



Dynamic Water Technologies

MARINA HEIGHTS
TEMPE, AZ
3-6-19

GEORGE CHAC



NATURALLY TREATING WATER

SCOPE OF REPORT

- The purpose of this report is to show the efficacy of Dynamic Water's UET reactor as an alternative water treatment to traditional chemical treatment at Marina Heights, Tempe AZ.
- The study will quantify efficacy using the following:
 - Biocontamination level
 - Water usage and savings
 - Corrosion rate
 - Approach temperatures

Marina Heights

- Cooling System: (2) BAC S3E-1020-07P 530 ton CTs
- UET System: (1) 4x4 UET Reactor Systems
- DWT Start Date: August 31st, 2017



Power Supply Upgrade

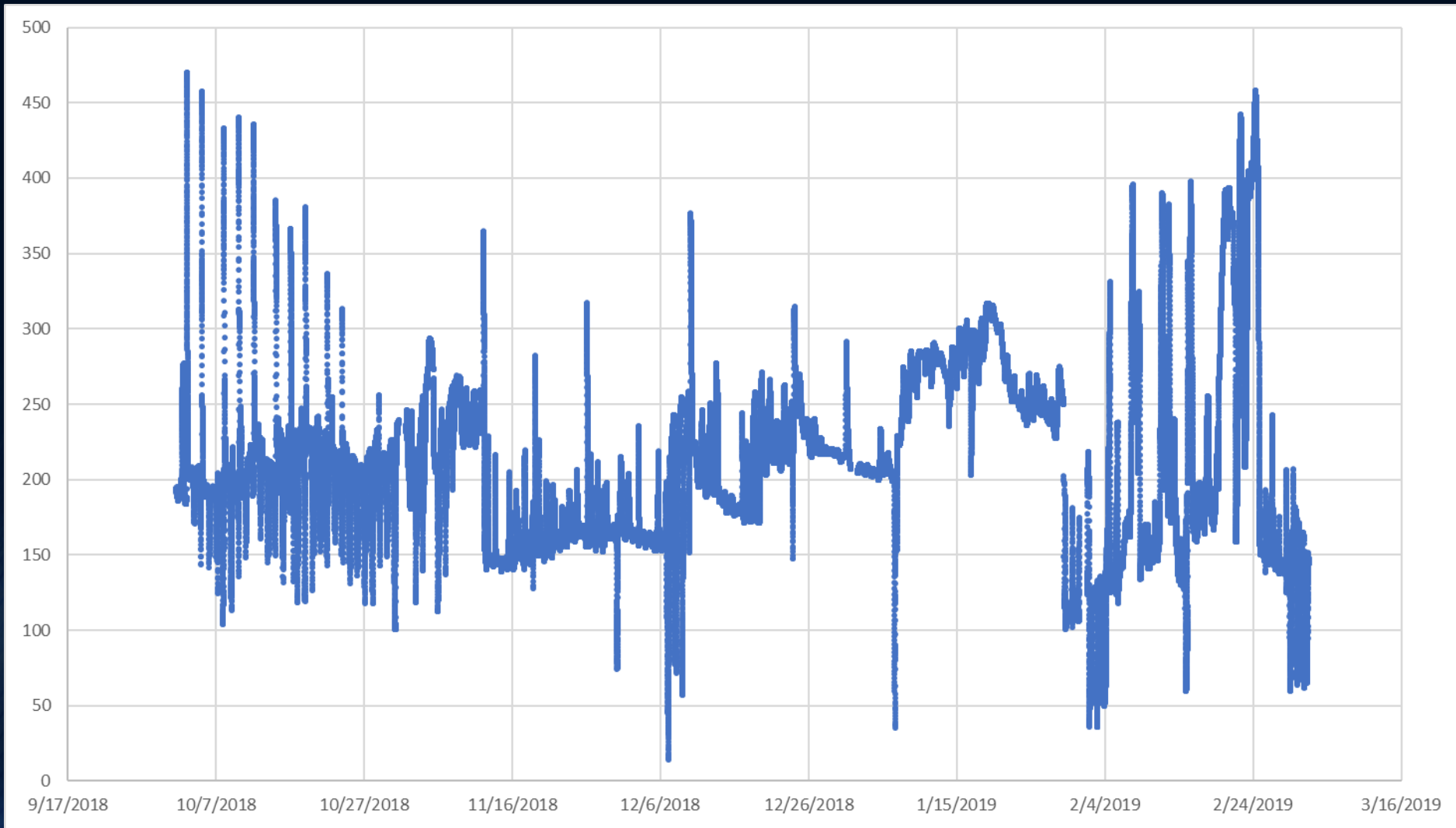
- On the first week of January, DWT upgraded the power supplies on the 4x4 Reactor Skid. This has allowed us to do the following:
 - Increase energy supplied for water treatment as needed
 - Create redundancies in case a power supply should malfunction
 - Run the power supplies at less capacity to avoid malfunction
- Increasing energy can have the following effects
 - Push water LSI lower, to form less scale and make the water more mineral deprived
 - Generate more residual chlorine

