

# Permit Fact Sheet

## 1 General Information

|                                  |   |  |
|----------------------------------|---|--|
| Permit Number:                   | WI-0030767-09-0   |  |
| Permittee Name:                  | ASHLAND SEWAGE UTILITY  |  |
| Address:                         | 2020 6th St East  |  |
| City/State/Zip:                  | Ashland WI 54806  |  |
| Discharge Location:              | 1300 feet north from the foot of 29 <sup>th</sup> Ave East (NE¼ – NW ¼ of Section 27; T48N-R4W)   |  |
| Receiving Water:                 | Chequamegon Bay of Lake Superior in the Fish Creek Watershed of the Lake Superior Drainage Basin, Ashland County (WIBC – 2751220)   |  |
| StreamFlow (Q <sub>7,10</sub> ): | 10:1 (Lake)   |  |
| Stream Classification:           | Full Aquatic Life – Coldwater, Public Drinking Water Supply   |  |
| Wild Rice Impacts                | No impacts identified. No wild rice waters inventoried near the outfall.  |  |
| Design Flow(s)                   | Daily Maximum   | 3.84 MGD                                     |
|                                  | Weekly Maximum  | 4.7 MGD                                      |
|                                  | Monthly Maximum   | 3.2 MGD                                      |
|                                  | Annual Average  | Dry Weather 1.92 MGD<br>Wet Weather 3.20 MGD |
| Significant Industrial Loading?  | No significant industrial loading. The facility accepts 12,644 gallons per day of landfill leachate, 9,013 gallons per day of holding tank wastes and 121 gallons per day of septic tank waste. The city is also considering accepting pre-treated wastewater from the NSP–Ashland Superfund Site on a limited basis. |  |
| Operator at Proper Grade?        | Yes   |  |

## 2 Facility Description

The City of Ashland owns and operates a domestic wastewater treatment system. The plant designed to treat 1,920,000 gallons per day actually handles an average of 1,233,000 gallons per day.

The facility consists of a step screen and aerated grit tank to remove debris before untreated wastewater enters the oxidation ditches (circular basins) where it mixes with activated sludge which breaks down the organic matter. Activated sludge is composed of settled solids containing naturally occurring active biological material recycled from the treatment system. Alun is then added to the wastewater to precipitate phosphorus. The treated water is pumped into clarifiers where solids including phosphorus settle out. The cleaned wastewater (effluent) is disinfected year-round using a Ultra-Violet light system and discharged to Chequamegon Bay of Lake Superior.

Settled solids (sludge) are removed from the clarifiers; some are returned to the head of the oxidation ditches to re-seed the new wastewater entering the system. The sludge that is not used as activated sludge is treated by bacteria and organisms through aerobic digestion which reduces harmful pathogens to safe levels. Water is removed from the sludge by a belt press before it is landspread twice a year on Department approved agricultural sites. If needed liquid sludge can be removed prior to the belt press and landspread as needed.

The plant includes a retention basin to handle wet-weather flows in excess of the peak plant capacity. Wastewater collection in the retention basin is pumped back to the plant for treatment after peak flows are over. There are 11 lift stations that feed the system as well as accepting hauled holding and septic tank wastes and landfill leachate.

| <b>Sample Point Designation</b> |  |   |
|---------------------------------|--|---|
| <b>Sample Point Number</b>      | <b>Discharge Flow, Units, and Averaging Period</b>                                       | <b>Sample Point Location, Waste Type/sample Contents and Treatment Description (as applicable)</b>  |
| 701<br><b>INFLUENT</b>          | An average of 1.270 MGD (Feb. 2012 to Feb. 2016 data)                                    | Representative samples shall be collected in the influent pipe ahead of the step screen.  |
| 001<br><b>EFFLUENT</b>          | An average of 1.233 MGD (Feb. 2012 to Feb. 2016 data)                                    | Representative samples shall be collected from the effluent channel prior to ultraviolet disinfection except for fecal coliform and Whole Effluent Toxicity (WET) Tests samples which shall be collected after disinfection. The permittee is authorized to discharge to the Chequamegon Bay of Lake Superior in Ashland County. The average annual design flow for the facility is 1.92 MGD. |
| 002<br><b>SLUDGE</b>            | 240 dry tons (information supplied in the application)                                   | Representative samples of the belt filter press cake shall be collected using a method appropriate for the specific test.   |
| 003<br><b>SLUDGE</b>            | Sludge prior to drying occasionally needs to be removed. Included in the 240 tons total. | If the aerobically digested sludge (prior to processing in the belt filter) needs to be removed the Department shall be contacted prior to removal for proper sampling requirements and forms. Representative samples shall be collected from the storage tank using a method appropriate for the specific test only when this sludge will be landspread.                                     |
| 101<br><b>IN PLANT</b>          | Not applicable – mercury monitoring only   | This is the field blank sample and it shall be collected using standard sample handling procedures.   |

### 3 Substantial Compliance Determination

|                               | Compliance?   | Comments |
|-------------------------------|---|----------|
| Discharge limits              | Yes   |          |
| Sampling/testing requirements | Yes   |          |
| Groundwater standards         | N/A   |          |
| Reporting requirements        | Yes   |          |
| Compliance schedules          | Yes   |          |
| Management plan               | N/A   |          |
| Operator at proper grade      | Yes   |          |
| Other                         | No  |          |
| Current Plant Subclasses      | A1. Biological Treatment – Suspended Growth; B. Solids Separation; C. Biological Solids/ Sludge Handling and Processing; D. Disinfection; L. Laboratory; P. Nutrient Removal-Total Phosphorus |          |
| Enforcement considerations    | N/A   |          |

|                            |                              |   |
|----------------------------|------------------------------|---|
| In substantial compliance? | Yes                          | Compliance inspection conducted 2/26/2015 |
|                            | Concurrence: Eric de Venecia | Date: 3/5/2015                            |

## 4 Influent - Proposed Monitoring

### 4.1 Sample Point Number: 701- INFLUENT TO PLANT

| Monitoring Requirements and Limitations |            |                 |                  |                      |   |
|---|------------|-----------------|------------------|----------------------|---|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type          | Notes   |
| Flow Rate                               |            | MGD             | Continuous       | Continuous           |   |
| BOD5, Total                             |            | mg/L            | Daily            | 24-Hr Flow Prop Comp |   |
| Suspended Solids, Total                 |            | mg/L            | Daily            | 24-Hr Flow Prop Comp |   |
| Mercury, Total Recoverable              |            | ng/L            | Quarterly        | 24-Hr Flow Prop Comp | *See the "Mercury Monitoring" section for more information. |

#### 4.1.1 Changes from Previous Permit and Explanation of Limits and Monitoring Requirements:

No changes from the previous permit. The parameters and monitoring frequency are appropriate for an activated sludge system.

\*The Mercury Monitoring table note refers a permit section explaining the continued use of testing with a limit of quantification (LOQ) less than 1.3 ng/L.

## 5 Inplant - Proposed Monitoring and Limitations

### 5.1 Sample Point Number: 101- MERCURY FIELD BLANK

| Monitoring Requirements and Limitations |            |                 |                  |             |   |
|---|------------|-----------------|------------------|-------------|---|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes   |
| Mercury, Total Recoverable              |            | ng/L            | Quarterly        | Grab        | *See the "Mercury Monitoring" section for more information. |

#### 5.1.1 Changes from Previous Permit and Explanation of Limits and Monitoring Requirements:

At least one field blank shall be collected for each day a sample of mercury is collected from Outfall 001. The purpose of the field blank is to determine if the field or sample transporting procedures and environment have contaminated the

sample. This sampling is a permit requirement and the results shall be recorded on the correct electronic Discharge Monitoring Report.

\*The Mercury Monitoring table note refers a permit section explaining the continued use of testing with a limit of quantification (LOQ) less than 1.3 ng/L.

## 6 Surface Water - Proposed Monitoring and Limitations

### 6.1 Sample Point Number:001- EFFLUENT

| Monitoring Requirements and Limitations |                |                 |                   |                      |   |
|---|----------------|-----------------|-------------------|----------------------|---|
| Parameter                               | Limit Type     | Limit and Units | Sample Frequency  | Sample Type          | Notes   |
| Flow Rate                               |                | MGD             | Daily             | Total Daily          |   |
| BOD5, Total                             | Monthly Avg    | 30 mg/L         | Daily             | 24-Hr Flow Prop Comp |   |
| BOD5, Total                             | Weekly Avg     | 45 mg/L         | Daily             | 24-Hr Flow Prop Comp |   |
| Suspended Solids, Total                 | Monthly Avg    | 30 mg/L         | Daily             | 24-Hr Flow Prop Comp |   |
| Suspended Solids, Total                 | Weekly Avg     | 45 mg/L         | Daily             | 24-Hr Flow Prop Comp |   |
| pH Field                                | Daily Max      | 9.0 su          | Daily             | Grab                 |   |
| pH Field                                | Daily Min      | 6.0 su          | Daily             | Grab                 |   |
| Fecal Coliform                          | Geometric Mean | 400 #/100 ml    | Weekly            | Grab                 |   |
| E. coli                                 |                | #/100 ml        | Weekly            | Grab                 | A limit is not required this permit term.                                       |
| Phosphorus, Total                       | Monthly Avg    | 1.0 mg/L        | Weekly            | 24-Hr Flow Prop Comp |   |
| Mercury, Total Recoverable              | Daily Max      | 11 ng/L         | Quarterly         | Grab                 | * See the "Mercury Monitoring" subsection for more information.                 |
| Nitrogen, Ammonia (NH3-N) Total         |                | mg/L            | Quarterly         | 24-Hr Flow Prop Comp | Monitoring is required during 2018.   |
| Acute WET                               |                | TUa             | See Listed Qtr(s) | 24-Hr Flow Prop Comp | **See the "Whole Effluent Toxicity (WET) Testing" section for more information. |
| Chronic WET                             |                | rTUc            | See Listed Qtr(s) | 24-Hr Flow Prop Comp | **See the "Whole Effluent Toxicity (WET) Testing" section for more              |

| Monitoring Requirements and Limitations |            |                 |                  |             |              |
|---|------------|-----------------|------------------|-------------|--------------|
| Parameter                               | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes        |
|   |            |                 |                  |             | information. |

