW0507NWP125B1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125 (Effluent)	15MLW0507NWP125C1	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125 (Influent)	15MLW0818NWP125A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.57	0.20 U	2.85	0.20 U							
WP-125 (Mid)	15MLW0818NWP125B1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125 (Effluent)	15MLW0818NWP125C1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125 (Influent)	15MLW1117NWP125A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.02	0.20 U	3.72	0.20 U							
WP-125 (Mid)	15MLW1117NWP125B1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-125 (Effluent)	15MLW1117NWP125C1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-129 (Influent)	15MLW0506NWP129A1	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.14	0.20 U							
WP-129 (Influent)	15MLW0818NWP129A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.09	0.20 U							
WP-129 (Influent)	15MLW1117NWP129A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.34	0.20 U							
WP-129 (Mid)	15MLW1117NWP129B1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-129 (Effluent)	15MLW1117NWP129C1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-14 (Influent)	14MLW1121NWP14A1	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.95	0.20 U	3.53	0.20 U							
WP-14 (Influent)	15MLW0226NWP14A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.89	0.20 U	3.27	0.20 U							
WP-14 (Influent)	15MLW0503NWP14A1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.93	0.20 U	3.42	0.20 U							
WP-14 (Mid)	15MLW0503NWP14B1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-14 (Effluent)	15MLW0503NWP14C1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-14 (Influent)	15MLW0819NWP14A1	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.93	0.20 U	3.65	0.20 U							
WP-14 (Influent)	15MLW1118NWP14A1	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.92	0.20 U	3.55	0.20 U							
WP-70 (Influent)	14MLW1120NWP70A2	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.19 J	0.20 U	4.54	0.20 U							
WP-70 (Influent)	15MLW0226NWP70A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.18 J	0.20 U	3.55	0.20 U							
WP-70 (Influent)	15MLW0504NWP70A1	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U	3.40	0.20 U							
WP-70 (Mid)	15MLW0504NWP70B1	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-70 (Effluent)	15MLW0504NWP70C1	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-70 (Influent)	15MLW0818NWP70A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.16 J	0.20 U	3.90	0.20 U							
WP-70 (Influent)	15MLW1118NWP70A1	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.18 J	0.20 U	3.52	0.20 U							
WP-83 (Influent)	14MLW1120DWP83A1	FD	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.29	0.20 U	1.25	0.20 U							
WP-83 (Influent)	14MLW1120NWP83A1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.25	0.20 U	1.08	0.20 U							
WP-83 (Influent)	15MLW0226NWP83A1	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.24	0.20 U	1.27	0.20 U							
WP-83 (Mid)	15MLW0503NW83B1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-83 (Effluent)	15MLW0503NW83C1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-83 (Influent)	15MLW0503NWP83A1	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.26	0.20 U	1.75	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	**Sample Name**	**Sample Type**	**Sample Date**															
WP-83 (Influent)	15MLW0819NWP83A1	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U	1.03	0.20 U							
WP-83 (Influent)	15MLW1118NWP83A1	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.29	0.20 U	1.13	0.20 U							
WP-86 (Influent)	14MLW1120NWP86A1	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.81	0.20 U							
WP-86 (Influent)	15MLW0227DWP86A1	FD	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.89	0.20 U							
WP-86 (Influent)	15MLW0227NWP86A1	N	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.89	0.20 U							
WP-86 (Influent)	15MLW0505DWP86A1	FD	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.26	0.20 U							
WP-86 (Influent)	15MLW0505NWP86A1	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.19	0.20 U							
WP-86 (Mid)	15MLW0505NWP86B1	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-86 (Effluent)	15MLW0505NWP86C1	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-86 (Influent)	15MLW0818NWP86A1	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.01	0.20 U							
WP-86 (Influent)	15MLW1117NWP86A1	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.22	0.20 U							
Private Wells																		
WP-03	15MLW0507DWP03	FD	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.26	0.20 U	1.00	0.20 U							
WP-03	15MLW0507NWP03	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.19	0.20 U							
WP-04	14MLW1120NWP04	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	1.67	0.20 U	5.44	0.20 U							
WP-04	15MLW0227NWP04	N	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.67	0.20 U	5.19	0.20 U							
WP-04	15MLW0507NWP04	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.58	0.20 U	4.80	0.20 U							
WP-04	15MLW0818NWP04	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	1.85	0.20 U	5.45	0.20 U							
WP-09	15MLW0504NWP09	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-10	15MLW0505NWP10	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-105	15MLW0507NWP105	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.26	0.20 U							
WP-111	15MLW0507NWP111	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
WP-116	15MLW0507NWP116	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.45	0.20 U	1.72	0.20 U							
WP-116	15MLW1117NWP116	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.44	0.20 U	1.71	0.20 U							
WP-120	15MLW0507NWP120	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.30	0.20 U							
WP-122	15MLW0504NWP122	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.70	0.20 U							
WP-126	15MLW0507NWP126	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.12 J	0.20 U	0.94	0.20 U							
WP-127	15MLW0504NWP127	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.89	0.20 U							
WP-128	15MLW0507NWP128	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40	0.20 U							
WP-130	15MLW0506NWP130	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.31	0.20 U							
WP-131	14MLW1121NWP131	N	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.94	0.20 U							
WP-131	15MLW0226NWP131	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.96	0.20 U							
WP-131	15MLW0506DWP131	FD	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.15	0.20 U							
WP-131	15MLW0506NWP131	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U	2.92	0.20 U							
WP-131	15MLW0818NWP131	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.60	0.20 U							
WP-131	15MLW1119NWP131	N	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.89	0.20 U							
WP-136	15MLW0507NWP136	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.15	0.20 U							
WP-137	15MLW0507NWP137	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.22	0.20 U							
WP-138	15MLW0505NWP138	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.30	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
WP-139	15MLW0505NWP139	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.69	0.20 U							
WP-13E	15MLW0504NWP13E	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-14	14MLW1121DWP14A1	FD	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	1.00	0.20 U	4.21	0.20 U							
WP-14	15MLW1118DWP14A1	FD	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.88	0.20 U	3.44	0.20 U							
WP-143	15MLW0505NWP143	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.75	0.20 U							
WP-144	15MLW0505NWP144	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
WP-145	15MLW0505NWP145	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.38	0.20 U							
WP-147	15MLW0506NWP147	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27	0.20 U							
WP-148	15MLW0506NWP148	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.17 J	0.20 U							
WP-149	15MLW0504NWP149	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.12 J	0.20 U							
WP-150	15MLW0504DWP150	FD	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.11 J	0.20 U							
WP-150	15MLW0504NWP150	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-151	15MLW0506NWP151	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.61	0.20 U							
WP-152	15MLW0507NWP152	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.22	0.20 U							
WP-153	15MLW0507NWP153	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U							
WP-154	15MLW0505NWP154	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
WP-155	15MLW0507NWP155	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40	0.20 U							
WP-156	15MLW0506NWP156	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.47	0.20 U							
WP-164	15MLW0504NWP164	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U							
WP-165	15MLW0507NWP165	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.24	0.20 U							
WP-167	14MLW1120NWP167	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.29	0.20 U							
WP-167	15MLW0227NWP167	N	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.60	0.20 U							
WP-167	15MLW0505NWP167	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.37	0.20 U							
WP-167	15MLW0819DWP167	FD	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.57	0.20 U							
WP-167	15MLW0819NWP167	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.63	0.20 U							
WP-167	15MLW1118NWP167	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.45	0.20 U							
WP-168	14MLW1120NWP168	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.93	0.20 U							
WP-168	15MLW0227NWP168	N	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.83	0.20 U							
WP-168	15MLW0505NWP168	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.27	0.20 U							
WP-168	15MLW0819NWP168	N	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.07	0.20 U							
WP-168	15MLW1118NWP168	N	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.26	0.20 U							
WP-169	15MLW0504NWP169	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.88	0.20 U							
WP-172	15MLW0507NWP172	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.35	0.20 U							
WP-175	15MLW0504NWP175	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.42	0.20 U							
WP-177	15MLW0505NWP177	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-178	15MLW0505NWP178	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.21	0.20 U							
WP-179	15MLW0507NWP179	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.13 J	0.20 U							
WP-180	15MLW0507NWP180	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.10 J	0.20 U							
WP-18N	15MLW0506NWP18N	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	**Sample Name**	**Sample Type**	**Sample Date**															
WP-18S	15MLW0506DWP18S	FD	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.16 J	0.20 U							
WP-18S	15MLW0506NWP18S	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.17 J	0.20 U							
WP-25W	15MLW0504DWP25W	FD	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.52	0.20 U							
WP-25W	15MLW0504NWP25W	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.55	0.20 U							
WP-27	14MLW1120NWP27	N	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.87	0.20 U							
WP-27	15MLW0225NWP27	N	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.67	0.20 U							
WP-27	15MLW0506NWP27	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.73	0.20 U							
WP-27	15MLW0818NWP27	N	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.61	0.20 U							
WP-27	15MLW1117NWP27	N	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.17	0.20 U							
WP-28	15MLW0506NWP28	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.73	0.20 U							
WP-33	15MLW0506NWP33	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.69	0.20 U							
WP-45	15MLW0505NWP45	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.12	0.20 U							
WP-50	15MLW0503NWP50	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-52	15MLW0504NWP52	N	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.35	0.20 U							
WP-54	15MLW0506NWP54	N	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.10 J	0.20 U							
WP-57	15MLW0505DWP57	FD	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.44	0.20 U							
WP-57	15MLW0505NWP57	N	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.44	0.20 U							
WP-66	15MLW0507DWP66	FD	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.32	0.20 U	1.34	0.20 U							
WP-66	15MLW0507NWP66	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U	1.20	0.20 U							
WP-68	15MLW0507NWP68	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.69	0.20 U							
WP-69	15MLW0507NWP69	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.24	0.20 U	1.72	0.20 U							
WP-71A	15MLW0507NWP71A	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.28	0.20 U							
WP-74	15MLW0507NWP74	N	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.22	0.20 U	1.30	0.20 U							
WP-82	15MLW0503NWP82	N	5/3/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.12 J	0.20 U							
Quality Control Samples																		
	15MLW11PE1	PE	11/16/2015	5.96	0.20 U	4.43	3.35	8.31	10.9	7.62	8.33							
	14MLW1117PDTB01	TB	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1117TB01	TB	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1117TB05	TB	11/17/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1118PDTB02	TB	11/18/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1119TB02	TB	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1119TB06	TB	11/19/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1120TB03	TB	11/20/2014	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	0.20 R	11.7 R	0.20 R							
	14MLW1120TB07	TB	11/20/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1120TB08	TB	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1121TB04	TB	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1121TB09	TB	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLE0225TB02	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0223PDTB01	TB	2/23/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	Sample Name	Sample Type	Sample Date															
	15MLW0224TB01	TB	2/24/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0225PDTB02	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0225ST04	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0225TB02	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0225TB04	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0226TB05	TB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0227TB03	TB	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0227TB06	TB	2/27/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0504TB06	TB	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0504TB12	TB	5/4/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0505TB01	TB	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0505TB07	TB	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0505TB13	TB	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0505TB14	TB	5/5/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0506TB08	TB	5/6/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0507NPDTB1	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0507NPDTB2	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0507TB02	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0507TB09	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0507TB10	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0508TB16	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0508TB17	TB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0509TB03	TB	5/9/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0510TB04	TB	5/10/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0511TB05	TB	5/11/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0818TB01	TB	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0818TB02	TB	8/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0819PDTB02	TB	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0819TB03	TB	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0819TB04	TB	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0819TB05	TB	8/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1117PDTB01	TB	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1117TB04	TB	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1117TB05	TB	11/17/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1118PDTB02	TB	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1118TB06	TB	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1118TB07	TB	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1119TB01	TB	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1119TB02	TB	11/19/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							

			Chemical Name	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCA	CIS-1,2-DCE	TRANS-1,2-DCE	TCE	VC	PERCHLORATE	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
			Analysis Method	EPA Method 524								EPA Method 6850	EPA Method 537					
			CAS RN	71-55-6	75-34-3	75-35-4	107-06-2	156-59-2	156-60-5	79-01-6	75-01-4	14797-73-0	375-73-5	375-85-9	355-46-4	375-95-1	1763-23-1	335-67-1
			MCL	200 µg/L		7 µg/L	5 µg/L	70 µg/L	100 µg/L	5 µg/L	2 µg/L	15 µg/L (HAL)	380 µg/L	µg/L	µg/L	µg/L	0.2 µg/L (HAL)	0.4 µg/L (HAL)
Well ID	**Sample Name**	**Sample Type**	**Sample Date**															
	14MLW1121EBWP131	EB	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0225EBWP02	EB	2/25/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
WP-04	15MLW0507EBNWP04	EB	5/7/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW1118EBWP01	EB	11/18/2015	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	14MLW1121FBWP14A1	FB	11/21/2014	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							
	15MLW0224FRB01	FB	2/24/2015										0.0300 U	0.00300 U	0.0100 U	0.00700 U	0.0100 U	0.00700 U

1,1,1-TRICHLOROETHANE 1,1,1-TCA
1,1-DICHLOROETHANE 1,1-DCA
1,1-DICHLOROETHENE 1,1-DCE
1,2-DICHLOROETHANE 1,2-DCA
CIS-1,2-DICHLOROETHENE CIS-1,2-DCE
TRANS-1,2-DICHLOROETHENE TRANS-1,2-DCE
TRICHLOROETHENE TCE
VINYL CHLORIDE VC

Perfluorobutanesulfonic Acid PFBS
Perfluoroheptanoic Acid PFHpA
Perfluorohexanesulfonic Acid PFHxS
Perfluorononanoic Acid PFNA
Perfluorooctanesulfonic Acid PFOS
Perfluorooctanoic Acid PFOA

Sample Type:
N -Normal Sample
EB – Equipment blank
TB – Trip Blank
FB – Field Blank
FD – Field Duplicate
PE – Performance Evaluation

Data Validation Qualifiers
J- Estimated
R- Rejected
U- Undetected at the stated limit

MCL – Maximum Contaminant Level
HAL – Health Advisory Level
µg/L – Micrograms per liter

APPENDIX C – 2015 Whole House Filter Efficiency Memorandum

U.S. ARMY CORPS of ENGINEERS
Seattle District

Environmental Engineering and Technology Section,
Technical Services Branch, Engineering Division

4735 East Marginal Way South
Seattle, WA 98134
Tel: 206-764-6792 Fax: 206-764-6964

MEMORANDUM

DATE: July 14, 2015

FROM: Karah Haskins – Technical Project Lead, USACE Seattle District

TO: Rod Lobos - Moses Lake RPM, Region 10

SUBJECT: Moses Lake Whole House Filter Efficiency Evaluation

The purpose of this memorandum (memo) is to evaluate results for Siemens AWC-1230 Whole House Filter (WHF) systems installed in August and October 2013 at Moses Lake residential wells WP-119, WP-121, WP-124, and WP-129. This memo evaluates whether the filters worked sufficiently for a year (November 2013, and February, June, and October 2014 events) to protect residents from exposure to TCE greater than the Maximum Contaminant Level (MCL), which is 5 µg/L. In addition, this memo evaluates whether there is sufficient evidence to support the reduction in filter sampling frequency from quarterly sampling.

WHF systems are installed at private wells when TCE concentrations are greater than or equal to 3.5 µg/L TCE. More information on the WHF systems can be found in Appendix A of the 2015 Work Plan. The granular activated carbon (GAC) in the WHF vessels is replaced annually to compensate for performance reduction due to dissolved solids, iron, biofilm, and adsorption of other organic constituents. Annual change-out also protects against buildup of nitrates in the system, which can be transformed to toxic nitrites under certain conditions. The validity of conclusions stated in this report are limited to the observed flow and contaminant concentration ranges discussed herein and the assumption that WHF GAC will be replaced annually.

The following is a summary of the actions taken at WP-119, 121, 124, and 129:

- **WP-119:** All three sampling ports were sampled during the November 2013 and February and June 2014 sampling events. In June 2014, the flow meter reading was not recorded due to field sampling team error[1]. WP-119 was not sampled during the October

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[1] Readiness review meetings have been implemented to better prepare field samplers. This practice has reduced field sampling errors.

2014 sampling event because the house was vacant and there was no power to the house. The WHF system was subsequently winterized[2] on November 10, 2014 to protect it from freezing.

- **<u>WP-121:</u>** All three sampling ports were sampled during all four 2014 sampling events at WP-121; however, it was determined that the flow meter was not accurate during the sampling events and was replaced on January 14, 2015.

- **<u>WP-124:</u>** All three sampling ports were sampled during the November 2013 and February and October 2014 sampling events. Due to field sampling error, only the effluent port was sampled and the flow meter was not recorded during the June 2014 sampling event.

- **<u>WP-129:</u>** All three sampling ports were sampled during the November 2013 and February, June, and October 2014 sampling events. During the October 2014 sampling event, the samplers noted that the house was repossessed. The WHF system was subsequently winterized on November 10, 2014 to protect it from freezing.

Flow rates were calculated using flow meter readings recorded at the time of quarterly sampling and are presented in **Table 1**. The annual average flow rates ranged from 97 to 391 gallons per day. Detected concentrations of TCE and cis-dichloroethene (cis-DCE) collected at the lead sample port (influent) are also summarized in **Table 1.**

Overall, the WHFs are working sufficiently to ensure protection of human health. There were no detections of TCE or cis-DCE in the mid or effluent ports. The average flow rates were significantly less than, and the average TCE concentrations were similar to, those observed during the WHF efficiency evaluation for WP-14, 70, 83, and 86 (summarized in a prior WHF efficiency analysis memo dated September 23, 2014). This evidence suggests that the WHFs are working sufficiently to protect human health at the current amount of TCE mass loading and volume of flow through the filters.

The technical team recommends continuing to sample the WHF influent ports quarterly at WP-119, WP-121, WP-124 and WP-129 to evaluate seasonal trends. However, the results of this memo conclude that the sampling frequency for the mid and effluent ports can be reduced to annual sampling and still protect human health based on the current flow rates, TCE concentrations, and assumption of annual replacement of WHFs.

Additional information: A WHF system was installed at WP-123 in September 2014 and is currently being sampled at all three ports. After the February 2015 sampling event, it was determined that WP-125 needed a WHF system. The WHF system at WP-125 was installed in April 2015 and sampled in May 2015. Efficiency evaluations for WP-123 and WP-125 will be made after the February 2016 sampling event.

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[2] AWHF system is winterized when it is known that a home will be vacant during the winter months. To winterize a WHF system, the system is bypassed and purged of remaining water.

Table 1. Moses Lake WHF Systems - Flow Meter Readings and Detected Analytes

Well ID	Date	Event[1,2]	Flow Meter Reading (gal)	Quarterly Flow Rate (gal/day)	Influent		Mid/Effluent Detect?
					TCE ug/L	CIS ug/L	
WP-119	11/19/2013	end of Q1	36,280	437	3.99	ND	No
	2/20/2014	end of Q2	64,094	299	3.95	ND	No
	6/24/2014	end of Q3	Not Recorded	--	4.25	ND	No
	10/2/2014	end of Q4	162,092	437	NS	NS	No
			avg flow	*391*	*gal/day*		
WP-121	11/19/2013	end of Q1	Not Recorded	--	4.02	ND	No
	2/20/2014	end of Q2	Not Recorded	--	3.47	ND	No
	6/24/2014	end of Q3	Not Recorded	--	4.89	ND	No
	10/2/2014	end of Q4	Not Recorded	--	4.67	ND	No
WP-124	11/19/2013	end of Q1	10,154	122	4.32	ND	No
	2/20/2014	end of Q2	51,229	442	3.72	0.086	No
	6/23/2014	end of Q3	not recorded		NS	NS	No
	10/2/2014	end of Q4	134,705	373	3.48	0.77	No
			avg flow	*312*	*gal/day*		
WP-129	11/19/2013	end of Q1	2,904	153	2.99	ND	No
	2/21/2014	end of Q2	11,233	89	2.76	ND	No
	6/25/2014	end of Q3	27,091	128	2.11	ND	No
	10/2/2014	end of Q4	28,843	18	1.41	ND	No
			avg flow	*97*	*gal/day*		

1 - Systems were installed in October 2013 and August, which = time 0.

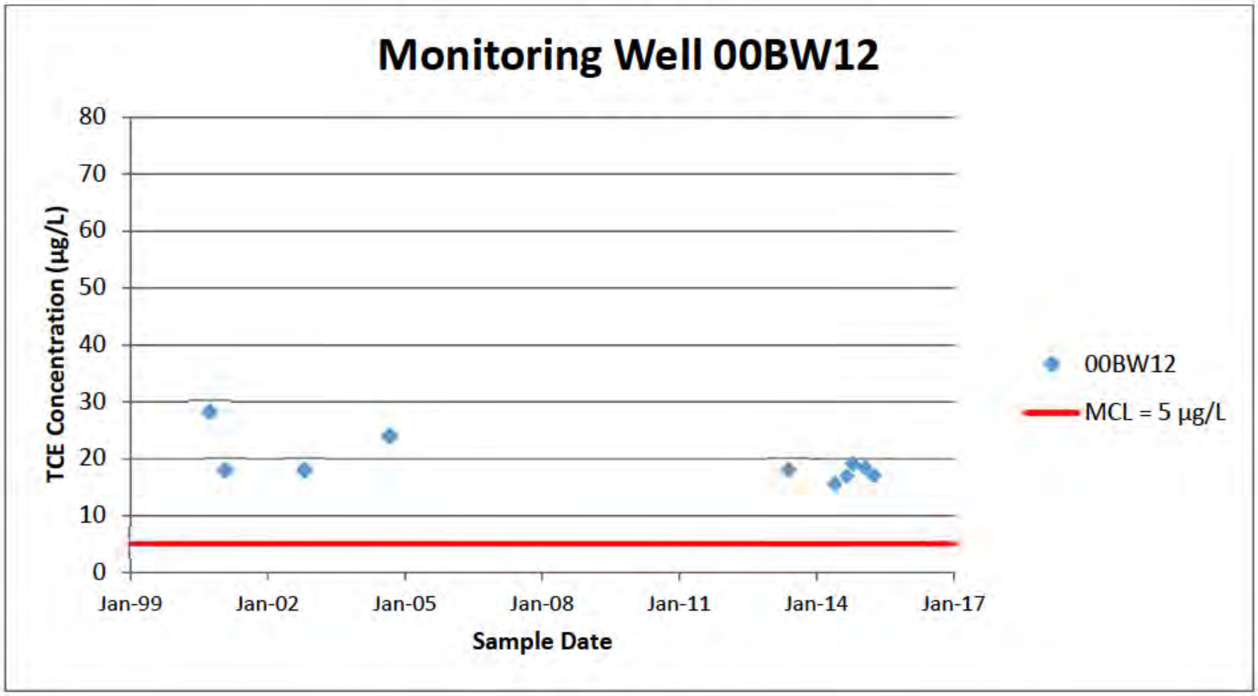
2 – Q1 was November 2013, Q2 was February 2014, Q3 was June 2014, Q4 was October 2014

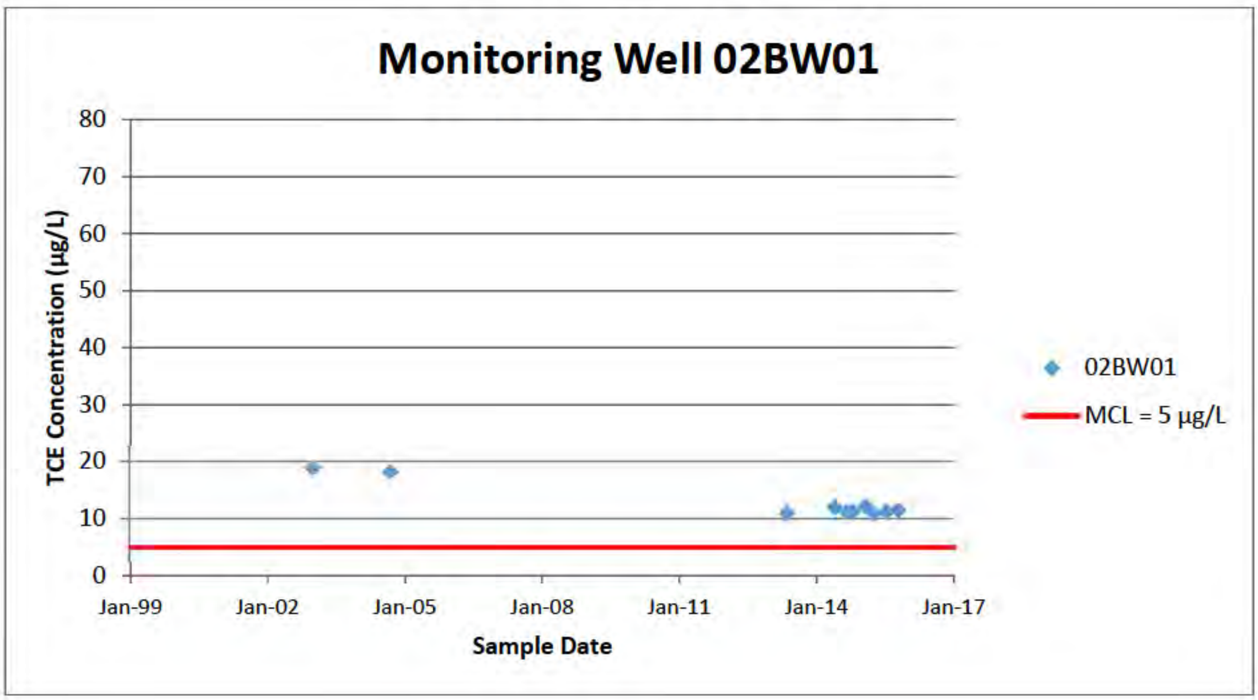
NS- Not sampled

ND- Non-detect

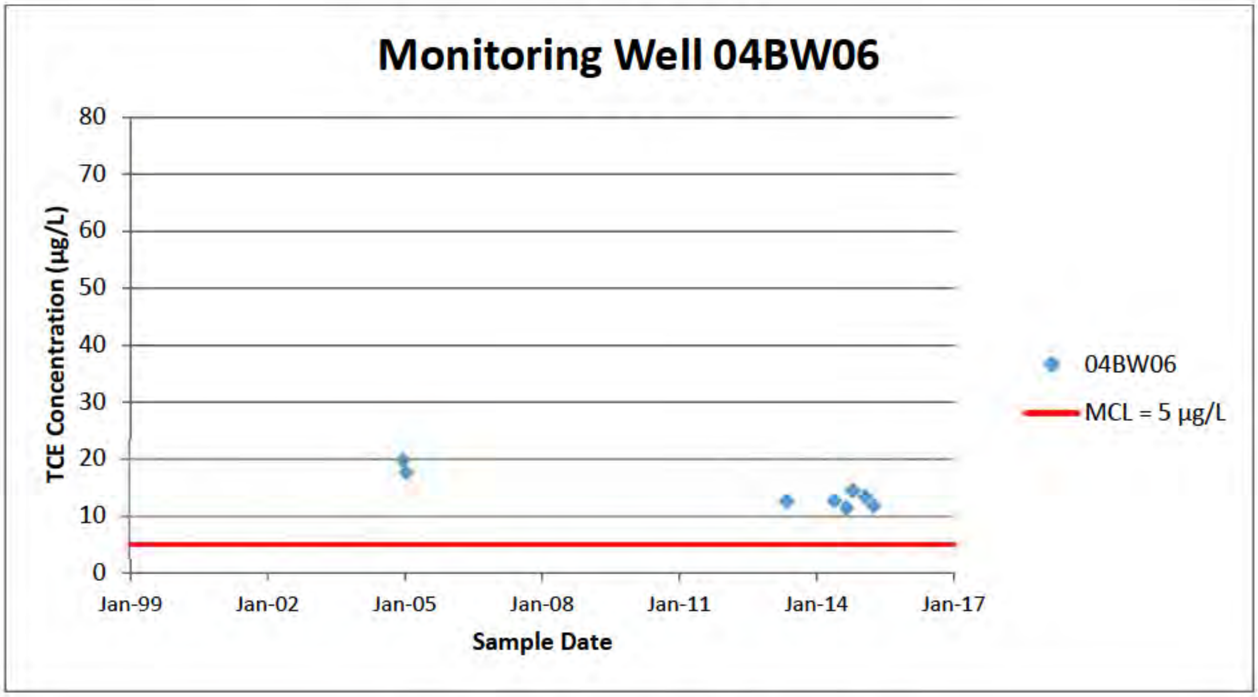
APPENDIX D – TCE Time-Series Graphs

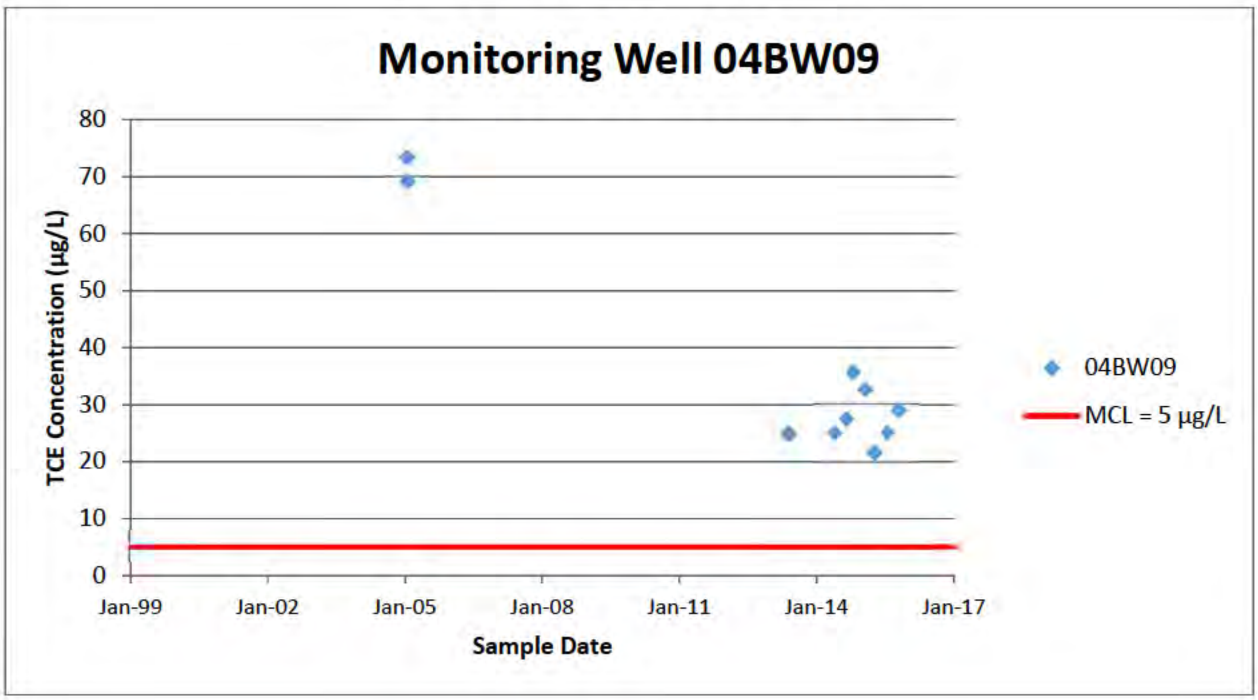
App D-TCE Time-Series Plots for Monitoring Wells Annual Monitoring

