

Q1 2020 Quarterly Progress Report Niagara Falls Water Board Order on Consent R9-20170906-129

Prepared for submission to:

New York State Department of Environmental Conservation Region 9
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Buffalo, New York 14203

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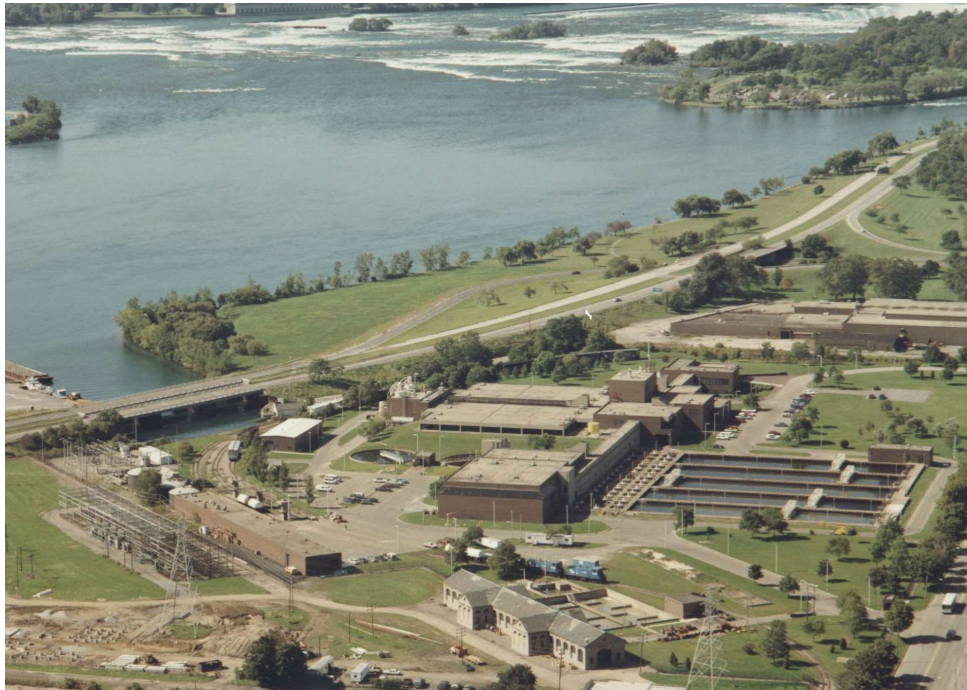
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April 30, 2020



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Executive Summary

This document is the ninth (9th) required quarterly progress report for the Niagara Falls Water Board (NFWB) Order on Consent R9-20170906-129 (Consent Order) as required by Schedule A Item 15 of the Consent Order. This progress report covers the period from January 1, 2020 through March 31, 2020. The next quarterly progress report covering the period April 1, 2020 through June 30, 2020 is due July 31, 2020.

During the past quarter, the NFWB has properly operated the wastewater treatment plant (WWTP) and has met all State Pollution Discharge Elimination System (SPDES) permit requirements. Solids processing (settling, thickening, dewatering) during this period has functioned as intended. Primary effluent is clean (minimal suspended solids) which has allowed the WWTP's activated carbon filters to efficiently process the plant's influent flow. This quarter the plant operated in winter mode, with wastewater temperatures generally in the 50°F to 53°F range. With the decreased temperature, sulfide levels exiting the carbon filters have been in the 3 to 5 mg/l range. Dewatering throughput during this period has kept up with incoming solids, compared to influent solids loadings. The WWTP was operated free of significant odors during the past quarter.

Maintenance activities during the reporting period have been ongoing, and as of the end of the quarter major treatment systems and components are functional. The WWTP is undertaking a number of capital upgrades and improvements that are within the capability of the WWTP's maintenance staff and/or contractors awarded service contracts. In addition to the projects being undertaken by the WWTP's staff and outside contractors, project planning, design, and construction of \$27 million in major capital upgrades are taking place. Engineering contracts are in place for eight (8) of the nine (9) capital projects (Projects 1, 2, 3, 4, 5, 6, 7 and 9) and one (1) of the capital projects has been completed by plant maintenance staff with assistance from an outside contractor under the mechanical services contract (Project 8). Construction of capital Projects Nos. 4 (GAC Changeout) and 6 (Effluent Disinfection) are underway as of Q1 2020.

The NFWB has met all scheduled requirements of the Consent Order as identified in Schedule A of the Consent Order. Specific submissions during the past quarter include:

- The eighth (8th) quarterly report for the fourth quarter of 2019 (Q4 2019) was submitted January 31, 2020 to the New York State Department of Environmental Conservation (NYSDEC) and posted on the NFWB's website (Consent Order Item 15).

