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COMMITMENT & INTEGRITY DRIVE RESULTS

HULL WATER POLLUTION CONTROL FACILITY

May

2019

MONTHLY OPERATING REPORT



NPDES NO. MA0101231

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Cover pictures: [top] Force Main break repair at PS4 – Aqualine Utility
[bottom] NWM vacor truck cleaning Wetwell at PS4

1 EXECUTIVE SUMMARY

This Monthly Operating Report provides a summary of the pertinent information and activities that occurred at Hull WPCF during the month of May 2019.

- No lost-time incidents for the month of May.
- There were 142 effluent samples taken in the month of May. Please see page (8) for details.
- There were no effluent permit violations.
- Plant average flows were lower in May, in comparison to previous 2 months. Overall rainfall lower and less than half of April's total. The average daily flow for the month was 1.42 MGD. A total of 3.65 inches of rainfall was recorded for the month.
- As noted last month, plant and collection system odors were still fairly low for this time of year, however, collection system H₂S levels on the rise by mid to end of May. Plans were made to obtain Bioxide product so that the system could be restarted by the end of May.
- Asset Management Accounts checkbook for tracking of expenses is on-going weekly for year #4. A summary of the latest year-to-date totals for [04M], is attached and all costs are nearly accounted for in for year #4. A review of the account status between W&C and Hull Sewer Dept. is an on-going process. The new checkbook totals for year #5 – 05M is attached.
- There was 1 grinder pump call out during the month of May that the staff responded to and corrected.
- In May, all punch list items were completed related to the AST fuel storage tank project, and the system piping was repainted where needed by contractor. Record Drawings were created for the AST Project.
- On May 15th W&C worked with National Water Main and was able to inspect approximately 700 feet of force main piping from Pump Station #4, and the remaining gravity sewer line closest to the wet well.
- A sanitary system overflow [SSO] occurred later that same day, at Pump Station #4 in the early evening. A resident called in to report seeing water in the street. W&C response to the area was very quick, and it was determined to be a sewage leak. The later findings confirmed a broken/corroded force main pipe, right at the exit of the pump station building. This incident was not a result of the work completed earlier in the day. Additional details and photos of the emergency repair work that took place are located in the maintenance section of this report.
- W&C O&M staff assisted where requested, for review of the "Critical Equipment" specifications for the SRF funded account.

Woodard & Curran strives to deliver a high-quality operations service and is responsive to our customers concerns. Please feel free to request any modifications to the format or content of this report.

