Appendix E: Draft Preliminary Effluent Limits

MINNESOTA POLLUTION CONTROL AGENCY

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E-Mail Letter
E-Mailed: January 31, 2023

Mr. Mark Lundgren
390 North Robert St.
Minneapolis, MN 55101

RE: Preliminary Effluent Limits for the Proposed Met Council Crow River Regional Wastewater Treatment Plant

Dear Mr. Lundgren:

This electronic-letter is a response to your March 11, 2022 request for preliminary effluent limits. It summarizes the preliminary effluent limits for the new Met Council WWTP, Crow River Regional WWTP. The preliminary limits are draft values. Effluent limits only become final after the National Pollutant Discharge Elimination System (NPDES) permit has undergone a complete review, been public noticed, the public's comments considered and either our Commissioner or a delegated representative signs the permit.

Please be aware that receiving the preliminary effluent limits in the tables below does not mean that your proposed expansion/new discharge has been approved. As part of the permitting process, your project must comply with antidegradation requirements. You must demonstrate that the chosen project alternative is the least degrading prudent and feasible alternative. In many cases, the least degrading prudent and feasible alternative may not be your preferred option, or the option(s) discussed in this letter. (7050.0280, subp. 2).

Proposed scenarios description

The Metropolitan Council proposes to replace its Rogers WWTP with a new WWTP that will receive waste from an expanded service area. Roges WWTP will be decommissioned in 2031. The new plant, Crow River Regional WWTP, will initiate operation in 2030. The Metropolitan Council requested preliminary effluent limits for eight scenarios, a combination of four AWWDFs and two outfall locations.
Scenarios 1 and 5: Continuous discharge with 2.75 mgd AWWDF and 1.98 mgd ADWDF.
Scenarios 2 and 6: Continuous discharge with 4.75 mgd AWWDF and 3.42 mgd ADWDF.
Scenarios 3 and 7: Continuous discharge with 10.0 mgd AWWDF and 7.2 mgd ADWDF.
Scenarios 4 and 8: Continuous discharge with 20.3 mgd AWWDF and 14.85 mgd ADWDF.

In Scenarios 1 through 4 the receiving water will be Crow River (T120N, R23W, ¼ NE S17). In scenarios 5 through 8 the receiving water will be Mississippi River within assessment unit (AUID) 07010206-805 from the Crow River to St. Anthony Falls.

The Crow River does not have a "listed" use designation under Minnesota Rule 7050.0470, subpart 1-9 and associated tables. Under Minn. R. 7050.0430 subpart 1 such "unlisted" waters are given uses 2Bg, 3, 4A, 4B, 5 and 6.

The Mississippi River AUID 07010206-805, Crow River to St. Antony Falls has a listed use designation under Minnesota Rule 7050.0470 Subp. 4. From Crow R. to the northwestern city limits of Anoka, river mile 873.5, the water uses are 1C, 2 Bd, 3, 4A, 4B, 5 and 6. In addition, this river segment is classified as an outstanding resource value water (Nov 5, 1984).

Under Minn. R. 7053.0205, subp. 7, water quality must be protected down to the low flow $7Q_{10}$ for all pollutants except for ammonia-nitrogen (NH_3-N); the $30Q_{10}$ is used for NH_3-N calculations.

The $7Q_{10}$ at the proposed point of discharge in the Crow River is 19.9 cfs. For the proposed ADWDFs: 3.06, 5.29, 11.14 and 22.98 cfs, the dilution ratios (annual $7Q_{10}$ to ADWDF): are 6.5, 3.8, 1.8 and 0.9, respectively). With such little dilution, it is justified to have effluent limits more stringent than the standard secondary effluent limits for the conventional pollutants (Minn. R. 7053.0235).

Preliminary effluent limits

The preliminary effluent limits for Scenarios 1, 2,5 and 6 are in Table 1. The preliminary effluent limits for Scenarios 3, 4, 7 and 8 are in Table 2.