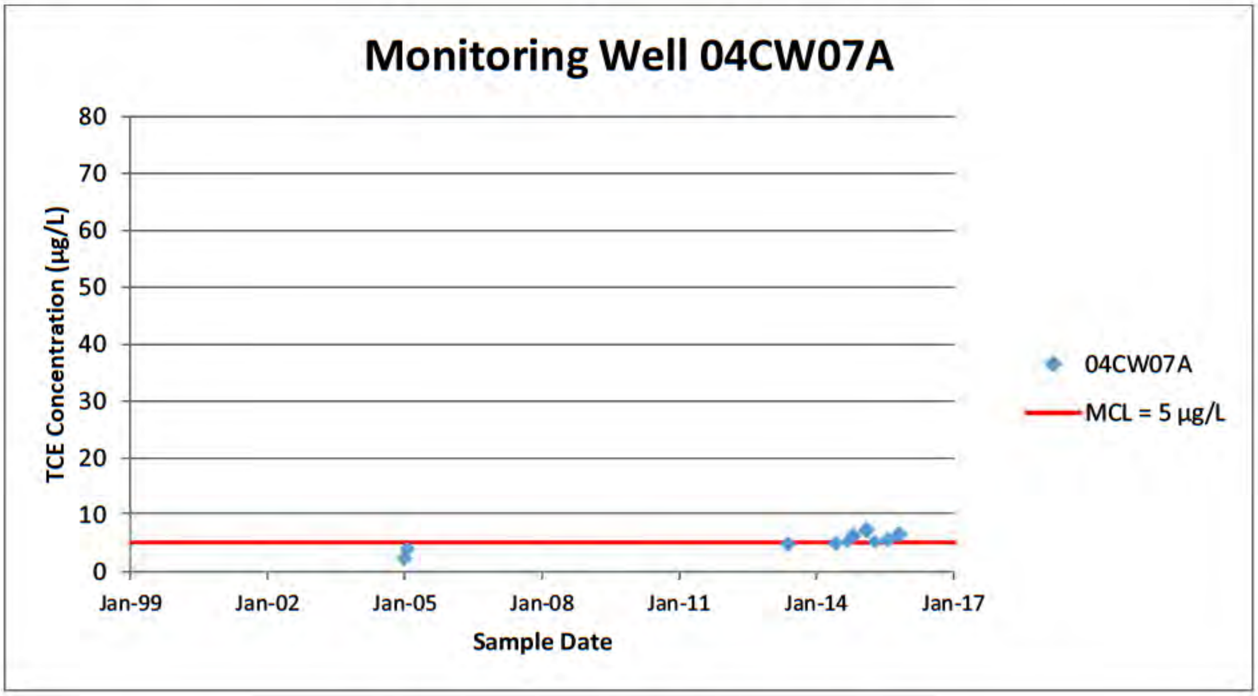


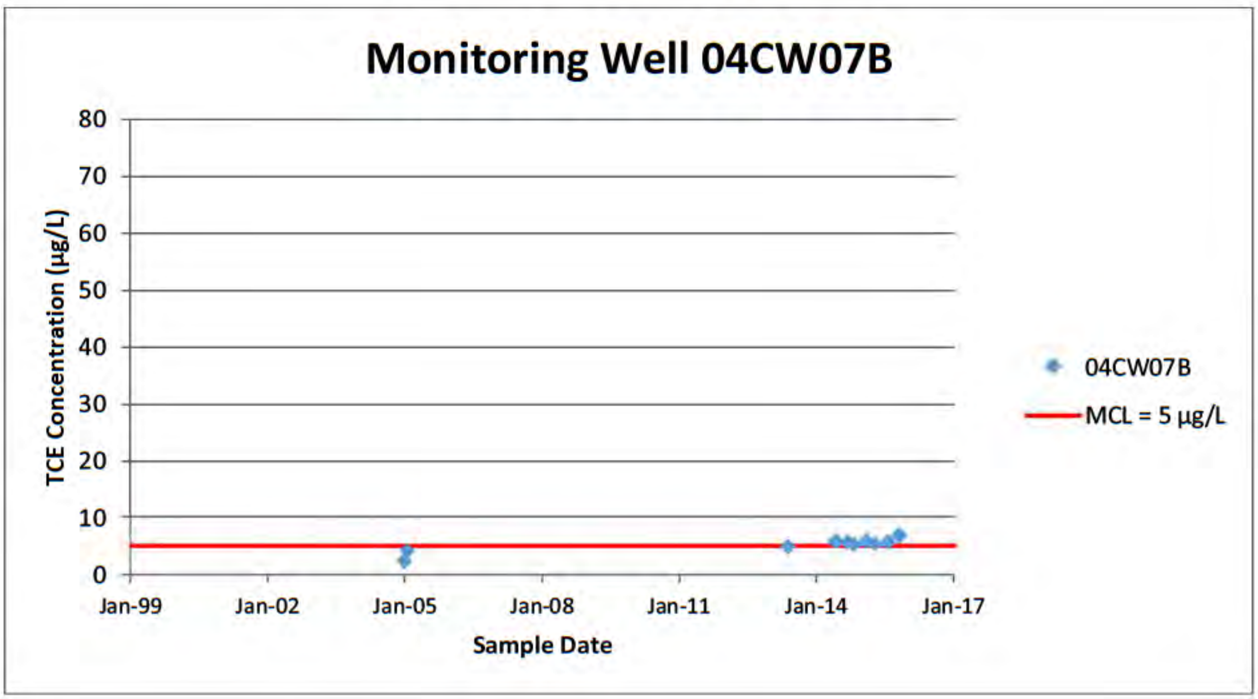


App D-TCE Time-Series Plots for Monitoring Wells Annual Monitoring

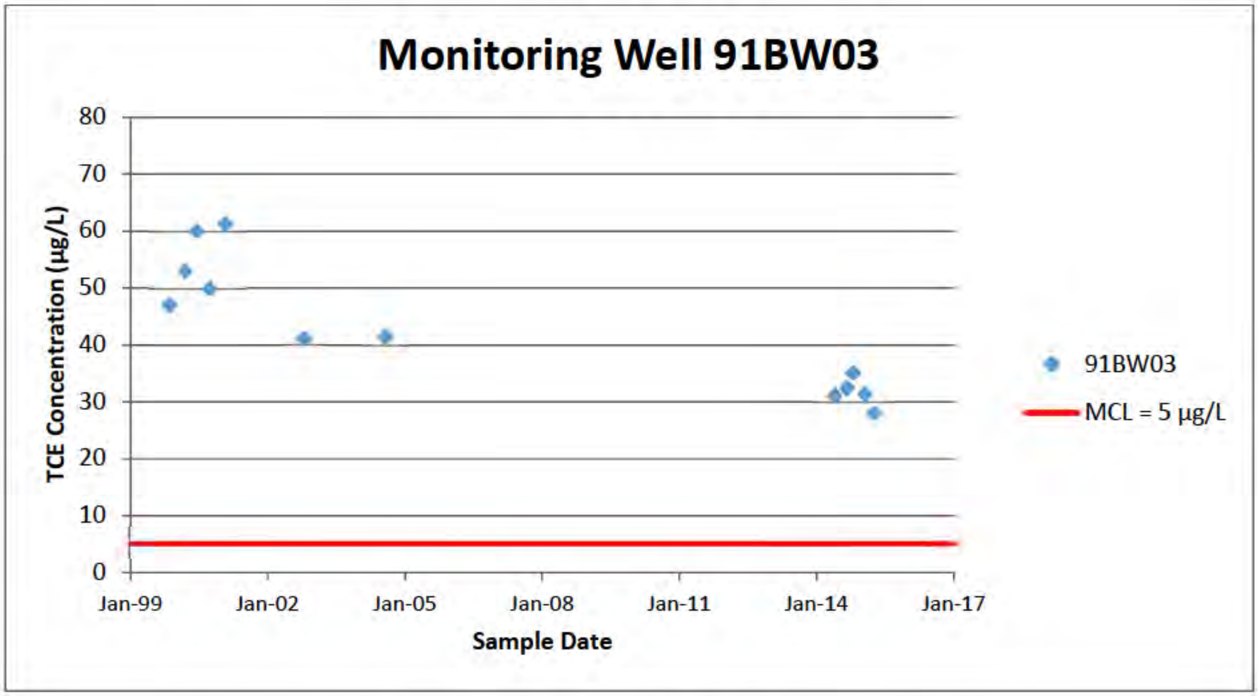


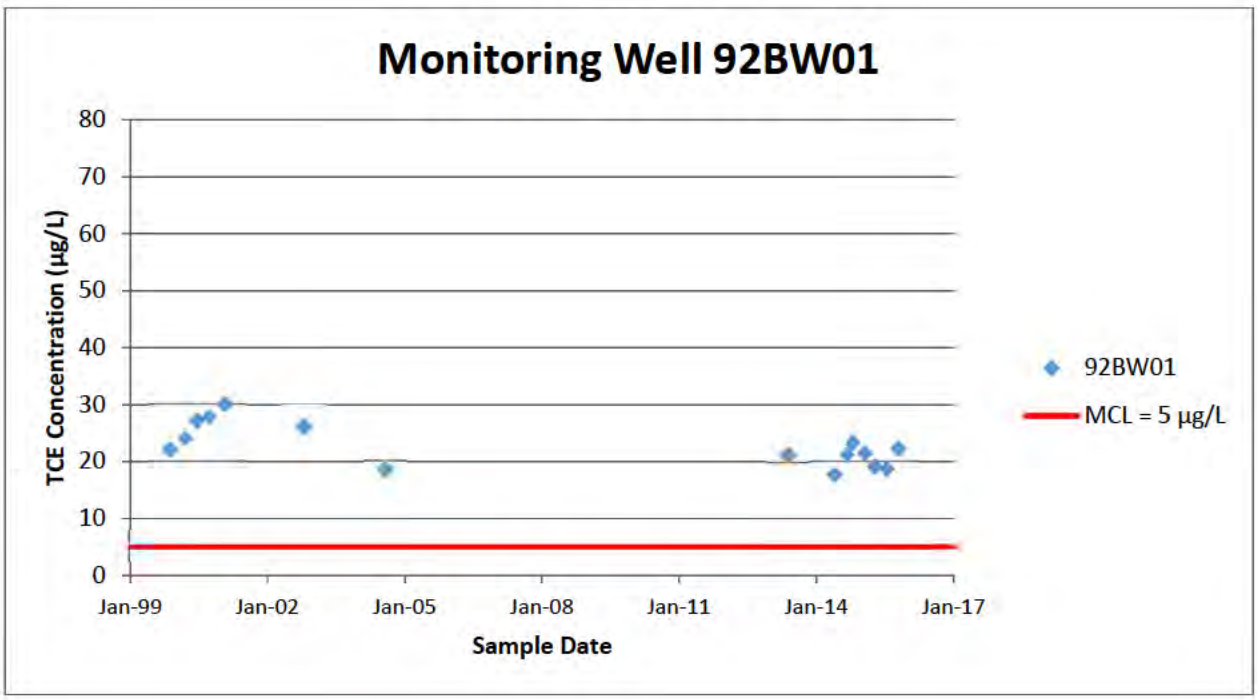



Monitoring Well 04CW07A
80
70
60
50
40
30
20
10
0
TCE Concentration (µg/L)
Jan-99
Jan-02
Jan-05
Jan-08
Jan-11
Jan-14
Jan-17
Sample Date
04CW07A
MCL = 5 µg/L


Monitoring Well 04CW07B
80
70
60
50
40
30
20
10
0
TCE Concentration (µg/L)
Jan-99
Jan-02
Jan-05
Jan-08
Jan-11
Jan-14
Jan-17
Sample Date
04CW07B
MCL = 5 µg/L

App D-TCE Time-Series Plots for Monitoring Wells Annual Monitoring





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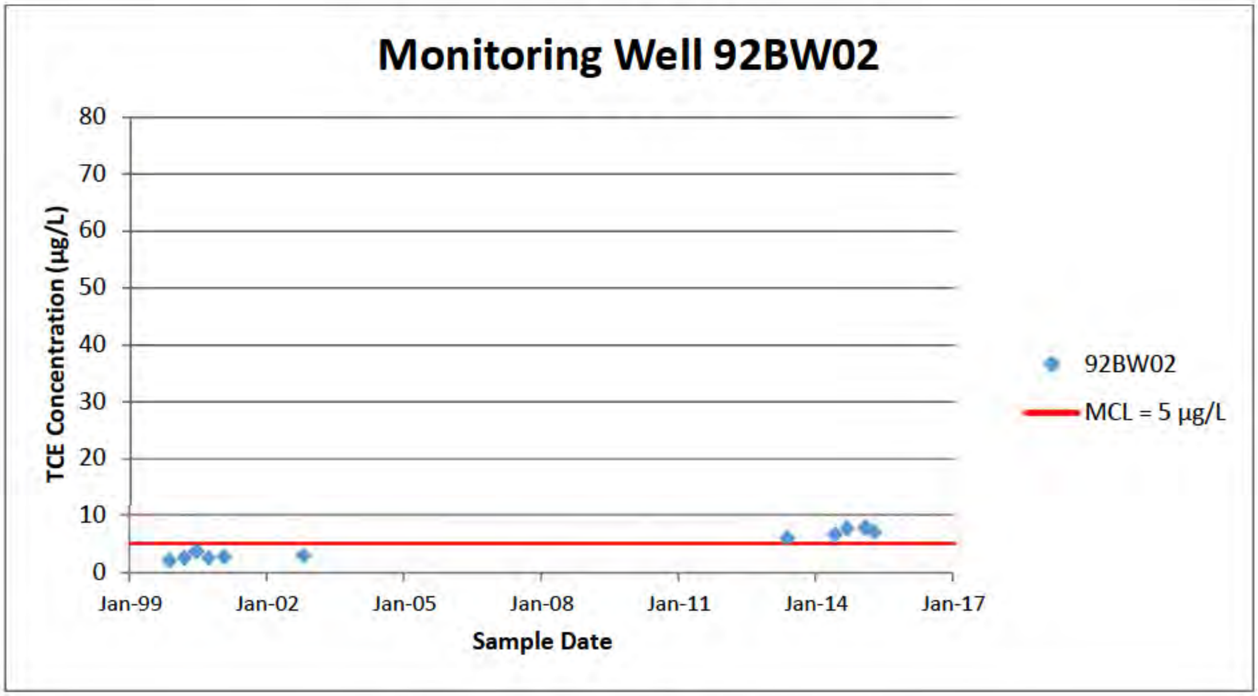

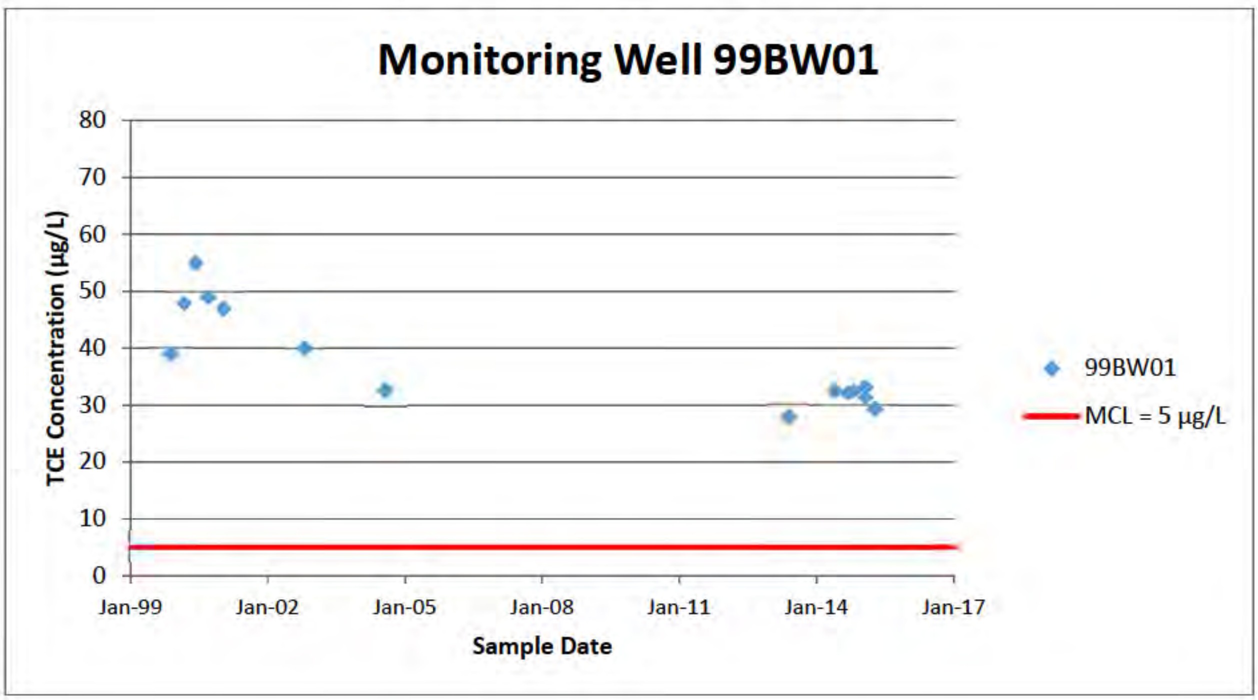

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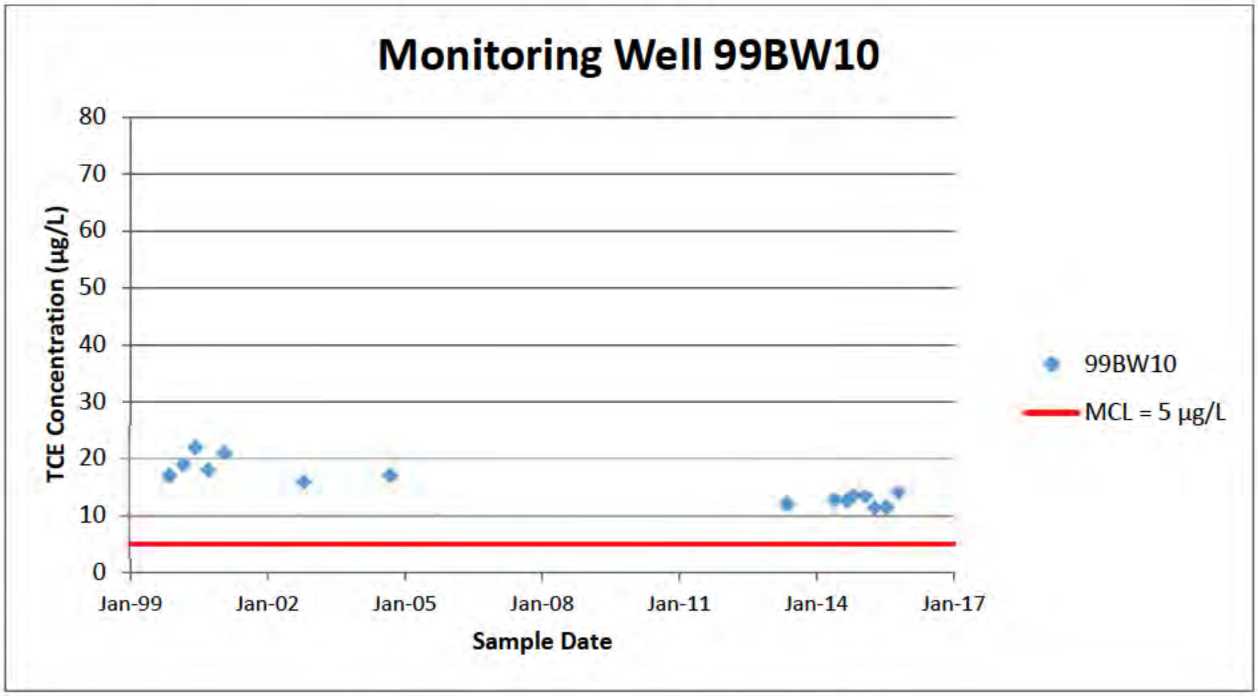
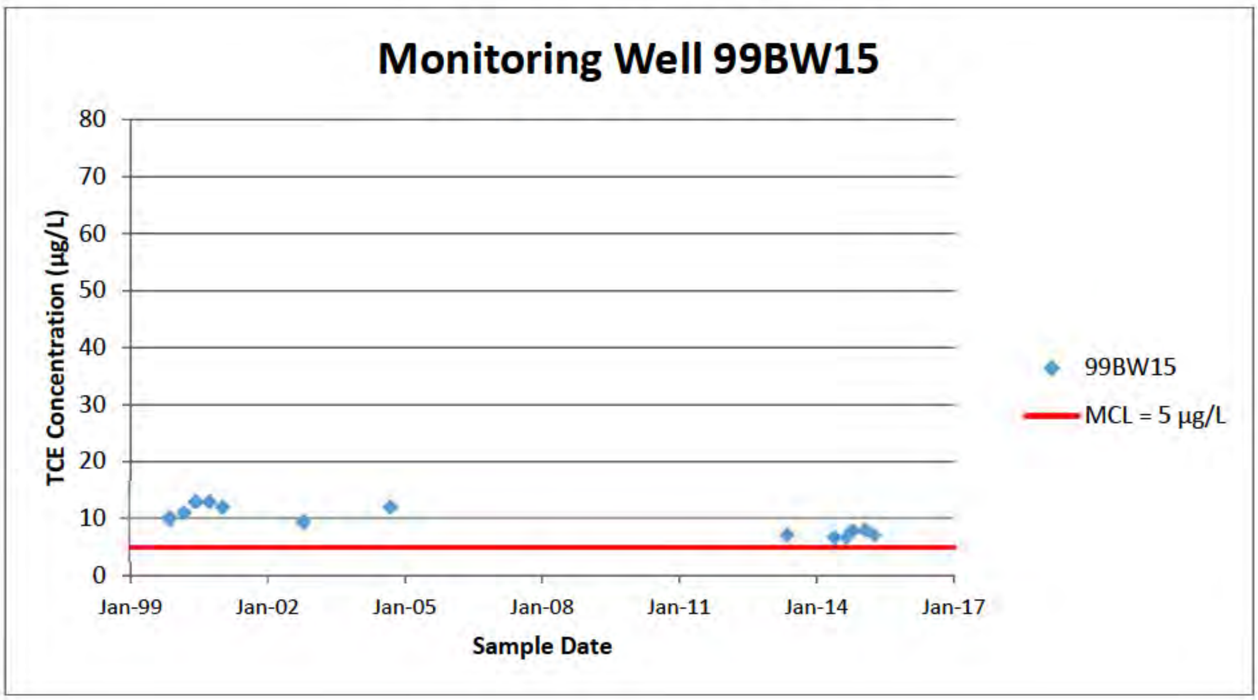
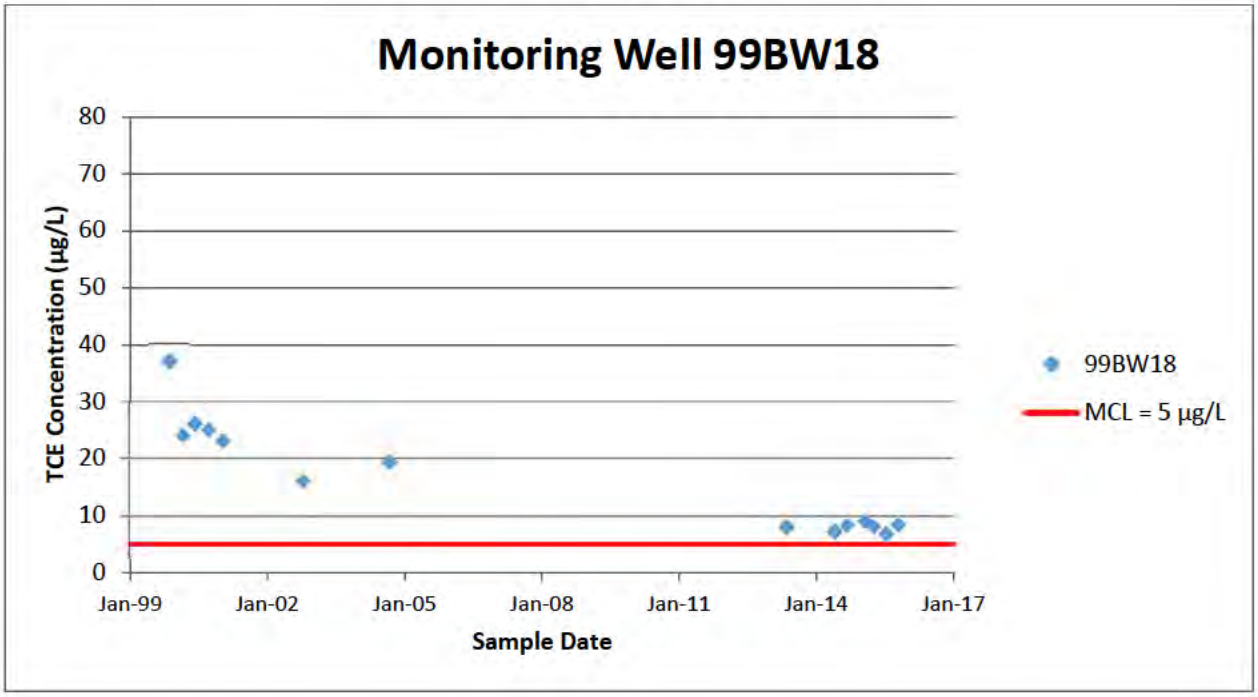
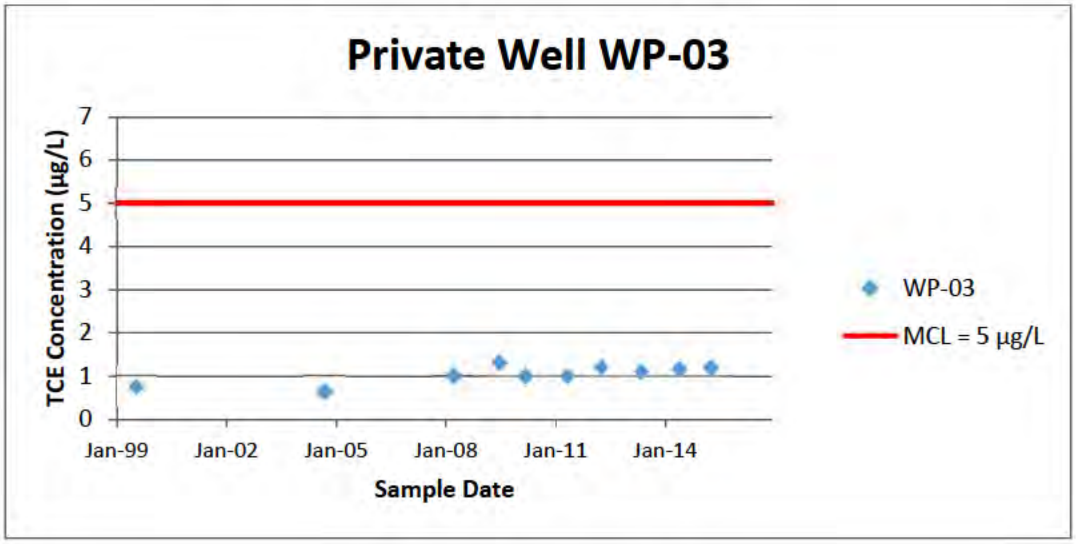


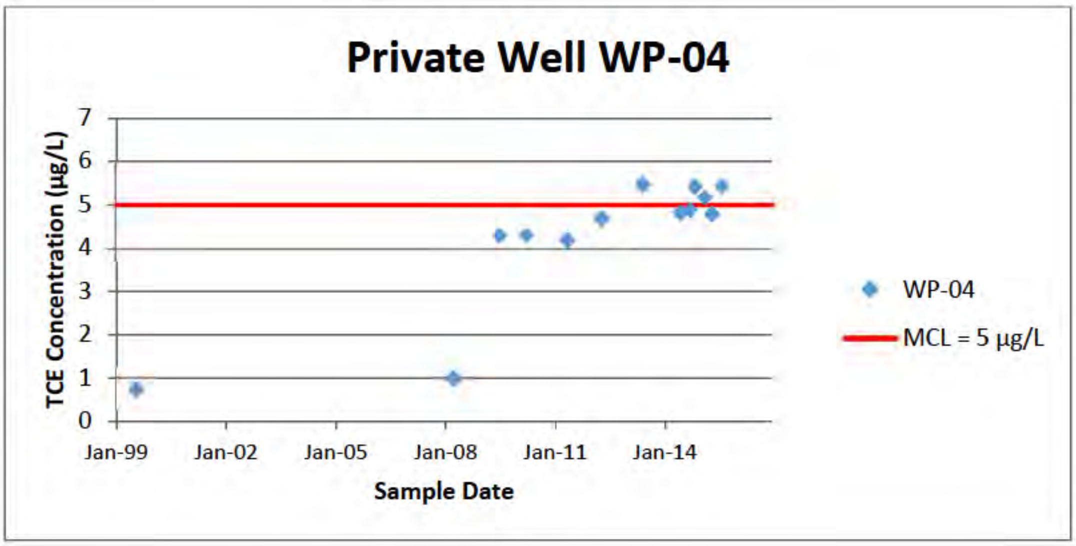


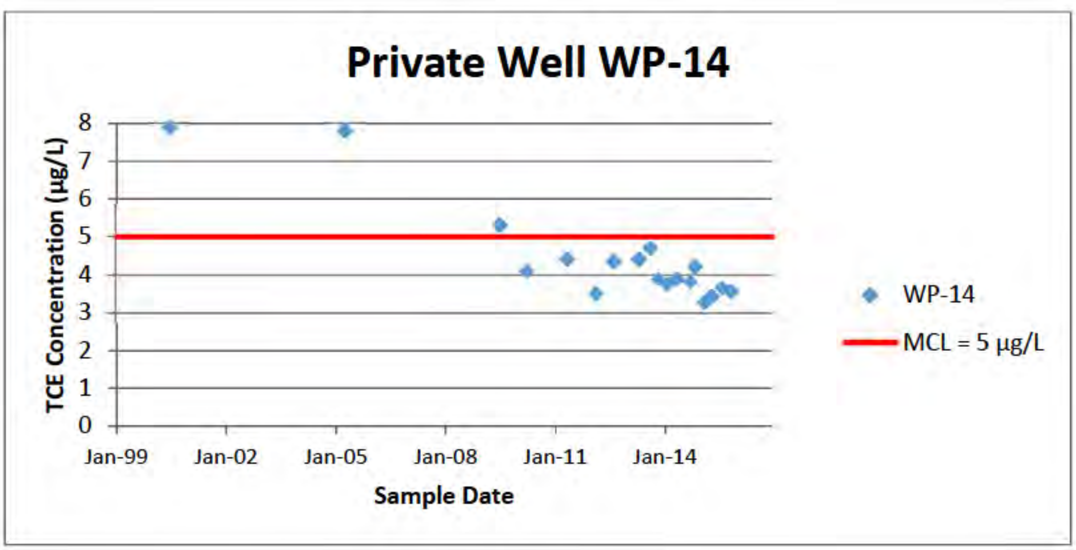
App D-TCE Time-Series Plots for Monitoring Wells Annual Monitoring



App D - TCE Time-Series Plots for Private Wells Annual Monitoring







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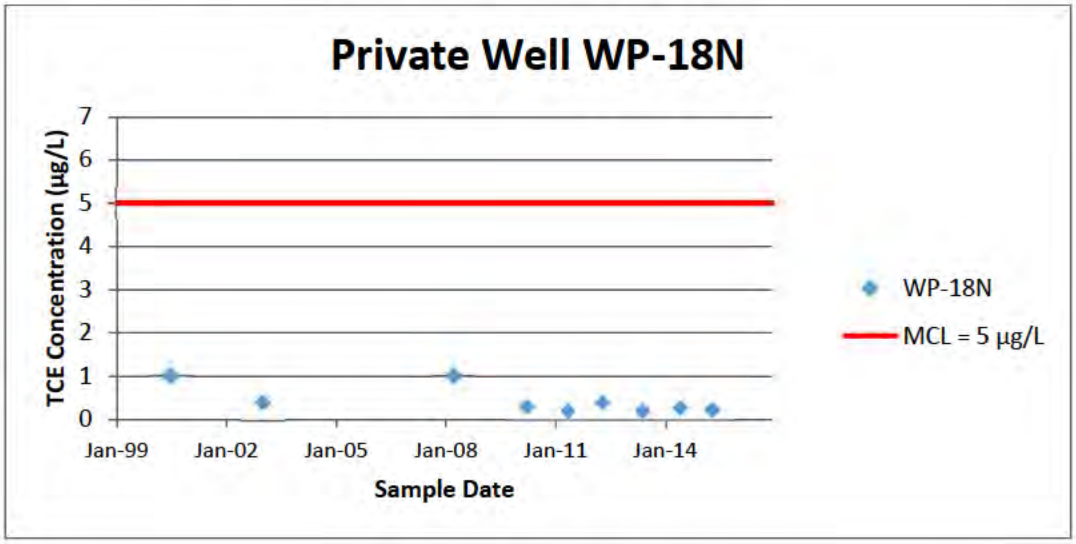

