**Camp Stanley Storage Activity**
**Environmental Program Update**

# FACT SHEET

**No. 36 – Annual Fact Sheet**
**May 2016**

*The purpose of this Fact Sheet is to provide an update on the status of Camp Stanley Storage Activity's (CSSA) environmental program, as well as an overview of quarterly groundwater sampling conducted in 2015. CSSA's Administrative Record and results for all groundwater sampling events are available in the CSSA Environmental Encyclopedia located on the internet at www.stanley.army.mil.*

## Overview of CSSA's Environmental Program

In 1991, routine water well testing by the Texas Department of Health detected the presence of dissolved cleaning solvent tetrachloroethene (PCE) and related degradation products above maximum contaminant levels (MCLs) in a CSSA water supply well (Well 16 [CS-16]). Subsequent sampling showed volatile organic compound (VOC) contaminant concentrations greater than MCLs in other wells. VOCs make up substances such as paint thinners, dry cleaning solvents, and some constituents of petroleum fuels (e.g. gasoline and natural gas). CSSA ceased using VOC solvents in the mid-1990s, and monitors for VOCs and metals associated with its past industrial processes.

Sources of CSSA's groundwater contamination were initially determined to be Solid Waste Management Unit (SWMU) O-1 and SWMU B-3; this area is referred to as Plume 1. Later, Area of Concern 65 (AOC-65) was identified as the source of groundwater contamination at Plume 2. Both plumes are shown on Figure 1.

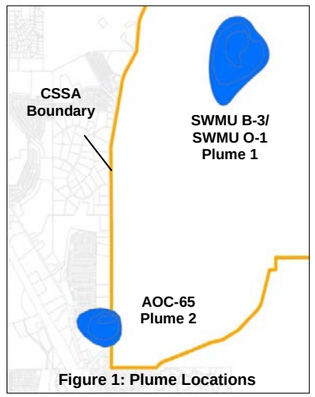

**Figure 1: Plume Locations**

In May 1999, the U.S. Environmental Protection Agency (USEPA) issued a Resource Conservation and Recovery Act (RCRA) 3008(h) Administrative Order on Consent (Order) requiring CSSA to identify, investigate, and prevent further spread of releases of hazardous wastes and/or hazardous constituents to the environment, and to ensure that corrective action activities are implemented to protect human health and the environment. These requirements were met by following the RCRA process as shown in Figure 2, and CSSA is currently in the final process of Corrective Measures Implementation and Completion.

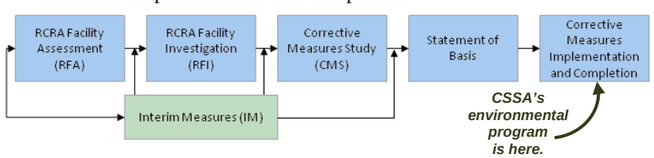

**Figure 2: RCRA Corrective Action Process**

As described in Fact Sheet No. 35 distributed in May 2015, USEPA issued the Statement of Basis (SB) to the public which detailed its preferred remedies for treating groundwater contamination at CSSA. USEPA subsequently issued a Final Decision Document in July 2015 that officially approved the remedies and initiated the Corrective Measures Implementation phase of RCRA. With these documents and corrective measures in place, CSSA is continuing with contaminant source remediation, and is moving forward with maximizing and enhancing the effectiveness of its long-term groundwater monitoring program.

## Updates to Long-term Groundwater Monitoring

On-post groundwater has been monitored since 1991, and off-post since 1999. Significant plume migration has not been observed in the 20 years CSSA has been monitoring groundwater contaminant concentrations. Sampling frequencies are determined by the Long-Term Monitoring Optimization (LTMO) Plan and Groundwater Monitoring Program Data Quality Objectives (DQOs), both of which were updated and approved by USEPA and TCEQ in early 2016.