The NFWB is committed to working cooperatively and openly with the NYSDEC to improve the Niagara Falls WWTP and operate it to the best of its capability. During the past quarter, several email and written communications took place regarding plant operations and consent order activities. One update meeting was held this past quarter with the NYSDEC on March 6, 2020.

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1. WWTP Performance

This section discusses the operation of the NFWB WWTP during the reporting period of January 1, 2020 through March 31, 2020. In the following sections, Treatment Plant Operations, Solids Removal Performance, and Treatment Plant Equipment Readiness are discussed.

1.1 Treatment Plant Operations

Mr. Robert Dunn serves as the Chief Operator of the wastewater treatment plant. Until such time as Mr. Dunn achieves the necessary operator's license, Mr. Fred Kasper (New York State Grade 4 licensed Operator 12489) is serving as the licensed plant operator. Mr. Kasper spends at least 4 hours per day on average at the facility on a Monday through Friday basis and assists Mr. Dunn with his duties.

The four (4) SOSs and the Chief Operator continue to be provided with individual training by Mr. Tim Lockhart (NYS Class 4A License Number 7816). During the reporting period there were no reported SPDES permit excursions. This marks a consecutive 27-month period with no SPDES permit excursions. Solids processing has kept up with the incoming solids, and equipment maintenance and repair activities have been conducted as promptly as possible.

During the past quarter, the WWTP has operated in winter mode. The influent temperature has ranged between 50°F and 53°F and sulfide concentrations are generally low. The sodium hypochlorite demand of the plant effluent has remained high throughout much of the past quarter, although effluent turbidity has not been that high, indicating that something other than sulfide is causing the elevated chlorine demand. This situation is being evaluated, as it adds significant operating cost for sodium hypochlorite. Adding to the sodium hypochlorite use for effluent disinfection is the continuing practice of chlorinating the plant's primary effluent (carbon filter influent) and dosing all filter backwashes with sodium hypochlorite. The practices of chlorinating the primary effluent and backwashing with sodium hypochlorite has continued to result in longer filter run times, and a reduced number of backwashes compared to historical levels.

As a result of the Consent Order Item 6, 7, 10 testing and implementation, the following operational changes have been made to the carbon filters:

- Each filter is operated at least once per day. Influent total residual chlorine (TRC) levels are being maintained at approximately 1 mg/l. The filter throughput rate was increased to 2,800 gpm (each filter), however by the end of the quarter had been reduced back to 2,200 to 2,400 gpm. After each use, the filter is backwashed for 10 minutes at 12,500 gpm backwash flow. Sodium hypochlorite is dosed into the backwash water before being pumped into the filter underdrain.
- An air scour is being performed two times per week on each filter, prior to a normal backwash cycle.

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- Filters are generally run for approximately 4 hours before being taken out of service and backwashed. Within this time frame the filters are not plugging and could continue to be operated. However, in order to use each filter every day, filters are being taken out of service after approximately 4 hours. This practice ensures that each filter is operated at least once per day. This mode of operation was determined to be necessary to keep filters from sitting idle for too long which has been found to result in increased sulfide levels.
- Filter rotation proceeds in numerical order (within each Train) to ensure that each filter is operated once per day. An equal number of A train and B train filters are operated at any one time.
- This past quarter several evaluations have been and continue to be performed to optimize backwash operations. Specifically, the following has been, or will be performed:
 - The calibration of the two backwash flow meters is being evaluated.
 - 9,500 gpm (bump washes) have been eliminated as they do not appear to flush a significant amount of solids from the filters.
 - Ramp time for the backwash pumps have been reduced from 5 minutes to 1 minute to enable a longer wash at the higher rate of flow, with an overall reduction in the volume of backwash water.
 - Backwash inlet valves and carbon filter effluent valves are being evaluated to ensure that they seal tight when closed. Leakage past these valves in any of the 27 other filters, will reduce the backwash water flow to the filter being backwashed.
 - Air scour inlet valves are being checked for leakage.

The above routine has resulted in a significant reduction in the volume of backwash water being generated, which now allows additional options for management of backwash water. As of February 3, 2020, all backwash water is being directed to the head of the plant, where it can be retreated through the sedimentation basins. As a result, Sedimentation Basin No. 5 is no longer being used for backwash flow management. The plant has operated continuously in this mode without any incidence of 100' weir flow since February 3, 2020.

