

Colbert Landfill Remediation Project

Annual Report 2019

Progress Report for

May 2018 through April 2019

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1.0 Colbert Landfill Remediation Project Summary

The Colbert Landfill Superfund site is a closed, 40-acre, municipal solid waste landfill located approximately 15 miles north of Spokane, Washington, and about 2.5 miles north of Colbert, Washington. The landfill received waste from 1968 to 1986 when it became filled to capacity. Groundwater in the vicinity of the landfill was found to be contaminated with volatile organic compounds and in 1983, the landfill was placed on the National Priorities List (NPL) by EPA. In 1989, a consent decree was executed to implement a site remedy. The site remedy includes:

- An available alternate water supply for residential wells impacted by groundwater contamination originating from the landfill.
- Institutional Controls
- Construction and operation of a pump and treat system to capture and prevent further spread of groundwater contaminants.
- Landfill closure according to the State of Washington regulations Minimal Functional Standards (WAC173-304).
- Monitoring of contaminants to protect human health and the environment at the site.

Construction of a pump and treat (P&T) system was completed in 1994. The P&T system operated successfully for 20 years. In 2014, an EPA recommended shut-down test was initiated to determine if the facility was continuing to add any significant benefit to the clean-up.

The programs currently in place include a Shut-down Test (lower aquifer) for the pump and treat system; and upper aquifer compliance groundwater monitoring (includes 1,4-dioxane monitoring' and Minimal Functional Standards (MFS) monitoring of the upper aquifer); residential well monitoring (includes both upper and lower aquifers); supplemental sampling (includes both upper and lower aquifers); and landfill cover maintenance and monitoring. The groundwater monitoring programs and criteria are summarized below.

Current Monitoring Programs

Program	Aquifer	Parameters	Schedule
Shut-down Test	Lower	VOC's	Annual (Extraction wells Quarterly)
Upper Aquifer Compliance	Upper	VOC's	Annual (Extraction wells Quarterly)
1,4-Dioxane Sampling	Upper	1,4-Dioxane	Annual
MFS Monitoring	Upper	Cl/NH3/NO2/NH3 /SO4/Fe/Mn/Zn/T OC/COD	Annual
Residential Monitoring	Lower /Upper	VOC's	Monthly/Quarterly/SemiAnnual /Annual/BiAnnual
Supplemental Sampling	Lower/ Upper	VOC's	Every five years

Program Criteria

PROGRAM	CRITERIA	TCA	DCE	DCA	TCE	PCE	MC	1,4-Dioxane	Units	
CONSENT DECREE	Performance Evaluation	200	7	4050	5	0.7	2.5		ug/L	
		200	7	4050	5	0.7	2.5	7		
SHUT-DOWN TEST	Action Level Evaluation	130	4.55	2632	3.25	0.5	1.63			
		200	7	4050	5	0.7	2.5			
RESIDENTIAL Monthly sampling initiated, evaluated in 12 months Exceedance requires alternative drinking water source be supplied		130	4.55	2632	3.25	0.5	1.63			
	MCL	200	7	4050	5	0.7	2.5			
		Cl	Fe	Mn	Zn	TOC	COD	SO4	NO3	
MFS	(mg/L)	250	0.3	0.05	5	NA	NA	250	10	mg/L

1.1 Geology/Hydrogeology

The geology beneath the Site consists of six vertically stratified and laterally discontinuous geologic units derived from glacial and fluvial material, modified by erosional (and possibly landslide) processes, overlaid on granitic bedrock. There are two primary aquifers that include the saturated portion of the Upper Sand and Gravel Unit and the saturated portion of the Lower Sand and Gravel Unit, which are separated by a Lacustrine Unit that serves as an aquitard. The Latah Formation serves as an aquitard that underlies the Lower Sand and Gravel Aquifer at most locations. A basalt unit forms a secondary aquifer interbedded in the Latah Aquitard and is referred to as the Basalt Aquifer. The Granite Unit is an aquitard that underlies the Latah Formation and serves as the lower boundary to the regional flow system. For more information, please refer to the Phase I Engineering Report (Landau Associates 1991).

The Upper Sand and Gravel Unit aquifer (Upper Aquifer) is unconfined with a water table that lies approximately 90 ft below the ground surface. Groundwater flow in this aquifer is generally north to south, changing to the southeast approximately 1 mile south of the Site. The direction of flow appears to be influenced by the topography of the upper surface of the Lacustrine Aquitard (Landau Associates 1991).

The Lower Sand and Gravel Unit aquifer (Lower Aquifer) is confined to the west of the landfill and unconfined to the east of the landfill. To the west of the landfill, the Upper and Lower aquifers are separated by the Lacustrine unit, which causes the confined conditions in that area. Groundwater flow in the Lower Aquifer is predominantly toward the west with discharge to the Little Spokane River.

1.2 Shut-down Test-Lower Aquifer

A pump and treat system was successfully operated from 1994 through March 31, 2014 to prevent further spread of groundwater contamination emanating from the landfill. A shut-down test for the lower aquifer pump and treat system was deemed appropriate for the site after a Remedial System Evaluation (RSE) was performed as recommended in the 2009 Five Year Review (EPA). The RSE recommendation stated that with the extensive groundwater monitoring programs in place and with concentrations having decreased substantially after 20 years of operation, the current pump and treat system may not be adding significant benefit to the overall protectiveness of the remedy and that a shut-down test would help determine its efficacy. The shut-down test procedures are outlined in the *Final Work Plan, Groundwater Pump and Treat System Shut-down Test, Colbert Landfill CERCLA Site, Spokane County Utilities/ Landau Assoc. 2013*. See Section 2 of this report for more details. The upper aquifer monitoring wells are governed by the Consent Decree compliance, Post Closure (Minimal Functional Standards), and 1,4-dioxane sampling programs and are not included in the Shut-down test work plan.

1.3 Upper Aquifer Monitoring

1.3.1 Compliance Monitoring (VOC's)

The compliance monitoring sampling program is outlined in the Consent Decree and performed according to the Colbert Landfill Operations and Maintenance manual (*Colbert Landfill Operations and Maintenance Manual, 1998*.). During implementation of the lower aquifer system Shut-down Test, the compliance monitoring will only apply to the upper aquifer. Per conditions set forth in the consent decree (Appendix B, page V-7), the south system extraction wells are not required to be in operation and have been on stand-by status since 2004, and therefore are included in the compliance monitoring program.

1.3.2 1, 4-Dioxane Sampling

During the 2005 (3rd) Five Year Site Review, EPA specified an additional constituent (1,4-Dioxane) for evaluation at the Colbert Landfill site. After extensive monitoring in both the upper and lower aquifers, it was determined that an ongoing monitoring program would apply to selected wells in the upper aquifer only. The selected upper aquifer well locations are sampled for 1,4-dioxane according to the *1,4-Dioxane Work Plan for the Colbert Landfill (December 2007)*.

1.3.3 Minimal Functional Standards (MFS) Post Closure

The landfill was closed pursuant to requirements of the Minimal Functional Standards for Solid Waste Handling (MFS, WAC173-304). Lower aquifer locations, as outlined in the MFS Groundwater Monitoring Plan (Landau Assoc., 1996), require no additional monitoring after the 2 year monitoring period, which ended in January 1999. Monitoring for the upper aquifer continue according to the *Colbert Landfill Operations and Maintenance Manual, 1998*, and the *MFS Groundwater Monitoring Plan, 1996* .

1.4 Residential Well Monitoring

The Consent Decree specified that domestic wells within the vicinity of the landfill be monitored to protect human health. Domestic well locations and schedules for this program were selected by

proximity to landfill contamination and are evaluated on a regular basis to accommodate any changes in groundwater contamination. This program includes well locations in both the upper and lower aquifers. Sampling for this program is done in accordance with the *Quality Assurance and Field Sampling Plan-Colbert Residential Well Sampling, 1991* and is governed by the Consent Decree.

1.5 Supplemental Sampling

Supplemental sampling occurs every five years and is intended to collect additional data from monitoring and residential wells not regularly sampled. Although there are no criteria for monitoring or reporting associated with supplemental sampling, data collected helps provide a more accurate snapshot of groundwater flow and contamination throughout the area.

1.6 Landfill Operations and Maintenance

In 1997, the landfill closure construction (cover system and components) was completed as part of the MFS requirements. The landfill gas collection and treatment system is monitored and maintained on a regular basis as outlined in the *Operations and Maintenance Manual for Colbert Landfill Closure, CH2MHill, May 1997*.

2.0 Shut-down Test

A shut-down test of the Colbert Landfill Groundwater Pump and Treat facility was initiated April 1, 2014 when all lower aquifer extraction wells were turned off and placed in standby mode. The shut-down test was deemed appropriate for the site after a Remedial System Evaluation (RSE) was performed as recommended in the 2009 Five Year Review (EPA). The shut-down test is performed according to the *Final Work Plan, Groundwater Pump and Treat System Shut-down Test, Colbert Landfill CERCLA Site, Spokane County Utilities/ Landau Assoc. 2013*.

2.1 Shut-down Testing Locations and Schedule

The lower aquifer wells selected as monitoring locations for the Colbert Landfill pump and treat system shut-down test include: the compliance monitoring well clusters (CD-41, CD-42, CD-43, CD-44, CD-45, and CD-48), monitoring well CD-49, and the lower aquifer extraction wells (CP-E1, CP-E2, CP-E3, CP-W1, CP-W2, and CP-W3). Locations are presented in Figure 2-1. Collection of groundwater samples (contaminant sampling) from the shut-down locations, along with the collection of water level measurements, was performed as outlined in Table 2-1.

2.2 Shut-down Test Monitoring

The lower aquifer extraction wells, the compliance monitoring well clusters (CD-41, CD-42, CD-43, CD-44, CD-45, and CD-48) and monitoring well CD-49 were sampled according to the *Colbert Landfill Operations and Maintenance Manual, 1998*. Field parameters were taken and VOC samples were collected. Cluster wells CD-48C3 had a pump failure during our annual sampling event. The County replaced the pump and conducted groundwater sampling on 5/21/2019. Field parameters and lab results are listed in Table 2-2 and Table 2-4, respectively.

2.2.1 Groundwater Elevations

Groundwater elevations for the reporting period are shown in Table 2-2 and in Figure 2-2. Estimated groundwater contours and flow are shown in Figure 2-3. Measurements were consistent and followed typical seasonal variation with levels slightly higher in the spring and slightly lower during the fall. Extraction well hydrographs show the increase in groundwater levels at the immediate vicinity of those wells in April 2014 when the system was shut down.

2.2.2 Field Parameters

Field parameters taken at the shut-down test locations are shown in Table 2-2. The highest conductivities were mostly seen in the east system extraction wells. Conductivity values in monitoring wells ranged from 261 to 1170 umhos/cm. Measurements of pH ranged from 6.74 to 8.13, with the lowest pH values generally found in the east system extraction wells.

2.2.3 Constituents of Concern (COC's)

Constituent of concern concentrations for Shut-down Test locations are presented Table 2-4. Concentrations versus time for Shut-down locations are presented in Figure 2-4. All detected concentrations found in the shut-down test compliance wells were well below any applicable criteria. Criteria are shown in Table 3-2. The COC's found in the shut-down program criteria dependent wells were low concentrations of TCA, DCA, and DCE. Although the concentrations found in the wells were far below any criteria, monitoring well CD-49 was kept on a quarterly

sampling schedule to better evaluate the increasing TCA concentrations found in this well, which is currently on a consistent decreasing trend. The cluster well CD-43C1 has also recently been included on the quarterly sampling schedule as well so that the County can better evaluate the new increasing trend in TCA concentrations. See Figure 2-9 for the estimated TCA plume boundaries in the lower aquifer.

Lower aquifer extraction wells are not criteria dependent locations, and therefore actions during the shut-down test are not governed by COC concentrations in these wells. Analytical results from the extraction well sampling are shown in Table 2-5. Time versus concentration plots are found in Figure 2-5 through Figure 2-8. In general, concentrations of COC's have remained relatively stable in east system wells. Although there were significant increases in concentrations for TCA, TCE, and DCA at CP-W3 since the shutdown that peaked around 2017, concentrations appear to be on a decreasing trend or stabilizing at lower concentrations. Concentrations in CP-W2, after noticeably decreasing three months after the wells were inactivated, have remained relatively low.

2.3 Data Evaluation

Data indicates a slight shift in plume concentrations toward the western edge of landfill, evident by the emerging concentrations of TCA and DCE found in CD-49, increasing concentrations for TCA in CD-43C1, and increasing concentrations (rebound) found in CP-W3. Supplemental sampling wells in the center of the landfill showed significant TCA concentrations and indicated a more connective plume than historically mapped.

2.4 Program Changes or Modifications

No criteria were exceeded during the reporting period. As stated in the work plan, sampling at the lower aquifer compliance monitoring wells is now on an annual schedule and will be sampled again in April 2020. The exception to this is monitoring well CD-49 and cluster well CD-43C1. Quarterly sampling will continue at CD-49 and CD-43C1 to monitor the increasing trend in concentrations. Per the EPA's Optimization Report (2017) recommendations, the sampling frequency at well clusters CD-43 and CD-42 will be re-evaluated. Since concentrations in the vicinity of CD-40 and CP-W3 appear to be stable or on a decreasing trend (with the exception of CD43C1, which is now sampled quarterly), the sampling plan to monitor the area around CD-49/CP-W3 will continue its current course until any significant changes occur. Quarterly sampling will continue at the extraction wells, as running the wells periodically will assist with preventive maintenance and provide indicators for any possible changes in COC concentrations near the landfill boundaries.

2.5 Cost Savings

Typical electrical costs associated with operating the pump and treat system for the lower aquifer on a continual basis for a period of one year were approximately \$59,000. From May 2018 through April 2019 the cost for electricity at the facility during the fourth year of the shut-down test was \$16,737. Increases in lab costs were minimal when compared to the savings in electricity.

Typical Annual Electrical Costs		\$60,000
Electrical Costs for Fourth Year of Shut-down Test		-\$16,737
Estimated Total Cost Savings		\$43,263

Figure 2-1 Shut-down Test Locations

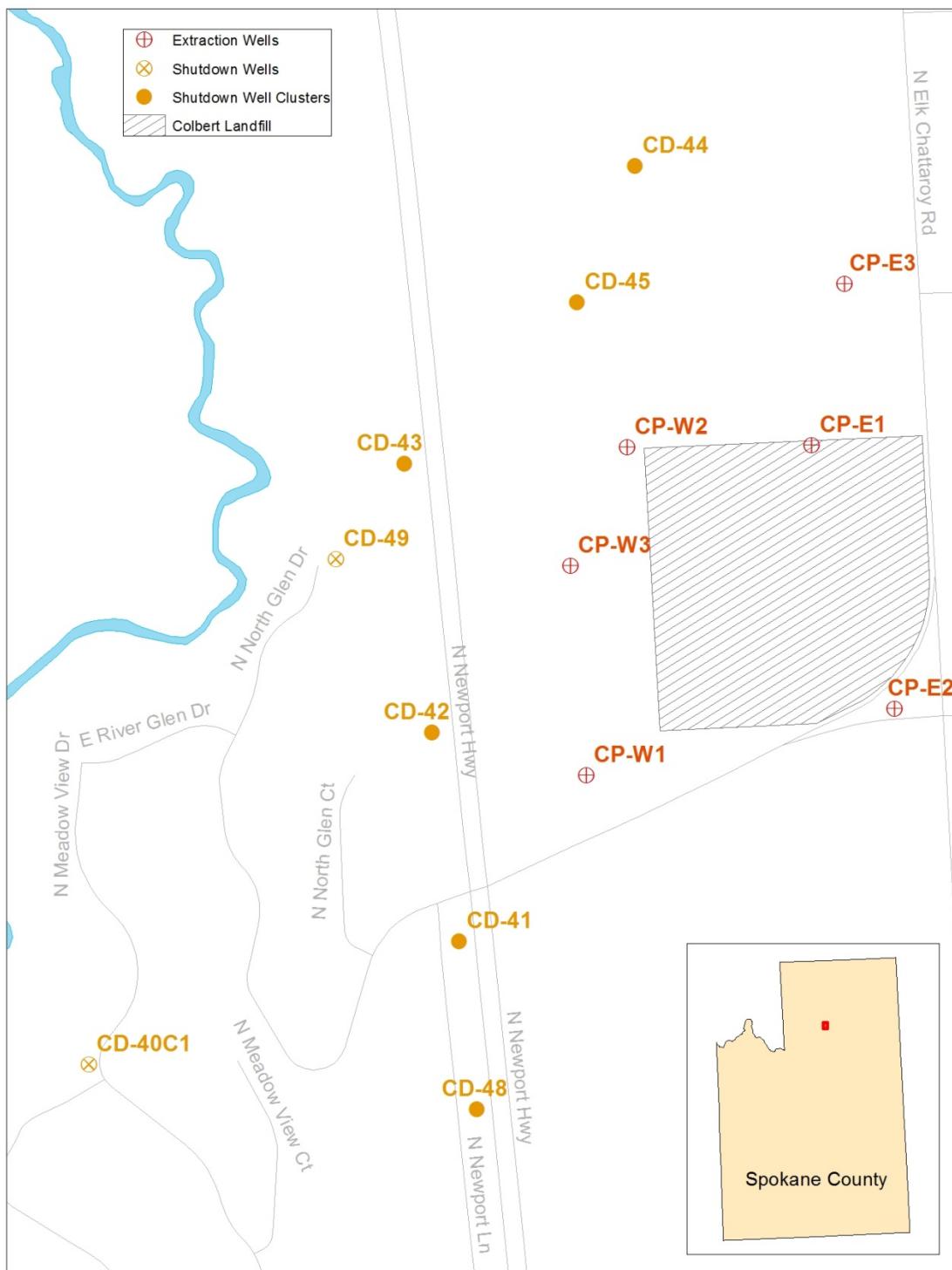


Table 2-1 Colbert Landfill Shut-down Test Sampling Schedule (May 2018 - April 2019)

System	Well ID	Monitoring Frequency		Shut-down Criteria Applies?
		Water Levels	Sampling	
West	CD-40C1	Quarterly	Annual	Yes
	CD-41C2	Quarterly	Annual	
	CD-41C3	Quarterly	Annual	
	CD-42C1	Quarterly	Annual	Yes
	CD-42C2	Quarterly	Annual	
	CD-42C3	Quarterly	Annual	
	CD-43C1	Quarterly	Quarterly	Yes
	CD-43C2	Quarterly	Annual	
	CD-43C3	Quarterly	Annual	
	CD-44C1	Quarterly	Annual	Yes
	CD-44C2	Quarterly	Annual	
	CD-44C3	Quarterly	Annual	
	CD-45C1	Quarterly	Annual	Yes
	CD-45C2	Quarterly	Annual	
	CD-45C3	Quarterly	Annual	
	CD-48C1	Quarterly	Annual	Yes
	CD-48C2	Quarterly	Annual	
	CD-48C3	Quarterly	Annual	
	CD-49	Quarterly	Quarterly	Yes
	CP-W1	Quarterly	Quarterly	
	CP-W2	Quarterly	Quarterly	
East	CP-W3	Quarterly	Quarterly	No
	CP-E1	Quarterly	Quarterly	
	CP-E2	Quarterly	Quarterly	
	CP-E3	Quarterly	Quarterly	

Changes to the program are highlighted in **RED**

Figure 2-2 Lower Aquifer Groundwater Elevations

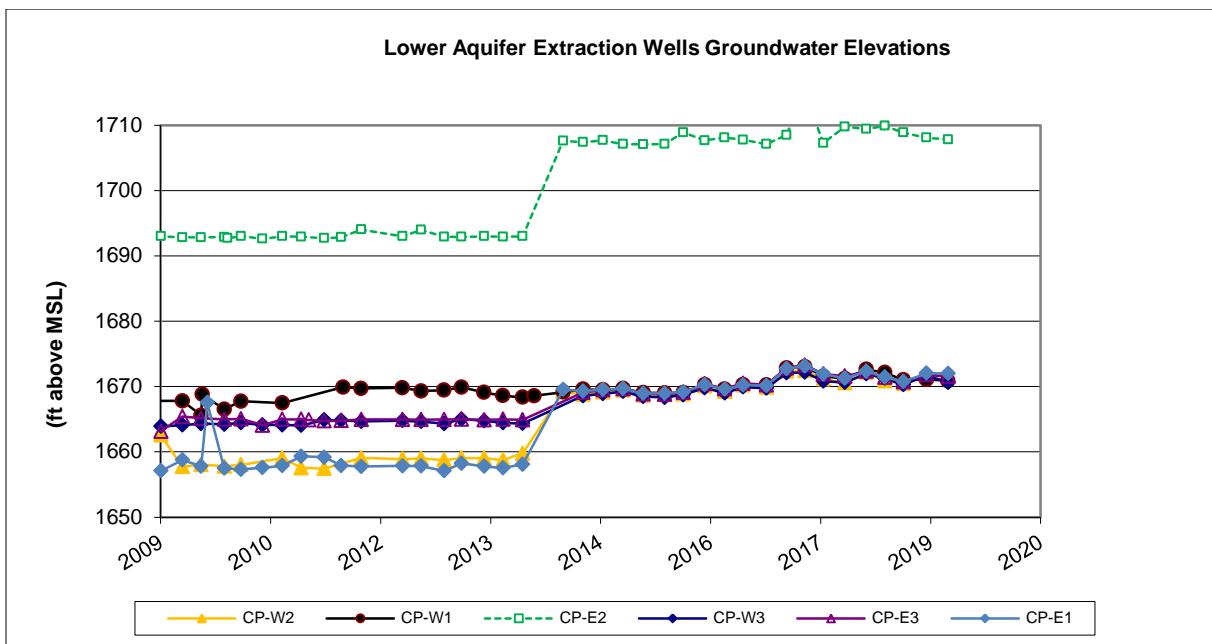
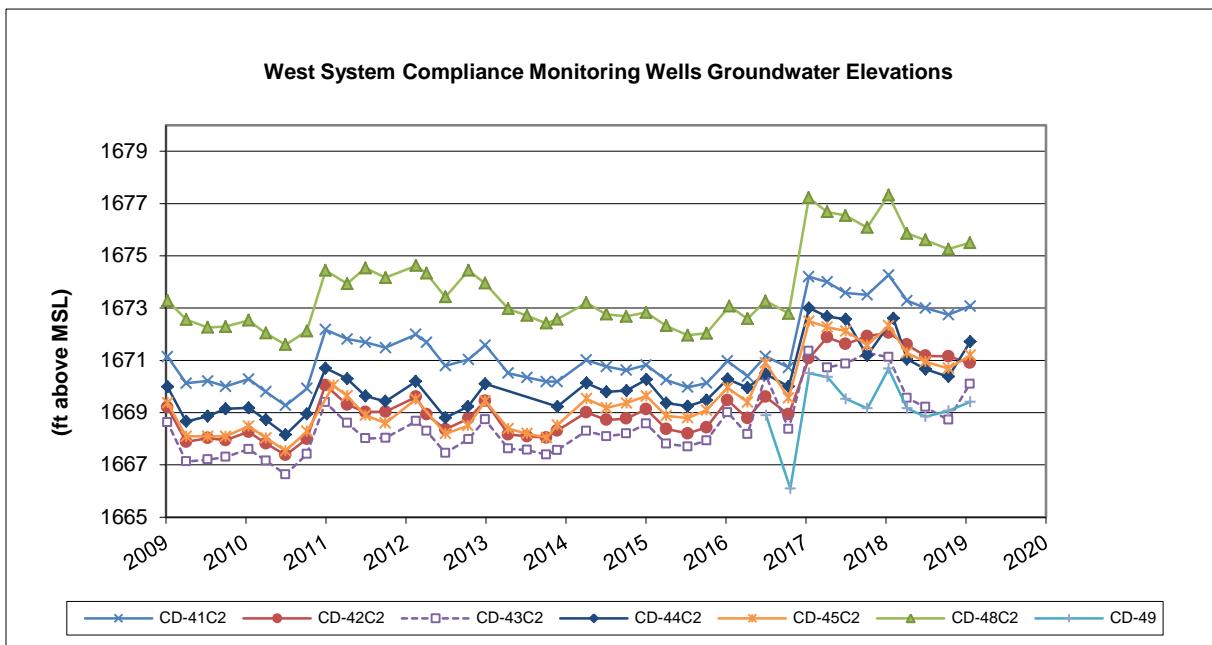
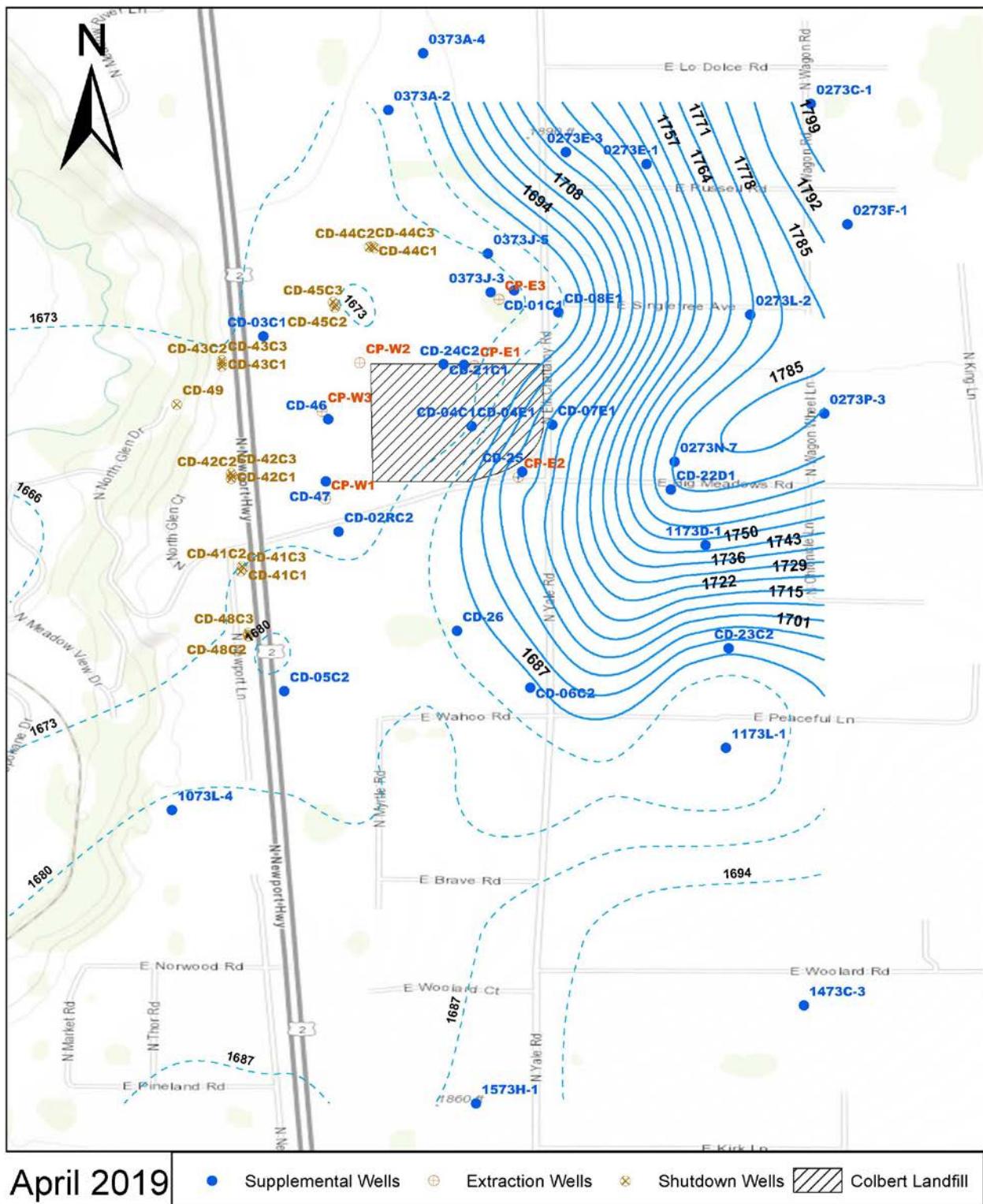


