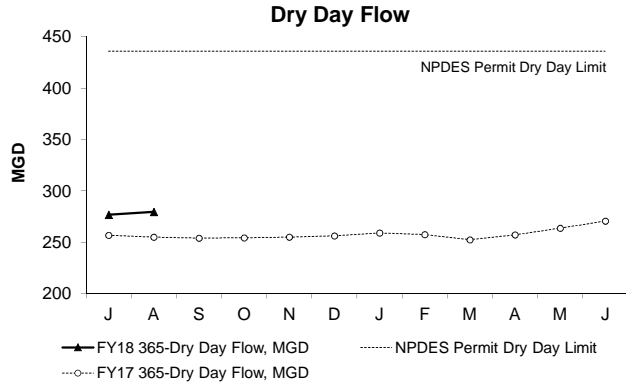
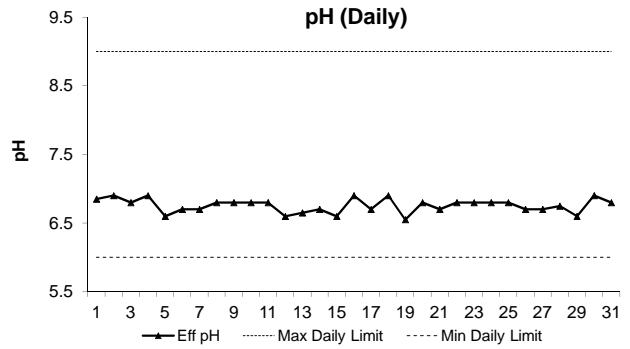


# Deer Island Operations

## August 2017 - FY18

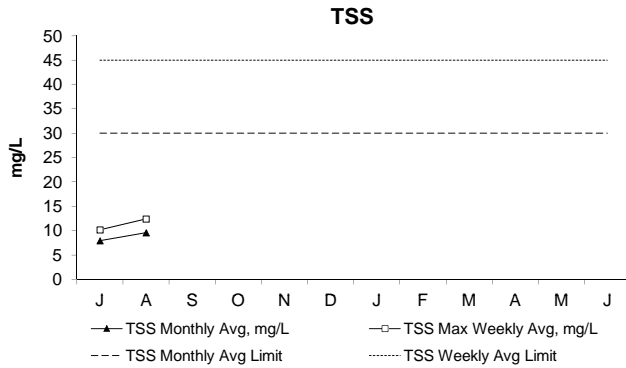


August's Dry Day Flow is the average of all dry weather influent flows over the previous 365 days from 9/1/2016 to 8/31/2017. The Dry Day Flow for the month was 279.5 MGD, well below the permit limit of 436 MGD.



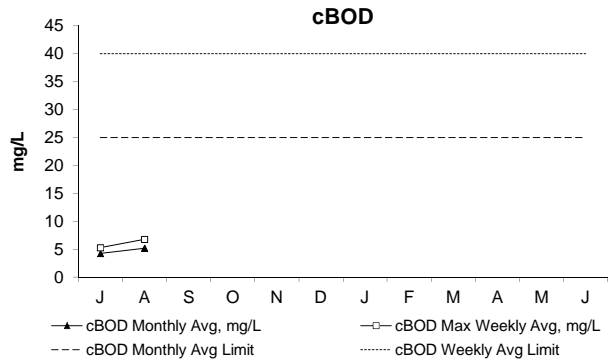
In August, all pH measurements were fairly typical for the season and within permit limits.

pH is a measure of the acidity or basicity of the effluent. Small fluctuations in pH do not have an adverse effect on marine environments. Because pure oxygen is used in the activated sludge reactors, the effluent pH tends to be at the lower range.



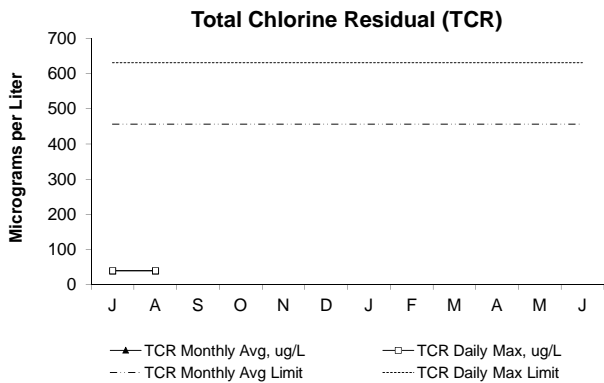
In August, both the weekly and monthly concentrations of TSS were below permit limits.

