### Effluent Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Units</th>
<th>Threshold*</th>
<th>Threshold Exceedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Day Flow</td>
<td>mgd</td>
<td>436</td>
<td>0</td>
</tr>
<tr>
<td>cBOD: Monthly Avg</td>
<td>mg/L</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Weekly Avg</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>TSS: Monthly Avg</td>
<td>mg/L</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Weekly Avg</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>TCR: Monthly Avg</td>
<td>ug/L</td>
<td>456</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Daily Avg</td>
<td>631</td>
<td>0</td>
</tr>
<tr>
<td>Fecal Coliform</td>
<td>col/100mL</td>
<td>14000</td>
<td>0</td>
</tr>
<tr>
<td>pH: Minimum</td>
<td>SU</td>
<td>6.0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>9.0</td>
<td>0</td>
</tr>
<tr>
<td>PCB Aroclors</td>
<td>ug/L</td>
<td>0.000045</td>
<td>0</td>
</tr>
<tr>
<td>Total Nitrogen: Caution Level</td>
<td>mtons/year</td>
<td>12500</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Warning Level</td>
<td>14000</td>
<td>0</td>
</tr>
<tr>
<td>Acute Toxicity: Mysid Shrimp</td>
<td>%</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Acute Toxicity: Inland Silverside</td>
<td>%</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Chronic Toxicity: Inland Silverside</td>
<td>%</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>Chronic Toxicity: Sea Urchin</td>
<td>%</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>Oil and Grease, Petroleum Origin</td>
<td>mg/L</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Plant Performance: Caution Level</td>
<td># of violations</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Warning Level</td>
<td>% noncompliance</td>
<td>5</td>
</tr>
</tbody>
</table>

* All levels are Warning Levels unless otherwise specified

There were no Deer Island Treatment Plant National Pollutant Discharge Elimination System (NPDES) permit limit exceedances in the 4th Quarter of Calendar Year (CY) 2018.

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### Dry Day Flow

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

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 94.6 - 96.1%.

### TSS

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 94.7 - 96.8%.

### TCR

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. On this graph, we used the detection limit of 40 ug/L for values below detection.
Deer Island Effluent Monitoring
4th Quarter 2018

This graph shows levels of petroleum hydrocarbons in the DITP effluent. Samples were collected 5-6 times a month during the quarter. The Contingency Plan Threshold warning level is 15 mg/L weekly average. 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.

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.

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.

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

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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, nitrate, and nitrite.