2 FLOWS AND LOADINGS

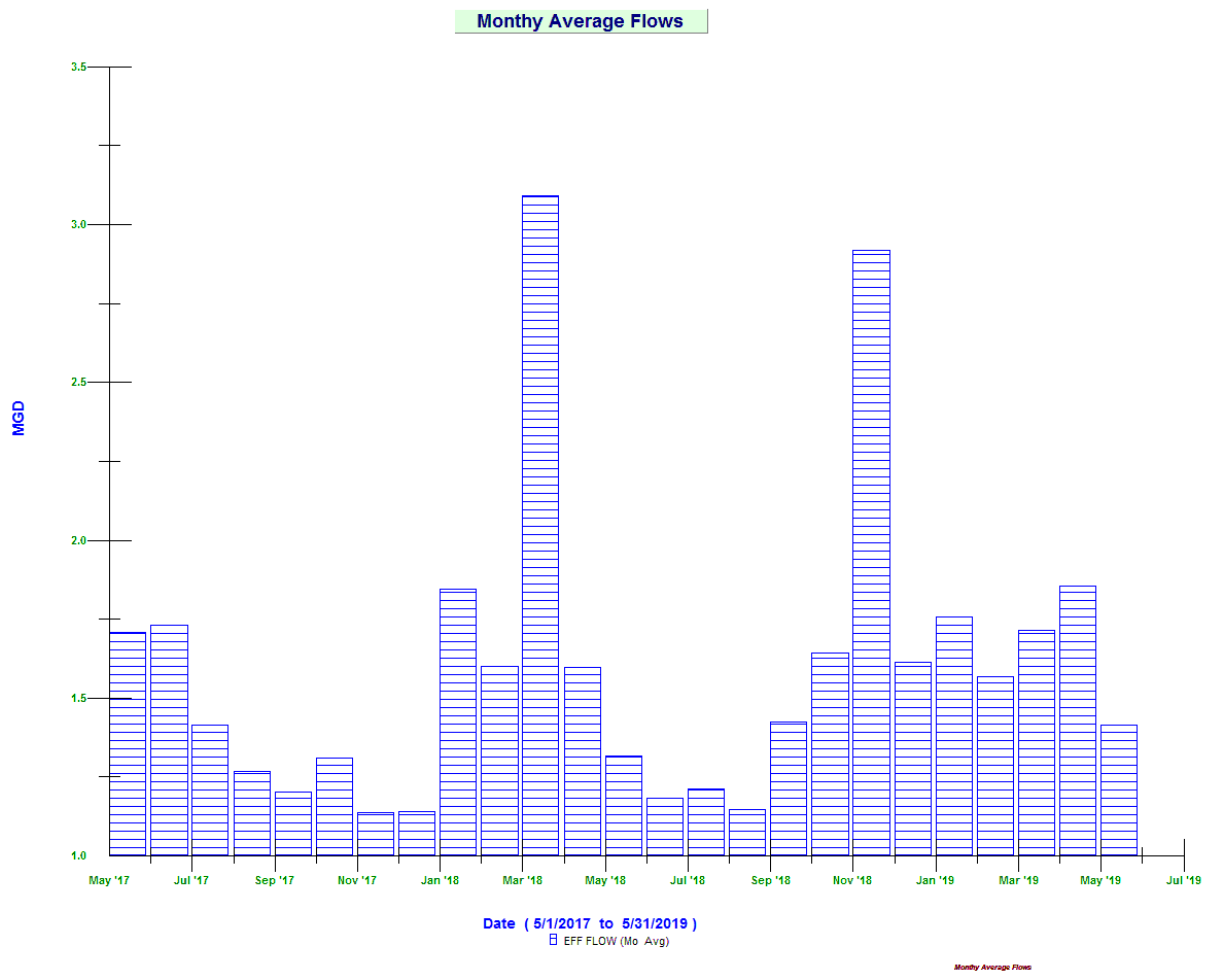


Average Daily Flows and Loadings for the Month:

	Eff Flow MGD	Inf Flow MGD	Inf BOD LBS	Inf TSS LBS	Eff BOD LBS	EFF TSS LBS
May 2017	1.708	1.872*	1792	2614	56	223
May 2018	1.315	1.700 *	1476	2140	98	179
May 2019	1.415	1.733 *	2272	4134	44	100

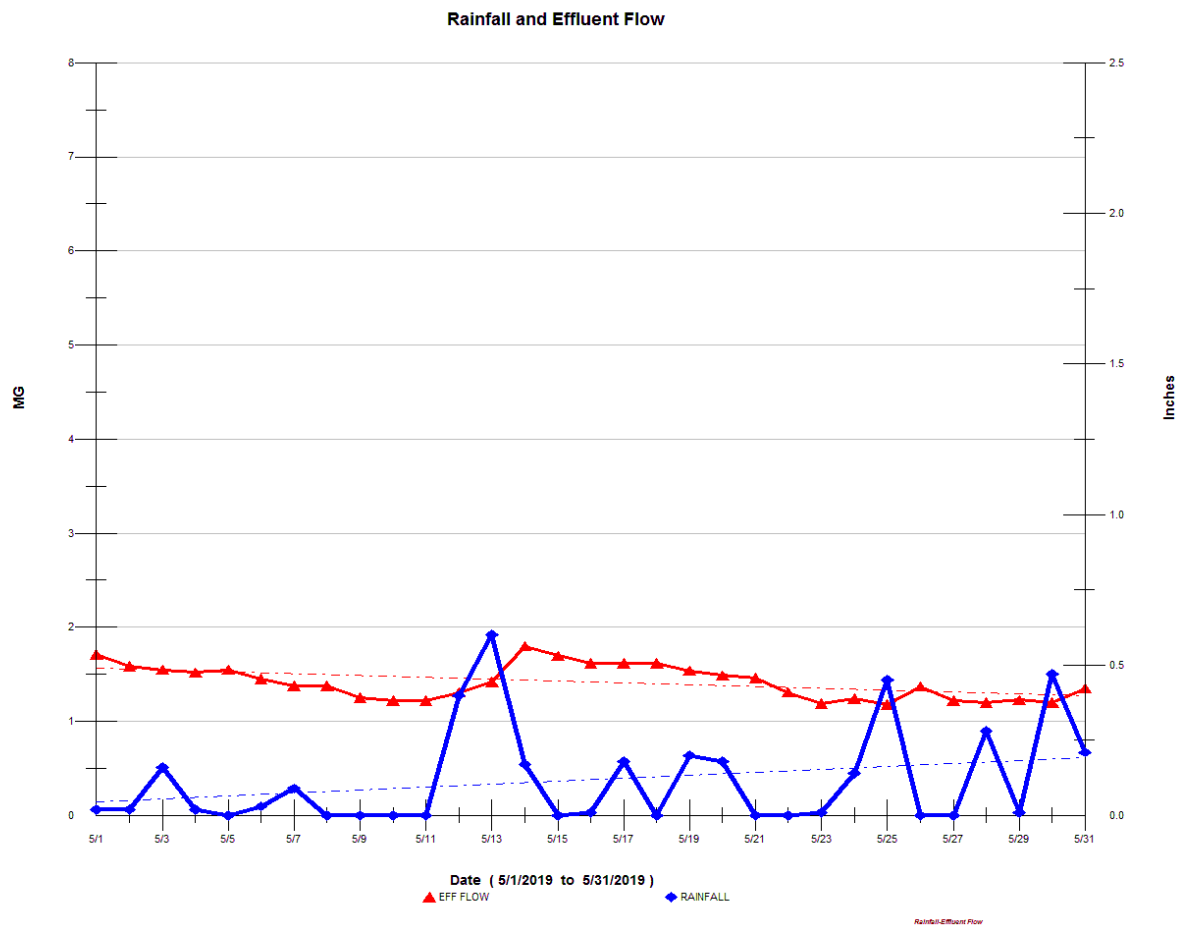
* Meter drift – influent flow meters are strap on doppler flow meters and the internal pipe condition prevents getting a strong signal. The staff adjusts accordingly and utilizes the area velocity meter in the aeration tank inlet channel as needed. All loadings are based on the effluent flow meter.