1.2 Solids Removal Performance

A solids balance for January, February, and March 2020 is presented in Table 1. The data is based upon effluent flow meter measurements and sample results generated by the facility. The data shows that the quantity of solids sent to the landfill was approximately the same as the amount of solids removed from the wastewater plus chemical solids added (ferric chloride and lime). This was a significant improvement from Q4 2019.

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1.3 Treatment Plant Equipment Readiness

During the reporting period there were several treatment plant equipment breakdowns that required maintenance staff to repair or replace equipment. Significant equipment repairs this past quarter have included:

- The work on the plant's power distribution system as a result of an April 14, 2019 lightning strike continued throughout the quarter and was completed as of February 24, 2020.
- The plant has ordered a replacement sludge screw and grit screw for use as needed in the sedimentation basins. Delivery is expected in Q2 2020.
- Minor repairs have been made this past quarter for pumps, belt filter presses, and sedimentation basin equipment, to address issues that have arisen.
- Maintenance staff have reconstructed the dewatered sludge conveyor belt that services belt filter presses Nos. 1 and 2. The work included replacement of all rollers, the belt, and steel trays, along with painting all existing and newly installed components. The work was performed on a weekend so that belt filter press operation was not affected.

Although these repairs may have kept equipment out of service for periods of time during the past quarter, it has not significantly affected the plant performance. In general, a sufficient number of sedimentation basins with fully functional sludge removal equipment have been available to treat all incoming flows. As of the close of Q1 2020, the following can be said regarding treatment equipment operability:

- Four (4) Main Pumps are operational.
- Four (4) Intermediate Pumps are operational.
- All sedimentation basins are functional. During the past quarter, two (2) sedimentation basins have been used for flows up to 40 mgd, three (3) basins used for flows between 40 mgd and 60 mgd, and four (4) basins for flows over 60 mgd. Sedimentation Basin 5 is empty and clean and could be placed in service if it is determined that backwash to head of the plant is not working as intended.
- Twenty-eight (28) activated carbon filters are functional, although one carbon filter needs carbon replenishment and is only used during wet weather and only if necessary. This filter should be topped off with activated carbon in Q2 2020.
- The filter backwash system is functional including two backwash pumps and two air scour blowers.
- Two (2) pugmills, two (2) lime feed systems, and two (2) lime storage silos are fully functional.

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Table 1

NFWB WWTP Solids Balance

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Month & Year	Average Daily Flow	Average Influent TSS	Average Effluent TSS	TSS Removed (Dry)	Ferric Chloride Added to Wastewater (Dry)	Lime Added to Sludge (Dry)	Total Solids (Dry) (TSS + Lime + Ferric)	Solids Content of Landfilled Sludge	Total Solids (Wet)	Solids Landfilled (DRY)	% Landfilled
	mgd	mg/l	mg/l	Tons/day	Tons/day	Tons/day	Tons/day	%	Tons/day	Tons/day	%
Jan-20	32.1	113	5.6	14.4	1.7	3.42	19.5	26.5%	73.5	19.6	101%
Feb-20	28.2	141	6.6	15.8	1.6	3.63	21.0	27.2%	77.2	21.2	101%
Mar-20	30.3	128	5.7	15.4	1.7	2.61	19.7	26.9%	73.2	18.50	94%

NOTES: mgd million gallons per day

TSS Total Suspended Solids

¹ % greater than or equal to 100 indicates all incoming solids plus all chemicals added are removed and sent to landfill.

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2. Deliverables and Routine Communications

This section presents a listing and discussion of deliverables prepared by the NFWB for submission to the NYSDEC. In addition, other related written communications between the NYSDEC and the NFWB are also discussed.

2.1 Deliverables Status

All deliverables required under the consent order have been submitted to the NYSDEC in accordance with the schedule in the Consent Order. Deliverables submitted during the past quarter are listed in Table 2.

Table 2
NFWB Submissions to NYSDEC per Schedule A of the Consent Order

Date	Prepared By	Consent Order Schedule A Items	Comment
January 30, 2020	AECOM	Item 15	The eighth quarterly progress report for the fourth quarter of 2019 (4 2019) was submitted.

2.1.1 Existing WWTP Optimization Efforts

AECOM has been performing studies and evaluations related to Consent Order Items 6, 7, and 10. This work focuses on optimization of the existing physical chemical treatment facilities. The work is being performed in accordance with the NYSDEC approved work plan. Briefly the work consists of:

Item 6 – Evaluate alternatives to the use of ferric chloride as a chemical coagulant.

Item 7 – Evaluate Sedimentation Basin 5 processes for managing carbon filter backwash water.