### 6.1.1 Changes from Previous Permit and Explanation of Limits and Monitoring Requirements:

The monitoring frequency and limits for **Flow, BOD5, Suspended Solids, Fecal Coliform** and **pH** have not changed from the previous permit term. All categorical limits are based on NR 104.02 and NR 210 (Subchapter II) Wis. Adm. Code. More information on calculating limits for these parameters as well as **Ammonia, Phosphorus, Temperature, WET Testing** and **Mercury** can be found in the “Water Quality-Based Effluent Limits Recommendations for Ashland Sewage Utility (WPDES Permit # WI-0030767)” memo dated May 13, 2015 and the Amendment to the “Water Quality-Based Effluent Limits Recommendations for Ashland Sewage Utility (WPDES Permit # WI-0030767)” memo dated March 22, 2016.

**E. coli** – In accordance with EPA federal water quality criteria for Great Lakes waters (40 CFR 122.44(d)(1)(I)), the facility has agreed to sample for E. coli. The EPA limitation of 126#/100ml has not been included in the permit but will be used as a guide by the facility. Data collected will be used for future limit determinations.

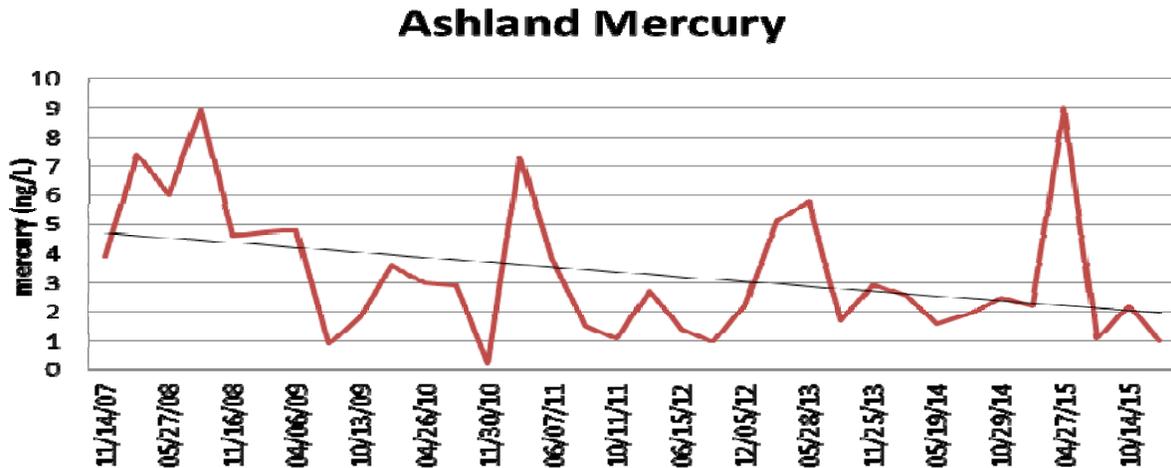
**Phosphorus** - Requirements are based on the Phosphorus Rules that became effective 12/1/2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based limit (TBL) and a water quality based limit (WQBEL). A TBL of 1 mg/L is needed because the facility discharges more than the threshold of 150 pounds per month. Based on the type of waterbody, the water quality criteria for Lake Superior (a Great Lake) is 5 ug/L. At this time no WQBEL has been calculated because NR 217.13(4) Wis. Adm. Code states that the Department shall set limits consistent with approved nearshore or whole lake model results. A whole lake model is in development by U.S. EPA which may impact Ashland’s limit, but until that time an interim monthly average limit of 0.6 mg/L may be applicable in accordance with s. NR 217.13(4). But the 30-day p99 value of the 218 sample results is 0.61 mg/L, monthly averages are higher. There is the potential for the facility to exceed an interim limit of 0.6 mg/L, therefore an interim limit equal to the previous limit (the TBL of 1 mg/L) shall remain in effect for the this permit term.

The Ashland Sewage Utility is a well operated and maintained wastewater treatment plant. This was verified by numerous site visits by DNR staff. The discharge has consistently been in compliance with the required limitations. It is unknown if the existing treatment plant is capable of achieving the final water quality based effluent limits once the model results are known. If future modeling results calculate the loading allocations lower than the current discharges the facility may need to consider other control methods. Upon completion of the nearshore or whole lake model, the Department has the authority to modify the WPDES permit to include established WQBELs.

**Mercury** - The City of Ashland has requested and was granted a continued application of a mixing zone for calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC’s) at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6.

The City didn’t have a mercury limit in the last permit issuance, but in accordance with NR. 106.145(5)(a and b) shall receive a daily maximum limit equal to the 1-day P<sub>99</sub> with quarterly monitoring. The 1-day P<sub>99</sub> of the data from March 2011 through January 2016 is 11.0 ng/L. The water quality based limit for mercury is equal to the wildlife criteria (1.3 ng/L), this limit shall be met at the edge of the mixing zone. The mixing zone shall be no larger than necessary and based on the mercury wildlife criteria of 1.3 ng/L, the background mercury concentration of 0.5 ng/L and the 30-day P<sub>99</sub> of 3.93 ng/L the mixing zone has been set at 3.3:1. The exemption applies only to this permit term. Another request will need to be made as part of the next permit reissuance application.

Ashland has successfully reduced mercury levels (see the following chart) and will continue to implement a pollution minimization program.



\*The Mercury Monitoring table note refers a permit section explaining the continued use of testing with a limit of quantification (LOQ) less than 1.3 ng/L.

**Ammonia** - Using current acute and chronic ammonia toxicity criteria for the protection of aquatic life and limit calculating procedures found in NR 105 and 106, Wis. Adm. Code (both effective March 1, 2004) Ammonia limitations were calculated for the facility. Daily Maximum (20.98 mg/L), Weekly Average (62 mg/L) and Monthly Average (24 mg/L) limits were considered. It was determined effluent ammonia limits are not needed this permit term because the maximum effluent ammonia concentration is 6 mg/L, the 1-day P<sub>99</sub> is 5.14 mg/L, the 4-day P<sub>99</sub> is 3.09 and the 30-day P<sub>99</sub> is 1.3 mg/L are all well below the corresponding calculated limits. Quarterly sampling is required during 2018 in preparation for the next permit reissuance application process.

**WET Testing (Acute and Chronic)** – Based on historical WET test data and reasonable potential factor (RPF) calculations (NR 106.08 Wis. Adm. Code) WET limits are not required this permit term. A WET Checklist was prepared to determine the number of WET tests that are needed. As toxicity potential increases, more points accumulate and more monitoring is required to assure toxicity is not occurring over the short (acute) and long (chronic) term. Based on the total points accumulated and Chapter 1.3 of the WET Guidance Document annual Acute and Chronic WET Tests are required over the permit term in rotating quarters.

\*\* WET Testing table note refers to a permit section with the sampling schedule

- 2016 – November 1 through December 31 (fourth quarter)
- 2017 – January 1 through March 31 (first quarter)
- 2018 – April 1 through June 30 (second quarter)
- 2019 – July 1 through September 30 (third quarter)
- 2020 - November 1 through December 31 (fourth quarter)
- 2021 - January 1 through March 31 (first quarter)

Acute and Chronic WET testing shall continue after the permit expiration date (until the permit is reissued) the next test would be required in the second quarter (April 1 through June 30, 2022).

**Thermal** - Using the administrative rules for thermal discharges detailed in NR 102 Wis. Adm. Code effective October 2010, effluent thermal limits were calculated. The calculated thermal limits for the Chequamegon Bay equal 120 degrees F (taking into consideration a mixing zone of 10:1 for lakes). Temperature readings were taken 2011 through 2015, the daily maximum result was just under 68.5 degrees F. This is well below the calculated limit; therefore a limit and monitoring are not required this permit term.