Figure 2-3 Lower Aquifer Groundwater Contours



April 2019

- Supplemental Wells ☒ Extraction Wells ✘ Shutdown Wells Colbert Landfill

Table 2-2 Shut-down Test Location Field Parameters

StationID	SampleDate	WtrElev	Temp	PH	Conductivity	Turbidity	Aquifer	Program
CD-41C1	4/17/2018	1674.31	11.4	7.87	348	0.15	lower	SD
CD-41C1	4/18/2018	1676.65	15.4	7.58	474	0.26	lower	SD
CD-41C1	4/24/2019	1672.97	11.4	7.91	409	0.13	lower	SD
CD-41C2	4/17/2018	1674.26	11.2	7.96	349	0.19	lower	SD
CD-41C2	4/24/2019	1673.07	11.4	7.99	431	0.19	lower	SD
CD-41C3	4/17/2018	1674.43	11.9	7.79	400	0.14	lower	SD
CD-41C3	4/24/2019	1673.2	12.1	7.83	469	0.18	lower	SD
CD-42C1	4/17/2018	1672.28	11.7	7.77	411	0.17	lower	SD
CD-42C1	4/23/2019	1671.07	12.2	7.83	451	0.18	lower	SD
CD-42C2	4/17/2018	1672.05	11.4	7.84	409	0.19	lower	SD
CD-42C2	4/23/2019	1670.9	12.2	7.89	457	0.09	lower	SD
CD-42C3	4/17/2018	1672.33	12.1	7.83	350	0.94	lower	SD
CD-42C3	4/23/2019	1671.04	12.8	7.91	401	0.19	lower	SD
CD-43C1	4/17/2018	1671	9.9	7.81	418	0.11	lower	SD
CD-43C1	4/23/2019	1669.97	10.3	8.09	478	0.13	lower	SD
CD-43C2	4/17/2018	1671.12	10.3	7.86	337	0.14	lower	SD
CD-43C2	4/23/2019	1670.1	11.2	8.13	367	0.09	lower	SD
CD-43C3	4/17/2018	1672.3	10.6	7.74	261	0.17	lower	SD
CD-43C3	4/23/2019	1670.9	11.7	8.04	278	0.18	lower	SD
CD-44C1	4/18/2018	1672.85	15.4	7.58	474	0.26	lower	SD
CD-44C1	4/24/2019	1672.03	16.4	7.61	476	0.28	lower	SD
CD-44C2	5/9/2018	1672.6	12.5	7.33	452	0.35	lower	SD
CD-44C2	4/24/2019	1671.71	11.3	7.59	457	0.15	lower	SD
CD-44C3	5/9/2018	1672.35	13.1	7.31	445	0.29	lower	SD
CD-44C3	4/24/2019	1671.57	11.8	7.62	461	0.69	lower	SD
CD-45C1	4/18/2018	1672.26	9.9	7.63	489	0.17	lower	SD
CD-45C1	4/24/2019	1670.96	10.2	7.75	502	0.12	lower	SD
CD-45C2	4/18/2018	1672.32	10.3	7.59	464	0.07	lower	SD
CD-45C2	4/24/2019	1671.19	10.7	7.66	459	0.13	lower	SD
CD-45C3	4/18/2018	1673.48	10.1	7.98	329	0.13	lower	SD
CD-45C3	4/24/2019	1672.07	10.4	8.06	381	0.11	lower	SD
CD-48C1	4/17/2018	1676.86	11.5	7.76	419	0.04	lower	SD
CD-48C1	4/23/2019	1675.04	11.4	7.74	481	0.26	lower	SD
CD-48C2	4/17/2018	1677.32	11.4	7.8	403	0.24	lower	SD
CD-48C2	4/23/2019	1675.5	11.4	7.82	430	0.17	lower	SD
CD-48C3	4/17/2018	1676.57	11.5	7.79	397	0.16	lower	SD
CD-48C3	5/21/2019	1674.88	11.8	7.34	513	0.45	lower	SD
CD-49	4/17/2018	1670.68	12.2	7.83	516	0.21	lower	SD
CD-49	7/11/2018	1669.16	13	7.74	475	0.12	lower	SD
CD-49	10/3/2018	1668.84	12.2	7.79	460	0.12	lower	SD
CD-49	1/16/2019	1669.07	12.7	7.86	537	0.14	lower	SD
CD-49	4/25/2019	1669.41	12.3	7.87	465	0.13	lower	SD
CP-E1	4/18/2018	1672.32	11.7	7.06	1129	1.11	lower	SD
CP-E1	7/11/2018	1671.45	12.9	6.85	1080	0.89	lower	SD
CP-E1	10/3/2018	1670.76	12.9	6.74	1100	1.3	lower	SD
CP-E1	1/16/2019	1672.02	9.5	6.95	1015	0.73	lower	SD
CP-E1	4/25/2019	1672	9.6	7.98	1012	0.69	lower	SD
CP-E2	4/18/2018	1709.42	12.5	7.11	1170	0.89	lower	SD
CP-E2	7/11/2018	1709.9	13.6	7.1	1095	0.87	lower	SD
CP-E2	10/3/2018	1708.85	13.3	6.88	1099	0.38	lower	SD
CP-E2	1/16/2019	1708.07	12.7	7.01	1100	0.28	lower	SD
CP-E2	4/25/2019	1707.8	11.3	7.06	1089	0.31	lower	SD

CP-E3	4/18/2018	1672.33	11.5	7.2	825	0.89	lower	SD
CP-E3	7/11/2018	1671.38	12.1	7.13	831	0.61	lower	SD
CP-E3	10/3/2018	1670.74	12.1	6.89	851	0.57	lower	SD
CP-E3	1/16/2019	1671.79	10.8	7.1	892	0.49	lower	SD
CP-E3	4/25/2019	1671.54	10.9	7.1	889	0.4	lower	SD
CP-W1	4/18/2018	1672.61	11.7	7.91	491	0.71	lower	SD
CP-W1	7/11/2018	1672.13	12.3	7.84	479	0.59	lower	SD
CP-W1	1/16/2019	1671.07	10.7	7.84	501	0.49	lower	SD
CP-W1	4/24/2019	1670.87	11.1	7.82	506	0.44	lower	SD
CP-W2	4/18/2018	1672.18	10	7.7	494	0.8	lower	SD
CP-W2	7/11/2018	1670.85	11.3	7.9	508	0.69	lower	SD
CP-W2	10/3/2018	1670.47	10.5	7.75	534	0.77	lower	SD
CP-W2	1/16/2019	1671.67	9.6	7.7	534	0.31	lower	SD
CP-W2	4/24/2019	1671.83	9.4	7.71	533	0.29	lower	SD
CP-W3	4/18/2018	1671.96	12	7.48	803	0.8	lower	SD
CP-W3	7/11/2018	1671.25	12	7.49	644	0.69	lower	SD
CP-W3	10/3/2018	1670.26	11.7	7.38	633	0.31	lower	SD
CP-W3	1/16/2019	1671.72	10.6	7.6	611	0.57	lower	SD
CP-W3	4/25/2019	1670.62	10.6	7.57	614	0.58	lower	SD

Temp=degrees C; Conductivity=umhos/cm; Turbidity= NTU

Table 2-3 Colbert Landfill Shut-down Test Criteria

SHUT-DOWN TEST CRITERIA		
COC	ACTION LEVEL CRITERIA (ug/L)	CONSENT DECREE EVALUATION CRITERIA (ug/L)
TCA	130	200
DCA	2632	4050
DCE	4.55	7
MC	1.6	2.5
PCE	0.5	0.7
TCE	3.25	5

Table 2-4 Shut-down Test Compliance Well Analytical Results (reported in ug/l)

StationID	SampleDate	DCA	DCE	MC	PCE	TCA	TCE
CD-40C1	4/18/2018	1.72	<0.5	<0.5	<0.5	2.04	<0.5
CD-40C1	4/24/2019	1.48	1.06	<0.5	<0.5	1.33	<0.5
CD-41C1	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-41C1	4/24/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-41C2	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-41C2	4/24/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-41C3	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-41C3	4/24/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C1	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C1	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C2	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C2	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C3	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-42C3	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-43C1	4/17/2018	<0.5	<0.5	<0.5	<0.5	1.45	<0.5
CD-43C1	4/23/2019	<0.5	<0.5	<0.5	<0.5	4.19	<0.5
CD-43C2	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-43C2	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-43C3	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-43C3	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-44C1	4/24/2019	<0.5	<0.5	<0.5	<0.5	2.65	<0.5
CD-44C2	5/9/2018	<0.5	<0.5	<0.5	<0.5	1.93	<0.5
CD-44C2	4/24/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-44C3	5/9/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-44C3	4/24/2019	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
CD-45C1	4/18/2018	<0.5	<0.5	<0.5	<0.5	1.31	<0.5
CD-45C1	4/24/2019	<0.5	<0.5	<0.5	<0.5	1.46	<0.5
CD-45C2	4/18/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-45C2	4/24/2019	<0.5	<0.5	<0.5	<0.5	0.76	<0.5
CD-45C3	4/18/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-45C3	4/24/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C1	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C1	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C2	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C2	4/23/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C3	4/17/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-48C3	5/21/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CD-49	4/17/2018	<0.5	2.59	<0.5	<0.5	3.31	<0.5
CD-49	7/11/2018	<0.5	<0.5	<0.5	<0.5	2.33	<0.5
CD-49	10/3/2018	<0.5	2.1	<0.5	<0.5	2.11	<0.5
CD-49	1/16/2019	<0.5	1.33	<0.5	<0.5	1.23	<0.5
CD-49	4/25/2019	<0.5	1.57	<0.5	<0.5	1.5	<0.5

Table 2-5 Lower Aquifer Extraction Well Analytical Results (reported in ug/l)

StationID	SampleDate	DCA	DCE	MC	PCE	TCA	TCE
CP-E1	4/18/2018	9.66	<0.5	<0.5	2.85	8.58	9.93
CP-E1	7/11/2018	7.71	<0.5	<0.5	3.48	6.73	8.22
CP-E1	10/3/2018	8.39	14.4	<0.5	3.53	3.42	9.22
CP-E1	1/16/2019	7.32	14	<0.5	2.78	7.07	8.14
CP-E1	4/25/2019	8.9	16.6	<0.5	2.28	9.4	8.97
CP-E2	4/18/2018	38.6	<0.5	<0.5	0.69	62.3	116
CP-E2	7/11/2018	27.2	<0.5	<0.5	0.84	45.5	96.7
CP-E2	10/3/2018	36.2	125	<0.5	1	54.2	143
CP-E2	1/16/2019	27	147	<0.5	0.94	45	135
CP-E2	4/25/2019	42.5	143	<0.5	0.83	54	133
CP-E3	4/18/2018	3.89	<0.5	<0.5	<0.5	7.53	3.23
CP-E3	7/11/2018	2.68	<0.5	<0.5	<0.5	6.46	3.04
CP-E3	10/3/2018	3.01	11	<0.5	<0.5	7.83	3.07
CP-E3	1/16/2019	2.08	8.36	<0.5	<0.5	6.04	2.2
CP-E3	4/25/2019	2.12	8.1	<0.5	<0.5	6.23	2.39
CP-S1	4/18/2018	1.48	0.58	<0.5	<0.5	0.7	1.73
CP-S1	7/11/2018	1.39	<0.5	<0.5	<0.5	0.62	1.72
CP-S1	10/3/2018	1.64	<0.5	<0.5	<0.5	<0.5	1.78
CP-S1	1/16/2019	1.72	<0.5	<0.5	<0.5	0.64	1.35
CP-S1	4/25/2019	1.53	<0.5	<0.5	<0.5	0.82	1.42
CP-S4	7/11/2018	<0.5	<0.5	<0.5	0.52	<0.5	1.33
CP-S4	1/16/2019	1.04	<0.5	<0.5	<0.5	<0.5	1.46
CP-S4	4/25/2019	1.36	<0.5	<0.5	<0.5	0.61	1.8
CP-S5	4/18/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S5	7/11/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S5	10/3/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S5	1/16/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S5	4/25/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S6	4/18/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S6	7/11/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S6	10/3/2018	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S6	1/16/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-S6	4/25/2019	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CP-W1	4/18/2018	<0.5	<0.5	<0.5	<0.5	2.54	<0.5
CP-W1	7/11/2018	<0.5	<0.5	<0.5	<0.5	1.97	<0.5
CP-W1	1/16/2019	<0.5	2.27	<0.5	<0.5	2.88	<0.5
CP-W1	4/24/2019	<0.5	2.63	<0.5	<0.5	4.19	<0.5
CP-W2	4/18/2018	0.78	<0.5	<0.5	<0.5	7.38	1.1
CP-W2	7/11/2018	<0.5	<0.5	<0.5	<0.5	6.11	<0.5
CP-W2	10/3/2018	<0.5	0.72	<0.5	<0.5	8.28	<0.5
CP-W2	1/16/2019	0.53	0.53	<0.5	<0.5	7.56	<0.5
CP-W2	4/24/2019	1.36	1.31	<0.5	<0.5	15.3	<0.5
CP-W3	4/18/2018	8.87	<0.5	<0.5	<0.5	43.5	36.6
CP-W3	7/11/2018	5.72	<0.5	<0.5	<0.5	29.7	27.8
CP-W3	10/3/2018	6.4	20.2	<0.5	<0.5	34.7	31.1
CP-W3	1/16/2019	4.66	16.5	<0.5	<0.5	30.3	23.1
CP-W3	4/25/2019	5.58	17.7	<0.5	<0.5	36.2	25.4

Figure 2-4 Lower Aquifer Monitoring Well COC Concentrations

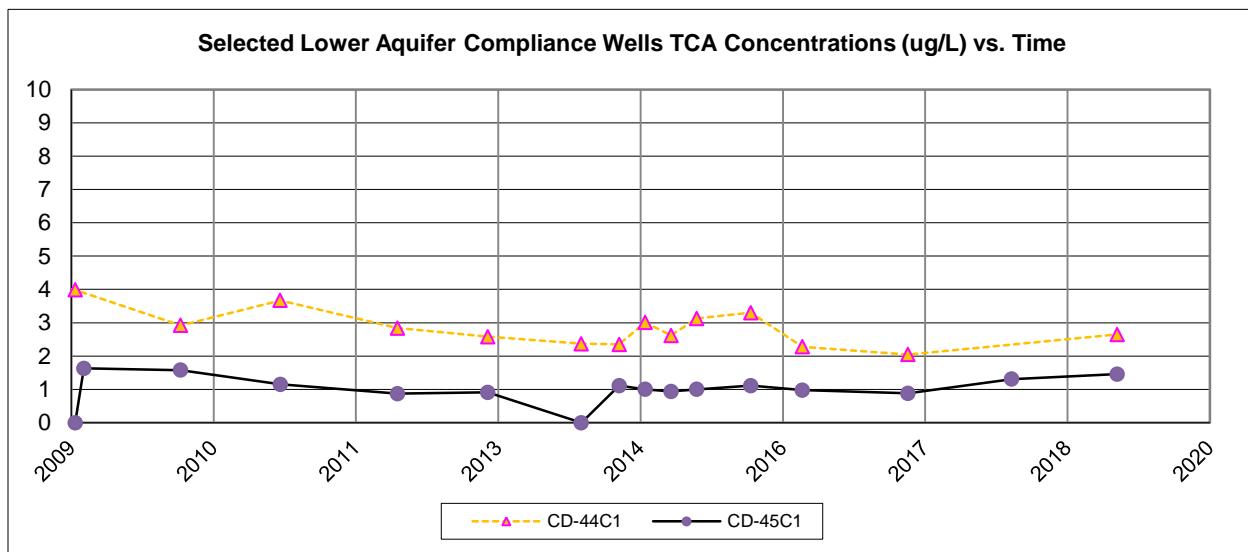
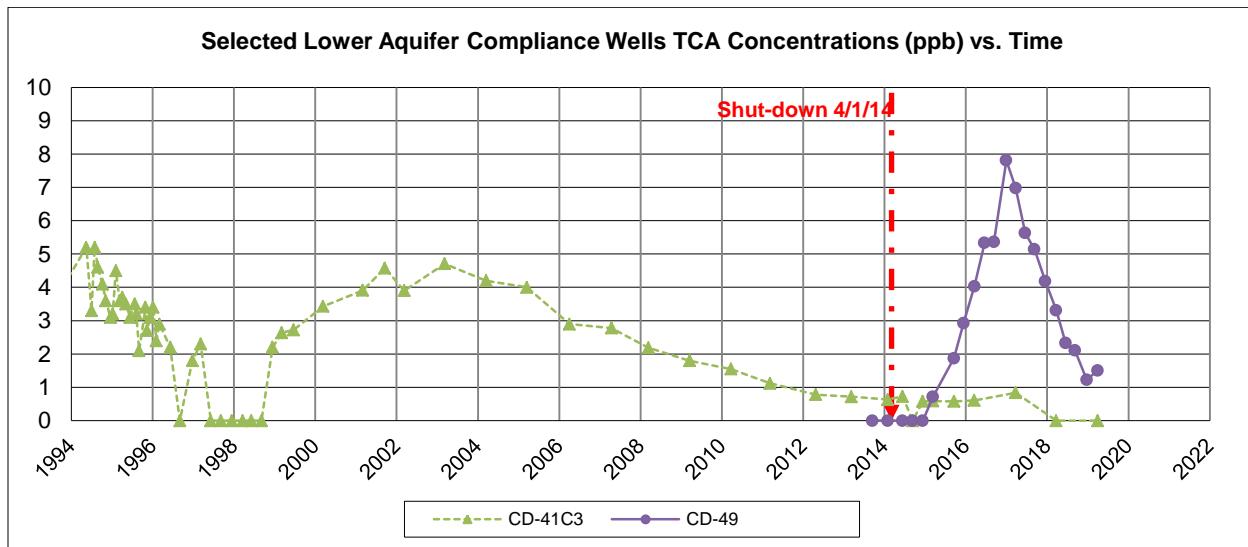