TSS, or Total Suspended Solids, in the effluent is a measure of the amount of solids that remain suspended after treatment.



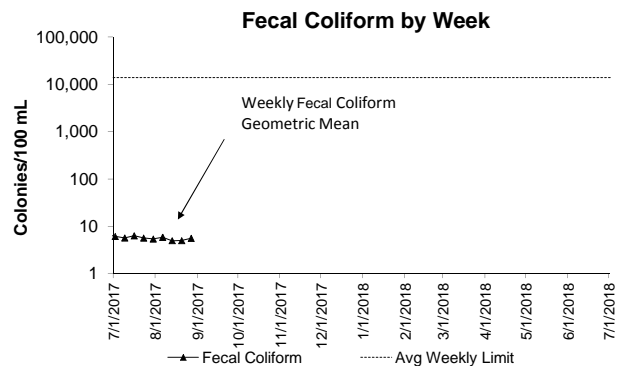
In August, both the weekly and monthly concentrations of cBOD were well below permit limits.

cBOD, or Carbonaceous Biochemical Oxygen Demand, is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in the environment.



In August, both the maximum daily and monthly concentrations of TCR were below permit limits. Both the TCR Monthly Avg and the TCR Daily Max values were non-detectable at 40 ug/L in July and August. Therefore, both parameters appear to be represented by the same trendline in the above graph.

TCR, or Total Chlorine Residual, in the effluent is a measure of the amount of chlorine that remains after the disinfection/dechlorination process. If the chlorine residual in the effluent is too high, it may threaten marine organisms.

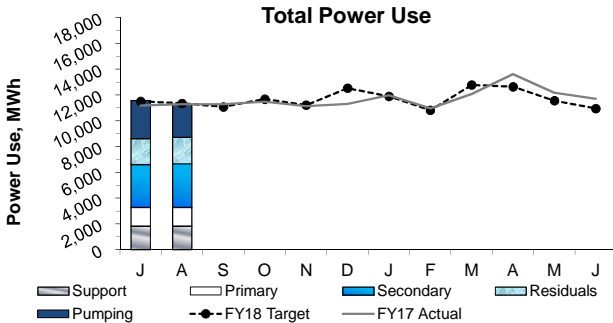


In August, all permit conditions for Fecal Coliform were met. Fecal Coliform is an indicator for the possible presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating many forms of disease-causing microorganisms.

There are four (4) conditions in the permit that must be met: daily geomean; weekly geomean; 10% of all samples in a month; and greater than three (3) consecutive samples not to exceed 14,000 colonies/100mL.

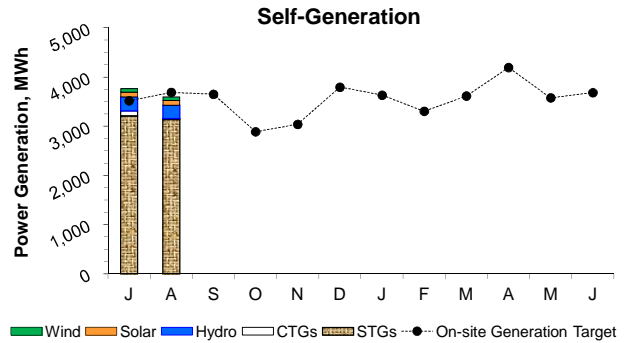
# Deer Island Operations

August 2017 - FY18

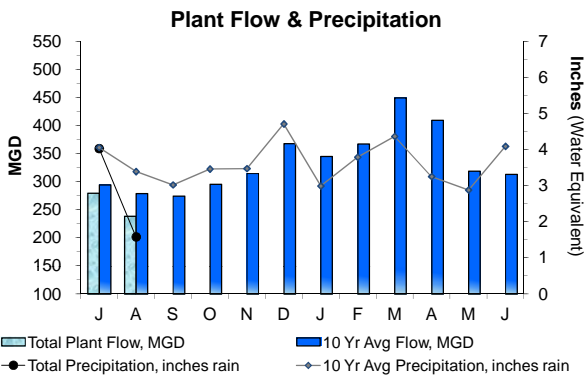


Total power usage in August was on target (-0.5%) as total plant flow was 2.5% lower than the 3 year average. All processes were on target or used less power than estimated this period.

