

**Addendum 2: TCEQ Analysis of TCEQ Contractor Surface Water Quality Sampling Data Collected on March 30, 2019
(Final lab results)**

The Texas Commission on Environmental Quality (TCEQ) received final surface water quality data for 129 constituents at three (3) different sites. One sample was collected at each site on March 30, 2019 by the TCEQ's contractor. The constituents consist of inorganics, organics, metals, nutrients, chemical oxygen demand (COD), carbonaceous biological oxygen demand (CBOD), total suspended solids, and oil and grease in water. The sampling sites were the following:

- Tucker Bayou Clean
- Mouth of Tucker @ Buffalo Bayou
- Tidal Road @ Tucker Bayou

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

	Tucker Bayou Clean	Mouth of Tucker @ Buffalo Bayou	Tidal Road @ Tucker Bayou
Number of Constituents	129**	129	129**
Number of constituents analyzed but not detected (not detected above the method detection limit or quantitation limit)	122	105	78
Number of constituents detected above the method detection limit or quantitation limit	6	24	23
Number of constituents detected but below their known PCLs	2	8	6
Number of constituents that exceeded their known PCLs	1	7	8
Number of constituents that are still pending further TCEQ evaluation	0	0	0
Number of constituents that do not have a PCL or are assessed with other constituents*	3	9	9

*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.

**Samples collected at the Tucker Bayou Clean and Tidal Road at Tucker Bayou sites included multiple constituents, listed below, where the MS/MSD recovery was found to be outside of the laboratory control limit due to possible matrix/chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD. Therefore, they were excluded from the assessment of laboratory results.

2-Chlorophenol	2-Chloronaphthalene	Naphthalene	4-Chloroaniline
2,4-Dichlorophenol	Chrysene	n-Nitrosodi-n-Propylamine	Benzoic Acid
2,4-Dimethylphenol	1,2-Dichlorobenzene	Phenanthrene	Benzyl Alcohol
2,4-Dinitrophenol	1,3-Dichlorobenzene	2-Methylnaphthalene	Nitrogen, Ammonia
4-Nitrophenol	Fluorene	2-Methylphenol	1-Methylnaphthalene
4-Chloro-3-methylphenol	Hexachlorobutadiene	3-Nitroaniline	
Phenol	Hexachlorocyclopentadiene	4-Nitroaniline	
Benzidine	Isophorone	n-Octadecane	

Table 2: Tucker Bayou Clean

Constituent	Maximum (micrograms/L)	PCL (micrograms/L)
Phenolic	19	0.29

Table 3: Mouth of Tucker @ Buffalo Bayou

Constituent	Maximum (micrograms/L)	PCL (micrograms/L)
Benzene	960	581
CBOD	57000	39500**
COD	880000	150000*
2-Methylnaphthalene	47.6	30
Oil & Grease, HEM	132000	28000
Phenolic	34.7	0.29
Zinc	117	84.2

Table 4: Tidal Road @ Tucker Bayou

Constituent	Maximum (micrograms/L)	PCL (micrograms/L)
Benzene	60800	581
CBOD	466000	39500**
COD	2600000	150000*
Copper	6.93	3.6
Phenolic	201	0.29
Toluene	13500	1000
Xylenes, Total	4590	850
Zinc	414	84.2

Footnote:

*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.

**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.