

Permit Fact Sheet

General Information

| | | |
|----------------------------------|---|------------|
| Permittee Name and Address: | Kieler Sanitary District No. 1 | |
| | 3854 Kilian Lane Kieler, Wi 530812 | |
| Permit Number: | WI-0029289-08-0 | |
| Proposed Permit Term: | July 1, 2016 through June 30, 2021 | |
| Discharge Location: | In the headwaters of Sinnipee Creek, approximately 60 feet from the SW corner of the WWTP building at 3854 Kilian Lane, Kieler, Wi 53812. Located in the SE ¼ of SE ¼ Section 33, T2N, R2W, Grant County. See Attachment 1 for map. | |
| Receiving Water: | The Headwaters of Sinnipee Creek, Platte River watershed (GP02), Grant-Platte River Basin, Grant County | |
| StreamFlow (Q _{7,10}): | Annual 7Q ₁₀ of Sinnipee Creek at the discharge is 0.15 cfs. | |
| Stream Classification: | Limited Forage Fish Community from the WWTP outfall to Bluff Rd. From Bluff Rd to the Mississippi River the waterway is Warm Water Sport Fish. Non-public water supply | |
| Design Flow(s) | Annual Average | 0.0914 MGD |
| Industrial Loading? | Packers Chemical, supplier of cleaning chemical for meat packing industry. | |

Facility and Discharge Description

Kieler Sanitary District No. 1 (Kieler) is an existing discharger and operates a wastewater treatment plant with an annual average design capacity of 0.0914 MGD. The actual annual average flow in 2015 was 0.049 MGD. The SD operates a small activated sludge oxidation ditch with influent screw screen and primary clarification. Effluent is disinfected via chlorination/dechlorination prior to discharge to the headwaters of Sinnipee Creek. Sludge handling and treatment consists of aerobic digestion and storage with final disposal to Department approved land application sites.

There are no planned changes to the treatment train or increases in flow to the facility during the proposed permit term.

Kieler submitted a permit application on May 04, 2015 that has been accepted by the Department. The Department has found the facility to be in substantial compliance with their current permit.

General Approach

The following sections of the fact sheet are numbered consistently with the numbering of corresponding conditions in the proposed permit. Shaded cells in the following tables indicate permit conditions that are new or are different from those found in the current permit. The fact sheet refers to the Kieler's current WPDES discharge permit, which will remain in effect, as the 'current permit' until the permit reissuance date. The proposed permit reissuance is addressed as the 'proposed permit' throughout this document. All monitoring or limits are year round throughout the permit term unless otherwise specified.

Sampling Point Designations

| Sample Point Designation | | |
|--------------------------|---|---|
| Sample Point Number | Discharge Flow, Units, and Averaging Period | Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable) |
| 701 | 0.054 MGD (5 year average) | Representative influent samples shall be collected after the screw screen. |
| 001 | 0.055 MGD (5 year average) | Representative effluent samples shall be collected at the beginning of the last channel of the chlorine contact tank and grab samples shall be collected at the end of the chlorine contact tank, prior to discharge to the headwaters of Sinnipee Creek. |
| 002 | 13.6 Metric Tons (3 year average) | Representative sludge samples shall be collected annually from the agitation pump outlet and monitored for Lists 1, 2, 3 & 4, as well as once in 2011 for PCBs. |

1 Influent - Monitoring

1.1 Sample Point Number: 701- INFLUENT

| Monitoring Requirements and Limitations | | | | | |
|---|------------|-----------------|------------------|----------------------|-------|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate | | MGD | Continuous | Continuous | |
| BOD5, Total | | mg/L | 2/Week | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | | mg/L | 2/Week | 24-Hr Flow Prop Comp | |

1.1.1 Changes from Previous Permit:

No changes.

1.1.2 Explanation of Limits and Monitoring Requirements

Standard monitoring for similar systems.