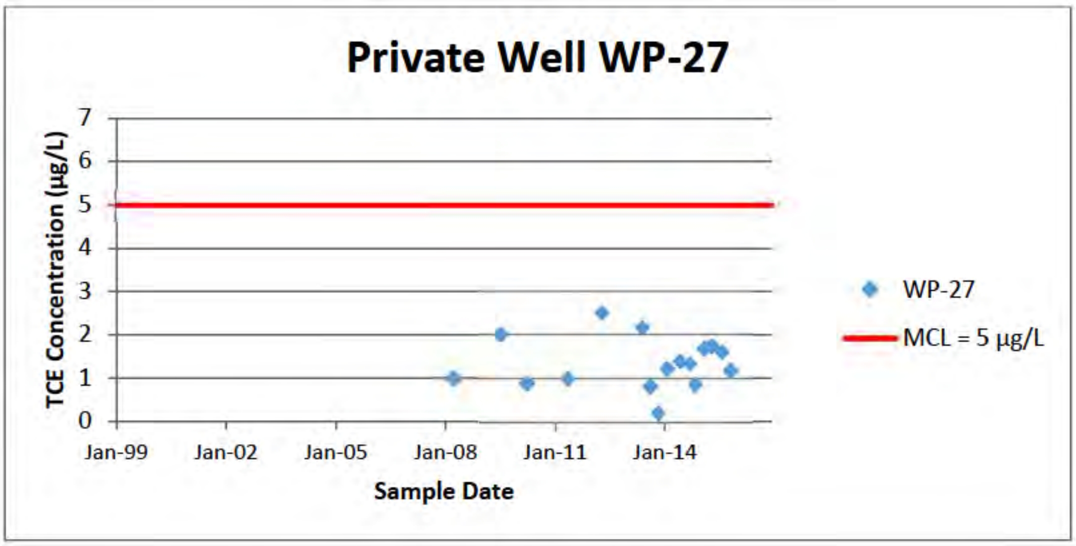

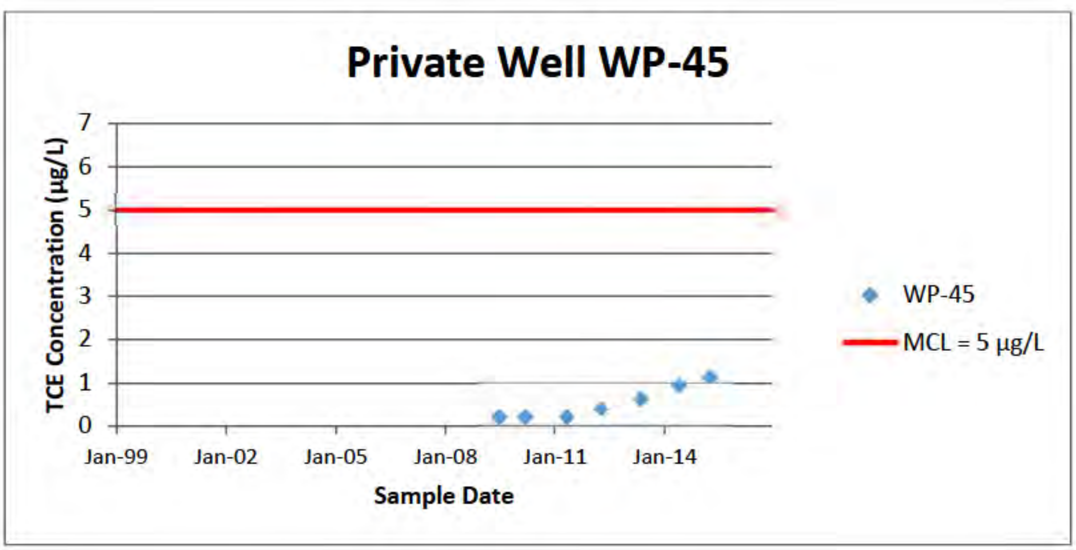

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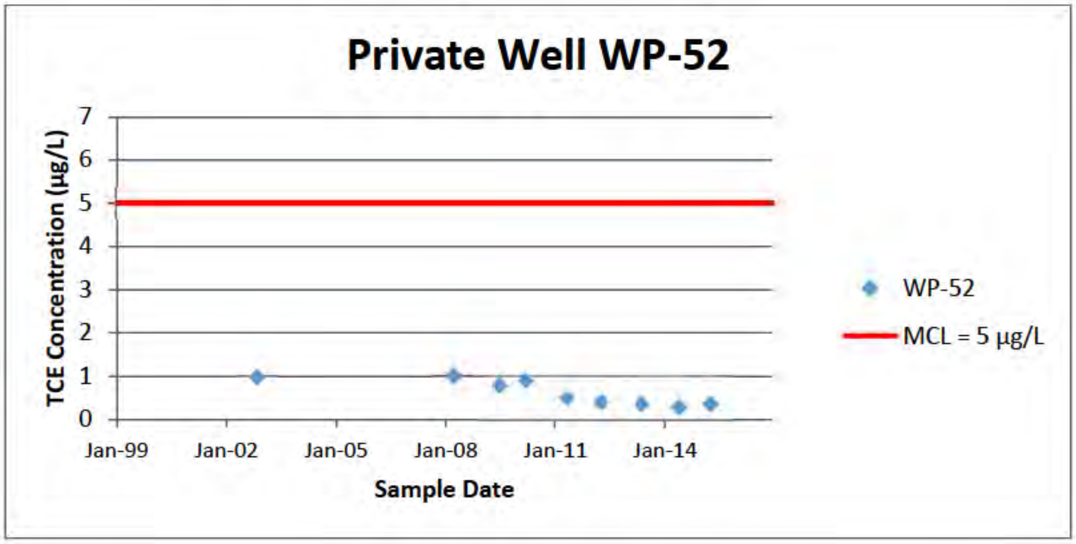
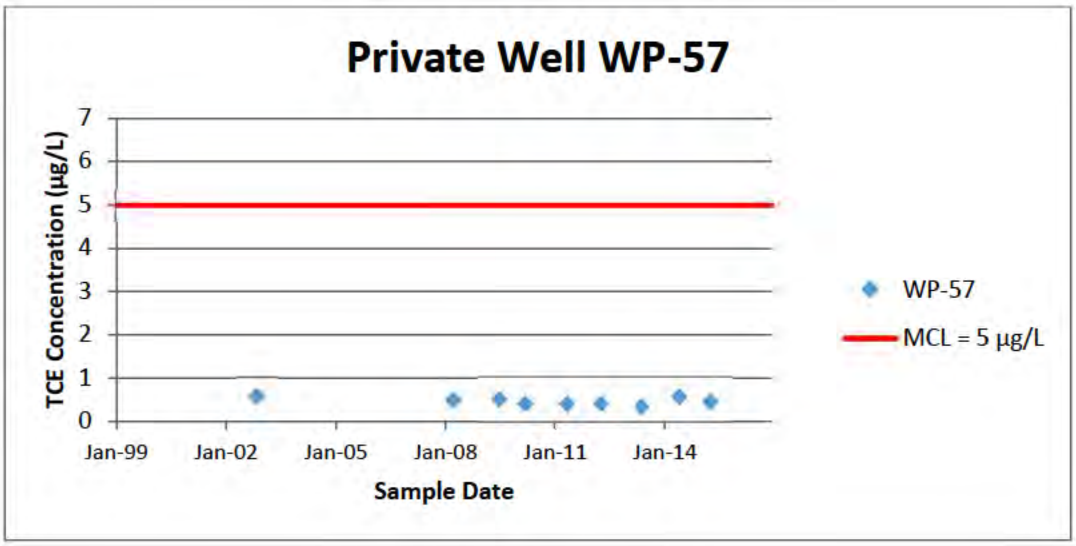
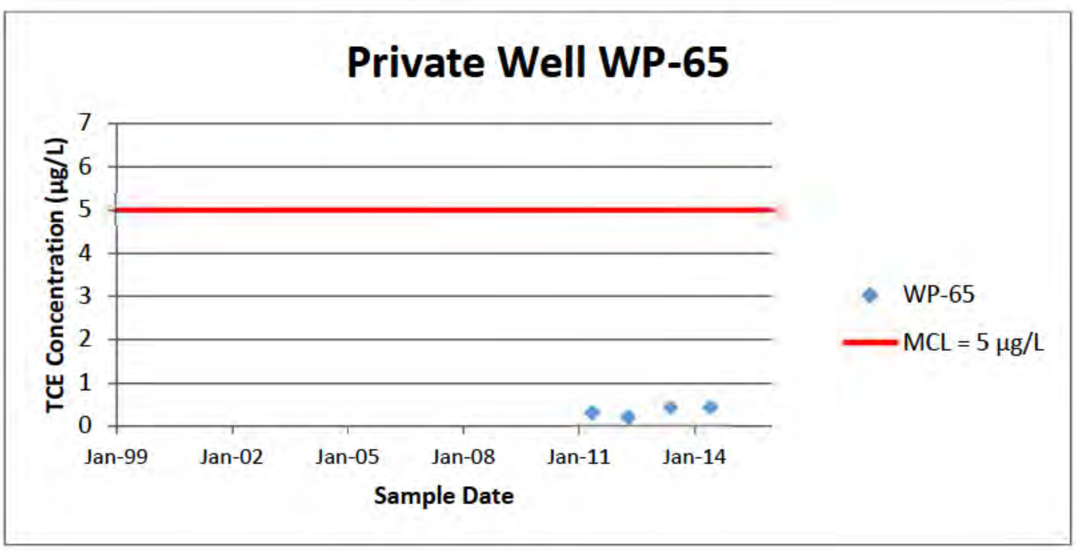
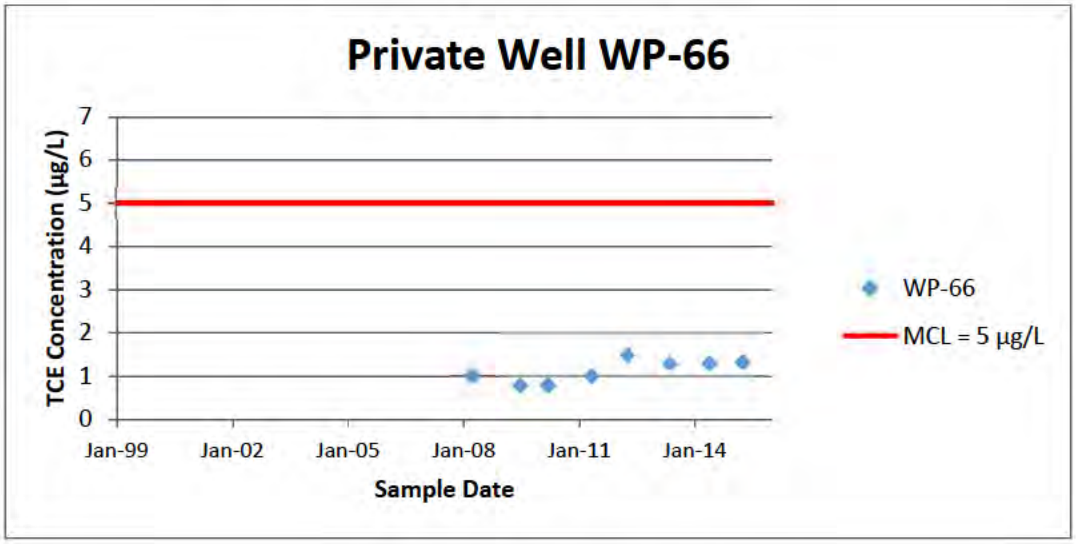
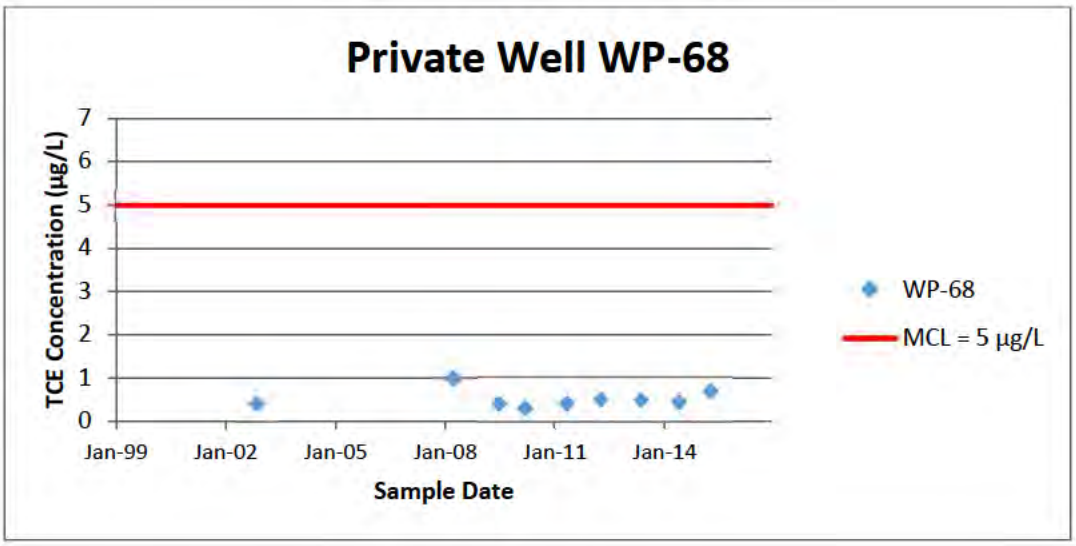


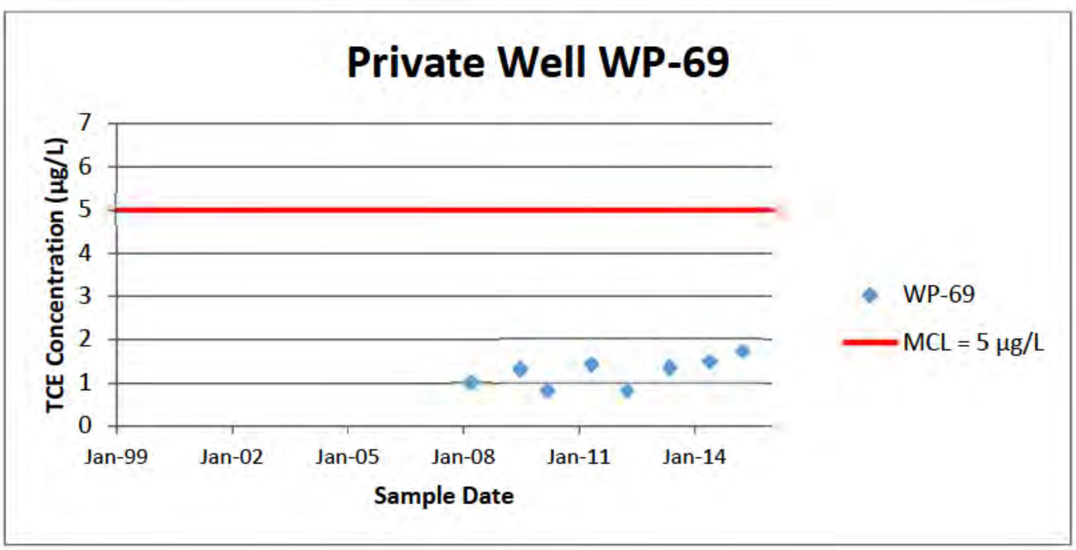




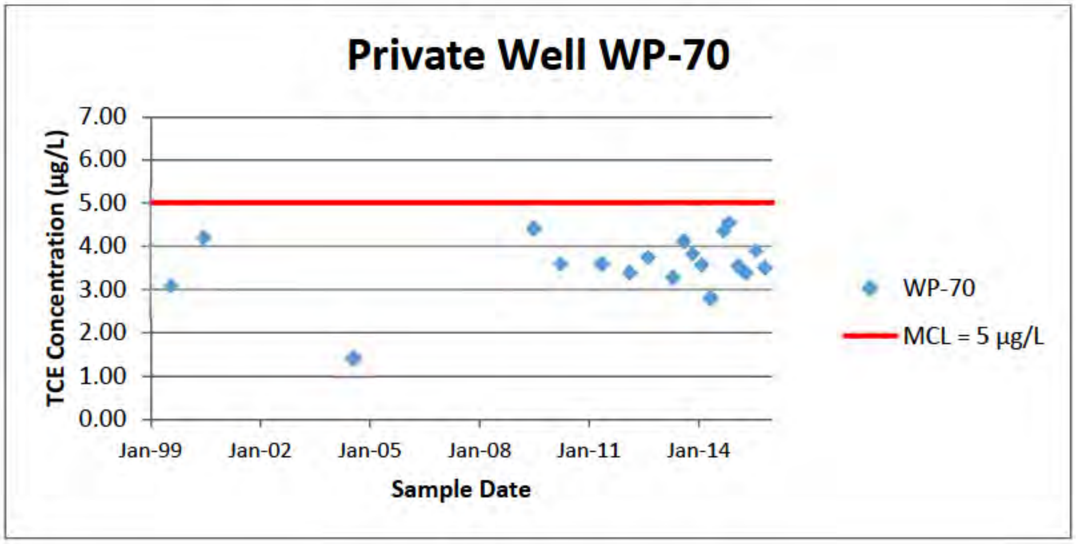
App D - TCE Time-Series Plots for Private Wells Annual Monitoring

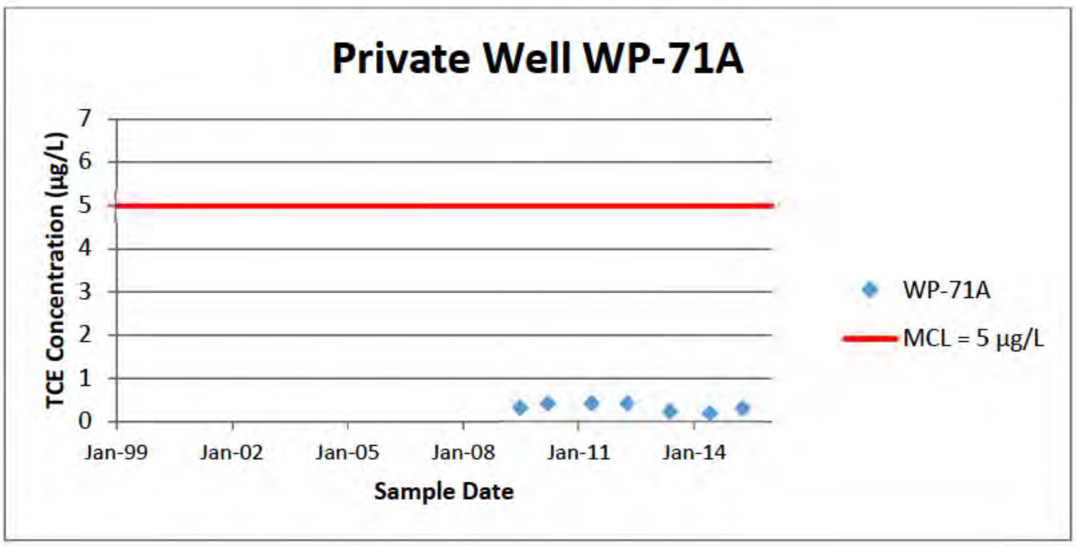


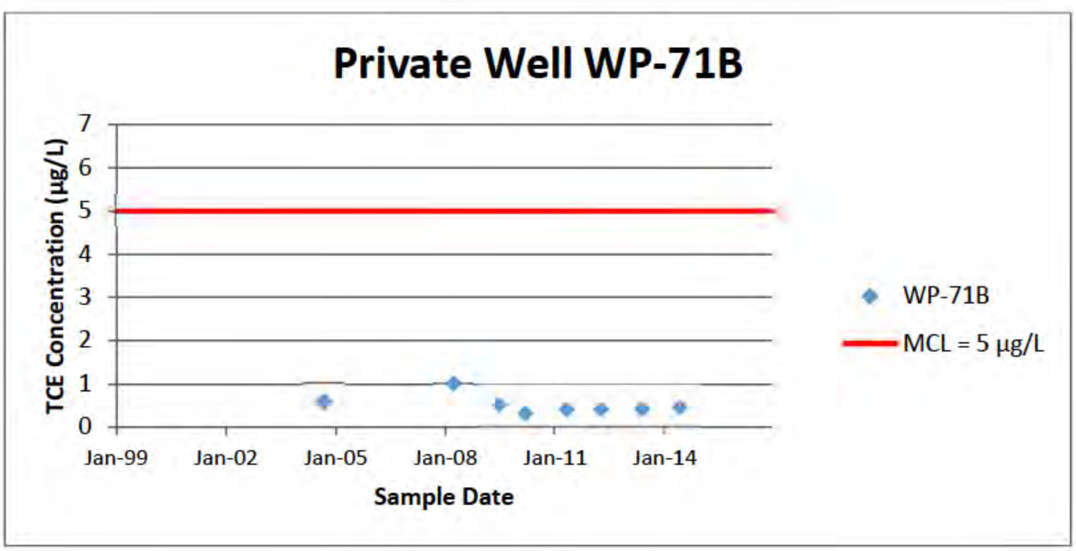




App D - TCE Time-Series Plots for Private Wells Annual Monitoring







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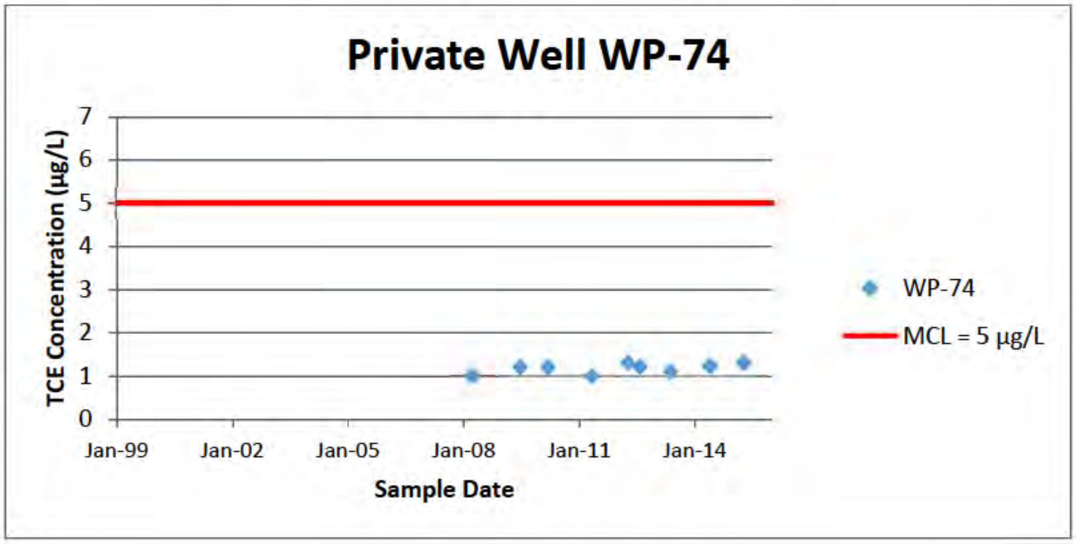
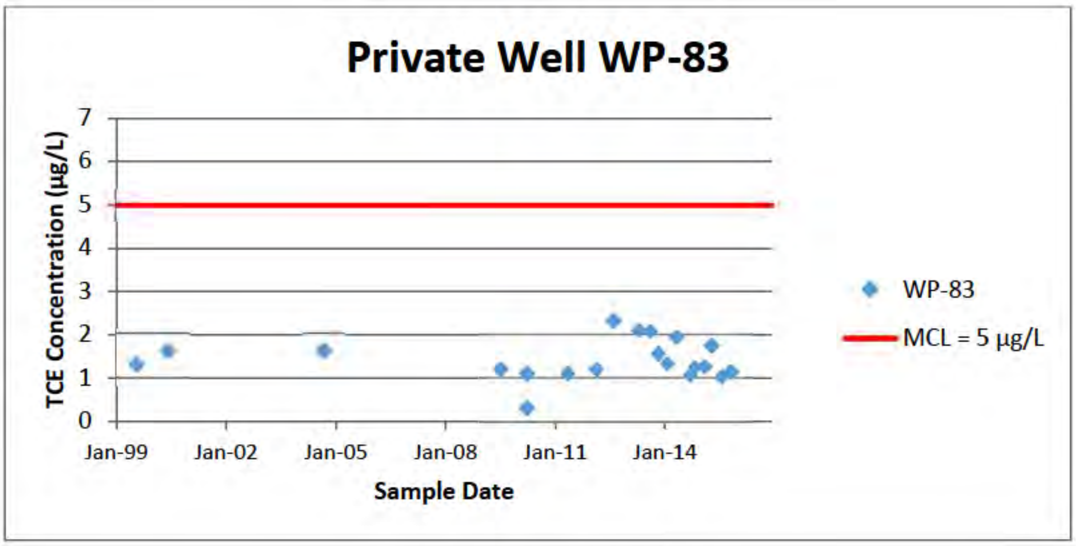
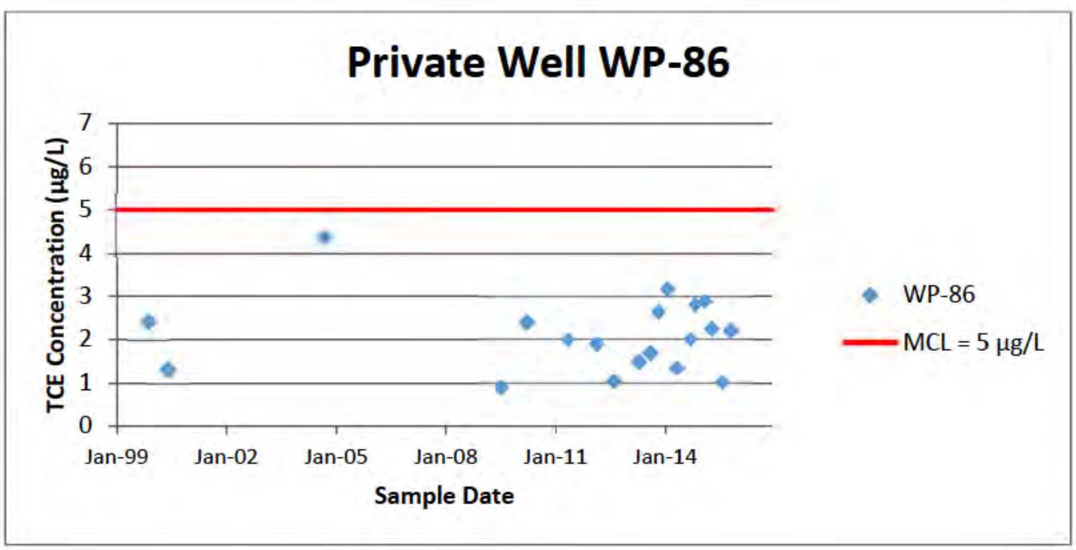
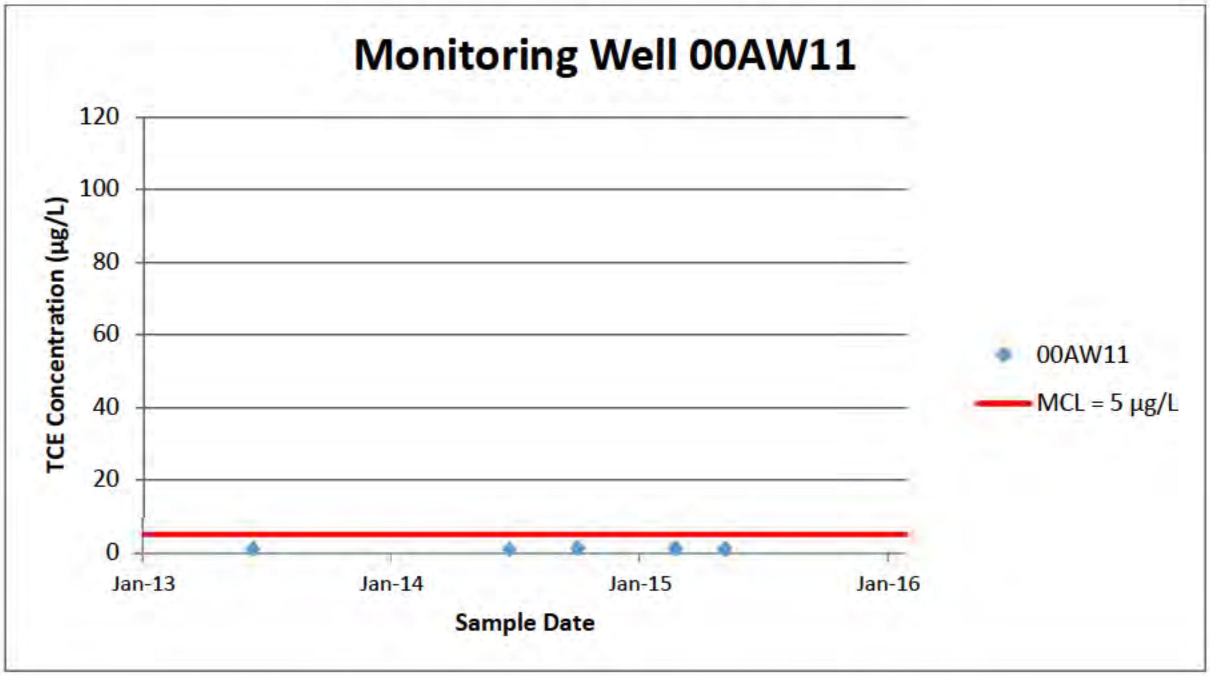
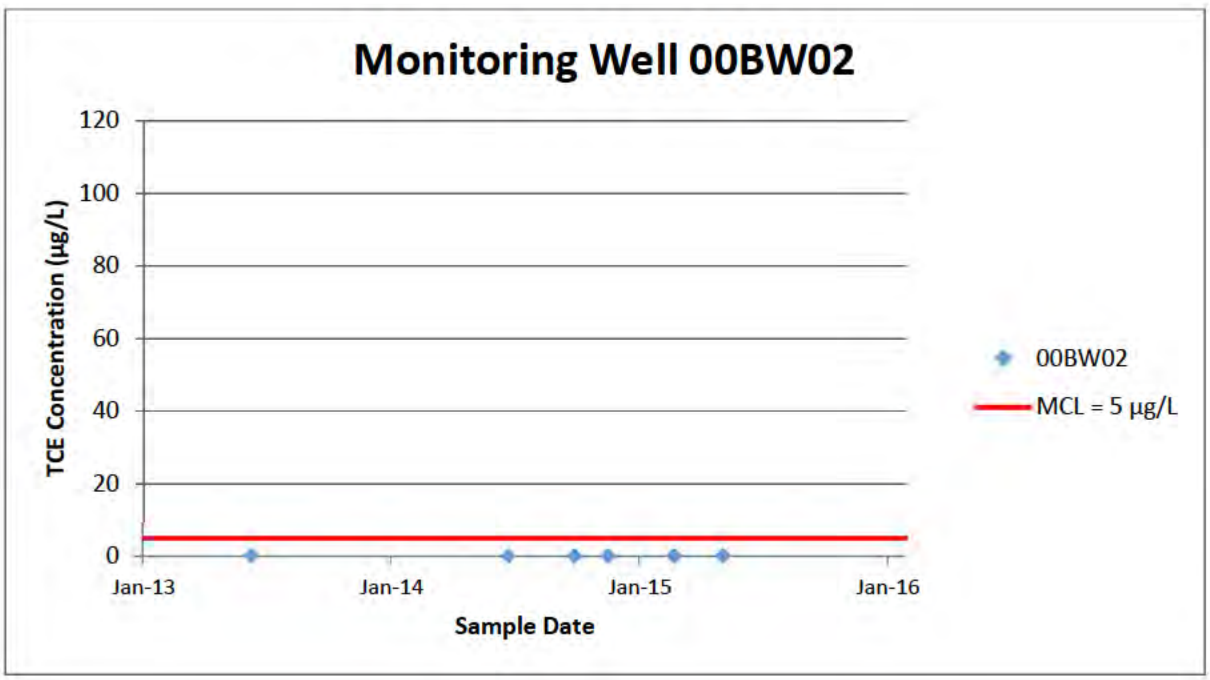






App D – TCE Time-Series Plots for Monitoring Wells Quarterly Monitoring





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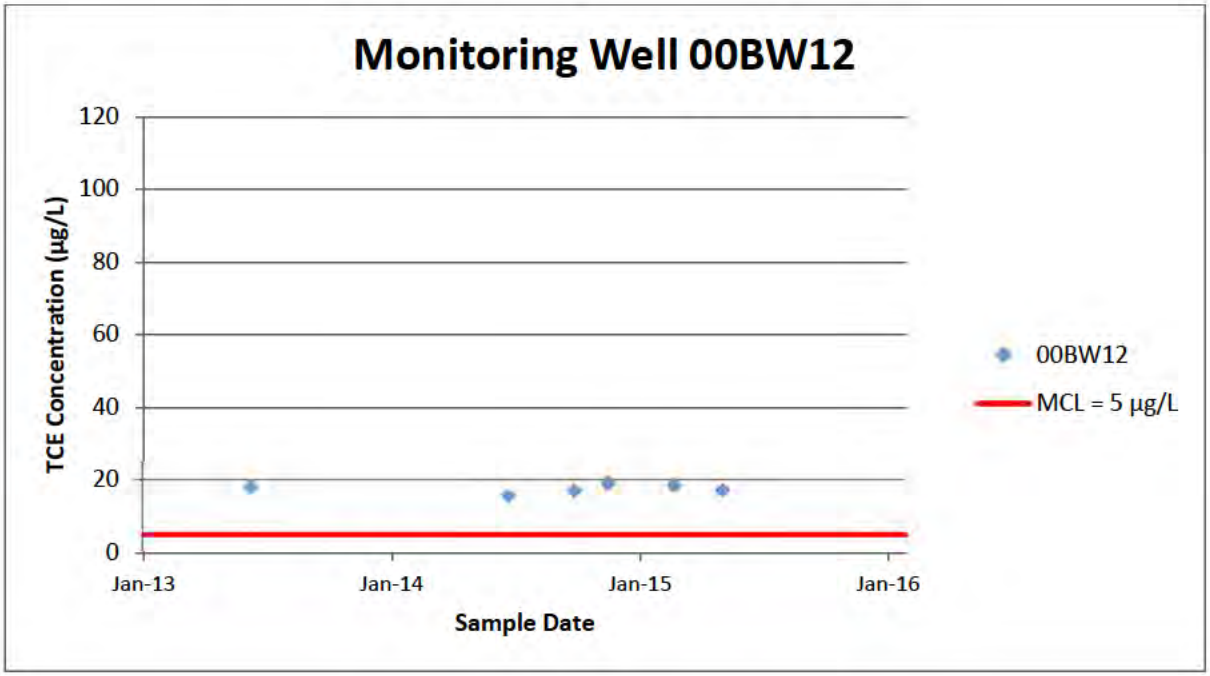