2.1 AVERAGE EFFLUENT MONTHLY FLOWS – TWO YEAR COMPARISON



Monthly average flow for May was 1.42 MGD, an amount lower than the recent spring months, and much lower than April 2019. There was one moderate rain event in mid-May, and 2/3 of the days in May saw some precipitation. The total precipitation for the month was 3.65 inches. The graph shows a 2-year summary of the monthly average flows.

2.2 MONTHLY SUMMARY OF RAINFALL AND THE INFLUENCE ON EFFLUENT FLOWS



This graph shows the days where plant flows were higher due to rainfall [Blue Peaks]. This graph provides a good indication of the influence that rainfall had on the effluent flows. Inflow and Infiltration out in the collection system has been noted with the increased effluent flow values when it rains.

3 COMPLIANCE



➤ Plant Effluent

- There were no exceedances for the month of May.

Plant process conditions continue to be good & maintaining very well. The clarifier surface was good during the month. For most of the month, both secondary clarifiers were online, and efforts focused on taking both the primary clarifier and gravity thickener tanks off line to minimize odors. Sludge settleability remained good and no chlorination of the RAS was needed. The process solids inventory varied depending on plant flows and wasting schedule, but generally, in our target range. The aeration process mode remains in contact stabilization mode, and all sewage bypassing the primary clarifiers, with varying amounts of limited flow into aeration tank #1, depending on system inventory and flows. The current split is approximately 10-15% to aeration tank #1, with all RAS flow going to aeration tank #1, and approximately 85-90% of flow going into aeration tank #3. This mode allows for lower solids loading to the secondary clarifiers, while maintaining a system inventory that is higher.

- A Copy of the NPDES report for May 2019 was submitted to the DEP and then forwarded to the Hull Sewer Dept.
- Continued working with corporate team [Frank C & Alan F] for Scada to Hach Wims data management computer data export.
- The Drylet Trial continued, and improved secondary effluent quality is very evident, especially during higher flow days. A decision was made to continue with the use of Drylet product and focus on process improvements and probable sludge reduction. The costs for use of the product is one that W&C has assumed, and the hope is that the product costs will be offset by the lower sludge generation and lower sludge disposal. The daily dose of Drylet product was put back to the original "2 scoops" dose, when the primary tanks were bypassed.

- To date, the facility's biological system continues to operate very well with the supplemental bacteria that is being added daily, and secondary clarifier performance is very good.

Photos below show the typical May conditions with the plant in contact stab mode process flow mode, with some feed to aeration tank #1 also. Good settling characteristics in secondary sludge and low turbidity in clarified effluent. Moderate brown system color, and no odors.



- There was one SSO reported on 5/15/19 for the PS#4 force main break. The incident response and details were summarized in the SSO form and submitted to all required agencies. Refer to the maintenance section.
- SPCC: Regular inspections of the temporary AST, new AST and fuel day tank, as well as container storage of waste oil. Updated file.

4 KEY PERFORMANCE INDICATORS



4.1 WATER QUALITY – MAY 2019

Parameter Info		Permit Requirements					Results				
Parameter	Units	Daily Max	Daily Min	Weekly Avg. Max	Monthly Avg. Max	Freq	Period Avg.	Period Min	Period Max	# of Samples	# of Violations
Eff TSS	MG/L	50		45	30	1 X Week	8.0	4.0	11.0	4	0
Eff TSS	LBS			1152	768	1 X Week	100.0	46.0	133.9		0
% TSS Rem	%		85			1 X Month	97.7				0
Eff BOD	MG/L	50		45	30	1 X Week	3.6	3.0	4.2	4	0
Eff BOD	LBS			1152	768	1 X Week	43.9	34.5	63.1		0
% BOD Rem	%		85			1 X Month	98.2				0
Eff Chlorine	MG/L	1.0			0.7	3 X Day	0.18	0.02	0.57	93	0
Eff Fecal	#/100 ML	260			88	1 X Week	10	10	10	5	0
Eff pH	SU	8.5	6.5			1X Daily	6.9	6.7	7.3	31	0
Enterococci	#/100 ML	276			35	1 X Week	12	10	20	5	0

- There were 142 effluent samples taken in the month of May with zero [0] NPDES Permit exceedances.