2 Surface Water - Proposed Monitoring and Limitations

2.1 Sample Point Number:001- EFFLUENT to SINNIPEE CREEK

| Monitoring Requirements and Limitations | | | | | |
|---|----------------|-----------------|------------------|----------------------|---|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Flow Rate | | MGD | Continuous | Continuous | |
| BOD5, Total | Weekly Avg | 30 mg/L | 2/Week | 24-Hr Flow Prop Comp | November - April |
| BOD5, Total | Weekly Avg | 15 mg/L | 2/Week | 24-Hr Flow Prop Comp | May - October |
| BOD5, Total | Weekly Avg | 22.9 lbs/day | 2/Week | Calculated | November - April |
| BOD5, Total | Weekly Avg | 11.4 lbs/day | 2/Week | Calculated | May - October |
| Suspended Solids, Total | Weekly Avg | 30 mg/L | 2/Week | 24-Hr Flow Prop Comp | November - April |
| Suspended Solids, Total | Weekly Avg | 15 mg/L | 2/Week | 24-Hr Flow Prop Comp | May - October |
| Suspended Solids, Total | Weekly Avg | 11.4 lbs/day | 2/Week | Calculated | May - October |
| Suspended Solids, Total | Weekly Avg | 22.9 lbs/day | 2/Week | Calculated | November - April |
| Nitrogen, Ammonia (NH3-N) Total | Daily Max | 14 mg/L | 2/Week | 24-Hr Comp | Year round |
| Nitrogen, Ammonia (NH3-N) Total | Weekly Avg | 5.6 mg/L | 2/Week | 24-Hr Comp | May - October |
| Nitrogen, Ammonia (NH3-N) Total | Monthly Avg | 2.2 mg/L | 2/Week | 24-Hr Comp | May - October |
| Nitrogen, Ammonia (NH3-N) Total | Monthly Avg | 12 mg/L | 2/Week | 24-Hr Comp | November - April |
| pH Field | Daily Max | 9.0 su | 2/Week | Grab | |
| pH Field | Daily Min | 6.0 su | 2/Week | Grab | |
| Dissolved Oxygen | Daily Min | 4.0 mg/L | 2/Week | Grab | |
| Fecal Coliform | Geometric Mean | 400 #/100 ml | Weekly | Grab | Limits & Monitoring apply May - September |
| Chlorine, Total Residual | Daily Max | 38 ug/L | 5/Week | Grab | Limits & Monitoring apply May - September |
| Chlorine, Total Residual | Weekly Avg | 7.3 ug/L | 5/Week | Grab | Limits & Monitoring apply May - September |

| Monitoring Requirements and Limitations | | | | | |
|---|-------------|-----------------|-------------------|----------------------|---|
| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
| Phosphorus, Total | Monthly Avg | 6.7 mg/L | Monthly | 24-Hr Flow Prop Comp | This is an interim limit. The final phosphorus limits are 0.075 mg/L as a six month average and 0.225 mg/L as a monthly average and are effective at the end of the compliance schedule. See the Phosphorus Limitations Subsection. |
| Chloride | Weekly Avg | 400 mg/L | 4/Monthly | 24-Hr Flow Prop Comp | Sampling shall be done on four consecutive days. This is an interim limit. See 'Chloride Variance' subsection in permit and 'Schedules' section for the applicable chloride target value. |
| Chloride | Weekly Avg | 300 lbs/day | 4/Monthly | Calculated | Chloride mass discharge shall be calculated using the daily concentration (mg/L) x daily flow (MGD) x 8.34. |
| Temperature Maximum | Weekly Avg | 63 °F | 3/Week | Continuous | Monitoring year round. Limit effective October annually starting 10/01/2020. See Temperature Subsections in the permit. |
| Temperature Maximum | Weekly Avg | 54 °F | 3/Week | Continuous | Monitoring year round. Limit effective November annually starting 10/01/2020. See Temperature Subsections in the permit. |
| Acute WET | | TUa | See Listed Qtr(s) | 24-Hr Flow Prop Comp | See WET Monitoring Subsection |
| Chronic WET | | rTUc | See Listed Qtr(s) | 24-Hr Flow Prop Comp | See WET Monitoring Subsection |

2.1.1 Changes from Previous Permit

Total Phosphorus monitoring and interim limitation has been added. Chloride concentration and mass weekly average limits were added. Temperature monitoring is required in the proposed permit and a weekly average limit effective for the

months of October and November beginning 10/1/2020 in accordance with the temperature compliance schedule. Acute and Chronic WET testing was added.