Table 1. Preliminary effluent parameter limits and mass loads, scenarios 1, 2, 5 and 6

	Existing Discharge		Scenario 1, Crow R		Scenario 5, Miss R		Scenario 2, Crow R		Scenario 6, Miss R	
AWWDF, mgd	0		2.75		2.75		4.75		4.75	
ADWDF, mgd	0		1.98		1.98		3.42		3.42	
Low river flow, $7Q_{10}$, cfs (mgd)	0		19.9 (12.9)		1354 (874.9)		19.9 (12.9)		1354 (874.9)	
Dilution Ratio, $7Q_{10}$:ADWDF	0		6.5		442		3.8		255.8	
Antideg review needed?	NA		Yes		Yes		Yes		Yes	
Environmental review needed?	NA		Yes		Yes		Yes		Yes	
Frozen Mass Limits Possible?	NA		Yes		Yes		Yes		Yes	
$CBOD_5$-Ammonia Linkage Eligible?	NA		Yes		NA		No		NA	
POLLUTANT / PARAMETER	Conc.	Mass	Conc.	Mass	Conc.	Mass	Conc.	Mass	Conc.	Mass
$CBOD_5$, mg/L, (kg/day)[0]	---	---	5[a]/15	---	25	---	15	---	25	---
TSS, mg/L, (kg/day)	---	---	30	---	30	---	30	---	30	---
Fecal Coliform Organisms, orgs/100 mL, year-round disinfection	---	---	200	NA	200	NA	200	NA	200	NA
Chlorine, total residual[1a], daily max, mg/L	--	--	0.038	--	0.038	--	0.038	--	0.038	--
Ammonia-N (June 1 - September 30)	--	--	5.4[a]/3	51/31.2	--	--	3	54	--	--
Ammonia-N (October 1 - November 30)	--	--	19.4	201.7	--	--	11.5	207	--	--
Ammonia-N (December 1 - March 31)	--	--	--/5	--/52	--	--	5	90	--	--
Ammonia-N (April 1 - May 31)	--	--	--/--	--/--	--	--	--	--	--	--
Dissolved Oxygen, mg/L	--	--	5.0	NA	--	NA	6.0	NA	--	NA
pH (Standard Unit)	---	---	6.0-9.0	NA	6.0-9.0	NA	6.0-9.0	NA	6.0-9.0	NA
Copper average monthly, ug/L, (g/d)	---	---	---	---	---	---	---	---	---	---
Mercury, mg/d	--	--	--	--	--	--	--	--	--	--
Selenium, g/d	--	--	--	--	--	--	--	--	--	--
Sulfate, mg/L	--	--	--	--	--	--	--	--	--	--
Phosphorus, Jan – Dec, mg/L, (kg/yr)	---	---	1	1,771	1	1,771	1	1,771	1	1,771
Phosphorus, Jun – Sep, kg/d or	--	---	--	3.4	--	3.4	--	3.4	--	3.4
Phosphorus, Jun – Sep, µg/L				263		263		263		263
Chloride as monthly average, mg/L (kg/day)	--	--	--	--	--	--	--	--	--	--

NA: Not applicable.

[0]Modeling work needs to be done to determine if 15 mg/L is protective enough of downstream dissolved oxygen in the Crow River. See details in Antidegradation paragraph.
[a]Scenario 1 Met Council may choose to have a 5 mg/L $CBOD_5$ and higher ammonia seasonal limits or choose to have 15 mg/L $CBOD_5$ and lower ammonia limits ($CBOD_5/NH_3$ linkage).
[1a]Total residual chlorine limit if chlorine is used for disinfection of the wastewater.

The total phosphorus monthly limit of 3.4 in kilograms per day (kg/day), June - September, is consistent with river eutrophication standards (RES). The WQBEL of 3.4 kg/day is based off a five-year long-term average waste load allocation (WLA) of 1.6 kg/day, June-September. The long-term average WLA of 1.6 kg/day is based on achieving RES 125 µg/L in the Crow River. The MPCA projects that by complying with the 3.4 kg/day monthly limit, the MCES Rogers/Crow River Regional WWTF will have to average 1.6 kg/day, June-September, over a five-year/long-term period. After the five-year permit cycle, MPCA will evaluate the facility's discharge and the downstream water quality. And if necessary, adjust the facility's 3.4 kg/day monthly average limit down to ensure that the long-term average WLA of 1.6 kg/day is achieved during the June-September effective period. A concentration limit of 263 µg/L and a long-term average of 125µg/L June-Sept. would also be an option in places of the based mass river eutrophication limit and long-term target. If the facility discharges to the Mississippi River, the waste load allocation and limit recommendations will be the same. In addition, Lake or River eutrophication WLA and limits could increase based on water quality trading or if Crow River Regional WWTP takes over an existing WWTP. The additions would need to assure that all downstream WLA are being met.