Bio-Contamination Level

Date	Reading
5/7/18	1,000 - 10,000 CFU/mL
6/12/18	100 - 1,000 CFU/mL (brine installed)
7/18/18	10 - 100 CFU/mL (NaOCl installed, 3x/week)
7/26/18	100 - 1,000 CFU/mL
8/6/18	0 - 10 CFU/mL (NaOCl reduced to 1x/week)
8/21/18 (Transwestern Datapoint)	100 – 1,000 CFU/mL
9/18/18	0 – 10 CFU/mL
10/2/18	100 – 1,000 CFU/mL
10/24/18	1,000 – 10,000 CFU/mL
12/6/18 (Transwestern Datapoint)	1,000 – 10,000 CFU/mL
12/13/18	1,000 – 10,000 CFU/mL
1/3/19 (Transwestern Datapoint)	100 – 1,000 CFU/mL (NaOCl dosing disabled)
1/31/19	1,000 – 10,000 CFU/mL
2/28/19	0 – 10 CFU/mL

- CTI/ASHRAE requires bio-contamination levels to be <10,000 CFU/mL

Oxidation Reduction vs. Time

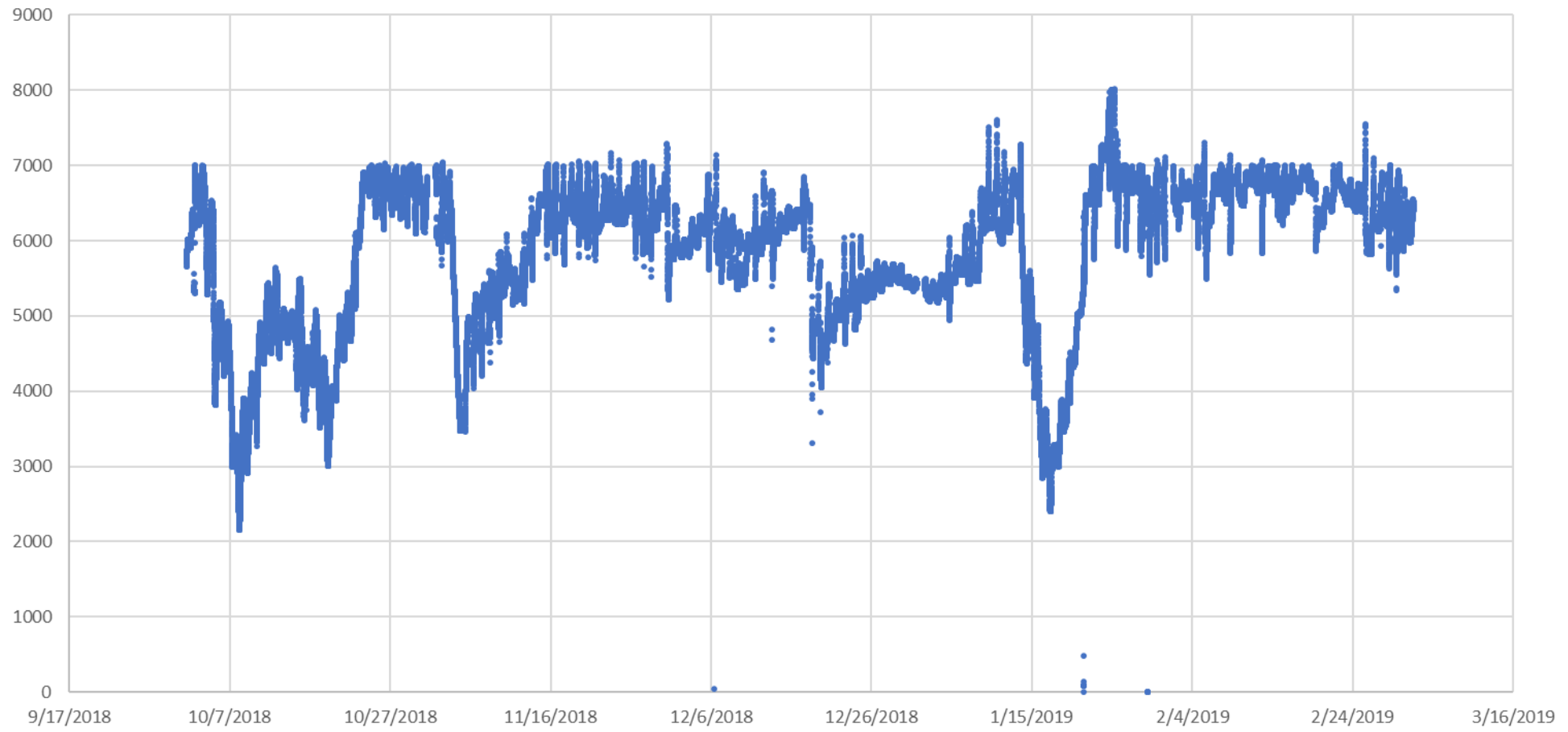


Water Savings

Original Proposal Estimate	
Previous Annual Water Usage (2017):	5,241,000 gallons
Projected Annual Water Usage with DWT:	3,819,000 gallons
Projected Annual Water Savings:	1,422,000 (27% makeup, 81% blowdown)
Annual Savings from Water:	\$8,532 (at \$6.00/1000 gallons)
Annual Chemical Savings:	\$20,000