2.1.2 Explanation of Limits and Monitoring Requirements

Categorical Limits

BOD, TSS, DO, pH, and fecal coliform: Requirements for BOD, pH and fecal coliform are included based on NR 210 Sewage Treatment Works requirements and retained from previous permits based on a December 15, 1980 limits memo.

Water Quality Based Limits and WET Requirements and Disinfection (if applicable)

Refer to the Water Quality Based Effluent Limitations (WQBELs) memo for Kieler, prepared by Nasrin Mohajerani dated February 17, 2016 used for this reissuance.

Ammonia: Ammonia limits are included in the proposed permit per Subchapter III of ch. NR 106 which establishes the procedure for calculating water quality base effluent limitations (WQBELs) effective March 1, 2004. The proposed ammonia daily maximum, weekly and monthly average limits were calculated based on ch. NR 106 and available effluent and stream data. See the attached WQBEL memo for detailed explanations.

Chlorine (Disinfection): The total residual chlorine limits remain the same from the current permit. These limitations are based on Chs. NR 105 and 106, Wis. Adm. Code.

Phosphorus: Recent revisions to the administrative rules for phosphorus discharges took effect on December 1, 2010. Details may be found at: <http://dnr.wi.gov/topic/surfacewater/phosphorus.html>. The final effluent limits for phosphorus are 0.225 mg/L monthly average and 0.075 mg/L six-month average are effective at the end of the compliance schedule. The facility cannot meet the proposed concentration limits year round. Since Kieler is unable to immediately achieve the proposed WQBELs based on existing operation, a schedule of compliance is appropriate and necessary pursuant to s. NR 217.17, Wis. Adm. Code. An extended compliance schedule has been included because the permittee will need a significant amount of time to meet the stringent phosphorus water quality based effluent limits (WQBEL) contained in the permit. The overall compliance schedule takes place over a 9 year time period. Please see compliance schedule specifics in the Schedules section. Because a phosphorus compliance schedule was granted, an interim phosphorus limit was also calculated based on current effluent quality to prevent backsliding during the term of the permit. The 30-day p99 is proposed as the interim limit of 6.7 mg/L monthly average.

Chloride: Weekly average concentration and mass limits were calculated in accordance with s. NR 106.05(4)(b), Wis. Adm. Code. The facility has recently changed the sampling procedures to follow the 4-consecutive day approach. It is believed with 4-consecutive day sampling Kieler will be able to meet Chloride limits.

Temperature: Year round monitoring is also required effective immediately. On October 1, 2010, revisions to chs. NR 102 and 106, Wis. Adm. Code, took effect. Details can be found at: <http://dnr.wi.gov/topic/SurfaceWater/thermal/html>. These revisions establish the criteria needed to calculate thermal limits. Kieler supplied the Department with enough effluent data to evaluate the reasonable potential for limits. Based on the analysis of this data a weekly average effluent limitation of is recommended for the months of October and November in the proposed permit that goes into effect 10/01/2020. Please refer to the Temperature Limits Compliance and Dissipative Cooling Evaluation below for additional details.

Whole Effluent Toxicity: Whole Effluent Toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.06 Wis. Adm. Code.