Table 2. Preliminary effluent parameter limits and mass loads, scenarios: 3, 4, 7 and 8

	Scenario 3, Crow R		Scenario 7, Miss R		Scenario 4, Crow R		Scenario 8, Miss. R	
AWWDF, mgd	10.0		10.0		20.3		20.3	
ADWDF, mgd	7.2		7.2		14.85		14.85	
Low river flow, $7Q_{10}$, cfs (mgd)	19.9 (12.9)		1354 (874.9)		19.9 (12.9)		1354 (874.9)	
Dilution Ratio, $7Q_{10}$: ADWDF	1.8		121.5		0.9		58.9	
Antideg review needed?	Yes		Yes		Yes		Yes	
Environmental review needed?	Yes		Yes		Yes		Yes	
Frozen Mass Limits Possible?	Yes		Yes		Yes		Yes	
$CBOD_5$-Ammonia Linkage Eligible?	No		NA		No		NA	
POLLUTANT / PARAMETER	Conc.	Mass	Conc.	Mass	Conc.	Mass	Conc.	Mass
$CBOD_5$, mg/L, (kg/day)[0]	**15**	--	25	--	**15**	--	25	--
TSS, mg/L, (kg/day)	30	--	30	--	30	--	30	--
Fecal Coliform Organisms, orgs/100 mL (Jan – Dec)	200	--	200	--	200	--	200	---
Chlorine, total residual[1a], daily max, mg/L	0.038	--	0.038	--	0.038	--	0.038	--
Ammonia-N (June 1 - September 30)	1.9	72.6	--	--	1.2	94.1	--	--
Ammonia-N (October 1 - November 30)	5.9	222.5	--	--	3.3	246.4	--	--
Ammonia-N (December 1 - March 31)	11.6	439	--	--	6.5	495.8	--	--
Ammonia-N (April 1 - May 31)	16.8	637.6	--	--	8.6	649.8	--	--
Dissolved Oxygen, mg/L	6	NA	--	--	6	NA	--	---
pH (Standard Unit)	6.0 - 9.0	---	6.0 - 9.0	--	6.0 - 9.0	---	6.0 - 9.0	---
Copper average monthly, ug/L, (g/d)	--	--	--	--	--	--	--	--
Mercury, mg/d	--	--	--	--	--	--	--	--
Selenium, g/d	--	--	--	--	--	--	--	--
Sulfate, mg/L	--	--	--	--	--	--	--	--
Phosphorus, Jan – Dec, mg/L, (kg/yr)	1	1,771	1	1,771	1	1,771	1	1,771
Phosphorus, Jun – Sep, (kg/d)	--	3.4	--	3.4	--	3.4	--	3.4
Chloride as monthly average, mg/L, (kg/day)	--	--	--	--	--	--	--	--

NA: Not applicable.

[0]Modeling work needs to be done to determine if 15 mg/L is protective enough of downstream dissolved oxygen in the Crow River. See details in Antidegradation paragraph.

[1a]Total residual chlorine limit if chlorine is used for disinfection of the wastewater.

The total phosphorus monthly of 3.4 in kilograms per day (kg/day), June - September, is consistent with river eutrophication standards (RES). The WQBEL of 3.4 kg/day is based off a five-year long-term average waste load allocation (WLA) of 1.6 kg/day, June-September. The long-term average WLA of 1.6 kg/day is based on achieving RES 125 µg/L in the Crow River. The MPCA projects that by complying with the 3.4 kg/day monthly limit, the MCES Rogers/Crow River Regional WWTF will have to average 1.6 kg/day, June-September, over a five-year/long-term period. After the five-year permit cycle, MPCA will evaluate the facility's discharge and the downstream water quality. And if necessary, adjust the facility's 3.4 kg/day monthly average limit down to ensure that the long-term average WLA of 1.6 kg/day is achieved during the June-September effective period. A concentration limit of 263 µg/L and a long-term average of 125µg/L June-Sept. would also be an option in places of the based mass river eutrophication limit and long-term target. If the facility discharges to the Mississippi River, the waste load allocation and limit recommendations will be the same. In addition, Lake or River eutrophication WLA and limits could increase based on water quality trading or if Crow River Regional WWTP takes over an existing WWTP. The additions would need to assure that all downstream WLA are being met.