## 7 Land Application - Proposed Monitoring and Limitations

| Municipal Sludge Description   |                       |                              |                           |                          |                              |  |
|--|-----------------------|------------------------------|---------------------------|--------------------------|------------------------------|--|
| Sample Point   | Sludge Class (A or B) | Sludge Type (Liquid or Cake) | Pathogen Reduction Method | Vector Attraction Method | Reuse Option                 | Amount Reused/Disposed (Dry Tons/Year) |
| 002  | B                     | Cake                         | Fecal Coliform            | Incorporation            | Land application or Landfill | 240 dry tons/year                      |
| 003  | B                     | Liquid                       | Fecal Coliform            | Incorporation            | Land application or Landfill | Part of the 240 tons/year              |
| Does sludge management demonstrate compliance? Yes   |                       |                              |                           |                          |                              |  |
| Is additional sludge storage required? No  |                       |                              |                           |                          |                              |  |
| Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No, in 2014 it was 0.8 pCi/liter.<br>If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility |                       |                              |                           |                          |                              |  |
| Is a priority pollutant scan required? No<br>Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.   |                       |                              |                           |                          |                              |  |

### 7.1 Sample Point Number:002- Belt Filter Press Cake

| Monitoring Requirements and Limitations |              |                 |                  |             |       |
|---|--------------|-----------------|------------------|-------------|-------|
| Parameter                               | Limit Type   | Limit and Units | Sample Frequency | Sample Type | Notes |
| Solids, Total                           |              | Percent         | Annual           | Composite   |       |
| Arsenic Dry Wt                          | Ceiling      | 75 mg/kg        | Annual           | Composite   |       |
| Arsenic Dry Wt                          | High Quality | 41 mg/kg        | Annual           | Composite   |       |
| Cadmium Dry Wt                          | Ceiling      | 85 mg/kg        | Annual           | Composite   |       |
| Cadmium Dry Wt                          | High Quality | 39 mg/kg        | Annual           | Composite   |       |
| Copper Dry Wt                           | Ceiling      | 4,300 mg/kg     | Annual           | Composite   |       |
| Copper Dry Wt                           | High Quality | 1,500 mg/kg     | Annual           | Composite   |       |
| Lead Dry Wt                             | Ceiling      | 840 mg/kg       | Annual           | Composite   |       |
| Lead Dry Wt                             | High Quality | 300 mg/kg       | Annual           | Composite   |       |
| Mercury Dry Wt                          | Ceiling      | 57 mg/kg        | Annual           | Composite   |       |
| Mercury Dry Wt                          | High Quality | 17 mg/kg        | Annual           | Composite   |       |
| Molybdenum Dry Wt                       | Ceiling      | 75 mg/kg        | Annual           | Composite   |       |
| Nickel Dry Wt                           | Ceiling      | 420 mg/kg       | Annual           | Composite   |       |

| <b>Monitoring Requirements and Limitations</b> |                   |                        |                         |                    |              |
|--|-------------------|------------------------|-------------------------|--------------------|--------------|
| <b>Parameter</b>                               | <b>Limit Type</b> | <b>Limit and Units</b> | <b>Sample Frequency</b> | <b>Sample Type</b> | <b>Notes</b> |
| Nickel Dry Wt                                  | High Quality      | 420 mg/kg              | Annual                  | Composite          |              |
| Selenium Dry Wt                                | Ceiling           | 100 mg/kg              | Annual                  | Composite          |              |
| Selenium Dry Wt                                | High Quality      | 100 mg/kg              | Annual                  | Composite          |              |
| Zinc Dry Wt                                    | Ceiling           | 7,500 mg/kg            | Annual                  | Composite          |              |
| Zinc Dry Wt                                    | High Quality      | 2,800 mg/kg            | Annual                  | Composite          |              |
| Nitrogen, Total Kjeldahl                       |                   | Percent                | Annual                  | Composite          |              |
| Nitrogen, Ammonium (NH4-N) Total               |                   | Percent                | Annual                  | Composite          |              |
| Phosphorus, Total                              |                   | Percent                | Annual                  | Composite          |              |
| Phosphorus, Water Extractable                  |                   | % of Tot P             | Annual                  | Composite          |              |
| Potassium, Total Recoverable                   |                   | Percent                | Annual                  | Composite          |              |
| PCB Total Dry Wt                               | Ceiling           | 50 mg/kg               | Once                    | Composite          |              |
| PCB Total Dry Wt                               | High Quality      | 10 mg/kg               | Once                    | Composite          |              |

### **7.1.1 Changes from Previous Permit and Explanation of Limits and Monitoring Requirements:**

No changes from the previous year. Requirements for land application of municipal sludge are determined in accordance with ch. NR 204 Wis. Adm. Code. Ceiling and high quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k). Sampling for PCBs is required once during the 2018 calendar year.

### **7.2 Sample Point Number:003- Liquid Sludge**

| <b>Monitoring Requirements and Limitations</b> |                   |                        |                         |                    |              |
|--|-------------------|------------------------|-------------------------|--------------------|--------------|
| <b>Parameter</b>                               | <b>Limit Type</b> | <b>Limit and Units</b> | <b>Sample Frequency</b> | <b>Sample Type</b> | <b>Notes</b> |
| Solids, Total                                  |                   | Percent                | Annual                  | Composite          |              |
| Arsenic Dry Wt                                 | Ceiling           | 75 mg/kg               | Annual                  | Composite          |              |
| Arsenic Dry Wt                                 | High Quality      | 41 mg/kg               | Annual                  | Composite          |              |
| Cadmium Dry Wt                                 | Ceiling           | 85 mg/kg               | Annual                  | Composite          |              |
| Cadmium Dry Wt                                 | High Quality      | 39 mg/kg               | Annual                  | Composite          |              |
| Copper Dry Wt                                  | Ceiling           | 4,300 mg/kg            | Annual                  | Composite          |              |

| <b>Monitoring Requirements and Limitations</b> |                   |                        |                         |                    |              |
|--|-------------------|------------------------|-------------------------|--------------------|--------------|
| <b>Parameter</b>                               | <b>Limit Type</b> | <b>Limit and Units</b> | <b>Sample Frequency</b> | <b>Sample Type</b> | <b>Notes</b> |
| Copper Dry Wt                                  | High Quality      | 1,500 mg/kg            | Annual                  | Composite          |              |
| Lead Dry Wt                                    | Ceiling           | 840 mg/kg              | Annual                  | Composite          |              |
| Lead Dry Wt                                    | High Quality      | 300 mg/kg              | Annual                  | Composite          |              |
| Mercury Dry Wt                                 | Ceiling           | 57 mg/kg               | Annual                  | Composite          |              |
| Mercury Dry Wt                                 | High Quality      | 17 mg/kg               | Annual                  | Composite          |              |
| Molybdenum Dry Wt                              | Ceiling           | 75 mg/kg               | Annual                  | Composite          |              |
| Nickel Dry Wt                                  | Ceiling           | 420 mg/kg              | Annual                  | Composite          |              |
| Nickel Dry Wt                                  | High Quality      | 420 mg/kg              | Annual                  | Composite          |              |
| Selenium Dry Wt                                | Ceiling           | 100 mg/kg              | Annual                  | Composite          |              |
| Selenium Dry Wt                                | High Quality      | 100 mg/kg              | Annual                  | Composite          |              |
| Zinc Dry Wt                                    | Ceiling           | 7,500 mg/kg            | Annual                  | Composite          |              |
| Zinc Dry Wt                                    | High Quality      | 2,800 mg/kg            | Annual                  | Composite          |              |
| Nitrogen, Total Kjeldahl                       |                   | Percent                | Annual                  | Composite          |              |
| Nitrogen, Ammonium (NH4-N) Total               |                   | Percent                | Annual                  | Composite          |              |
| Phosphorus, Total                              |                   | Percent                | Annual                  | Composite          |              |
| Phosphorus, Water Extractable                  |                   | % of Tot P             | Annual                  | Composite          |              |
| Potassium, Total Recoverable                   |                   | Percent                | Annual                  | Composite          |              |

### **7.2.1 Changes from Previous Permit and Explanation of Limits and Monitoring Requirements:**

The outfall/sample point shall be used only as necessary for the discharge of liquid sludge from the process prior to the belt press. If a situation arises and the outfall is needed the permittee shall notify the assigned Department wastewater engineer so that the appropriate monitoring forms can be generated.

No changes from the previous year. Requirements for land application of municipal sludge are determined in accordance with ch. NR 204 Wis. Adm. Code. Ceiling and high quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements.

## 8 Compliance Schedules

### 8.1 Pollutant Minimization Program

| Required Action   | Due Date   |
|---|------------|
| Annual Status Report: The permittee shall submit to the Department an annual status report on the progress of the PMP as required by s. NR 106.145(7), Wis. Adm. Code. Submittal of the annual status report is required by March 31st of each year.<br><br>Note: If the permittee wishes to apply for an alternative mercury effluent limitation, that application is due with the application for permit reissuance by 6 months prior to permit expiration. The permittee should submit or reference the PMP plan as updated by the Annual Status Report or more recent developments as part of that application. | 03/31/2017 |
| Annual Status Report #2:  | 03/31/2018 |
| Annual Status Report #3:  | 03/31/2019 |
| Annual Status Report #4:  | 03/31/2020 |
| Annual Status Report #5: Continue to submit annual reports until permit reissuance.   | 03/31/2021 |

### 8.2 Explanation of Compliance Schedules

**Pollutant Minimization Program** – As part of obtaining a Mixing Zone Exemption the facility must perform a pollution minimization program and submit annual status reports.