3 Land Application - Monitoring and Limitations

Sludge Description

| Sample Point | Waste Description | Sludge Class | Pathogen Reduction Method | Land Application Method(s) | Disposal Method(s) | Amount Reused/Disposed |
|--|--------------------------|---------------------|----------------------------------|-----------------------------------|---------------------------|--|
| 002 | Municipal Liquid | B | Anaerobic digestion | Incorporation | Land Application | 13.6 Metric Tons (5 year average LAMP data) |
| Vector attraction reduction requirements met? Yes | | | | | | |
| Does sludge management demonstrate compliance? Yes | | | | | | |
| Is additional sludge storage required? 180 days is provided | | | | | | |
| Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No | | | | | | |
| Is a priority pollutant scan required? No | | | | | | |

3.1 Sample Point Number:002- Anaerobic Liquid Sludge

Monitoring Requirements and Limitations

| Parameter | Limit Type | Limit and Units | Sample Frequency | Sample Type | Notes |
|-------------------|-------------------|------------------------|-------------------------|--------------------|--------------|
| PCB Total Dry Wt | Ceiling | 50 mg/kg | Once | Composite | Once in 2017 |
| PCB Total Dry Wt | High Quality | 10 mg/kg | Once | Composite | Once in 2017 |
| 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 | |
| Nickel Dry Wt | High Quality | 420 mg/kg | Annual | Composite | |
| Selenium Dry Wt | Ceiling | 100 mg/kg | Annual | Composite | |

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

3.1.1 Changes from Previous Permit

No changes

3.1.2 Explanation of Limits and Monitoring Requirements

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) Wis. Adm. Code. Requirements for pathogens are specified in ss. NR 204.07 (6) and NR 204.07(7) Wis. Adm. Code for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k) Wis. Adm. Code. Radium requirements are addressed in s. NR 204.07(3)(n) Wis. Adm. Code.

4 Schedules

4.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

| Required Action | Due Date |
|--|------------|
| Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by 06/30/2019. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than 06/30/2019 and state whether the measures, improvements, and modifications will | 06/30/2017 |

| | |
|--|------------|
| <p>enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by 06/30/2019 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p>STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than 10/01/2025.</p> | |
| <p>Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p> | 06/30/2018 |
| <p>Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p> | 06/30/2019 |
| <p>Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p> | 06/30/2020 |

| | |
|--|------------|
| Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | |
| Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 06/30/2021 |
| Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 06/30/2022 |
| Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 09/30/2022 |
| Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 09/30/2023 |
| Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 09/30/2024 |
| Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 06/30/2025 |
| Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit. | 07/01/2025 |

4.1.1 Explanation of Compliance Schedules

Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

Subchapter NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality based phosphorus limits within 9 years. As part of the compliance schedule the permittee is required to submit:

- An Operational Evaluation Report to optimize reductions in phosphorus and proceed with implementation of the plans for reduction;
- A Study of Feasible Alternatives for meeting final phosphorus WQBELs and complying with the remaining required actions of this schedule of compliance;

- A Status Report on compliance alternatives, source reductions, and improvements;
- A Preliminary and Final Compliance Alternatives Plan to select a preferred compliance option for meeting final phosphorus WQBELs; and
- Assuming that facility upgrades will be made to comply with the final phosphorus WQBELs, the last steps of the phosphorus compliance schedule are to: submit final plans and specifications for construction, submit progress reports, and comply with final phosphorus WQBELs. If an alternative compliance option is selected such as water quality trading or adaptive management, the compliance schedule will be amended to reflect these compliance options through either permit reissuance or permit modification.

The permittee may be required to meet the final phosphorus WQBEL sooner than July 1, 2025 (less than 9 years) if the required “Operational Evaluation Report” concludes that the phosphorus WQBEL can be met using the existing treatment system with only source reduction measures, operational improvements and minor facility modifications. Also, the permittee will conduct a “Study of Feasible Alternatives” to determine whether Water Quality Trading or Adaptive Management, either alone or in combination with plant upgrades will allow the plant to meet the phosphorus WQBEL. It is probable that, in order to consistently comply with the concentration and mass limits, Stoughton will need to evaluate and implement any number of the following approaches:

- Plant optimization;
- Phosphorus source reduction;
- Pilot testing of new or additional treatment processes;
- Additional treatment processes;
- Multiple treatment processes;
- Obtaining financing for construction;
- Potential for adaptive management and/or pollutant trading with upstream contributors, and implementation of such trades.

The Department believes that the compliance schedule suggested in the draft permit 9 years provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option and meet the final phosphorus limits (WQBELs).

