OMEGA ENVIRONMENTAL SERVICES, INC

Date: 12/18/2020

To: Mitchell Gayer

From: David Ekstrand
Kadeem Hill
Veronica Kero, CIH, P.E.

Re: **(NJIT NEWARK CAMPUS WASTEWATER DISCHARGE SARS-CoV-2 SAMPLING & PCR ANALYSIS) WEEKLY DATA SUMMARY FOR 12/14/2020-12/16/2020** {Omega Project #: 20-1177}

Attachment(s):

- *Results Summary Trends*
- *Prestige EnviroMicrobiology Laboratory Analysis Reports for samples collected 12/14-12/16/2020*

Project Overview:

In order to proactively predict potential escalation of COVID-19 cases in occupied campus dormitory buildings, 24-hour composite wastewater (WW) discharge sampling is being performed, followed by 3rd party laboratory analysis in accordance with the published method cited on the attached laboratory analysis report using the approved CDC EUA Kit.

Weekly Data Summary:

WW Discharge Sampling Location	24-hr Sampling Date Range	2019-nCoV (N1 Protein)	Cycle Threshold Value[3] (N1 Protein)	2019-nCoV (N2 Protein)	Cycle Threshold Value[3] (N2 Protein)	Conc. (Copies of RNA/mL)
Oak-17	12/14-12/15/2020	ND	ND	ND	ND	NA
Cypress-16	12/14-12/15/2020	Positive	38.01	Positive	37.63	23
Laurel M-16	12/14-12/15/2020	Positive	31.05	Positive	31.86	640
Laurel E-14	12/14-12/15/2020	Positive	28.15	Positive	28.96	2,100
Redwood-15	12/15-12/16/2020	ND	ND	ND	ND	NA
GRK Honors-17*	12/14-12/15/2020	Positive	33.57	Positive	34.04	160

* Due to incoming snow storm this one sample was collected over four hours

Local Trending:

According to *covidactnow.org* online database for Essex County:

Active or imminent outbreak.

Essex County is either actively experiencing an outbreak or is at extreme risk. COVID cases are exponentially growing and/or Essex County's COVID preparedness is significantly below international standards.

Essex Infection Rate 12/9 (most recent data): 1.02% (decreasing)
Essex Positivity Rate 12/14 (most recent data): 8.3% (decreasing)
Essex Daily New Cases Per 100k (as of 12/17): 51.7 (at a critical level)

Discussion of CT Score

The cycle threshold (Ct) refers to the number of cycles in an RT-PCR assay needed to amplify viral RNA to reach a detectable level. The Ct value can thus indicate the relative viral RNA level in a specimen (with lower Ct values reflective of higher viral levels).

Since the assessment of COVID-19 in sewers is an ongoing developing project the following is intended as a guideline only.

Omega Recommendations:

CT Value	RNA/L	Occupant Risk	Recommendation
>40	<2,000	None Detected – No Risk identified above normal for the surrounding area.	No Action
39.99 – 37.5	2,001 – 20,000	Low	Voluntary COVID-19 Testing for occupants
37.4 – 32.59	20,001 – 200,000	Moderate	Non-Voluntary COVID-19 testing for all dorm occupants.
32.58 - 29.11	200,001 – 1,999,999	High	Non-Voluntary COVID-19 testing for all dorm occupants. Occupant isolation until test results are received.
29.1 – <26.49	2,000,000 - >20,000,000	Very High	Occupant isolation for a minimum of a week. Non-Voluntary COVID-19 testing for all dorm occupants at the start and end of the week

Please note, there is an inverse relationship between CT values and RNA/L.

Summary

Trending:

- Cypress- decreased RNA positive results (moderate risk).
- Laurel Extension – *increased* RNA positive results (now very high risk)
- Laurel Main – *increased* RNA positive result (now high risk)

- Greek Houses/Honors – *decreased* RNA positive results (still high risk)
- Redwood, Oak – no change (ND)

Depending upon NJIT policies Omega recommends:

- For confirmed cases, students should be removed from shared rooms and quarantined in single rooms
- Encourage adherence to standard precautions (mask, social distancing, and personal hygiene).
- Discourage unnecessary social interactions both in the building and elsewhere on campus until negative test results are received.
- Consider installing a temperature checking camera at residence halls entrances and requiring students to undergo a temperature check before entering the building.

(1) Current information indicates that wastewater testing may reveal the presence of Covid-19 4 or 5 days prior to clinical tests or the development of symptoms. If feasible, NJIT may want to encourage occupants to take two tests, approximately 4 days apart.