LTMO improves the cost-effectiveness of the groundwater monitoring effort by identifying inadequate or redundant sampling of the groundwater plume. This is especially true as the remedy progresses, the monitoring results become more predictable, and the extent of the contamination shrinks or stabilizes. Decreases in monitoring frequency and locations can be implemented in ways that do not sacrifice monitoring objectives, maintain adequate understanding of groundwater conditions, but also provide cost savings.


**Figure 3: Field Technicians Sample a Monitoring Well**

As a result of the 2015 LTMO evaluation, 41 off-post wells that are currently sampled at varying frequencies are recommended for eventual exclusion from future routine monitoring. These wells are either greater than 1.5 miles from the CSSA boundary or they have consecutive non-detect results over the course of at least 5 years of sampling. Contaminant concentrations in wells greater than 1.5 miles from the CSSA boundary are not expected to increase in the future due to their distance from the plume sources. Wells with consistent non-detect concentrations over 5 years are also unlikely to see a change in their concentrations. Wells along the plume boundary will continue to be monitored for evidence of plume migration

Off-post well owners who fall into one or both of the categories described above will be notified by mail, with a personal notification letter, that their well is scheduled for removal from the routine sampling program. Each notification letter will include a graph or other visual representation of all past sampling results for the well.

## Source Area Cleanup

Plume 1 originates from SWMUs B-3 and O-1 in the central portion of CSSA (Figure 1). In 2007, a bioreactor was installed to eliminate VOCs by accelerating biological activity of microorganisms that destroy PCE and TCE. USEPA approved the bioreactor as the final remedy for the Plume 1 in July 2015. Wells installed around SWMU B-3 are closely monitored to confirm that the system is running efficiently and effectively, and that degradation of the contamination is continuing.

AOC-65, located in the southwest corner of CSSA, is the source area for Plume 2. In 2012, in-situ chemical oxidation (ISCO) was conducted to treat underlying VOC contamination remaining in the near-surface rock in a former drainage ditch at AOC-65. ISCO was approved by USEPA as the final remedy for the Plume 2 in July 2015.

The ISCO process chemically destroys contaminants such as PCE and TCE. ISCO material is injected into the ground and the material destroys TCE and PCE on contact. Five injections of ISCO have taken place at AOC-65 since August 2012, resulting in approximately 160,000 gallons of ISCO solution injected to treat the Plume 2 source area. Laboratory results indicate that the treatment process is capable of dislodging and reducing the amount of contaminants present in the surrounding bedrock. ISCO is conducted under an underground injection control (UIC) permit from TCEQ.

## Off-post Groundwater Monitoring

The goals of CSSA's off-post monitoring program are to confirm that off-post drinking water meets USEPA and TCEQ safe drinking water standards, determine where VOC contamination has migrated, and define the appropriate response. As part of the program, 54 off-post wells were sampled in 2015 (see Table 1).

Factors considered in deciding if a well is sampled include where the well is located, how close it is to areas where VOCs have been detected, whether the well owner grants access for sampling, and results of previous sampling at the well. A well is initially sampled for four consecutive quarters (i.e., every three months for one year). Depending on the analytical results for the well, future sampling occurs as illustrated on Figure 4.

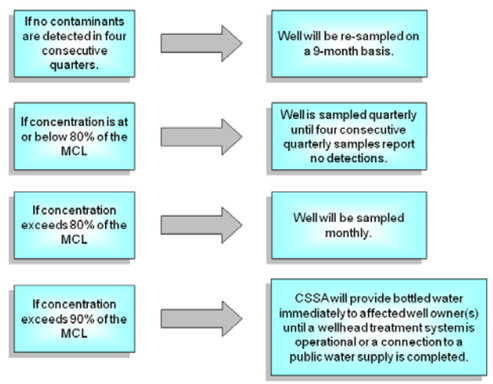

**Figure 4: Off-Post Well Sampling Decision Chart**

CSSA takes action if VOCs are detected in off-post wells at concentrations that begin approaching 90% of the MCL (greater than 4.5 ppb).

