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December 16, 2016

Wastewater Treatment Facility – Mercury Minimization Plan

City of Rushford, MN

BMI Project No. H19.111249

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WASTEWATER TREATMENT FACILITY
MERCURY MINIMIZATION PLAN

CITY OF RUSHFORD, MINNESOTA

DECEMBER 16, 2016

BMI Project No. H19.111249

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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Date 12/16/16

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SECTION 1 INTRODUCTION

A. SCOPE OF PLAN

The City of Rushford owns and operates a wastewater treatment facility which provides treatment to municipal wastewater generated from residences and businesses in Rushford. The City operates this wastewater treatment facility under the terms of the National Pollutant Discharge Elimination System (NPDES) and State Disposal System (SDS) Permit Number MN0024678. Under the terms of this permit, the City is required to develop and implement a Mercury Minimization Plan (MMP). The purpose of this plan is to establish a background of the amount of mercury currently discharged from the City's wastewater treatment facility, identify potential contributors of mercury into the wastewater treatment system, and develop a plan for the reduction of the amount of mercury discharged by the facility.

Included in this plan are the following:

- Existing conditions, including a summary of mercury monitoring over the past three (3) years.
- Identification of potential sources of mercury in the community.
- Implementation plan for mercury management.
- Minnesota Pollution Control Agency (MPCA) Mercury Minimization Plan Guide and Sector Worksheets.

SECTION 2 EXISTING CONDITIONS

A. TREATMENT FACILITIES

The Rushford Wastewater Treatment Facility was originally constructed in 1983 and utilizes the activated sludge process for biological treatment of municipal wastewater generated by residences and businesses throughout the City of Rushford. The original construction consisted of a single oxidation ditch facility, which was upgraded in 1996 to treat the current average wet weather design flow of 0.330 MGD. The Class C facility has a continuous discharge (SD001) to the Root River, which is a Class 2B, 3C, 4A, 4B, 5, 6 surface water suitable for aquatic recreational activities. The current treatment facility consists of the following components:

- *Collection System* – consists of nine (9) lift stations and gravity sewer piping ranging from 6 to 10 inches in diameter (PVC, VCP, and RCP materials). The lift stations and sewer piping have various construction dates.

- *Screening* – the original manual bar screen was installed in 1983. In 1996, a mechanical fine screen was installed while the manual screen is now used as a bypass. The fine screen has ¼" openings and is automatically cleaned.

- *Grit Removal* – consists of a dual-trough system originally installed in 1983.

- *Parshall Flume* – 3-inch flume originally installed in 1983. The flume is rated for a flow rate of 814 gpm and is in good operating condition.

- *Oxidation Ditches* – the original 150,000 gallon single-train oxidation ditch was constructed in 1983. In 1996, an additional oxidation ditch was constructed and increased the overall volume to 330,000 gallons. Each oxidation ditch is equipped with two (2), 10 HP rotors for mixing and aeration.

- *Final Clarifiers* – the two (2) existing 28-foot diameter, center-feed style clarifiers were constructed in 1996 and 2012, respectively. The original 18-foot diameter clarifiers constructed in 1983 were demolished in a recent improvements project.

- *RAS/WAS Pumping* – the existing 7.5 HP RAS pump was installed in 2001 and is used to pump settled mixed liquor from the Final Clarifiers back to the Oxidation Ditches. The existing 10 HP WAS pump was installed in 1996 and pumps sludge from the Final Clarifiers to the solids processing system.

- *UV Disinfection* – consists of a single-channel system originally installed in 1996.

- *Effluent Flow Metering* – 90 degree V-notch weir with ultrasonic level transducer for metering of effluent flow from the treatment process.

- *Influent & Effluent Samplers* – automatic, flow-paced samplers that take 24-hour composite samples of the influent and effluent wastewater.

- *Effluent Lift Station* – consists of two (2) 1,200 gpm pumps originally constructed in 1983.

- *Outfall* – consists of 70 feet of 8-inch cast iron forcemain and 340 feet of 12-inch VCP gravity sewer piping. The outfall discharges to the Root River along the south side of the facility.

- *Aerobic Digesters* – the original 28-foot diameter aerobic digester has a capacity of 30,000 gallons and was constructed in 1983. In 2012, a new 45-foot diameter aerobic digester was constructed to increase biosolids treatment capacity.

- *Sludge Holding Tank* – consists of a 60-foot diameter, 211,500 gallon capacity sludge holding tank. The tank is not aerated.

(Note: there are no chemicals utilized in the treatment process)

Metals, including mercury, are discharged from the wastewater treatment facility in two ways: 1) wastewater effluent to the Root River and 2) land application of treated biosolids. Mercury is largely removed from the liquid wastewater stream with solids captured in the treatment process and, thus, mercury accumulates in the residual biosolids. Before land applying biosolids, the operators must sample the sludge to ensure mercury levels are below the permitted threshold concentration of 57 mg/kg. Multiple samples are necessary if the concentration exceeds 28 mg/kg.

B. MERCURY MONITORING IN WASTEWATER

Mercury monitoring has been implemented for the wastewater influent and effluent. Rushford's NPDES Permit requires influent and effluent mercury monitoring in January and July of each year. Monitoring data for the years 2013 to 2015 was obtained from the MPCA online wastewater data browser. Monitoring data for 2016 was incomplete and, therefore, was not evaluated. Table 2.1 shows the monitoring results.

The average mercury influent and effluent concentrations over the three-year sampling period is 159.62 ng/L and 1.66 ng/L, respectively. According to the U.S. Environmental Protection Agency (U.S. EPA), typical mercury concentrations in treated wastewater effluent range from 1 to 20 ng/L. The City of Rushford is on the very low end of this range, which indicates much of the influent mercury is being removed in the sludge processes. Table 2.2 summarizes annual mercury removal for the past three years (2013-2015). Average removal of influent mercury has been over 99%.