## 9 Attachments:

Water Flow Schematic(s)

Water Quality-Based Effluent Limits Recommendations for Ashland Sewage Utility (WPDES Permit # WI-0030767)” memo dated May 13, 2015

Amendment to the “Water Quality-Based Effluent Limits Recommendations for Ashland Sewage Utility (WPDES Permit # WI-0030767)” memo dated March 22, 2016

## 10 Proposed Expiration Date:

June 30, 2021

### Prepared By:

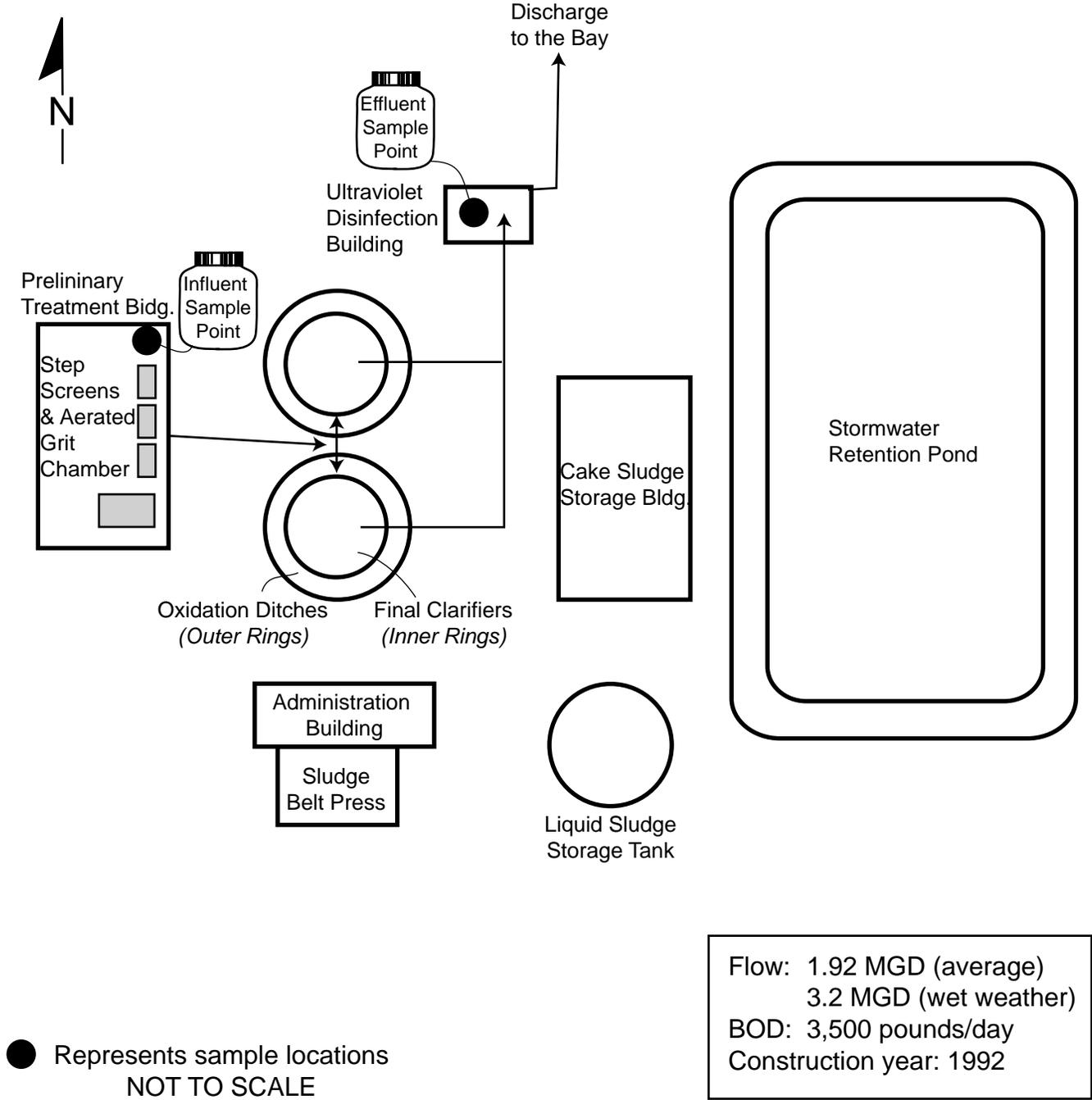
**Sheri A. Snowbank** Wastewater Specialist

**Date:** March 22, 2016

cc: Eric DeVenecia, Superior

# City of Ashland Wastewater Treatment Plant

The Ashland wastewater facility treatment units include: static screens, an aerated grit chamber, two oxidation ditches operated in parallel, final clarifiers, and ultraviolet disinfection. Effluent is discharged to Chequamegon Bay of Lake Superior. Sludge is treated aerobically in the oxidation ditches and storage tank prior to thickening in the belt press. Cake and liquid sludge are spread as a soil conditioner on approved cropland. There is also a stormwater retention basin at the facility, where peak wastewater flows can be collected (during storm events) and stored for treatment during normal flow conditions. The diagram below shows the treatment units and sampling locations.



DATE: May 13, 2015 FILE REF: 3200

TO: Sheri Snowbank – North Water District / Spooner

FROM: Jim Schmidt – WY/3 

SUBJECT: Water Quality-Based Effluent Limitations for Ashland Sewage Utility (WPDES Permit # WI-0030767)

This is in response to your request for an evaluation of water quality-based effluent limitations using chs. NR 102, 105, 106, 207, and 217 of the Wisconsin Administrative Code (where applicable), for Ashland's discharge to Chequamegon Bay. The evaluation of the permit recommendations is discussed in more detail in the attached report. Based on our review, the following recommendations are made on a chemical-specific basis:

| <u>Substance</u>       | <u>Effluent Limitations</u>   |
|------------------------|---|
| BOD5                   | 30 mg/L monthly average, 45 mg/L weekly average                               |
| Total Suspended Solids | 30 mg/L monthly average, 45 mg/L weekly average                               |
| pH                     | 6.0 s.u. daily minimum, 9.0 s.u. daily maximum                                |
| Fecal Coliforms        | 400 colonies / 100 mL monthly geometric mean                                  |
| <i>E. Coli</i>         | Monitoring only   |
| Total Phosphorus:      |   |
| Water quality-based    | Not recommended at this time pending EPA development of the Great Lakes model |
| Interim                | 1.0 mg/L monthly average  |
| Mercury                | 1.3 ng/L monthly average (see NOTE below)                                     |

NOTE: Ashland may re-apply for the mixing zone phase-out exemption for mercury which was part of its current WPDES permit. Continuation of this exemption is believed to result in a permit limit not to exceed 4.5 ng/L daily maximum (see second attachment to this memo).

Ammonia and temperature monitoring are no longer necessary in Ashland's effluent because past results are far below calculated limits.

Along with the chemical-specific recommendations mentioned above, acute and chronic whole effluent toxicity testing is recommended for this permittee. Accordingly, following the guidance provided in the most recent version of the Department's Whole Effluent Toxicity Program Guidance Document, acute and chronic whole effluent toxicity test batteries are recommended at a frequency of once each per year. Please consult the attached report regarding relevant monitoring conditions that relate to this discharge.

If there are any questions or comments, please contact me at (608) 267-7658 or via e-mail at jamesw.schmidt@wisconsin.gov.

Attachments

cc: Eric DeVenecia – North Water District / Superior

**Water Quality-Based Effluent Limitations for  
Ashland Sewage Utility  
WPDES Permit # WI-0030767  
Prepared by:  
Jim Schmidt - WY/3**

**Existing Permit Limitations (WPDES Permit #WI-0030767-08, effective January 1, 2011 and expiring December 31, 2015):**

Outfall 001 – Effluent from oxidation ditch system with ultraviolet disinfection and alum addition for phosphorus removal

| <u>Substance</u>       | <u>Effluent Limitations</u>   |
|------------------------|---|
| BOD5                   | 30 mg/L monthly average, 45 mg/L weekly average   |
| Total Suspended Solids | 30 mg/L monthly average, 45 mg/L weekly average   |
| pH                     | 6.0 s.u. daily minimum, 9.0 s.u. daily maximum  |
| Fecal Coliforms        | 400 colonies / 100 mL monthly geometric mean  |
| <i>E. Coli</i>         | Monitoring only   |
| Total Phosphorus       | 1.0 mg/L monthly average  |
| Ammonia                | Monitoring only   |
| Mercury                | 4.5 ng/L daily maximum (variance limit based on mixing zone phase-out for bioaccumulating chemicals of concern) |

The above limitations for BOD5, TSS, pH and fecal coliforms are not changing at this time pursuant to typical municipal discharge limits to Lake Superior and Chequamegon Bay. No changes are recommended to the *E. coli* monitoring as well since that is standard for lake discharges with beach considerations, in anticipation of potential criteria development by U.S. EPA in the future. The phosphorus and mercury limits shall be re-evaluated in this document along with the need for permit limits for ammonia as well as any other pollutant monitored as part of the permit reissuance application.

**Information for Permit Reissuance Evaluation:**

**Receiving Water Information**

Name: Chequamegon Bay (of Lake Superior)  
 Classification: Coldwater community, public water supply  
 Flows: Dilution factor of one-part effluent with ten-parts-lake-water (or eleven-parts total)

Source of background concentration data = Bad River and Bois Brule River for chloride, Lake Superior data from nearby permittees for hardness (Ashland as well as Northern States Power, Madeline Sanitary District, Superior, Washburn, and Calumet Superior LLC).