## 2015 Groundwater On- and Off-Post Sampling Results

The locations of all on- and off-post wells sampled in 2015 are shown on Figure 5 (back side). Table 1 presents off-post groundwater data for PCE and TCE from all 2015 sampling events. Two wells (RFR-10 and OFR-3) exceeded the MCL for PCE and TCE in samples collected prior to the well's GAC filter. In all other wells tested, any VOCs that were detected had concentrations below the drinking water MCLs for PCE and TCE.

In March and September 2015 analyses of the GAC-filtered water samples confirmed that no VOCs were present above the laboratory detection levels and that GAC units were functioning properly (Table 2). Carbon filter maintenance for the GAC filtration systems was performed in August 2015 and February 2016. Well I10-4 is not currently being used and therefore is not equipped with a GAC filtration system. The next carbon-canister replacement is scheduled for August 2016. GAC-filtered samples are collected every six months and will be collected again in September 2016.

CSSA will continue to sample both on- and off-post groundwater wells at frequencies approved by USEPA and TCEQ; and to coordinate the groundwater monitoring program with the regulatory agencies and other potentially affected parties in the community.

## Activities Planned for 2016

- Continued monitoring and operation & maintenance (O&M) of the AOC-65 ISCO remediation area and the SWMU B-3 bioreactor system to assess the remedies' impacts to source area contaminant concentrations.
- Continued groundwater monitoring at on- and off-post wells in accordance with the most recent LTMO results and DQOs approved by USEPA and TCEQ.
- CSSA drinking water system monitoring and O&M.

## Public Outreach and Future Fact Sheets

CSSA has been issuing Fact Sheets similar to this one since 2000. We will continue to mail Fact Sheets annually to provide information on sampling results, ongoing investigations, and cleanup activities. Each well owner involved in the groundwater monitoring program will continue to receive a separate letter concerning laboratory results for their wells after sampling by CSSA. The public is welcome to comment on this Fact Sheet and the environmental activities at CSSA by writing or calling:

- CSSA Installation Manager, Mr. Jason D. Shirley, Camp Stanley Storage Activity, 25800 Ralph Fair Road, Boerne, TX 78015-4800 at (210) 295-7416;
- USEPA Regional Program Manager, Mr. Greg Lyssy, at (214) 665-8317;
- TCEQ Regional Program Manager, Ms. Amanda Pirani, at (512) 239-6526; or
- Fort Sam Houston, Public Affairs Office, Mr. Phillip Reidinger, at (210) 221-8580 or (210) 336-0449 (mobile).