TABLE 2.1
Influent & Effluent Mercury Monitoring

Month/Year	Influent				Effluent			
	Flow (MG)	Flow (MGD)	Mercury Inf. (ng/L)	Mercury Inf. (mg/day)	Flow (MG)	Flow (MGD)	Mercury Eff. (ng/L)	Mercury Eff. (mg/day)
Jan-13	3.80	0.122	224	103.38	3.50	0.114	1.7	0.73
Jul-13	4.88	0.156	101	59.60	4.30	0.139	0.931	0.49
Jan-14	3.56	0.115	86.7	37.72	3.92	0.128	2.04	0.99
Jul-14	4.24	0.190	382	274.57	4.26	0.137	0.382	0.20
Jan-15	3.20	0.100	67	25.35	2.70	0.090	3.1	1.06
Jul-15	3.10	0.100	97	36.69	2.60	0.080	1.8	0.54
Yearly Totals								
2013	55.11	0.151	162.50	92.98	4.37	0.144	1.32	0.71
2014	46.08	0.131	234.35	115.91	3.87	0.127	1.21	0.58
2015	38.03	0.104	82.00	32.34	2.66	0.086	2.45	0.80
3-year Average	46.41	0.127	159.62	76.77	43.61	0.119	1.66	0.75

TABLE 2.2 Annual Mercury Removal				
Parameter	**2013**	**2014**	**2015**	**Totals**
Influent				
Annual Flow (MG/yr)	55.11	46.08	38.03	139.22
Mercury Conc. (ng/L)	162.50	234.35	82.00	159.62
Mercury Loading (mg/yr)	33,878	40,852	11,797	86,527
Effluent				
Annual Flow (MG/yr)	52.46	46.49	31.88	130.83
Mercury Conc. (ng/L)	1.32	1.21	2.45	1.66
Mercury Loading (mg/yr)	261	213	295	769
Percent Removal	99.23%	99.48%	97.50%	99.11%

C. MERCURY MONITORING IN BIOSOLIDS

Biosolids generated at the wastewater treatment facility are tested for metals, including mercury, twice per year. The City of Rushford's NPDES permit states that the biosolids applied to the land must not exceed the ceiling concentration of 57 mg/kg of mercury and must be applied so that the cumulative mass of mercury is greater than 15 lbs./acre. Table 2.3 shows the mercury testing results between the years of 2013 to 2016.

TABLE 2.3 Biosolids Mercury Monitoring Data		
Month/Year	Mercury Concentration (mg/kg)	Mercury Loading (lbs./acre)
Oct-13	0.098	0.0002
Apr-14	1.280	0.0020
Oct-14	0.960	0.0017
Apr-15	1.040	0.0023
Oct-15	0.906	0.0019
Apr-16	0.557	0.0010
Average	0.807	0.0015

Biosolids mercury concentration and mass loadings are well below the City's permitted threshold values. The average concentration of mercury in the facility's biosolids over the past three years was 0.807 mg/kg (or 0.807 ppm). Typical ranges for mercury concentration in biosolids is 1 to 20 ppm. By all measures, mercury levels in the facility's residual biosolids are well within expected ranges and do not pose a risk to agricultural land applications.

SECTION 3 IDENTIFICATION OF POTENTIAL SOURCES OF MERCURY IN THE COMMUNITY

A. TYPICAL MERCURY SOURCES IN A COMMUNITY

Mercury is discharged to the Rushford Wastewater Treatment Facility through the collection system by the users of the system. Thus, identification of the potential sources of mercury is the first step in minimizing the discharge of mercury from the wastewater treatment facility. The following is a list of activities or businesses which have historically shown the potential to be significant sources of mercury.

- Hospitals
- Dentists
- Septic Haulers
- Industrial Laundries
- Laboratories
- Veterinary Clinics
- Printing Industry
- Pottery and Arts
- Automobile Service
- Painting and Paint Stripping
- Scrap Dealers
- Landfill Leachate

B. IDENTIFICATION OF SOURCES BY SECTORS

Appendix A contains worksheets developed by the Minnesota Pollution Control Agency (MPCA) for each of the following sectors:

- Dentist facilities
- Industrial facilities
- Medical facilities
- Residential
- Schools

These worksheets will be utilized during the implementation of the mercury minimization plan to develop a list for facility audits and targeted mailings.

SECTION 4 IMPLEMENTATION PLAN FOR MERCURY MANAGEMENT

A. IMPLEMENTATION TIMELINES

The City of Rushford will implement a Mercury Minimization Plan over the next five years. The activities which will be included over this time period, and the timeline for implementation, are presented in Table 4.1.

TABLE 4.1
Implementation Schedule

	Action Items	Responsible Party	Timeline
1	Develop Mercury Minimization Plan (MMP)	WWTF Staff	July 2016 – January 2017
2	Continue monitoring mercury in WWTF influent and effluent	WWTF Staff	Ongoing as required by NPDES Permit
3	Conduct audits of high priority potential sources	WWTF Staff	Complete audits by August 2017
4	Conduct phone survey of high priority potential sources not scheduled for auditing	WWTF Staff / Administration	Complete surveys by August 2017
5	Conduct mass mailing to all system users	Administration	One (1) mailing annually. Beginning in Summer 2017.
6	Prepare materials for public display, take part in public display and educating public regarding mercury	WWTF Staff / Administration	Display at appropriate public events. Beginning 2017.
7	Evaluate data collected during audits and surveys and implement mercury minimization strategies as applicable.	WWTF Staff / Administration	Complete by the end of 2018
8	Update the Mercury Minimization Plan as part of NPDES permit renewal	WWTF Staff	Complete as required by NPDES permit

