

**Well Site Description**

As clearly noted in the last BCRET Quarterly Report (September 1 to December 31, 2015), only the sample collection point for the house well adjacent to the animal house facilities and slurry holding ponds was reconfigured to exclude any potential sources of sample contamination. The existing well was used; no new well was dug adjacent to the animal housing facility in connection with our groundwater sampling. We simply instructed the owners to re-plumb the well head to allow us to collect water prior to any possible external influences. Thus, we are sampling from the same well as previously recorded and reported.

It was determined that the risk of contamination was a result of factors such as well-head pump and in-house maintenance, In addition to installing a new well-water sampling site, USGS water quality sampling guidelines were used, which involved collection of a well sample when in-situ field measurement of well water temperature, pH, and electrical conductivity had stabilized.

The combination of the new sampling port and well purging methodology now ensures sample integrity to reflect the chemistry of the ground water at the base of this well. We will continue to report analyses as “House Well” but note when the new sampling began and the [potential for external contamination was eliminated.

Well water analyses from samples collected after the new sampling port and sampling protocol were in operation are summarized below and were reported in the last quarterly report (September 1 to December 31, 2015), which was released January 15, 2016. There is no new data to report and as no new well was dug related to this well sampling, there is no well drilling information.

	Dissolved P	Total P	Nitrate-N	Total N	E. coli	Total coliform	Conductivity
	----- mg/L -----				--- MPN/100L ---		µS/cm
9/30/2015	0.009	0.016	0.499	0.60	<1.0	2.0	446
10/8/2015	0.008	0.020	0.518	0.53	<1.0	<1	455
10/14/2015	0.012	0.020	0.490	0.63	<1.0	<1	461
10/22/2015	0.010	0.014	0.478	0.50	<1.0	2.0	453
10/28/2015	0.008	0.016	0.391	0.54	<1.0	<1	456
11/4/2015	0.010	0.016	0.468	0.54	<1.0	<1	455
11/12/2015	0.009	0.012	0.501	0.55	<1.0	<1	458
11/18/2015	0.009	0.014	0.464	0.59	<1.0	<1	458
12/2/2015	0.011	0.014	0.480	0.60	1.0	1.0	422

## Sampling Methodology

Following installation of the new well sampling port adjacent to the animal facilities and slurry holding ponds, the following well-water sampling protocol was adopted, where each time a sample of well water is collected, the well will be initially purged and water temperature, pH, and electrical conductivity measured on-site every 30 seconds until all values stabilize (primarily water temperature). At that point a sample of water is collected in a 1-L acid-washed bottle.

This method is taken from USGS and EPA well-water sampling protocols. See USGS methods for sampling at [https://water.usgs.gov/owq/FieldManual/chapter4/pdf/Chap4\\_v2.pdf](https://water.usgs.gov/owq/FieldManual/chapter4/pdf/Chap4_v2.pdf). Specific and detailed guidance on the collected of water quality data can be found in the USGS National Field Manual at [file:///U:/Words/C&H%20Farm/Publications/Planning/USGS%20National%20Field%20Mannual\\_complet e%202015.pdf](file:///U:/Words/C&H%20Farm/Publications/Planning/USGS%20National%20Field%20Mannual_complet e%202015.pdf)

Similarly, the U.S. EPA recommend that selected water quality parameters such as temperature, pH, conductivity, and dissolved oxygen can be monitored during low-rate purging, with stabilization of these parameters indicating when the discharge water represents aquifer water or source well water.

See:

[http://www.csus.edu/indiv/h/hornert/Geol\\_210\\_Summer\\_2012/Week%20%20readings/Puls%20and%20Barcelona%201996%20Low%20flow%20sampling.pdf](http://www.csus.edu/indiv/h/hornert/Geol_210_Summer_2012/Week%20%20readings/Puls%20and%20Barcelona%201996%20Low%20flow%20sampling.pdf) and <https://in-situ.com/wp-content/uploads/2015/01/Low-Flow-Groundwater-Sampling-Techniques-Improve-Sample-Quality-and-Reduce-Monitoring-Program-Costs-Case-Study.pdf>