Gallons Treated vs Sludge Disposed

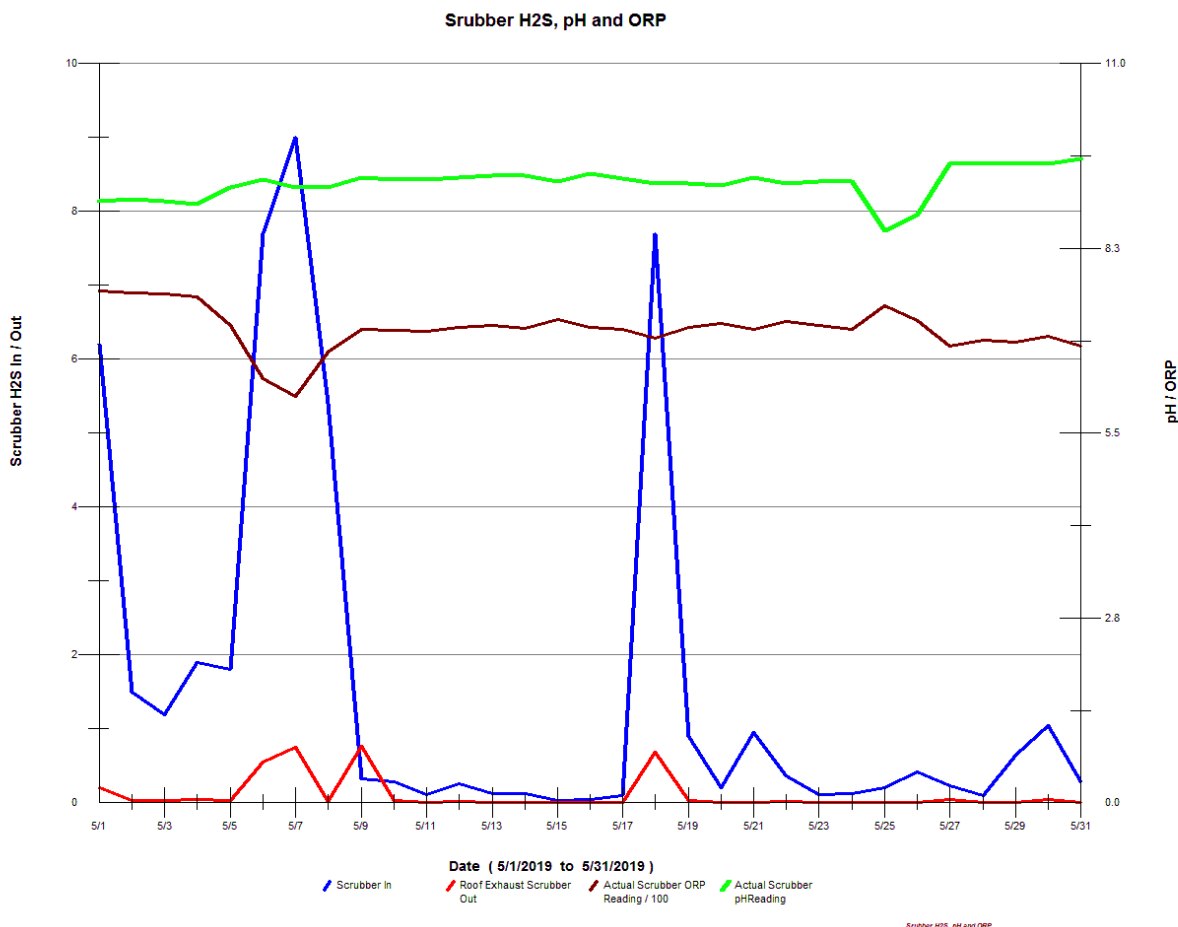
Month	Effluent Treated, MG	Sludge Disposed, Gals
May 2017	52.96	153,000
May 2018	40.77	132,000
May 2019	43.89	90,000

5 ODOR CONTROL

There were no odor complaints reported in May 2019.

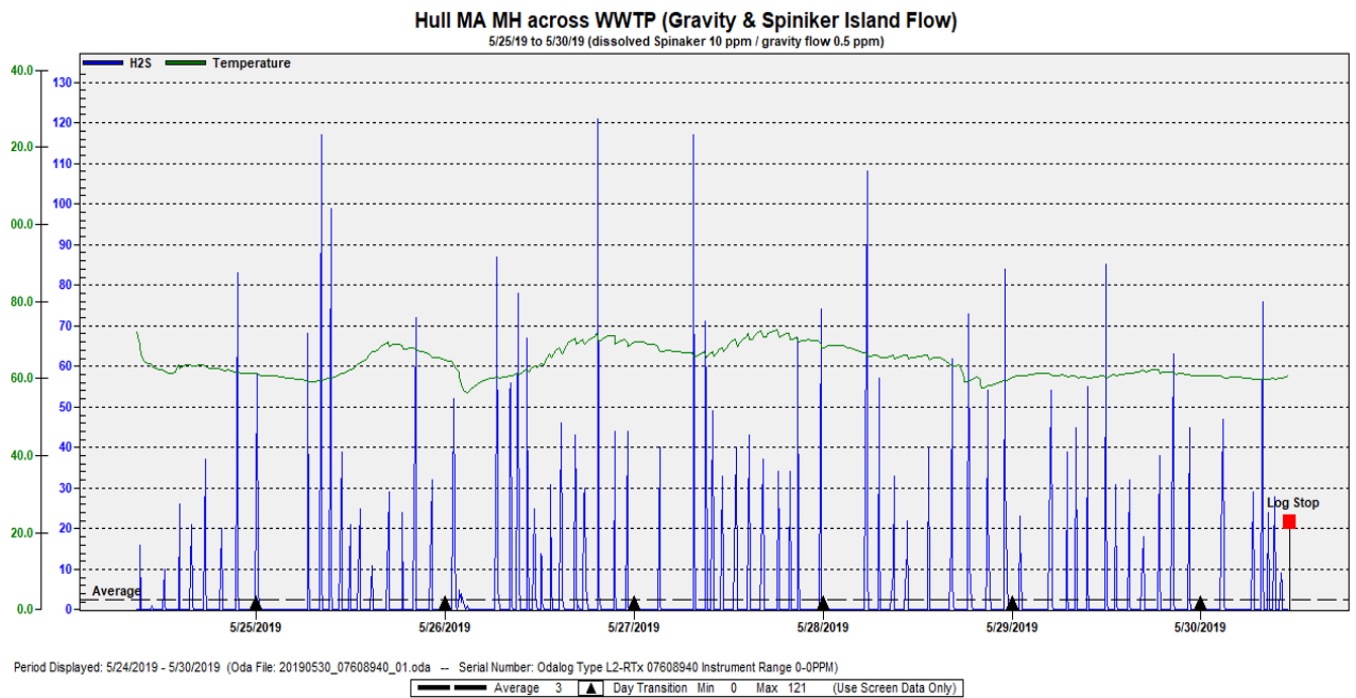
The gravity thickener and primary clarifier were on for approximately half of the month, and the process was transitioned away from these units. These tanks are the source of a lot of the odors within the facility and were completely offline before the Memorial Day weekend. The above ground sludge storage tank was put back into service when the sludge thickening processes were resumed in May. Continued flushing of the aeration tank troughs to minimize build-up of odors.

