

September 4, 2020

Big Sky Wastewater Testing Results

Result Summary: Big Sky Inflow Sample was positive; Irrigation Sample was negative

Sample Description:

- 1) A composite sample of wastewater (1.0 L total) inflow to the Big Sky treatment plant was captured on 9/2/2020 using an auto-sampler over the previous 24-hour period. Referred to below as “Inflow” samples in **Table 1**.
- 2) A single-catch sample (1.0 L total) of water used for irrigation of the Big Sky Golf Course was captured on 9/2/2020. Referred to below as “Irrigation” samples in Table below.

Testing Information and Raw Data:

Testing for the presence and abundance of the SARS-CoV2 genome in the above samples was performed using a kit designed by the US Centers for Disease Control and Prevention (CDC 2019-Novel Coronavirus (2019-nCoV), Real-Time RT-PCR Diagnostic Panel). Importantly, this test kit was originally designed to detect the virus in human samples and NOT wastewater or other kinds of environmental samples. The test was used here to determine whether a detectable amount of virus was present. Results need to be interpreted with caution, as described below.

Each of the above samples were split and processed as two replicates. Two tests were performed on each replicate and two independent locations on the SARS-CoV2 genome were targeted (N1 and N2). RNA was isolated from inactivated/concentrated samples, reverse-transcribed to DNA and used as template in quantitative PCR reactions as per kit instructions. Results were recorded as cycle threshold (Ct) numbers based on test interpretation guidelines described by the CDC. A standard curve was generated using a pre-made virus target and used to calculate the number of genomes in each sample.

Note: Previous test results included three replicate samples. These results also use a correction factor of 2.31 cycles (Cts) to adapt a new method to improve sensitivity.

Results were as follows:

Big Sky Sample ID	Replicate ID	Target	Ct	Potential Genomes per liter
Inflow_1	N1.1	N1	35.4211	10404
Inflow_1	N1.2	N1	35.3489	10978
Inflow_1	N2.1	N2	36.0838	6359
Inflow_1	N2.2	N2	36.0838	5102
Inflow_2	N1.1	N1	35.1306	12911
Inflow_2	N1.2	N1	35.3557	10922
Inflow_2	N2.1	N2	36.0242	6647
Inflow_2	N2.2	N2	36.0242	6216
Irrigation_1	N1.1	N1	Undetermined	0
Irrigation_1	N1.2	N1	Undetermined	0
Irrigation_1	N2.1	N2	Undetermined	0
Irrigation_1	N2.2	N2	Undetermined	0
Irrigation_2	N1.1	N1	Undetermined	0
Irrigation_2	N1.2	N1	Undetermined	0
Irrigation_2	N2.1	N2	Undetermined	0
Irrigation_2	N2.2	N2	Undetermined	0

Interpretation:

Signal in all replicates of the inflow sample was above our limit of detection. Based on our experience with wastewater testing, this is strong evidence of virus in wastewater. Levels of virus in the inflow was increased relative to the previous week's sample (taken 8/25/2020). Levels of virus in the irrigation pond remain negative.

Relevant text from CDC guidelines:

"...a specimen is considered positive for 2019-nCoV if all 2019-nCoV marker (N1, N2) cycle threshold growth curves cross the threshold line within 40.00 cycles (< 40.00 Ct)."

"When all controls exhibit the expected performance and the cycle threshold growth curve for any one marker (N1 or N2 but not both markers) crosses the threshold line within 40.00 cycles (< 40.00 Ct) the result is inconclusive."