Background results used in limit calculations:

| <u>Substance</u> | <u>Result</u>  |
|------------------|--|
| Chloride         | 3.8 mg/L   |
| Hardness         | 48 PPM for Lake Superior, equal to effluent hardness for the tributary |

**Effluent Information**

Actual Flow (1/1/2011 – 3/31/2015):

Peak daily = 4.741 MGD (4/10/2014)  
 Peak 7-day average = 4.158 MGD (4/6 – 4/12/2014)  
 Peak 30-day average = 3.715 MGD (4/6 – 5/5/2014)  
 Peak 365-day average = 1.613 MGD (1/13/2014 – 1/12/2015)

Design Flow:

Annual average = 1.92 MGD (from WPDES permit reissuance application)  
 Estimated peak daily = 5.643 MGD (4.741 MGD X 1.92 / 1.613)  
 Estimated peak weekly = 4.949 MGD (4.158 MGD X 1.92 / 1.613)  
 Estimated peak monthly = 4.422 MGD (3.715 MGD X 1.92 / 1.613)

Acute dilution factor used = Not applicable

Effluent concentration data - Substances tested: Since Ashland's discharge exceeds 1 MGD, Ashland is required to test for each of the substances on the EPA priority pollutant list.

Monitored and detected during permit term = Mercury, ammonia, phosphorus

Monitored as part of the WPDES permit reissuance application and detected in the effluent = Chloride, hardness, copper, total cyanide (cyanide amenable to chlorination was not detected), nickel, zinc and chloroform.

Results:

Substances with single test results = Total cyanide at 7 ug/L, nickel at 1.3 ug/L, zinc at 34 ug/L, chloroform at 0.67 ug/L

Substances with multiple results = Summarized below

| Date               | Chloride (mg/L) | Hardness (PPM)  |
|--------------------|-----------------|-----------------|
| 10/2/2012 WET test |                 | 124             |
| 1/12/2015          | 91              | 200             |
| 1/15/2015          | 87              | 180             |
| 1/19/2015          | 89              | 160             |
| 1/26/2015          | 87              |                 |
| Mean               | 88.5            | 163 (geo. mean) |

| Date      | Copper (ug/L) | Date      | Copper (ug/L) | Date      | Copper (ug/L) |
|-----------|---------------|-----------|---------------|-----------|---------------|
| 1/12/2015 | 10            | 1/26/2015 | 14            | 2/10/2015 | 17            |
| 1/15/2015 | 14            | 1/29/2015 | 14            | 2/13/2015 | 19            |
| 1/19/2015 | 11            | 2/2/2015  | 13            | 2/17/2015 | 15            |
| 1/22/2015 | 13            | 2/6/2015  | 19            | Mean      | 14.45         |

1-day P99 = 22.53 ug/L, 4-day P99 = 18.17 ug/L, 30-day P99 = 15.73 ug/L

| Date       | Mercury (ng/L) | Date       | Mercury (ng/L) | Date       | Mercury (ng/L) |
|------------|----------------|------------|----------------|------------|----------------|
| 3/8/2011   | 7.3            | 8/29/2012  | 0.96           | 1/21/2014  | 2.6            |
| 6/7/2011   | 3.8            | 12/5/2012  | 2.2            | 5/19/2014  | 1.6            |
| 9/12/2011  | 1.5            | 2/26/2013  | 5.1            | 7/31/2014  | 1.9            |
| 10/11/2011 | 1.1            | 5/28/2013  | 5.8            | 10/29/2014 | 2.5            |
| 3/22/2012  | 2.7            | 8/12/2013  | 1.7            | 1/12/2015  | 2.2            |
| 6/15/2012  | 1.4            | 11/25/2013 | 2.9            | Mean       | 2.78           |

1-day P99 = 9.09 ng/L, 4-day P99 = 5.45 ng/L, 30-day P99 = 3.61 ng/L

Because of the large number of results reported for ammonia and phosphorus during the permit term, only the statistics are summarized here.

|                             | Ammonia              | Phosphorus              |
|-----------------------------|----------------------|-------------------------|
| # of results (all detected) | 50                   | 218                     |
| Mean                        | 0.53 mg/L            | 0.49 mg/L               |
| Maximum (and date)          | 6 mg/L<br>(2/4/2014) | 2.7 mg/L<br>(1/21/2013) |
| 1-day P99                   | 5.14 mg/L            | 1.34 mg/L               |
| 4-day P99                   | 3.09 mg/L            | 0.85 mg/L               |
| 30-day P99                  | 1.30 mg/L            | 0.61 mg/L               |

In the above tables, the term "P99" refers to the 99<sup>th</sup> upper percentile values calculated using the procedure in s. NR 106.05(5) when eleven or more detected results are available.

### Effluent Limit Summary

Only detected substances with criteria are evaluated here. Results are in units of ug/L unless indicated otherwise.

#### DAILY MAXIMUM LIMITS based on ACUTE TOXICITY CRITERIA

| <u>Substance</u> | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |            |             |
|------------------|------------------------|------------------------|-------------------------|--------------------------------|------------|-------------|
|                  |                        |                        |                         | <u>Mean</u>                    | <u>P99</u> | <u>Max.</u> |
| Copper           | 24.6 *                 | 49.20                  |                         |                                | 22.53      | 19          |
| Mercury          | 0.83                   | 0.83                   |                         |                                | 0.00909    | 0.0073      |
| Nickel           | 688.7 *                | 1377.40                | 275.48                  | 1.3                            |            |             |
| Zinc             | 184.54 *               | 369.08                 | 73.82                   | 34                             |            |             |
| Chlorides (mg/L) | 757                    | 1514                   | 302.80                  | 88.50                          |            | 91          |

\* - Criterion is based on a mean effluent hardness of 163 PPM.

#### WEEKLY AVERAGE LIMITS based on CHRONIC TOXICITY CRITERIA

| <u>Substance</u> | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |            |
|------------------|------------------------|------------------------|-------------------------|--------------------------------|------------|
|                  |                        |                        |                         | <u>Mean</u>                    | <u>P99</u> |
| Copper           | 5.52 *                 | 60.72                  |                         |                                | 18.17      |
| Mercury          | 0.44                   | 0.44                   |                         |                                | 0.00545    |
| Nickel           | 28.05 *                | 308.55                 | 61.71                   | 1.3                            |            |
| Zinc             | 63.36 *                | 696.96                 | 139.39                  | 34                             |            |
| Chlorides (mg/L) | 395                    | 4307                   | 861.40                  | 88.5                           |            |

\* - Criterion is based on a mean receiving water hardness of 48 PPM.

#### MONTHLY AVERAGE LIMITS based on WILDLIFE CRITERIA

| <u>Substance</u>      | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |             |
|-----------------------|------------------------|------------------------|-------------------------|--------------------------------|-------------|
|                       |                        |                        |                         | <u>Mean</u>                    | <u>P99</u>  |
| <b>Mercury (ng/L)</b> | <b>1.3</b>             | <b>1.3</b>             |                         |                                | <b>3.61</b> |

#### MONTHLY AVERAGE LIMITS based on HUMAN THRESHOLD CRITERIA

| <u>Substance</u>      | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |             |
|-----------------------|------------------------|------------------------|-------------------------|--------------------------------|-------------|
|                       |                        |                        |                         | <u>Mean</u>                    | <u>P99</u>  |
| <b>Mercury (ng/L)</b> | <b>1.5</b>             | <b>1.5</b>             |                         |                                | <b>3.61</b> |
| Nickel                | 100                    | 1100                   | 220                     | 1.3                            |             |
| Cyanide (total)       | 138.6                  | 1525                   | 305                     | 7                              |             |

MONTHLY AVERAGE LIMITS based on HUMAN CANCER CRITERIA

| <u>Substance</u> | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |            |
|------------------|------------------------|------------------------|-------------------------|--------------------------------|------------|
|                  |                        |                        |                         | <u>Mean</u>                    | <u>P99</u> |
| Chloroform       | 53                     | 583                    | 117                     | 0.67                           |            |

MONTHLY AVERAGE LIMITS based on NR 102 TASTE and ODOR CRITERIA

| <u>Substance</u> | <u>Crit-<br/>erion</u> | <u>Effl.<br/>Limit</u> | <u>1/5 of<br/>Limit</u> | <u>Effluent Concentrations</u> |            |
|------------------|------------------------|------------------------|-------------------------|--------------------------------|------------|
|                  |                        |                        |                         | <u>Mean</u>                    | <u>P99</u> |
| Copper           | 1000                   | 11000                  |                         |                                | 15.73      |
| Zinc             | 5000                   | 55000                  | 11000                   | 34                             |            |

NOTE: Since total cyanide was detected but cyanide amenable to chlorination was not, cyanide limits were not calculated and evaluated based on acute or chronic toxicity criteria.

**Permit Recommendations:**

Mercury) Mercury limits are potentially needed in the permit because the 30-day P99 exceeds the monthly average limits based on both wildlife and human threshold criteria. The calculated limits were set equal to both criteria because the U.S. EPA Great Lakes Initiative (GLI) regulation (40 CFR Part 132, Appendix F, Procedure 3.C.) specifies the phase-out of mixing zones after November 15, 2010 when calculating effluent limits for bioaccumulating chemicals of concern (BCCs), including mercury, for discharges to waters in the Great Lakes basin. While ch. NR 106, Wis. Adm. Code has not yet been revised to reflect this mixing zone phase-out, the Department's intention in issuing WPDES permits authorizing discharge to the Great Lakes is to comply with the terms of the GLI, thereby recognizing EPA's over-promulgation of mercury standards. Elimination of the mixing zone is likely to mean effluent limits would be set equal to the most restrictive applicable toxicity criterion. For mercury the most stringent toxicity criterion (wildlife) is 1.3 ng/L, and effluent monitoring results from Ashland (30-day P99 value) exceeded this value.