The odor scrubber system was on-line for entire the month. The scrubber fan speed was at a mid-range due to lower levels of hydrogen sulfide production, however, the H₂S levels were on the rise as the month progressed along. The facility realizes electrical savings, when the fan operates at a lower speed.

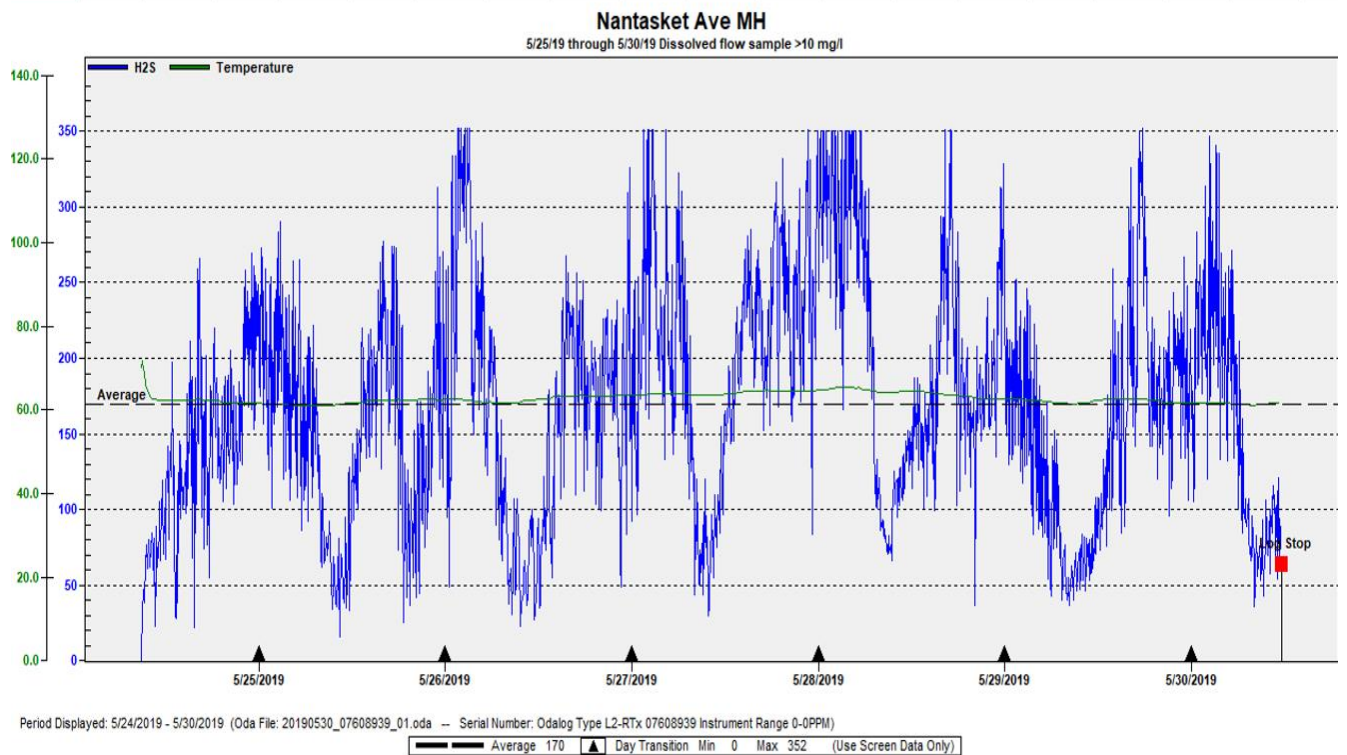


Graph shows some small peaks for H₂S to the scrubber, but these are all below 1.0 ppm. These [blue] peaks are primarily due to the H₂S generated in the primary sludge or gravity thickened sludge when sludge is pumped to the bulk sludge truck, and then the lines are drained to the headworks to prevent freezing until the next truck is scheduled to return and pump sludge. The portable H₂S meter was functional for most of the month, as a loaner unit was in use.