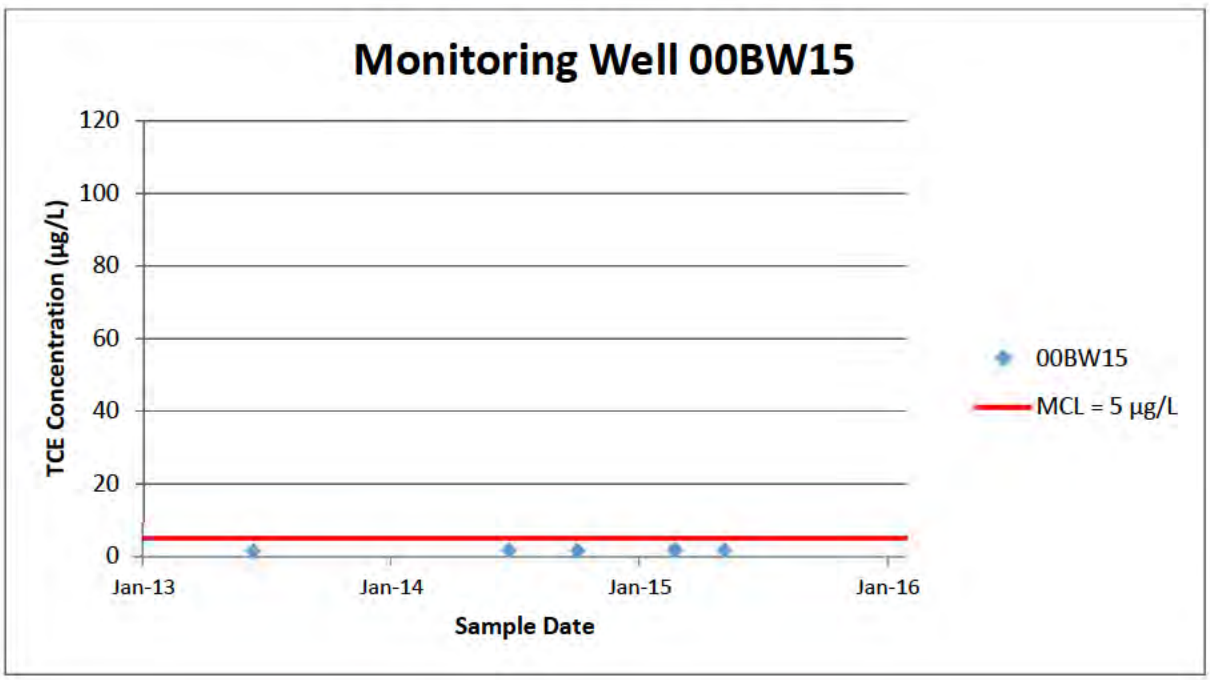

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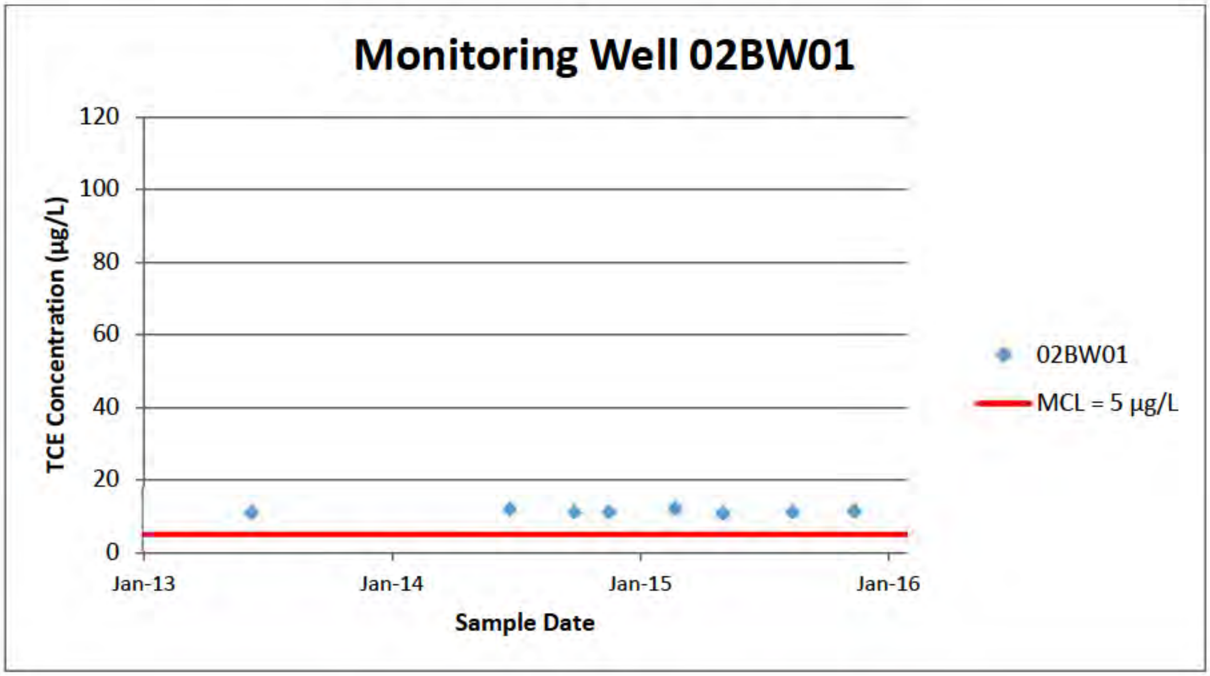

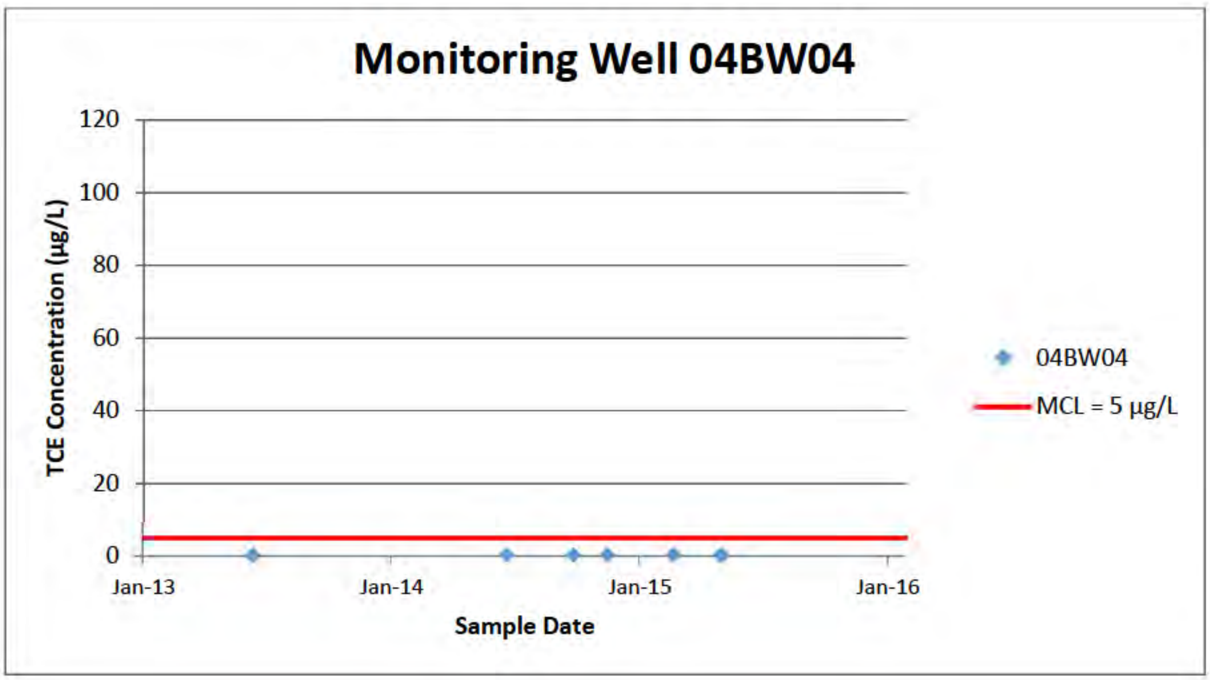

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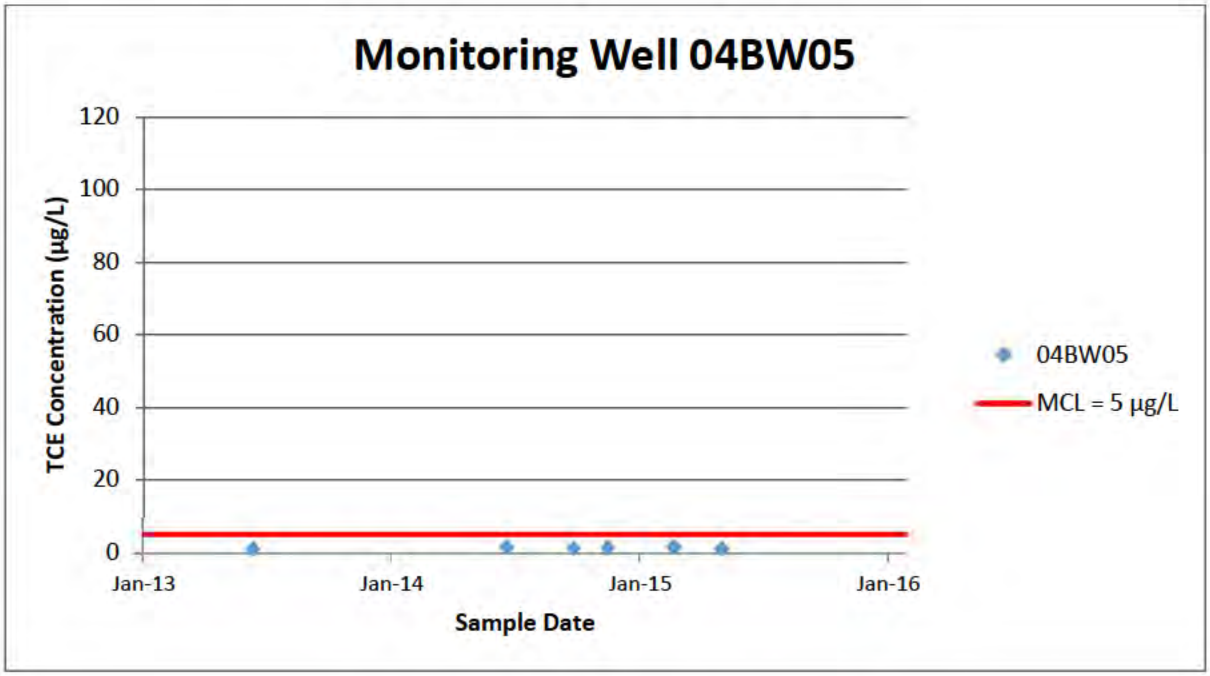

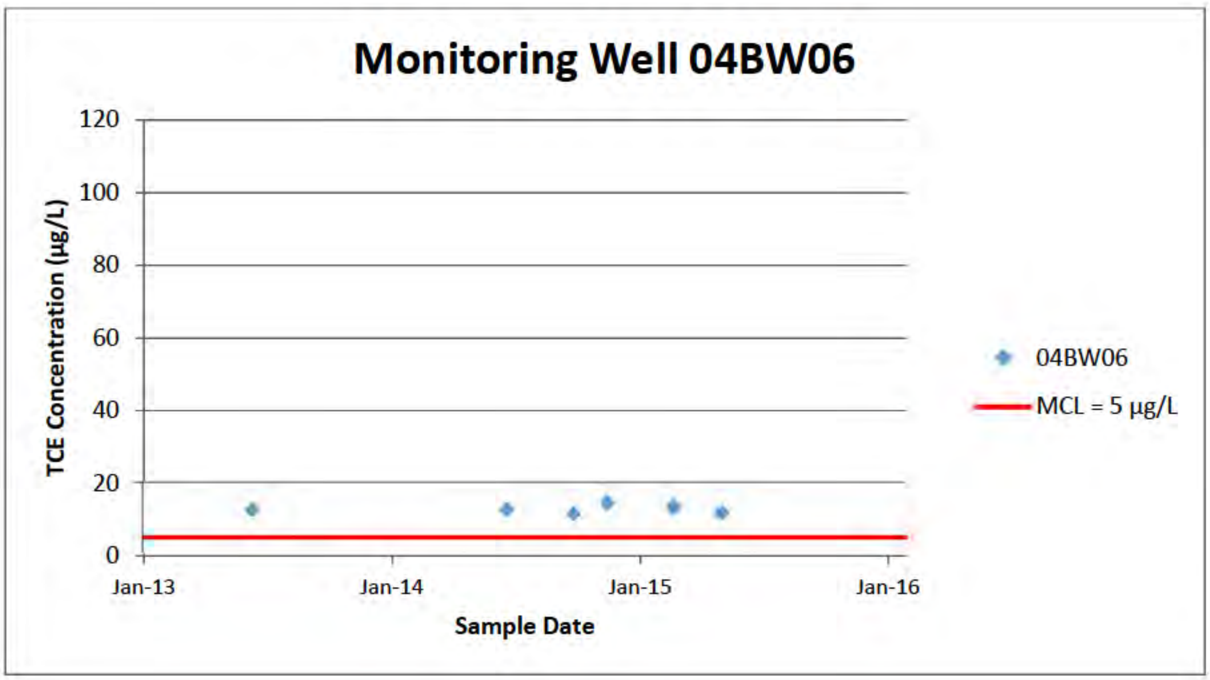

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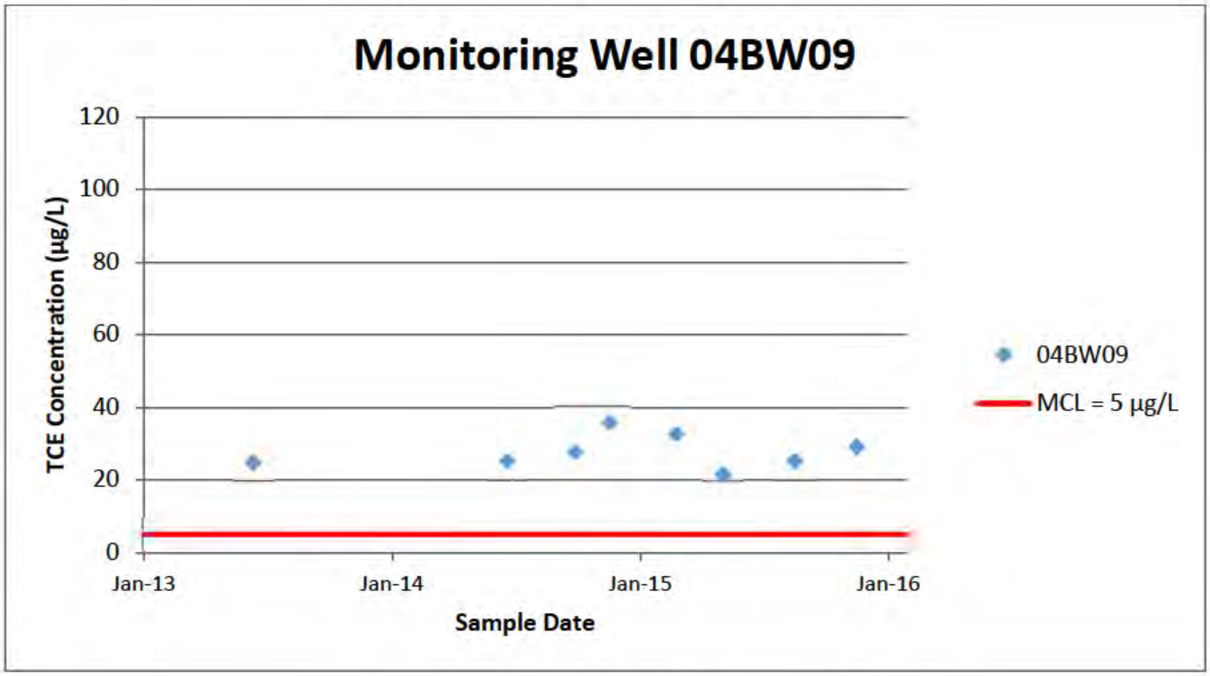
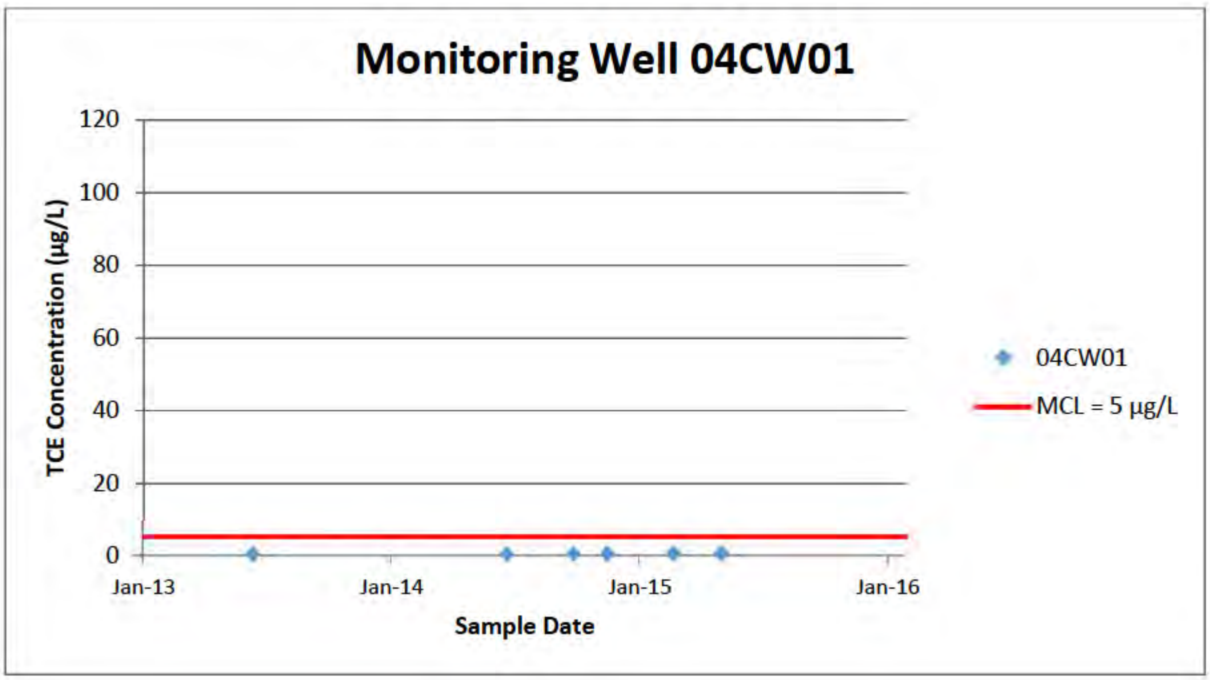
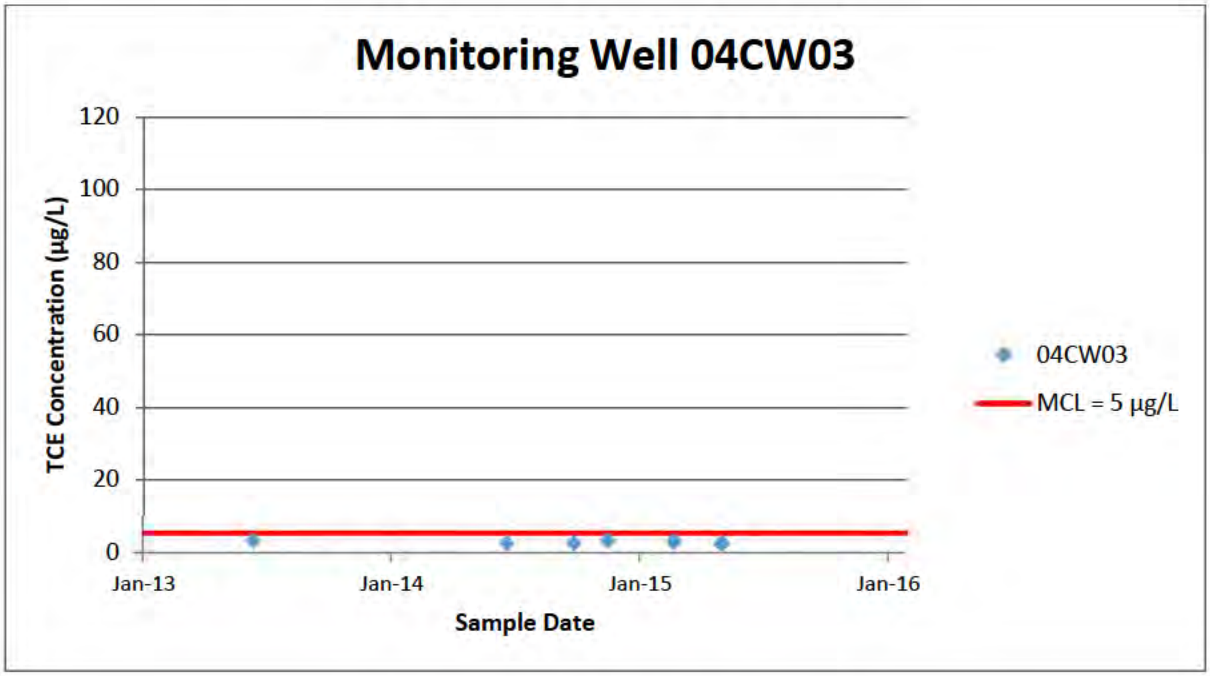
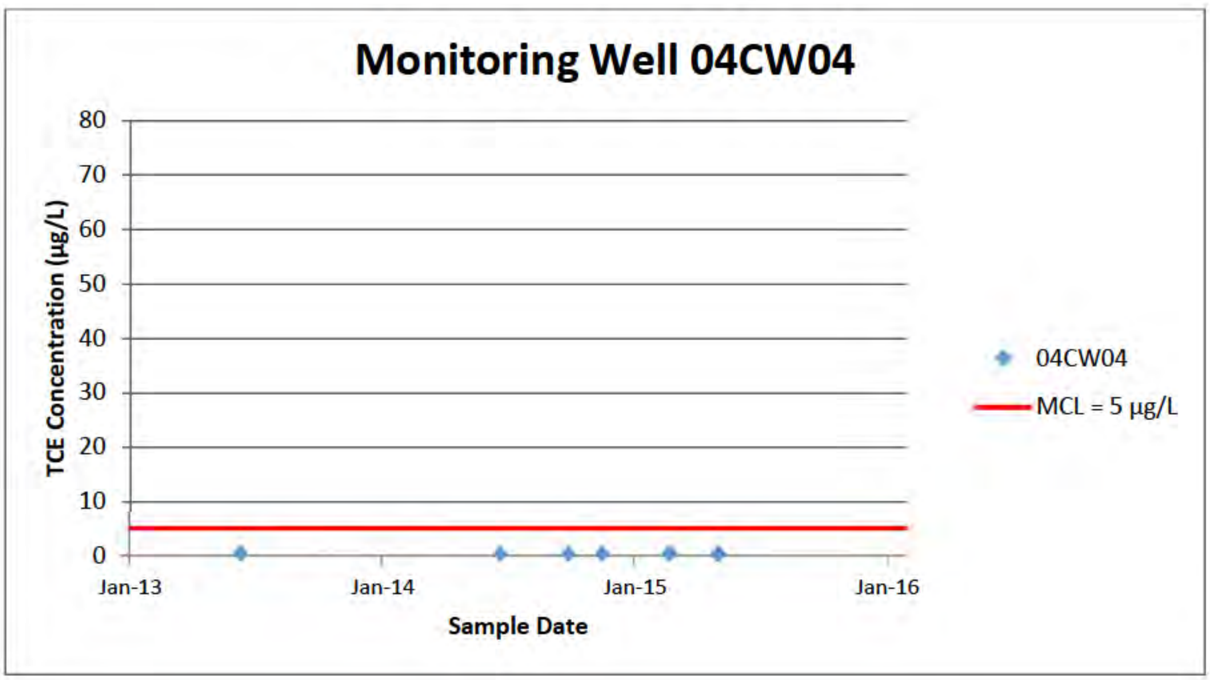




App D – TCE Time-Series Plots for Monitoring Wells Quarterly Monitoring





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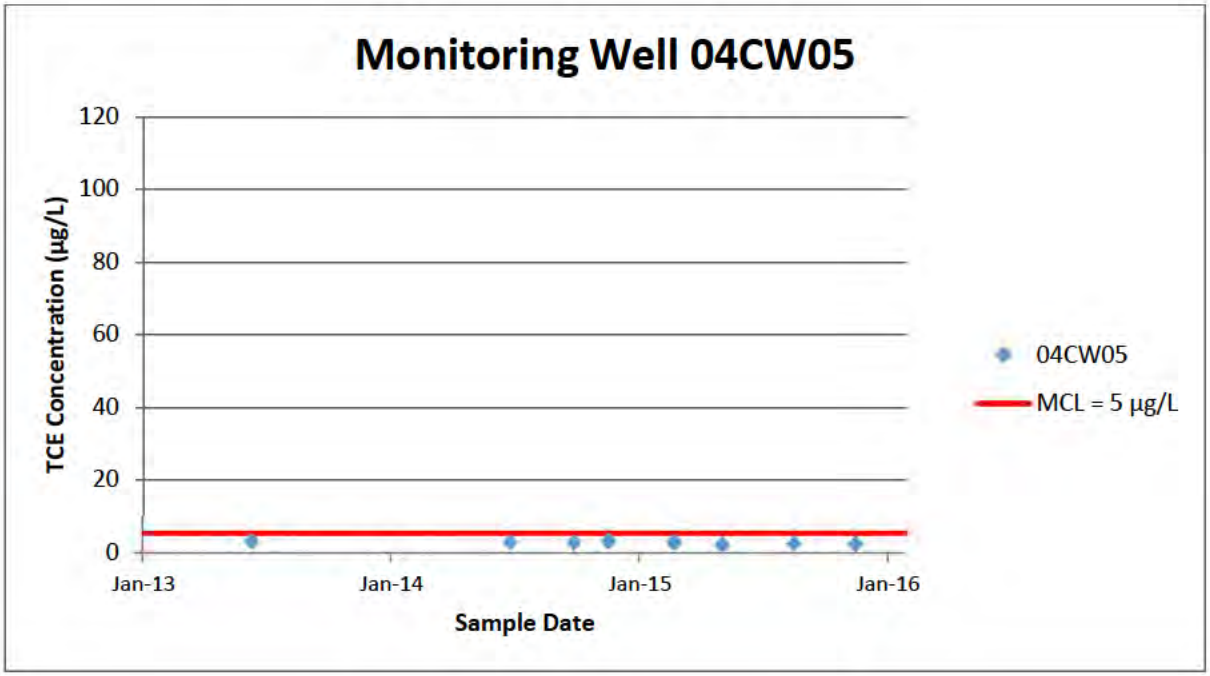

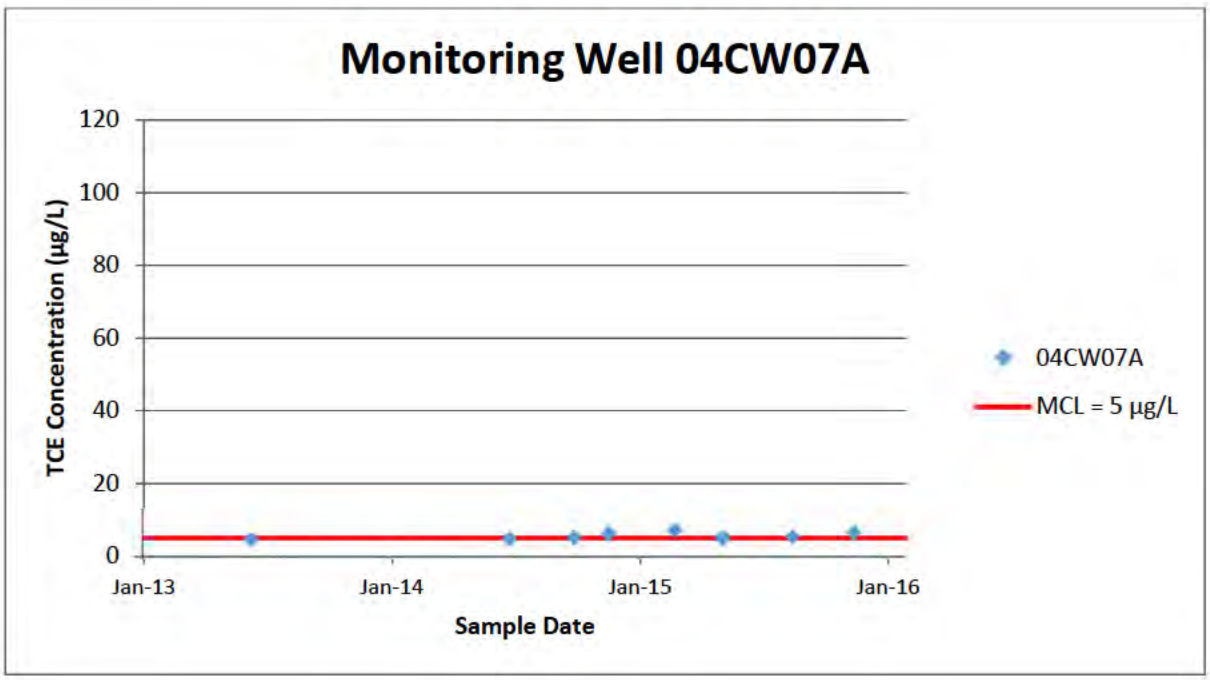

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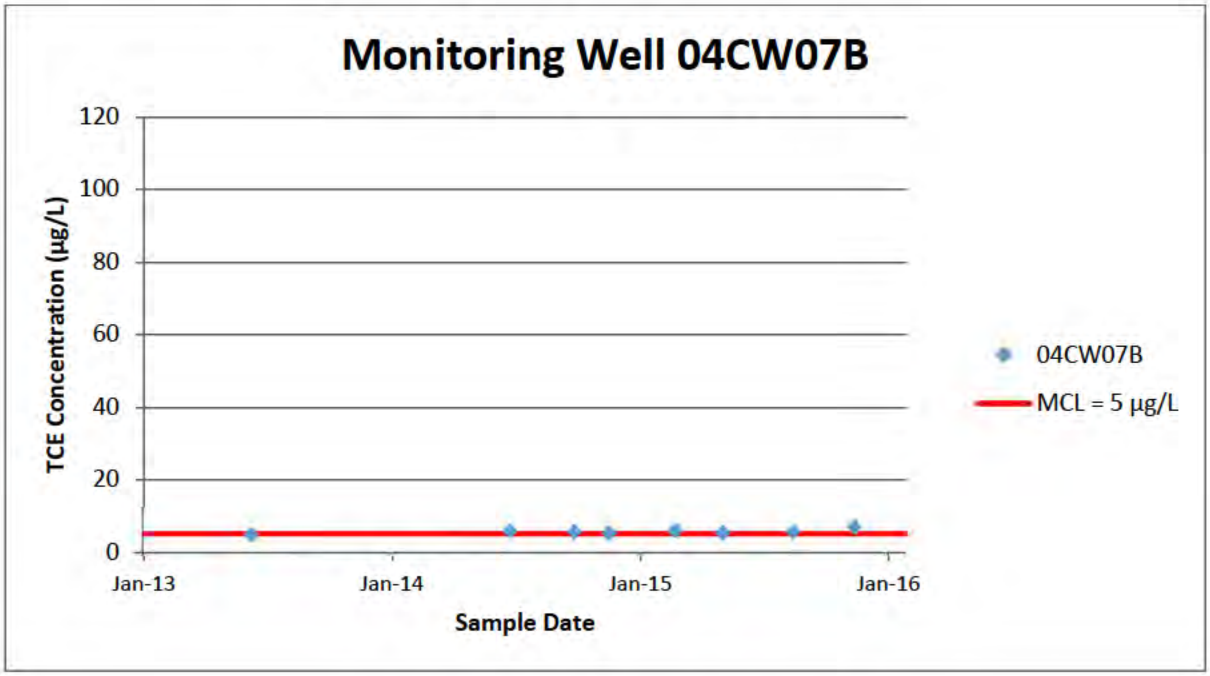

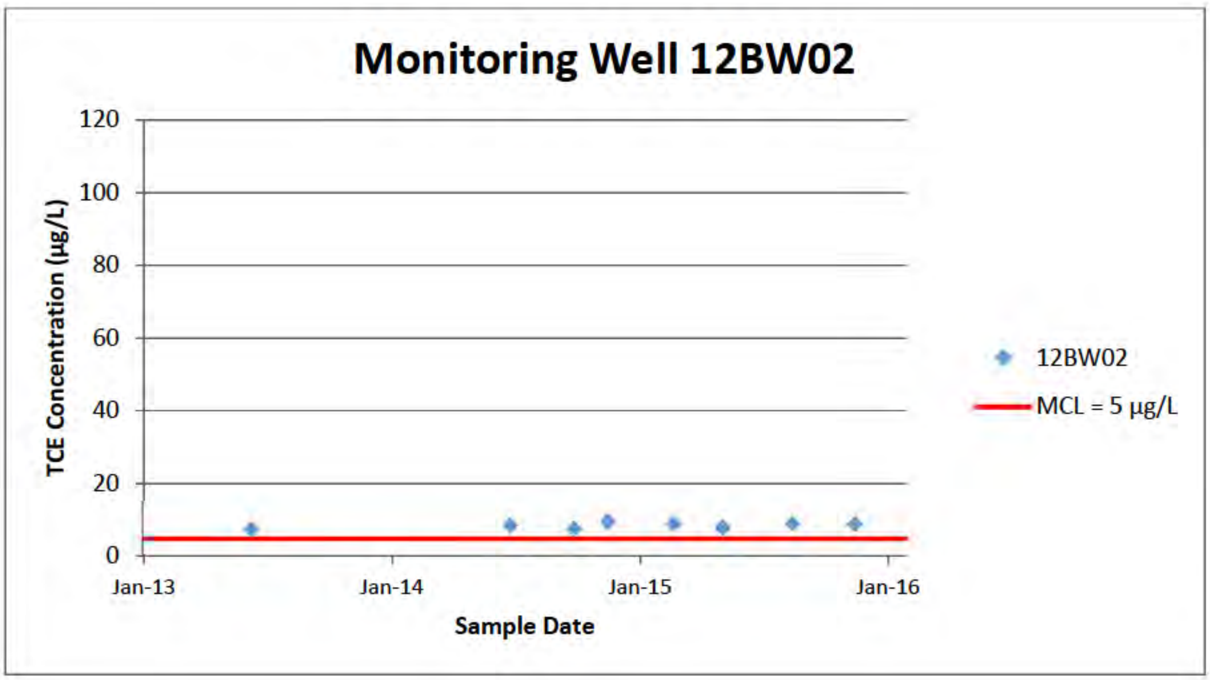

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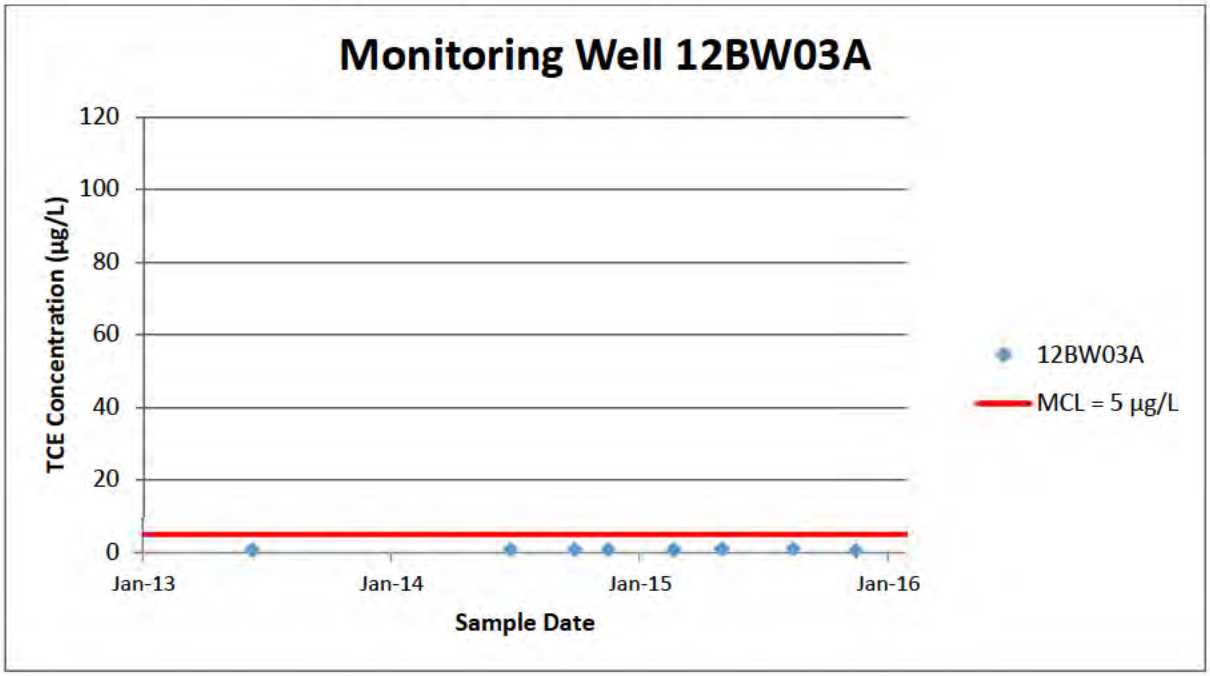