It should also be noted that the MPCA is currently developing new and/or revised water quality standards for nitrate and/or ammonia. Once this process has been completed, additional nitrate and/or ammonia effluent limits may be applied to this facility. This should be considered when designing a wastewater treatment facility. The appendix contains the proposed seasonal ammonia concentration limits based on the existing standard and the limits based on the adoption of 2013 USEPA ammonia criteria.

Antidegradation

Antidegradation is one of the fundamental protections in the Clean Water Act, and all newly issued or re-issued wastewater permits must comply with both state and federal antidegradation rules. The goal of antidegradation is to preserve waters of high quality and to ensure that they are not degraded unless balanced by important economic or social development. See Minn. R. 7050.0250 to 7050.0335. The antidegradation assessment process may result in more restrictive effluent limits than are included in this letter.

For wastewater permitting, antidegradation concerns are triggered when a new discharge is proposed or when an existing discharger is proposing to increase the loading of any parameter of concern in its discharge.

An antidegradation assessment is a substantial evaluation that must consider all beneficial uses of the receiving water, potential economic impacts, all possible treatment options and the potential environmental degradation for every pollutant that triggers the need for an antidegradation assessment. The applicant must demonstrate that the chosen project alternative is the least degrading prudent and feasible alternative. The applicant must also examine the socioeconomic impacts of the project as compared to the environmental changes in water quality. The environmental degradation must be offset by the socioeconomic benefit.

This is a new wastewater treatment plant and Met Council will need to do an antidegration review for the parameters listed in Table 1 (which are the same as those in Table 2). Mercury, selenium, copper, and chloride are known to be in the wastewater that this new facility will receive from the decommissioned Rogers WWTP.

The lower Crow River downstream of Delano is an area of rapid urban growth. The addition of effluent from Crow River Regional plant may pose a potential winter and summer dissolved oxygen (DO) problem.

Due to freezing temperatures in the receiving water, organic pollutants decay at a much lower rate than in summer, but they still decay. In decaying they consume oxygen. Under winter conditions (freezing temperatures, days of weak sunlight, ice and snow cover on the river surface) aquatic vegetation is either dormant or produces insignificant amounts of oxygen. The river's ice cap is a physical barrier that prevents oxygen replenishment in the river from atmospheric oxygen. Under such conditions, when a stream's DO is depressed, it takes 20-40 miles for the DO to recover. For a typical summer low dilution ratio conditions, it takes DO to recover 3-6 miles.

The impact zone from the Crow Regional WWTP outfall in the Crow River will overlap that of Otsego East, which is about 5.5 miles downstream of the proposed outfall, and probably result in a cumulative impact. Modeling will need to be done to determine if a 15 mg/L $CBOD_5$ is protective of dissolved oxygen on the segment of the Crow River from the proposed outfall to the mouth of the Crow River.

The applicant must submit the antidegradation assessment to the Minnesota Pollution Control Agency (MPCA). The MPCA staff will review the assessment to determine if it satisfies state and

federal rules. The MPCA has developed a guidance document for developing antidegradation assessments that you may find helpful.

Antidegradation assessments frequently require applicants to carry out additional water quality monitoring of receiving waters upstream and downstream of the discharge to ensure appropriate water quality evaluations. The water quality monitoring required for an antidegradation assessment is permit-specific and is intended to fill gaps in existing water quality knowledge. The MPCA can provide water quality monitoring data that is currently available for the receiving water upon request.