Item 10 – Evaluate oxidizer use for preventing sulfide formation in the carbon filters.

A status update report was issued to the NYSDEC in Q3 2019 and a meeting with the NYSDEC to discuss “next steps” was conducted on October 9, 2019 at the WWTP. Numerous discussions regarding plant optimization have occurred during the past two quarters between the NYSDEC, the NFWB and AECOM. In a February 19, 2020 letter from the NYSDEC to the NFWB, the NYSDEC has indicated that implementation of alternative coagulants does not need to proceed at this time, but the NFWB is required to further evaluate chlorine dioxide as an alternative oxidizer/disinfectant that should be studied in the facility’s carbon filters. This effort will get underway in Q2 2020.

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2.2 Deliverables in Next Quarter

All deliverables required under the Consent Order have been submitted. No deliverables are pending or due in Q2 2020 other than the routine quarterly report.

2.3 Routine Communications in Past Quarter

During the past quarter the correspondence items listed in Table 3 were submitted to the NYSDEC by the NFWB. The written communications listed below in Table 4 were received from the NYSDEC during the reporting period.

2.4 Unresolved Issues/Delays

There are no unresolved issues currently.

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Table 3
NFWB Communications to NYSDEC

Date	Prepared By	Purpose
January 9, 2020	AECOM	Email communication regarding discharging filter backwash water to the head of plant.
February 4, 2020	AECOM	Email communication regarding Project 1 construction sequencing and filter backwash water management during construction.
February 24, 2020	Rupp Baase	Email requesting permission to fund ClO ₂ study with DASNY Phase II funds.
March 20, 2020	Rupp Baase	Technical memorandum regarding 100-foot weir flow quality with and without the impact of sedimentation basin 5 discharges.

Table 4
Communications Received from NYSDEC

Date	Delivered To	Purpose
February 19, 2020	NFWB	NYSDEC letter to NFWB requesting study of ClO ₂ use in filters and concurring with not conducting further alternative coagulant testing in sedimentation basins at this time.
February 21, 2020	NFWB	NYSDEC email provides comments on Project 1 Engineering Report and provides comments on Project 1 sequencing and filter backwash water management during construction.
February 24, 2020	Rupp Baase	NYSDEC email to Rupp Baase saying no objection to use of DASNY Phase II funds for ClO ₂ study but inquiring as to cost of study.
March 6, 2020	Rupp Baase	NYSDEC email correspondence approving the use of a pilot scale ClO ₂ study as requested by NFWB in meeting earlier this date.
March 27, 2020	Rupp Baase	NYSDEC email approving back wash to head of plant with 100-foot weir overflow if necessary, i.e. no need to switch back to Sedimentation Basin 5 even if 100- foot weir flow is imminent.

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3. Capital Improvement Program

In this section, progress on WWTP capital upgrades is discussed. Capital upgrades are proceeding on several fronts. Projects that are within the capability of in-house maintenance staff are being undertaken as quickly as possible. Additionally, outside contractors selected for WWTP work (Mechanical Contractor – Mollenberg Betz, Electrical Contractor – Ferguson Electric) are being utilized for larger projects. Lastly, design is underway to perform a number of capital upgrades that are necessary to stabilize the operation of the existing treatment plant. Each of these items is discussed in this section.

3.1 In-House Capital Upgrades Completed/Underway

This category of projects includes work being undertaken by plant maintenance staff or outside contractors without the need for extensive design and engineering documents. This work is generally considered repair and/or replace in kind and therefore NYSDEC approval is not generally required prior to performing the work. During the past quarter, the following projects are proceeding and/or were completed:

- **Traveling Bridge Rack and Rail Improvements** – Operation of the traveling bridges is becoming increasingly difficult due to several issues including the rack, rail, and hold down hardware. There are several places where rack and rail splices are loose, rack mounts are bent, and rail mounting hardware is out of tolerance. During the past quarter repairs were undertaken on Sedimentation Basins 2 and 3. Work will resume on Sedimentation Basin 4 in the Q2 of 2020. Assuming Sedimentation Basin 5 is the first basin addressed in Project 1 (Construction during 2020), rack and rail repairs to Sedimentation Basin 5 will not be undertaken.
- **Effluent Disinfection** – Work has continued on the installation of piping and equipment for effluent disinfection. In the past quarter underground work to install sodium hypochlorite pipelines and buried electrical conduits was initiated. Work will proceed in Q2 2020.

3.2 Capital Improvement Projects

A schedule for the ongoing capital projects is shown in Figure 1.

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Capital Projects Estimated Construction Schedule

2019