B. PRIORITIZATION OF ACTIVITIES

Activities identified above will be targeted at specific sectors. Audits will be prioritized based on maximizing potential impact. Audits will thus be initiated in the following order:

1. Dental facilities
2. Medical facilities
3. Industrial facilities
4. Schools

APPENDIX A

MINNESOTA POLLUTION CONTROL AGENCY (MPCA) WORKSHEETS

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Mercury Minimization Plan Guide

National Pollutant Discharge Elimination System (NPDES) Wastewater Program

Doc Type: Pollutant Minimization Plans

Additional Information on Page 8

Instructions: This guide was created to assist you in completing your Mercury Minimization Plan (MMP). The guide provides details on each of the five steps and suggested resources to complete the information. The attached Sector Worksheets can be used to record your plan and implementation of the activities to provide future mercury reductions. Additional information can be found on page 8.

Facility Information

Date (mm/dd/yyyy): 12/16/2016

Facility name: Rushford Wastewater Treatment Facility Permit No.: MN0024678

Facility address: PO Box 430

City: Rushford State: MN Zip code: 55971

Preparer name: Kris Swanson, Bolton & Menk, Inc. Preparer's telephone: (507) 625-4171

Background

Mercury is present in all municipal and many industrial wastewater discharges. Mercury is a powerful neurotoxin that affects human health and the environment. A naturally-occurring element, mercury does not breakdown into less harmful substances over time. Instead, mercury released into the environment accumulates in fish and animal tissues, a process known as bioaccumulation. Widespread mercury contamination has prompted the Minnesota Department of Health to issue fish consumption advisories throughout the state. Most of Minnesota's impaired waters are contaminated by mercury and other bio-accumulative toxins. The Minnesota Pollution Control Agency (MPCA) is carefully evaluating all mercury discharges in the state.

Provide a Facility Description Update

The MPCA has a facility description from the most recent permit application. In order to review and process your MMP to make sure that it meets permit requirements, it would be helpful to:

1. Briefly describe any changes in your facility, collection system or operation process in the last five years, including changes in industrial, commercial or institutional users or their discharges in Table A.
2. Record any place within the facility where you are monitoring for mercury and the results in Table B.

Table A – Changes in your facility

Change	2011	2012	2013	2014	2015
Facility	N/A	New Final Clarifier and Aerobic Digester	N/A	N/A	N/A
Collection System	Sewer improvements on 5 streets	N/A	N/A	Sewer improvements on TH 43/Mill Street	N/A
Operation Process	N/A	N/A	N/A	N/A	N/A
Changes in Industrial Users (added or removed)	N/A	N/A	N/A	N/A	N/A
Other					

Table B – Monitoring for Mercury

Location	Results
WS-001 (Influent Waste Stream)	See Attachment #1 for results from January 2013 to December 2015
SD-001 (Effluent Stream to Surface Water)	See Attachment #1 for results from January 2013 to December 2015

Step 1: Measure Your Wastewater Treatment Facilities (WWTFs) Influent, Effluent, and Biosolids Mercury Concentrations

Compile influent and effluent mercury measurements taken at the WWTF

Some facilities may not have data at this time. If data has been collected in the past, provide a summary of mercury influent and effluent concentrations and biosolids monitoring data, using the most recent five years of monitoring data. Most operators can expect changes in mercury levels over time due to daily, seasonal or annual variations; as a result of changes in facility operations or contributions from business or domestic sources. Business sources include industrial, commercial and institutional users. Note any trends and describe in the MMP.

Working your data into a MMP

You can use *Discharge Monitoring Reports* (DMR) or *Supplemental Report Forms* (daily values) to complete Tables A and B. Additional monitoring beyond what is required by your NPDES Permit may be useful for preparing your MMP.

Mass load

Determining mass loading estimates from individual sources to a WWTF will help decide where to best remove the most mercury from the influent to most effectively reduce the discharger's effluent concentrations. The more mass influent removed, the more likely effluent will respond accordingly.

Usually WWTF operators use concentration (nanograms per liter or ng/L) to describe mercury levels. To calculate mass load in the table, multiply the concentration and the flow (million gallons per day or MGD) by 3.785—a conversion factor.

For WWTFs with industrial, commercial, and institutional users, mass load will be useful for goal setting later in this guide.

Mass load (mg/day) = Flow (MGD) x Concentration (ng/L) x 3.785

Record data in Table C, or submit your own spreadsheets.

If you submit your own spreadsheets, attach copies at the end of your MMP. (There is no need to duplicate information in this Microsoft Word table.) Complete one table for each year of data. Insert additional tables as needed.

Table C – W WTF calendar month average influent and effluent data

(See Attachment #1 for DMR data between the months of January 2013 to December 2015)

	Year:						**Year:**					
	Influent			**Effluent**			**Influent**			**Effluent**		
	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)
Jan												
Feb												
Mar												
Apr												
May												
Jun												
Jul												

Aug												
Sep												
Oct												
Nov												
Dec												
Annual average												

Table D – Flow/Load Information

(See Attachment #2 for calculation of Table D values – calculation includes monitoring data from 2015)

Summary Data	Value	Unit	Formula	Mg	Grams
Annual influent flow	31.88	MG	Annual average influent flow (MGD) x 365	-	-
Annual effluent flow*	38.03	MG	Annual average effluent flow (MGD) x 365 (if available)	-	-
Annual influent mercury load	9,888	mg/yr	Annual influent flow [million gallons (MG)] x Annual average influent mercury concentration (ng/L) x 3.785	9,888	9.888
Annual effluent mercury load	352	mg/yr	Annual effluent flow* (MG) x Annual average effluent mercury concentration (ng/L) x 3.785	352	0.352
Mercury percent removal	96.44	%	[Annual average concentration (ng/L) - Annual average effluent concentration (ng/L)] / Annual average influent concentration (ng/L) x 100	-	-

mg = milligrams *ng/L = nograms per Lister*
mg/yr = milligrams per year *MGD = million gallons per day*

The examples below show how potential inputs would result in answers for the table on the preceding page. Insert your plant's input numbers to determine answers.