Monitoring requirements

Monitoring for the following parameters will be required in addition to the NPDES permit monitoring requirements for the parameters that have limits in Tables 1 and 2.
Total and dissolved mercury and TSS grab sample when taking the mercury sample.
Nitrogen series: nitrate + nitrite, total Kjeldahl nitrogen (TKN), ammonia.
Salty parameters: bicarbonate, hardness, chloride, TDS, specific conductance, calcium, sodium, magnesium, and potassium.
Priority pollutant scan, three times during the life of the permit.
Chronic whole effluent toxicity (WET) testing for discharges to the Crow River and acute whole effluent toxicity testing for discharges to the Mississippi River.

TMDL

This facility would be included in the South Metro Mississippi TSS TMDL; Lake Pepin and Mississippi River Eutrophication TMDL; and Statewide mercury TMDL. If the facility discharges to the Crow River, the North Fork Crow and Lower Crow Bacteria, turbidity and low DO TMDL would apply to this facility.

Environmental review

Met Council needs to complete and submit online, the Environmental Review pre-screening form (p-ear1-08, https://www.pca.state.mn.us/sites/default/files/p-ear1-08.docx) to document if a mandatory EAW is triggered for the new Crow River Regional WWTP.
Mr. Dan Card (dan.card@state.mn.us) is the unit supervisor.

Wetlands

Since the construction activities will alter a wetland, the Permittee should contact Mark Gernes (MPCA) at
651-757-2387 or via email at mark.gernes@state.mn.us. Wetland mitigation is required if construction within any part of an existing wetland results in that wetland's physical alteration (Minn. R. 7050.0186). Wetland sequencing from the construction impacts requires consideration of alternatives that avoid, minimize, and replace lost wetland designated uses.

The Permittee will need to follow up with Mr. Ben Carlson, Wetland Specialist, Carver, Dakota, Hennepin, and Scott Counties, Minn. Board of Water & Soil Resources (bern.carlson@state.mn.us) and with Mr. David Studenski, US Army Corps of Engineers, Regulatory Division (david.a.studenski@usace.army.mil).

Regulatory Certainty

In response to listening session comments, a proposed, voluntary option — part of the Governor's Community Water Infrastructure bonding investment package — could provide up to 20 years of regulatory certainty for wastewater treatment facilities that are willing to design, construct, and fully operate a biological nutrient removal (BNR) treatment system. BNR systems remove both phosphorous and nitrogen and are considered the best available technology for wastewater treatment. BNR is the only known cost-effective wastewater removal technology for nitrogen.

Once the BNR system is in place, the facility would not be required to comply with any new phosphorous or nitrogen limits, beyond those in their discharge permit, for the estimated useful life of new BNR system. The proposal is linked to a bonding request for water infrastructure grants and is intended to incentivize facility upgrades to BNR systems.

Communities that volunteer to participate by installing BNR systems would comprehensively address all nutrients for up to 20 years and obtain regulatory certainty. Over time, communities could also save money by reducing both energy use and the purchase of chemicals for phosphorus removal. Water quality in Minnesota lakes and rivers would benefit from treatment plants converting to the best available technology and because Minnesota is home to the headwaters of the Mississippi River, the Great Lakes, and the Red River of the North, the impact of reducing phosphorus and nitrogen in the state will be felt in all our downstream waters, including the Hudson Bay, the Gulf of Mexico, and the Great Lakes.

Please contact me with any questions,

Sincerely,

Aida Mendez, PhD, PE
Minnesota Pollution Control Agency
651-757-2566
Aida.Mendez@state.mn.us

Appendix

Total ammonia chronic concentration limits, mg/L

AWWDF, mgd	Method	Jun-Sep	Oct-Nov	Dec-Mar	Apr-May
2.75	Current	5.4/3	19.4	--/5	NA
	2013 USEPA	4.7/3	15.4	15.1/5	NA
4.75	Current	3.4	11.5	22.8	NA
	2013 USEPA	3.0	9.2	9.6	NA
10.0	Current	1.9	5.9	11.6	16.8
	2013 USEPA	1.7	4.7	5.6	14.5
20.3	Current	1.2	3.3	6.5	8.6
	2013 USEPA	1.1	2.6	3.7	7.4

Note: ammonia concentration is a function of pH and temperature. The effluent temperature was based on median of medians of effluent temp for Brainerd WWTP, MCES-Metro & MCES-Empire 2017/2018-2022