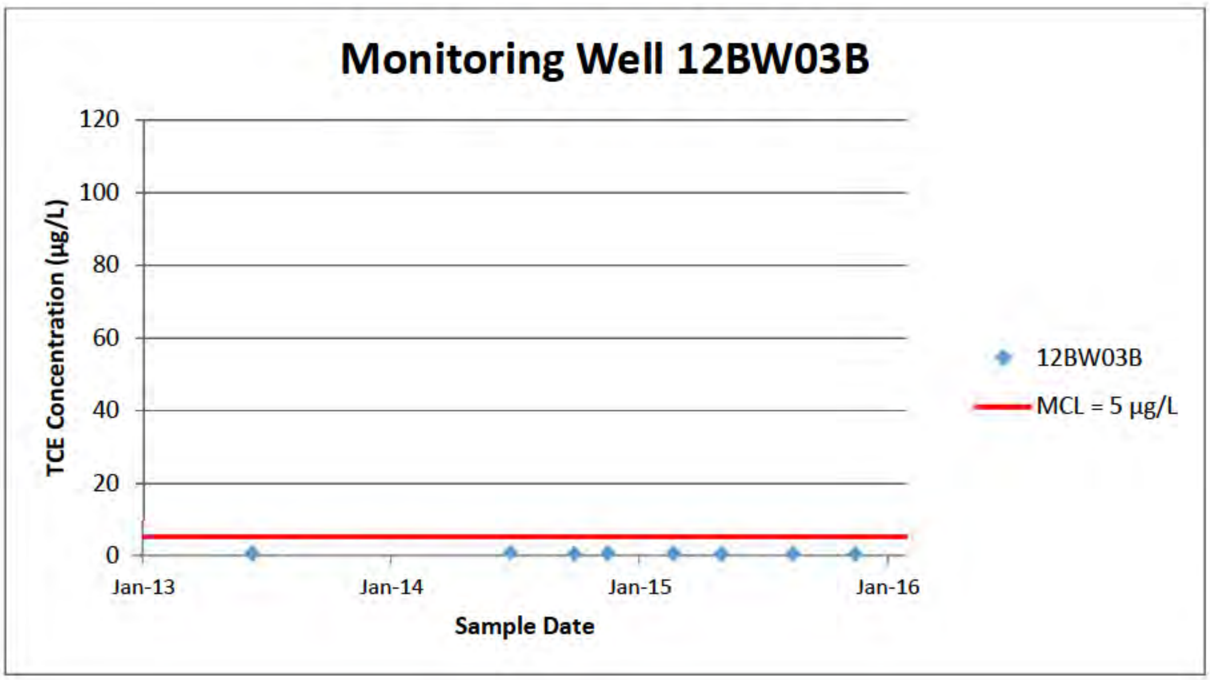

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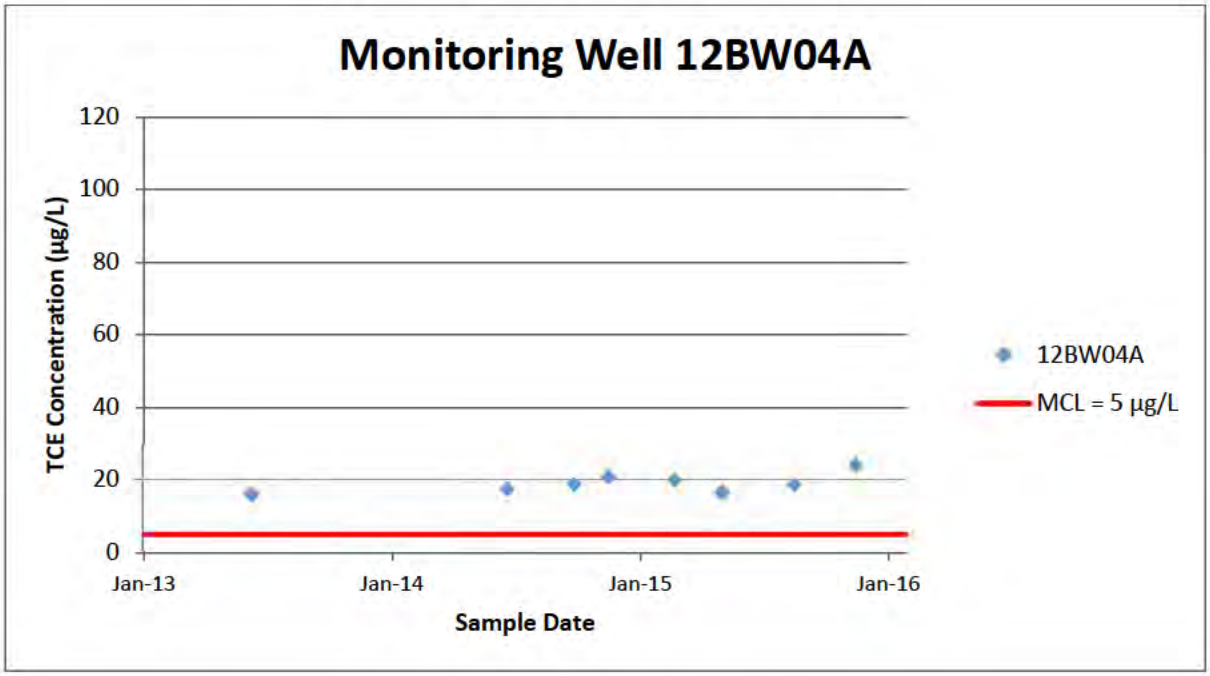

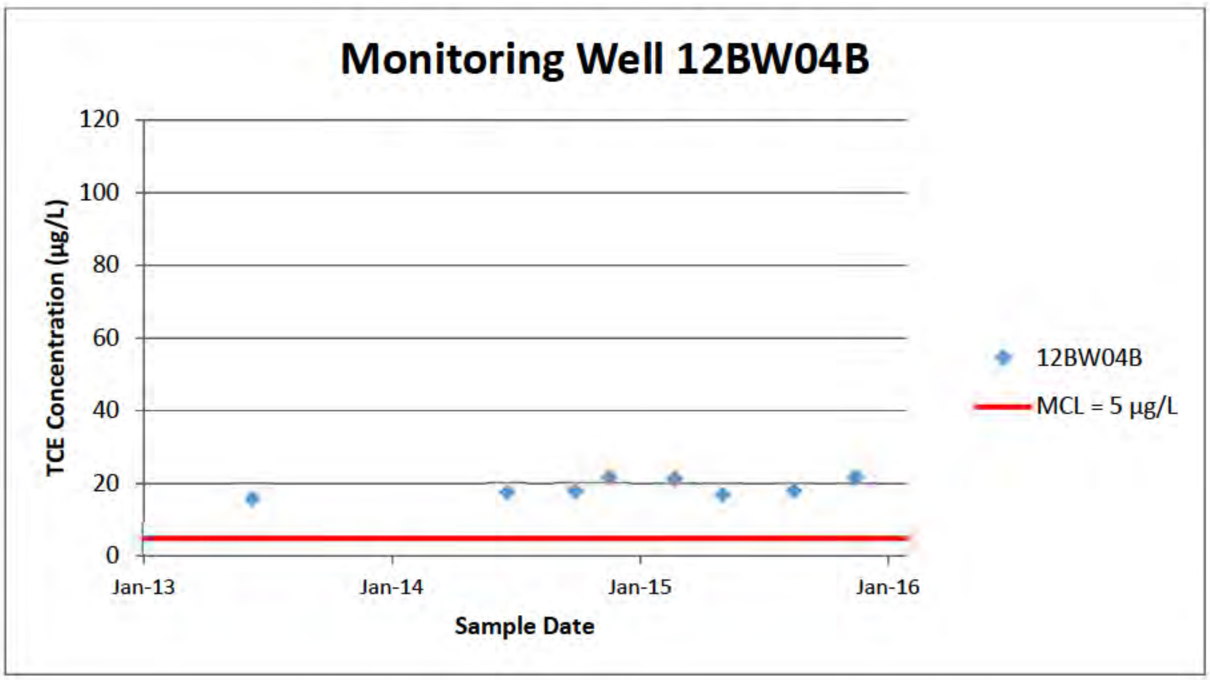

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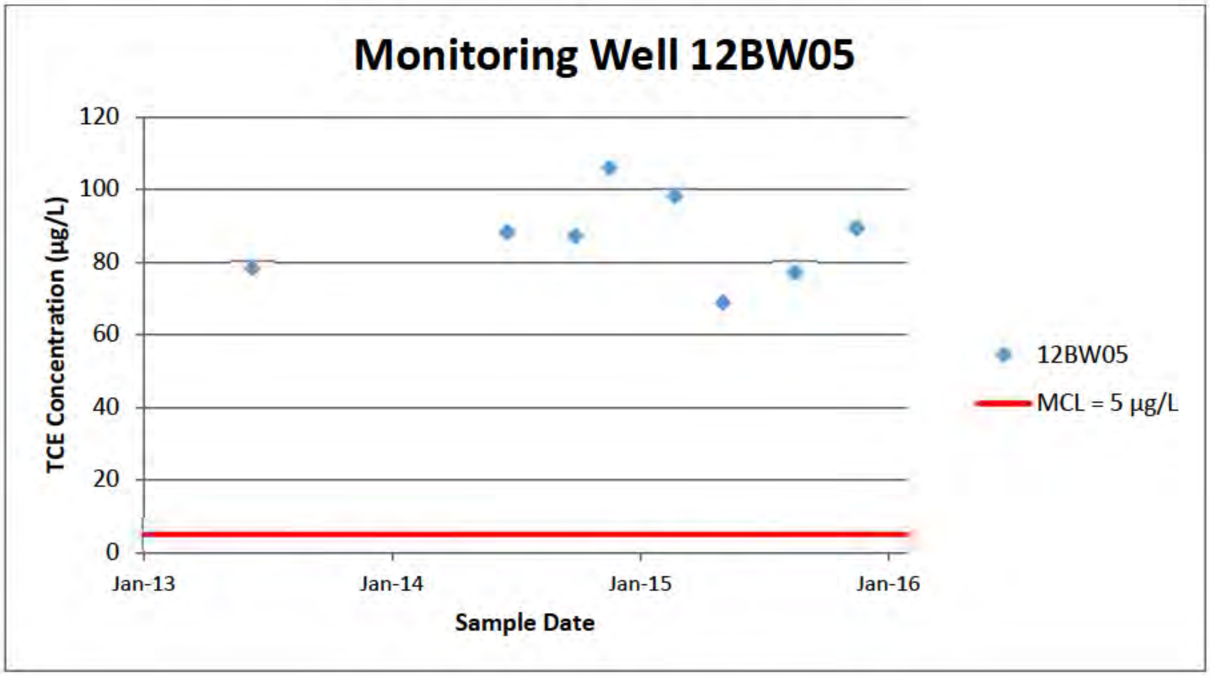

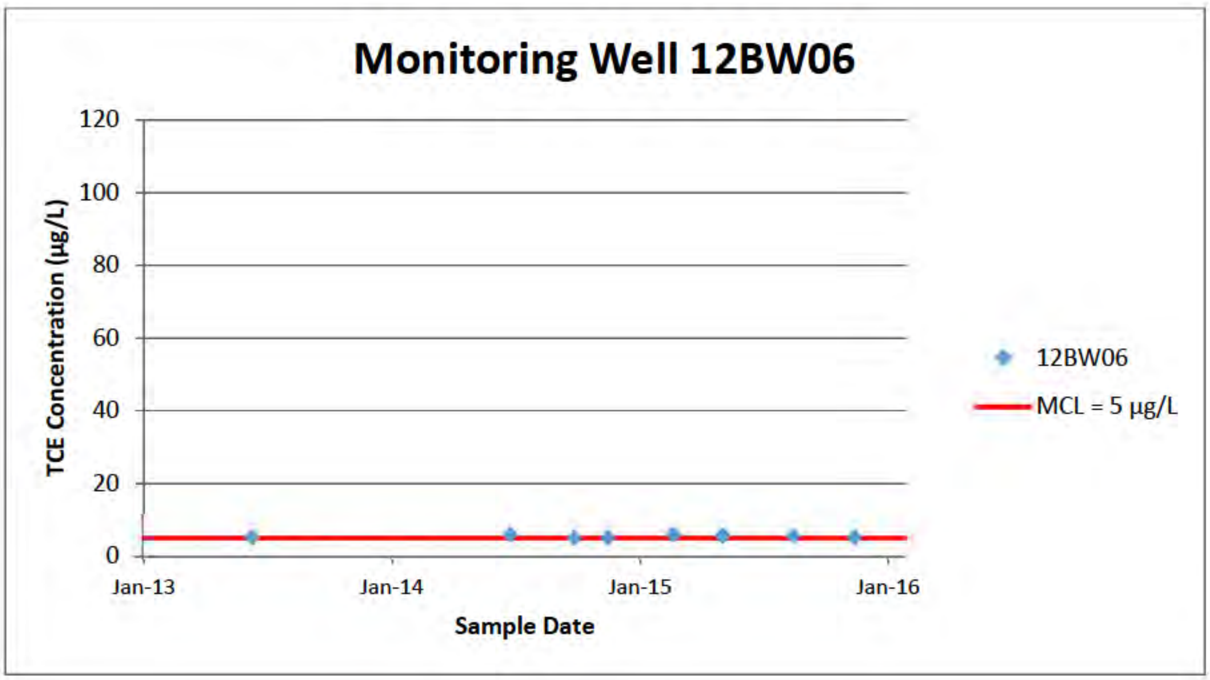

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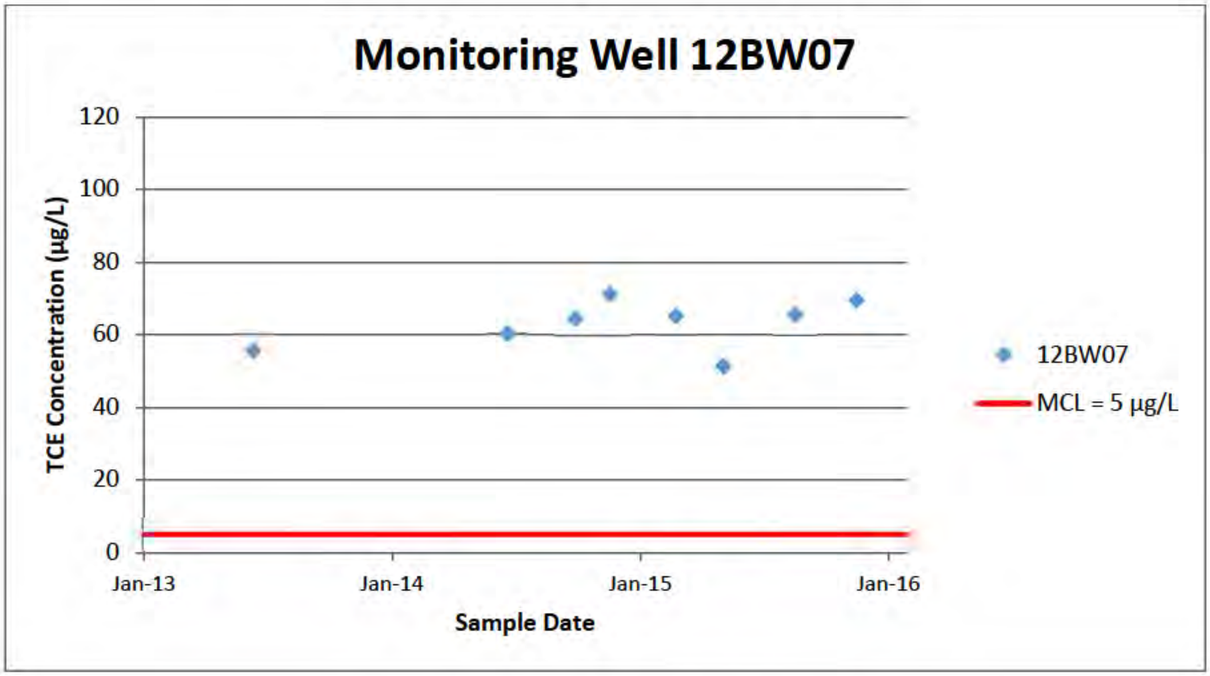

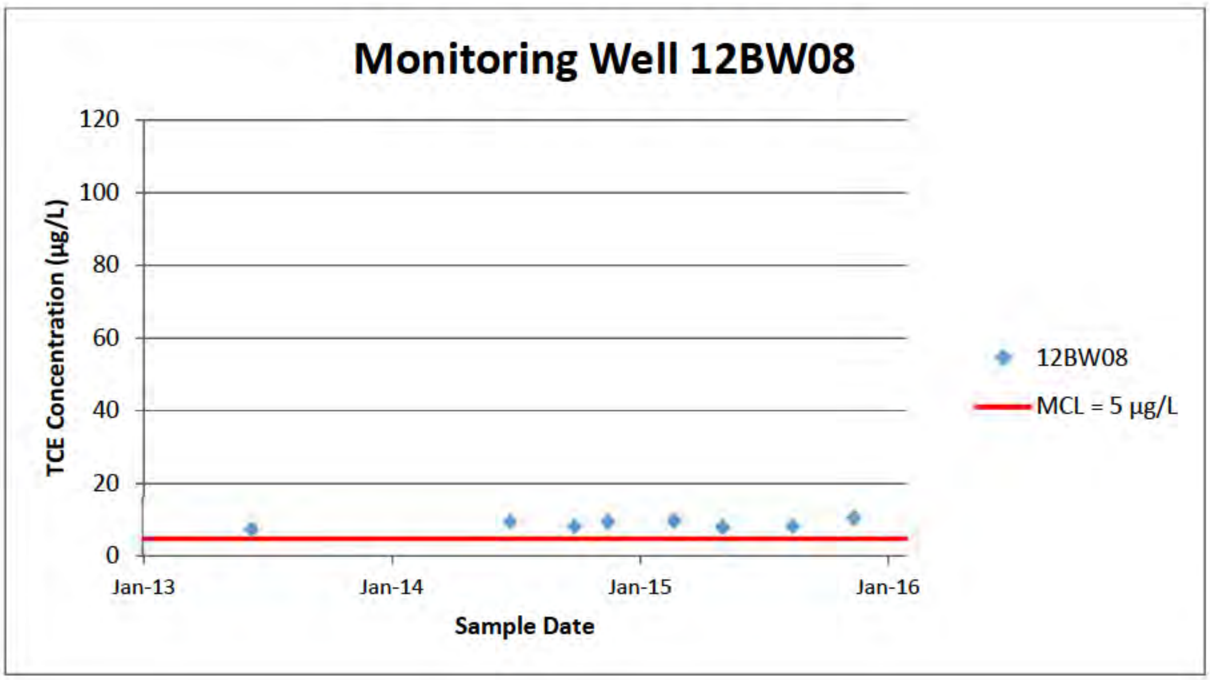

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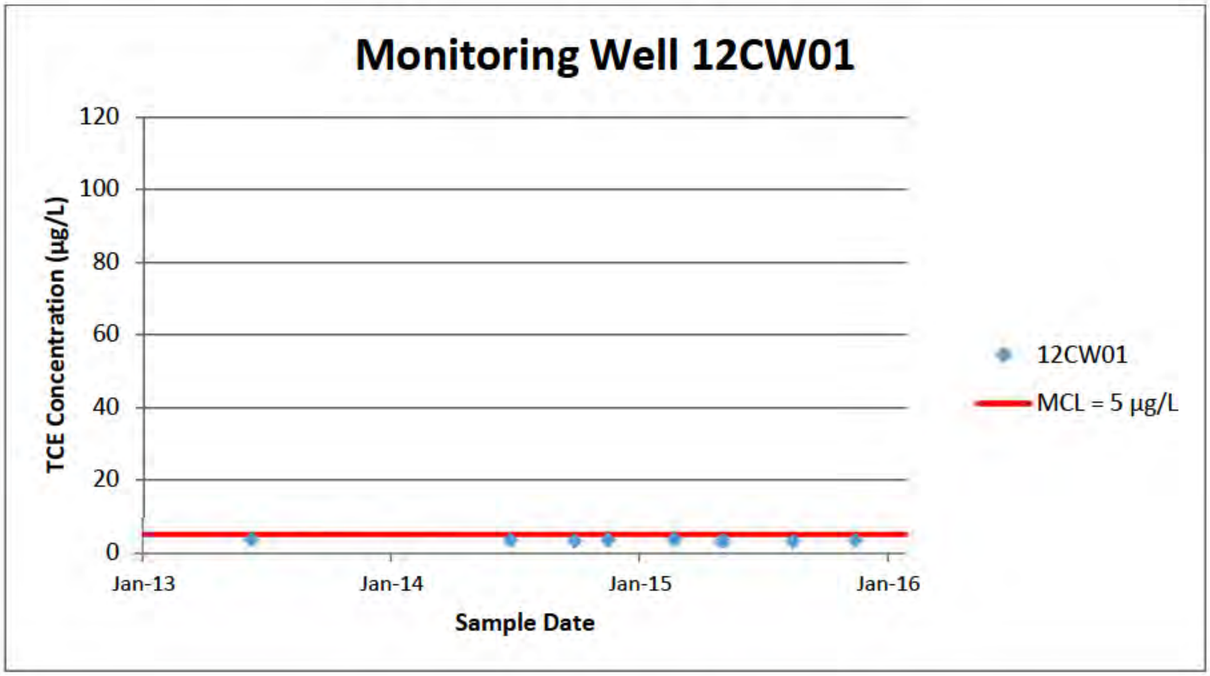

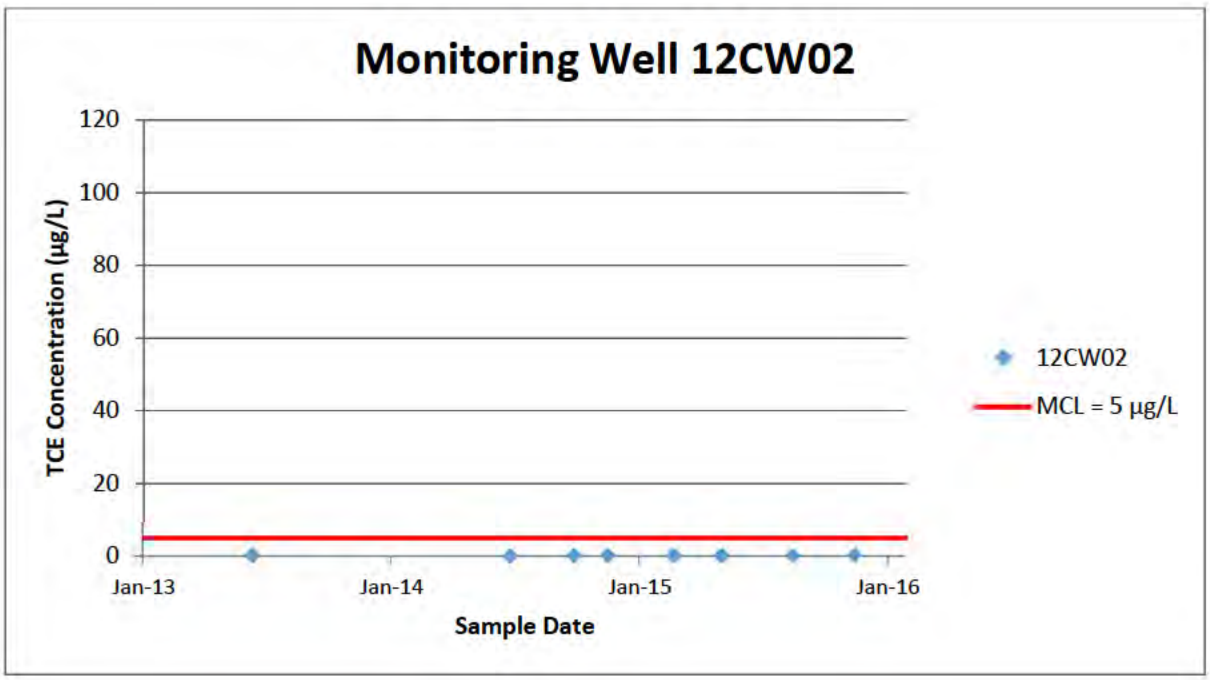

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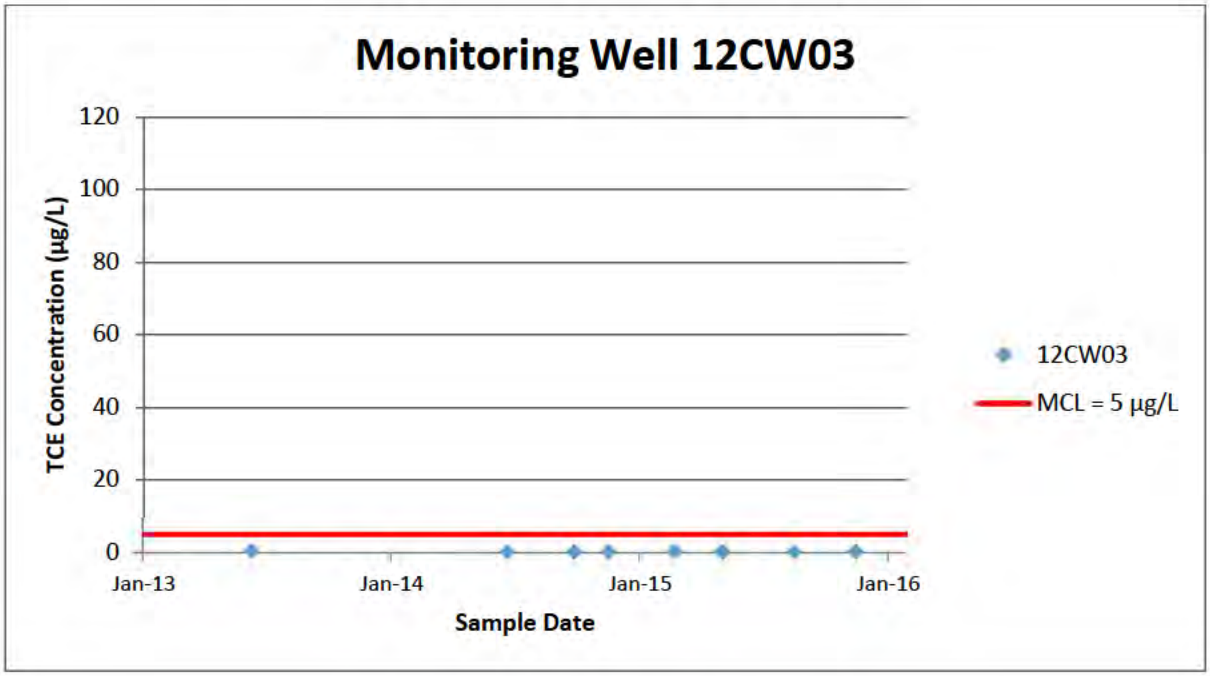

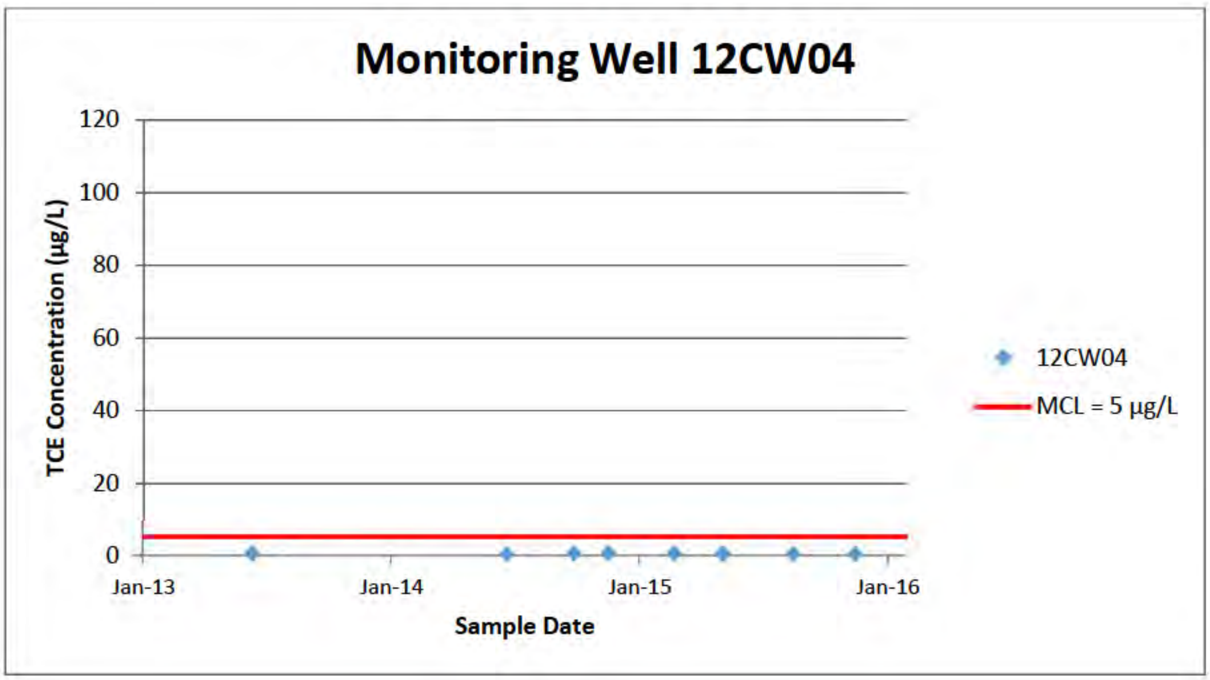

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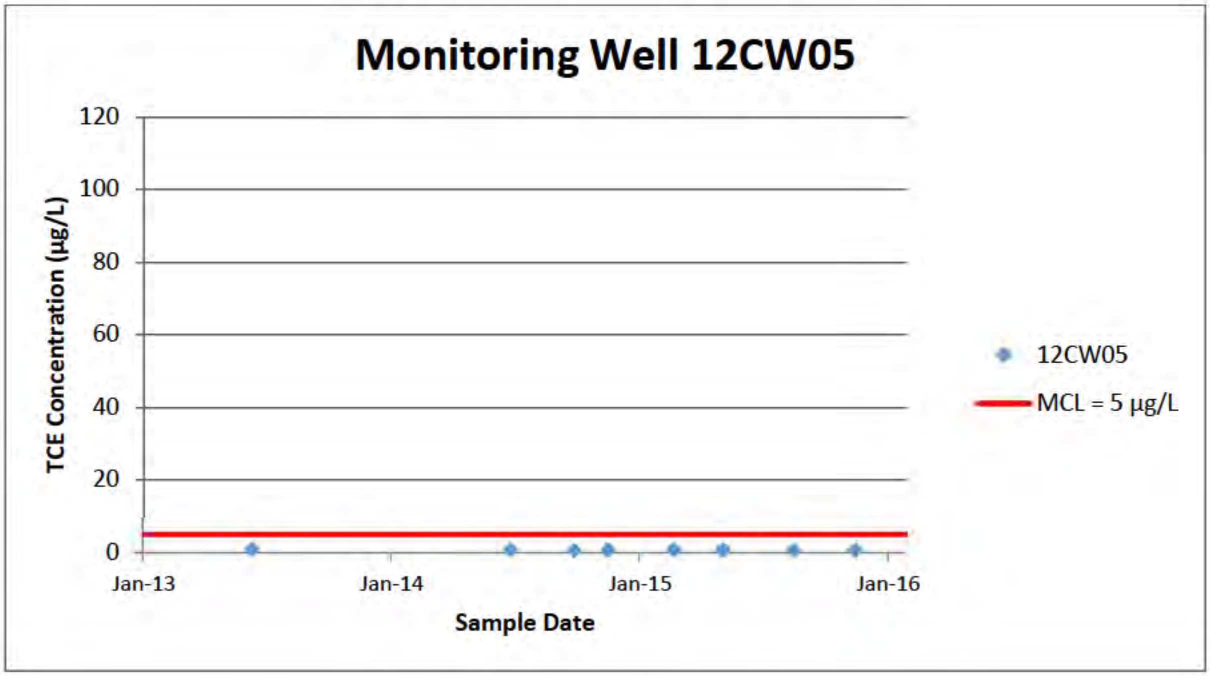