Ashland may request the use of a mixing zone for calculating effluent limitations for mercury to be continued beyond November 15, 2010 under the exemption for technical and economic considerations to the mixing zone phase-out for BCCs in the GLI at 40 CFR, Part 132, Appendix F, Procedure 3. C. 6. In fact, the mixing zone exemption was part of Ashland's current WPDES permit. Ashland may re-apply for the mixing zone exception as part of the reissued permit, since the exception was only applicable over a single permit term. NOTE: Draft evaluation language regarding the phase-out is attached at the end of this document.

Pending a potential re-application for the mixing zone phase-out exemption, the recommended water quality-based limit is 1.3 ng/L as a monthly average in response to EPA's position. If a phase-out exemption is not provided, a variance may be sought to grant an alternate mercury effluent limit (AMEL). The conditions for granting an AMEL include a requirement to develop and implement a Mercury Pollution Minimization Program (PMP) in accordance with ss. NR 106.04(5) and NR 106.145(7). Typically, the variance limit would be set equal to the 1-day P99 from current data and expressed as a daily maximum limit. Based on current data, the 1-day P99 at Outfall 001 is 9.09 ng/L. However, it should be noted that the current permit limit for mercury was 4.5 ng/L daily maximum based on the exemption. An increased effluent limit would represent significant lowering of water quality as defined in s. NR 207.02(6) and would be subject to the antidegradation procedures in ch. NR 207 which include determination of the need for an increased limit and especially the social/economic justification for such an increase. The social/economic justification may be difficult for Ashland to make since the treatment system is not being upgraded. As a result, the limit based on the exemption should not exceed

the 4.5 ng/L daily maximum limit in the current permit.

**Other Evaluations:**

**Phosphorus – Technology Based:** Wisconsin Administrative Code, ch. NR 217, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average technology-based limit of 1.0 mg/L, or an approved alternative concentration limit. The following table summarizes annual average effluent flows and phosphorus concentrations over recent years.

| Calendar Year | Annual Average Effluent Flow (MGD) | Annual Average P Concentration (mg/L) | Estimated Annual Total P Loading (lbs/year) |
|---------------|------------------------------------|---------------------------------------|---|
| 2011          | 1.09                               | 0.45                                  | 1493  |
| 2012          | 1.00                               | 0.49                                  | 1496  |
| 2013          | 1.47                               | 0.54                                  | 2416  |
| 2014          | 1.61                               | 0.48                                  | 2352  |

Since the discharge exceeds 1800 pounds per year (or 150 pounds per month), the 1.0 mg/L monthly average limit is recommended to stay in the permit pending the determination of the need for water quality-based limits.

**Phosphorus - WQBEL** Revisions to the administrative rules regulating phosphorus took effect on December 1, 2010 and established water quality criteria (WQC) for phosphorus. The criterion for Chequamegon Bay and Lake Superior is 5 ug/L as described in s. NR 102.06 (5)(a). A whole lake model is in development by U.S. EPA which may impact Ashland’s limit, but until that time an interim monthly average limit of 0.6 mg/L may be applicable in accordance with s. NR 217.13(4).

The reason the word “may” was underlined in the previous paragraph is that as noted in s. NR 217.13(4), the Department may set an interim effluent limit based on the best readily available phosphorus removal technology currently used in Wisconsin. A note attached to sub. (4) states that as of December 1, 2010 (when the NR 217 rule changes became effective), the best readily available phosphorus removal technology indicates a limit of 0.6 mg/L, but the listing of 0.6 mg/L in a “note” to the rule is not considered to be a permit requirement for Great Lakes discharges, given that sub. (4) contains the word “may” in regards to interim limit application. Effluent results for Ashland show 218 sample results dated January 2011 through March 2015. The 30-day P99 value for those 218 results is 0.61 mg/L, but the calculated averages for three months during the current permit term were much greater than 0.61 mg/L (January 2013 = 0.87 mg/L, June and July 2014 = 0.86 mg/L) so there is the potential that this facility is unable to meet the 0.6 mg/L interim monthly average limit. Since the current permit limit is 1.0 mg/L, that limit recommended as the interim limit in the reissued permit.

It is noted that although the Great Lakes model has not yet been officially completed, preliminary results show the potential for significant dilution factors even for the largest municipal discharge from Wisconsin into the Great Lakes, namely the two treatment plants serving the Milwaukee Metropolitan Sewerage District. Based on that, it appears highly likely that even larger dilution factors would be applied to a smaller discharge such as that from Ashland. As a result, it is possible that in the future, the need for the interim limit may be reconsidered as well as the need for a water quality-based limit based on the lake model. Until that time, the interim limit is the only recommended limit for this permittee.

**Ammonia)** Acute and chronic (4-day and 30-day) toxicity criteria are available for both classifications below the outfall. Typically, acute toxicity criteria are assessed at or near the outfall, but with the lake being ¼ mile from the outfall pipe, acute and chronic criteria are evaluated via limit calculations in both the tributary and the lake.

Acute toxicity criteria for ammonia are used to calculate daily maximum limits. The criteria are based upon the effluent pH, and since ammonia is more toxic at higher pH the 99<sup>th</sup> upper percentile pH value is used to determine the daily maximum ammonia limit. Since Ashland has a pH limit in its current permit, a large effluent pH database is available. Between October 1, 2010 and February 28, 2015, a total of 1,550 effluent pH results were reported. The 99<sup>th</sup> upper percentile value would therefore be represented as being midway between the 15<sup>th</sup> and 16<sup>th</sup> highest results, which are 7.66 and 7.64 s.u., respectively. Therefore the estimated 99<sup>th</sup> percentile value is 7.65 s.u. At 7.65 s.u., the acute toxicity criterion for waters classified as coldwater is 10.49 mg/L, which corresponds to a daily maximum limit of 20.98 mg/L. At Ashland, the peak daily ammonia concentration reported during the current term was 6 mg/L while the 1-day P99 was 5.14 mg/L, based on the database summary on page 3 of this document. Both of those concentrations are far below the calculated limits, so there is no need to include daily maximum ammonia limits in the reissued permit.

As for weekly and monthly average limits based on chronic toxicity criteria, updated ambient pH and temperature data are used to calculate chronic toxicity criteria as well as weekly and monthly average ammonia limits for both the tributary and the lake. In Chequamegon Bay and Lake Superior, a default dilution factor of 10:1 (1 part effluent in 10 parts lake water, or 11 parts total) is applied in order to calculate limits based on the lake criteria (coldwater community).

Since chronic toxicity criteria for ammonia are more stringent in waters with higher temperature and higher pH, the need for permit limits based on those criteria are evaluated during summer months. The following table summarizes the information used to calculate those limits.

|                            | Chequamegon Bay<br>(Coldwater) |
|----------------------------|--------------------------------|
| Ambient Conditions:        |                                |
| Summer Temp. (°F)          | 64                             |
| Summer Temp. (°C)          | 17.8                           |
| pH (s.u.)                  | 7.9                            |
| Chronic Toxicity Criteria: |                                |
| 4-day Criteria             | 5.67 mg/L                      |
| 30-day Criteria            | 2.27 mg/L                      |
| Effluent Limits (rounded): |                                |
| Weekly Average             | 62 mg/L                        |
| Monthly Average            | 24 mg/L                        |

Ambient temperatures in Chequamegon Bay are based on Table 5 of ch. NR 102. Ambient pH values are based on summertime values for Chequamegon Bay.

From the effluent data summary on page 3 of this document, the 4-day P99 is 3.09 mg/L and the 30-day P99 is 1.30 mg/L. Both P99 values are far below the calculated limits, so chronic toxicity criteria-based limits are not needed at Ashland.

It is noted that according to s. NR 106.33(2), limits ammonia limits are included in permits when they are below 20 mg/L in May – October or 40 mg/L in November – April. However, a court decision on July 11, 2014 rendered s. NR 106.33(2) invalid (*Case No. 12CV3654, Midwest Environmental Defense Center Inc. v. Wisconsin Department of Natural Resources, et. al., an action for declaratory judgment under s. 227.40, Stats., the Circuit Court for Dane County, Branch 1, entered a Final Order and Judgment providing in relevant part: Wis. Admin. Code § NR 106.33(2) is declared invalid.*). As a result of this decision, the seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. Since Ashland had no ammonia limits in the current permit, the “P99” comparison process used above is appropriate, and no permit limits are recommended.

Monitoring is not necessary during the term of the upcoming permit because the effluent results are so far below any limits. Ammonia monitoring may be deferred until the time of the next permit reissuance application.

**Temperature**) New surface water quality standards for temperature took effect on October 1, 2010. These new regulations are detailed in Chapter NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. For discharges to Chequamegon Bay, the sub-lethal criteria (which are the controlling factors for the bay) range from 72°F in July to 41°F. The relatively small size of this discharge compared to the allowable mixing zone area in the lake results in limits of 120°F daily maximum year-round to protect the bay. Effluent temperatures above 90°F are not expected in municipal treatment plants without potential harm to the treatment process. Between February 2011 and March 2015, Ashland has been monitoring and reporting effluent temperature. During that period, the maximum reported temperature was just under 68.5°F (August 29, 2013). Since Ashland’s results are so far below the limits, permit limits are not necessary in the reissued permit and thermal monitoring is no longer necessary in Ashland’s effluent.

**Whole Effluent Toxicity Evaluation:** WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time. Acute tests predict the concentration that causes lethality of aquatic organisms during a 48-96 hour exposure. Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven day exposure.