Influent example

4.0 MGD x 365 days/year x 120 ng/L influent mercury concentration x 3.785 = 663,132 mg/yr or 663.1 grams/year (divide by 1000 to convert to grams)

Effluent example

3.9 MGD x 365 days/year x effluent mercury concentration 4 ng/L x 3.785 = 22,552 mg/yr or 22.6 grams/year (divide by 1000 to convert to grams.)

Step 2: Evaluate the Mercury Reduction Potential of Your Users

Many sources of mercury discharge into your wastewater treatment plant. As appropriate for your facility, you should consider dental clinics, hospitals, medical clinics, nursing homes, schools, and industries with potential for mercury contributions. You may need to consult with other municipal staff to identify all possible contributing industrial, commercial and institutional sources, especially small operations.

Determining existing and potential sources of mercury concentrations and/or loading to the facility is actually three sub-steps, identify, measure (monitor) and prioritize those that could result in the greatest reduction.

Identify

Identify a list of potential mercury dischargers by reviewing the attached sector worksheets and start recording your sources. Sector Worksheets are available for:

- Medical facilities
- Dental facilities

ATTACHMENT #1

RUSHFORD, MN - MERCURY MINIMALIZATION PLAN

Influent and Effluent Sample Results (January 2013 - December 2015)

Year: 2013

	Influent			Effluent		
Month	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)
Jan	0.122	224.0	103.38	0.114	1.7	0.73
Feb	0.121			0.11		
Mar	0.126			0.115		
Apr	0.190			0.193		
May	0.240			0.223		
Jun	0.237			0.218		
Jul	0.156	101.0	59.60	0.139	0.931	0.49
Aug	0.128			0.113		
Sep	0.121			0.118		
Oct	0.128			0.119		
Nov	0.124			0.131		
Dec	0.122			0.129		
Average	0.151	162.50	92.98	0.144	1.32	0.71

Percent Removal = 99.23%

Year: 2014

	Influent			Effluent		
Month	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)
Jan	0.115	86.7	37.72	0.128	2.04	0.99
Feb	0.137			0.163		
Mar	0.157			0.163		
Apr	0.158			0.159		
May	0.131			0.124		
Jun	0.136			0.139		
Jul	0.190	382	274.57	0.137	0.382	0.20
Aug	0.125			0.122		
Sep	0.110			0.100		
Oct	0.110			0.100		
Nov	0.110			0.090		
Dec	0.090			0.100		
Average	0.131	234.4	115.91	0.127	1.211	0.58

Percent Removal = 99.48%

Year: 2015

	Influent			Effluent		
Month	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)
Jan	0.100	67	25.35	0.090	3.1	1.06
Feb	0.100			0.080		
Mar	0.110			0.090		
Apr	0.110			0.090		
May	0.110			0.080		
Jun	0.100			0.080		
Jul	0.100	97	36.69	0.080	1.8	0.54
Aug	0.100			0.085		
Sep	0.103			0.088		
Oct	0.104			0.088		
Nov	0.105			0.090		
Dec	0.109			0.096		
Average	0.104	82.0	32.34	0.086	2.45	0.80

Percent Removal = 97.50%

ATTACHMENT #2

RUSHFORD, MN - MERCURY MINIMALIZATION PLAN

Last 12 Months of Operating Data - Percent Removal Calculation

Time Period: 2015 Monitoring Data

	Influent			Effluent		
Month	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)	Flow (MGD)	Conc. (ng/L)	Mass (mg/day)
Jan	0.100	67	25.35	0.090	3.1	1.06
Feb	0.100			0.080		
Mar	0.110			0.090		
Apr	0.110			0.090		
May	0.110			0.080		
Jun	0.100			0.080		
Jul	0.100	97	36.69	0.080	1.8	0.54
Aug	0.100			0.085		
Sep	0.103			0.088		
Oct	0.104			0.088		
Nov	0.105			0.090		
Dec	0.109			0.096		
Year Total	0.104	82.0	32.34	0.086	2.45	0.80

Calculation for Table D:

Yearly Mass Loading = Average Daily Flow (MGD) x 365 day/yr x Average Mercury Conc. (ng/L) x 3.785

Influent Loading = 11810.0 mg/yr

Effluent Loading = 292.5 mg/yr

Percent Removal = ***97.5%***

- Schools
- Industrial facilities
- Residential, Collection Systems, and Septage Sources

Measure

In some cases dischargers should be monitored individually for a baseline reading. In other instances, there may be a large number of similar individual dischargers, and representative sampling may be more efficient. Sometimes, it may be helpful to review other program results for a specific sector to provide estimates. For more information on mercury monitoring, consult U.S. Environmental Protection Agency (EPA) Region 5, *"Mercury Pollutant Minimization Program Guidance"* at http://www.epa.gov/npdes/pubs/pt_region5_mercury_pmp_guidance.pdf pages 6-7. Also the Western Lake Superior Sanitary District (WLSSD) in Duluth, Minnesota, has created a *"Blueprint for Mercury Elimination".* Please see pages 10 and 11 of this report at http://www.wlssd.com/pollution_mercury_prevention.php.