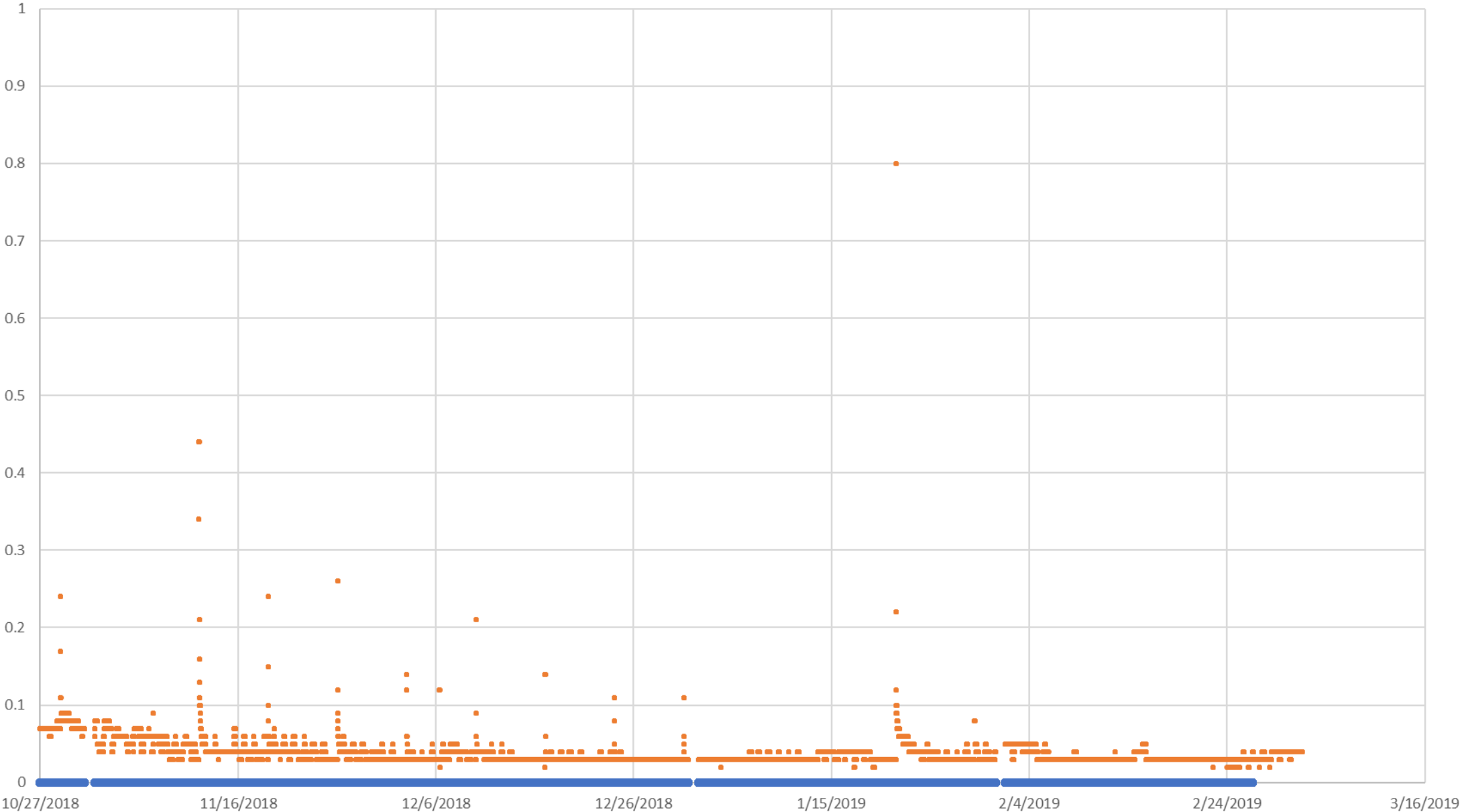
One Year of Operation	Data Collected from 4/4/18 to 3/6/19 extrapolated
Annual Water Usage:	3,762,956 gallons (estimated)
Projected Usage with Pre-DWT Operation:	5,020,838 gallons (estimated)
Savings:	1,257,882 gallons (25.1% makeup, 75.2% blowdown)
Annual Savings from Water:	\$7,547 (at \$6.00/1000 gallons)
Annual Chemical Savings:	\$20,000

