



Nashville, TN

Industrial User Local Limits and Plant Protection Criteria Changes

For

Central WWTP – NPDES Permit No. TN0020575

Whites Creek WWTP – NPDES Permit No. TN0024970

Dry Creek WWTP – NPDES Permit No. TN0020648

Report Date: January 12, 2021

Report Revision Date: March 29, 2021

**Prepared By: Metro Water Services' Environmental Compliance Section,
and
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Evaluation Summary

This report is a revision of the previous January 12, 2021 local limits evaluation report to address comments provided by Tennessee Department of Environment & Conservation (TDEC). All calculation appendices were revised with revisions highlighted. No revisions resulted in the change of selected industrial user local limits or plant protection criteria previously submitted on January 12, 2021. Monitoring and Management Services, LLC was contracted by Metro Water Services to evaluate the industrial user (IU) local limits and the plant protection criteria for Metro’s Central, Whites Creek, and Dry Creek Wastewater Treatment Plants (WWTPs). The plant protection criteria and local limits evaluation is required per Section 3.2 of the newly issued NPDES permits. The evaluation included calculations that used August 2018 – July 2020 monitoring results and flow data from the WWTPs and IUs. The allowable headworks loading for each WWTP and the IU local limits were based on the most stringent result of the following criteria:

- Prevention of Pass-Through of Pollutants to the Receiving Stream
- Prevention of Inhibition/Interference at the POTW
- Sludge Quality Protection,
- Worker Safety, and
- Corrosion

Thirty-three (33) pollutants of concern (POCs) were evaluated. The POCs included twenty-four (24) Tennessee Department of Environment and Conservation (TDEC) issued pass-through pollutants, and nine (9) other POCs based on either NPDES Permit limits, sludge quality protection, worker safety, or corrosion. The nine (9) other POCs include: biochemical oxygen demand-5 day (BOD₅), total suspended solids (TSS), oil and grease, ammonia, arsenic, molybdenum, selenium, xylene, and hydrogen sulfide. The POCs evaluated included:

Ammonia	Selenium	Trichloroethylene
Arsenic	Silver	1,2 trans Dichloroethylene
Cadmium	Zinc	Methylene Chloride
Chromium, Total	Cyanide, Total	Phenols, Total
Chromium, III *	Toluene	Naphthalene
Chromium, VI **	Benzene	Phthalates, Total
Copper	1,1,1 Trichloroethane	Xylene
Lead	Ethylbenzene	Hydrogen Sulfide
Mercury	Carbon Tetrachloride	BOD ₅
Molybdenum	Chloroform	TSS
Nickel	Tetrachloroethylene	Oil and Grease

* No pass-through limit for Central WWTP, Whites Creek WWTP, or Dry Creek WWTP (report only)

** No pass-through limit for Dry Creek WWTP (report only)

Industrial user local limits and plant protection criteria for all three (3) Metro Water Services WWTPs were calculated for twenty-nine (29) of the POCs evaluated. The other four (4) POCs included BOD₅, TSS, oil and grease, and hexavalent chromium. BOD₅, TSS, and oil and grease are compatible pollutants that have surcharge initiation concentrations established. To protect the WWTPs from compatible pollutant organic overload, “assessment level” indicators were calculated for each WWTP. The “assessment level” indicators have three (3) criteria that

Metro Water Services can monitor to ensure that organic overload from IU sources does not inhibit the WWTP's operation. The three (3) indicators include: WWTP allowable loading (90% level), total IU loading to each WWTP, and individual IU average concentration monitoring. TDEC issued pass-through limits for each WWTP that included monitoring for trivalent chromium with "Report Only" requirement. Historical data (2018-2020) for trivalent chromium for all of Metro's WWTPs showed all sample results below the analytical detection level. Also, a literature review of activated sludge, nitrification, and anaerobic digestion inhibition concentration levels for trivalent chromium were in the range of 10 mg/L to 130 mg/L. These concentrations were well above any total chromium plant protection criteria and IU local limit calculated. Thus, based on analyses results below detection level, and other inhibition criteria at high concentrations, plant protection criteria and an IU local limit for trivalent chromium was not established at this time.