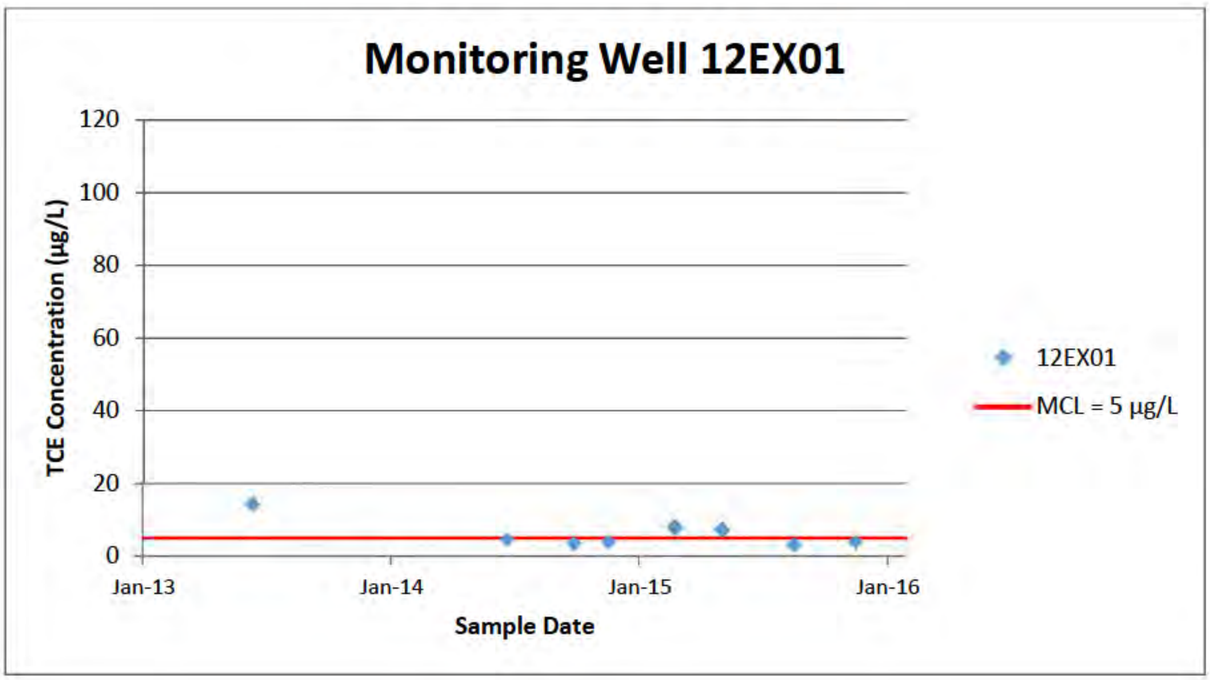

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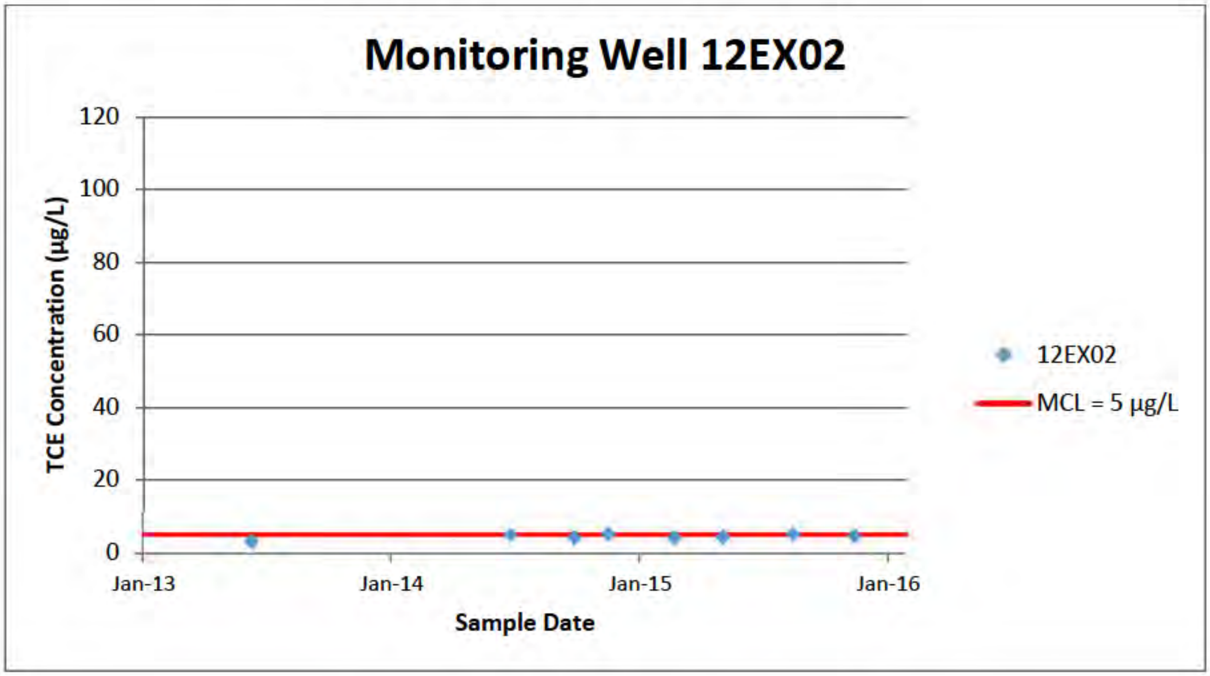

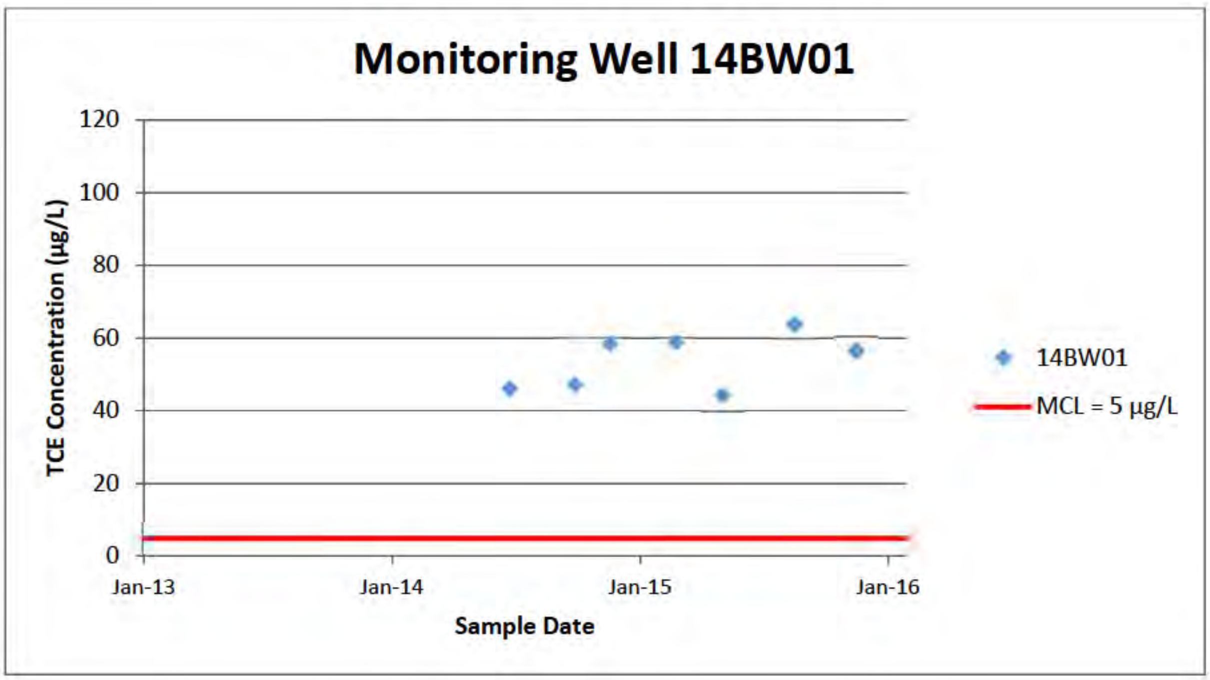

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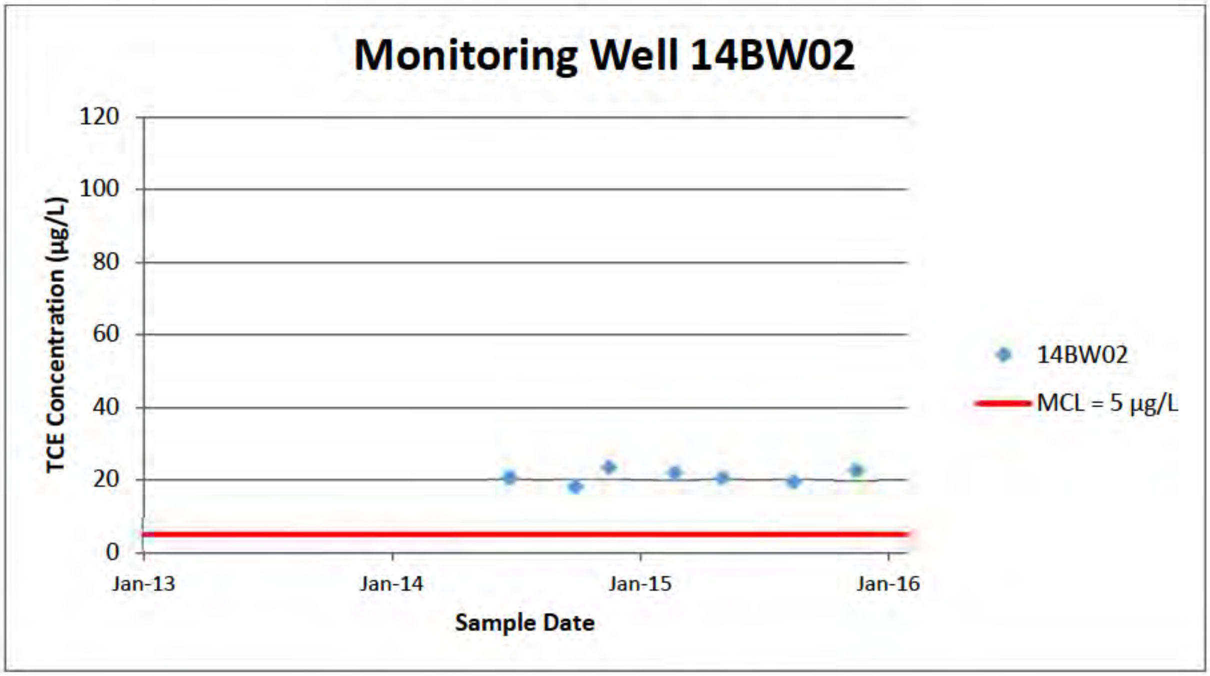

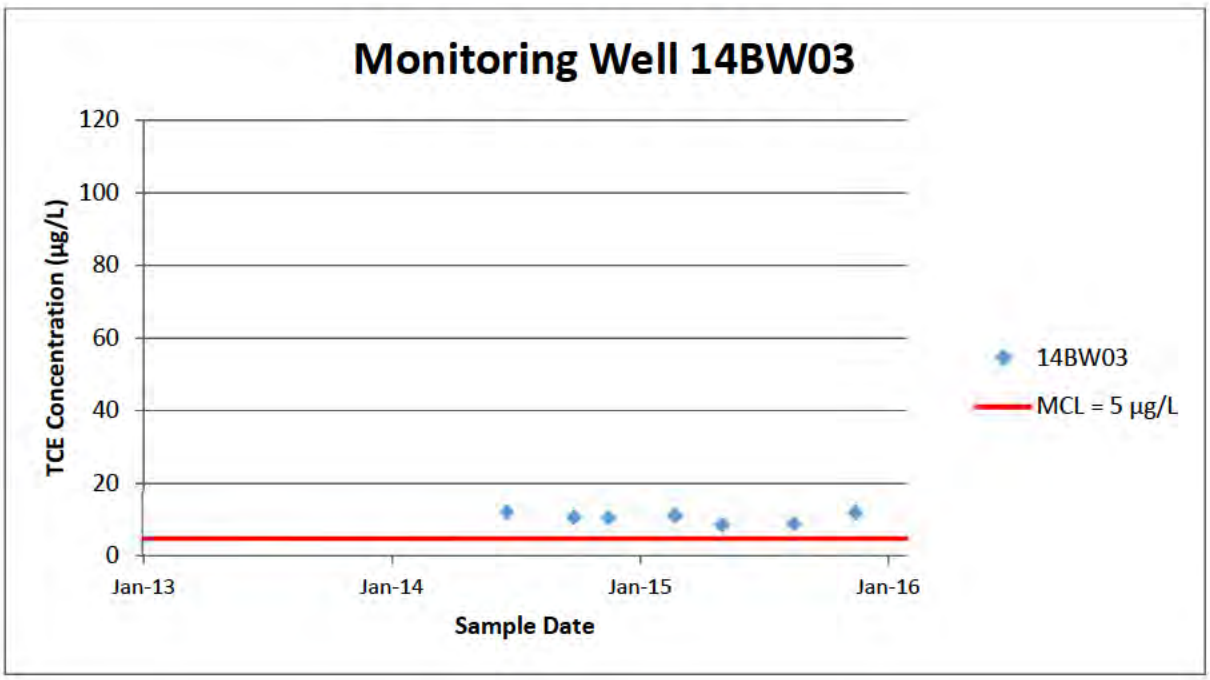

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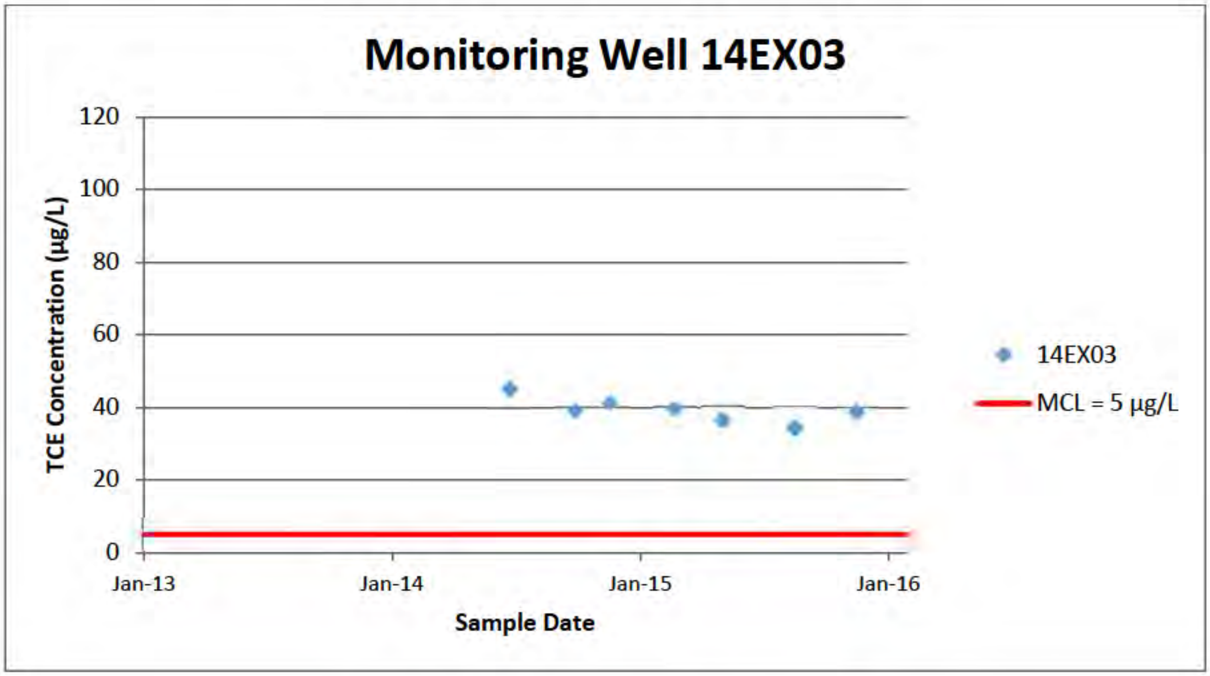

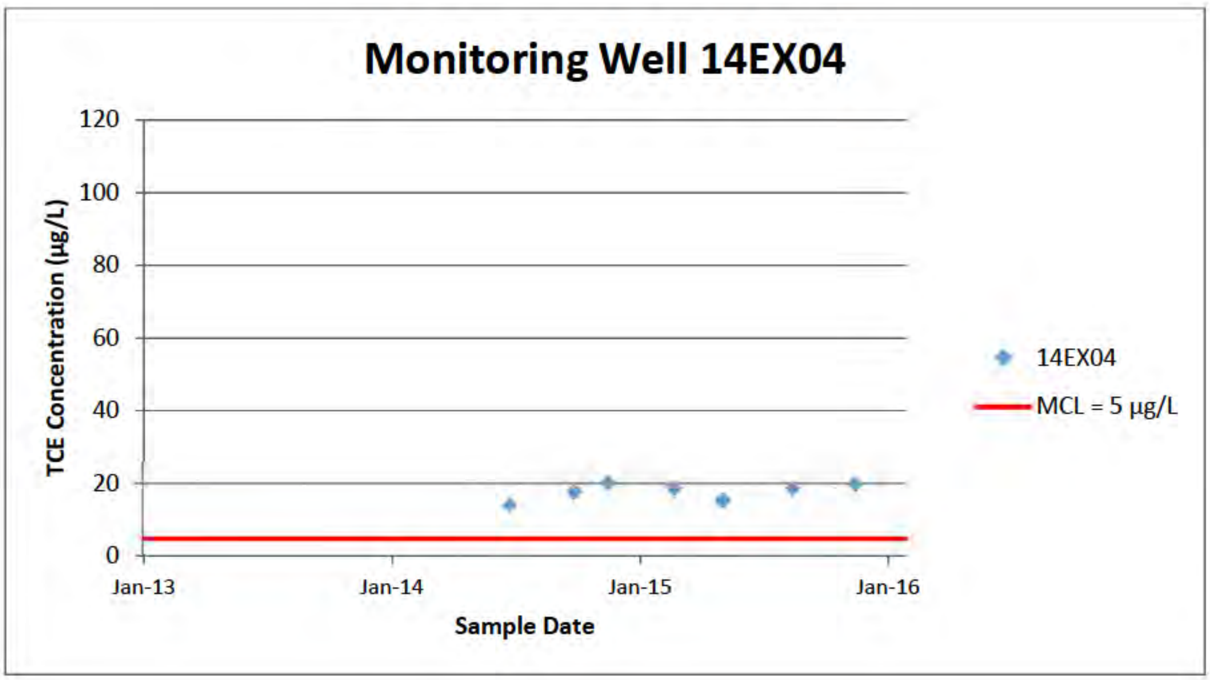

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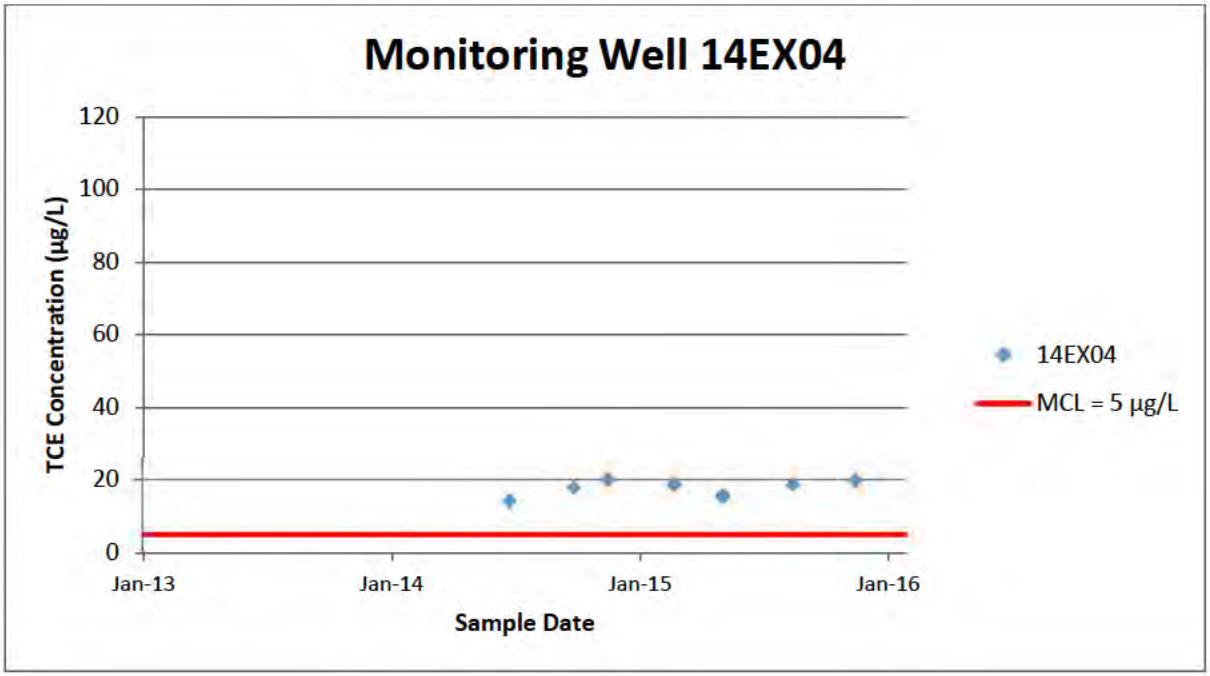

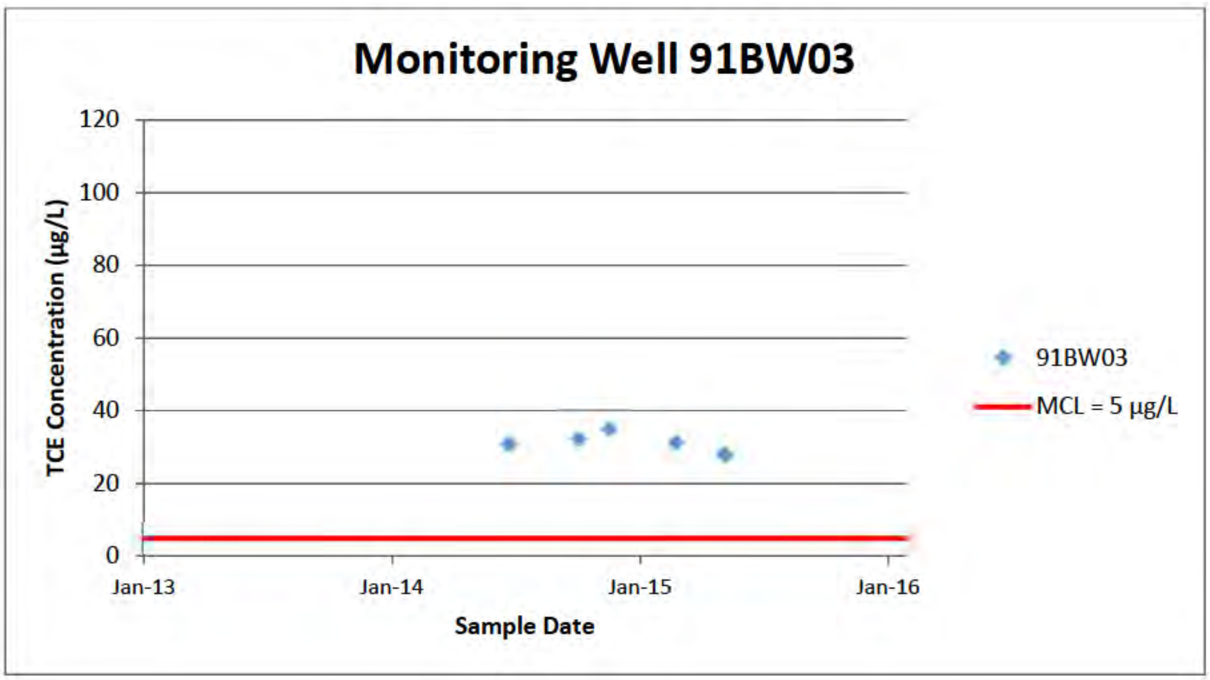

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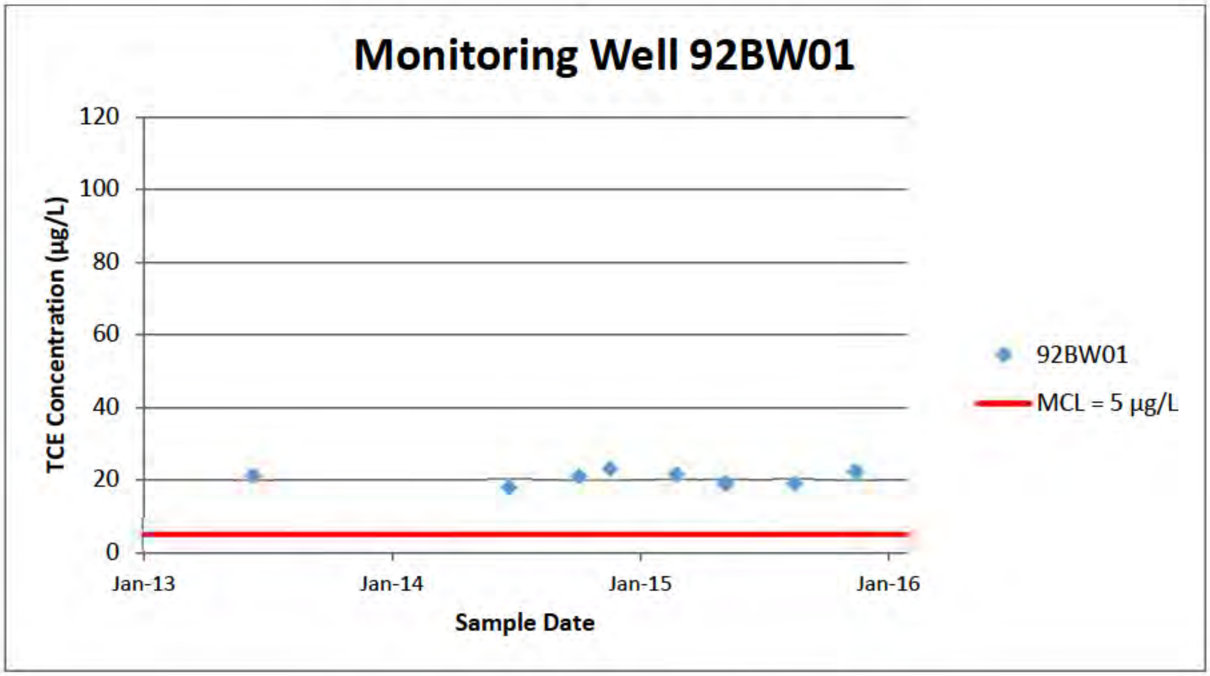

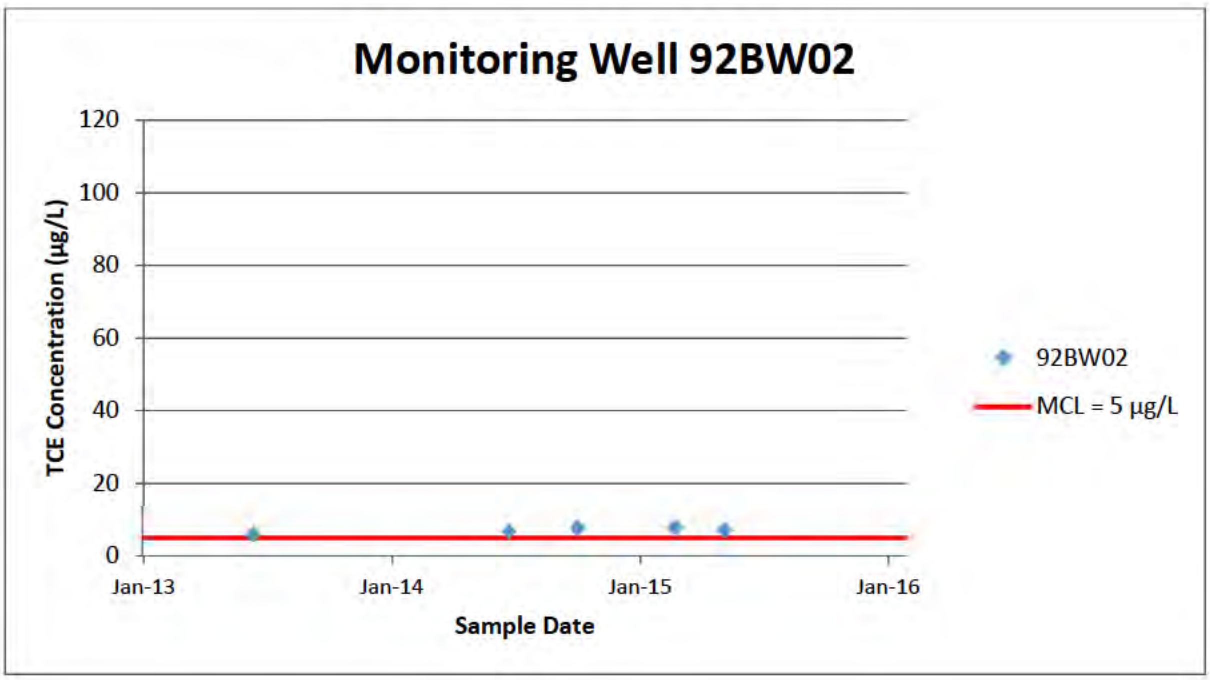

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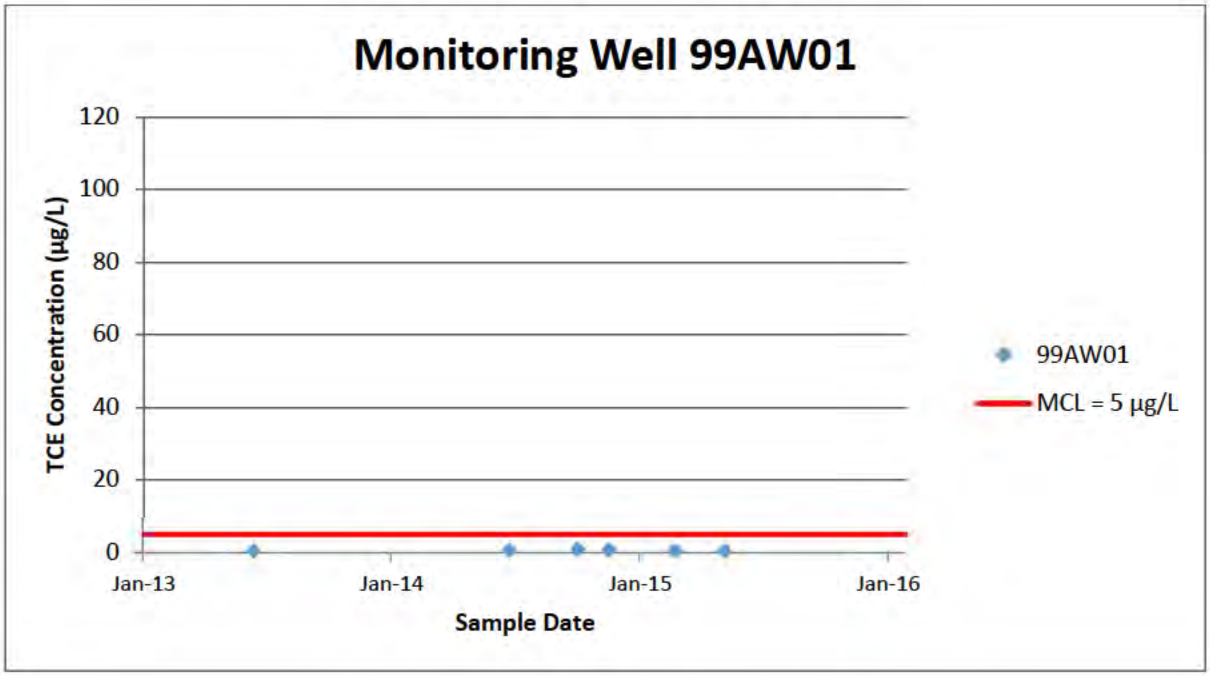