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**Acute WET:** In order to assure that the discharge from outfall 001 is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> greater than 100% effluent.

**Chronic WET:** In order to assure that the discharge from outfall 001 is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> greater than the instream waste concentration (IWC). The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 9.1% shown in the WET Checklist summary below was calculated based on the default dilution factor of one part effluent in ten parts lake water (or eleven parts total).

**Dilution Series:** According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Wis. Adm. Code), the default acute dilution series is: 6.25, 12.5, 25, 50, 100%, and the default chronic dilution series is 100, 30, 10, 3, 1%. Other dilution series may be chosen by the permittee or Department staff, but alternate dilution series must be specified in the WPDES permit. For guidance on selecting an alternate dilution series, see Chapter 2.11 of the WET Guidance Document.

**Receiving water:** According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Wis. Adm. Code) receiving water must be used as the dilution water and primary control in WET tests, unless the use of another dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on outfall 001 shall be a grab sample collected from Chequamegon Bay, out of the influence of the mixing zone and any other known discharge]. The receiving water location must be specified in the WPDES permit.

**Historical WET Data:** Below is a tabulation of all available WET data for outfall 001 during the current permit term.

| Date Initiated | Acute Results<br>LC <sub>50</sub> (% survival in 100% effluent) |                |                |              | Chronic Results<br>IC <sub>25</sub> |                |       |                |              | Footnotes                  |
|----------------|---|----------------|----------------|--------------|-------------------------------------|----------------|-------|----------------|--------------|----------------------------|
|                | <i>C. dubia</i>   | Fathead minnow | Pass or Fail ? | Use in RPF ? | <i>C. dubia</i>                     | Fathead Minnow | Algae | Pass or Fail ? | Use in RPF ? |                            |
|                | 2/21/2012   | 100            | 100            | Pass         | Yes                                 |                |       |                |              |                            |
| 10/2/2012      | 100   | 100            | Pass           | Yes          | 100                                 | 100            |       | Pass           | Yes          | Split sample, same results |

RPF = Reasonable Potential Factor

**WET Checklist.** Department staff use the WET Checklist when deciding whether WET limits and monitoring are needed. As toxicity potential increases, more points accumulate and more monitoring is needed to insure that toxicity is not occurring. The Checklist recommends acute and chronic WET limits (as needed) based on the Reasonable Potential Factor (RPF), as required by s. NR 106.08, Wis. Adm. Code, and monitoring frequencies based on points accumulated during the Checklist analysis. The completed WET Checklist and monitoring recommendations are summarized in the table below. (For more on the RPF and WET Checklist, see Chapter 1.3 of the WET Guidance Document, at: <http://dnr.wi.gov/topic/wastewater/documents/Chap1x3MonitoringLimits.pdf>)

**WHOLE EFFLUENT TOXICITY (WET) CHECKLIST SUMMARY**

|                                     | ACUTE   | CHRONIC  |
|-------------------------------------|---|--|
| <b>1. INSTREAM WASTE CONC.</b>      | 1A. Not Applicable<br><b>TOTAL POINTS = 0</b>   | 1B. IWC = 9.1%<br><b>TOTAL POINTS = 0</b>                                  |
| <b>2. HISTORICAL DATA</b>           | 2A. Two tests used in RPF, both passed;<br>RPF = 0<br><b>TOTAL POINTS = 0</b>                                 | 2B. One test used in RPF, it passed;<br>RPF = 0<br><b>TOTAL POINTS = 0</b> |
| <b>3. EFFLUENT VARIABILITY</b>      | 3A. Insignificant variability, no violations or upsets, consistent WWTF operations<br><b>TOTAL POINTS = 0</b> | 3B. Same as Acute<br><b>TOTAL POINTS = 0</b>                               |
| <b>4. REC. WATER CLASSIFICATION</b> | 4A. Coldwater community (Lake Superior is an Exceptional Resource Water)<br><b>TOTAL POINTS = 15</b>          | 4B. Same as Acute<br><b>TOTAL POINTS = 15</b>                              |

| Checklist continued              | ACUTE  | CHRONIC  |
|----------------------------------|--|--|
| <b>5. CHEMICAL SPECIFIC DATA</b> | 5A. No limits recommended. Ammonia, copper, chloride, nickel and zinc have criteria but no permit limits are needed (3 pts). Chloroform was also detected but it has no aquatic toxicity criterion (2 pts).<br><b>TOTAL POINTS = 5</b> | 5B. Same as Acute.<br><b>TOTAL POINTS = 5</b>  |
| <b>6. ADDITIVES</b>              | 6A. Alum added for phosphorus removal.<br><b>TOTAL POINTS = 1</b>  | 6B. Additives used more than once per 4 days, same points as acute.<br><b>TOTAL POINTS = 1</b> |
| <b>7. DISCHARGE CATEGORY</b>     | 7A. No significant industrial contributors. The significant industries in the community have direct discharges to the bay.<br><b>TOTAL POINTS = 0</b>  | 7B. Same as Acute<br><b>TOTAL POINTS = 0</b>   |
| <b>8. WASTEWATER TREATMENT</b>   | 8A. Secondary Treatment<br><b>TOTAL POINTS = 0</b>   | 8B. Same as Acute<br><b>TOTAL POINTS = 0</b>   |
| <b>9. DOWNSTREAM IMPACTS</b>     | 9A. None attributable to discharge<br><b>TOTAL POINTS = 0</b>  | 9B. Same as Acute<br><b>TOTAL POINTS = 0</b>   |
| <b>TOTAL POINTS</b>              | 21   | 21   |

NOTE: The mercury limits are not based on acute or chronic toxicity criteria and therefore no points were assigned in items 5A or 5B.

**WET Monitoring and Limit Recommendations:** Based on historical WET data and RPF calculations (as required in s. NR 106.08, Wis. Adm. Code), limits are not required. Based upon the point totals generated by the WET Checklist, other information given above, and Chapter 1.3 of the WET Guidance Document, once per year testing is recommended on both an acute and a chronic basis. This is consistent with the minimum requirements for major municipal discharges (in excess of 1 MGD). The checklist showed that no additional testing beyond the minimum annual frequency is needed. Tests should be done in rotating quarters, in order to collect seasonal information about this discharge. When including recommended monitoring frequencies in the WPDES permit, staff should specify required quarters (e.g., Jan-Mar, Apr-Jun, Jul-Sep, or Oct-Dec).

## DRAFT Mixing Zone Phase-Out Exception for Mercury - City of Ashland

The City of Ashland has requested a continued exception to the proposed mixing zone phase out when calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC's) at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. In consideration of the requirements contained at the above reference, the Wisconsin Department of Natural Resources (WDNR) determines that:

- The City of Ashland is in compliance with and shall continue to comply with all applicable requirements of Clean Water Act sections 118, 301, 302, 303, 304, 306, 307, 401, and 402, including existing categorical effluent limits and water quality based effluent limits (WQBELs).
- The City of Ashland will accept a permit compliance schedule requiring the development and implementation of a Mercury Pollution Minimization Plan (PMP) meeting the requirements of s. 106.145(7). WDNR believes the finding at s. 106.145(1)(a) sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective.
- The City of Ashland's wastewater treatment facility discharges directly to Chequamegon Bay (Lake Superior). Under s. NR 106.06(4)(b)2 WQBELs are calculated using a mixing or dilution calculation of one part effluent to ten parts receiving water. The WQBEL for mercury using this procedure is 9.3 ng/L, the mercury limit based on applying the exemption during the current permit term is 4.5 ng/L, and the 30-day P99 for mercury in Ashland's effluent is 3.61 ng/L.
- The size of the mixing zone is defined by a 10:1 dilution ratio, ten parts lake water (at an ambient concentration of 0.5 ng/L based on data from the Bayfront power plant in Ashland) to one part effluent. There are no regulatory requirements nor does data and information exist to allow WDNR to make a scientifically and valid determination of an alternative size of the mixing zone that could be attained with current available and economically feasible technology.
- By definition, the water quality criteria are met at the edge of the mixing zone.
- There is currently no applicable TMDL for mercury in Lake Superior and available data indicate the concentration of mercury in Lake Superior meets all applicable water quality criteria.
- With a mixing zone exemption a WQBEL for mercury is not required. The requirements for authorizing the exception and the circumstances under which it is being granted are essentially the same as those for granting a variance to water quality standards. WDNR has analyzed the potential impacts to endangered and threatened species as part of its variance process. The analysis concluded that approval of mercury variances, with more stringent permit requirements for PMPs, is unlikely to adversely affect bald eagles or other listed species that occur within the State of Wisconsin.

Therefore, WDNR grants a mixing zone phase out exemption for effluent discharges from the wastewater

treatment facility operated by the City of Ashland due to technical and economic considerations.

The granting of this exception to the City of Ashland shall apply only to the 5-year permit term of the proposed WPDES permit. The City will need to make a similar request and DNR will need to make a similar determination for a further continuation of a mixing zone, if those actions become appropriate for the next permit term.