Prioritize

Take time now to complete the sector worksheets with information and data. Complete as much of each worksheet as appropriate for your WWTF. Add extra rows as needed. Use utility bills or accounts as a reference. You may want to contact your facilities to obtain some of the information. Record your contact information on the worksheets.

WLSSD's *"Blueprint for Mercury Elimination"* also has helpful information on prioritizing which facilities to work with. The following information comes from page 10 in the guide:

> *"Evaluate which of these sources have the greatest opportunity for reducing mercury. Work with the largest sources of mercury first. It is important to consider the following:*
> - *The loading to the plant from each contributor.*
> - *The range of mercury concentrations.*
> - *The number of each type of contributor in your community."*

Depending on the businesses that discharge to your facility, you may want to conduct walk-throughs to inventory their specific mercury sources, sample effluent to determine the concentration of mercury, or conduct ongoing monitoring. WLSSD's publication mentioned above, has a section on monitoring, called *"How important is monitoring?"* at http://www.wlssd.com/uploads/WLSSD_Blueprint_Mercury_Reduction.pdf.

Step 3: Evaluate Your WWTF's Mercury Reduction Potential

An evaluation of past and present WWTF operations is helpful to determine those operating procedures that maximize mercury removal within the facility. WLSSD's case study (*"Blueprint for Mercury Elimination"* pages 20-21.) of its facility provides the following information:

- WWTF process chemicals including caustic soda, sulfuric acid, and ferric chloride can contain mercury. New purchases of these chemicals can be screened for mercury levels.
- A checklist and survey were developed for WWTF maintenance staff to use in identifying sources of mercury in their work areas.
- Clean out of interceptor lines may create a mercury discharge, especially below historic dischargers of mercury containing waste.

Analyzing your data

Note variations or patterns in your WWTF data and wastewater data from your businesses. The relative importance of daily, weekly, seasonal, and annual trends depend on the specific activities at the WWTF and your industrial, commercial and institutional users.

The time at which samples are collected can impact your data. Spikes or trends in mercury concentration can result from business patterns or collection system cleanouts.

Changes in products and discharges of mercury from business or domestic sources will affect future mercury levels. Being aware of how businesses and the community are changing will help you build more accurate projections of future mercury levels. Changes in equipment or operational practices at businesses during the monitored period or in the future may impact your influent as well.

Record patterns and trends

As part of your analysis, evaluate past and present WWTF operations to determine the procedures that maximize mercury removal. Several technologies, such as sand filters, membrane filtration, and adsorbants/filtration have shown promise or are effective in removing mercury.

Compare mercury treatment of your WWTF with other WWTFs

Typical POTW wastewater influent is 50 - 500 ng/L. Typical wastewater effluent ranges from 1 - 20 ng/L. See the chart on page 8 of *"US EPA Mercury Pollutant Minimization Program Guidance."* at http://www.epa.gov/npdes/pubs/pt_region5_mercury_pmp_guidance.pdf.

Step 4: Summarize mercury reduction activities implemented during the last five years.

Prevention first

Mercury can be reduced at the source by eliminating or minimizing it through product substitution or other means. You may not be able to reduce mercury to needed levels by implementing only one approach. You may need to work with a variety of businesses and WWTF processes. Your community and the businesses that discharge to your facility may have already completed some activities to reduce mercury. (See EPA chart in Table E.) This section discusses how to summarize past mercury reduction activities.

Has your community or facility implemented any source reduction or WWTF optimization activities in the past five years? Take credit for those efforts and list past mercury reduction activities below.

Past Mercury reduction strategies – past five years

Please use the attached worksheets to record and review information on each sector. Use the space below to highlight the Mercury reduction activities during the past five years.

Medical facilities

None undertaken

Dental facilities

None undertaken

Schools

None undertaken

Industrial facilities

None undertaken

Residential, collection systems, and septage sources

None undertaken

Examples: Below is a table from EPA's *"Mercury Pollutant Minimization Program Guidance."* (Table E) It provides some examples of activities that may have been completed in your community. The sector worksheets may also provide ideas, and can be used as worksheets to record activities done by sector businesses and community groups.

Table E – Direct contributors to address in Mercury Pollution Management Plans

Sector	Activity	Performance Measure	Goal
Medical – hospitals, clinics, nursing homes, veterinarians	• Mail American Hospital Association (AHA) best management practices (BMP) literature • Workshops • Onsite visits • BMP requirements • Permits	• Date/content of mailing • Participation/Reduction • Progress, quantity recycled • Adoption/implementation	Mercury-free wherever practicable. Spill management.
Dental Clinics	• Mail appropriate BMP literature • Meetings with dentists • Onsite visits • Survey(s) • Adherence to American Dental Association's (ADA's) BMPs (voluntary or mandatory) • Mercury recycling(voluntary or mandatory) • Adoption of removal equipment meeting ISO standards(voluntary or mandatory) • Permits	• Date/content • Participation • Adoption /implementation • Quantity recycled • Adoption/implementation (Note: Certain facilities do not use or generate mercury, some measures may not apply)	Capture and recycle mercury used or generated. Minimize mercury discharges.
Schools – secondary	• Mail BMP literature • Workshops • Onsite visits • Permits	• Date/content • Participation • Reduction progress • Quantity of mercury recycled	Mercury free wherever practicable. Spill management.
Schools – Colleges/Technical, laboratories	• See Medical and School Sectors	• See Medical and School Sectors	
Other industries and businesses with potential for mercury contributions	• Mail chemical/equipment literature • Onsite visit during pretreatment inspection • Application of local limits and/or require BMPs for IUs • Require PMPs in IU permits	• Reduction progress • Quantity recycled	Phase out of mercury containing devices and chemicals. Spill management.
General Public	• Promote mercury clean sweeps • Displays at community events • Public service announcements • Outreach at schools • Establish local mercury website	• Date/contents • Quantity of mercury recycled • Website hits	Reduced use of mercury containing products. Recycling of mercury products. Spill management.