Results Summary Table

Week Ending	Cypress				Greek Village				Honors				Laurel-Extension				Laurel-Main				Oak				Redwood			
	2019-nCoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)	2019 n-CoV (N1)	CTV* (N1)	2019 n-CoV (N2)	CTV* (N2)
8/28/2020					ND	ND	ND	ND									ND	ND	ND	ND	ND	ND	ND	ND				
9/4/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND					ND	ND	ND	ND	ND	ND	ND	ND				
9/11/2020	ND	ND	ND	ND	ND	ND	ND	ND									ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9/18/2020	Positive	35.68	Positive	35.49	ND	ND	ND	ND					ND	ND	ND	ND					ND	ND	ND	ND	ND	ND	ND	ND
9/25/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/2/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/9/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/16/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Positive	32.88	Positive	33.32	ND	ND	ND	ND	ND	ND	ND	ND
10/23/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Positive	35.62	Positive	33.78	ND	ND	ND	ND	ND	ND	ND	ND
10/30/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Positive	31.47	Positive	31.6	ND	ND	ND	ND	ND	ND	ND	ND
11/6/2020	Positive	33.74	Positive	34.02	ND	ND	ND	ND	ND	ND	ND	ND	Positive	37.65	Positive	36.93	Positive	37.32	Positive	38.78	ND	ND	ND	ND	ND	ND	ND	ND
11/13/2020	Positive	24.68	Positive	24.66	ND	ND	ND	ND	ND	ND	ND	ND	Positive	28.14	Positive	28.29	Positive	34.43	Positive	34.26	ND	ND	ND	ND	ND	ND	ND	ND
11/20/2020	Positive	30.30	Positive	30.29	ND	ND	ND	ND	ND	ND	ND	ND	Positive	31.02	Positive	30.99	ND	ND	ND	ND	ND	ND	ND	ND	Positive	35.31	Positive	34.48
11/27/2020	Positive	35.73	Positive	36.08	ND	ND	ND	ND	ND	ND	ND	ND	Positive	32.50	Positive	32.48	Positive	29.49	Positive	30.04	ND	ND	ND	ND	ND	ND	ND	ND
12/4/2020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Positive	31.18	Positive	31.90	Positive	35.71	Positive	36.08	ND	ND	ND	ND	ND	ND	ND	ND
12/11/2020	Positive	35.38	Positive	35.50	Positive	30.66	Positive	30.90	Positive	30.66	Positive	30.90	Positive	29.74	Positive	29.84	Positive	38.56	Positive	38.26	ND	ND	ND	ND	ND	ND	ND	ND
12/18/2020	Positive	38.01	Positive	37.63	Positive	33.57	Positive	34.04	Positive	33.57	Positive	34.04	Positive	28.15	Positive	28.96	Positive	31.05	Positive	31.86	ND	ND	ND	ND	ND	ND	ND	ND
12/25/2020																												

Note: CTV score *decreases* with *increasing* virus detected (> 40 = ND)

N1: N1 Indicator Protein N2: N2 Indicator Protein ND: None Detected CTV: Cycle Threshold Value

ATTACHMENTS

Prestige EnviroMicrobiology, Inc.

Analytical Test Report

Client: Omega Environmental Services, Inc., 280 Huyler Street, South Hackensack, NJ 07606

Client Project/Name: 20-1177

Sample date: 12-14-2020 & 12-15-2020

Submittal date: 12-15-2020

Sample received: 12-16-2020

Samples submitted by: Val Rublikov

Date analysis completed: December 16, 2020

Prestige Report number: 201216-01

RT-PCR 2019-nCoV: Analysis of Water samples for the detection of SARS-CoV-2 Genetic Markers

Prestige # Client sample ID Location	2019-nCoV (N1 Protein)	Cycle Threshold (Ct) Value[3] (N1 Protein)	2019-nCoV (N2 Protein)	Cycle Threshold Value[3] (N2 Protein)	Conc. (copies of RNA/mL)
201216-01-001 Oak-17	ND	ND	ND	ND	NA
201216-01-002 Cypress-16	Positive	38.01	Positive	37.63	23
201216-01-003 Laurel M-16	Positive	31.05	Positive	31.86	640
201216-01-004 Laurel E-14	Positive	28.15	Positive	28.96	2,100
201216-01-005 Greek Honors-17	Positive	33.57	Positive	34.04	160

Report approved: Theresa Lehman

Theresa Lehman, MPH, Lab Director

Technical Manager:

Chin S Yang, Ph.D.

Analyst: Ching-Yi Tsai, Ph.D.

1. The samples in this report were received in good, acceptable conditions. Results relate only to the items tested.
2. Wastewater samples are processed following the protocol described in the article: Ahmed, W., et al. 2020. First confirmed detection of SARS-CoV-2 in untreated wastewater in Australia: A proof of concept for the wastewater surveillance of COVID-19 in the community. Science of the Total Environment 728. https://doi.org/10.1016/j.scitotenv.2020.138764
3. The primers and probes in 2019-nCoV CDC EUA Kit are designed for the detection of the two SARS-CoV-2 genes that encode for the N1 and N2 proteins. The kit is manufactured and supplied by Integrated DNA Technologies and approved by the U.S. Centers for Disease Control and Prevention (CDC). Three controls, two positive controls for N proteins and one internal control for the RNA extraction process, are simultaneously run with the samples.
4. Cycle Threshold Value refers to the number of cycles required for the fluorescent signal to cross the detectable threshold in Reverse Transcriptase Polymerase Chain Reaction (RT-PCR); a lower cycle threshold value indicates a higher viral load.