The uniform concentration method was used to calculate the IU local limits, except for the BOD5, TSS, and oil & grease calculations that used industrial contributory flow. To provide for consistent opportunities for economic development, the WWTP with the most stringent calculated IU local limit for each POC was selected as the IU local limit for the entire Metro Water Services' jurisdiction. Based on the IU local limit calculations, none of the POCs had IU local limit results more stringent than the current IU local limits.

Removal efficiency changes, sludge volume and solids changes, more stringent pass-through limits, and WWTP flow changes can affect the plant protection criteria and IU local limits. Based on the evaluation, more stringent plant protection criteria limits are proposed for the following pollutants at each WWTP:

- **Central WWTP:** total chromium and lead
- **Whites Creek WWTP:** No changes
- **Dry Creek WWTP:** copper

The following pages' summary table compares the current IU local limits and proposed IU local limits (Table A), and compares the current and proposed Central, Whites Creek, and Dry Creek plant protection criteria (Table B)

Please submit questions or comments regarding the evaluation criteria and proposed Limits to:

MWS Environmental Compliance

- Email: ECO@nashville.gov subject line "Local Limits"
- Phone: 615-862-4591 Monday thru Friday 7:00am – 3:30pm
- Mail: 1360 County Hospital Road, Nashville, TN 37218

TABLE A

Metro Water Services Industrial User Limits Summary

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This is a summary of the local limits calculation results that were completed in December 2020.

Central Chromium VI revised from 2.31 to 2.36 on March 29, 2021

All results are expressed as mg/L.

Pollutant	Calculated CENTRAL WWTP IU Limits	Calculated WHITES CREEK WWTP IU Limits	Calculated DRY CREEK WWTP IU Limits	<i>Current IU Limit</i>	Proposed IU Limit for All WWTPs	Industrial User Local Limit Basis / Comments
Ammonia *1	300	300	300	300	300	Fume Toxicity. No change to limit.
Arsenic	4.5	7.8	3.01	1.0	1.0	Sludge Quality-DC. No change to limit
Cadmium	0.64	1.10	0.426	0.253	0.253	Passthrough-DC. No change to limit
Chromium, total	7.3	25.3	9.8	3.5	3.5	Passthrough-Central. No change to limit
Chromium, VI	2.36	3.99	NA	2.2	2.2	Passthrough-Central. No change to limit
Copper	20.6	28.2	11.4	5.0	5.0	Passthrough-DC. No change to limit
Lead	5.0	8.9	3.4	1.5	1.5	Passthrough DC. No change to limit
Mercury	0.040	0.070	0.0269	0.0055	0.0055	Passthrough-DC. No change to limit
Molybdenum	35.1	107.8	5.29	1.4	1.4	Sludge Quality-DC. No change to limit
Nickel	15.9	24.3	9.3	5.0	5.0	Inhibition. No change to limit
Selenium	81.6	266.5	13.2	1.0	1.0	Sludge Quality-DC. No change to limit
Silver	0.65	1.12	0.434	0.065	0.065	Passthrough-DC. No change to limit
Zinc	15.0	29.6	7.38	5.0	5.0	Passthrough-WC. No change to limit
Cyanide	2.6	4.54	9.62	2.0	2.0	Passthrough-Central. No change to limit
Toluene	9.5	16.4	5.89	0.82	0.82	Passthrough-DC. No change to limit
Benzene	0.63	1.09	0.42	0.27	0.27	Passthrough-DC. No change to limit
1,1,1 Trichloroethane	9.1	15.7	6.05	3.81	3.81	Passthrough-DC. No change to limit
Ethylbenzene	1.25	2.16	0.834	0.53	0.53	Passthrough-DC. No change to limit
Carbon Tetrachloride	1.75	3.02	1.17	0.35	0.35	Passthrough-DC. No change to limit
Chloroform	11.5	20.1	7.55	4.76	4.76	Passthrough-DC. No change to limit
Tetrachloroethylene	5.67	9.76	3.77	2.30	2.30	Passthrough-DC. No change to limit
Trichloroethylene	4.11	7.07	2.73	1.72	1.72	Passthrough-DC. No change to limit
1,2 trans dichloroethylene	0.155	0.266	0.103	0.069	0.069	Passthrough-DC. No change to limit
Methylene chloride	5.49	9.45	3.65	2.02	2.02	Passthrough-DC. No change to limit
Total Phenol	17.1	30.8	3.05	3.05	3.05	Passthrough-DC. No change to limit
Naphthalene	0.155	0.170	0.103	0.069	0.069	Passthrough-DC. No change to limit
Total phthalates	9.5	13.0	6.76	5.41	5.41	Passthrough-DC. More stringent.
Xylene	0.63	1.09	0.42	0.27	0.27	Passthrough-DC. No change to limit
Hydrogen Sulfide	0.5	0.5	0.5	0.5	0.5	Fume Toxicity. No change to limit.