Step 5: Create an Implementation Plan for Mercury management and reduction measures for the next five years.

Select Mercury reduction strategies

To start preparing your implementation plan, use the resources listed in this guidance and the attached sector worksheets to evaluate reduction strategies specific to your facility and mercury contributors. Prioritize activities according to the potential reduction opportunities of mercury contributors that have been recorded in the sector worksheets.

Develop a timeline

Create a timeline for implementing the strategies. Set milestones to review the reduction goals and strategies to determine if changes are needed. If businesses will be closely involved in helping you achieve an influent goal, meet with them to confirm the implementation plan.

Throughout the implementation plan, explain your choice of reduction strategies, timelines or milestones. You may want to explain why you chose one option over another.

Include additional information

In some cases, including additional information in your implementation plan may be helpful:

- Will all the strategies combined reduce total mercury to achieve your goal?
- If a phased implementation is planned, explain why.
- Will you need to collect additional information before finalizing the MMP?
- How will you reassess goals and strategies at the milestones?
- What is the potential for new mercury contributions from domestic or business sources?
- What is the potential for increases from existing sources?

Describe your implementation plan (Include reduction strategies and a timeline.)

Looking ahead five years, focus on preventive practices—those practices that reduce mercury at the source before it becomes a waste.

Mercury reduction strategies – Next five years

After reviewing the information collected in tables in this guide and sector worksheets, use the space below to highlight the Mercury reduction activities planned for the next five years.

Medical facilities

Conduct survey, on-site audits, and distribute Best Management Practice (BMP) literature

Dental facilities

Conduct survey, on-site audits, and distribute Best Management Practice (BMP) literature

Schools

Conduct survey, on-site audits, and distribute Best Management Practice (BMP) literature

Industrial facilities

Conduct survey of potential mercury sources, on-site Audits, and distribute BMP literature

Residential, collection systems, and septage sources

Mail BMP literature and conduct public outreach activities.

Certification

Preparer (please print): Kristopher J. Swanson

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Title: Public Works Director Date: 12-16-16

Signature:

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Submission of MMP

You may be required to submit a MMP to the MPCA. If you have a MPCA permit, (NPDES/SDS) please review it carefully to ensure that your submission is complete and on time. Your NPDES/SDS Permit will also specify how and where the MMP must be submitted.

Additional Information

Purpose of the Mercury Minimization Plan guide

This document was created to assist municipalities, companies, consultants, operators, permittees, etc. to identify and reduce sources of mercury in collection and treatment systems. This document will also assist you in creating a Mercury Minimization Plan (MMP) to comply with permit requirements. Using the guide is optional and your MMP may be prepared using an alternate format. However, this guide may speed up the process of organizing and understanding your mercury data and, therefore, allow the MPCA to review your plan more quickly.

Mercury reduction

You may currently have mercury limits in your wastewater permit, or may receive mercury limits in the near future. Included in this guide are some mercury reduction ideas you may choose to implement whether there are permit requirements, or not. While the primary mercury reduction goal is to meet the mercury limits specified in your permit, the purpose of doing a MMP is to evaluate discharges to the system, to determine possible sources of mercury to wastewater facility influent, as well as identify potential mercury reduction options. If you have a MPCA permit (NPDES/SDS) please review it carefully to ensure that your submission is complete and on-time. Your permit will specify how and where the MMP must be submitted. If you are required to create and submit a MMP, the MPCA will review your MMP and may contact you to discuss your submittal. You may implement your MMP at any time in order to meet your permit goals as well as reduce mercury in the environment.

MMP submittal requirements

Individual permits will indicate exactly who needs to provide a MMP and will specify where it should be sent and when. In general, all municipal major facilities and municipal minor facilities that will be upgrading to major status will be required to submit a new or updated MMP when the permit is issued or reissued. MMPs are also required for minor facilities that discharge to the Lake Superior Basin. MMPs may be required for minors that do not discharge to the Lake Superior Basin on a case by case basis. The requirements to submit a MMP will be included in permits as compliance schedules.

Note: If you have previously submitted a MMP, you must update the MMP and submit it to the MPCA. If you are a major facility discharging in the Great Lakes Basin, you are also required to send in an annual plan update.

Five steps to build your MMP

At a minimum, the MMP must include the following:

1. A summary of mercury influent and effluent concentrations and biosolids monitoring data using the most recent five years of monitoring data, if available.
2. Identification of existing and potential sources of mercury concentrations and/or loading to the facility.
3. An evaluation of past and present WWTF operations to determine those operating procedures that maximize mercury removal.
4. A summary of any mercury reduction activities implemented during the last five years.
5. A plan to implement mercury management and reduction measures during the next five years.

Facilities that Discharge to Lake Superior

These facilities are required to send in an annual update of the MMP to the MPCA Water Quality Submittals Center by March 1 of each year (per MN Rule 7052.0250,) following MPCA approval of the MMP. The annual report shall include, but is not limited to:

a) All MMP program monitoring results for the year.
b) A list of potential sources of mercury.
c) A summary of all actions taken to meet the effluent limit for mercury.
d) Any updates of the control strategy.

All mercury monitoring data collected during the previous year should be included with the annual report. This includes tracking of source reduction activities; influent, effluent, and biosolids data; and data collected from potential sources.

For More Information

If you have questions on how to use these resources or how to prepare a MMP, the following assistance is available.