Figure 2-5 Lower Aquifer Extraction Well COC Concentrations

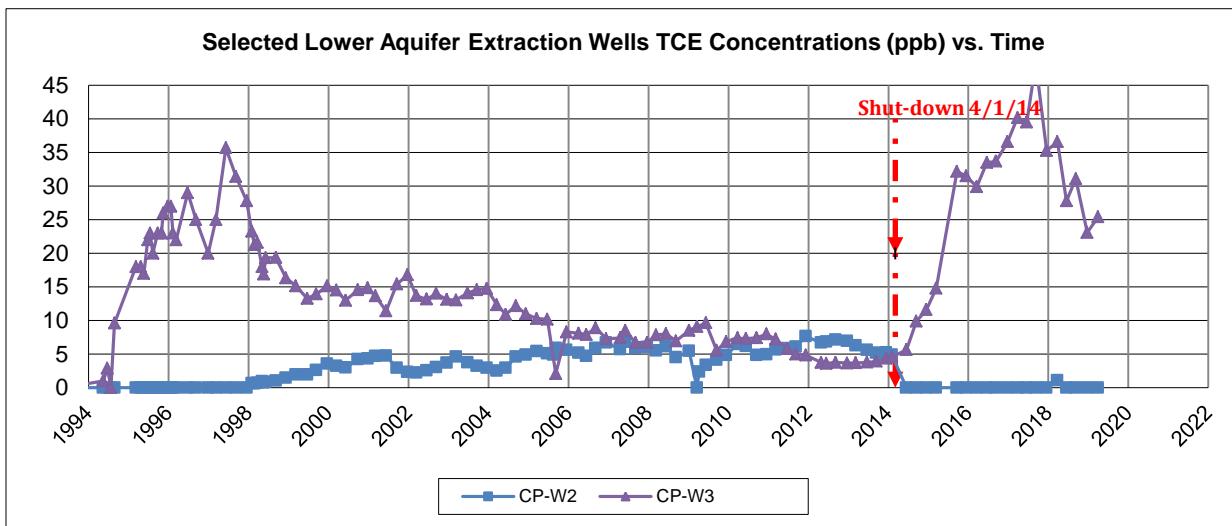
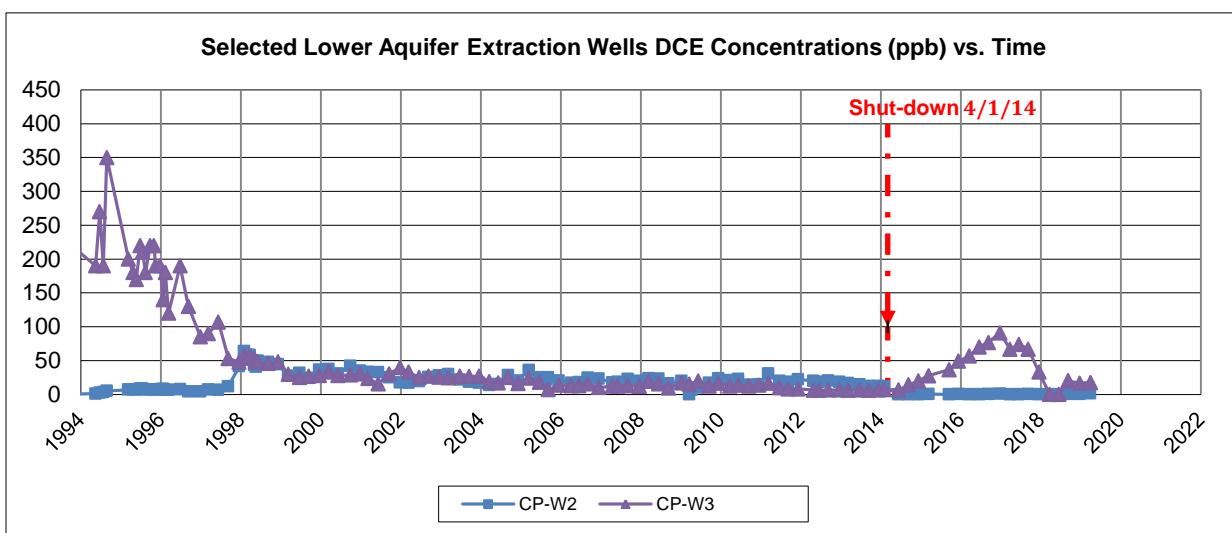
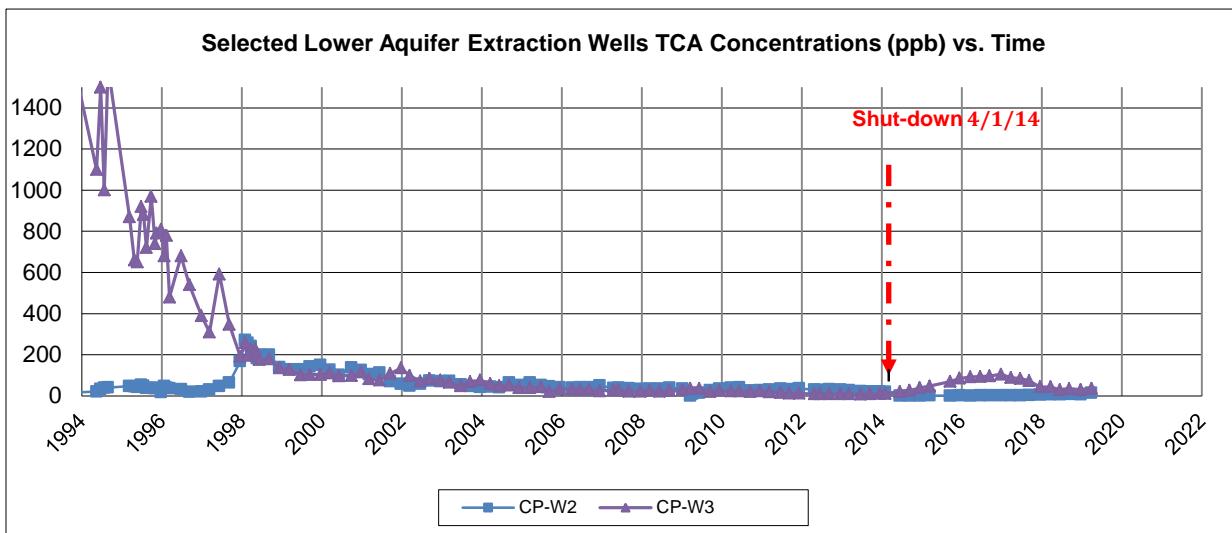


Figure 2-6 Lower Aquifer Extraction Well COC Concentrations

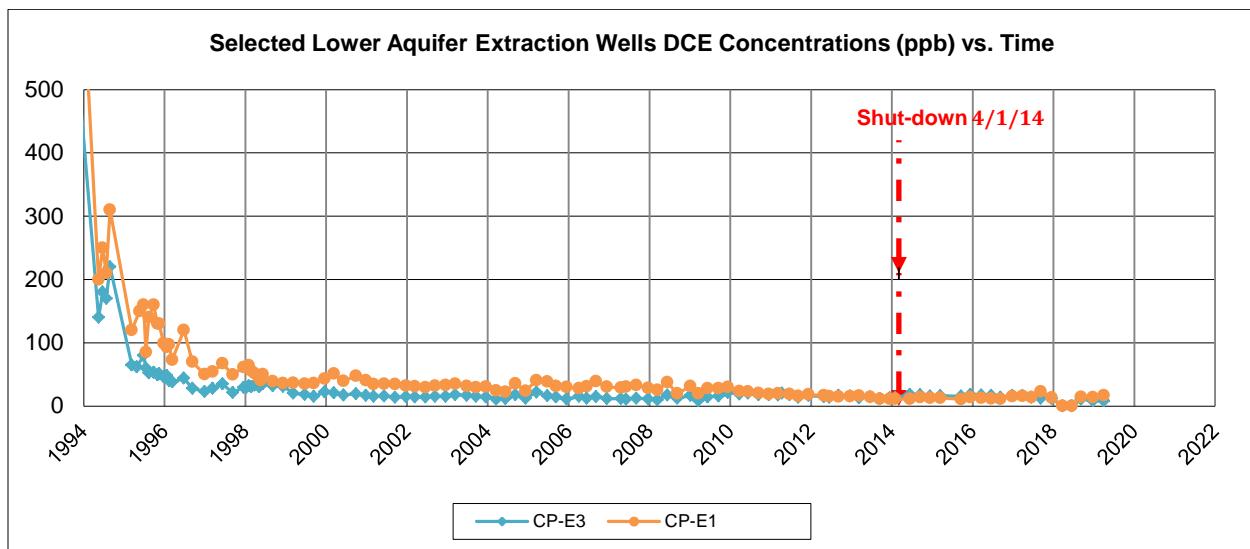
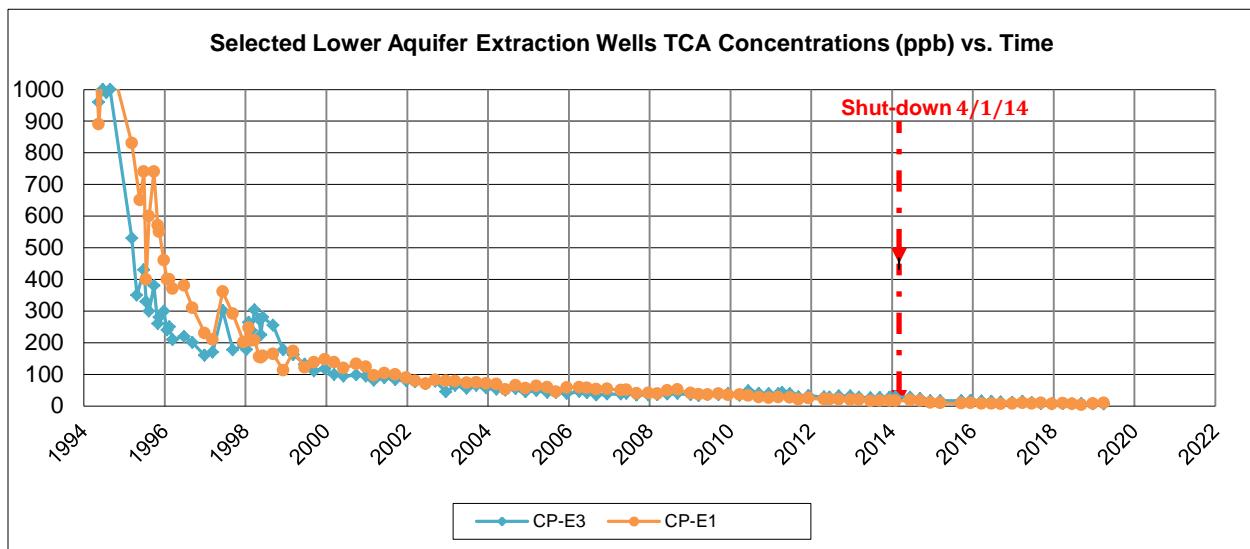


Figure 2-7 Lower Aquifer Extraction Well Concentrations

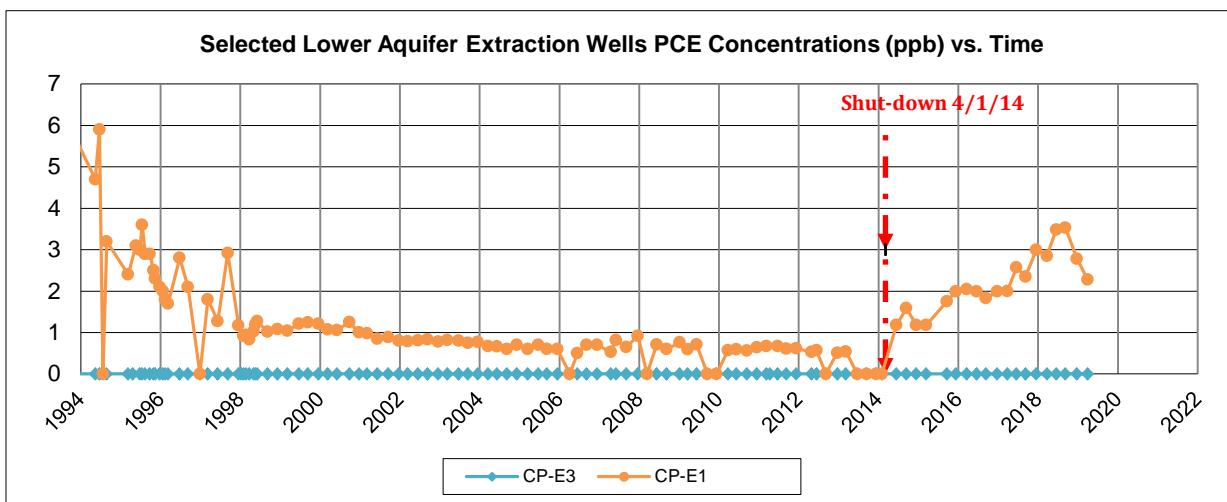
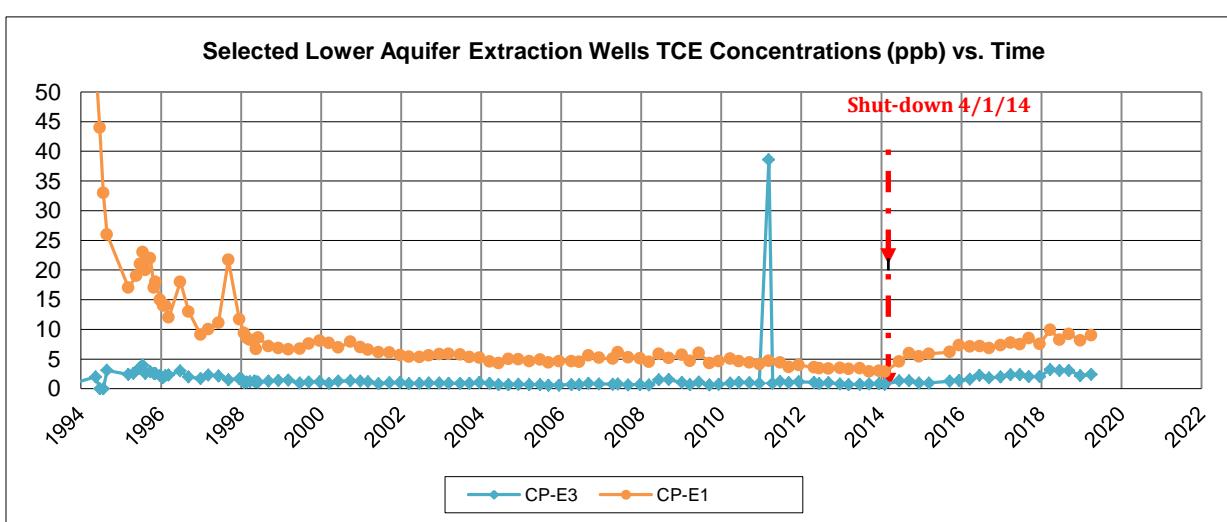
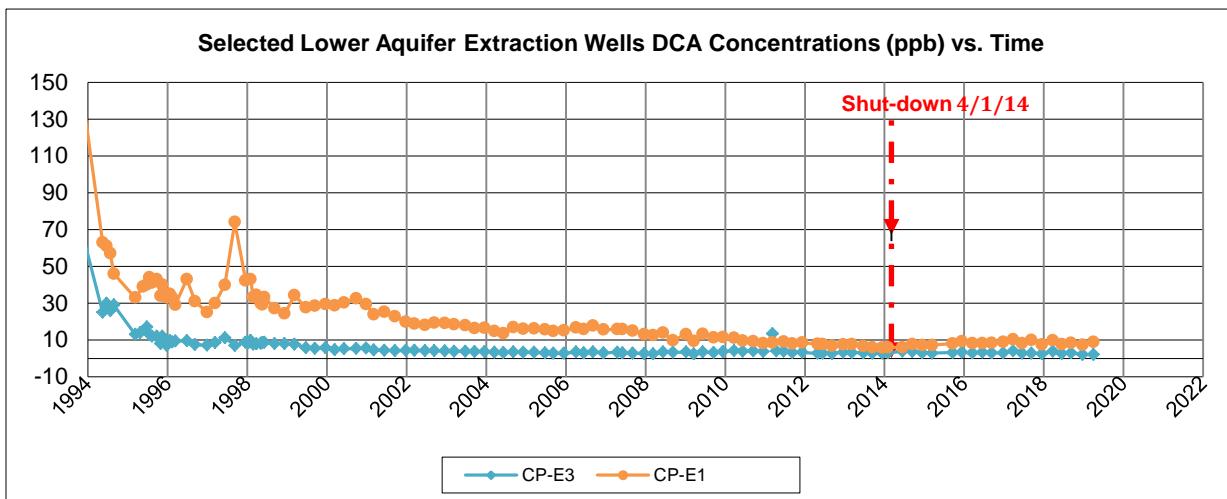
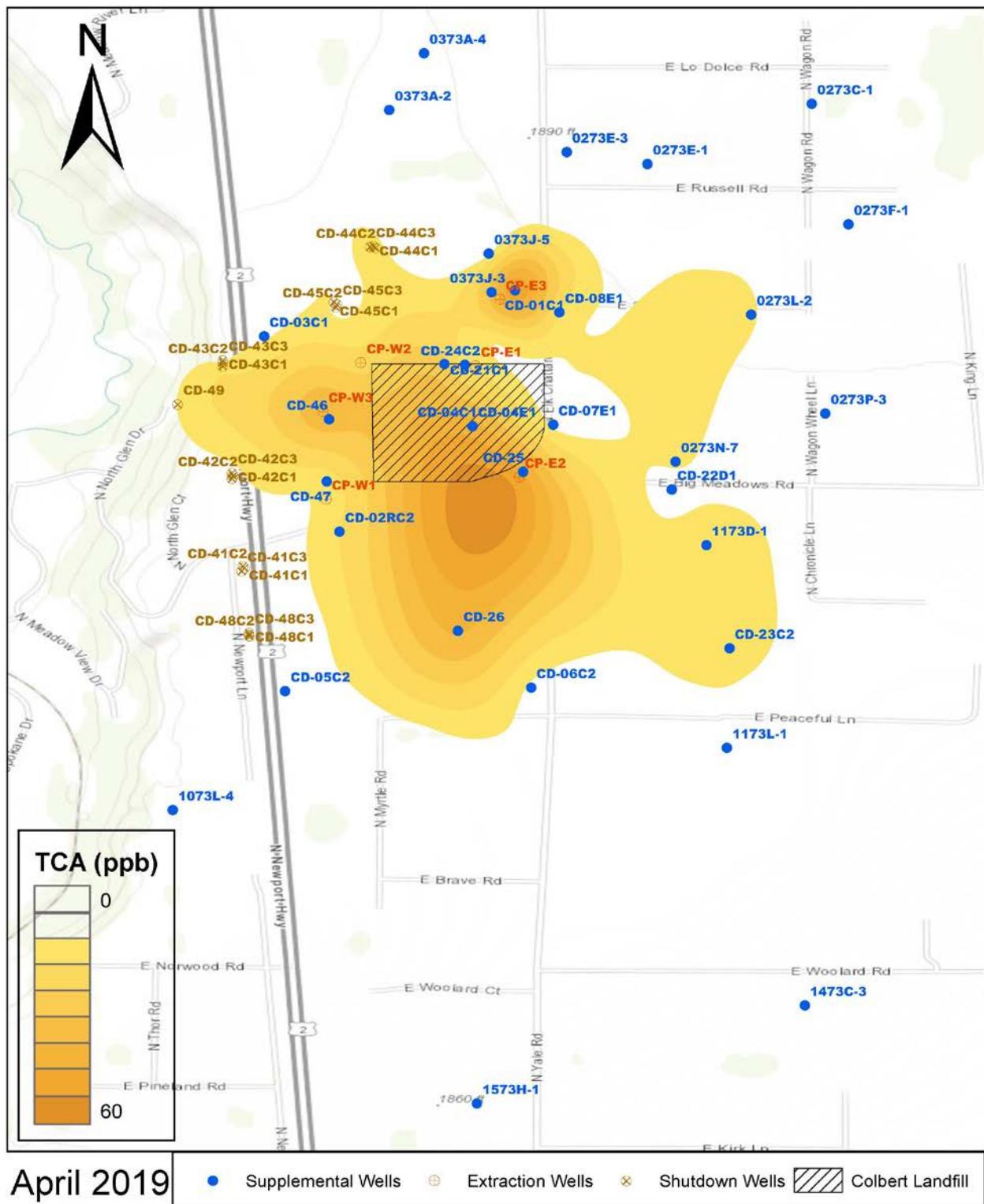


Figure 2-8 Lower Aquifer Estimated TCA Plume



3.0 Upper Aquifer Monitoring

The upper aquifer monitoring program includes the sampling of compliance indicator COC's (VOC's), 1,4-dioxane sample collection, and MFS sampling from selected monitoring wells. Table 3-1 presents all wells located in the upper aquifer monitoring program and the sample analyses assigned to each well. Upper aquifer monitoring locations are presented in Figure 3-1. All upper aquifer monitoring occurs on an annual basis with the exception of extraction wells, which are operated and sampled quarterly.

3.1 Field Data and Groundwater Elevations

All upper aquifer compliance monitoring field parameters and groundwater elevations for this reporting period are shown in Table 3-3. Conductivity values ranged from 351 to 734 umhos/cm. Field pH values ranged from 6.45 to 7.85. The highest Conductivity values and some of the lowest pH values seem to be located in the southern extraction wells. Upper aquifer groundwater elevation contours and flow paths are presented in Figure 3-3.

3.2 Compliance Monitoring (VOC's)

All wells in the upper aquifer have VOC samples collected from them and analyzed, even though the VOC analysis is not required in the MFS or 1,4-Dioxane work plan specifications.

3.2.1 Chemical Data

Constituent of concern concentrations at the south system extraction wells were consistent with previous quarters (see Table 3-4). Selected upper aquifer wells TCA concentrations versus time are presented in Figure 3-4. Upper aquifer TCA plume boundaries are shown in Figure 3-5.

3.2.2 Criteria

Criteria for the upper aquifer programs are presented in Table 3-2. There were no criteria exceeded in any of the upper aquifer compliance monitoring wells or extraction wells during this reporting period.

3.3 1,4-Dioxane Sampling

As outlined in the *1,4-Dioxane Workplan for the Colbert Landfill (December 2007)*, five locations were selected for one year of Quarterly 1,4-dioxane sampling to further evaluate the extent of this analyte as well as protect residential wells at the Colbert Landfill site (see Table 3-1). In April 2009, that sample event concluded the year of quarterly sampling at these locations. Since then, Spokane County has continued sampling these wells on an annual basis. The 2019 1,4-dioxane sampling was performed during the month of April.

3.3.1 Chemical Data

The results for April 2019 1,4-dioxane sampling are shown in Table 3-5. Concentrations versus time are presented Figure 3-6. None of the wells listed on the 1,4-Dioxane monitoring plan exceeded any criteria during the annual sampling event in April 2019.

3.4 Upper Aquifer Minimal Functional Standards (MFS) Monitoring

Upper aquifer locations designated in the MFS groundwater monitoring program were sampled in April 2019.

3.4.1 Chemical Data

Concentrations of analytes tested for under MFS monitoring were consistent with previous results (see Figure 3-7 and Figure 3-8). None of the metals had any concentrations in the MFS wells above the reporting limit during this reporting period.

3.4.2 Criteria

None of the MFS sampling locations exceeded any of the applicable criteria during this reporting period.

3.4.3 Statistical Analysis

The MFS Groundwater Monitoring Plan (Landau Assoc., 1996) requires three statistical methods be used when evaluating groundwater Quality in accordance with MFS requirements. Time series plots were performed and discussed previously. Box plots were required after one year of data was collected. Box plots are presented in Figure 3-9.

The third statistical method required is the Mann-Whitney nonparametric significance test. The summary results for this test are presented in Table 3-6. Although lower aquifer locations are no longer scheduled for sampling, previous results are shown here as well. A statistically significant change (less than 0.05 level of significance) from this test indicates that a difference may exist between background and downgradient wells but does not differentiate between sets. While it is true that a difference in nitrate and chloride concentrations may exist between background and downgradient wells, when taking time series plots and box plots into consideration, it is not likely these differences were due to influence by the landfill.

