**Section 302.407 Chemical Constituents**

a) The acute standard (AS) for the chemical constituents listed in subsection (e) must not be exceeded at any time except as provided in subsection (d).

b) The chronic standard (CS) for the chemical constituents listed in subsection (e) must not be exceeded by the arithmetic average of at least four consecutive samples collected over any period of four days, except as provided in subsection (d). The samples used to demonstrate attainment or lack of attainment with a CS must be collected in a manner that assures an average representative of the sampling period. For the chemical constituents that have water quality-based standards dependent upon hardness, the chronic water quality standard will be calculated according to subsection (e) using the hardness of the water body at the time the sample was collected. To calculate the attainment status of chronic standards, the concentration of the chemical constituent in each sample is divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

c) The human health standard (HHS) for the chemical constituents listed in subsection (f) must not be exceeded, on a 12-month rolling average based on at least eight samples, collected in a manner representative of the sampling period, except as provided in subsection (d).

d) In waters where mixing is allowed under Section 302.102, the following apply:

1) The AS must not be exceeded in any waters except for those waters for which a zone of initial dilution (ZID) applies under Section 302.102.

2) The CS must not be exceeded outside of waters in which mixing is allowed under Section 302.102.

3) The HHS must not be exceeded outside of waters in which mixing is allowed under Section 302.102.

e) Numeric Water Quality Standards for the Protection of Aquatic Organisms

|  |  |  |
| --- | --- | --- |
| Constituent | AS(µg/L) | CS(µg/L) |
| Arsenic(trivalent, dissolved) | 340 X 1.0\*=340 | 150 X 1.0\*=150 |
| Benzene | 4200 | 860 |
| Cadmium(dissolved) | *e*A+B ln(H) X {1.138672-[(ln(H))(0.041838)]}\*, where A=-2.918 and B=1.128 | *e*A+B ln(H) X {1.101672-[(ln(H))(0.041838)]}\*, where A= -3.490 and B=0.7852 |
| Chromium (hexavalent, total)  | 16 | 11 |
| Chromium (trivalent, dissolved)  | *e*A+B ln(H) X 0.316\*, where A=3.7256 andB=0.8190 | *e*A+B ln(H) X 0.860\*,where A=0.6848 and B=0.8190 |
| Copper(dissolved)  | *e*A+B ln(H) X 0.960\*,where A=-1.645 andB=0.9422 | *e*A+B ln(H) X 0.960\*,where A=-1.646 and B=0.8545 |
| Cyanide\*\* | 22 | 10 |
| Ethylbenzene | 150 | 14 |
| Fluoride (total) | *e*A+B ln(H),where A=6.7319and B=0.5394 | *e*A+B ln(H), but must not exceed 4.0 mg/L,where *A*=6.0445 and *B*=0.5394 |
| Lead(dissolved)  | *e*A+B ln(H) X {1.46203-[(ln(H))(0.145712)]}\*,where A=-1.301 and B=1.273 | *e*A+B ln(H) X {1.46203-[(ln(H))(0.145712)]}\*,where A=-2.863 andB=1.273 |
| Manganese (dissolved) | *e*A+B ln(H) X 0.9812\*,where *A*=4.9187and *B*=0.7467 | *e*A+B ln(H) X 0.9812\*,where *A*=4.0635and *B*=0.7467 |
| Mercury (dissolved) | 1.4 X 0.85\*=1.2 | 0.77 X 0.85\*=0.65 |
| Nickel (dissolved) | *e*A+B ln(H) X 0.998\*,where A=0.5173 andB=0.8460 | *e*A+B ln(H) X 0.997\*,where A=-2.286 andB=0.8460 |
| Toluene | 2000 | 600 |
| TRC | 19 | 11 |
| Xylene(s) | 920 | 360 |
| Zinc (dissolved) | *e*A+B ln(H) X 0.978\*,where A=0.9035 andB=0.8473 | *e*A+B ln(H) X 0.986\*,where A=-0.4456 andB=0.8473 |

where:

|  |  |  |
| --- | --- | --- |
| µg/L | = | microgram per liter |
| H | = | Hardness concentration of receiving water in mg/L as CaCO3 |
| *e*x | = | base ofnatural logarithms raised to the x-power |
| ln(H) | = | natural logarithm of hardness in mg/L as CaCO3 |
| \* | = | conversion factor multiplier for dissolved metals |
| \*\* | = | standard to be evaluated using either of the following USEPA approved methods, incorporated by reference at 35 Ill. Adm. Code 301.106: Method OIA-1677, DW: Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry, January 2004, Document Number EPA-821-R-04-001; or Cyanide Amenable to Chlorination, Standard Methods 4500-CN-G (40 CFR 136.3) |

f) Numeric Water Quality Standard for the Protection of Human Health

|  |  |
| --- | --- |
| Constituent | HHS (µg/L) |
| Benzene | 310 |
| Mercury (total) | 0.012 |
| Phenols | 860,000 |

where:

|  |  |  |
| --- | --- | --- |
| µg/L | = | microgram per liter |

g) Numeric Water Quality Standards for Other Chemical Constituents

 Concentrations of the following chemical constituents must not be exceeded except in waters for which mixing is allowed under Section 302.102.

|  |  |  |
| --- | --- | --- |
| Constituent | Unit | Standard |
| Chloride | mg/L | 500 |
| Iron (dissolved) | mg/L | 1.0 |
| Selenium (total) | mg/L | 1.0 |
| Silver (dissolved) | µg/L  | *e*A+B ln(H) X 0.85\*, where A=-6.52 and B=1.72 |
| Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 25 but ≤ 500) | mg/L | [1276.7+5.508(H)-1.457(C)] X 0.65 |
| Sulfate (where H is ≥ 100 but ≤ 500 and C is ≥ 5 but < 25) | mg/L | [-57.478 + 5.79(H) + 54.163(C)] X 0.65 |
| Sulfate (where H > 500 and C ≥ 5) | mg/L | 2,000 |

where:

|  |  |  |
| --- | --- | --- |
| mg/L | = | milligram per liter |
| µg/L | = | microgram per liter |
| H | = | hardness concentration of receiving water in mg/L as CaCO3 |
| C | = | chloride concentration of receiving water in mg/L |
| *e*x | = | base of natural logarithms raised to the x-power |
| ln(H) | = | natural logarithm of hardness in milligrams per liter |
| \* | = | conversion factor multiplier for dissolved metals |

h) Concentrations of other chemical constituents in the South Fork of the South Branch of the Chicago River (Bubbly Creek) must not exceed the following standards:

|  |  |
| --- | --- |
| CONSTITUENT | CONCENTRATION (mg/L) |
| Ammonia Un-ionized (as N\*) | 0.1 |
| Arsenic (total) | 1.0 |
| Barium (total) | 5.0 |
| Cadmium (total) | 0.15 |
| Chromium (total hexavalent) | 0.3 |
| Chromium (total trivalent) | 1.0 |
| Copper (total) | 1.0 |
| Cyanide (total) | 0.10 |
| Fluoride (total) | 15.0 |
| Iron (total) | 2.0 |
| Iron (dissolved) | 0.5 |
| Lead (total) | 0.1 |
| Manganese (total) | 1.0 |
| Mercury (total) | 0.0005 |
| Nickel (total) | 1.0 |
| Oil, fats and grease | 15.0\*\* |
| Phenols | 0.3 |
| Selenium (total) | 1.0 |
| Silver | 1.1 |
| Zinc (total) | 1.0 |
| Total Dissolved Solids | 1500 |

\* For purposes of this Section, the concentration of un-ionized ammonia must be computed according to the following equation:



*where:*

|  |  |  |
| --- | --- | --- |
| X | = |  |
| U | = | Concentration of un-ionized ammonia as N in mg/L |
| N | = | Concentration of ammonia nitrogen as N in mg/L |
| T | = | Temperature in degrees Celsius |

\*\* Oil must be analytically separated into polar and non-polar components if the total concentration exceeds 15 mg/L. In no case may either of the components exceed 15 mg/L (i.e., 15 mg/L polar materials and 15 mg/L non-polar materials).

(Source: Amended at 47 Ill. Reg. 4437, effective March 23, 2023)