Regulatory requirements and assistance with preparing a MMP:

MPCA staff contact:
Jaramie Logelin, Pretreatment Coordinator
Duluth Office
525 Lake Avenue South, Suite 400, Duluth, MN 55802
218-302-6640 or 800-657-3864
Jaramie.logelin@state.mn.us

Non-regulatory technical assistance, including prevention options and assistance identifying reduction strategies for a MMP:

Minnesota Technical Assistance Program (MnTAP)
612-624-1300 or 800-247-0015

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Dental Facilities Sector Worksheet

National Pollutant Discharge Elimination System (NPDES) Wastewater Program

Mercury Minimization Plan

Doc Type: Pollutant Minimization Plans

Western Lake Superior Sanitary District (WLSSD) found average mercury contribution to wastewater from 0.1-0.3 grams per dentist per day.

List of all dental offices (list business name)	Contact name and date contacted	Does the dentist office have mercury amalgam separators?	Is the separator adequate for the capacity (# chairs?)	Is the separator adequate for the system flow?	Does the dental office provide for proper operation and maintenance of the amalgam separator?	Does the dental office provide for pickup and recycling of mercury waste?	Does the facility belong to a local dental association ?	Monitoring: Grab sample from manhole#	Flow (MGD)	Mercury concentration (mg/day)	Total mass load
Rushford Dental Clinic	Gary M. Marcoux										

Resources

MPCA fact sheet "Recognition For Dental Providers Using Amalgam Removal Equipment"
(Certificate of Recognition): http://www.pca.state.mn.us/publications/wq-wwtp1-02.pdf

U.S. Environmental Protection Agency (EPA): http://amalgamrecycling.org/

American Dental Association: http://www.ada.org/

Minnesota Dental Association:
http://www.mndental.org/professionals/amalgam_recovery/

Minnesota Technical Assistance Program (MnTAP) fact sheet www.mntap.umn.edu
"Dental Office Hazardous Waste"

WLSSD Case study included in "A Blueprint for Mercury Elimination."
http://www.wlssd.com/documents/WLSSD_Blueprint_Mercury_Reduction.pdf

Wisconsin Minnesota Department of Natural Resources (DNR) Mercury Reduction Environmental Dental Health Management
http://dnr.wi.gov/org/caer/cea/mercury/potw.htm

EPA Mercury Web site http://www.epa.gov/mercury/

MCES Web site http://www.metrocouncil.org/environment/IndustrialWaste/news-ocn-0612.pdf

Solid Waste Management Coordinating Board Self Audit and FAQ for dentists.

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Medical Facilities Sector Worksheet

National Pollutant Discharge Elimination System (NPDES) Wastewater Program

Mercury Minimization Plan

Doc Type: Pollutant Minimization Plans

Western Lake Superior Sanitary District (WLSSD) found mercury concentrations to wastewater from hospitals ranging from 0.3 parts per billion (ppb) to 5.4 ppb.

List of hospitals, clinics, and nursing homes (list business name)	Contact name and date contacted	Mercury usage assessment done (WLSSD Attachment F)	Lab reagent assessment done?	Pharmaceutical reagent assessment done?	Has mercury containing equipment been labeled? Replaced?	Are there alternatives for mercury containing equipment?	Is there information on what has been disposed of down the drain, past, and present? Any accumulation in drain traps? Have traps been cleared?	Does the hospital have adequate mercury spill kits?	Have staff been trained on proper use and disposal of mercury spill kits?	Monitoring: Grab sample from manhole#	Flow (MGD)	Mercury concentration (ug/L)	Total mass load (mg/day)
Good Shepherd Nursing Home		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				
Hoff Funeral Home		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				
Winona Heath – Rushford Clinic		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				
Rushford Chiropractic Clinic		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				
		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				
		☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	☐Yes ☐No	☐Yes ☐No				

Resources

MnTAP Web page http://mntap.umn.edu/index.htm (search under mercury) fact sheets
- "Mercury in Health Care Lab Reagents" (#92)
- "Mercury in Labs and Pharmacies" (#10a)
- "Mercury in Patient Care Areas" (#10c)
- "Mercury in Non-clinical Health Care Areas" (#10b)
- Mercury Use Survey

MASCO Mercury Management Guide
www.masco.org/specialproject_mercuryworkgroup.htm

U.S. Environmental Protection Agency (EPA) document "Reducing Mercury Use in Healthcare Promoting a Healthier Environment, a How-To-Manual" http://www.epa.gov/mercury/healthcare.htm

WLSSD Case study "WLSSD Success Story St. Mary's Duluth Clinic Health System (SMDC) p. 18" included in "A Blueprint for Mercury Elimination" http://www.wlssd.com/documents/WLSSD_Blueprint_Mercury_Reduction.pdf

Hospitals for a Healthy Environment web site http://www.h2e-online.org/

Wisconsin Minnesota Department of Natural Resources (DNR) Web site
http://dnr.wi.gov/org/caer/cea/mercury/potw.htm

EPA Mercury Web site http://www.epa.gov/mercury/

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Industrial Facility Mercury Sector Worksheet

National Pollutant Discharge Elimination System (NPDES) Wastewater Program

Mercury Minimization Plan

Doc Type: Pollutant Minimization Plans

List of all possible industrial facility contributors	Business name Contact name Date contacted	Does the facility use large amounts of caustic soda or acid?	Hg concentration from industry?	Flow of industry	Total Hg loading from industry
Veterinary Clinics	Valley Veterinary Clinic 302 Industrial Dr., Rushford, MN 55971 (507) 864-2244	☐Yes ☐No			
Automobile Services	Dahl's Auto Works, Inc. 207 S. Elm St., Rushford, MN 55971 (507) 864-7711	☐Yes ☐No			
	L&L Volkman Auto Body Repair 305 Industrial Drive, Rushford, MN 55971 (507) 864-2590	☐Yes ☐No			
		☐Yes ☐No			
Other	JMW Enterprises, Inc. 309 W. Pickle Alley, Rushford, MN 55971 (507) 864-7477	☐Yes ☐No			
	RiverStar Production Facility 1000 North Mill St., Rushford, MN 55971 (507) 864-4300				