Conductivity Over Time



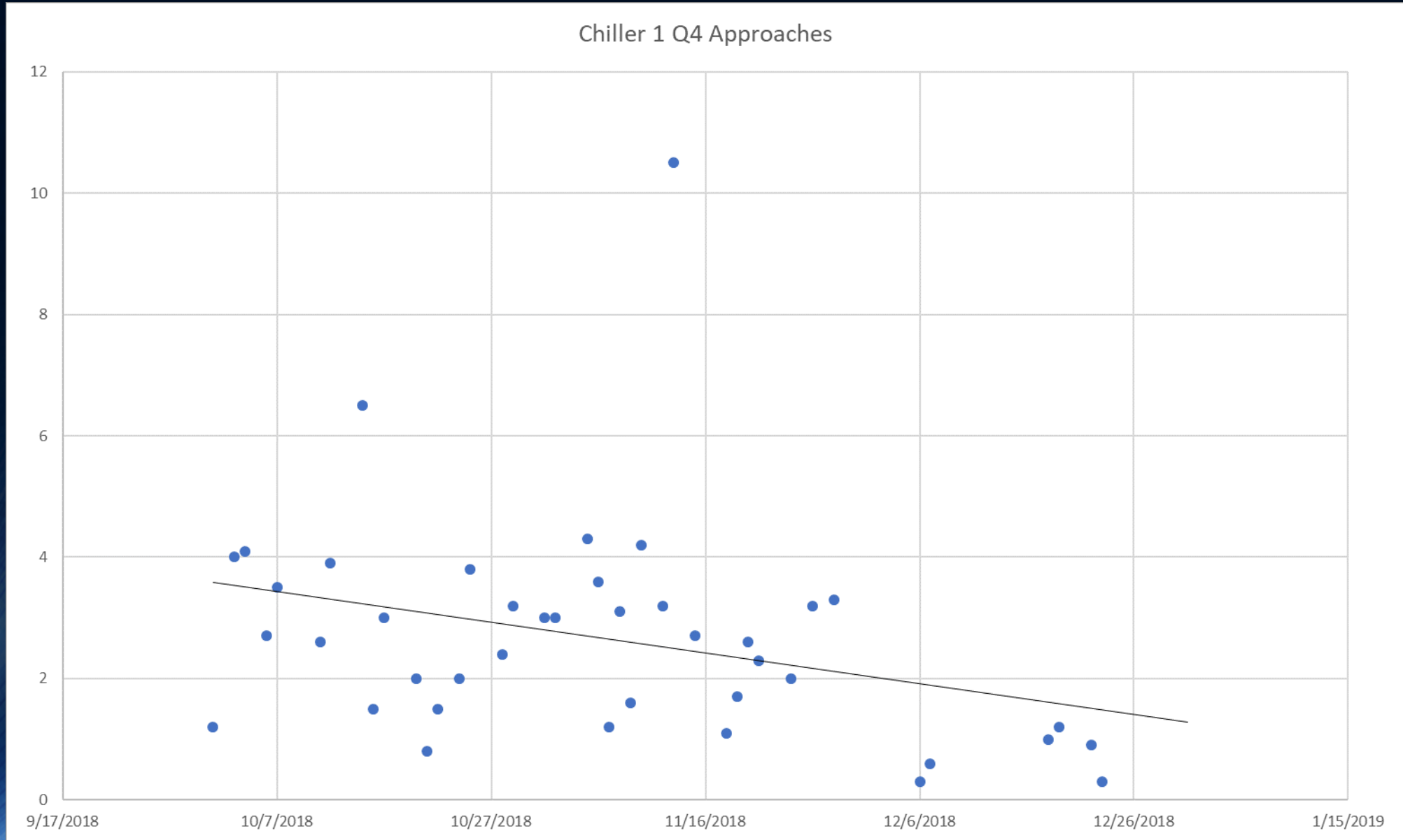
Corrator rates Mils/year vs. Date

• Copper • Mild Steel

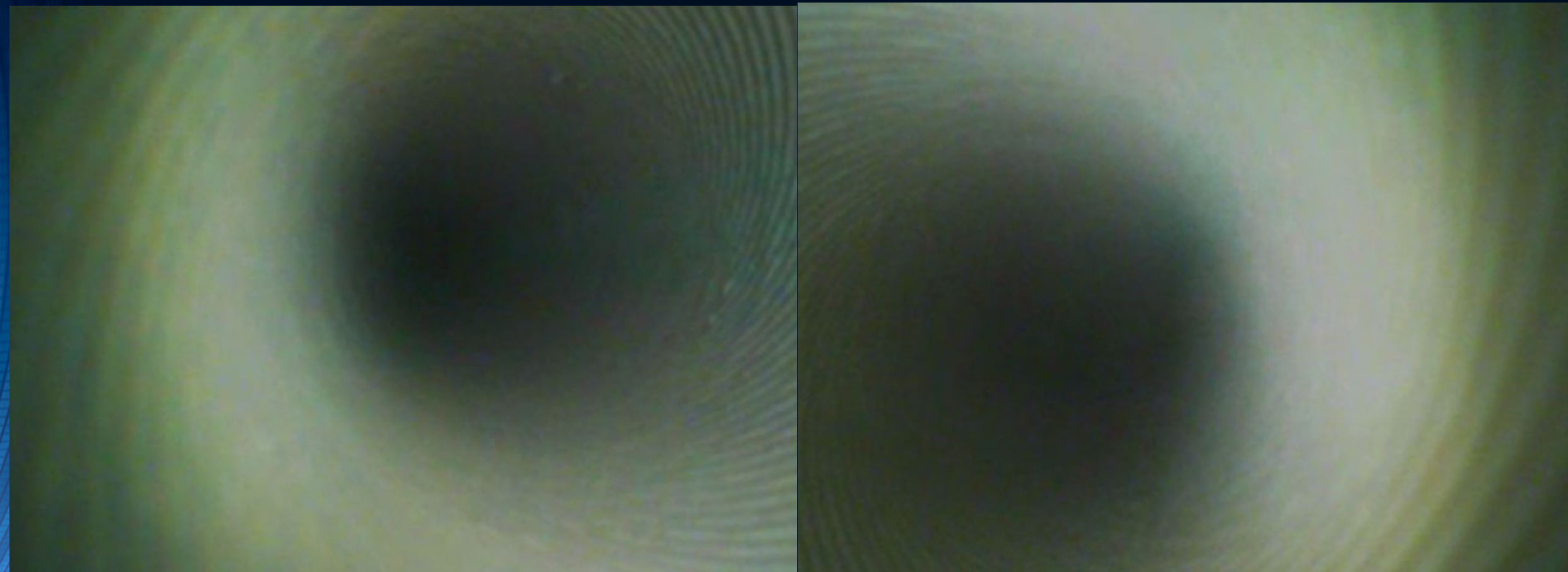


Approach Temperatures

Chillers were cleaned early June

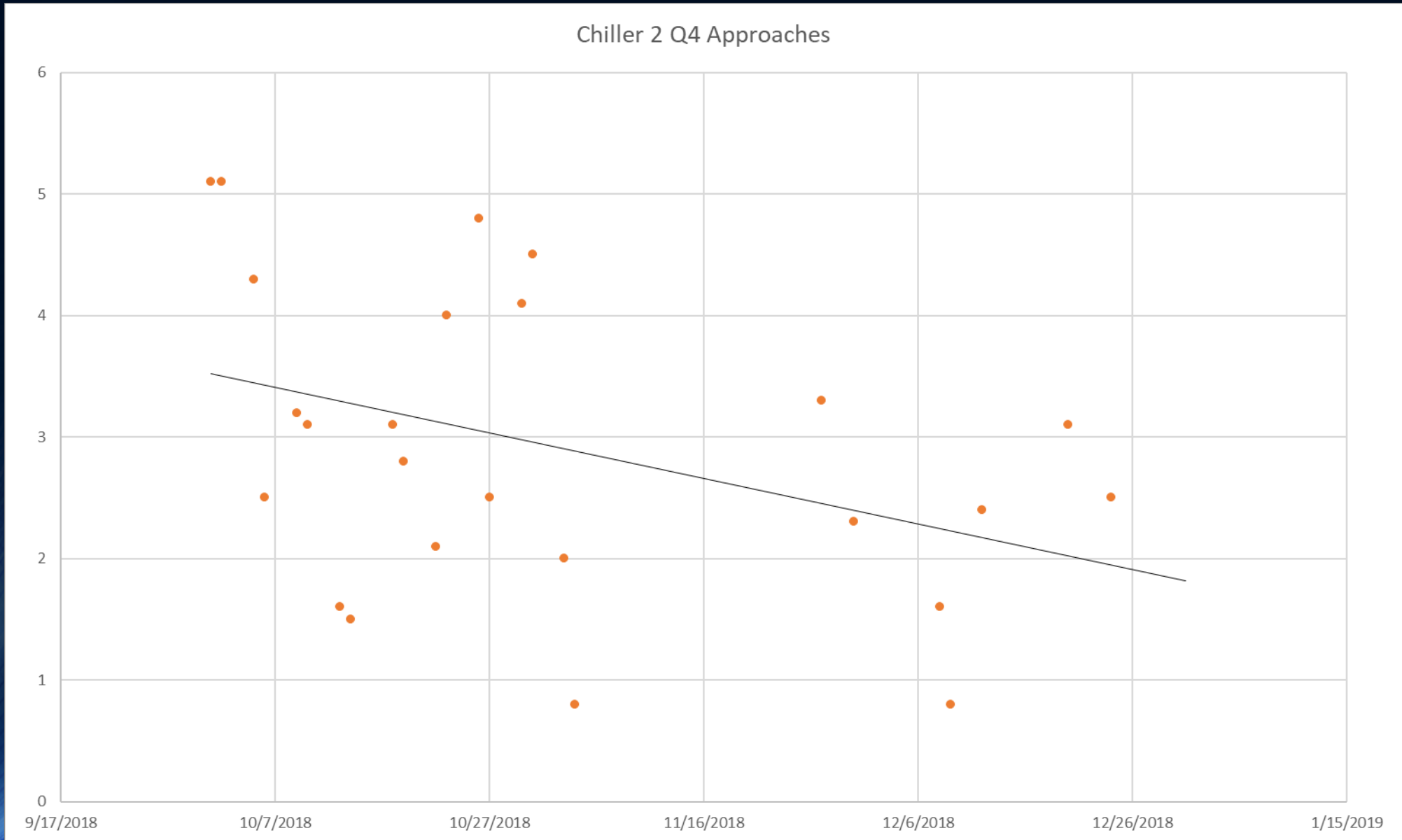


Chiller 1 Borescope Images – February 2019



Approach Temperatures

Chillers were cleaned early June

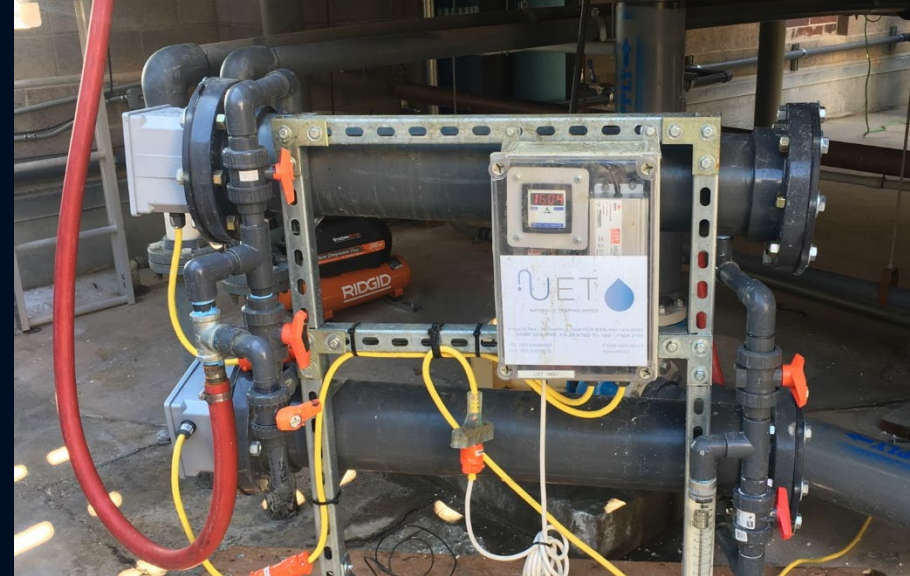


Chiller 2 Borescope Images – February 2019



DWT Halo-Gen Chlorine Generator Prototype

- New DWT Technology that produces chlorine using UET science and application
- Can treat up to 5GPM per tube, generating excess of 8.0 ppm measurable free chlorine.
- 3 skids can treat a volume of 10,000 gallons for a residual of 0.5 ppm chlorine at all times
- Standalone, separate technology. Does not require UET water treatment reactors.



The logo for Dynamic Water Technologies, LLC features a stylized water drop or wave shape on the left, composed of two overlapping curved segments in shades of blue and gold. To the right of this graphic, the words "DYNAMIC WATER" are stacked in a large, bold, blue sans-serif font, with "TECHNOLOGIES, LLC" in a smaller, blue sans-serif font below them.

**DYNAMIC
WATER**
TECHNOLOGIES, LLC

The logo for Nuet features the word "NUET" in a light blue, sans-serif font. The letter "N" is stylized with a curved top and a small blue drop at the end of its vertical stem. The letters "U", "E", and "T" are in a simple, clean font. Below the word "NUET" is a thin horizontal line.

NUET

NATURALLY TREATING WATER

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