Table 3-1 Upper Aquifer Monitoring Programs and Locations

Program	Schedule	Parameters	Wells
Compliance Monitoring	Annual Quarterly at extraction wells	VOC's	CD-31A1, CD-34A1, CD-36A1, CD-37A1, CD-38A1, CP-S1, CP-S3, CP-S4, CP-S5, CP-S6
1,4-Dioxane Sampling	Annual	1,4-Dioxane	CP-S1, 1073D-1*, 1473M-1*, 1573A-1*, CD-40C1**
MFS Monitoring	Annual	Cl/NH3/NO2/NH3/SO4 /Fe/Mn/Zn/TOC/COD	CD-03A1, CD-60A1, CD-61A1, CS-04A1

* Residential use wells

**Well considered to be screened in fluvial aquifer and COC source is from upper aquifer west of Hwy 2 (see *Phase 1 Engineering Report. Landau Assoc, 1991.*)

Table 3-2 Upper Aquifer Criteria

PROGRAM	CRITERIA	TCA	DCE	DCA	TCE	PCE	MC	1,4-Dioxane	Units
CONSENT DECREE	Performance Evaluation	200	7	4050	5	0.7	2.5		ug/L
		200	7	4050	5	0.7	2.5	7	
		Cl	Fe	Mn	Zn	TOC	COD	SO4	NO3
MFS	(mg/L)	250	0.3	0.05	5	NA	NA	250	10
									mg/L

Figure 3-1 Upper Aquifer Compliance Monitoring Locations

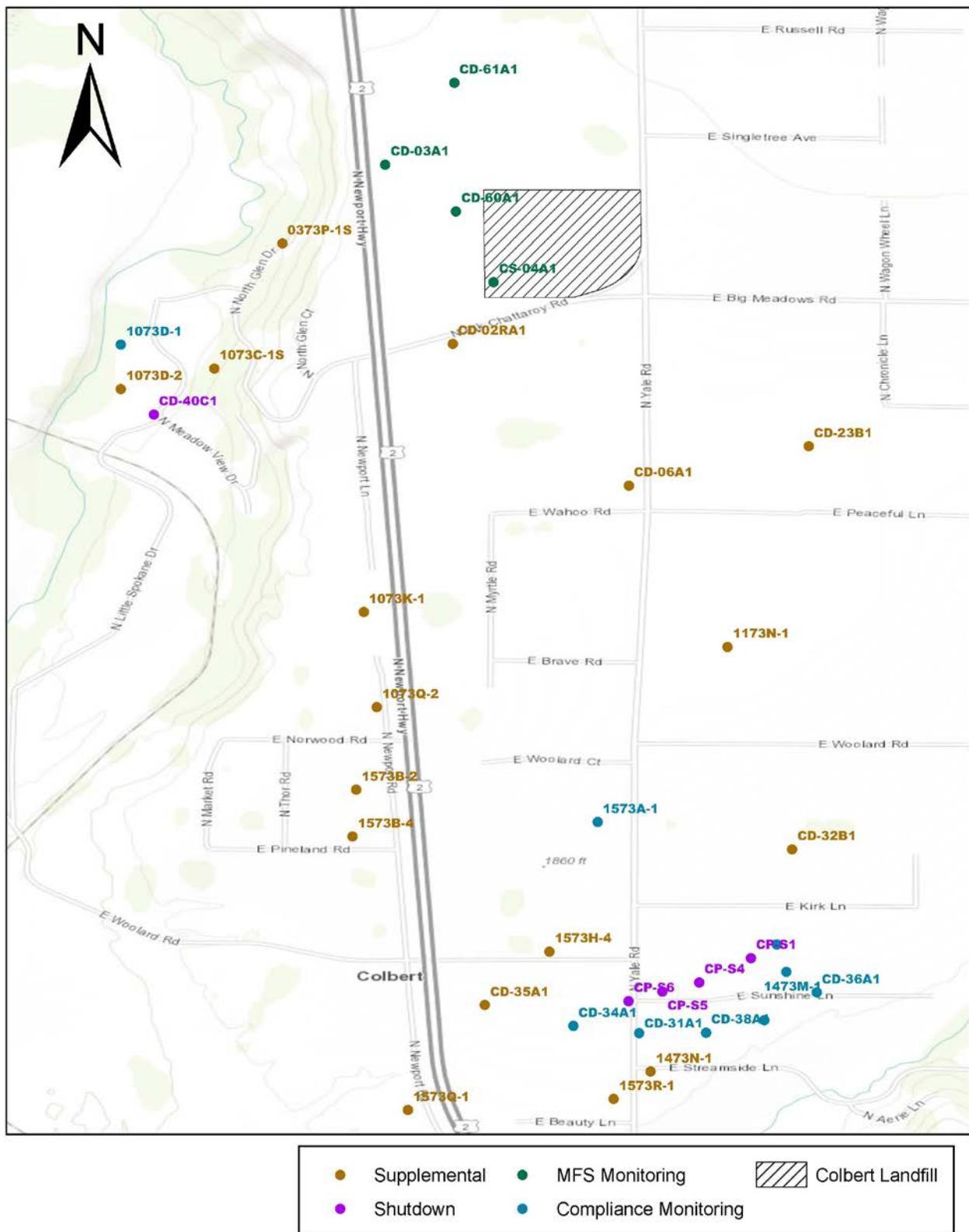


Table 3-3 Upper Aquifer Field Parameters

StationID	SampleDate	WtrElev	Temp	PH	Conductivity	Turbidity	Aquifer	Program
1073D-1	4/24/2019		10.8	7.85	441	0.47	upper	CCM
1473M-1	4/17/2018		11.5	7.52	642	0.21	upper	CCM
1473M-1	4/24/2019		10.8	7.66	619	0.29	upper	CCM
1573A-1	4/17/2018	1763.36	10.1	7.57	608	1.68	upper	CCM
1573A-1	10/9/2018	1763.22	10.7	7.37	545	0.29	upper	CCM
1573A-1	4/24/2019	1762.12	11	7.51	578	0.19	upper	CCM
CD-31A1	4/17/2018	1762.89	9	7.65	445	0.6	upper	CCM
CD-31A1	4/23/2019	1761.49	10.5	7.37	585	0.58	upper	CCM
CD-34A1	4/17/2018	1763.46	9.1	7.41	592	0.4	upper	CCM
CD-34A1	4/23/2019	1761.97	10.8	7.44	636	0.24	upper	CCM
CD-36A1	4/18/2018	1753.74	9.3	7.47	568	0.87	upper	CCM
CD-36A1	4/23/2019	1756.24	10.5	7.57	580	0.41	upper	CCM
CD-37A1	4/17/2018	1755.66	9.8	7.55	528	0.41	upper	CCM
CD-37A1	4/23/2019	1756.89	10.6	7.4	629	0.18	upper	CCM
CD-38A1	4/17/2018	1756.7	9.2	7.69	430	4.58	upper	CCM
CD-38A1	4/23/2019	1758.92	10.4	7.5	411	0.048	upper	CCM
CP-S3	4/17/2018	1760.25	11.9	7.49	633	0.89	upper	CCM
CP-S3	4/24/2019	1758.44	10.5	7.31	661	3.98	upper	CCM
CD-03A1	4/18/2018	1775.28	9.2	7.56	370	0.4	upper	MFS
CD-03A1	4/25/2019	1774.3	9.3	7.32	351	0.21	upper	MFS
CD-60A1	4/18/2018	1774.69	10.3	7.03	553	0.21	upper	MFS
CD-60A1	4/25/2019	1773.71	9.7	7.11	468	0.13	upper	MFS
CD-61A1	4/18/2018	1776.06	9.7	7.47	417	0.18	upper	MFS
CD-61A1	4/25/2019	1774.78	9.6	7.62	383	0.19	upper	MFS
CS-04A1	4/18/2018	1774.35	9.3	6.54	706	2.16	upper	MFS
CS-04A1	4/25/2019	1773.42	10.7	6.45	646	1.24	upper	MFS
CD-40C1	4/18/2018	1662.79	9.8	7.77	553	0.47	upper	SD
CD-40C1	4/24/2019	1663.78	10.5	7.01	543	0.27	upper	SD
CP-S1	4/18/2018	1759.54	11.5	7.43	703	0.29	upper	SD
CP-S1	7/11/2018	1761.39	10.7	7.25	580	0.61	upper	SD
CP-S1	10/3/2018	1760.82	12	7.15	591	0.89	upper	SD
CP-S1	1/16/2019	1762.36	9.9	7.24	584	0.46	upper	SD
CP-S1	4/25/2019	1760.09	10.8	7.43	583	0.44	upper	SD
CP-S4	4/18/2018	1761.12	11.4	7.34	630	0.79	upper	SD
CP-S4	7/11/2018	1761.53	10.7	7.18	659	0.21	upper	SD
CP-S4	1/16/2019	1764.4	10.4	7.22	705	1.26	upper	SD
CP-S4	4/25/2019	1763.7	10.4	7.21	710	1.13	upper	SD
CP-S5	4/18/2018		10.8	7.53	551	1.08	upper	SD
CP-S5	7/11/2018		10.9	7.25	695	0.19	upper	SD
CP-S5	10/3/2018		10.3	6.9	695	0.76	upper	SD
CP-S5	1/16/2019		9.6	7.16	663	0.17	upper	SD
CP-S5	4/25/2019		9.2	7.15	642	0.14	upper	SD
CP-S6	4/18/2018	1763	10.5	7.4	515	0.98	upper	SD
CP-S6	7/11/2018	1763.49	11	7.35	682	0.17	upper	SD
CP-S6	10/3/2018	1762.75	10.3	6.92	734	0.21	upper	SD
CP-S6	1/16/2019	1765.64	9.5	7.25	682	0.97	upper	SD
CP-S6	4/25/2019	1765.18	9.4	7.2	683	0.89	upper	SD

Figure 3-2 Upper Aquifer Groundwater Elevations vs. Time

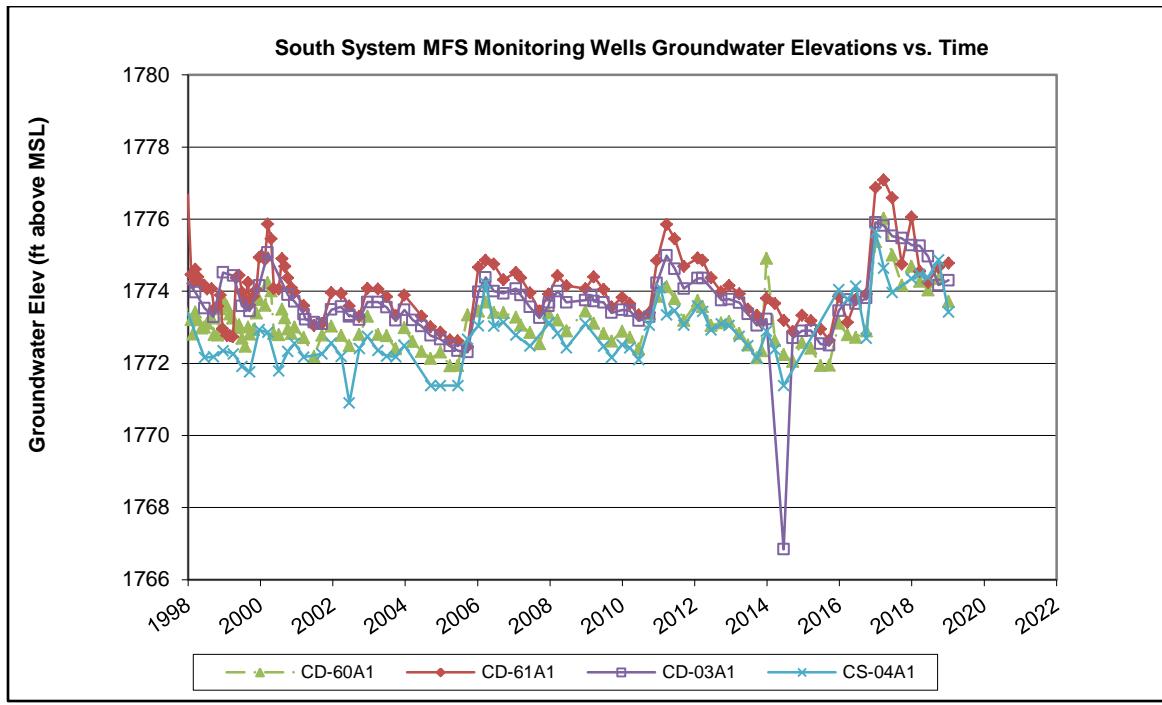
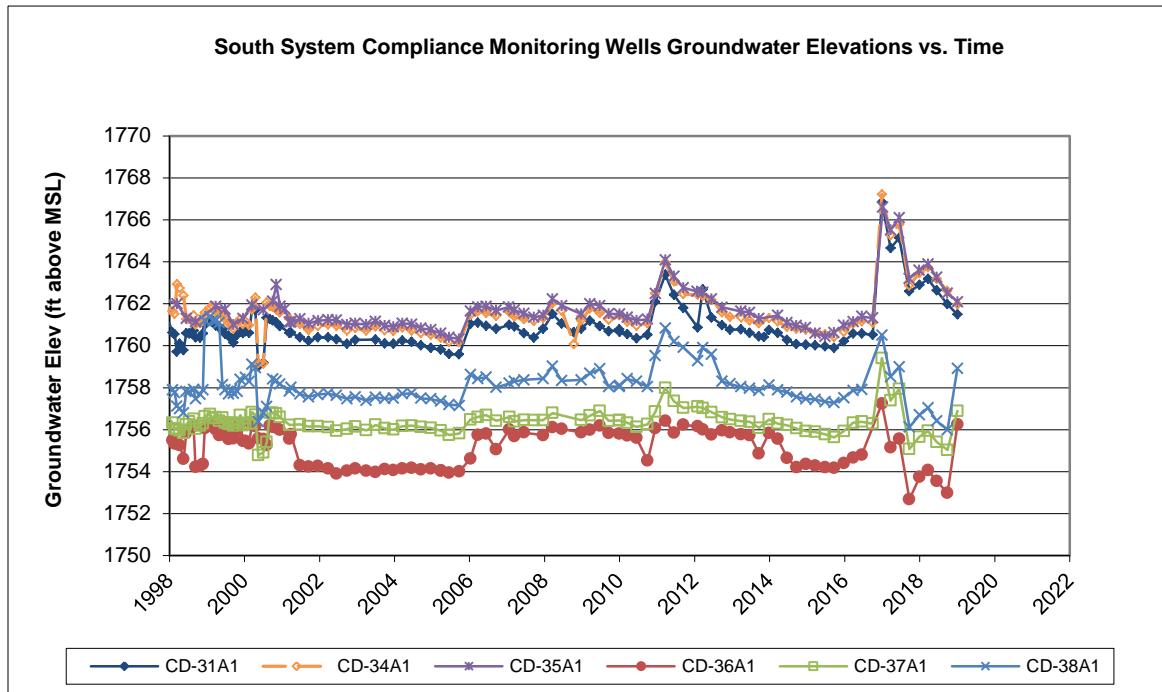
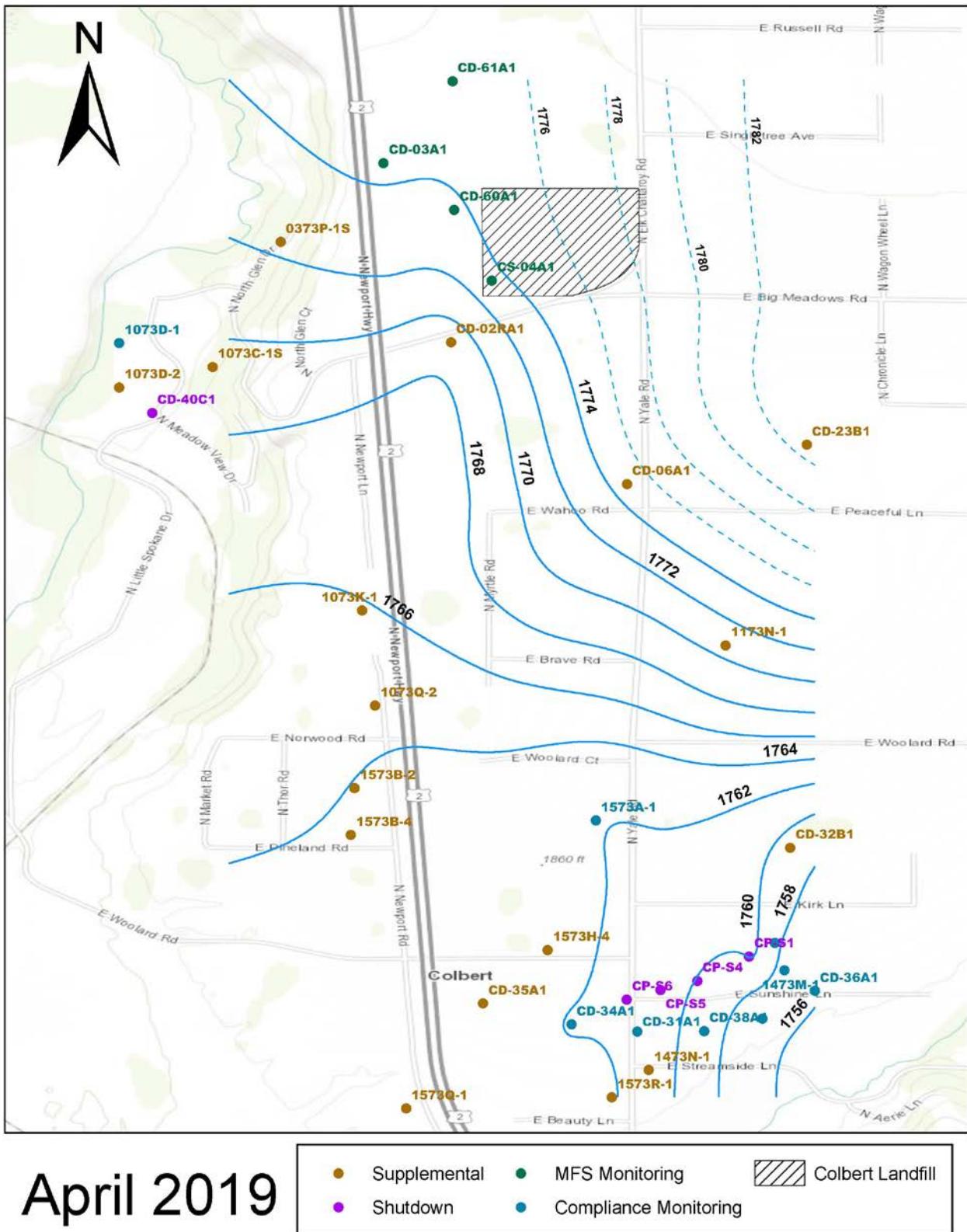


Figure 3-3 Upper Aquifer Estimated Groundwater Elevation Contours



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Table 3-4 Upper Aquifer Groundwater Monitoring Result

StationID	Aquifer	Program	SampleDate	DCA (ug/L)	DCE (ug/L)	MC (ug/L)	PCE (ug/L)	TCA (ug/L)	TCE (ug/L)	Cl (mg/L)	COD (mg/L)	Fe (mg/L)	Mn (mg/L)	N-NH3 (mg/L)	N-NO3 (mg/L)	SO4 (mg/L)	TOC (mg/L)	Zn (mg/L)
1473M-1	upper	CCM	4/24/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
1573A-1	upper	CCM	4/17/2018	0.84	<0.50	<0.50	<0.50	1.18	0.56									
1573A-1	upper	CCM	4/24/2019	0.97	0.54	<0.50	<0.50	1.42	0.73									
CD-31A1	upper	CCM	4/17/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-31A1	upper	CCM	4/23/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-34A1	upper	CCM	4/17/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-34A1	upper	CCM	4/23/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-36A1	upper	CCM	4/18/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-36A1	upper	CCM	4/23/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-37A1	upper	CCM	4/17/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-37A1	upper	CCM	4/23/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-38A1	upper	CCM	4/17/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-38A1	upper	CCM	4/23/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S3	upper	CCM	4/17/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S3	upper	CCM	4/24/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CD-03A1	upper	MFS	4/18/2018	<0.50	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	<0.50	<0.50	0.433	6.61	<0.50	<0.50	
CD-03A1	upper	MFS	4/25/2019	<0.50	<0.50	<0.50	<0.50	<0.50	0.83	<0.50	<0.50	<0.50	<0.50	0.535	6.61	<0.50	<0.50	
CD-60A1	upper	MFS	4/18/2018	<0.50	<0.50	<0.50	0.61	<0.50	<0.50	3.16	<0.50	<0.50	<0.50	<0.50	1.11	6.11	<0.50	<0.50
CD-60A1	upper	MFS	4/25/2019	<0.50	<0.50	<0.50	<0.50	<0.50	4.93	<0.50	<0.50	<0.50	<0.50	2.26	9.28	<0.50	<0.50	
CD-61A1	upper	MFS	4/18/2018	<0.50	<0.50	<0.50	<0.50	1.98	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	0.143	8.96	<0.50	<0.50
CD-61A1	upper	MFS	4/25/2019	<0.50	<0.50	<0.50	<0.50	1.5	<0.50	1.07	<0.50	<0.50	<0.50	<0.50	0.258	7.82	<0.50	<0.50
CS-04A1	upper	MFS	4/18/2018	0.61	<0.50	<0.50	<0.50	<0.50	0.55	2.08	<0.50	<0.50	<0.50	<0.50	0.077	6.21	1.28	<0.50
CS-04A1	upper	MFS	4/25/2019	0.64	<0.50	<0.50	<0.50	<0.50	0.56	2.52	<0.50	<0.50	<0.50	<0.50	0.547	6.3	1.13	<0.50
CD-40C1	upper	SD	4/18/2018	1.72	<0.50	<0.50	<0.50	2.04	<0.50									
CD-40C1	upper	SD	4/24/2019	1.48	1.06	<0.50	<0.50	1.33	<0.50									
CP-S1	upper	SD	4/18/2018	1.48	0.58	<0.50	<0.50	0.7	1.73									
CP-S1	upper	SD	7/11/2018	1.39	<0.50	<0.50	<0.50	0.62	1.72									
CP-S1	upper	SD	10/3/2018	1.64	<0.50	<0.50	<0.50	<0.50	1.78									
CP-S1	upper	SD	1/16/2019	1.72	<0.50	<0.50	<0.50	0.64	1.35									
CP-S1	upper	SD	4/25/2019	1.53	<0.50	<0.50	<0.50	0.82	1.42									
CP-S4	upper	SD	7/11/2018	<0.50	<0.50	<0.50	0.52	<0.50	1.33									
CP-S4	upper	SD	1/16/2019	1.04	<0.50	<0.50	<0.50	0.52	<0.50	1.46								
CP-S4	upper	SD	4/25/2019	1.36	<0.50	<0.50	<0.50	0.61	1.8									
CP-S5	upper	SD	4/18/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S5	upper	SD	7/11/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S5	upper	SD	10/3/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S5	upper	SD	1/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S5	upper	SD	4/25/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S6	upper	SD	4/18/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S6	upper	SD	7/11/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S6	upper	SD	10/3/2018	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S6	upper	SD	1/16/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								
CP-S6	upper	SD	4/25/2019	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50								

Table 3-5 1,4-Dioxane Monitoring Results

StationID	Aquifer	Analyte	AnalyzedDate	Result	Units	Reporting Limit	Qualifier
1073D-1	upper	1,4-Dioxane	5/8/2019	0.5	ug/L	0.4	
1473M-1	upper	1,4-Dioxane	5/8/2019	0.4	ug/L	0.4	U
1573A-1	upper	1,4-Dioxane	5/8/2019	0.4	ug/L	0.4	U
CD-40C1	upper	1,4-Dioxane	5/8/2019	2.1	ug/L	0.4	
CP-S1	upper	1,4-Dioxane	5/8/2019	2.6	ug/L	0.4	