DATE: March 22, 2016

TO: Sheri Snowbank – North Water District / Spooner

FROM: Jim Schmidt – WY/3

SUBJECT: Amendment to the Water Quality-Based Effluent Limitations for Ashland Sewage Utility (WPDES Permit # WI-0030767)

This amendment updates the Mercury section of the Water Quality-Based Effluent Limitations for Ashland Sewage Utility (WPDES Permit # WI-0030767) dated May 13, 2015. Four additional data points are available to use in limit calculations covering the period of April 2015 – January 2016.

| Date       | Mercury<br>(ng/L) | Date       | Mercury<br>(ng/L) | Date       | Mercury<br>(ng/L) |
|------------|-------------------|------------|-------------------|------------|-------------------|
| 3/8/2011   | 7.3               | 12/5/2012  | 2.2               | 7/31/2014  | 1.9               |
| 6/7/2011   | 3.8               | 2/26/2013  | 5.1               | 10/29/2014 | 2.5               |
| 9/12/2011  | 1.5               | 5/28/2013  | 5.8               | 1/12/2015  | 2.2               |
| 10/11/2011 | 1.1               | 8/12/2013  | 1.7               | 04/27/15   | 9.0               |
| 3/22/2012  | 2.7               | 11/25/2013 | 2.9               | 07/14/15   | 1.1               |
| 6/15/2012  | 1.4               | 1/21/2014  | 2.6               | 10/14/15   | 2.2               |
| 8/29/2012  | 0.96              | 5/19/2014  | 1.6               | 01/19/16   | 1.0               |

#### P99 calculations

1-day P99\* = 10.97 ng/L  
 4-day P99 = 6.30 ng/L  
 30-day P99 = 3.93 ng/L  
 Mean = 2.88 ng/L

\*The term “P99” refers to the 99<sup>th</sup> upper percentile values calculated using the procedure in s. NR 106.05(5) when eleven or more detected results are available.

#### Mercury Limit Summary

DAILY MAXIMUM LIMITS based on ACUTE TOXICITY CRITERIA

| <u>Substance</u> | <u>Criterion</u> | <u>Effl. Limit</u> | <u>Effluent Concentrations</u> |             |
|------------------|------------------|--------------------|--------------------------------|-------------|
|                  |                  |                    | <u>P99</u>                     | <u>Max.</u> |
| Mercury          | 0.83 ug/L        | 0.83 ug/L          | 0.01097                        | 0.009       |

WEEKLY AVERAGE LIMITS based on CHRONIC TOXICITY CRITERIA

| <u>Substance</u> | <u>Criterion</u> | <u>Effl. Limit</u> | <u>Effluent Concentrations</u> |
|------------------|------------------|--------------------|--------------------------------|
|                  |                  |                    | <u>P99</u>                     |
| Mercury          | 0.44 ug/L        | 0.44 ug/L          | 0.0063                         |

MONTHLY AVERAGE LIMITS based on WILDLIFE CRITERIA

| <u>Substance</u> | <u>Criterion</u> | <u>Effl. Limit</u> | <u>Effluent Concentrations</u> |
|------------------|------------------|--------------------|--------------------------------|
|                  |                  |                    | <u>P99</u>                     |
| Mercury          | 1.3 ng/L         | 1.3 ng/L           | 3.93 ng/L                      |

MONTHLY AVERAGE LIMITS based on HUMAN THRESHOLD CRITERIA

| <u>Substance</u> | <u>Criterion</u> | <u>Effl. Limit</u> | <u>Effluent Concentrations</u> |
|------------------|------------------|--------------------|--------------------------------|
|                  |                  |                    | <u>P99</u>                     |
| <b>Mercury</b>   | <b>1.5 ng/L</b>  | <b>1.5 ng/L</b>    | <b>3.93 ng/L</b>               |

**Permit Recommendations:**

Mercury) Mercury limits are potentially needed in the permit because the 30-day P99 exceeds the monthly average limits based on both wildlife and human threshold criteria. The calculated limits were set equal to both criteria because the U.S. EPA Great Lakes Initiative (GLI) regulation (40 CFR Part 132, Appendix F, Procedure 3.C.) specifies the phase-out of mixing zones after November 15, 2010 when calculating effluent limits for bioaccumulating chemicals of concern (BCCs), including mercury, for discharges to waters in the Great Lakes basin. While ch. NR 106, Wis. Adm. Code has not yet been revised to reflect this mixing zone phase-out, the Department’s intention in issuing WPDES permits authorizing discharge to the Great Lakes is to comply with the terms of the GLI, thereby recognizing EPA’s over-promulgation of mercury standards. Elimination of the mixing zone is likely to mean effluent limits would be set equal to the most restrictive applicable toxicity criterion. For mercury the most stringent toxicity criterion (wildlife) is 1.3 ng/L, and effluent monitoring results from Ashland (30-day P99 value) exceeded this value.

Ashland requested the use of a mixing zone for calculating effluent limitations for mercury to be continued beyond November 15, 2010 under the exemption for technical and economic considerations to the mixing zone phase-out for BCCs in the GLI at 40 CFR, Part 132, Appendix F, Procedure 3. C. 6. In fact, the mixing zone exemption was part of Ashland’s current WPDES permit. Ashland re-applied for the mixing zone exception as part of the reissued permit, since the exception was only applicable over a single permit term. NOTE: Draft evaluation language regarding the phase-out is attached at the end of this document.

Pending the decision for the mixing zone phase-out exemption, the recommended water quality-based limit is 1.3 ng/L as a monthly average in response to the EPA’s position. If a phase-out exemption is not provided, a variance may be sought to grant an alternate mercury effluent limit (AMEL). The conditions for granting an AMEL include a requirement to continue to implement a Mercury Pollution Minimization Program (PMP) in accordance with ss. NR 106.04(5) and NR 106.145(7). Typically, the variance limit would be set equal to the 1-day P99 from current data and expressed as a daily maximum limit. Based on current data, the 1-day P99 at Outfall 001 is 11.0 ng/L.

It should be noted that the current permit granted the mixing zone phase-out exemption, but a limit for mercury was not included because a daily maximum limit was not calculated only a monthly average effluent limit was. The 30-day P99 and the average were below the calculated limit and it was surmised that no limits were needed. If the exemption is granted for this permit term a daily maximum limit equaling the 1-day P99 (11.0 ng/L) shall be included in the permit.

Another factor to take into consideration is the size of the mixing zone. The EPA requires in 40 CFR, Part 123, Appendix F, Procedure 3. C. 6 (a-c) the size of the mixing zone shall be no larger than necessary to account for the technical constraints and unreasonable economic effects, while meeting water quality criteria. The mixing zone size is calculated by adjusting the ratio to come to a final number that is as close to the monthly average limit (30-day P99) as possible:

$$\text{Monthly Ave. Limit} = ((\text{Ratio} + 1) * \text{Wildlife Criteria}) - (\text{Ratio} * \text{Background Conc.})$$

3.93 = ((Ratio + 1) \* 1.3) - (Ratio \* 0.5), the number 3.3 provides the ratio that is the closest to the calculated monthly average limit. Therefore, the size of the mixing zone is 3.3:1.

## Mixing Zone Phase-Out Exception for Mercury – City of Ashland

The City of Ashland has requested continued application of a mixing zone for calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC's) at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. In consideration of the requirements contained at the above reference, the Wisconsin Department of Natural Resources (WDNR) determines that:

- The City of Ashland is in compliance with and shall continue to comply with all applicable requirements of Clean Water Act sections 118, 301, 302, 303, 304, 306, 307, 401, and 402, including existing categorical effluent limits and water quality based effluent limits (WQBELs).
- The City of Ashland has accepted a permit compliance schedule requiring the implementation of a Mercury Pollution Minimization Plan (PMP) that meets the requirements of s. 106.145(7). WDNR believes the finding at s. 106.145(1)(a) sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective.
- The City of Ashland discharges directly to Lake Superior.
- There has not previously been effluent mercury limitations included in the City of Ashland WPDES permits (WI-0030767).
- The discharger has reduced and will continue to reduce—to the maximum extent possible—its discharge of the BCC for which the mixing zone is requested. The mixing zone shall be no larger than necessary to account for the technical constraints and economic effects identified pursuant to this exception. Therefore the mixing zone shall be set at 3.3:1 based on the 30-day P99 of discharge of 3.61 ng/L, the criterion of 1.3 ng/L and background of 0.5 ng/L
- The limit shall be set at 11.0 ng/L, the 1-day P<sub>99</sub> of discharge, with quarterly monitoring
- By definition, the water quality criteria are met at the edge of the mixing zone.
- There is currently no applicable TMDL for mercury in Lake Superior as data indicate that the concentration of mercury in Lake Superior meets all applicable water quality criteria. Other actions in Wisconsin to reduce releases of mercury include rules to control emissions from utility boilers and proposed mercury product legislation.
- This mixing zone and resulting WQBELs meet the requirements at 40 CFR, Part 132, Appendix F, Procedure 3 D., including that the actions will not jeopardize the continued existence of endangered or threatened species. The requirements for authorizing the above mixing zone exception and the circumstances under which it is being granted is essentially the same as those for granting a variance to water quality standards. WDNR has analyzed the potential impacts to endangered and threatened species as part of its variance process. The analysis concluded that approval of mercury variances, with more stringent permit requirements for PMPs, is unlikely to adversely affect bald eagles or other listed species that occur within the State of Wisconsin.

In consideration of the foregoing determinations, WDNR grants a mixing zone extension for the City of Ashland wastewater treatment facility due to technical and economic considerations.

The granting of this exception to The City of Ashland shall apply only to the 5-year permit term of the proposed WPDES permit. The City will need to make a similar request and DNR will need to make a similar determination for a further continuation of a mixing zone, if those actions become appropriate for the next permit term.