

TCEQ Analysis of TCEQ Contractor Surface Water Quality Sampling Data Collected on April 6, 2019 (Final Lab Results)

The Texas Commission on Environmental Quality (TCEQ) received final surface water quality data for 129 constituents at four (4) different sites. One sample was collected at each site on April 6, 2019 by the TCEQ's contractor. The constituents consist of inorganics, organics, metals, nutrients, total suspended solids, chemical oxygen demand (COD), carbonaceous biochemical oxygen demand (CBOD), and oil and grease in water. The sampling sites were the following:

- Upstream Tucker Bayou Clean
- Tidal Road @ Tucker Bayou
- Mouth of Tucker Bayou @ Buffalo Bayou
- Tidal Road @ Gate 13

This assessment is based on final results received from the laboratory. As additional water quality sampling is completed, the data will be assessed, and results made available.

The TCEQ used the Texas Water Quality Standards and the Texas Risk Reduction Program as references for determining the known health protective concentration levels (PCLs) in surface water. PCLs are very conservative and below levels where we would expect any health impacts. The TCEQ is using these PCLs to evaluate impacts to aquatic life and human health. No public drinking water system draws its source water from the Houston Ship Channel. This methodology was also used for previously reviewed data from samples collected by ITC and will be used to review samples from the TCEQ contractor. The TCEQ used the PCLs listed in the tables below to assess the surface water quality data.

Table 1: Assessment of Final Laboratory Results

| | Upstream Tucker Bayou Clean | Tidal Road @ Tucker Bayou | Mouth of Tucker Bayou @ Buffalo Bayou | Tidal Road @ Gate 13 |
|--|-----------------------------|---------------------------|---------------------------------------|----------------------|
| Number of Constituents | 129 | 129 | 129 | 129 |
| Number of constituents analyzed but not detected (not detected above the method detection limit or quantitation limit) | 121 | 106 | 118 | 104 |
| Number of constituents detected above the method detection limit or quantitation limit | 8 | 23 | 11 | 25 |
| Number of constituents detected but below their known PCLs | 3 | 9 | 2 | 5 |
| Number of constituents that exceeded their known PCLs | 1 | 6 | 1 | 12 |
| Number of constituents that are still pending further TCEQ evaluation | 0 | 0 | 0 | 0 |
| Number of constituents that do not have a PCL or are assessed with other constituents* | 4 | 8 | 8 | 8 |

*The water quality parameters ammonia nitrogen (as N), total Kjeldahl nitrogen, total phosphate, total organic nitrogen, total sulfides, and total suspended solids are not related to human health; therefore it is not appropriate to develop human health comparison values to evaluate these parameters. Three chemicals on the laboratory target analyte list (4-bromophenyl phenyl ether, 4-chlorophenyl phenyl ether, and benzo(g,h,i)perylene) do not have surface water comparison values and consequently will not be evaluated. These water quality parameters and chemicals are not directly related to the ITC incident, and the TCEQ is evaluating the chemicals that are directly related to the ITC incident (benzene and toluene, for example). C6-12, C12-28 and C28-35 range hydrocarbons, as well as total petroleum hydrocarbons, are included in the assessment of oil and grease. Therefore, these constituents are not assessed individually.

Below are tables of the constituents that exceeded their known PCL at the sampling sites.

Table 2: Upstream Tucker Bayou Clean

| Constituent | Maximum (micrograms/L) | PCL (micrograms/L) |
|-------------|---------------------------|--------------------|
| Copper | 5.94 | 3.6 |

Table 3: Tidal Road @ Tucker Bayou

| Constituent | Maximum (micrograms/L) | PCL (micrograms/L) |
|---------------|---------------------------|--------------------|
| Benzene | 7800 | 581 |
| COD | 340000 | 150000** |
| Copper | 6.06 | 3.6 |
| Phenolic | 199 | 0.29 |
| Toluene | 2350 | 1000 |
| Total Xylenes | 3290 | 850 |

Table 4: Mouth of Tucker @ Buffalo Bayou

| Constituent | Maximum (micrograms/L) | PCL (micrograms/L) |
|---------------------|---------------------------|--------------------|
| Oil and Grease, HEM | 30800 | 28000 |

Table 5: Tidal Road @ Gate 13

| Constituent | Maximum (micrograms/L) | PCL (micrograms/L) |
|---------------------|-----------------------------------|---------------------------|
| Benzene | 25600 | 581 |
| CBOD | 1030000 | 39500* |
| COD | 2850000 | 150000** |
| Copper | 21.7 | 3.6 |
| Lead | 8.67 | 3.83 |
| 2-Methylnaphthalene | 93 | 30 |
| Naphthalene | 254 | 125 |
| Oil & Grease, HEM | 11700000 | 28000 |
| Phenolic | 131 | 0.29 |
| Toluene | 7660 | 1000 |
| Total Xylenes | 9030 | 850 |
| Zinc | 828 | 84.2 |

Footnote:

* CBOD is an organic pollution indicator that measures the oxygen demand exerted by the microbial decomposition of carbonaceous organic material in water (microbial breakdown of nitrogenous constituents is suppressed). There is not a known PCL for CBOD, therefore the permitted technology-based limit for treated process water of 39500 micrograms/L was used for comparison purposes.

**COD is a measure of the oxygen demand exerted by chemical constituents in water. There was not a known PCL for COD, therefore the permitted technology-based limit was used for comparison purposes. Although COD levels for treated process wastewater vary 150000 micrograms/L for noncontact stormwater was provided for comparison purposes.