Figure 3-4 1,4-Dioxane Concentrations vs Time

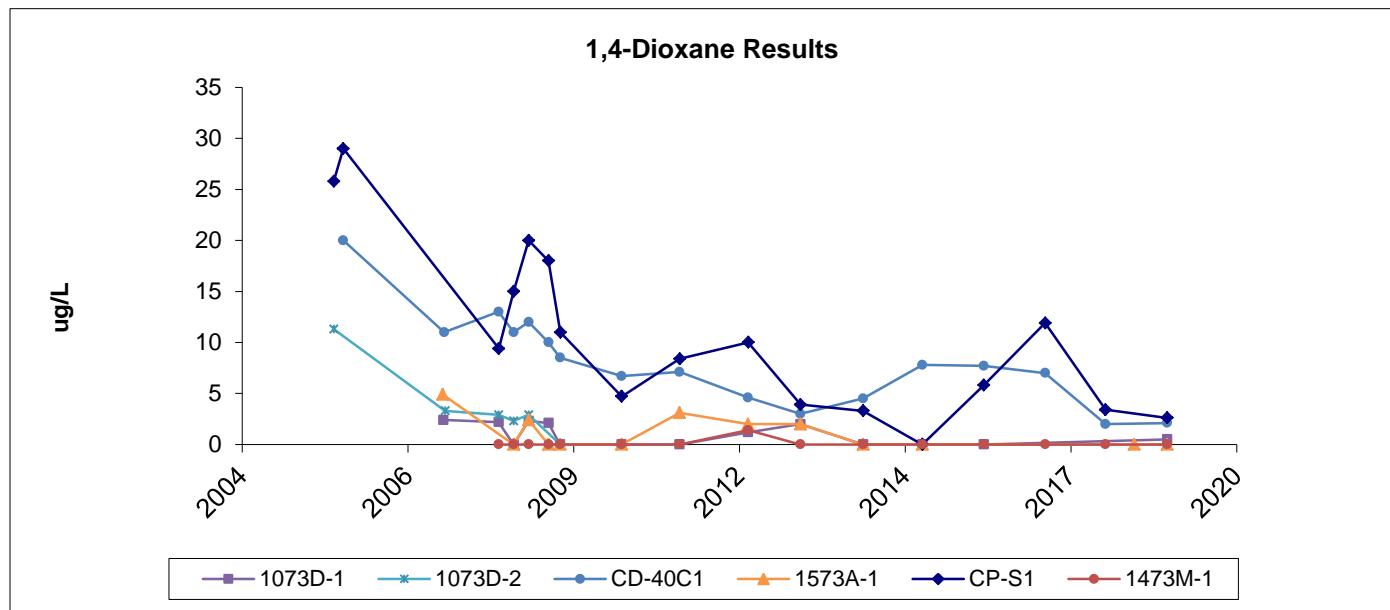


Figure 3-5 Upper Aquifer COC Concentrations vs Time

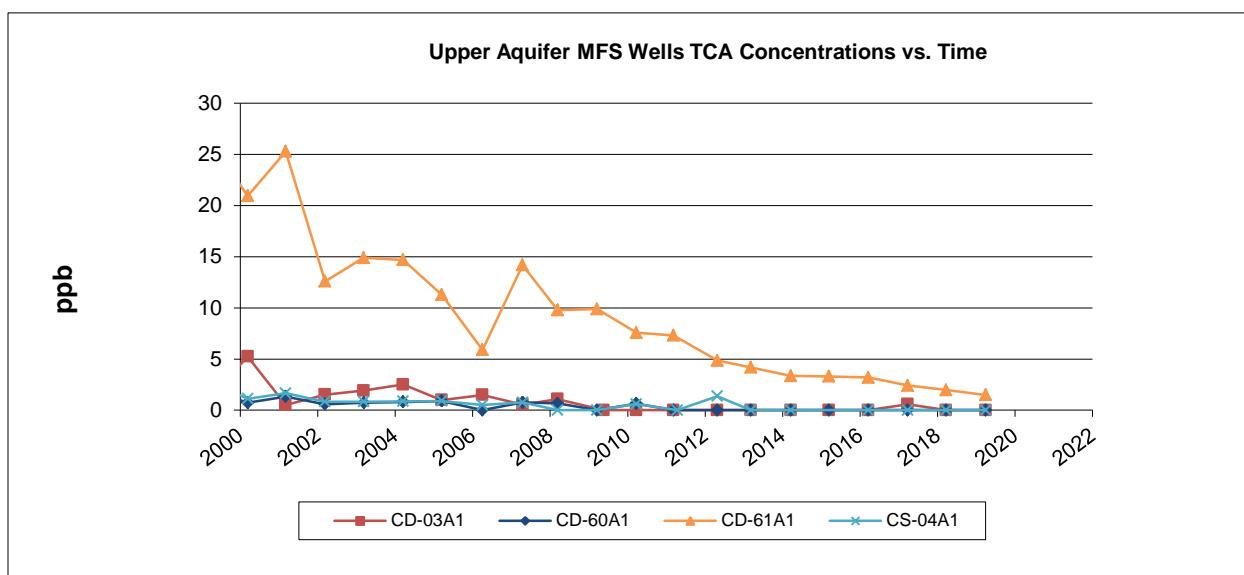
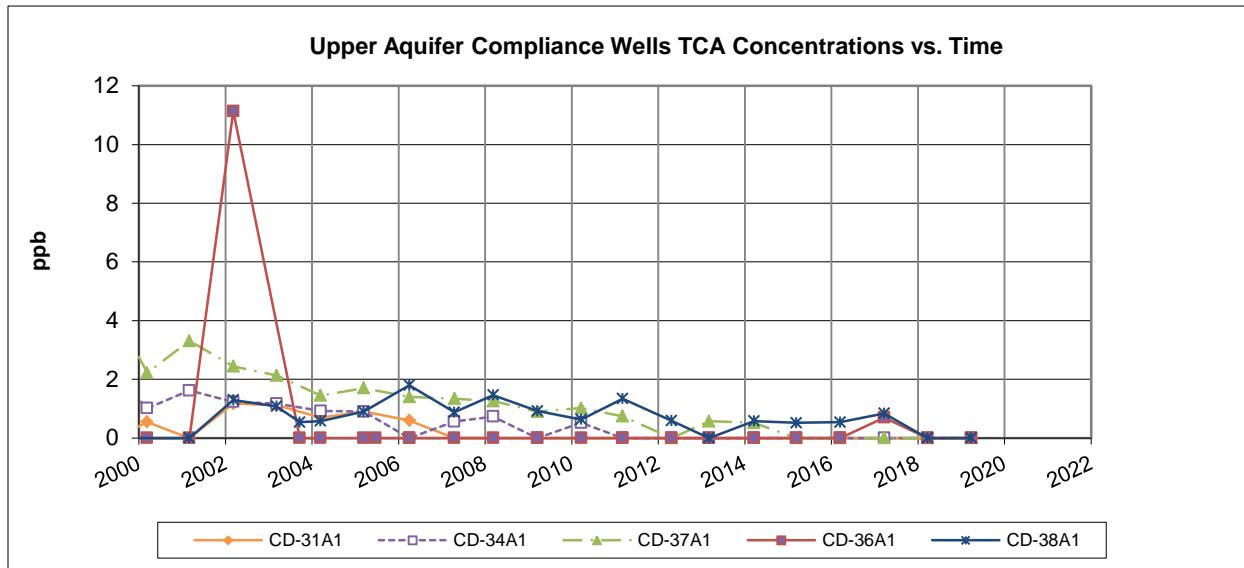
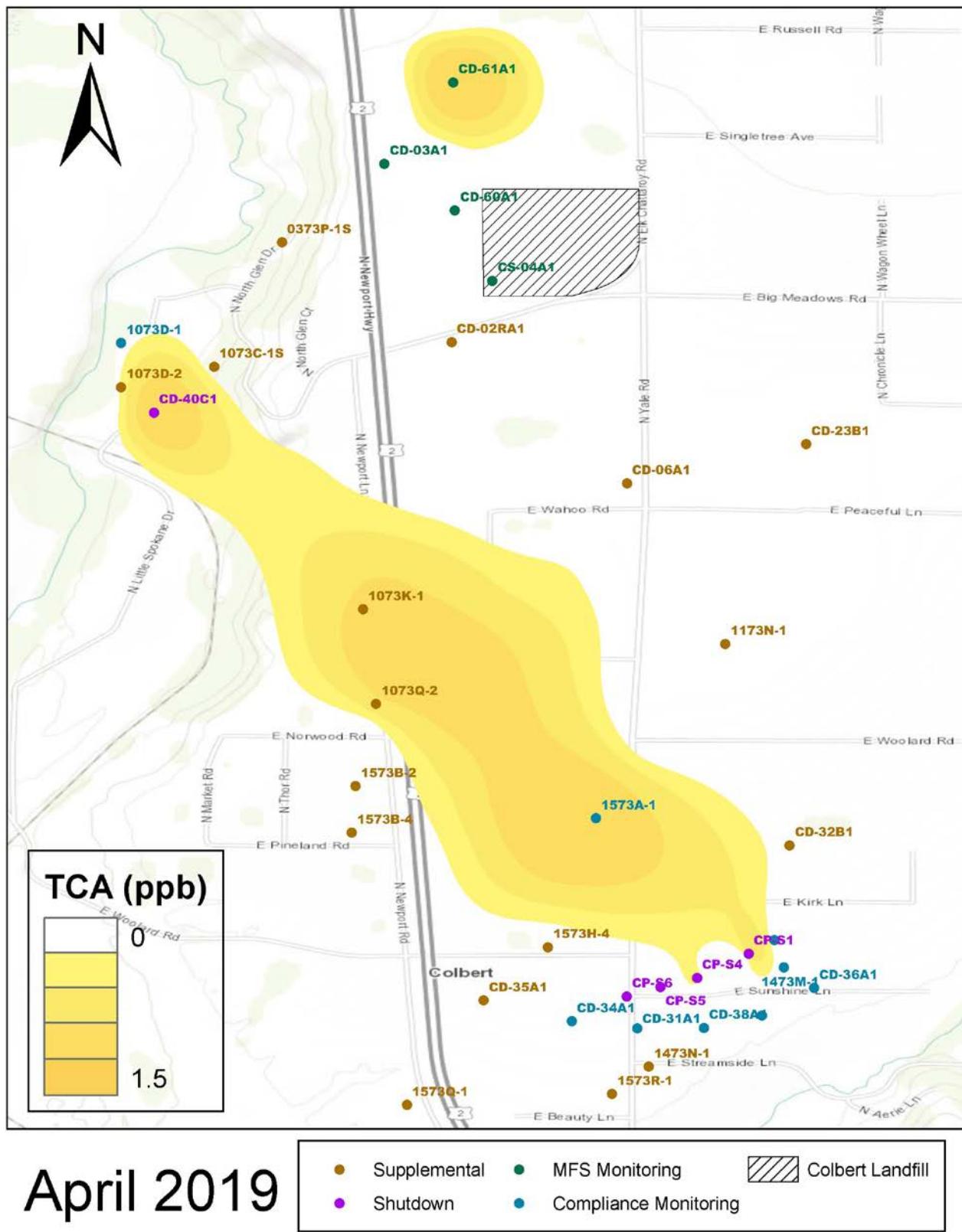


Figure 3-6 Upper Aquifer Estimated TCA Plume Boundaries



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Figure 3-7 Upper Aquifer MFS Parameters vs Time

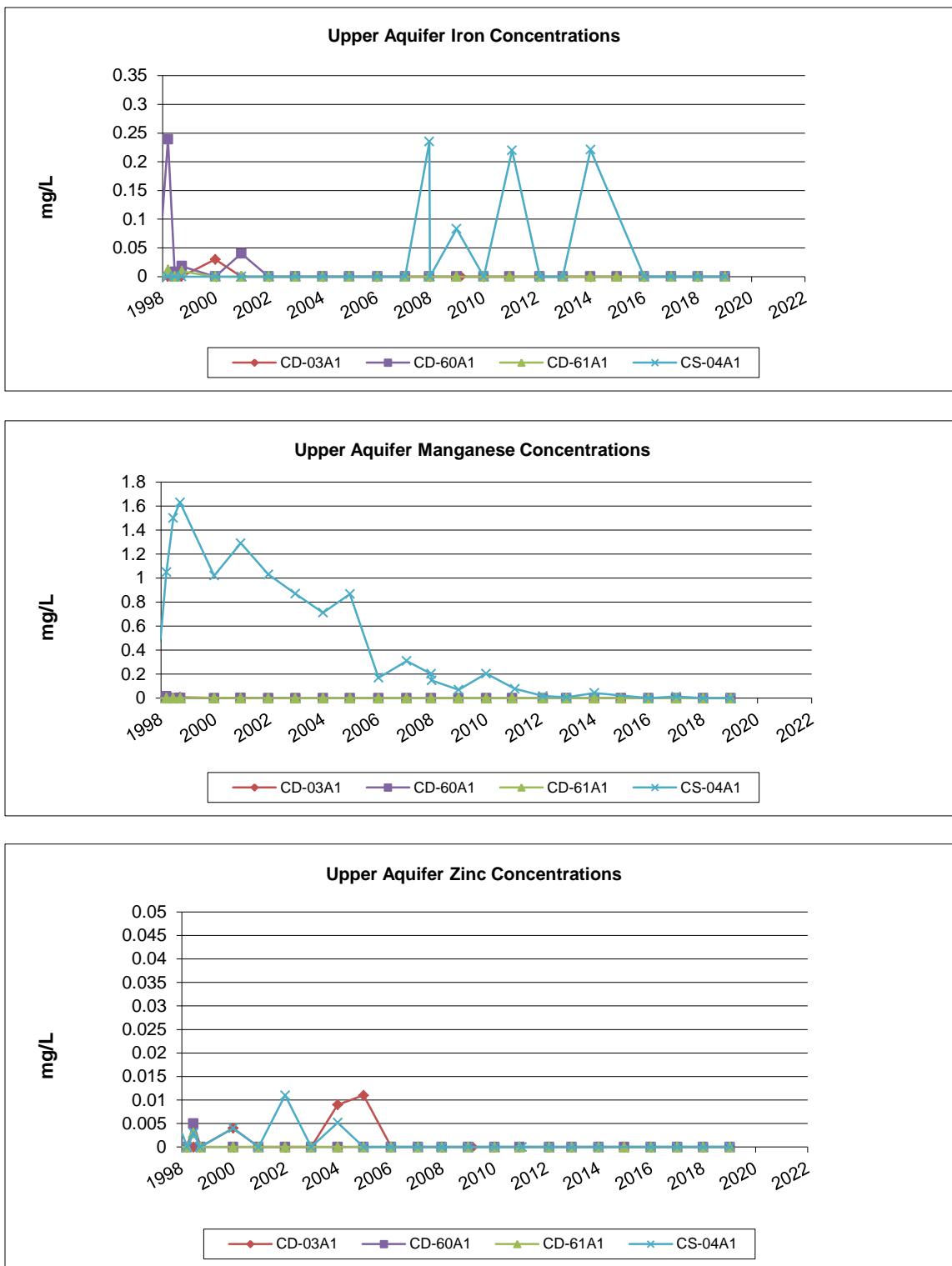


Figure 3-8 Upper Aquifer MFS Parameters vs Time

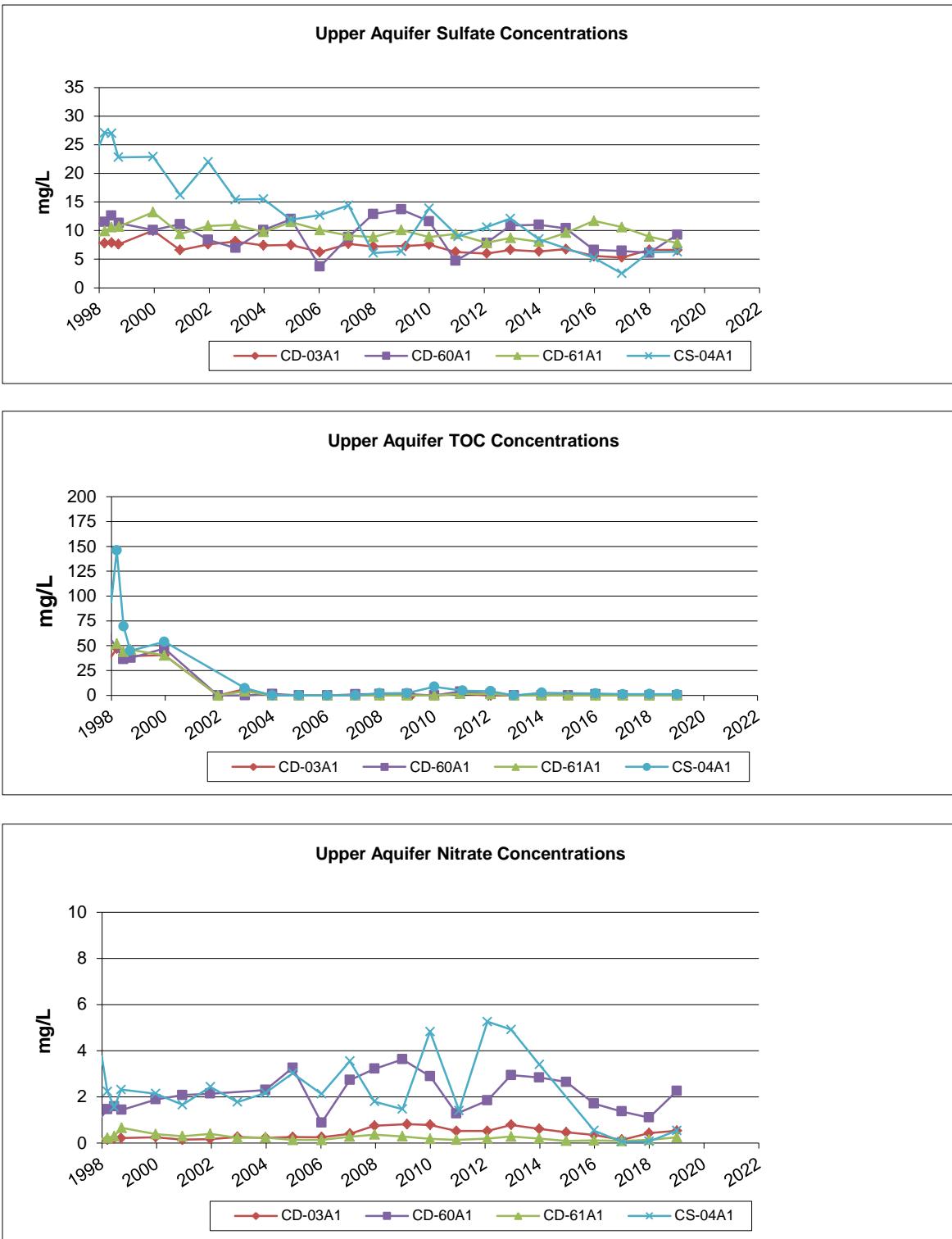


Table 3-6 Summary Results for the Mann-Whitney Nonparametric Significance Test (2019)

Constituent	Level of Significance (p)	
	Upper Aquifer	*Lower Aquifer (1999)
Chloride (Cl)	2.54E-05	0.006
Chemical Oxygen Demand (COD)	0.4648	0.48
Iron (FE)	0.1469	0.17
Manganese (MN)	0.06775	0.86
Ammonia (NH3)	0.4746	0.42
Nitrite (NO2)	0.4298	1.13
Nitrate (NO3)	2.91E-06	0.08
Sulfate	0.6692	0.0006
Total Organic Carbon	0.6903	0.32
Zinc	0.06327	0.06

* Lower aquifer results from January 1999 using CP-E2 and CD-48C2 analytical results for calculations.

Bold number indicates a level of significance under 0.05, test run as two-tailed method.

Figure 3-9 Box Plots for Background and Downgradient MFS Wells (2019)

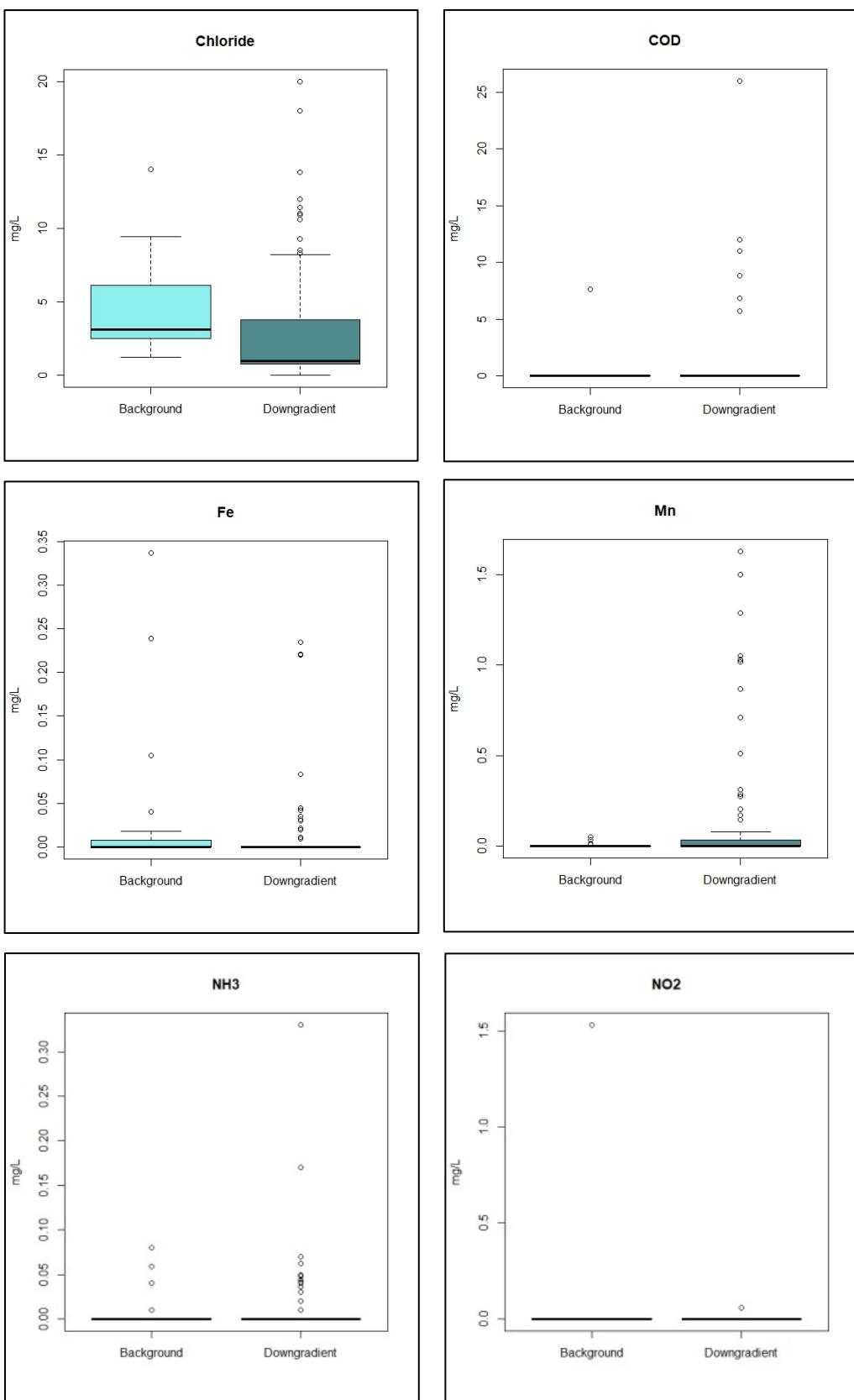
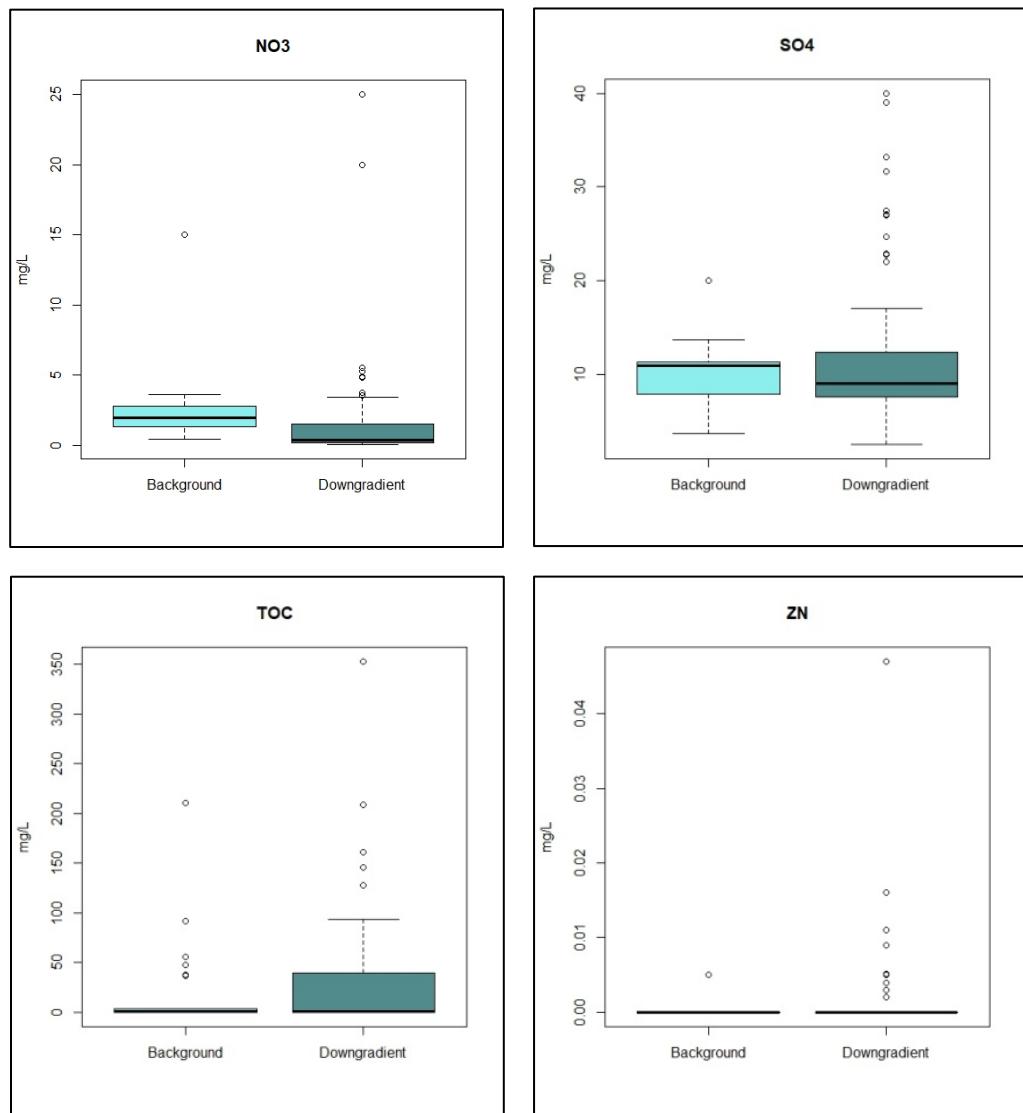


Figure 4-9 continued



4.0 Residential Program

4.1 Locations and Schedule

Current residential well sampling locations can be found in Figure 4-1. The residential sampling schedule is included in Table 4-1.