*Other Prohibited Discharges are listed on page 2 of Industrial User Limits Summary

*1: Ammonia IU discharge limit is 300 mg/L. Surcharge initiation level is 30 mg/L.

TABLE A (continued)

1. Any discharge of the following compounds or materials is prohibited (*1):

(a) Polychlorinated Biphenyls (PCBs)

(b) Herbicides and Pesticides, including, but not limited to:

Aldrin	Endrin aldehyde	Methoxychlor
Chlordane	Guthion	Parathion
Demeton	Heptachlor	4,4-DDD
Dieldrin	Heptachlor epoxide	4,4-DDE
Endosulfan I	Hexachlorocyclo-hexane	4,4-DDT
Endosulfan II	Hexachlorocyclopentadiene	Alpha BHC, Beta BHC, Delta BHC, or Gamma BHC *
Endosulfan sulfate	Lindane	Tetrachlorodiphenylethane (TDE)
Endrin	Mirex	Toxaphene

* BHC: Benzene Hexachloride

(c) Organic compounds that include:

Acetone	Phenanthrene
Dioxin (TCDD)	2-butanone (MEK)
Hexane	4-methyl-2-pentanone (MIBK)

2. No Person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public, or private sewer, or treatment works in a quantity that will cause acute or chronic worker health and safety problems, or danger to the life and health of the public; or will cause any impact to the Metro sewer collection system or any Metro Wastewater Treatment Plant.

Organic pollutants subject to this restriction include but are not limited to:

Any organic compound listed in 40 Code of Federal Regulations 433.11(e) - Total Toxic Organics (TTO) list.

(*1) "Prohibited" means that these compounds shall not be discharged to the POTW. Any wastewater sample that detects these compounds will be considered a violation of the Metro Water Services' Local Limits.

TABLE B

Metro Water Services Wastewater Treatment Plant Protection Criteria

Calculations completed December 2020. Revisions on 3/29/2021 did not result in any limit changes.

All results expressed as mg/L.