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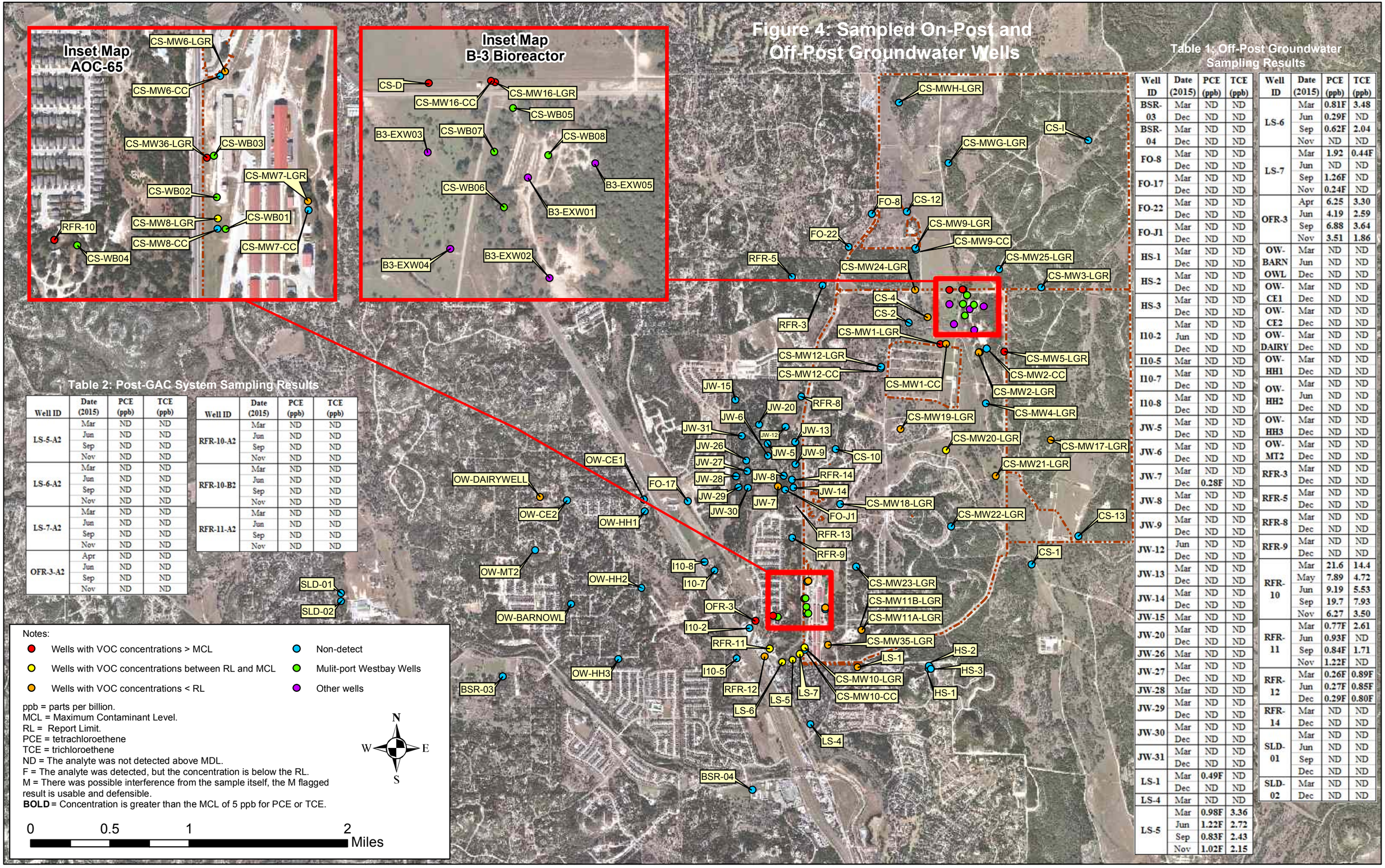
# Figure 4: Sampled On-Post and Off-Post Groundwater Wells




Notes:

- Wells with VOC concentrations > MCL
- Wells with VOC concentrations between RL and MCL
- Wells with VOC concentrations < RL
- Non-detect
- Mulit-port Westbay Wells
- Other wells

ppb = parts per billion.
MCL = Maximum Contaminant Level.
RL = Report Limit.
PCE = tetrachloroethene
TCE = trichloroethene
ND = The analyte was not detected above MDL.
F = The analyte was detected, but the concentration is below the RL.
M = There was possible interference from the sample itself, the M flagged result is usable and defensible.
**BOLD** = Concentration is greater than the MCL of 5 ppb for PCE or TCE.

## Table 2: Post-GAC System Sampling Results

| Well ID | Date (2015) | PCE (ppb) | TCE (ppb) |
|---|---|---|---|
| LS-5-A2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |
| LS-6-A2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |
| LS-7-A2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |
| OFR-3-A2 | Apr | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |

| Well ID | Date (2015) | PCE (ppb) | TCE (ppb) |
|---|---|---|---|
| RFR-10-A2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |
| RFR-10-B2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |
| RFR-11-A2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Nov | ND | ND |