4.2 Monitoring Results and Criteria

Criteria for residential use wells were established in the Consent Decree. The Consent Decree states that if any residential well with a concentration over the evaluation criteria OR any residential well that has an average concentration over 65% of the evaluation criteria over a 12 month period, the county shall supply that residence with an alternative water source.

All residential well results were well below established criteria. Results from sampling are presented in Table 4-2. Time series plots for wells with COC detections are shown in Figure 4-2.

4.3 Data Evaluation

Only one of the residential well measured concentrations above the method detection limits for the 2018-2019 sampling year. Although the detection was above the detection limit, it was below any criteria.

4.4 Program Modifications

On a regular basis, the program schedule is re-evaluated to determine if any changes are needed. With the initiation of the Shut-down test, a re-evaluation was performed comparing plume maps and well locations as well as a list of residences connected to a public water supply. Some modifications to increase sampling in specific areas were made to the schedule to ensure a conservative approach with regard to public health.

10 changes have been made to the schedule for the upcoming 2019-2020 sampling year. There were 9 decreases in the sampling schedule (several decreases from semi-annual to annual, a couple decreases from annual to bi-annual, and one decrease from quarterly to semi-annual), and 1 increase from annual to semi-annual. Changes are not required by any documentation or work plan.

The 2019 residential well sampling schedule and changes to the program are presented in Table 4-3.

Figure 4-1 Residential Well Sampling Locations

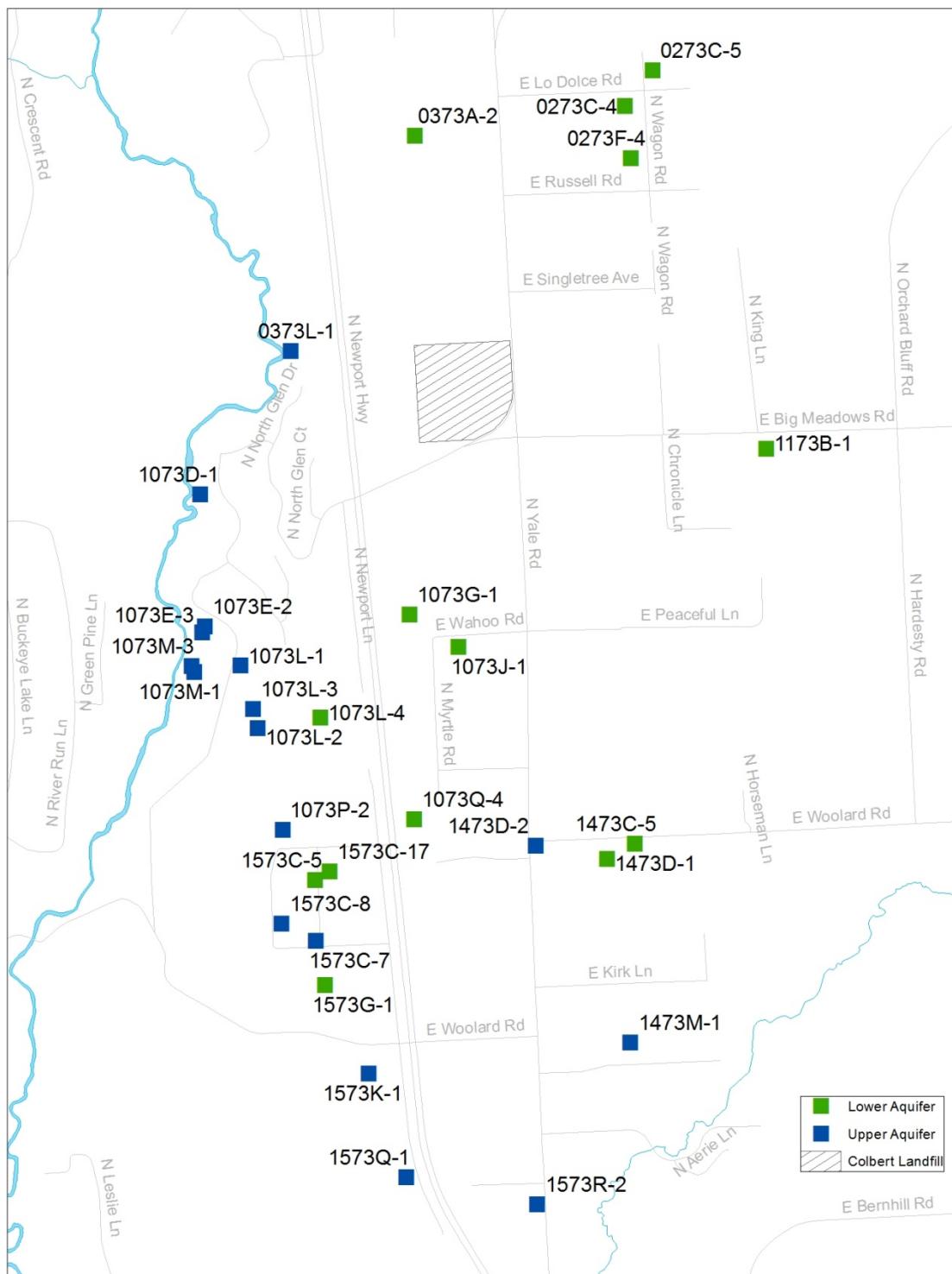


Table 4-1 Residential Well Sampling Schedule for Reporting Period

Colbert Residential Sampling Plan 2019

Station#	Location	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	School Commence
0273C-2	Vannatter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
0273C-3	Kramer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
0273C-4	McQuesten	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>										
0273D-6	Thomton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
0273F-4	Gander	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
0373A-2	Resseman	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
0373A-4	Vansickel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									
0373L-1	Sterling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1073D-1	Nerren	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1073E-2	Pullen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1073E-3	Clark	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1073G-1	Rux	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1073J-1	Moreno	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1073L-1	Halpin	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1073L-2	Countryman	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1073L-3	Anderson	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1073L-4	Crabb	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
1073M-1	Bertholf	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
1073M-3	Lane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
1073P-1	Greenen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1073P-2	Petrelli	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
1073Q-4	NORTH MEADOWS W	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1173B-1	Bise	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
1473C-5	Overmyer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
1473D-2	Wardian	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

StationID	Last Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Other Comments
1473M-1	Ennis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573C-10	Lake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573C-17	RESIDENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573C-5	Nelson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573C-7	Brown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573C-8	Williams	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573H-1	Hunter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573K-1	Eschenbacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573Q-1	Saunder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1573R-2	Hunter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Changes made to the Colbert Residential Sampling Schedule

StationID	Still active?	Sampling schedule
1173B-1	Yes	Increased to semi-annual - June
1573C-17	Yes	Decreased to annual - April
0273D-6	Yes	Decreased to annual - August
0273F-4	Yes	Decreased to annual - January
1073M-3	Yes	Decreased to annual - June
0273C-2	Yes	Decreased to annual - March
0373A-4	Yes	Decreased to annual - October
1573C-10	Yes	Decreased to bi-annual
0273C-4	Yes	Decreased to bi-annual - Nov. 2020
0373A-2	Yes	Decreased to semi-annual - June/Dec.

Table 4-2 Residential Groundwater Monitoring Program Results
(May 2018 through April 2019)

StationID	SampleDate	Aquifer	LastName	TCA	DCA	DCE	MC	PCE	TCE
0273C-2	10/10/2018	lower	Vannatter	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0273C-2	4/24/2019	lower	Vannatter	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0273C-4	11/6/2018	lower	McQuesten	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0273D-6	8/14/2018	lower	Thornton	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0273D-6	1/30/2019	lower	Thornton	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0273F-4	12/19/2018	lower	Gander	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373A-2	9/20/2018	lower	Resseman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373A-2	12/19/2018	lower	Resseman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373A-2	4/24/2019	lower	Resseman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373A-4	4/12/2018	lower	Vansickel	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373A-4	10/11/2018	lower	Vansickel	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073G-1	9/20/2018	lower	Rux	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073G-1	12/19/2018	lower	Rux	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073G-1	4/23/2019	lower	Rux	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073J-1	4/11/2018	lower	Moreno	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073J-1	10/11/2018	lower	Moreno	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073J-1	1/31/2019	lower	Moreno	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073J-1	4/23/2019	lower	Moreno	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-4	9/19/2018	lower	Crabb	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073Q-4	9/20/2018	lower	NORTH MEADOWS WATER	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073Q-4	12/19/2018	lower	NORTH MEADOWS WATER	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073Q-4	4/23/2019	lower	NORTH MEADOWS WATER	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1173B-1	12/19/2018	lower	Bise	<0.5	<0.5	<0.5	1.35	<0.5	<0.5
1473C-5	8/14/2018	lower	Overmyer	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-17	4/11/2018	lower	RESIDENT	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-17	10/10/2018	lower	RESIDENT	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-17	4/23/2019	lower	RESIDENT	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-5	8/14/2018	lower	Nelson	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573H-1	5/10/2018	lower	Hunter	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373L-1	5/9/2018	upper	Sterling	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
0373L-1	11/6/2018	upper	Sterling	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073D-1	5/10/2018	upper	Nerren	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073D-1	8/15/2018	upper	Nerren	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073D-1	11/6/2018	upper	Nerren	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073D-1	1/31/2019	upper	Nerren	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-2	4/11/2018	upper	Pullen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-2	10/11/2018	upper	Pullen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-2	1/30/2019	upper	Pullen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-2	4/24/2019	upper	Pullen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-3	5/9/2018	upper	Clark	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-3	8/14/2018	upper	Clark	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-3	11/7/2018	upper	Clark	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073E-3	1/30/2019	upper	Clark	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-1	9/19/2018	upper	Halpin	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-1	12/19/2018	upper	Halpin	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-1	4/23/2019	upper	Halpin	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

1073L-2	4/11/2018	upper	Countryman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-2	10/10/2018	upper	Countryman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-2	4/23/2019	upper	Countryman	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-3	5/9/2018	upper	Anderson	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-3	8/14/2018	upper	Anderson	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073L-3	11/7/2018	upper	Anderson	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073P-1	5/10/2018	upper	Greenen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073P-1	10/10/2018	upper	Greenen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1073P-2	8/14/2018	upper	Petrelli	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473D-2	5/9/2018	upper	Wardian	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473D-2	8/15/2018	upper	Wardian	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473D-2	11/6/2018	upper	Wardian	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473D-2	1/31/2019	upper	Wardian	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473M-1	4/12/2018	upper	Ennis	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473M-1	10/10/2018	upper	Ennis	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1473M-1	1/30/2019	upper	Ennis	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-7	4/11/2018	upper	Brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-7	10/10/2018	upper	Brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-7	4/23/2019	upper	Brown	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573C-8	1/31/2019	upper	Williams	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573K-1	4/11/2018	upper	Eschenbacher	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573K-1	10/10/2018	upper	Eschenbacher	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573K-1	4/23/2019	upper	Eschenbacher	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573R-2	5/10/2018	upper	Hunter	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1573R-2	11/7/2018	upper	Hunter	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

*Bold indicates a value greater than non-detection.

Figure 4-2 Upper Aquifer Residential Wells Concentrations vs Time

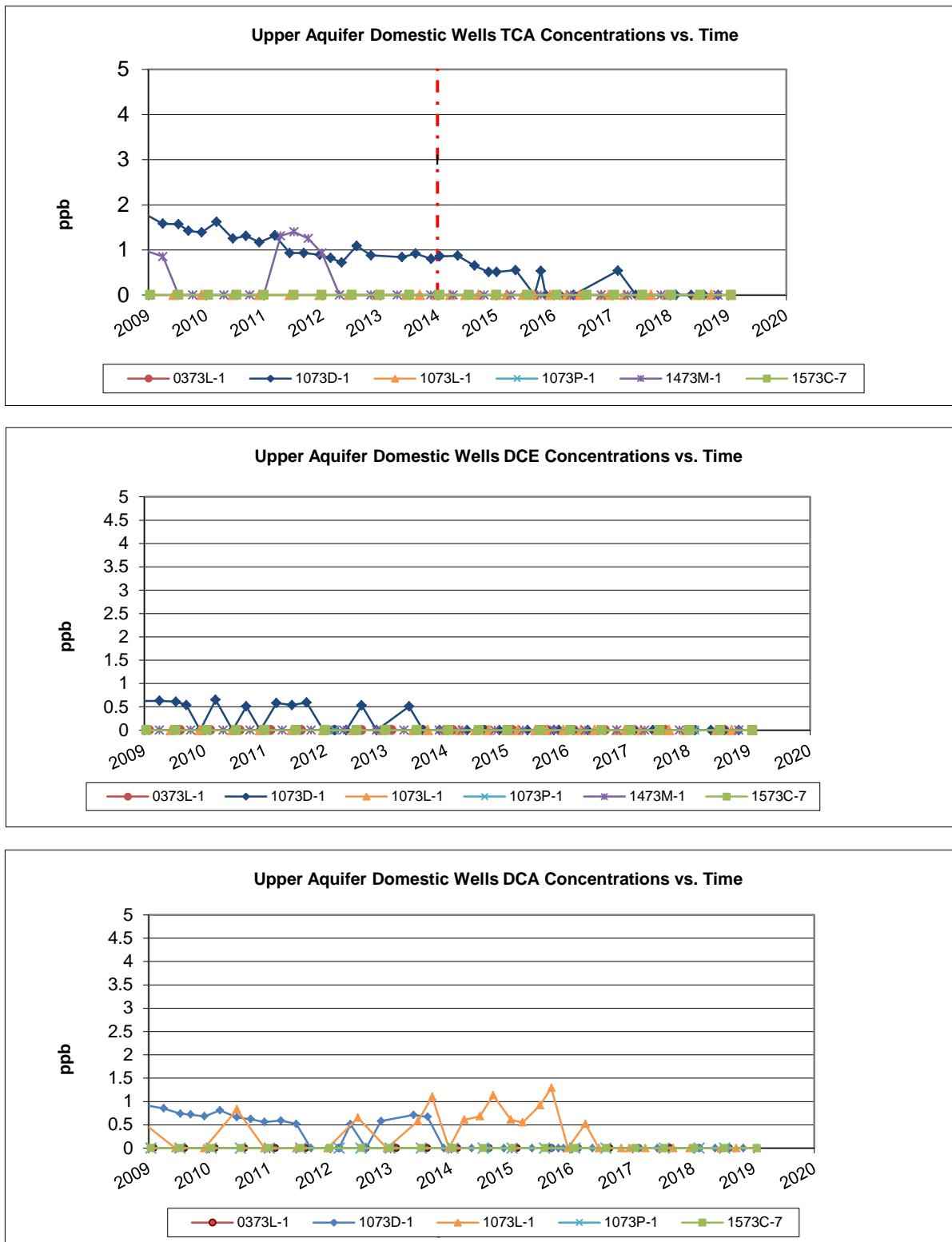
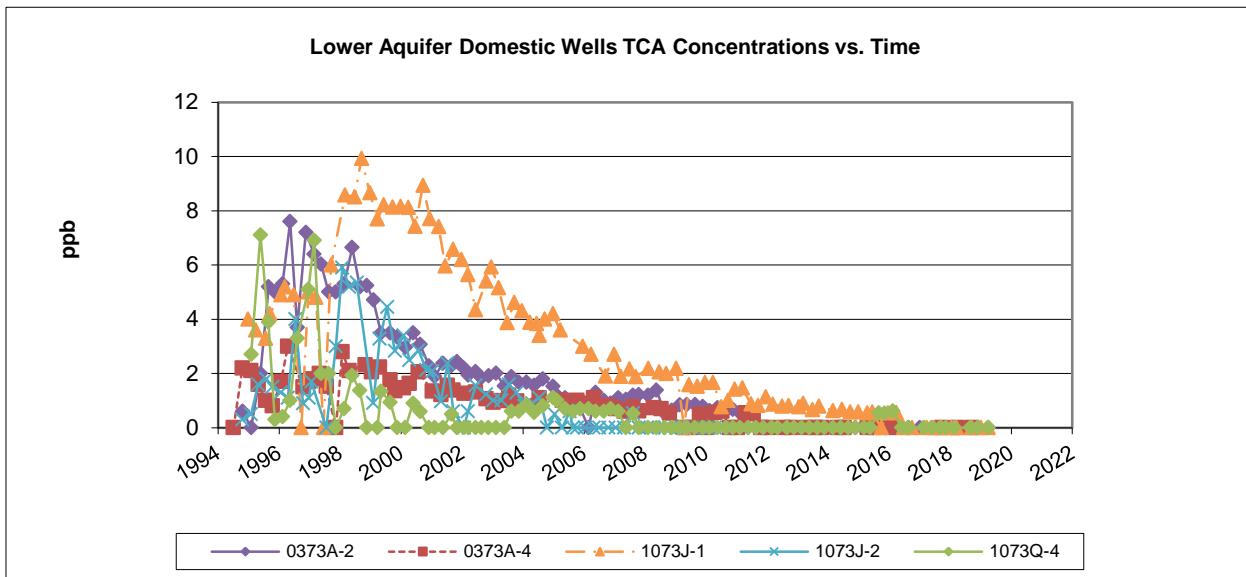


Figure 4-3 Lower Aquifer Residential Wells Concentrations vs Time



5.0 Landfill Operations and Maintenance

From May 1, 2014 through April, 2019 the following routine landfill cover and gas system monitoring and maintenance was accomplished at the Colbert Landfill. Data collected is included in this section.

- Monthly monitoring at gas probes and exhaust system
- Monthly condensate tank levels
- Monthly gas fan maintenance (greasing, belt tension adjustments, etc.)
- Landfill gas sampling and analysis (Method TO-15) was performed in April 2017.
- Quarterly monitoring of trench risers (June, October, February and April).

Other notable items include:

- Cover and ditch weed control was ongoing throughout the growing season.
- Carbon tub change outs were performed in November 2016, June 2017, and April 2018.
- A cost-benefit analysis was conducted for the option to switch from the activated carbon gas filtration system to a biofilter system at the Colbert site in the fall of 2017. The practice had been to change out the activated carbon every 6 months, but due to the rising costs of purchasing new carbon material and disposing of the old, the annual cost of this practice had risen to \$25,000. Taking into account the higher upfront costs of constructing a biofilter, with lower lifetime costs of this system, we found that the financial break-even point over a 20 year period would be to change out the activated carbon every 1.5 years. In other words, if the activated carbon required changing more frequently than once per every 1.5 years, it is financially beneficial to undertake the construction and maintenance of a biofilter system.

From the fall of 2016 to the spring of 2018, Environmental techs had been sampling the effluent gas every 3 months for signs of "break-out," or when compounds were no longer adsorbing to the carbon material. TO-15 samples for study were collected on 12/14/2016, 3/30/2017, 11/21/2017, and 3/21/2018. After a year and a half, the quarterly samples began to show small signs of mal-adsorption, with emissions of just a few compounds still less than De Minimus thresholds. Because of the financial modeling and the quarterly sampling results, the staff feel comfortable with a new plan to change out the activated carbon material once every 1.5 years now instead of the unnecessary 6-month change out.

- Spokane County is implementing about 10 new settlement markers in June 2019 across several known areas of concern regarding settlement on the landfill. These settlement markers will be surveyed every 2 years, and will be monitored for any additional settling that might occur on the Colbert landfill.