- “In-Pipe” bacteria addition continued with all 24 dosing stations operational. No additional actions taken for headworks sulfide reduction plan proposed by “In-Pipe. The inspection/replacement with full bottles took place on 5/8/19. Additional kick-start vegetable protein and bacteria were added to all locations during the monthly service visits. The program will follow this plan monthly over the summer months to evaluate overall effectiveness and odor reduction. All work being tracked on the Utility Cloud [UC].
- Continued the bi-weekly change outs of the bacteria bottles at three lift stations Microbe Dosing Stations (MDU’s) with installation just in front of the three largest pump stations [in the wet wells or manhole just prior to the station. [PS 3, PS 5, PS 9] The re-load plan is delivering an additional 5.4 liters per month in total (1.8 liters x 3 locations). The goal is to see if we get a step change and reduce odors, while at the same time potentially reducing sludge. This change is being monitored closely over the summer months, for pump stations and at the plant.
- On-going – frequent pumping of the secondary scum wells. Tank cleaning performed quickly and as needed. For the warmer weather months, this timing of this activity to be scheduled during the week only, to avoid unforeseen odor issues on the weekends.
- Neighborhood odor warning letter distributed on 5/28, in advance of the secondary clarifier tank cleaning.
- Mixing systems/aerators all functional at the pump stations, except for pump station #3. New Medora Gridbee mixing system for PS 3 not installed yet. Mixer/Aerators at PS 4 & PS 6 are on timed control through SCADA. The plan is to add additional station mixers to timed control in the coming months.
- The bioxide system was turned on May 30, 2019. [feed rate at 137 gpd]. 3800 gallons of product was delivered the previous week, and all systems checked out and ready. Odor data loggers were installed in two manholes to log H2S results. The results below show data from 5/25 to 5/30 before any bioxide introduced to the collection system. H2S levels were high with a number of peaks over 100 ppm, indicating that chemical addition should be started.



Manhole at Nantasket Ave and Water Street [end of force main from PS 3 & PS 4]



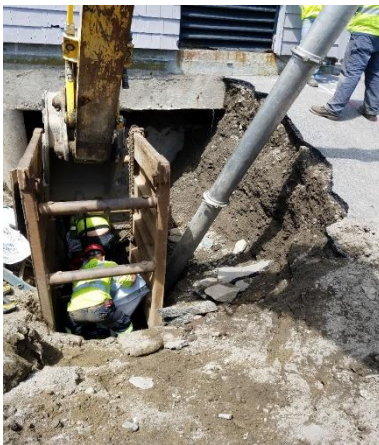
6 MAINTENANCE SUMMARY

6.1 TASKS COMPLETED THIS MONTH

The SEMS monthly work order summary for May is compiled and attached as a pdf file for review.

Key items of note are listed below.

- 1) In-Pipe units – battery change out and circuit board troubleshooting and replacement as needed.
 - On-going E-1 Repairs: Replaced Grinder pump at 37 Elm Ave [5/10/19]
- 2) On-going issue – the need to add oil to sec clarifier gear boxes and the GT gear boxes. All of the units have leaks [lower gear box seals are no good]. We are using a flowable grease product that is heavier to lessen the amount of leakage. The estimated use of product was 2.5 gallons per week, until two of the units were taken off line [SC #2 and GT #1].
- 3) Weekly exercise without loads and Monthly load tests completed on all generators including the portable generator and pump stations.
- 4) Responded to SSO at PS#4 on 5/15. The force main pipe broke due to pipe corrosion and settlement, resulting in the sewage release. Emergency clean-up done by JHoadley vector truck, and excavation and pipe repairs done by Aqualine Utility. Due to the unstable soil conditions use of the trench box and additional shoring necessary and hydro-excavation by JHoadley vector truck. Bypass pumping was done with 2 pumper trucks from Rosano-Davis, and project oversight and assistance by W&C and HSD. The break was noticed and reported at approximately 6:40pm on 5/15. A response was immediately initiated, and the pump station was shut down. Co-ordination calls made for repairs and response plan in place by approximately 9:30pm. All of the crews and equipment worked through the evening into the next day when the repairs were completed by 2pm on 5/16.



Hydro-excavation and repair



new pipe [left]; old pipe [right]



SSO response/clean up

- 5) Various yard/groundskeeping tasks performed to clean up plant site from winter season – tree branches, brush, other & be presentable for Memorial Day weekend. Maintenance on yard equipment – mowers, trimmer, etc. Fence on cemetery side of facility repaired, with additional upright support bracing done.



- 6) On-going repairs to the Rotary sludge thickening [RST] unit – drive chain & alignment and various drum wheels replaced. Polymer blending system optimization on-going, with new injection point changed to the suction side of the feed pump, yielding improved performance. Met with vendor to discuss future polymer blending system replacement.



New polymer injection port



New Drive chain



Drive system adj screw

- 7) Inspection of Emergency lighting units in Ops building – battery replacements needed in some of the units, while fixture replacements completed where needed.
- 8) Responded to early AM 5/21 alarm at PS1, as a result of power surge on 5/20 [evening]. Transfer switch out of sequence and no 3-phase power to run the pumps. Alarm notifications made – high wet well level and “no pump activity” alarm.

- 9) Responded to clogged pump condition at PS5 on 5/29. A large mat of rags that was hanging off of the level transducer and wet well ladder rungs fell off into the bottom of the wet well. Both suction pipe inlets to the pumps were clogged. A station bypass pump was set up, while unclogging of the pump suction lines was done, using a backflush from the force main. The pumps are very corroded and separation of components is not an option. Vactor truck assisted.



- 10) Visits to D Street stormwater station as needed to ready/prime portable trash pump for back-up use. Both of the 4-inch submersible pumps were operational.
- 11) A significant number of Dig-Safe mark outs completed, due to emergencies, upcoming paving projects, water main replacement work. Responded to all calls regarding rattling manhole covers, broken manhole covers/rims, sunken manholes covers/rims. All work that W&C completed is documented in the monthly Work Order Report and utility cloud.