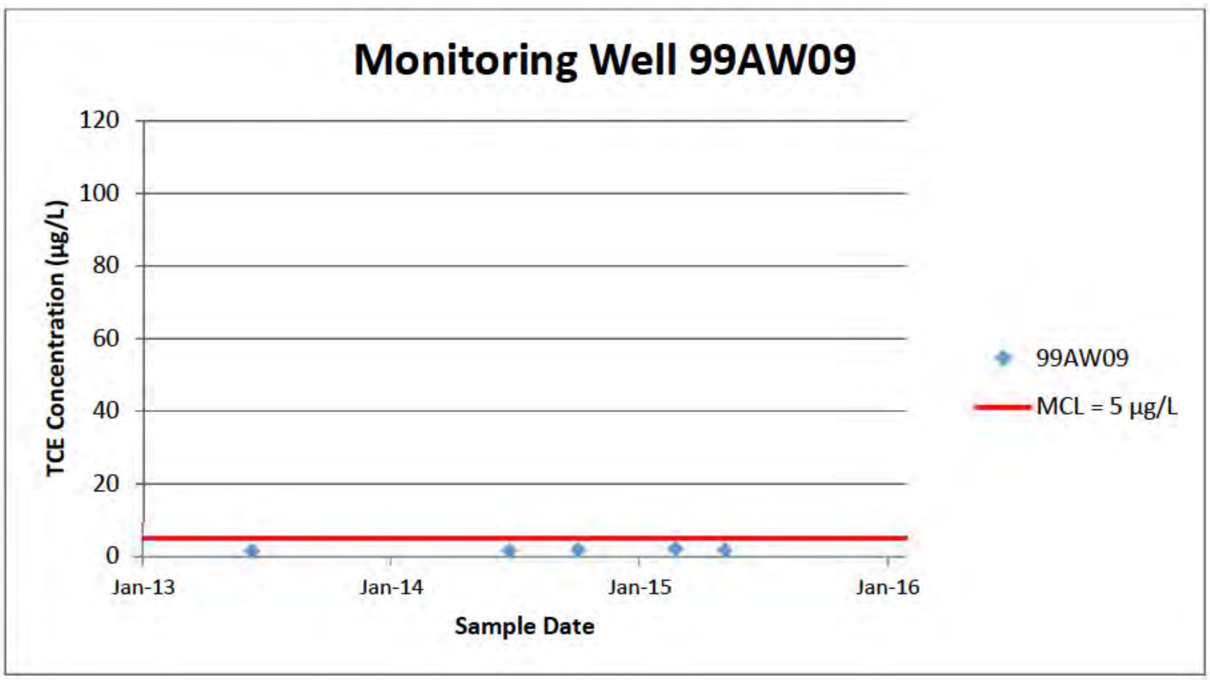

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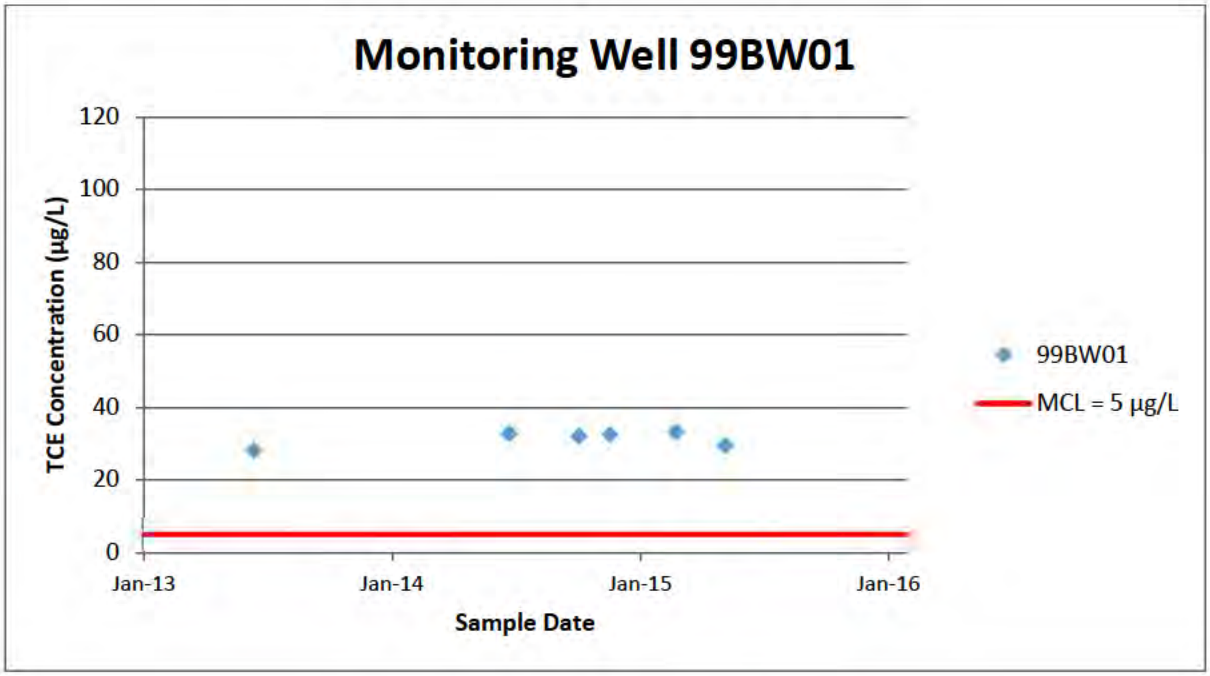

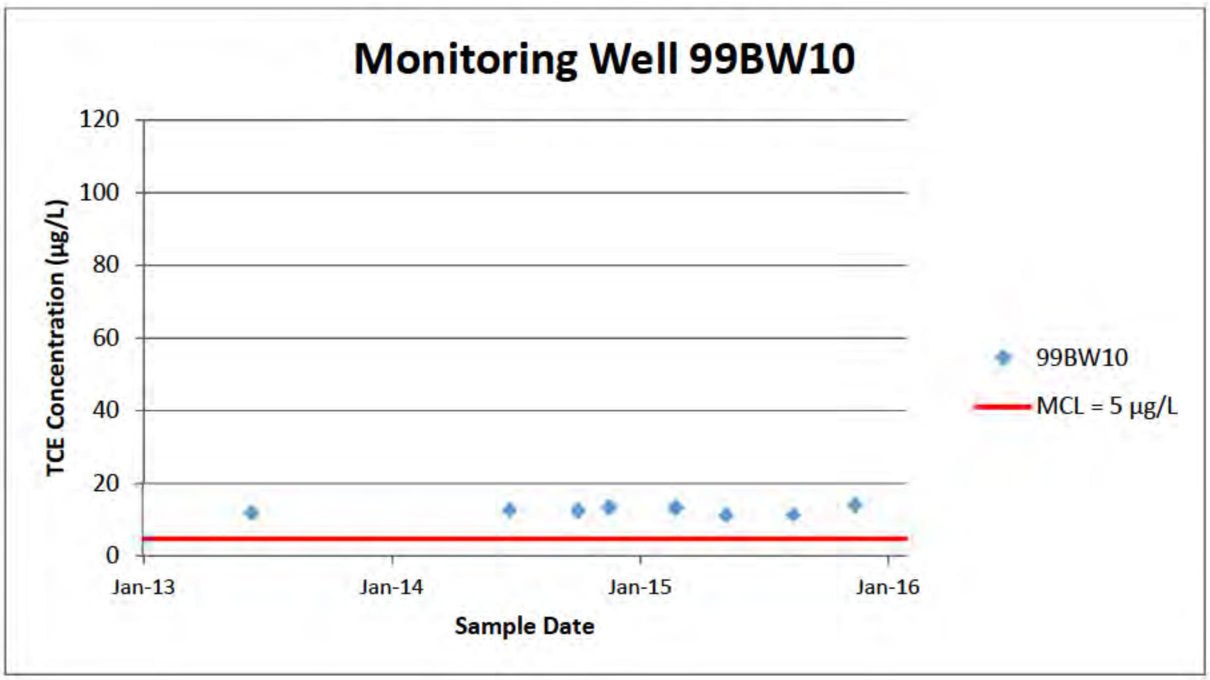

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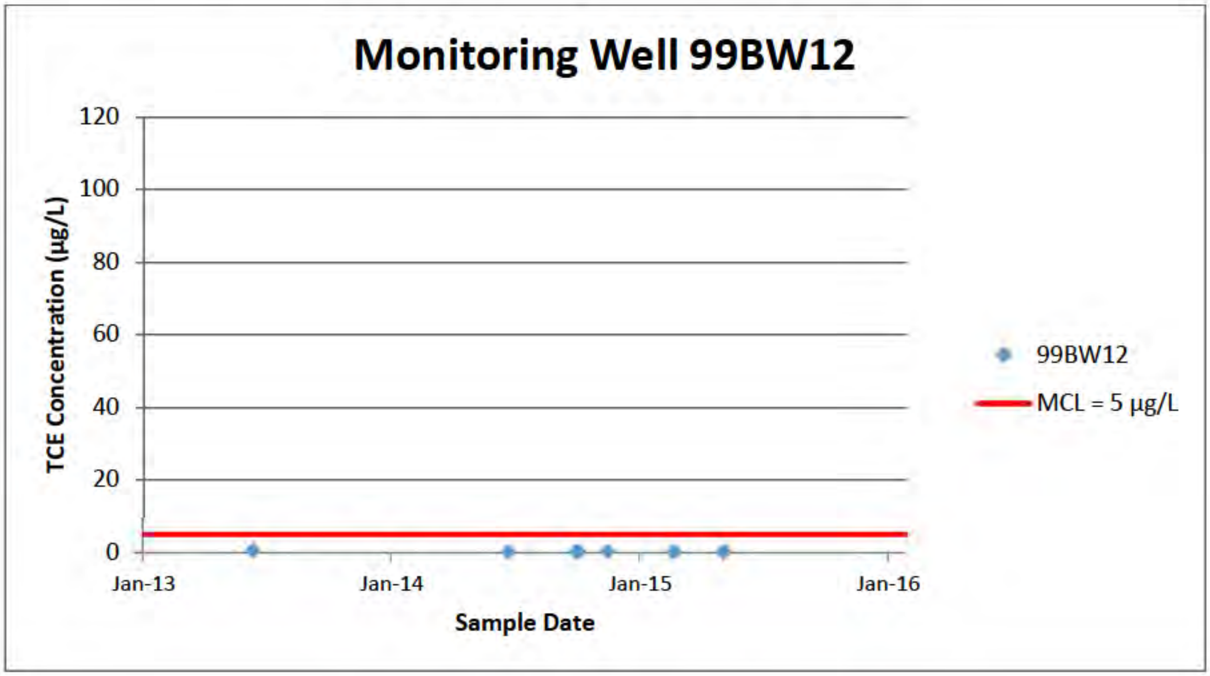

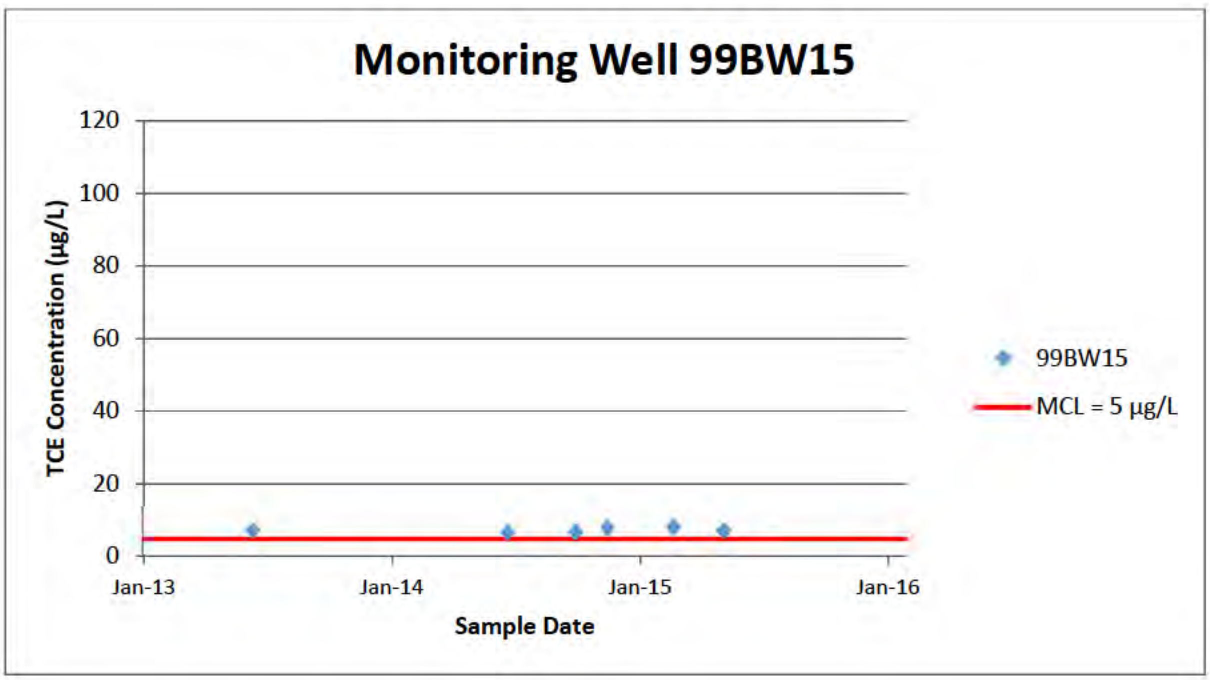

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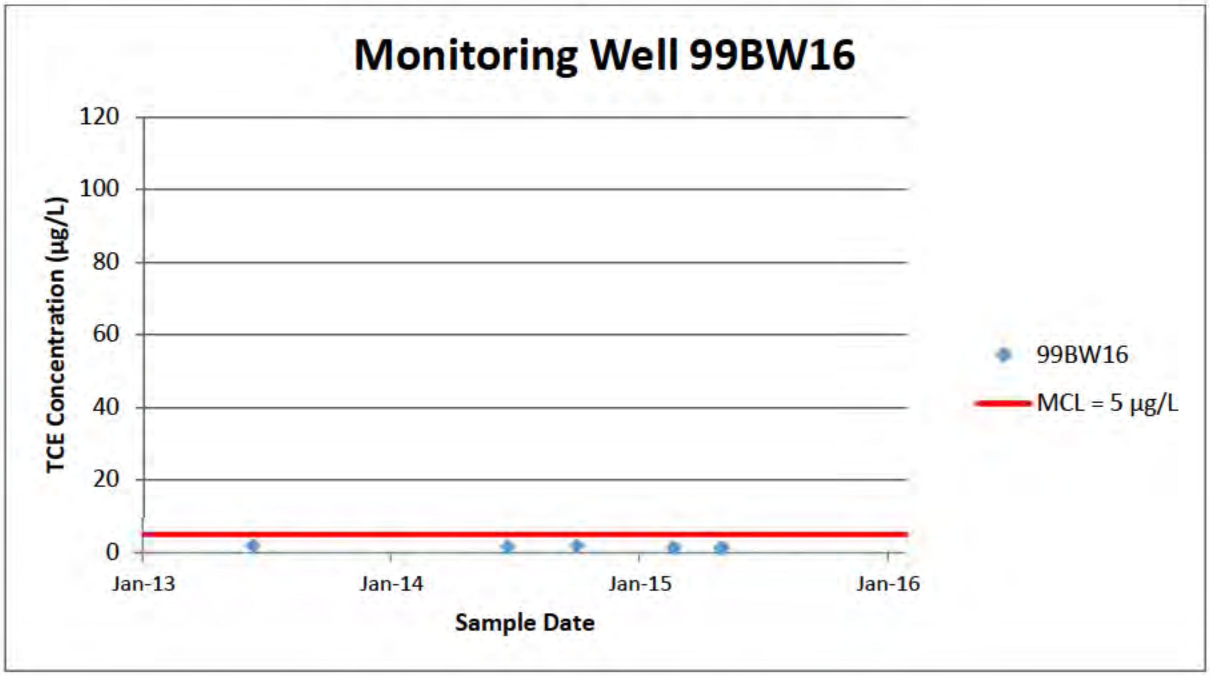

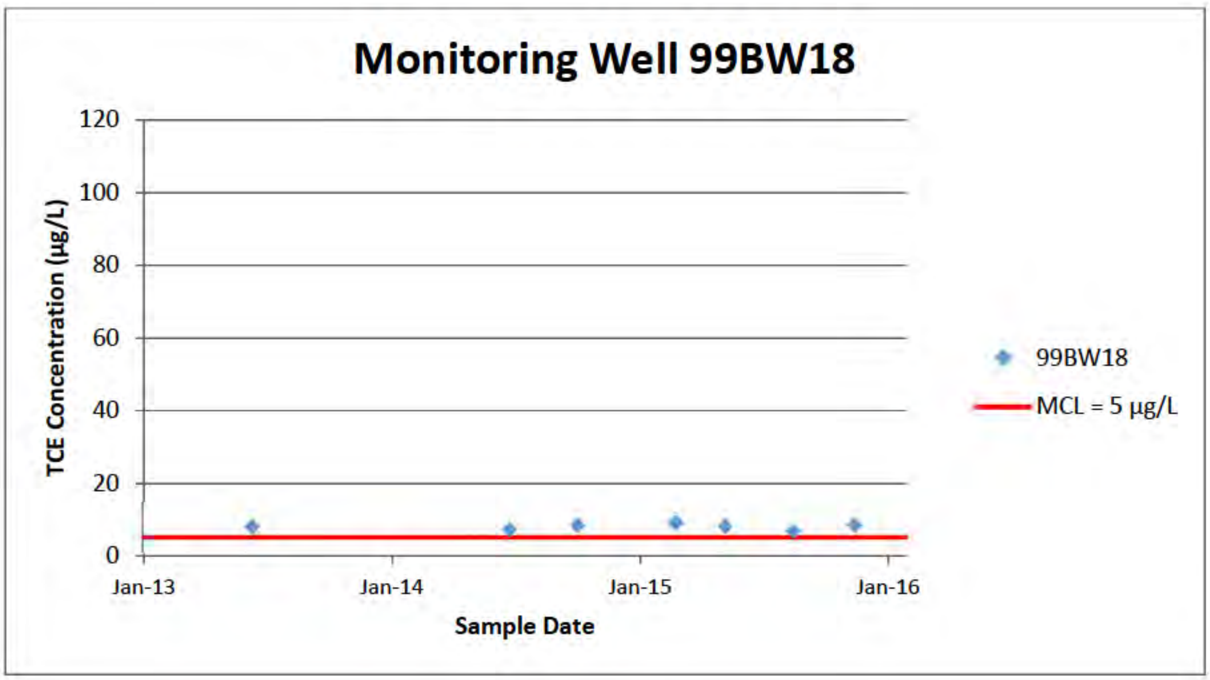

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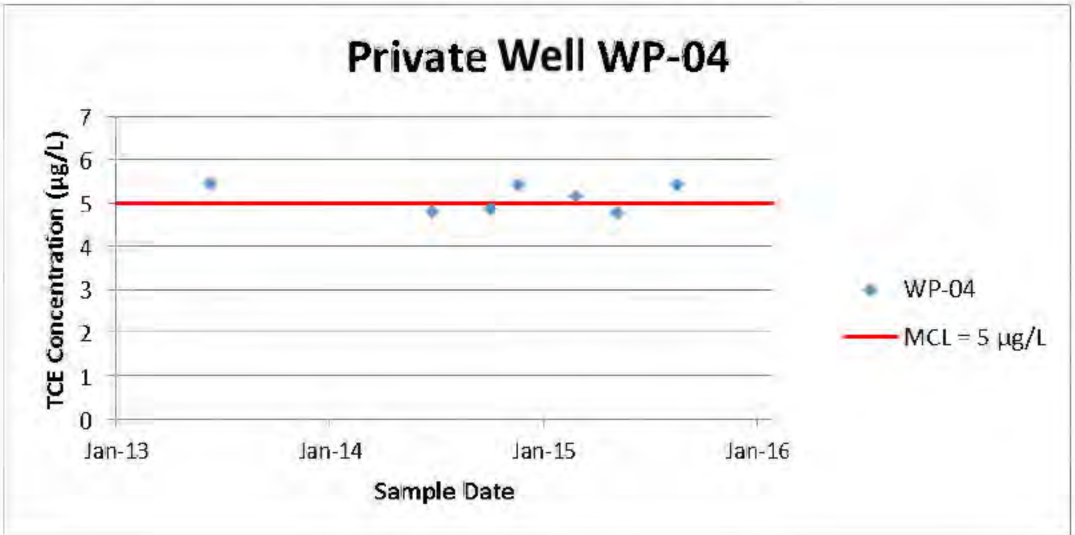

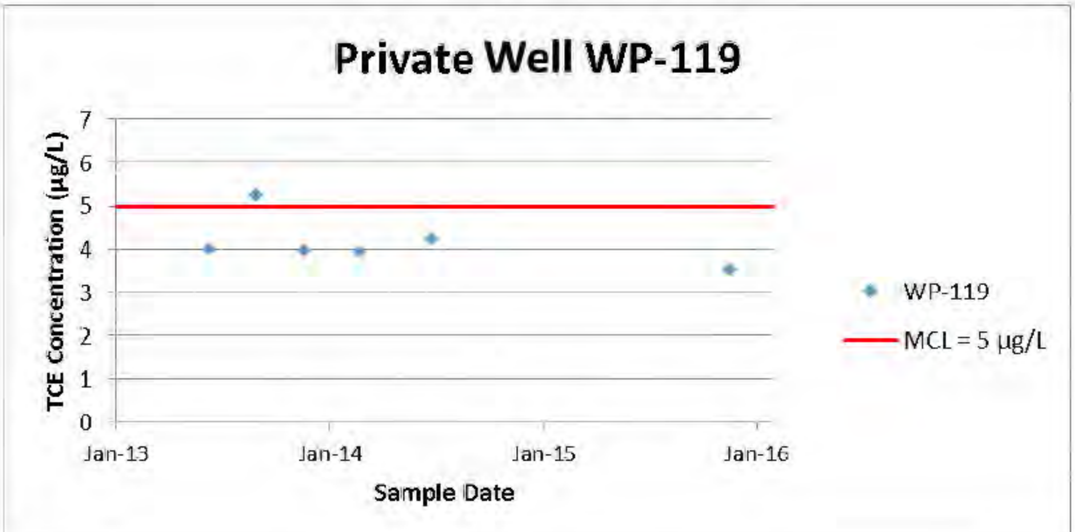

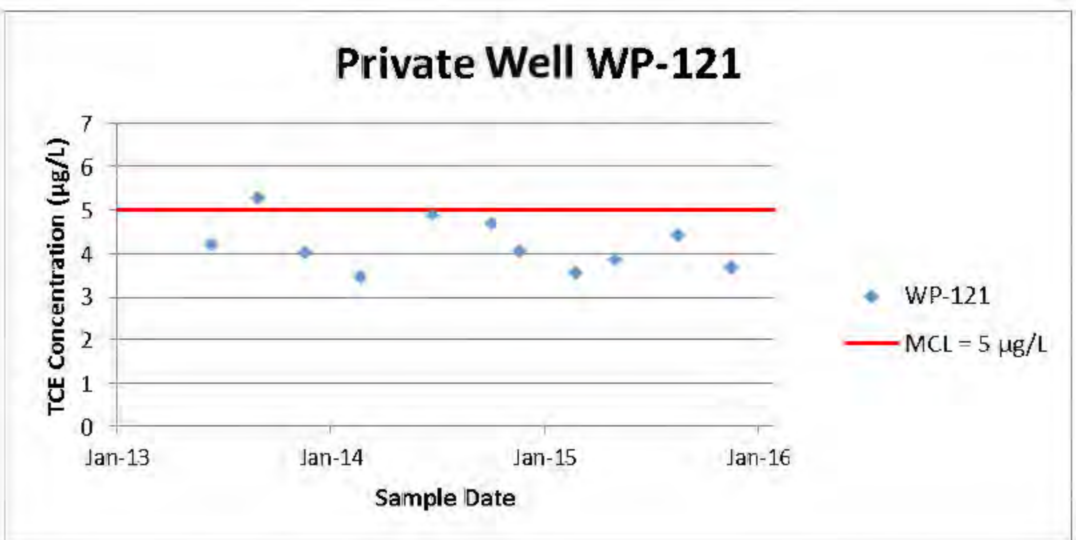

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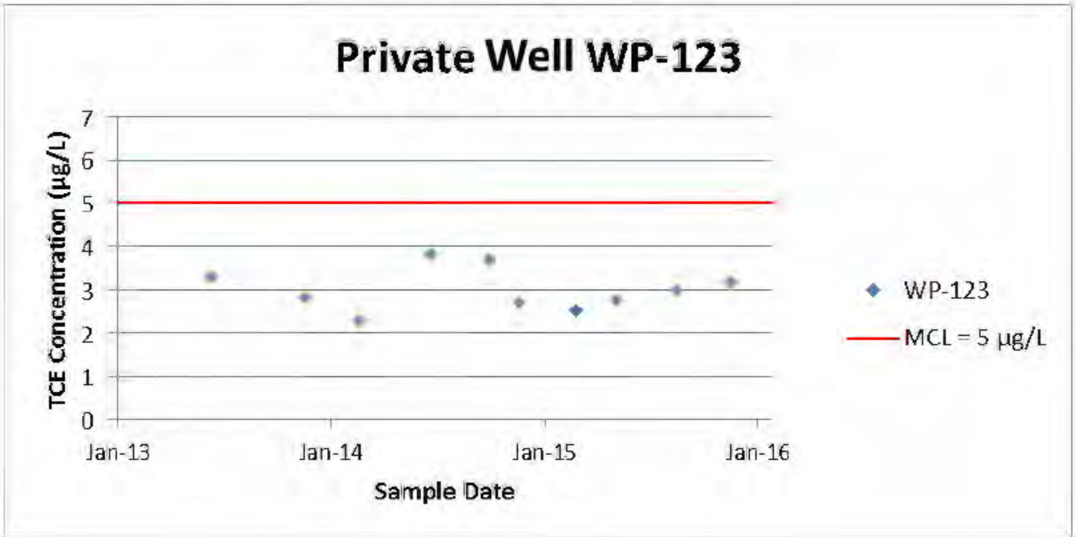

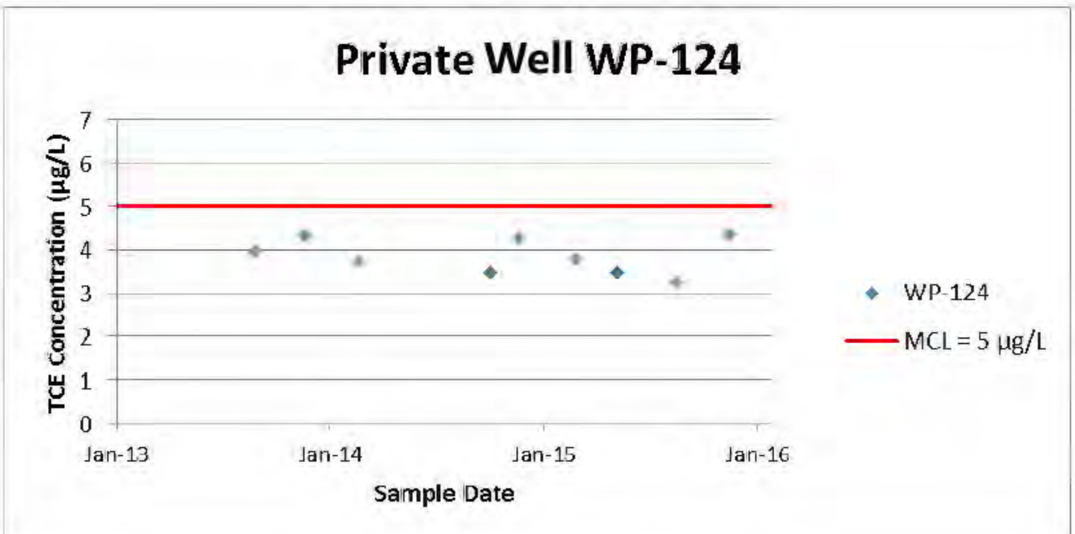

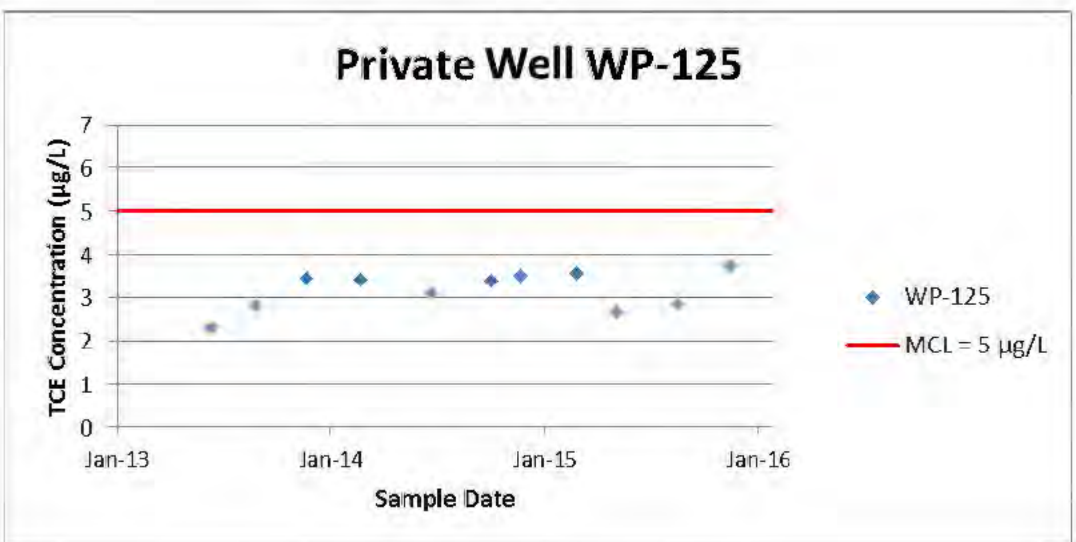

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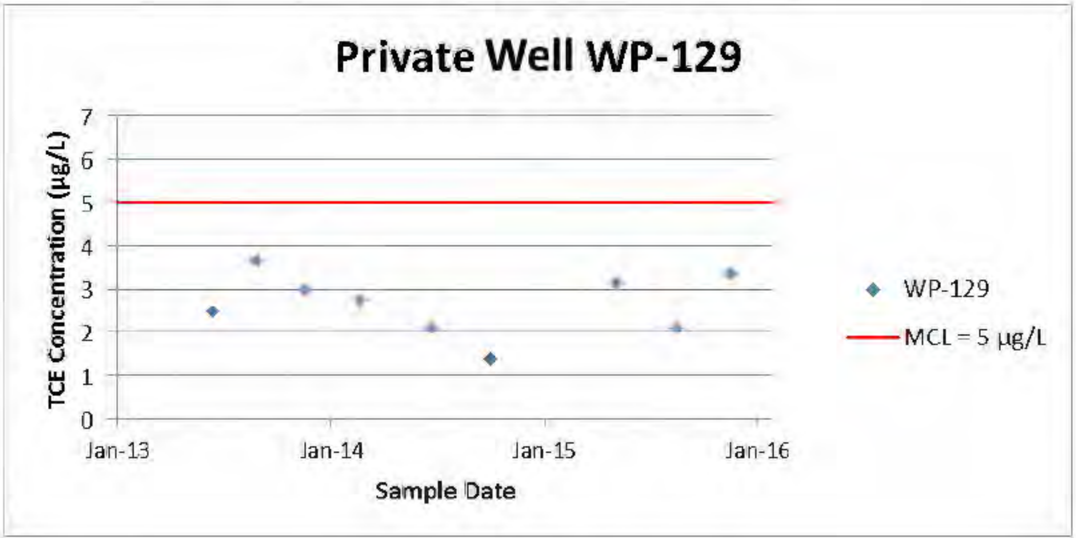

