

## Deer Island Effluent Monitoring

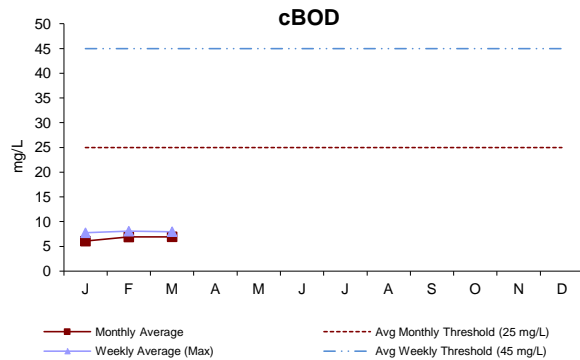
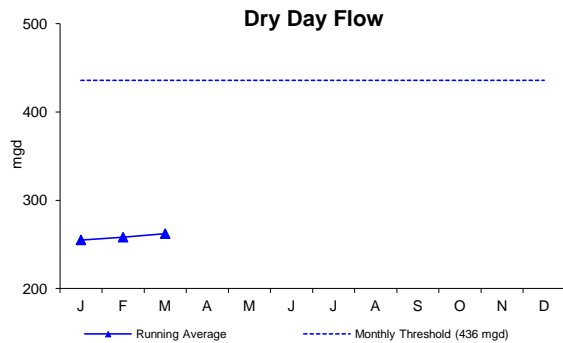
1st Quarter 2016

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Effluent Characteristics	Units	Threshold	Threshold Exceedance
Dry Day Flow	mgd	436	0
cBOD: Monthly Avg	mg/L	25	0
Weekly Avg	mg/L	40	0
TSS: Monthly Avg	mg/L	30	0
Weekly Avg	mg/L	45	0
TCR: Monthly Avg	ug/L	456	0
Daily Avg	ug/L	631	0
Fecal Coliform	col/100mL	14000	0
pH: Minimum	SU	6.0	0
Maximum	SU	9.0	0
PCB, Aroclors	ug/L	0.000045	0
Total Nitrogen: Caution Level	mtons/year	12500	0
Warning Level	mtons/year	14000	0
Acute Toxicity: Mysid Shrimp	%	50	0
Acute Toxicity: Inland Silverside	%	50	0
Chronic Toxicity: Inland Silverside	%	1.5	0
Chronic Toxicity: Sea Urchin	%	1.5	0
Oil and Grease, Petroleum Origin (Weekly)	mg/L	15	0
Plant Performance: Caution Level	# of violations	0	0
Warning Level	% noncompliance	0	0

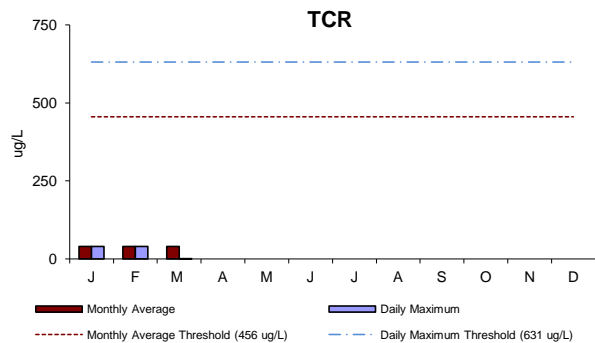
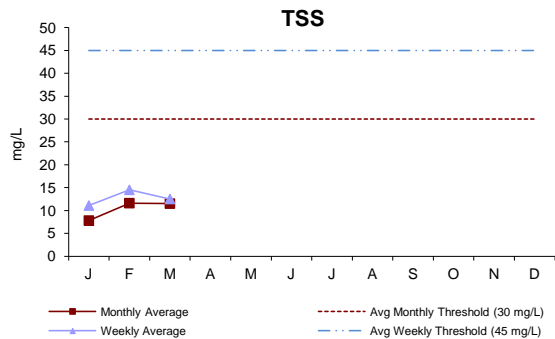
\* - All levels are Warning Levels, unless specified

There were no Deer Island Treatment Plant National Pollutant Discharge Elimination System (NPDES) permit limit exceedances in the 1st Quarter of Calendar Year (CY) 2016.



The dry day flow is calculated by averaging influent flow over the previous 365 days during dry weather. A dry day is defined as a day with < 0.09 inches of precipitation and no snow melt. In addition, the precipitation for the previous three days must be less than 0.3, 1.0, and 2.0 inches, respectively.

cBOD is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in effluent. The weekly and monthly concentrations for the quarter were below threshold values. The 5-day cBOD percent removal range for the quarter was 92.3 - 94.4%.



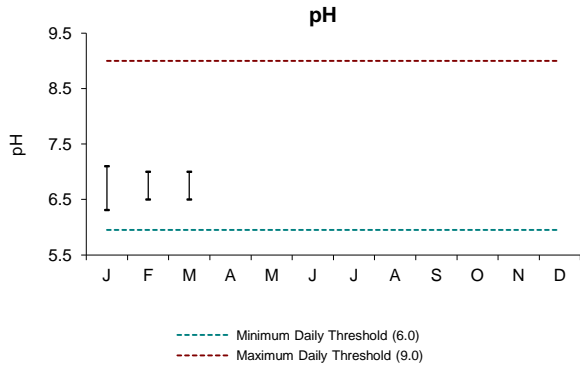
Total Suspended Solids is a measure of the amount of solids that remain suspended after treatment. The weekly and monthly concentrations for the quarter were below threshold values. The TSS percent removal range for the quarter was 93.1-95.7%.