6.2 ON GOING PROJECT UPDATES



- Drylet bacterial process enhancement trial continued in May. Going forward the process plan is to continue use of the product as long as benefits seen. Therefore, the project approach will not be referred to a “trial” going forward. The effectiveness and costs will be reviewed annually. [See effluent/compliance section].
- An alternative use for one of the existing primary clarifiers, especially the #1 PC, is still being considered, since the drive unit had sustained extensive damage. Conversion to a mixed tank and floating aerator are being considered. This would allow for hydraulic flow into the tank, keep it mixed and fresh, and not restrict flow at the D-box, which is currently a concern, as having the primary tanks off-line in the warmer months eliminates many of the odors around the facility. To date a couple of budgetary quotes have been received.
- Pump Station #1 – The new pumps are currently operating normally. Output flows from each pump are being investigated to determine how higher capacities could be reached. Pressure tests and drawdowns / flow testing was completed in January and found slightly higher pressures are contributing to lower outputs than the original design points. The pump assemblies were checked in March and found to be clear of any debris. In review of prior reports and investigations it was determined that the pump capacities were always lower than the designed points, going back to the 1980's. It was also found that the motors are not reaching their full load amps and have approximately 25% more available amps that handle an increase in flows if the impellers are upsized. Aram & Bill are working on summarizing the findings and evaluating larger impeller trim sizes to take advantage of the existing available motor power.
- The co-ordination with Duperon for a site visit to inspect the influent channel flex rake is still being pursued. They have not had an available technician scheduled for our area. They were booked through the winter months, and it is hoped that they will have a technician in the area some time during the summer months.

- Pump Station 9 [PS 9] – Currently operational, with both pumps have leaking mechanical seals. One of the pump assemblies was replaced with a used one for the short-term, while service is being done on the removed pump assembly. The spare pump assembly has been repaired. A new “special order” check valve has been ordered for the station. This check valve and one isolation valve will be replaced this summer. In addition, the rotating assemblies will be replaced as they become available. At PS #9, the structural and overall station condition assessment and corrective action is part of the larger structural project being discussed.
- A work plan was developed to complete PS #4 area CCTV and vector truck cleaning work before the paving project. The project work required plugging of the gravity sewer lines near the pump station, with pump & haul trucking on-going while work was being conducted. National Water Main Co. [NWM]and W&C conducted this work on 5/15/19. The pump and haul operations were necessary while the pump station was off-line. The project was a coordinated effort between NWM, HSD, W&C, septic pump trucking companies and the HPD.
- BMC Corp work set up for CCTV and vector cleaning in the following areas:
 - Bay St
 - Marginal Rd
 - Cadish Ave
 - Hampton Circle
 - Rockland Circle
 - Summit Ave

Please see the attached summary of the Asset Management accounts for contract year (4)

7 SAFETY



It is Woodard & Curran's policy to maintain a safe and healthy work environment for every employee and to comply with applicable occupational health and safety regulations.

- No lost-time incidents for the month of May.
- Plant Tour given to Hull Fire Department [HFD] members on 5/30, at request of the HFD to familiarize their staff on the facility and chemical storage areas, in the event that an incident response action was necessary.
- Safety Stand Down discussion on 5/15 – Hand injury and selecting proper PPE for hand protection
- Ongoing - Daily safety briefing meetings, review site safety policies with sub-contractors, safety tailgate topics.
- Pure Safety topic– May – “Insect & Arachnid Safety & Heat Illness Prevention”
- Monthly staff safety meeting conducted on 5/23/19
 - Cumulative trauma injuries – tool-box topic
 - Lessons Learned from April 2019 - Near misses and incidents from other company projects.
 - Traffic Control tool-box topic
 - Discuss W&C Traffic Control Policy & Work Zone Safety
 - Confined Space Annual refresher – Non-entry Rescue
- Annual Host & Crane inspections completed. No mechanical deficiencies found, except some I.D. tags will need to be replaced.

8 STAFF DEVELOPMENT

Training is an important part of any operation to ensure employee health and safety is assured, quality standards are maintained, staff skills are improved, career opportunities become available, and higher productivity is achieved.

Listed is a general outline of training that the staff received over the course of the month:

- W&C intern Ryan Holman accepted offer for full-time employment and expected to start in late June. He still remains in a part-time employment capacity working at the facility for one day every 2 weeks for various assignments.
- Monthly staff Safety training – completed – Pure Safety and monthly safety meeting.
- Operational updates and process control discussions, especially with recent electrical issues and plant shut-downs, pump station operations, odor issues, dig-safes, etc.
- W&C “near-miss” incidents at all projects for April discussed.
- Jim G continues to work with staff on various SEMS updates – work order management & scheduling.
- Various staff members continued/completed spring training seminars to prepare for wastewater certification exams and continuing education training hours for license renewal.
- RCM KickOff meeting – 5/21/19 - some introductory and training sessions by Marius Basson from Aladon and Tacoma Zak from Uberlytics. Several of the staff and support staff attended the 1-day introduction.