Prestige EnviroMicrobiology, Inc. Tel: 856-767-8300 www.Prestige-em.com
242 Terrace Boulevard, Suite B-1, Voorhees, New Jersey 08043

Prestige Proj.#: 201216-01

Chain-of-Custody and Analysis Request Form

Company Name: Omega Environmental Services

Client Proj. #: 20-1177

Company Address: 280 Huyler St., S. Hackensack, NJ

PO#:

Date Sampled: 12/14 - 12/15/2020

Contact Name: David Ekstrand Phone: 201-522-9879 E-mail: davide@omega-env.com/lab@omega-env.com

Sample ID	Location or source	Sample type	Area (inch^2)	Analysis requests code or description	Turnaround time*	Notes or special instructions
Oak -	17	Water		**PCR for COVID19**	Same Day	
Cypress -	16	Water		**PCR for COVID19**	Same Day	
Laurel	M - 16	Water		**PCR for COVID19**	Same Day	
Laurel	E - 14	Water		**PCR for COVID19**	Same Day	
Greek Honors -	17	Water		**PCR for COVID19**	Same Day	
.	. .	Water .	.	**PCR for COVID19**	Same Day	. .
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		

*Indicate your request, either standard (3 business days), next day, same day or Saturday.

Samples Submitted by: (print) Val Rublikov Samples Submitted by: (sign) Date submitted: 12/15/2020

Received by: (sign & print) Ching-Yi Tsai Date & time received: 12/16/2020, 11:55am Delivered by: Fedex, UPS, USPO, in person

Prestige EnviroMicrobiology, Inc.

Analytical Test Report

Client: Omega Environmental Services, Inc., 280 Huyler Street, South Hackensack, NJ 07606

Client Project/Name: 20-1177

Sample date: 12-15-2020 & 12-16-2020

Submittal date: 12-16-2020

Sample received: 12-18-2020

Samples submitted by: David Ekstrand

Date analysis completed: December 18, 2020

Prestige Report number: 201218-01

RT-PCR 2019-nCoV: Analysis of Water samples for the detection of SARS-CoV-2 Genetic Markers

Prestige # Client sample ID Location	2019-nCoV (N1 Protein)	Cycle Threshold (Ct) Value[3] (N1 Protein)	2019-nCoV (N2 Protein)	Cycle Threshold Value[3] (N2 Protein)	Conc. (copies of RNA/mL)
201218-01-001 Redwood-15	ND	ND	ND	ND	NA

Report approved: Theresa Lehman
Theresa Lehman, MPH, Lab Director

Technical Manager:
Chin S Yang, Ph.D.

Analyst: Ching-Yi Tsai, Ph.D.

1. The samples in this report were received in good, acceptable conditions. Results relate only to the items tested.
2. Wastewater samples are processed following the protocol described in the article: Ahmed, W., et al. 2020. First confirmed detection of SARS-CoV-2 in untreated wastewater in Australia: A proof of concept for the wastewater surveillance of COVID-19 in the community. Science of the Total Environment 728. https://doi.org/10.1016/j.scitotenv.2020.138764
3. The primers and probes in 2019-nCoV CDC EUA Kit are designed for the detection of the two SARS-CoV-2 genes that encode for the N1 and N2 proteins. The kit is manufactured and supplied by Integrated DNA Technologies and approved by the U.S. Centers for Disease Control and Prevention (CDC). Three controls, two positive controls for N proteins and one internal control for the RNA extraction process, are simultaneously run with the samples.
4. Cycle Threshold Value refers to the number of cycles required for the fluorescent signal to cross the detectable threshold in Reverse Transcriptase Polymerase Chain Reaction (RT-PCR); a lower cycle threshold value indicates a higher viral load.
5. ND = not detected, no genetic marker is detected within 40 PCR cycles. NA = not applicable. The detection limit is 10 copies/reaction.

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242 Terrace Boulevard, Suite B-1, Voorhees, New Jersey 08043

Prestige Proj.#: 201218-01

Chain-of-Custody and Analysis Request Form

Company Name: Omega Environmental Services

Company Address: 280 Huyler St., S. Hackensack, NJ

Client Proj. #: 20-1177

PO#:

Date Sampled: 12/15 - 12/16/2020

Contact Name: David Ekstrand Phone: 201-522-9879 E-mail: davide@omega-env.com/lab@omega-env.com

Sample ID	Location or source	Sample type	Area (inch^2)	Analysis requests code or description	Turnaround time*	Notes or special instructions
Redwood - 15		Water		**PCR for COVID19**	Same Day	
		Water		**PCR for COVID19**	Same Day	
		Water		**PCR for COVID19**	Same Day	
		Water		**PCR for COVID19**	Same Day	
		Water		**PCR for COVID19**	Same Day	
.	.	. Water	.	**PCR for COVID19**	Same Day	. .
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		
		Water		**PCR for COVID19**		

*Indicate your request, either standard (3 business days), next day, same day or Saturday.

Samples Submitted by: (print) Val Rublikov Samples Submitted by: (sign) Date submitted: 12/16/2020

Received by: (sign & print) Jiajing Julie Yang Date & time received: 12/8/20 11:20A Delivered by: (Fedex), UPS, USPO, in person