Landfill Operations and Maintenance Field Data

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.02

Tech: MT

Calibration: Zeroed O2 at AB air -> CALGAS CH4 reading 14.9% calibrated to 15.0%; CO2 reading 14.8% calibrated to 15.0%; zeroed O2 to CALGAS-> calibrated to 20.9% AB

FanFlow:

48

Weather

MC mid 80's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0001L	7/20/2018		0	3.1	15.9	81	0	-0.01	
CGP0001L	5/20/2019		0	2.2	20.4	77.4	0	-0.02	
CGP0001L	4/26/2019		0	2.9	15.6	81.5	0	0	
CGP0001L	3/21/2019		0	4.6	14	81.4	0	0	
CGP0001L	2/1/2019		0	3.1	16.4	80.5	0	0	
CGP0001L	1/4/2019		0	2.1	17.4	80.5	0	0	
CGP0001L	10/30/2018		0	3.1	16.9	81	0	-0.01	
CGP0001L	8/17/2018		0	3.1	16.4	80.5	0	0	
CGP0001L	6/19/2018		0	2.5	16.4	81.1	0	0	
CGP0001L	5/31/2018		0	3.1	17.1	79.8	0	-0.01	
CGP0001L	4/25/2018		0	2.2	17	80.8	0	-0.01	
CGP0001L	12/18/2018		0	2.7	17.1	80.2	0	0	
CGP0001L	11/16/2018		0	2.2	17.7	80.1	0	0	
CGP0001L	9/21/2018		0	3	16	81	0	-0.01	
CGP0001U	12/18/2018		0	6.1	7.2	86.7	0	0	
CGP0001U	11/16/2018		0	5.9	6.4	87.7	0	-0.01	
CGP0001U	4/26/2019		0	4.9	6.1	89	0	0.01	
CGP0001U	4/25/2018		0	5.1	15.1	79.8	0	0	
CGP0001U	5/31/2018		0	6.8	6.8	86.4	0	0	
CGP0001U	6/19/2018		0	5	5.7	89.3	0	0	
CGP0001U	7/20/2018		0	5.9	5.4	88.7	0	0	
CGP0001U	9/21/2018		0	5.9	6.1	88	0	0	
CGP0001U	10/30/2018		0	7.1	8.2	85.9	0	0	
CGP0001U	1/4/2019		0	6.2	6.5	87.3	0	0	
CGP0001U	2/1/2019		0	6	5.8	88.2	0	0	
CGP0001U	3/21/2019		0	2.1	17.6	80.3	0	0	
CGP0001U	5/20/2019		0	4.8	6.3	88.9	0	-0.01	
CGP0001U	8/17/2018		0	6	5.8	88.2	0	0	
CGP0002L	3/21/2019		0	5.1	6.7	87.9	0	0	
CGP0002L	12/18/2018		0	6.1	7.1	86.8	0	-0.01	
CGP0002L	4/25/2018		0	4.4	8	87.6	0	0	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.1

Tech: MT

Calibration: Zeroed CH4 to AB air -> CALGAS CH4 reading 15.3% calibrated to 15.0%; CO2 reading 14.9% calibrated to 15.0%; zeroed O2 to CALGAS. O2 reading 20.7%

FanFlow:

45

Weather

Cloudy upper 50's
low 60's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0002L	5/31/2018		0	4.6	15.9	79.5	0	-0.01	
CGP0002L	6/19/2018		0	5	6.9	88.1	0	-0.02	
CGP0002L	7/20/2018		0	5	7.1	87.9	0	0	
CGP0002L	8/17/2018		0	5.2	6.9	87.9	0	-0.03	
CGP0002L	9/21/2018		0	5.1	7	87.9	0	-0.01	
CGP0002L	10/30/2018		0	6.9	7.2	85.8	0	-0.01	
CGP0002L	5/20/2019		0	4.9	6.6	88.5	0	-0.03	
CGP0002L	2/1/2019		0	5.2	6.9	87.9	0	0	
CGP0002L	4/26/2019		0	6.1	6	87.9	0	-0.02	
CGP0002L	11/16/2018		0	5.6	6.9	87.5	0	-0.03	
CGP0002L	1/4/2019		0	7.1	6.8	86.1	0	-0.01	
CGP0002U	6/19/2018		0	1.1	20.1	78.8	0	0	
CGP0002U	12/18/2018		0	2	19	79	0	0	
CGP0002U	8/17/2018		0	1.1	19.5	79.4	0	-0.01	
CGP0002U	11/16/2018		0	1.1	20	78.9	0	-0.01	
CGP0002U	5/20/2019		0	1.2	6.9	91.9	0	-0.02	
CGP0002U	4/25/2018		0	2	18	80	0	-0.01	
CGP0002U	5/31/2018		0	1.1	19.5	79.4	0	0	
CGP0002U	7/20/2018		0	1.2	19.1	79.7	0	0	
CGP0002U	9/21/2018		0	1.1	19.5	79.4	0	0	
CGP0002U	10/30/2018		0	1.5	19.1	79.1	0	0	
CGP0002U	1/4/2019		0	1.9	19.1	79	0	-0.01	
CGP0002U	2/1/2019		0	1.1	19.5	79.4	0	-0.01	
CGP0002U	3/21/2019		0	1.1	19.5	79.4	0	-0.02	
CGP0002U	4/26/2019		0	1.9	18.1	80	0	-0.02	
CGP0003L	12/18/2018		0	8.9	5	86.1	0	-0.01	
CGP0003L	3/21/2019		0	7.8	5.3	86.5	0	-0.01	
CGP0003L	1/4/2019		0	8.9	5.3	85.8	0	0	
CGP0003L	10/30/2018		0	9.3	5.1	85	0	0	
CGP0003L	9/21/2018		0	7.9	5.6	86.5	0	0	
CGP0003L	8/17/2018		0	8	5.5	86.5	0	-0.04	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.02

Tech: MT

Calibration: Zeroed O2 at AB air -> CALGAS CH4 reading 14.9% calibrated to 15.0%; CO2 reading 14.8% calibrated to 15.0%; zeroed O2 to CALGAS-> calibrated to 20.9% AB

FanFlow:

48

Weather

MC mid 80's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0003L	7/20/2018		0	7.8	5.4	86.8	0	-0.01	
CGP0003L	6/19/2018		0	7.7	5.1	87.2	0	0	
CGP0003L	11/16/2018		0	8.8	5.3	85.9	0	-0.04	
CGP0003L	4/25/2018		0	8.9	5.1	86	0	-0.03	
CGP0003L	5/20/2019		0	8.4	5	86.6	0	0	
CGP0003L	4/26/2019		0	8.9	4.1	87	0	0	
CGP0003L	5/31/2018		0	3.8	16.5	79.7	0	0	
CGP0003L	2/1/2019		0	8	5.5	86.5	0	-0.01	
CGP0003U	10/30/2018		0	1.3	20.1	79.2	0	0	
CGP0003U	5/20/2019		0	1.4	21.2	77.4	0	0	
CGP0003U	4/26/2019		0	2	17.2	80.8	0	0	
CGP0003U	3/21/2019		0	2.2	18.1	79.6	0	0	
CGP0003U	1/4/2019		0	1.3	19.1	79.6	0	0	
CGP0003U	9/21/2018		0	1.9	18.3	79.8	0	0	
CGP0003U	8/17/2018		0	2	18.4	79.6	0	-0.02	
CGP0003U	7/20/2018		0	1.7	17.9	80.4	0	-0.01	
CGP0003U	6/19/2018		0	1.6	18.7	79.7	0	-0.02	
CGP0003U	5/31/2018		0	1.2	19.1	79.7	0	0	
CGP0003U	4/25/2018		0	1.9	19.1	79	0	0	
CGP0003U	12/18/2018		0	1.6	19.9	78.5	0	0	
CGP0003U	11/16/2018		0	1.1	19.6	79.3	0	-0.02	
CGP0003U	2/1/2019		0	2	18.4	79.6	0	0	
CGP0004L	3/21/2019		0	4.2	7	88.8	0	-0.02	
CGP0004L	7/20/2018		0	4.1	7.1	88.6	0	0	
CGP0004L	11/16/2018		0	5.5	6.6	87.9	0	-0.03	
CGP0004L	12/18/2018		0	4.6	16.1	79.3	0	-0.02	
CGP0004L	4/25/2018		0	5.4	6.6	88	0	-0.01	
CGP0004L	1/4/2019		0	7.9	6	86.1	0	-0.01	
CGP0004L	5/31/2018		0	2.4	17.9	79.7	0	0	
CGP0004L	6/19/2018		0	4.2	6.9	88.9	0	0	
CGP0004L	8/17/2018		0	4	7.2	88.8	0	-0.03	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.14

Tech: MT

Calibration: Zeroed CH4 to AB air -> CALGAS -> CH4 reading 14.8% calibrated to 15.0%; CO2 reading 15.1% calibrated to 15.0%; Zeroed O2 to CALGAS -> removed CALGAS O2

FanFlow:

53

Weather

Partly Cloudy mid-60's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0004L	9/21/2018		0	4.2	7	88.8	0	-0.01	
CGP0004L	10/30/2018		0	4.5	16.1	79.5	0	-0.02	
CGP0004L	2/1/2019		0	4	7.2	88.8	0	-0.02	
CGP0004L	4/26/2019		0	5.5	5.8	88.7	0	-0.01	
CGP0004L	5/20/2019		0	4.8	6.3	88.9	0	0	
CGP0004L	11/16/2018		0	5.5	6.6	87.9	0	-0.02	
CGP0004U	7/20/2018		0	3.5	9.9	86.6	0	-0.01	
CGP0004U	12/18/2018		0	3.6	16.2	80.2	0	0	
CGP0004U	11/16/2018		0	3.2	16.6	80.2	0	-0.01	
CGP0004U	4/25/2018		0	2	16	82	0	0	
CGP0004U	1/4/2019		0	4.3	6.9	88.8	0	0	
CGP0004U	5/31/2018		0	3.5	16	80.5	0	-0.01	
CGP0004U	6/19/2018		0	3.3	7.2	89.5	0	0	
CGP0004U	9/21/2018		0	3	16.6	80.4	0	-0.01	
CGP0004U	10/30/2018		0	3.8	16.2	80.2	0	-0.01	
CGP0004U	2/1/2019		0	3.2	16.4	80.4	0	-0.03	
CGP0004U	3/21/2019		0	3.3	16.2	80.4	0	-0.06	
CGP0004U	4/26/2019		0	2.1	16.2	81.7	0	0	
CGP0004U	8/17/2018		0	3.2	16.4	80.4	0	-0.03	
CGP0004U	5/20/2019		0	3.2	6.7	90.1	0	0	
CGP0005L	7/20/2018		0	3	10.1	86.9	0	0	
CGP0005L	4/25/2018		0	6.5	2.1	91.4	0	0	
CGP0005L	4/26/2019		0	4.4	5.6	90	0	0	
CGP0005L	3/21/2019		0	2.2	17.3	80.3	0	-0.01	
CGP0005L	2/1/2019		0	2.5	17.2	80.3	0	-0.01	
CGP0005L	11/16/2018		0	4.4	7.2	88.4	0	-0.01	
CGP0005L	10/30/2018		0	7.5	7.6	86.6	0	0	
CGP0005L	8/17/2018		0	2.5	17.2	80.3	0	-0.01	
CGP0005L	6/19/2018		0	3	7.2	89.8	0	0	
CGP0005L	5/31/2018		0	3.1	17.1	79.8	0	-0.01	
CGP0005L	1/4/2019		0	8.1	5.5	86.4	0	0	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30

Tech: MT

Calibration: Had to reset to factory settings, then normal calibration.
See field book

FanFlow:

56

Weather

Partly Cloudy 60's
NE wind 10-15

Equipment: GEM 500 410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0005L	5/20/2019		0	3.5	6.5	90	0	0	
CGP0005L	12/18/2018		0	6.9	6.6	86.5	0	0	
CGP0005L	9/21/2018		0	2.1	17.6	80.3	0	0	
CGP0005U	9/21/2018		0	1	19.1	79.9	0	0	
CGP0005U	1/4/2019		0	1.1	15.9	83	0	0	
CGP0005U	4/26/2019		0	2.1	16.3	81.6	0	0	
CGP0005U	3/21/2019		0	1.2	18.5	79.9	0	-0.05	
CGP0005U	2/1/2019		0	1.1	19	79.9	0	-0.04	
CGP0005U	11/16/2018		0	1.1	19.3	79.6	0	-0.01	
CGP0005U	5/20/2019		0	1.7	20	78.3	0	0	
CGP0005U	10/30/2018		0	1.8	19.1	79.1	0	-0.01	
CGP0005U	7/20/2018		0	1.5	17.1	80.4	0	0	
CGP0005U	5/31/2018		0	1.5	19.2	79.3	0	0	
CGP0005U	4/25/2018		0	1.7	14.8	83.5	0	0	
CGP0005U	12/18/2018		0	1.1	19.8	79.1	0	0	
CGP0005U	8/17/2018		0	1.1	19	79.9	0	-0.04	
CGP0005U	6/19/2018		0	1.2	18.7	80.1	0	-0.03	
CGP0007L	11/16/2018		0	1.2	18.3	80.5	0	-0.01	
CGP0007L	12/18/2018		0	1.3	19.7	79	0	0	
CGP0007L	1/4/2019		0	1.5	19.8	78.7	0	0	
CGP0007L	5/31/2018		0	1.5	18.5	80	0	0	
CGP0007L	6/19/2018		0	0.5	19.7	79.8	0	0	
CGP0007L	7/20/2018		0	0.6	19.9	79.5	0	-0.01	
CGP0007L	4/25/2018		0	2.9	20.1	77	0	-0.01	
CGP0007L	8/17/2018		0	0.5	20.3	79.2	0	-0.02	
CGP0007L	10/30/2018		0	1.3	19.9	78.9	0	0	
CGP0007L	2/1/2019		0	0.5	20.3	79.2	0	-0.02	
CGP0007L	3/21/2019		0	0.5	20.3	79.2	0	-0.01	
CGP0007L	5/20/2019		0	2	18	80	0	0	
CGP0007L	4/26/2019		0	1.9	18.1	80	0	-0.03	
CGP0007L	9/21/2018		0	0.9	19.9	79.2	0	-0.01	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.08

Tech: MT

Calibration: Zeroed CH4 to AB air -> CALGAS CH4 reading 14.9% calibrated to 15.0%; CO2 reading 14.8% calibrated to 15.0%; zeroed O2 to CALGAS -> O2 reading 20.7% AB

FanFlow:

55

Weather

Haze but sunny
upper 80's to low
90's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0007U	8/17/2018		0	0.3	20.1	79.6	0	-0.03	
CGP0007U	5/31/2018		0	4.1	6.1	89.8	0	-0.01	
CGP0007U	5/20/2019		0	3.2	7	89.8	0	0	
CGP0007U	10/30/2018		0	3.9	15.9	81.2	0	-0.01	
CGP0007U	1/4/2019		0	1	20.1	78.9	0	0	
CGP0007U	12/18/2018		0	3.6	15.2	81.2	0	-0.01	
CGP0007U	6/19/2018		0	2.3	16.9	80.8	0	-0.03	
CGP0007U	7/20/2018		0	2.1	17.1	80.8	0	0	
CGP0007U	9/21/2018		0	3	18.2	78.8	0	-0.01	
CGP0007U	11/16/2018		0	3.4	7.2	89.4	0	0	
CGP0007U	2/1/2019		0	0.3	20.1	79.6	0	-0.03	
CGP0007U	3/21/2019		0	0.3	20.1	79.6	0	-0.02	
CGP0007U	4/26/2019		0	0.4	19.2	80.5	0	-0.01	
CGP0007U	4/25/2018		0	2.1	19.5	78.4	0	0	
CGP0010L	7/20/2018		0	3.6	7.1	89.3	0	-0.01	
CGP0010L	1/4/2019		0	5.1	6.9	88	0	-0.01	
CGP0010L	4/25/2018		0	3.7	16.3	80	0	0	
CGP0010L	5/31/2018		0	5.1	5	89.9	0	-0.02	
CGP0010L	6/19/2018		0	2.8	7.2	90	0	-0.01	
CGP0010L	8/17/2018		0	5.1	5.5	89.4	0	-0.04	
CGP0010L	9/21/2018		0	5.3	5.3	89.4	0	-0.02	
CGP0010L	11/16/2018		0	2.1	18.2	79.7	0	-0.03	
CGP0010L	12/18/2018		0	2.9	6.9	90.2	0	0	
CGP0010L	4/26/2019		0	3.6	6.5	89.9	0	-0.01	
CGP0010L	10/30/2018		0	6.2	6.6	86.7	0	-0.01	
CGP0010L	3/21/2019		0	5.1	5.4	89.3	0	-0.02	
CGP0010L	5/20/2019		0	3.7	6.3	90	0	0	
CGP0010L	2/1/2019		0	5.1	5.5	89.4	0	-0.02	
CGP0010U	3/21/2019		0	1.9	18	80.1	0	0	
CGP0010U	1/4/2019		0	1.7	18.3	80	0	0	
CGP0010U	4/25/2018		0	1.7	18.3	80	0	-0.01	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer:

30.1

Tech: MT

Calibration: Zeroed CH4 to AB air -> CALGAS CH4 reading 15.3% calibrated to 15.0%; CO2 reading 14.9% calibrated to 15.0%; zeroed O2 to CALGAS. O2 reading 20.7%

FanFlow:

45

Weather

Cloudy upper 50's
low 60's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0010U	5/31/2018		0	1.5	18	80.5	0	0	
CGP0010U	6/19/2018		0	1	19.2	79.8	0	-0.03	
CGP0010U	7/20/2018		0	1.5	17.9	80.6	0	0	
CGP0010U	9/21/2018		0	2	17.9	80.1	0	-0.02	
CGP0010U	10/30/2018		0	2.1	17.2	80.5	0	0	
CGP0010U	11/16/2018		0	1.1	19.3	79.6	0	-0.02	
CGP0010U	2/1/2019		0	1.9	18	80.1	0	0	
CGP0010U	5/20/2019		0	1.8	16.4	81.8	0	0	
CGP0010U	4/26/2019		0	1.8	16.4	81.8	0	0	
CGP0010U	8/17/2018		0	1.9	18	80.1	0	-0.01	
CGP0010U	12/18/2018		0	2.2	17.3	80.5	0	-0.01	
CGP0011L	12/18/2018		0	0.4	19.7	79.3	0	-0.02	
CGP0011L	9/21/2018		0	0.4	20.5	79.1	0	-0.01	
CGP0011L	8/17/2018		0	0.1	20.8	79.1	0	-0.01	
CGP0011L	7/20/2018		0	0.1	19.1	80.8	0	0	
CGP0011L	6/19/2018		0	0	21	79	0	0	
CGP0011L	5/31/2018		0	1.1	19.7	79.2	0	-0.01	
CGP0011L	1/4/2019		0	1	20.1	78.9	0	0	
CGP0011L	11/16/2018		0	0.2	21.5	78.3	0	-0.01	
CGP0011L	3/21/2019		0	0.1	20.3	79.1	0	-0.02	
CGP0011L	4/25/2018		0	1	19.9	79.1	0	0	
CGP0011L	4/26/2019		0	0.2	19.9	79.9	0	0	
CGP0011L	5/20/2019		0	0.9	19.1	80	0	-0.02	
CGP0011L	2/1/2019		0	0.1	20.8	79.1	0	-0.01	
CGP0011L	10/30/2018		0	1	17.3	79.3	0	-0.01	
CGP0011U	4/26/2019		0	2.2	16.3	81.5	0	-0.02	
CGP0011U	1/4/2019		0	3.4	16.9	80.6	0	-0.01	
CGP0011U	4/25/2018		0	2.8	17.5	79.7	0	-0.01	
CGP0011U	5/31/2018		0	3.5	15.5	81	0	-0.01	
CGP0011U	6/19/2018		0	2	17.7	80.3	0	-0.03	
CGP0011U	7/20/2018		0	2.3	16.4	81.2	0	0	

COLBERT PERIMETER GAS MONITORING REPORT

Barometer: 30.08

Tech: MT

Calibration: Zeroed CH4 to AB air -> CALGAS CH4 reading 14.9% calibrated to 15.0%; CO2 reading 14.8% calibrated to 15.0%; zeroed O2 to CALGAS -> O2 reading 20.7% AB

FanFlow:

55

Weather

Haze but sunny
upper 80's to low
90's

Equipment: Gem 500 #410

Location	Date	Time	CH4	CO2	O2	Balance	Static Press	Diff. Press.	Comments
CGP0011U	8/17/2018		0	2.6	16.2	81.2	0	0	
CGP0011U	9/21/2018		0	2.8	16	81.2	0	0	
CGP0011U	10/30/2018		0	5	15.5	80.4	0	0	
CGP0011U	11/16/2018		0	2.2	17.7	80.1	0	-0.03	
CGP0011U	3/21/2019		0	2.4	16.2	81.2	0	0	
CGP0011U	5/20/2019		0	2.3	19.4	78.3	0	-0.01	
CGP0011U	12/18/2018		0	2.7	17.1	80.4	0	0	
CGP0011U	2/1/2019		0	2.6	16.2	81.2	0	0	
CTS00001	4/26/2019		0	2.4	6.3	91.3	0	0	
CTS00002	4/26/2019		0	3.4	6.2	90.4	0	-0.03	
CTS00003	4/26/2019		0	1.6	16.2	82.2	0	-0.02	
CTS00004	4/26/2019		0	2.1	5.7	92.2	0	-0.02	
CTS00005	4/26/2019		0	8.5	4.4	87.1	0	-0.02	

3/21/18 (WED)

- SUMMAS RUN TODAY for CURRENT TO-15 STUDY ON CARBON UNITS
- CGI - 003-180321 e 1100
- CGE- 001- 180321 e 1115

* NOTHING OUT OF THE ORDINARY OBSERVED.

3/22/2019

WEEKLY GAS FLOW 48 CFM e 136°C 1 GAL
MOSTLY CLOUDY WARM LOW 60'S

3/30/18 (FRI)

WEEKLY FLOW READING 47 CFM e 13.1°C & com
CLOUDY COOL UPPER 40'S

4/6/2018 (FRI)

WEEKLY GAS FLOW READING 47 CFM e 13.1°C

4/13/2018 (FRI)

WEEKLY GAS FLOW READING 45 CFM e 12.9°C
~~STORM~~ COOL P. CLOUDY 40'S

4/20/18 (FRI)

- WEEKLY GAS FLOW READING 47 CFM e 18.1°C
CLEAN WARM UPPER 60'S LOW 70'S

GAS PROBE & GAS EXTRACTION (APRIL 2018)

4/25/2018 (WED)

TECH: M. TERRIS

WEATHER: SLI CLOUDY UPPER 60'S - LOW 70'S

B.P. 30.11 S GAS FLOW 49 CFM @ 18.9°C Ø COND.

GEM 500 #410 FAN HRS 25524

GAS CALIBRATION: ZEROED CH₄ → CALGAS → CH₄

READING 14.8% CALIBRATED TO 15.0%; CO₂ READING

14.7 CALIB. TO 15.0% CO₂; ZEROED O₂ TO CALGAS;

→ O₂ READING 20.6%; CALIB. TO 20.9% AB AIR.

MT SAMPLED ALL 4 GAS EXTRACTION LOCATIONS FOR %CH₄, %CO₂, %O₂ & PRESSURE. MT SAMPLED ALL GAS PROBE LOCATIONS & 1 PORT IN ALL. (INTERIOR & EXTERIOR PROBES) FOR %CH₄, %CO₂ & %O₂ & PRESSURE. ALL READINGS ARE IN NORMAL RANGE & NO ADJUSTMENTS WERE MADE NOTHING OUT OF THE ORDINARY WAS OBSERVED.
(WASTE MANAGEMENT)

* JESSE GRANDO, SR. DISTRICT MANAGER ON SITE TO CHECK IF CAN DROP OFF CONTAINERS FOR STORAGE.

4/26/2018 (TITANS)

- MONTHLY MAINT. GAS SYSTEM

* FAN BELT CHECKED (6 lbs)

* GAS FAN GREASED (CLEANED) ALL BEARINGS

* KNOCK OUT & RESET TO Ø

* TANK LEVELS 3.00" LS. @ 9.5"

* SWITCHED

AFTER 1 1/2 YEAR STUDY ON GAS CARBON UNITS AND DISCUSSION ON BREAKOUT FELT IT WAS TIME TO SWITCH OUT UNITS

CLOSED VALVE ON UNIT #1 (SPENT UNIT) OPENED

UNIT #3 VALVE OPEN Rite in the Rain.

COLBERT GAS SYSTEM
5/31/2018

DATE: 5/31/2018 (THURS)

WEATHER: CLOUDY LOW 60's

B.P. = 30.10

TECH: M.TERUS

GAS FLOW 45 CFM TEMP 19.7°C FAN HLR 26388
GEM 500 #410

GAS CALIBRATION: ZEROED CH₄ TO AB ~~TEMP.~~ → CALGAS
→ CH₄ READING 15.3% CALIB 15.0%; CO₂ READING
14.9% CALIB TO 15.0%; ZEROED O₂ TO CALGAS →
O₂ READING 20.7% CALIB TO 20.9%

LOCATION	% CH ₄	% CO ₂	% O ₂	TEMP	PRESSURE
13-TRENCH RISERS	*	*	*	*	*
4 GAS EXTRACTION	*	*	*		*
21 GAS PROBES	*	*	*		*

* MT SAMPLED ALL GAS PORTS ABOVE; ALL
READINGS ARE IN THE NORMAL RANGE
NOTHING OUT OF THE ORDINARY NO
ADJUSTMENT WERE MADE

- FAN MAINT PERFORMED GREASED BEARING ✓
BELT TENSION 5.5 IBS. ALL IS GOOD.

- KNOCKOUT e φ

- TANK LEVELS 3.0" IS C 95"
Flows for MAY

5/4	GAS FLOW	50 cfm	e 18.9°C
5/11	GAS FLOW	50 cfm	e 17.9°C
5/18	GAS FLOW	49 cfm	e 19.6°C
5/24	GAS FLOW	47 cfm	c 19.1°C

5-31-18 GAS FLOW 45 cfm @ 19.1°C

6-8-2018 GAS FLOW 49 cfm @ 20.7°C

6-15-2018 GAS FLOW 50 cfm @ 21.7°C

GAS ROUND 6/2018

(6-19-2018 CTUES) TECH M.TERRIS
FAN HLR 26845 BP 30.09↓ P.CLOUDY 70's
~~FAN~~ GAS FLOW 51 cfm GAS TEMP 21.7°C
GEM 500 #410

GAS CALIB.: ZEROED CH₄ TO AB AIR → CALGAS →
CH₄ READING 14.8%, CALIBRATED 15.0%; CO₂
READING 15.1% CALIB. TO 15.0%; ZEROED
O₂ TO CALGAS, CALIB. TO 20.9% O₂ AB AIR.