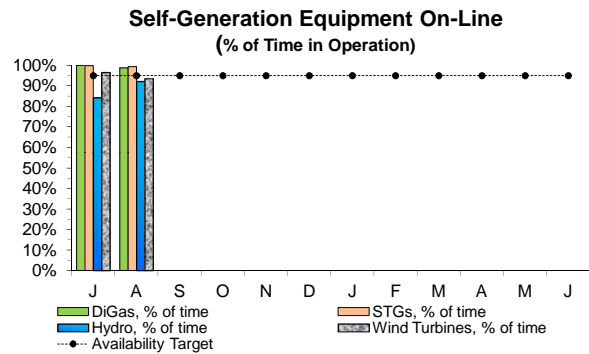
Note: Power usage projections are based on 3 year averages.



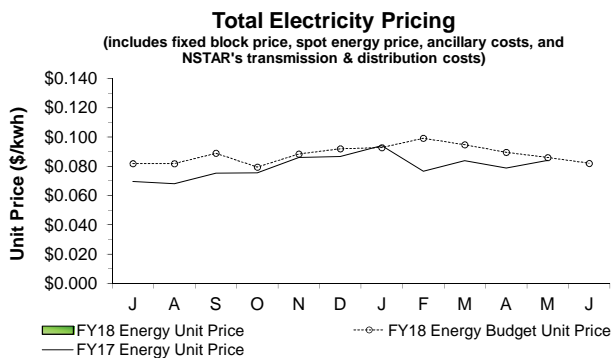
Power generated on-site was 2.5% below target. The CTGs were only operated on one (1) day in August for maintenance/checkout purposes. As a result, CTG generation was 83.1% lower than target which had assumed operation for peak shaving. The STGs generation was 3.1% above target this period, as DiGas production was on target (+0.4%) in August, and 99.0% of all the DiGas was utilized at the Thermal Power Plant. The Hydro Turbine generation was 28.7% lower than its target due to an issue with the cooling system in Turbine #2 and lower than average flow during this period. The Wind Turbine generation in August was 7.7% above target, and the Solar Panel generation was on target (-0.6%).



Total Plant Flow for the month of August (238.5 MGD) was 14.5% below target with the 10 year average flow estimate (279.0 MGD) as precipitation was 53.4% below target with the 10 year average (1.58 inches actual vs. 3.39 inches expected).

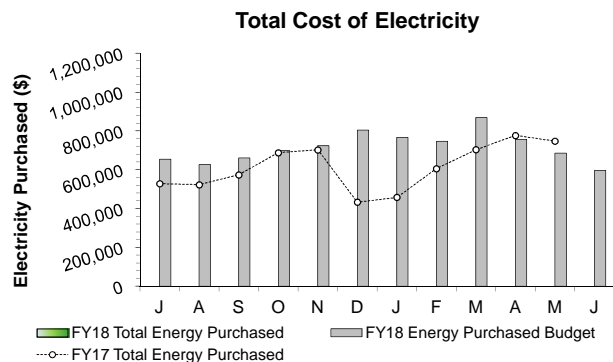


The STGs, DiGas System, and Wind Turbines exceeded their 95% availability target in August. Hydro Turbine availability dropped slightly due to a cooling system issue.



Under the current energy supply contract, a block portion of DI's energy is a fixed rate and the variable load above the block is purchased in real time. The actual total energy unit price in July and August are not yet available as the invoices have not all been received. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

Note: Only the actual energy prices are reported. Therefore, the dataset lags by two (2) months due to the timing of invoice receipt and review.