Total Chlorine Residual is the concentration of chlorine in the effluent as it leaves the treatment plant. Chlorine levels will drop off significantly as the effluent travels the length of the 9.5 mile outfall pipe. For values below detection, we used the detection limit of 40 ug/L.

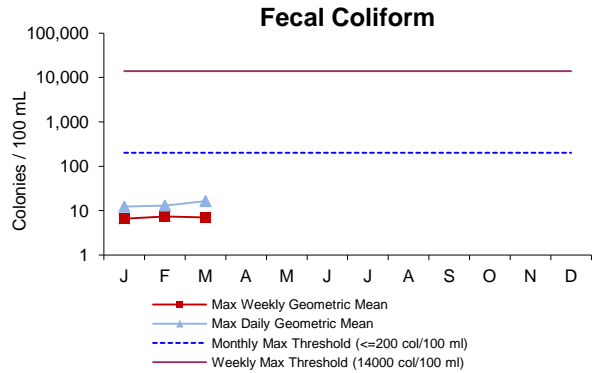
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1st Quarter 2016

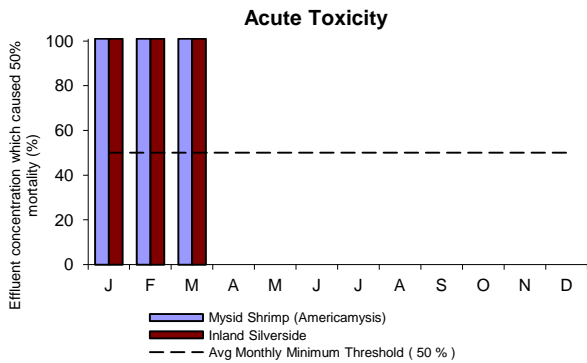
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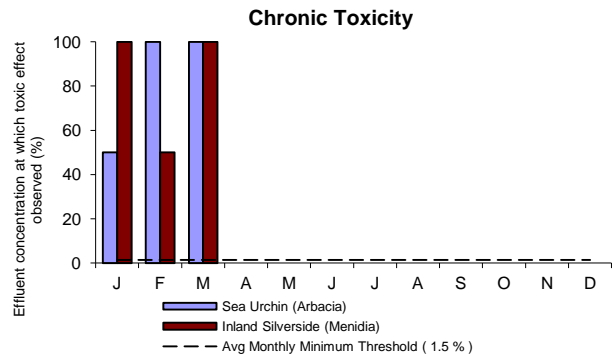
pH is a measure of alkalinity or acidity. Fluctuations in effluent pH are unlikely to impact marine environments, which have significant buffering capacity. Because of the pure oxygen used in the activated sludge process, effluent pH tends to be at the lower end of the permit-required range. All pH measurements were within the threshold range for the quarter.



Fecal Coliform is an indicator of the presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating disease-causing microorganisms. The Contingency Plan requires that the monthly geometric mean not exceed 14000 col/100mL. The monitoring results for the quarter were well below the threshold value.



The acute toxicity test simulates the short-term toxic effects of pollutants in sewage effluent on marine animals. The test measures the concentration (percent) of effluent that kills half the test organisms within four days. The higher the concentration of effluent required, the less toxic the effluent. For permit compliance, the effluent concentration that causes mortality to mysid shrimp and inland silverside must be at least 50%. The threshold limits were met for the quarter.

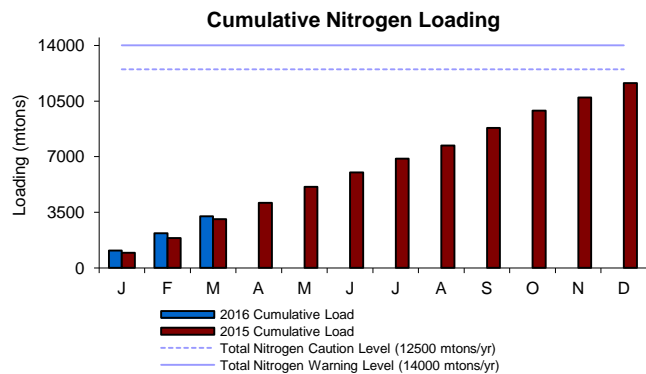


Typically, effects of chronic exposures differ from those of acute exposures. Because of this, chronic toxicity responses are not necessarily related to acute toxicity. The chronic toxicity test simulates the long-term toxic effects of pollutants in sewage effluent on marine animals. To meet permit limits, at least 1.5% of effluent must show no observed effect on the growth and reproduction of the test species. The threshold limits were met for the quarter.

## Petroleum Hydrocarbons

Effluent Petroleum Hydrocarbons – 2016		
Quarter	Detects?	Date(s) of detects
1 <sup>st</sup>	Yes (0.75 mg/L)	2/8/2016
2 <sup>nd</sup>		
3 <sup>rd</sup>		
4 <sup>th</sup>		

The table shows PHC detects in the DITP effluent. In the first quarter of 2016, samples were collected 4-6 times a month and there was one detectable reading. The Contingency Plan Threshold warning level is 15 mg/L per week. Since PHCs are lighter than water, they rise to the surface and are easily collected as scum from the primary and secondary clarifiers at DITP.



Total nitrogen is not regulated under the permit, but the Contingency Plan requires it to be closely monitored because of its potential effects on Massachusetts Bay. Total nitrogen includes total Kjeldahl nitrogen, nitrates, and nitrites.