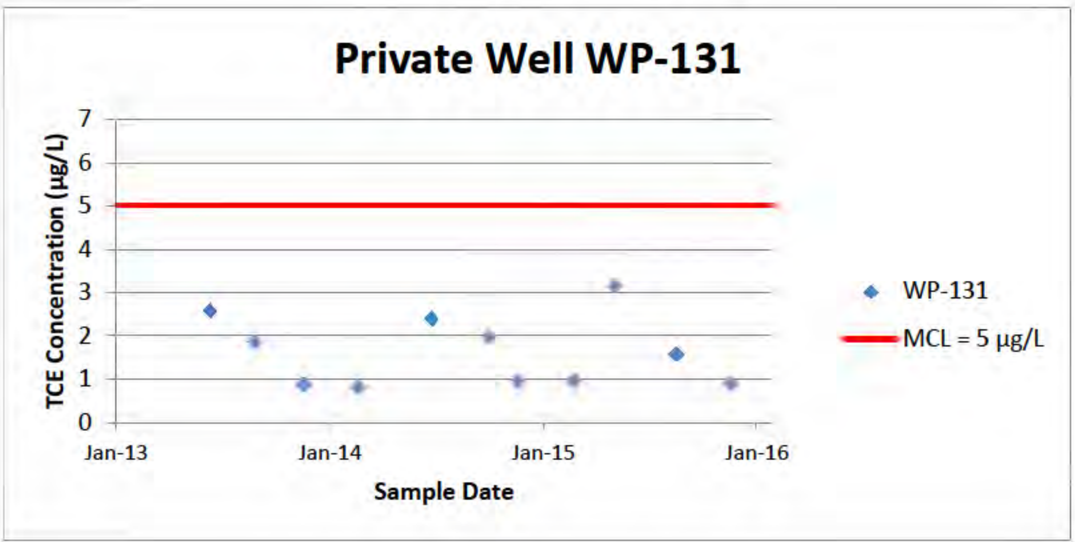

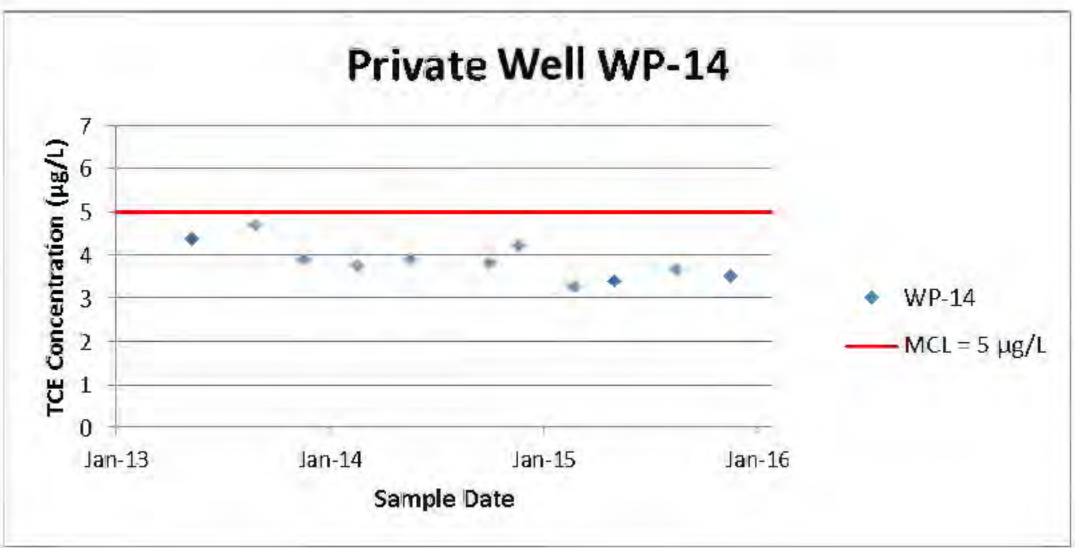

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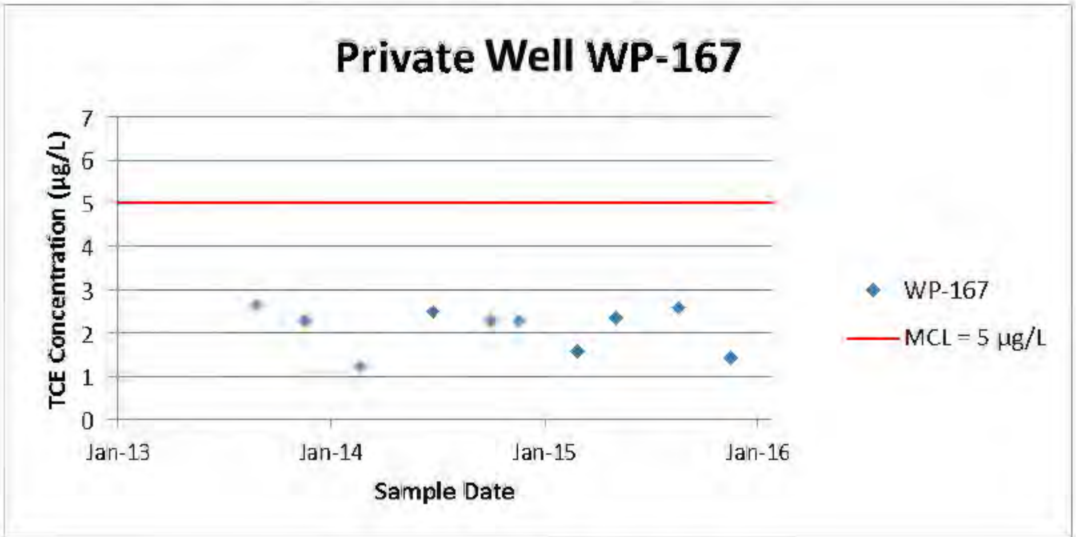

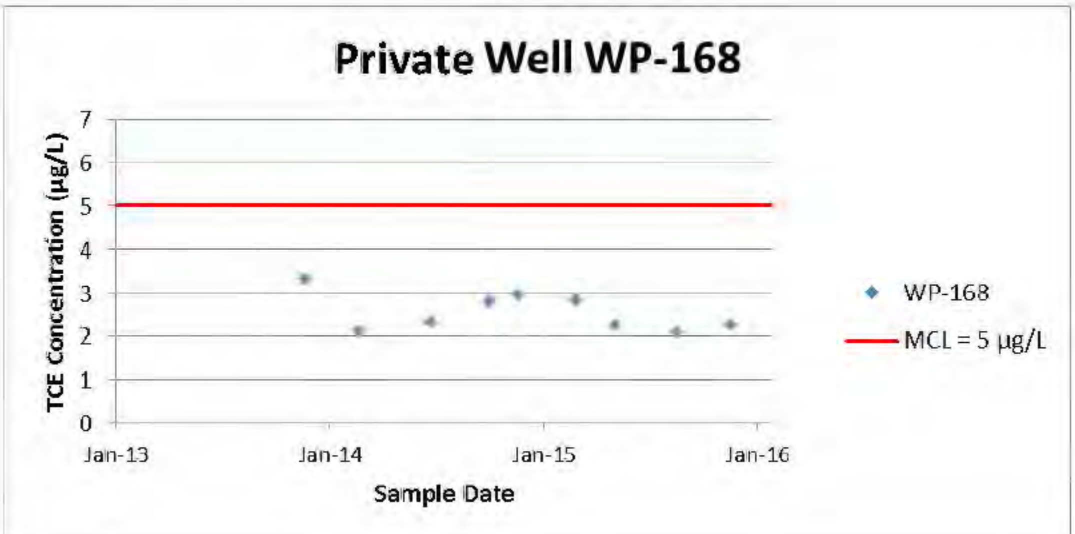

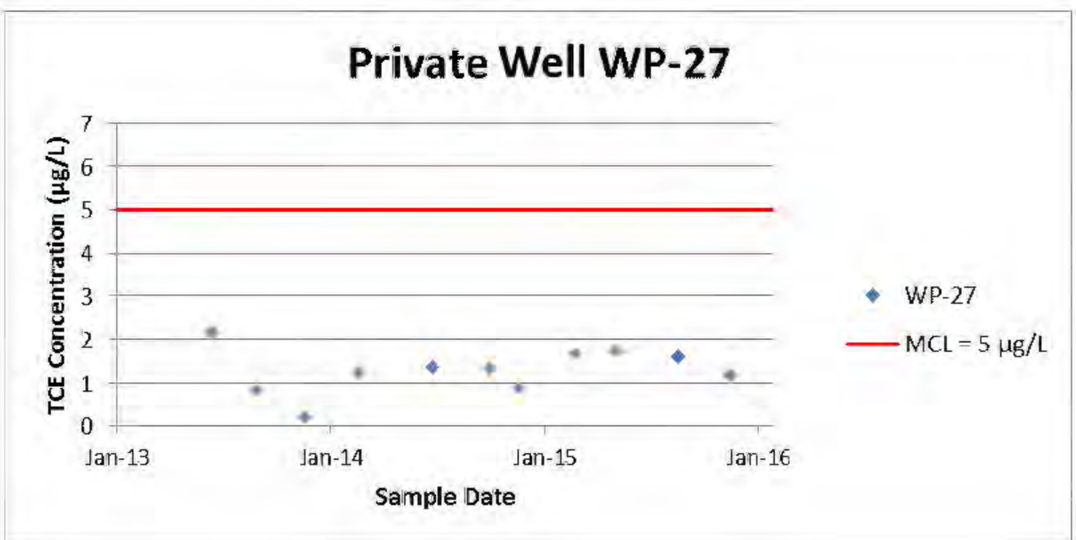

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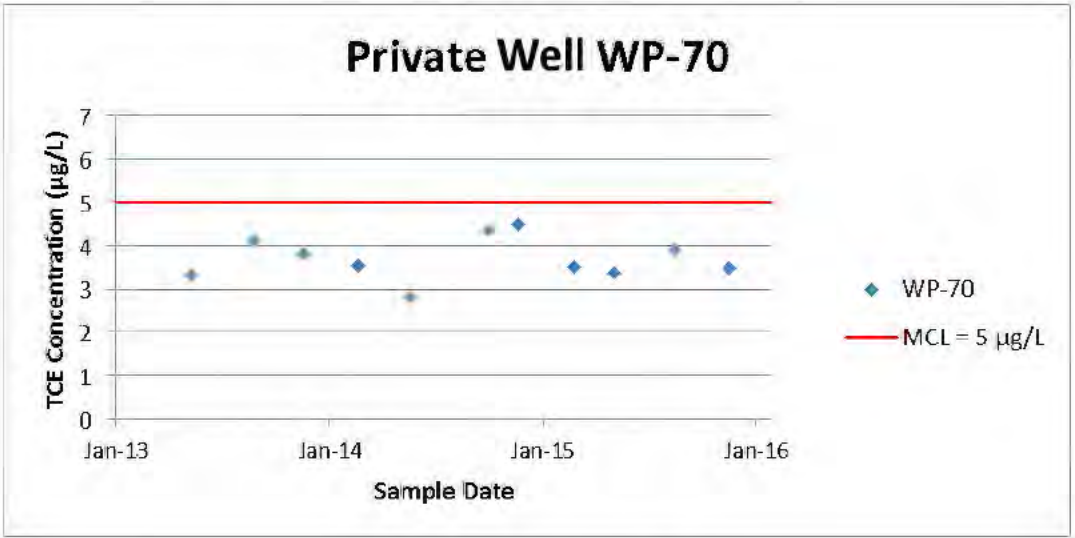

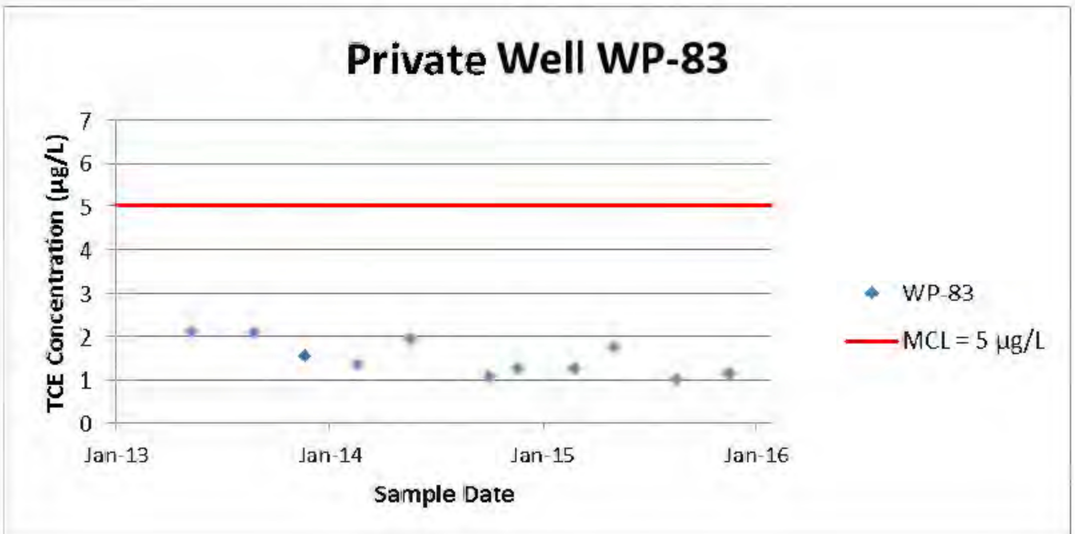

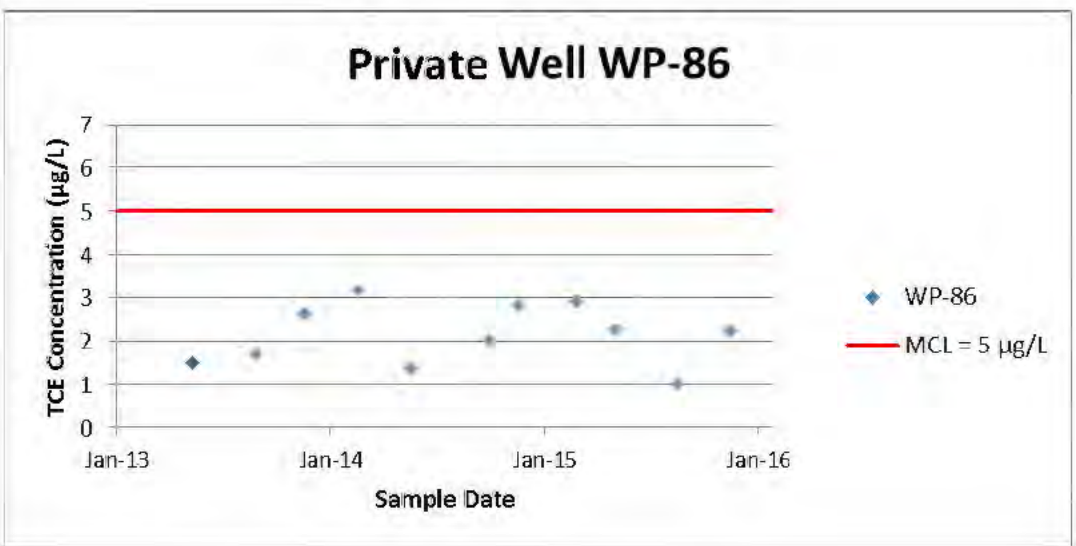

APPENDIX E - Laboratory Data Packages (CD only)

APPENDIX F - Quality Control Summary Report

Final

QUALITY CONTROL SUMMARY REPORT

2015

MOSES LAKE WELLFIELD SUPERFUND SITE

GROUNDWATER MONITORING AND WHOLE HOUSE FILTER PROGRAM

MOSES LAKE, WASHINGTON

CERCLIS ID# WA988466355

Prepared by

U.S. ARMY CORPS OF ENGINEERS

SEATTLE DISTRICT

4735 East Marginal Way South

Seattle, Washington 98134

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 10

1200 6th Avenue

Seattle, Washington 98101

January 2016

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Contents

ACRONYMS AND ABBREVIATIONS

ADR	Automated Data Review
DOD	Department of Defense
DQI	Data Quality Indicator
DQO	Data Quality Objective
DVR	Data Validation Report
EPA	U.S. Environmental Protection Agency
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PCB	Polychlorinated biphenyls
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCSR	Quality Control Summary Report
QSM	Quality Systems Manual
RPD	Relative Percent Difference
SDG	Sample Delivery Group
TOC	Total Organic Carbon
USACE	U.S. Army Corps of Engineers Seattle District
WP	Work Plan
%R	Percent Recovery
mg/L	Milligrams per liter
µg/L	Micrograms per liter

1 Introduction

This Quality Control Summary Report (QCSR) presents Stage 2a and Stage 4 data validation results for samples collected during the November 2014 through November 2015 sampling period. Data validation was performed in accordance with the 2015 Moses Lake Work Plan-QAPP (USACE 2015), U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0 (DOD QSM) (DoD, July 2013), and Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (CLPNFG) (USEPA, June 2008). Laboratory Data Consultants, Inc., an independent subcontractor to the U.S. Army Corps of Engineers, Seattle District (USACE), performed the data validation task.

This QCSR was based on the outcome of the data review and data validation performed on all five laboratory reports submitted by Analytical Resources, Inc. in Tukwila, WA.

The purpose of this QCSR is to provide the project management and data end-users (1) an overview of data quality in terms of precision, accuracy, representativeness, comparability, sensitivity, and completeness, (2) specific data quality anomalies and their effects on data usability, and (3) recommendations to the extent of data usage.

Following the requirements outlined in the WP-QAPP, samples were analyzed with analytical protocols defined in:

- Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry (Method 524.3) EPA 815-B-09-009, June 2009.
- Determination of Perchlorate in Water, Soils and Solid Wastes Using High Performance Liquid Chromatography/Electrospray Ionization/Mass Spectrometry (Method 6850), January 2007
- Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/ Tandem Mass Spectrometry (Method 537), EPA-600-R-08-092, September 2009

2 Quality Control Activities

During the November 2014 through November 2015 sampling events a total of 489 samples were analyzed for volatile organic compounds (VOCs), three samples were analyzed for perfluorinated compounds, and nine samples were analyzed for perchlorate. The sample identification, collection dates, analyses requested/performed, and validation levels and well identification numbers (IDs) are presented in the Data Validation Report (DVR) attachments (Appendix G to 2015 Annual Report).

All sample results were subjected to Stage 2a data validation, which consists of an evaluation of quality control (QC) summary results for sample holding times, surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), method blanks, trip blanks, field blanks, equipment blanks, and field duplicate samples.

A Stage 4 evaluation of the QC summary forms as well as initial and continuing calibrations and the raw data was performed on only private drinking water wells beginning in May 2015 to confirm sample quantitation and identification. Prior to May 2015, a Stage 4 evaluation was performed on 10% of all VOC samples collected. In February 2015, Stage 4 evaluation was performed for all perfluorinated compounds and perchlorate samples collected.

Based on the data review, the chain-of-custody (COC) forms and sample receipt forms submitted in the analytical reports were clear and complete in all cases. Cooler temperatures were within the 4±2°C criteria.

3 Data Quality Assessment

Based on the outcomes of the data validation, the following sections evaluate if the quality of the data collected during this sampling event achieves the data quality objectives (DQOs) specified in the WP-QAPP. Data quality was determined based on various quality measures commonly referred to as data quality indicators (DQIs) - precision, accuracy/bias, representativeness, comparability, completeness and sensitivity (quantitation limits).

3.1 Data Quality Indicators

Data quality indicators are defined in the following sections. Quality control parameters evaluated in the data review/validation and the corresponding DQIs are presented as attachments to the DVRs. Definitions of the data quality indicators are provided as follows:

3.1.1 Precision

Precision is defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions. Analytical precision is evaluated via the relative percent difference (RPD) values of matrix spike/matrix spike duplicate (MS/MSD) and laboratory control sample/ laboratory control sample duplicate (LCS/LCSD). The RPD values of field duplicate analyses represent the combined precision of sample collection and analysis procedures, as well as sample heterogeneity.

3.1.2 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random and systematic errors. It is quantified as the degree of agreement between a measurement and a known reference. Analytical accuracy is evaluated via the percent recovery (%R) values of initial and continuing calibration (percent difference [%D] or percent drift [%Df]), internal standards, surrogate spikes, MS/MSD, LCS/LCSD, in conjunction with method blank, trip blank, and field blank results. Results of blanks assist in identifying the type and magnitude of effects contributed to the system error introduced via field and/or laboratory procedures.

3.1.3 Representativeness

Representativeness is the level of confidence that the analytical data reflects the actual field condition. Representativeness is ensured by maintaining sample integrity during collection, preparation, and analysis. The evaluation of associated method, trip, and field blanks also assists in identifying artifacts that may skew the representativeness of the samples.

3.1.4 Comparability

Comparability is the confidence with which one data set can be compared to another data set. Using standard methods throughout the data generation processes ensures the comparability of data generated in separate sampling days or events.

3.1.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data is complete and valid if it meets all acceptance criteria including accuracy, precision, and any other criteria specified by the particular analytical method being used. Four calculations of completeness are specified in the project QAPP.

Contract compliance completeness falling below the target level may result in the issuance of a corrective action request for the project laboratory. Contract compliance failures are usually the result of lack of corrective action. The impact of contract compliance deficiencies varies with the specific correction action failure and is be determined during the data usability assessment.

$$\text{Contract Completeness} = \frac{\#\ \text{contract compliant results} \times 100\%}{\#\ \text{results reported}}$$

Analytical completeness is used to assess the laboratories ability to generate high quality data. This may be a reflection of contract compliance or other issues and requires detail assessment of the cause for qualification during data usability assessment.

$$\text{Analytical Completeness} = \frac{\#\ \text{unqualified results} \times 100\%}{\#\ \text{results reported}}$$

(Estimated results are considered as useable for project decision making.)

Technical completeness is a measure which reflects the laboratories ability to produce usable results. The impact of failure to meet this goal will results in serious impacts to data usability (rejected results) and may result in termination of the contract.

$$\textit{Technical Completeness} = \frac{\#\ \textit{useable results} \times 100\%}{\#\ \textit{results reported}}$$

Field sampling completeness reflects whether the samples planned for collection were actually acquired.

$$\textit{Field Sampling Completeness} = \frac{\#\ \textit{samples collected} \times 100\%}{\#\ \textit{samples planned}}$$

The minimum goals for completeness are as follows: 1) Contract = 100%, 2) Analytical = 90% or greater, 3) Technical = 90% or greater and 4) Field = 100%. The goal for holding times is 100%. Estimated results are treated as usable results for technical completeness. These are considered minimum goals.

3.1.6 Sensitivity

Sensitivity depicts the level of ability an analytical system (i.e., sample preparation and instrumental analysis) of detecting a target component in a given sample matrix with a defined level of confidence. Factors affecting the sensitivity of an analytical system include: analytical system background (e.g., laboratory artifact or method blank contamination), sample matrix (e.g., mass spectrometry ion ratio change, co-elution of peaks, or baseline elevation), instrument instability, and field procedures (including sample transport).

To evaluate if the analytical sensitivity achieved the project expectation, sample-specific project quantitation limits (PQLs) were compared against the reporting limit (RL) goals set forth in the QAPP. In addition, sample results were compared to detections of target analytes in method blanks, and trip blanks to identify potential effects of laboratory background and field procedures on sensitivity.

3.2 Data Quality Indicator Evaluation

The following subsections present an evaluation of the data. The assessment is intended to reconcile the existing data quality with the project DQOs. Assessment is presented herein in terms of the data quality indicators. The qualified data are presented in the DVR attachments.

DQIs for VOC data met the project goals with the following exceptions:

Precision – No RPDs were outside criteria.

Accuracy/Bias – The following QC outliers indicate potential bias of VOC data:

- November 2014: One MS/MSD pair exceeded the %R acceptance criteria for trichloroethene. No data were qualified due to %R outside of the acceptance criteria since the sample concentration was significantly greater than the spike amount.
- August 2015: Two MS/MSD pairs exceeded the %R acceptance criteria for trichloroethene. The trichloroethene result in sample 15MLW0818N99BW10 was qualified as detected estimated (J+).
- November 2015: One MS/MSD pair exceeded the %R acceptance criteria for trichloroethene. The associated result for sample 15MLW1116N12BW08 was qualified as qualified as estimated (J+) for detects due to high MS %R.

MS/MSD and LCS/LCSD outlier reports can be found in the DVR attachments.

Representativeness – The following QC outliers indicate potential impact on sample representativeness:

- November 2014: Samples 14MLW1119N00AW11, 14MLW1119N00BW10, 14MLW1119N00BW15, 14MLW1119N92BW02, 14MLW1120N00BW13, 14MLW1120N91BW04, 14MLW1120N99AW09, and 14MLW1120N99BW18 were qualified rejected due to trichloroethene contamination in trip blank 14MLW1120TB03.

See November 2014 Sampling DVR for rejected data.

Completeness – The following list represents completeness outliers for the VOC data:

November 2014:

- The contract completeness level attained for the field samples was 92.1 percent. Due to quality control exceedances, seventy two out of 912 results were qualified as estimated. Percent contract compliance does not consider surrogate outliers or MS/MSD outliers when associated LCS recoveries are in control.
- The overall analytical completeness level attained for the field samples was 92.1 percent. The holding time completeness level attained was 100 percent. Due to quality control exceedances, seventy two out of 912 results were qualified as estimated.
- The technical completeness, which included all QC parameters, attained for the field samples was 92.1 percent. Due to contamination present in the associated trip blank, seventy two out of 912 results were qualified as rejected and are not usable for any purposes.

August 2015:

- The overall analytical completeness level attained for the field samples was 99.8 percent. The holding time completeness level attained was 100 percent. Due to quality control exceedances, one out of 488 results was qualified as estimated.

November 2015:

The contract completeness level attained for the field samples was 98.8 percent. Due to quality control exceedances, 7 out of 592 results were qualified as estimated. Percent contract compliance does not consider surrogate outliers or MS/MSD outliers when associated LCS recoveries are in control. (Goal is 100%).

- The analytical completeness level attained for the field samples was 98.6 percent. Due to quality control exceedances, 8 out of 592 results were qualified as estimated, or non-detected. (Goal is 90%). Holding time completeness was 99.6%. Three out of 719 results were qualified as estimated (Goal is 100%).

See the DVRs for full completeness reports of each sampling event.

Sensitivity – The target quantitation limits generally meet QAPP requirements. The following exception was noted:

- Target compounds detected below the limit of quantitation (flagged J by the laboratory) should be considered estimated.

Reporting limit outliers are presented in the DVR attachments.

4 Performance Evaluation Samples

One PE sample (15MLW11PE1) was submitted to the laboratory and analyzed for the purpose of evaluating the accuracy of the performance of the measurement or analytical procedures used by the laboratory. All results were within the acceptance limits. Additional detail can be found in November 2015 DVR.

5 Data Usability

The overall quality of the data is acceptable. All project DQIs were met with the exception of those noted above. All sample preservation requirements and all holding times were met. All instrument performance checks and calibrations were performed as required. All calibration factors and internal standard percent recoveries were within acceptance criteria. All surrogate, MS/MSD and LCS/LCSD percent recoveries and RPDs were within acceptance criteria with the exception described in Section 3.2.1. Method blanks, trip blanks, and field blanks were performed at the required frequency. Field duplicates were collected at the required frequency and the precision was considered acceptable. Therefore, all data except those identified above are considered usable with consideration of their data review qualifiers.

6 References

DoD, 2010. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0, July 2013.

EPA, 2008. Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, USEPA-540-R-08-01, Washington, D.C.

EPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, January 2009, EPA 540-R-08-005, Washington, D.C.

Laboratory Data Consultants, Inc., 2006, Automated Data Review, Version 1.5.0.160.

USACE, 2015. 2015 Work Plan with Quality Assurance Project Plan, Groundwater Monitoring and Whole-House Filter Program for Moses Lake Wellfield Superfund Site (Former Larson AFB), Moses Lake, Washington.

EPA, 2009. Measurement of Purge able Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry: Method 524.3 Version 1, June 2009. USEPA-815-B-09-009. Cincinnati, OH

APPENDIX G – Data Validation Report

APPENDIX H – Washington Department of Ecology - New Well Query

Well Logs

Home Map Search Text Search Forms Site Info Contact Us Water Portal

TEXT SEARCH RESULTS

Back New Search

- **Search Criteria Used:** Township: 19N, Range: 28E, Section(s): 4 5 6 7 8 9 16 17 18, Completed From: 12/15/2014, Completed To: 2/1/2016, Received From: 12/15/2014, Received To: 2/1/2016
- There are 2 well logs that match your search criteria.
- The results are sorted by Well Owner Name

Download all 2 images | Download all 2 data records | Print this page | Help

Displaying 1 - 2 of 2 well log results Sort results by Well Owner Name

1. (b) (6) [redacted] - { View PDF }
   Public Land Survey: SW, SW, S-09, T-19-N, R-28-E, Tax Parcel Number: 313482000
   County: Grant, Well Address:(b) (6) [redacted]
   Well Log ID: 1022025, Well Tag ID:BHW096, Notice of Intent Number: W362314
   Well Diameter: 6 in. , Well Depth: 140 ft.
   Well Type: Water
   Well Completion Date: 05/05/2015, Well Log Received Date: 05/18/2015
2. (b) (6) [redacted] - { View PDF }
   Public Land Survey: SW, SW, S-08, T-19-N, R-28-E, Tax Parcel Number: 120919000
   County: Grant, Well Address:(b) (6) [redacted]
   Well Log ID: 1021985, Well Tag ID:BHW097, Notice of Intent Number: WE20147
   Well Diameter: 6 in. , Well Depth: 140 ft.
   Well Type: Water
   Well Completion Date: 05/06/2015, Well Log Received Date: 05/18/2015

Total Result Pages: 1

Ecology Home | Report a Problem | Data Disclaimer | Privacy Policy

DEPARTMENT OF ECOLOGY State of Washington

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

CURRENT

Notice of Intent No. WE 20147

Unique Ecology Well ID Tag No. BHW 097

Water Right Permit No. NO

Property Owner Name (b) (6) [redacted]

Well Street Address [redacted]

City Moses Lake County Grant

Location SW 1/4-1/4 SW 1/4 Sec 8 Twn 19 R 28 EWM ☒ or WWM ☐

(s, t, r Still REQUIRED)

Lat/Long Lat Deg ____ Lat Min/Sec ____

Long Deg ____ Long Min/Sec ____

Tax Parcel No. (Required) 120919000

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other ____

TYPE OF WORK: Owner's number of well (if more than one) ____

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven

☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 140 ft.

Depth of completed well 140 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 6" Diam. from +3 ft. to 110 ft.

☐ Liner installed ____" Diam. from ____ ft. to ____ ft.

☐ Threaded ____" Diam. From ____ ft. to ____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used ____

SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location ____

Manufacturer's Name ____

Type ____ Model No. ____

Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand ____

Materials placed from ____ ft. to ____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18 ft.

Material used in seal Dry Bentonite

Did any strata contain unusable water? ☒ Yes ☐ No

Type of water? Surface Depth of strata 34'-42', 68'-84'

Method of sealing strata off Cased

PUMP: Manufacturer's Name ____

Type: ____ H.P. ____

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.

Static level 36 ft. below top of well Date 5/6/15

Artesian pressure ____ lbs. per square inch Date ____

Artesian water is controlled by ____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? ____

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____

Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.

Airtest 20 gal./min. with stem set at 138 ft. for 2 hrs.

Artesian flow ____ g.p.m. Date 5/6/15

Temperature of water ____ Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Topsoil	0'	1'
Cobbles & Gravel	1'	28'
Gravel	28'	34'
Gravel & H2O	34'	40'
Gravel, H2O & Brown Clay	40'	42'
Brown Clay	42'	68'
Tan Soft Clay & Sand H2O	68'	84'
Sticky Brown Clay	84'	91'
Gray Clay	91'	102'
Brown Clay	102'	106'
Brown Basalt & Brown Clay	106'	108'
Brown Basalt Soft H2O	108'	140'

RECEIVED

MAY 18 2015

Department of Ecology
Eastern Regional Office

Start Date 5/6/15 Completed Date 5/6/15

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☐ Driller ☐ Engineer ☒ Trainee Name (Print) Cole

Driller/Engineer/Trainee Signature D. Cole

Driller or trainee License No. 3165T

IF TRAINEE: Driller's License No: 1267

Driller's Signature: Mitch Martin

Drilling Company DC Drilling Inc

Address PO Box 1264

City, State, Zip Royal City WA 99357

Contractor's Registration No. DCDRICD875OF Date 5/6/15

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WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

[X] Construction
[ ] Decommission *ORIGINAL INSTALLATION*
Notice of Intent Number ____

CURRENT
Notice of Intent No. W362314
Unique Ecology Well ID Tag No. BHW096
Water Right Permit No. NO
Property Owner Name (b) (6)
Well Street Address
City Moses Lake County Grant
Location SW 1/4-1/4 SW 1/4 Sec 9 Twn 19 R 28 EWM [X] or WWM [ ]
(s, t, r Still REQUIRED)

Lat/Long Lat Deg ____ Lat Min/Sec ____
Long Deg ____ Long Min/Sec ____
Tax Parcel No. (Required) 313482000

PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] DeWater [ ] Irrigation [ ] Test Well [ ] Other ____

TYPE OF WORK: Owner's number of well (if more than one) ____
[X] New well [ ] Reconditioned *Method:* [ ] Dug [ ] Bored [ ] Driven
[ ] Deepened [ ] Cable [X] Rotary [ ] Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 140 ft.
Depth of completed well 140 ft.

CONSTRUCTION DETAILS
Casing Installed: [X] Welded 6" Diam. from +3 ft. to 90 ft.
[ ] Liner installed ____" Diam. from ____ ft. to ____ ft.
[ ] Threaded ____" Diam. From ____ ft. to ____ ft.

Perforations: [ ] Yes [X] No
Type of perforator used ____
SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: [ ] Yes [X] No [ ] K-Pac Location ____
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: [ ] Yes [X] No Size of gravel/sand ____
Materials placed from ____ ft. to ____ ft.

Surface Seal: [X] Yes [ ] No To what depth? 18 ft.
Material used in seal Dry Bentonite
Did any strata contain unusable water? [X] Yes [ ] No
Type of water? Surface Depth of strata 22'
Method of sealing strata off Casing

PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 49 ft. below top of well Date 5/5/15
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes, by whom? ____
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest 23 gal./min. with stem set at 138 ft. for 2 hrs.
Artesian flow ____ g.p.m. Date 5/5/15
Temperature of water ____ Was a chemical analysis made? [ ] Yes [X] No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
TopSoil	0	1'
Cobbles & gravel	1'	17'
gravel	17'	51'
gravel & H2O	51'	73'
Brown Clay	73'	85'
Brown Clay & Brown Basalt	85'	94'
Brown Basalt & H2O	94'	127'
Hard gray Basalt	127'	133'
Black Basalt medium		
Little H2O	133'	138'
Hard Gray Basalt	138'	140'

RECEIVED
MAY 18 2015
Department of Ecology
Eastern Regional Office

Start Date 5/5/15 Completed Date 5/5/15

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

[ ] Driller [ ] Engineer [X] Trainee Name (Print) Cole
Driller/Engineer/Trainee Signature D. Cole
Driller or trainee License No. 31657
IF TRAINEE: Driller's License No: 1267
Driller's Signature: Mitch Martin

Drilling Company DC Drilling Inc
Address PO Box 1289
City, State, Zip Royal City WA 99357
Contractor's Registration No. DCDRICD875OF Date 5/5/15

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Well Logs

Home   Map Search   Text Search   Forms   Site Info   Contact Us   Water Portal

TEXT SEARCH RESULTS

Back   **New Search**

- **Search Criteria Used:** Township: 20N, Range: 28E, Section(s): 16 17 19 20 21 28 29 30, Completed From: 12/15/2014, Completed To: 2/1/2016, Received From: 12/15/2014, Received To: 2/1/2016
- There are 0 well logs that match your search criteria.
- The results are sorted by Well Owner Name

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Displaying 0 of 0 well log results   Sort results by Well Owner Name

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