Staffing related items:

- Cody Piepenbrink remained on the “on-call” list for plant coverage and emergencies for the near term. Ryan Holman will fill the vacant position.
- Continued involvement with Mass Maritime [MM] internship program/career fair for future interns. Corporate human resources department leading the effort for future intern for summer months.
- A summer intern was selected from a pool of candidates that visited the facility in recent months. Andrew Zamanian, a junior at MM will be starting the summer internship in late June.
- Sunday rotation schedule in place with Jim Gagliard working every other Sunday, and remaining weekends being filled by Roger B., Aram V., and Bill B. When Bill is not scheduled for a Sunday, he will be on a Monday-Friday schedule.
- Supplementing staff needs with O&M tech support where needed. Jim G and Jody S providing coverage when staff levels are lower due to sickness, vacation, or training.

9 COLLECTION SYSTEM

9.1 WET WELL CLEANING

The actual schedule for wet well cleaning: May 2019 to April 2020:

(X-Cleaned) - (Orange – Inspected) - (Green – See notes) - (blank – no work done)

Frequency of cleaning	Pump Station							
	A	1	3	4	5	6	9	D
May, 2019				X	X			
June, 2019								
July, 2019								
Aug., 2019								
Sept. 2019								
Oct., 2019								
Nov, 2019								
Dec., 2019								
Jan., 2020								
Feb., 2020								
March 2020								
April 2020								

All pump stations except for Pump Station 3 and Station D have an aerator/mixer in the wet wells

9.2 COLLECTION SYSTEM MAINTENANCE

Woodard & Curran assisted/conducted camera work in the Hull collection system at the following areas during the month of May.

- Marginal Road & Bay Street
- Summit Ave
- Rockland House Rd.

Manholes:

- Staff responded to various rattling manhole covers, broken manhole covers/rims and sunken manholes covers/rims.
- Flagged & replaced a number of manhole covers where requested/notified. Assisted with inspection and identification of a number of manholes, where frame and cover replacements needed.

Dig Safe mark outs:

- Numerous Dig-Safe mark outs were completed throughout the Town of Hull in order to assist/facilitate the Town's paving project and the emergency repairs of the broken water lines, broken sewer laterals due to gas main work.

Collection system work is being documented and tracked in Utility Cloud and a summarized report for the month of May has been included as an attachment with the Monthly Operating Report.

10 PROJECT MANAGEMENT & ADMINISTRATION



10.1 ON-GOING PROJECTS AND SUPPORT ITEMS

- Asset management checkbook for tracking of expenses. Review of account status between W&C and Hull Sewer Dept. is on-going. [04M]. The report information is available to the Sewer Department and located in the shared file location. **The current snapshot of the account status as of 6/13/19 is included as an attached pdf file with this report.** Worked on developing 05M checkbook spreadsheet with proposed maintenance task plan for the year. The summaries are also included with this report.
- Provided pricing breakdown for the Year (5) invoicing details with a cover letter outlining the CPI-U increase and the new budget amounts.
- Utility Cloud was fully operational during the month of May with more and more work being tracked through the GIS / asset management / cloud-based program. Work is intended to grow each month as the staff works with Bill and Andy Crawford on specific workflow usage in Hull. **A copy of the UC printout for May is attached.**
- Continued to research options and quotes for D Street Stormwater station to remove the existing vertical turbine pump, keep the existing roof in place and existing electrical service, increasing pump capacity with a different style pump. Preliminary project approach and draft budget prepared for discussion. Waiting for sub-contractor approval to proceed ahead with the “old” pump removal.
- Tom Herer met with AV & BB onsite in early May to review the headworks bypass and screening options, while structural work and pipe relining work performed. Also discussed project concerns with JS and BK. A preliminary plan with needed items developed by Tom H. for review.
 - Bypass pumping:
 - Contractor to provide 4 MGD (minimum) of bypass pumping for duration of project
 - Pumps to be setup at manhole directly upstream of manhole (SMH-3)
 - Redundant bypass pump to be provided
 - Separate discharge piping to be provided from existing town owned Godwin pump
 - Existing town owned Godwin bypass pump to act as backup pump for flows in excess of 4 MGD

- *Pump setup to be maintained in current location (SMH-1)*
 - *Existing discharge piping to be maintained*
- *Total bypass pump capability would be approximately 8-9 MGD. Flows in excess of 9 MGD would require the influent gate for the headworks to be opened and flow to be routed through the headworks. This would result in the work areas in headworks being cleared out to facilitate flow through headworks. Advance forecast should be available to indicate flows at this range, this will provide adequate time for work areas to be cleared.*
- *Temporary screening:*
 - *Contractor to provide temporary manual bypass screening upstream of aeration tanks*
 - *Two modified tanks (30-yd dumpsters – 22ft long, 8 ft wide, 6 ft tall) with manual screens to be fabricated by contractor (Similar to Uxbridge setup, see attached photos)*
 - *Tanks to be placed in series, 1st tank to have approx. 1.25-inch bar spacing, 2nd tank to have approx. ¾-inch bar spacing*
 - *Flow to be pumped to tanks, gravity discharge to aeration tank influent channel*
 - *Cleaning, disposal, and monitoring of screen to be responsibility of contractor for duration of bypass*
 - *Overflow to be provided to adjacent aeration tank to prevent SSO*
- Continued to assist and provide information to T&B engineering for the HVAC system upgrade, discussed floor plan options, electrical chases, and duct work for the HVAC system.
- Continued to assist with the W&C engineers on task order projects: Sampling of existing coatings in headworks, critical spares – equipment specs, effluent pump room