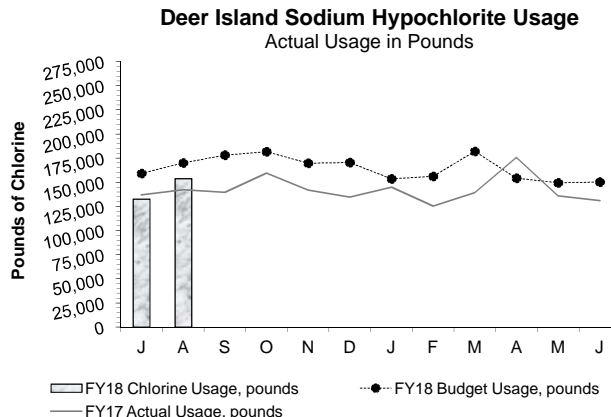
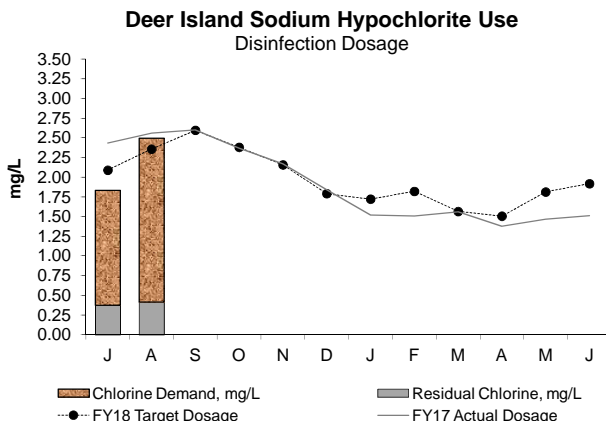


The Electricity cost data for Electricity Purchased in July and August are not yet available as the invoices have not all been received.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by two (2) months due to the timing of invoice receipt and review.

# Deer Island Operations

August 2017 - FY18



The disinfection dosing rate in August was 6.0% higher than target even though overall plant flow for the month was 14.5% below target. DITP maintained an average disinfection chlorine residual of 0.42 mg/L this month with an average dosing rate of 2.50 mg/L (as chlorine demand was 2.08 mg/L). Actual sodium hypochlorite usage in pounds of chlorine was 9.5% below target this month due to lower plant flows.

The overall disinfection dosing rate (target and actual) is dependent on plant flow, target effluent total chlorine residual levels, effluent quality and NPDES permit levels for fecal coliform.

## Secondary Blending Events

Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	2	2	0	99.5%	7.51
A	0	0	0	100.0%	0.00
S					
O					
N					
D					
J					
F					
M					
A					
M					
J					
<b>Total</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>99.7%</b>	<b>7.51</b>

100.0% of all flows were treated at full secondary in August as there were no blending events. The Maximum Secondary Capacity for the entire month was 700 MGD.

Secondary permit limits were met at all times during August.

## Deer Island Operations & Maintenance Report

### Environmental/Pumping:

The plant achieved an instantaneous peak flow rate of 676.1 MGD in the evening on August 2. This peak flow occurred during a rain event that produced 0.96 inches of precipitation. Overall, Total Plant Flow in August was 14.5% below target with the 10 year average plant flow target for the month.

Essential maintenance and rehabilitation activities involving the replacement of butterfly flow control valves, discharge isolation valves, flow meters, and associated piping for each of the 10 wastewater pumps in the North Main Pump Station (NMPS) continued in August. All equipment is original and dates back to the facility upgrades in 1995. Over time, the valves in these facilities have sustained damage from age and wear and must be replaced to allow proper isolation of pumps and equipment for maintenance. Two (2) force main isolation events occurred in August to install the new equipment for Pumps #7 and #10. These two (2) shutdowns completed this phase of the valve replacement project. NMPS, Winthrop Terminal Headworks Facility, and South System Pump Station continued to operate during these events. No interruptions or restrictions in flow occurred during this work as all north system flow was handled through the other force main in the facility. Flow through the isolated force main in NMPS was suspended by 3:30 a.m. and was restored by 3:30 p.m. once the scheduled tasks for the day were completed.