Resources:

U.S. Environmental Protection Agency (EPA) Mercury Web site http://www.epa.gov/mercury/
Interstate Mercury Education and Reduction Clearinghouse (IMERC) http://www.newmoa.org/prevention/mercury/imerc.cfm

Western Lake Superior Sanitary District (WLSSD) data showed that industry was contributing 250 times more mercury to the treatment plant than laboratories or individual dentists, even though the concentration of mercury in its wastewater was the lowest measured. When prioritizing pollution prevention activities, it is important to measure or estimate flow and not to rely strictly on concentration data. WLSSD Case study included in WLSSD "Blueprint for Mercury Elimination," pages 10 and 11 at http://www.wlssd.com/documents/WLSSD_Blueprint_Mercury_Reduction.pdf.

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Sector Worksheet - Schools

National Pollutant Discharge Elimination System (NPDES) Wastewater Program

Mercury Minimization Plan

Doc Type: Pollutant Minimization Plans

Background: "A pilot project conducted from autumn 2000 through early 2001 in the Lake Superior Basin found that, on average, schools had more than 4.5 pounds of mercury and mercury containing equipment." Minnesota Pollution Control Agency (MPCA) Mercury-Free Zone Program Fact Sheet #4.01 August 2006.

List of all middle and secondary schools, vocational schools and colleges. (list school name)	Contact Name Date of contact	Has the school pledged to be part of the Mercury-Free Zone?	Has the school completed an inventory of mercury containing chemicals and devices? (See Mercury Audit Assessment Checklist resource)	Has the MPCA mercury detection dog visited the school? (date?)	Have mercury containing devices been removed or replaced?	Monitoring: Grab sample from manhole #	Flow (MGD)	Mercury concentration (ug/L)	Total Mass Load (mg/day)
Rushford – Peterson Public School									

Resources

Mercury Free Zone Program http://www.pca.state.mn.us/programs/mercury-free/index.html. Materials available from MPCA as part of this program:

- "Mercury Audit Assessment Checklist for Mercury-Free Zone Schools"
- Fact sheet "MPCA Mercury-Free Zone Program" Web page
- MPCA brochure "Keeping Your Family Safe from Mercury"
- MPCA/Minnesota Department of Health (MDH) Fact Sheet "Cleaning up Mercury spills in your school"
- Curriculum available upon request
- Video "Mercury, Your School and You"
- Assessment with Clancy the Mercury Detecting Dog
- Set up an exchange of mercury containing product

U.S. Environmental Protection Agency (EPA) Mercury Web site http://www.epa.gov/mercury/

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Residential,Collection System, and Septage Mercury Sector Worksheet

National Pollutant Discharge Elimination System (NPDES) Wastewater Program
Mercury Minimization Plan

Doc Type: Pollutant Minimization Plans

Residential

Background: From Western Lake Superior Sanitary District (WLSSD) "A Blueprint for Mercury Elimination." WLSSD found an average concentration of 0.1 ppb when sampling sewer lines from neighborhoods. Metropolitan Council Environmental Services (MCES) estimates that "*residential waste may contribute a substantial portion of mercury to wastewater treatment plants. Approximately two-thirds of the hydraulic load at MCES treatment plants are residential. Even at low concentrations, the amount of mercury would be significant*." From "*Controlling Dental Facility Discharges in Wastewater*, Water Environment Federation, 1999.

Name of Community? (County or City)	Has the community done thermometer exchanges?	Has the community collected mercury during Household Hazardous Waste (HHW) collections? (Measures, amounts?)	Has the community provided education on proper disposal of mercury and mercury containing items? (brochures, newsletters, articles?)	Has the wastewater staff partnered with HHW staff at the county or city level to reduce improper disposal of mercury?
City of Rushford	No	No	No	No

Resources:
WLSSD Guide "Blueprint for Mercury Elimination, p. 22 "Suggestions for communities embarking on mercury reduction projects."
EPA Mercury Web page http://www.epa.gov/mercury/

POTW Collection System

Background: Cleanouts for collection systems may cause a spike in influent as sediment is washed from collection pipes. This is especially likely when cleanouts occur where a historic mercury discharge may have occurred. From WLSSD "A Blueprint for Mercury Elimination." "*Sewer Cleaning Practices: Mercury collects in the sediments in sewer lines because it is much heavier than water. Sewer cleaning practices send a significant amount of mercury to a plant through flushing of the lines. Alternative cleaning methods, such as removing sediment with a bucket, or vacuuming sewer lines, should be considered for use below facilities with current or historic uses of mercury".*

Are collection system cleanouts performed?	How often are they done?	Are WWTF staff notified of cleanout?	Is influent monitored during cleanouts?	Monitoring results
Yes	Annually	Yes	No	NA

Septage

From WLSSD "A Blueprint for Mercury Elimination." *"WLSSD found an average mercury concentration of 62 ppb when sampling septic hauler discharge. The total volume is low compared to other sources. Calculate a mass-loading estimate to assess the importance of the contribution to your facility. WLSSD estimated 1.6 percent of influent mercury was from septage".*

Does the WWTF accept septage from haulers? ☐ **Yes** ☒ **No** **If yes, please complete table.**

List of septage haulers (business name)	Contact Name: Date:	Are contributors to haulers septage known? (domestic, industrial?)	Has the septage been sampled for mercury?	Results