MT SAMPLED AT ALL 21 GP LOCATIONS
AND 4 GAS EXTRACTION LOCATIONS
%CH₄, %CO₂, %O₂ & PRESSURE. MT SAMPLED
AT EACH LOCATION, MT FOUND ALL READING
ARE WITHIN NORMAL RANGE, SO NO
ADJUSTMENTS WERE MADE TO SYSTEM.
NOTHING OUT OF THE ORDINARY WAS
OBSERVED.

- GAS FAN MAINT ✓ TENSION ON BELT
5-5.51BDS GREASED BEARINGS.

(FOUND A LITTLE VIBRATION ON BELT SCREEN
CAUSING NOISE.)

- KNOCKOUT & φ

- TANK LEVELS 3.0" ~ 1.5" @ 95"

7-5-2018 Gas flow 57 cfm @ 32.0°C

7-12-18 (TUES)

GAS FLOW 55 cfm @ 26.1°C

COLBERT GAS RD

7/20/2018

7/20/2018 (C FRI)

WEATHER: MC MID-80's
TECH: M.TERRIS
GEM 500 #410GAS FLOW 48 cfm
GAS TEMP 224°

FAN HR 27585.9

GAS CALIBRATION ZEROED CH₄ TO AB AIR →
CALGAS, CH₄ READING 14.9% CALIBRATED TO
15.0%; CO₂ READING 14.8% CALIBRATED TO 15.0%;
ZEROED O₂ TO CALGAS, CALIB. TO 20.9%
AB AIR.

* MT SAMPLED ALL 21 GAS PROBE LOCATIONS
ON SITE & 4 GAS EXTRACTION LOCATIONS.
FOR %CH₄, %CO₂, %O₂ & PRESSURE AT
ALL LOCATIONS. ALL READINGS ARE IN
NORMAL RANGE. NO ADJUSTMENT WERE
MADE. WORKING ON NOX WEED CONTROL
TURNED THAT OVER TO KM. PROCARE
OUT THIS WEEK TO CONTROL ON ROAD.
KM WILL TAKE CARE OF LANDFILL.
MT LOOK AT RIMPEL ON COVER TALKED
TO DEB TO ASK FOR ANY ADVICE TO
WHAT TO DO WITH NO VEG GROWING.
DEB IS AWARE.

- ZERO COND IN LINE
- GAS FAN MAINT. GREASED BOTH BEARINGS
- ✓ BELT TENSION & WEAR ALL WOOD GOOD
- KNOCK OUT C ♂
- ✓ SUMP PUMP BOTH WORKING
- COND TANK NE corner; 2.75-300" → IS 9.5"

7/27/2018 (FRI)

GAS FLOW 51CFM @ 21.9°C

8/3/2018 (FRI)

* GAS FLOW 52CFM @ 21.7°C

8/8/18 (WED)

* GAS FLOW 51CFM @ 24.9°C

GAS RD

8/17/18 (FRI)

B. PRESS 30.08

WEATHER SUNNY HAZY UPPER 80'S LOW 90'S

TECH: M. TERRIS GAS FLOW 55 CFM TEMP 22.6

GAS FAN HR: 28260

GEM 500 #410

GAS CALIBRATION:

ZEROED CH₄ TO AB AIR → CALGAS CH₄ READING

14.9% CALIB TO 15.0%; CO₂ READING 14.8%

CALIBRATED TO 15.0%; ZEROED O₂ TO CALGAS →

O₂ READING 20.7% AB AIR CALIB TO 20.9%

* MT SAMPLED NORMAL PROTOCOL FOR ALL 21
GAS PROBE LOCATION & 4 GAS EXTRACTION
LOCATIONS %CH₄, %CO₂, %O₂ & PRESSURE.
ALL READINGS ARE IN NORMAL RANGE, OTHER
THAN CH₄ RISING IN EXTRACTION SYSTEM
NORMAL IS 45% THIS MONTH 9% COULD
BECAUSE OF RISE IN OUTSIDE TEMP, WILL
KEEP AN EYE OPEN.

* NOTHING OUT OF THE ORDINARY WAS
OBSERVED. SAPPINGS NEED TO BE PULLED.
NO ADJUSTMENTS WERE MADE

- QT GAS FAN MAINT DONE BELT LOOKS
GREAT 5-6 lbs OF PRESSURE

- KNOCKOUT \varnothing 2.75"-3.00" → 18.95"

- round TANK NE CONNEX After rain 2.75"-3.00" → 18.95"

8-23-18 GAS FLOW 57 CFM @ 19.7°C

8-31-18 GAS FLOW 59 CFM @ 20.3°C

9-7-18 GAS FLOW 53 CFM @ 19.1°C

9-12-18 GAS FLOW 56 CFM @ 19.4°C (CONT.)

COLBERT GAS RD

9/2018

DATE: 9/21/2018 (CFM)

FAN HR: 21112

GAS FLOW 53 CFM

GAS TEMP: 19.1°C GEM 500 #410

WEATHER P. CLOUDY MID-60'S

B. PRESS 30.14

GAS CALIB: ZEROED CH₄ TO AB AIR → CALGAS →

CH₄ READING 14.8% CALIB TO 15.0% CH₄; CO₂

READING 15.1% CALIB TO 15.0% → REMOVED

~~CALGAS~~ → ZEROED O₂ TO CALGAS → REMOVED

CALGAS → O₂ READING 20.7 CALIB. O₂ 20.9%

AB AIR.

* ALL 21 GAS PROBE LOCATIONS ± 4

GAS EXTRACTION LOCATIONS WERE SAMPLED FOLLOWING NORMAL PROTOCOL WHILE SAMPLING FOR %CH₄, %CO₂, %O₂ & PRESSURE AT ALL LOCATION. ALL READINGS ARE WITHIN NORMAL READINGS. NOTHING OUT OF THE ORDINARY WAS OBSERVED. NO ADJUSTMENTS WERE MADE.

- GAS FAN MAINT; GREASED SHAFT BEARING & MOTOR BEARING. LOOK @ BELT & TENSION 5.5 IBS
- 2.5 GAL OF LUBE IN EFF GAS LINE
- KNOCKOUT & ✓
- ✓ GAS LINE TRAPS OK.
- TANK LEVELS 2.75-3.00" IS 9.5"

9-28-18 (FR2)

- GAS FLOW 56 CFM @ 18.1°C 1 GAL COND

10-4-18 (THURS)

- GAS FLOW 56 CFM @ 18.7°C Ø

10-12-18 (FR2)

- GAS FLOW 51 CFM @ 18.1°C 1 GAL COND

10-18-18 (THURS)

- GAS FLOW 55 CFM @ 18.9°C 2 GAL COND

10-26-18 (FRU)

- GAS FLOW 56 CFM @ 17.9°C 5 GAL CON
(TURNED HEAT TRACE ON)

GAS PROBES

10-30-18 (TUES)

TECH: M. TERRIS

WEATHER: P. CLOUDY 40°-50° B.P. 3007 R

GAS TEMP 12.4°C GEM 500 #410

GAS FLOW 51 CFM

FAN HR 22048 HR.

GAS CALIB.: ZEROED CH₄ TO AB AIR → CALGAS
CH₄ READING 15.1% CALIB. TO 15.0%; CO₂
READING 14.9% CALIB. TO 15.0%; ZEROED
O₂ TO CAL GAS → O₂ READING 20.6% CAL.
TO AB AIR 20.9%

- ALL 21 GAS PROBES + 4 GAS EXTRACTION SYSTEM LOCATIONS WERE SAMPLED FOLLOWING NORMAL PROTOCOL WHILE SAMPLING %CH₄, %CO₂, %O₂ & PRESSURE AT ALL LOCATIONS. ALL READINGS ARE WITHIN NORMAL READINGS. NOTHING OUT OF THE ORDINARY WAS OBSERVED. NO ADJUSTMENT WAS MADE.

- GAS FAN MAINT. BEARINGS GREASED ✓ BELTS
- 3.0 GAL OF CONDENSATE IN EFF GAS LINE
- KNOWL OUT @ Ø
- TANK LEVELS 2.75" IS 9.5"
Rite in the Rain

11/21/2018 GAS flow 51 cfm 13.9°C 2 GAL CON

11/9/2018 GAS flow 49 cfm @ 13.1°C Ø

TRENCH RISERS / GAS PROBES / EXTRACTION

11/16/2018 (frz) GEM 500 #410

WEATHER: MOSTLY CLEAR 30'S LOW 40'S B.P. 30.09
Gas flow: 46-48 CFM @ 12.4°C FAN AR: 30446
4 GAL OF COND IN EFF LINE (DRAINED)

THE FOLLOWING WAS SAMPLED USING GEM 500

LOCATIONS	%CH ₄	%CO ₂	%O ₂	FLOW	PRESS	TEMP
13 TRENCH	X	X	X	X	X	X
21 GAS PROBE	X	X	X		X	
4 GAS EXTRACT	X	X	X		X	

NORMAL PROTOCOL WAS USED WHILE SAMPLING ALL LOCATIONS ABOVE. ALL READINGS ARE IN NORMAL RANGES, NO ADJUSTMENTS WERE MADE. NOTHING OUT OF THE ORDINARY WAS OBSERVED

- WINTERIZED GAS SYSTEM (TUNED TRENCH RISERS TO ALLOW GOOD FLOW OF COND.)
- FLAGGED ALL SURFACE LEVEL LOCATIONS.
- FAN MAINT. TURNED FAN OFF ✓ BELT A LITTLE WEAR BUT OK AT THIS TIME 5-6 lbs TENSION 1 lbs ON BELT (OK)
- TURNED FAN BACK ON GREASED ALL BEARINGS SHAFT & MOTOR
- KNOCKOUT COUNTER @ 1 RESET TO Ø
- TRAPS LOOK/SOUND GOOD
- TANK LEVELS 2 3/4" COND IS 95" OIL

11/20/2018 (TUES)

-WEEKLY GAS FLOW 50CFM @ 12.9°
1 GAL. COND.

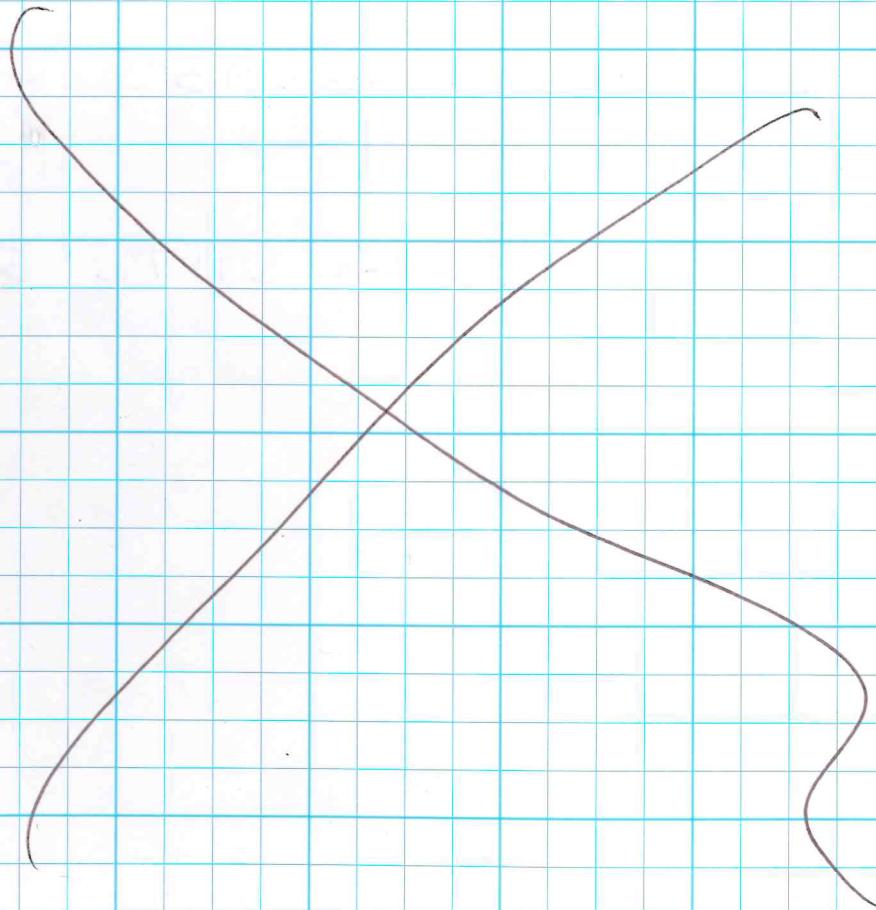
-PULLED SAPPING from COVER
(WE HAVE A PACK OF COYOTES ON
Cover (4-5) THEY ARE THE ONES
DIGGING Holes

12/4/2018 (Tues)

-Weekly Gas flow 49 cfm @ 12.8°C

12-14-18 (Fri)

-WEEKLY FLOW 51 CFM @ 14.1°C & GAL



MONTHLY GP | EXTRACTION

TECH : M. TERRIS

12-19-2018 (FRI)

WEATHER: R CLOUDY 40's

GAS FLOW: 56 CFM @ 12.8°

GEM 500 #410

B.P. 30.01 R

KNOCKOUT @ Ø

GAS CALIB: Ø CH₄ TO AB AIR → CALGAS CH₄READING 14.9 CALIB TO 15.0%; CO₂

READING 15.1% CALIB TO 15.0%; ZERODED

O₂ TO CALGAS → O₂ READING 20.6

TO AB AIR CALIB. TO 20.9%

* ALL 21 GAS PROBES & 4 GAS EXTRACTION SYSTEM LOCATIONS WERE SAMPLED

FOR % CH₄, % CO₂, % O₂ & PRESSURE.

ALL LOCATIONS ARE IN NORMAL RANGE

NO ADJUSTMENTS WERE MADE

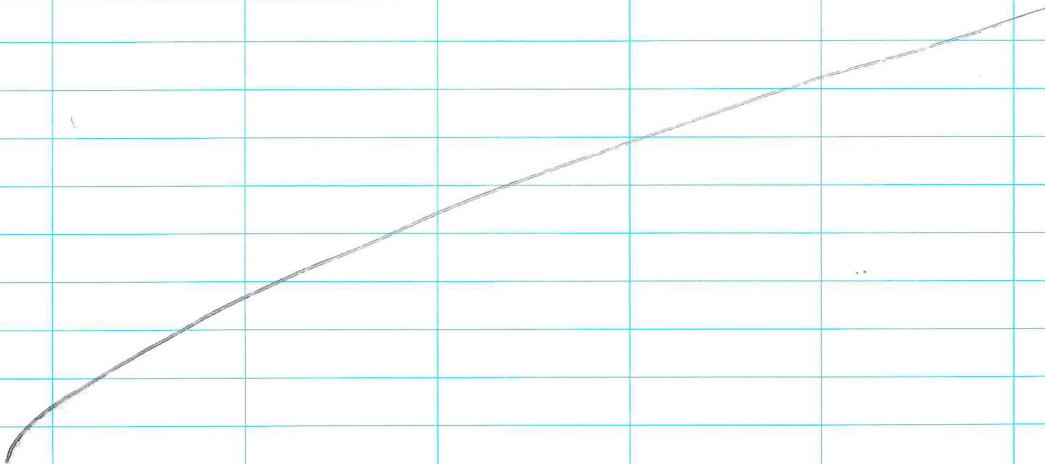
- GAS FAN MAINT & BELT ✓ = ALL IS OK

BELT TENSION @ 5.5 lbs GREASED BEARINGS

- TANK LEVELS 2.75-3.00 IS = 9.5"

12/26/2018 (WED)

* WEEKLY GAS FLOW 54 CFM @ 11.7°C 2 GAL



COLBERT GP / EXTRACTION

1/4/2019 (Fri) 40S
WEATHER: P.C UPPERS 40S
GAS FLOW 54 cfm e 14.1°
FAN HR: 31617
GEM 500 #410

TECH: M. TERRIS
B.P. 30.22 ↓

KNOCKOUT E \emptyset
ZERO COND IN EFF LINE

GAS CALIB: \emptyset CH4 TO AB AIR \rightarrow CALGAS
CH4 READING 14.8 CALIB TO 15.0%;
CO2 READING 15.0%U NO CAL NEEDED;
ZEROED O2 TO CALGAS \rightarrow O2
READING 20.7 CALIB TO 20.9 AB
AIR.

MT SAMPLED ALL 21 GAS PROBE LOCATION
(INTERIOR / EXTERIOR) & 4 GAS
EXTRACTIONS LOCATIONS AS PER OUR
REGULATIONS. SAMPLED %CH4, %CO2,
%O2 & PRESSURE AT ALL 25 LOCATION.
NOTHING OUT OF THE ORDINARY WAS
OBSERVED SO NO ADJUSTMENTS WERE
MADE

- GAS FLOW FAN MAINT WITH NORMAL SERVICE
- J'D COND. TANK NE CORNER OF
LANDFILL; 2.75"-3" 9.5 IS.
- KNOCKOUT \emptyset
- \emptyset COND. IN EFF GAS LINE

1/11/2019 (Fri)

GAS FLOW 52 cfm e 12.1°c 1 GAL COND.

1/18/19 (FR1)

GAS FLOW @ 54 CFM 12.2°C TEMP OF COND.

1/18/19 - New BATT for GEM (GF)

1/25/19 (FR1)

54 CFM GAS FLOW TEMP 10.9°C 2 GAL

~~H26~~
~~NE~~

COLBERT GAS PROBE / EXTRACTION

2/1/2019 (FR1)

TECH: M. TERRIS

WEATHER: CLOUDY 40's

B.P 30.01 ↓

GAS FLOW 52 CFM @ 9.7°C EFF GAS LINE: Ø COND

FAN Hr: 32291

GEM 500# 410 CALIBRATION:

Ø CH₄ TO AB AIR; CALGAS → CH₄ READING
14.9% CALIB. TO 15.0%; CO₂ READING 15.1%
CALIB. TO 15.0%; O₂ ZEROED TO GAS CALIB. →
O₂ READING 20.7% TO AB AIR CALIB.
TO 20.9%

MT SAMPLED ALL 21 GAS PORT LOCATIONS
(INTERIOR & EXTERIOR)
AND 4 EXTRACTION
LOCATION PER OWN REQUIREMENTS.

MT SAMPLE FOR %CH₄, %CO₂, %O₂ AND
PRESSURE AT ALL LOCATIONS. NOTHING
OUT OF THE ORDINARY OBSERVED SO NO
ADJUSTMENTS WERE MADE. ~~SEEM~~

- SEEM TO BE POCKETS OF SETTLEMENT ON
LANDFILL NEED DAVE BENTIS CREW OUT
TO SURVEY.

- GAS FAN NORMAL MAINT GREASED BEARING
✓ BELT 55 lbs TENSION ON BELT
- ✓ SUMPS OK
- TANK NE CORNER 2.75"-3.00' IS 9.5°

2/6/19 (WED)

COLD vent COLD!!
GAS flow 53 cfm 8.7°C Ø Cond.

2/14/19 (Thursday)

another cold Wind (very) day
Gas flow 53 cfm 8.8°C Ø cond.

2/20/19 (Wednesday)

very cold - windy also
Gas flow 54 cfm

8.7°C

Ø cond

2/27/19 (Wednesday)

Once again Cold 19°F

Gas flow 54 cfm

8.7°C

Ø cond

3/7/19 (Thursday)

Gas flow 53 cfm

8.8°C

Ø cond

3/14/19

GAS flow 54 cfm 9.9°C

Ø cond

3/22/2019 (FRI)

- Gas Flow 56 cfm 12.2°C 3 GAL Cond.

3/26/2019 (TUES)

GAS flow 54 cfm 13.7°C 1 GAL cond

~~4/3/2019 (WED)~~

GAS f

GAS PROBES (EXT. SYSTEM)

3/21/19 (TITANS)

Tech: KM

GEM 500 #410

Weather: P. CLOUDY → CLOUDY UPPER 30's Low 40's

B-Press 30.05

Flow 51 CFM

No GASCAL INFO

- ALL GAS PROBES READING TAKEN, + 4 GAS EXTRACTIONS LOCATIONS SAMPLED
%CH₄, %CO₂, %O₂ ? PRESSURE

ALL INFORMATION RECORDED. IN THIS ROUND

4/3/19 (WED)

GAS FLOW 52 CFM @ 14.0°C φ (CON)

4/12/19 (FRI)

GAS FLOW 54 CFM 137°C φ COND.

4/3/19 (WED)

- GAS FLOW 52 cfm e 14.0°C φ COND

4/12/19 (FRI)

- GAS FLOW 54 cfm e 13.7°C φ COND

4/17/19 (WED)

- GAS FLOW 52 cfm e 14.7°C φ COND

4/26/19 (FRI) COLBERT GAS ANNUAL
TECH: M.TERZIS
FAN HTR 34305 WEATHER: CLOUDY SHOWERS 50'S
GAS FLOW 55 cfm e 17.1°C B.PRESS 30.01↓

GAS CALIBRATION: ZEROED CH₄ TO AB AIR → CALGAS →
CH₄ READING 14.8% CALB. TO 15.0%; CO₂ READING 14.9%
CALB. TO 15.0%; & ZEROED O₂ TO CALGAS; O₂ READING
20.6% CALB. TO 20.9% AB AIR.

MT SAMPLE AT EACH LOCATION AS FOLLOWS

LOCATION	%CH ₄	%CO ₂	%O ₂	FLOW	PRESSURE	TEMP
13 TR's	X	X	X	X	X	X
2 MV's	X	X	X		X	
5 MSS	X	X	X		X	
5 TS's	X	X	X		X	
21 GPS	X	X	X		X	
4 EXTRACTION	X	X	X		X	

MT PERFORMED ANNUAL GAS SAMPLING EVENT
AT ALL LOCATIONS ABOVE NORMAL PROTOCOL
WAS FOLLOWED; ALL TR VALUE PLACED IN
SUMMER POSITION NOTHING OUT OF THE
ORDINARY WAS OBSERVED NO ADJUSTMENT
WENT MADE

126/19 CONT.

GAS FAN WAS TURNED OFF DID SEMI-ANNUAL MAINT. CLEANED BEARING EXTRA GREASE OFF. REGREASED BEARING TO NORMAL MOTOR BEARINGS GREASED CLEANED BELT ✓ TENSION & WEAR TENSION < 5.5 lbs. A LITTLE WEAR IN BELT WAS OBSERVED.

Ø COND IN EFF LINE

- KNOCKOUT C 5 RESET TO Ø
TANK LEVELS 2.75-3.00" IS 9.5
✓ Sumps in line OK.

11/2019 (WED)

GAS FLOW 55 CFM < 17.9° Ø COND

10/2019 (FRI)

GAS FLOW 56 CFM < 20.0° Ø COND
GREASE BEARING ON GAS FAN - NOISE

*5/11/19 CALLED DAVE BENTO FOR SCHEDULING
OF MARKERS ON SITE, ALLEN BERRY
CALLED WILL SCHEDULE. (NEEDS MAP)

5/15/19 PROCARE ON SITE TO STREAM ROADS

COLGAS PROBER

5/20/2019 (MON)

FAN HR: 34904

GAS FLOW: 56 CFM @ 14.8°

~~WEATHER: P. CLOUDY 60S NEWIND 10-15 MPH~~
B. PRESS 30.00↓

GAS CALIB. HAD TO RESET TO FACTORY SETTINGS
THEN CALIB METER.

ZERO CH₄ TO AB AIR → COLGAS → CH₄ READING 14.1%
CALIB TO 15.0%; CO₂ READING 14.4% CALIB
TO 15.0%; ZEROED O₂ TO COLGAS → O₂ READING
20.1% CALIB TO 20.9%

MT SAMPLED C ALL 21 GP LOCATION ON
SITE + 4 GAS EXTRACTION LOCATIONS
FOR %OCH₄, %CO₂; O₂ & PRESSURE. ALL
READINGS ARE IN NORMAL RANGE. NOTHING
OUT OF THE ORDINARY WAS OBSERVED.
NO ADJUSTMENT WERE MADE.

- MAINT. ON GAS FAN GREASED BEARING
- KNOCKOUT @ Ø
- NO COND IN GAS LINE
- TANK LEVELS AT 2.50"-2.75" IS 9.5"

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