: New or more stringent WWTP influent limit

Pollutant	CENTRAL WWTP			WHITES CREEK WWTP			DRY CREEK WWTP		
	<i>Current</i>	Calculated Limit Dec 2020	Proposed WWTP Influent Limit	<i>Current</i>	Calculated Limit Dec 2020	Proposed WWTP Influent Limit	<i>Current</i>	Calculated Limit Dec 2020	Proposed WWTP Influent Limit
Ammonia	33	37.6	33	33	55	33	33	50.8	33
Arsenic	<i>0.10</i>	0.10	0.10	<i>0.054</i>	0.10	0.054	<i>0.10</i>	0.10	0.10
Cadmium	<i>0.012</i>	0.015	0.012	<i>0.011</i>	0.015	0.011	<i>0.015</i>	0.015	0.015
Chromium, Total	<i>0.33</i>	0.172	0.172	<i>0.167</i>	0.333	0.167	<i>0.191</i>	0.333	0.191
Chromium, VI	<i>0.059</i>	0.063	0.059	<i>0.059</i>	0.063	0.059	NA	NA	NA
Copper	<i>0.32</i>	0.49	0.32	<i>0.325</i>	0.38	0.325	<i>0.49</i>	0.45	0.45
Lead	<i>0.12</i>	0.11	0.11	<i>0.12</i>	0.12	0.12	<i>0.12</i>	0.12	0.12
Mercury	<i>0.0010</i>	0.0010	0.0010	<i>0.0010</i>	0.0010	0.0010	<i>0.0005</i>	0.0010	0.0005
Molybdenum	<i>0.256</i>	0.767	0.256	<i>0.055</i>	1.37	0.055	<i>0.176</i>	0.176	0.176
Nickel	<i>0.31</i>	0.35	0.31	<i>0.183</i>	0.31	0.183	<i>0.31</i>	0.31	0.31
Selenium	<i>0.538</i>	1.79	0.538	<i>0.422</i>	3.38	0.422	<i>0.435</i>	0.435	0.435
Silver	<i>0.015</i>	0.020	0.015	<i>0.008</i>	0.020	0.008	<i>0.008</i>	0.020	0.008
Zinc	<i>0.50</i>	0.50	0.50	<i>0.48</i>	0.49	0.48	<i>0.50</i>	0.50	0.500
Cyanide	<i>0.064</i>	0.064	0.064	<i>0.060</i>	0.064	0.060	<i>0.324</i>	0.324	0.324
Toluene	<i>0.036</i>	0.214	0.036	<i>0.063</i>	0.214	0.063	<i>0.081</i>	0.214	0.081
Benzene	<i>0.015</i>	0.015	0.015	<i>0.015</i>	0.015	0.015	<i>0.015</i>	0.015	0.015
1,1,1 Trichloroethane	<i>0.200</i>	0.200	0.200	<i>0.200</i>	0.200	0.200	<i>0.200</i>	0.200	0.200
Ethylbenzene	<i>0.029</i>	0.029	0.029	<i>0.029</i>	0.029	0.029	<i>0.029</i>	0.029	0.029
Carbon Tetrachloride	<i>0.021</i>	0.039	0.021	<i>0.039</i>	0.039	0.039	<i>0.019</i>	0.039	0.019
Chloroform	<i>0.258</i>	0.258	0.258	<i>0.258</i>	0.258	0.258	<i>0.258</i>	0.258	0.258
Tetrachloroethylene	<i>0.125</i>	0.125	0.125	<i>0.125</i>	0.125	0.125	<i>0.125</i>	0.125	0.125
Trichloroethylene	<i>0.091</i>	0.091	0.091	<i>0.091</i>	0.091	0.091	<i>0.091</i>	0.091	0.091
1,2 trans dichloroethylene	<i>0.005</i>	0.005	0.005	<i>0.005</i>	0.005	0.005	<i>0.005</i>	0.005	0.005
Methylene chloride	<i>0.132</i>	0.132	0.132	<i>0.132</i>	0.132	0.132	<i>0.132</i>	0.132	0.132
Total Phenol	<i>0.258</i>	0.50	0.258	<i>0.19</i>	0.50	0.19	<i>0.163</i>	0.166	0.163
Naphthalene	<i>0.005</i>	0.005	0.005	<i>0.005</i>	0.005	0.005	<i>0.005</i>	0.005	0.005
Total phthalates	<i>0.230</i>	0.230	0.230	<i>0.219</i>	0.230	0.219	<i>0.230</i>	0.230	0.230
Xylene	<i>0.015</i>	0.015	0.015	<i>0.015</i>	0.015	0.015	<i>0.015</i>	0.015	0.015

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