## Table 1: Off-Post Groundwater Sampling Results

| Well ID | Date (2015) | PCE (ppb) | TCE (ppb) |
|---|---|---|---|
| BSR-03 | Mar | ND | ND |
| | Dec | ND | ND |
| BSR-04 | Mar | ND | ND |
| | Dec | ND | ND |
| FO-8 | Mar | ND | ND |
| | Dec | ND | ND |
| FO-17 | Mar | ND | ND |
| | Dec | ND | ND |
| FO-22 | Mar | ND | ND |
| | Dec | ND | ND |
| FO-J1 | Mar | ND | ND |
| | Dec | ND | ND |
| HS-1 | Mar | ND | ND |
| | Dec | ND | ND |
| HS-2 | Mar | ND | ND |
| | Dec | ND | ND |
| HS-3 | Mar | ND | ND |
| | Dec | ND | ND |
| I10-2 | Mar | ND | ND |
| | Jun | ND | ND |
| | Dec | ND | ND |
| I10-5 | Mar | ND | ND |
| I10-7 | Mar | ND | ND |
| | Dec | ND | ND |
| I10-8 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-5 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-6 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-7 | Mar | ND | ND |
| | Dec | 0.28F | ND |
| JW-8 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-9 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-12 | Jun | ND | ND |
| | Dec | ND | ND |
| JW-13 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-14 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-15 | Mar | ND | ND |
| JW-20 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-26 | Mar | ND | ND |
| JW-27 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-28 | Mar | ND | ND |
| JW-29 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-30 | Mar | ND | ND |
| | Dec | ND | ND |
| JW-31 | Mar | ND | ND |
| | Dec | ND | ND |
| LS-1 | Mar | 0.49F | ND |
| | Dec | ND | ND |
| LS-4 | Mar | ND | ND |
| LS-5 | Mar | 0.98F | 3.36 |
| | Jun | 1.22F | 2.72 |
| | Sep | 0.83F | 2.43 |
| | Nov | 1.02F | 2.15 |

| Well ID | Date (2015) | PCE (ppb) | TCE (ppb) |
|---|---|---|---|
| LS-6 | Mar | 0.81F | 3.48 |
| | Jun | 0.29F | ND |
| | Sep | 0.62F | 2.04 |
| | Nov | ND | ND |
| LS-7 | Mar | 1.92 | 0.44F |
| | Jun | ND | ND |
| | Sep | 1.26F | ND |
| | Nov | 0.24F | ND |
| OFR-3 | Apr | 6.25 | 3.30 |
| | Jun | 4.19 | 2.59 |
| | Sep | 6.88 | 3.64 |
| | Nov | 3.51 | 1.86 |
| OW-BARN OWL | Mar | ND | ND |
| | Jun | ND | ND |
| | Dec | ND | ND |
| OW-CE1 | Mar | ND | ND |
| | Dec | ND | ND |
| OW-CE2 | Mar | ND | ND |
| | Dec | ND | ND |
| OW-DAIRY | Mar | ND | ND |
| | Dec | ND | ND |
| OW-HH1 | Mar | ND | ND |
| OW-HH2 | Jun | ND | ND |
| | Dec | ND | ND |
| OW-HH3 | Dec | ND | ND |
| OW-MT2 | Mar | ND | ND |
| | Dec | ND | ND |
| RFR-3 | Mar | ND | ND |
| | Dec | ND | ND |
| RFR-5 | Mar | ND | ND |
| | Dec | ND | ND |
| RFR-8 | Mar | ND | ND |
| | Dec | ND | ND |
| RFR-9 | Mar | ND | ND |
| | Dec | ND | ND |
| RFR-10 | Mar | 21.6 | 14.4 |
| | May | 7.89 | 4.72 |
| | Jun | 9.19 | 5.53 |
| | Sep | 19.7 | 7.93 |
| | Nov | 6.27 | 3.50 |
| RFR-11 | Mar | 0.77F | 2.61 |
| | Jun | 0.93F | ND |
| | Sep | 0.84F | 1.71 |
| | Nov | 1.22F | ND |
| RFR-12 | Mar | 0.26F | 0.89F |
| | Jun | 0.27F | 0.85F |
| | Dec | 0.29F | 0.80F |
| RFR-14 | Mar | ND | ND |
| | Dec | ND | ND |
| SLD-01 | Mar | ND | ND |
| | Jun | ND | ND |
| | Sep | ND | ND |
| | Dec | ND | ND |
| SLD-02 | Mar | ND | ND |
| | Dec | ND | ND |

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