# Deer Island Operations

August 2017 - FY18

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## Deer Island Operations & Maintenance Report (continued)

### Secondary Treatment:

Significant essential maintenance work on Secondary Treatment Batteries A, B, and C took place in July and August. The return sludge ("RSL") header isolation valves in the secondary batteries have suffered wear and corrosion damage and were scheduled for replacement. Because the secondary batteries cannot operate without the return sludge header for more than several hours, each battery was removed from service, one at a time, while the associated valves were replaced. Secondary Battery B was the first battery scheduled for this RSL valve replacement work, followed by Secondary Batteries A and C. In addition, the contractor replaced scum system hardware in the effluent channel of Secondary Batteries A and B during their respective shutdowns. Secondary Battery C did not require this work. The contractor worked 24 hours per day to minimize the shutdown of the battery to preserve the microbiology in the Secondary Battery reactors. During each Secondary Battery shut down, the primary effluent flow was treated by the two remaining Secondary Batteries.

### Odor Control:

The Residuals Odor Control (ROC) Facility, which is responsible for treating the process airflows from the Primary Gravity Thickeners (GT) and the Secondary Centrifuge Thickeners (CT), was shutdown from 9:03 am to 11:10 am on August 30 for a total shutdown of 2 hours and 7 minutes. This shutdown was necessary to allow for scheduled maintenance to perform part of the work necessary to rebuild the entire fan assembly for Fan 3 and allowed staff to safely work on this fan without the risk of potential exposure to the process air. The fan assembly for Fan 3 was removed so that staff can rebuild the fan assembly and a blank was installed in the ductwork to prevent process air from escaping into the facility while the fan is disconnected. Process air was contained within the building during this shutdown and there were no odor complaints associated with this work. A second shutdown on September 6 was completed to connect the rebuilt fan assembly to the treatment system and to remove the blank in the ductwork.

### Residuals:

The sludge feed to Module #2 Digesters 3 and 4 was temporarily suspended for 4-5 days each in order to allow for scheduled maintenance to clean the digester overflow box and piping.

### Energy and Thermal Power Plant:

Overall, total power generated on-site accounted for 31.9% of Deer Island's total power use for the month. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 31.7% of Deer Island's total electrical power use for the month.

DI Wind Turbine #1 was taken offline on August 1 for preventative maintenance to replace the main power cable and was returned to service on August 4.

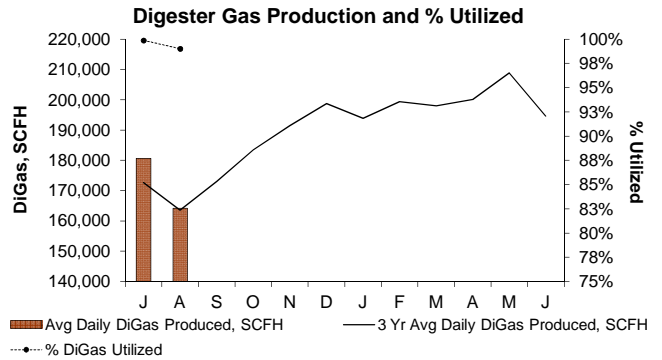
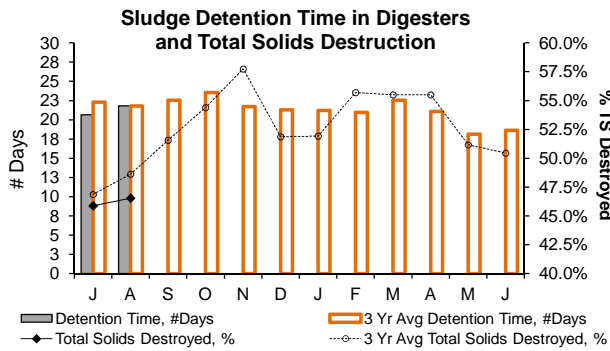
### Regulatory:

Emissions compliance testing for the Residuals Odor Control (ROC) treatment system at DITP was conducted by consultants on June 26 to June 27 and on August 21 to August 22. The ROC system treats combined process air from the Primary Gravity Thickeners (GT) and the Secondary Centrifuge Thickeners (CT). The DITP Air Quality Operating Permit issued by the MA DEP requires that DITP conduct emissions compliance testing for the various emission units once every five (5) years to demonstrate compliance with applicable total reduced sulfur (TRS) and non-methane hydrocarbon (NMHC) emission limits. This testing requires the continuous emissions monitoring of the inlet and outlet of the odor control system over a 24-hour period for TRS at the outlet (stack) of the odor control system and for NMHC at the inlet. All emissions test results show that DITP was in compliance. The final report summarizing the test results was reviewed by staff and submitted to the MA DEP on August 30.

# Deer Island Operations and Residuals

August 2017 - FY18

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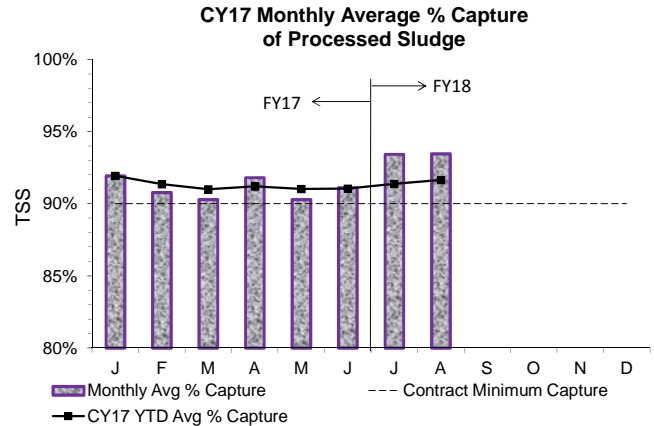
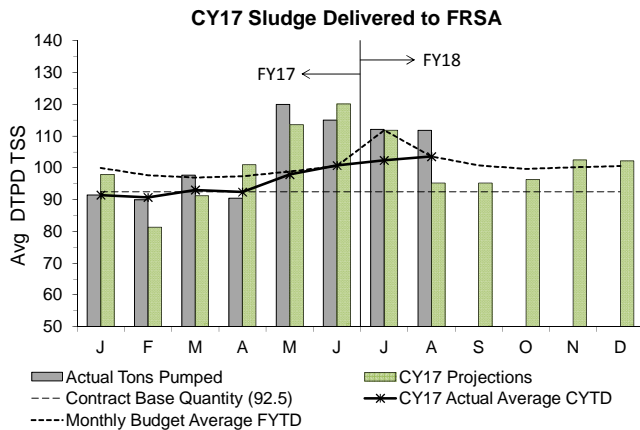
Total Solids (TS) destruction following anaerobic sludge digestion was 46.5% in August, 4.3% below target with the 3 year average, as sludge detention time in the digesters was 21.8 days, on target with the 3 year average of 21.8 days. DI operated with an average of 7.8 digesters in August as a result of scheduled maintenance on two (2) digesters.

The Avg Daily DiGas Production in August was on target with the 3 Year Avg Daily DiGas Production. 99.0% of all the DiGas produced in August was utilized at the Thermal Power Plant.

Total solids (TS) destruction is dependent on sludge detention time which is determined by primary and secondary solids production, plant flow, and the number of active digesters in operation. Solids destruction is also significantly impacted by changes in the number of digesters and the resulting shifting around of sludge.

## Residuals Pellet Plant

MWRA pays a fixed monthly amount for the calendar year to process up to 92.5 DTPD/TSS (Dry Tons Per Day/Total Suspended Solids) times 365 days divided by 12 months. At the end of the year, the actual totals are calculated and additional payments are made on any quantity above the base amount. The base quantity of 90.0 DTPD/TSS was changed to 92.5 DTPD/TSS starting on January 1, 2016 with the terms of the new contract. On average, MWRA processes more than 92.5 DTPD/TSS each year (FY17's budget is 100.6 DTPD/TSS and FY18's budget is 99.5 DTPD/TSS).



Total sludge sent to FRSA was above target. DITP delivered 111.9 TSS tons per day (TPD) to FRSA, resulting in a variance of 17.5% (approximately 16.7 TSS TPD) from the August target of 95.2 TSS TPD for the month. TS destruction was 46.5% in August, similar to the three (3) year average solids destruction rate of 48.6%.

The contract requires NEFCo to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility in Quincy. The capture rate of solids in August was 93.47%.

The CY17 average quantity of sludge pumped (through August) is 103.6 DTPD - 4.0% above target with FY18's average budget of 99.5 DTPD.