4.2 Temperature Limits and Dissipative Cooling Evaluation

This compliance schedule requires the permittee to achieve compliance by the specified date

| Required Action | Due Date |
|--|------------|
| Report on Effluent Discharges: Submit a report on effluent temperature with conclusions regarding compliance. Informational Note: Refer to the Surface Water subsections regarding 'Determination of Need for Effluent Limits' and 'Dissipative Cooling Demonstration - Weekly Average Limits' concerning requests for a Department determination on the need for limits and follow-up procedures for demonstration of dissipative cooling per NR 106.59, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code. | 02/01/2018 |
| Action Plan: Submit an action plan for complying with all effluent temperature limits that remain following the Department's review for necessity. | 06/30/2018 |
| Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal. | 06/30/2019 |
| Initiate Actions: Initiate actions identified in the plan. | 09/30/2019 |
| Achieve Compliance: Complete actions necessary to achieve compliance with effluent temperature limits. | 09/01/2020 |

4.2.1 Explanation of Compliance Schedules

Temperature Limits Compliance and Dissipative Cooling Evaluation

As noted above new Thermal Rules went into effect October 1, 2010 and the Kieler will have a weekly average temperature maximum limit of 63° F for the month of October and 54° F for the month of November with the limit going into effect October 1, 2020. A compliance schedule, as allowed by NR 106.62, Wis. Adm. Code, is included in this permit to allow the permittee time to evaluate the facilities thermal discharge, determine whether dissipative cooling as allowed in NR 106.59, Wis. Adm. Code, will preclude the need for temperature limits because the permittee can demonstrate that the heat in the effluent is rapidly dissipated to the environment, and evaluate whether a facility upgrade is needed to meet the temperature limitations.

Other Comments:

Post Public Notice Revisions: See Notice of Final Determination for a description of any post public notice revisions. If no comments were received, see the Notice of No Comments Received for any typographical corrections the Department made after the public notice period.

Attachments:

Water Quality Based Effluent Limits with discharge location map– Dated 02/17/2015

Substantial Compliance Inspection Form

Flow Diagram

Prepared By: Jennifer Jerich– WDNR Wastewater Permits Specialist & David Carper – WDNR Wastewater Engineer

Date: 03/23/2016

Public Notice Fact Sheet Date: 04/11/2016

Amended Post Public Notice Fact Sheet Date:

CORRESPONDENCE/MEMORANDUM

DATE: February 17, 2016

FILE REF: 3200

TO: Phillip Spranger – SCR

FROM: Nasrin Mohajerani – SCR *N. Mohajerani*

SUBJECT: Updated Water Quality-based Effluent Limitations for the Kieler Sanitary District #1 (WI – 0029289) in Grant County.

This is in response to your request for an evaluation of the need for water quality-based effluent limitations using Chapters NR 102, 104, 105, 106, 207, 210 and 217 of the Wisconsin Administrative Code (where applicable), for the Kieler Sanitary District #1 in Grant County.

The wastewater treatment plant discharges effluent at an annual average design flow rate of 0.0914 mgd to the headwaters of Sinnipee Creek in the Platte River Watershed (GP02) of the Grant-Platte River Basin. Outfall 001 is located in the SE 1/4 of the SE 1/4 of Section 33, T2N-R2W in Grant County.

No changes are recommended in the permit limitations for BOD₅, TSS, pH, DO and chlorine. Based on our review, the following recommendations are made for the permit reissuance:

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Avg. | Six-month Avg. |
|---|--|---------------|--|----------------------------|----------------|
| BOD₅ & TSS: May - Oct. Nov. - April | | | 15 mg/L (11.4 lb./day) 30 mg/L (22.9 lb./day) | | |
| pH | 9.0 s.u | 6.0 s.u | | | |
| Dissolved Oxygen | | 4 mg/L | | | |
| Ammonia Nitrogen | | | | | |
| Year-round | 14 mg/L | | | | |
| May-Oct. | | | 5.6 | 2.2 | |
| Nov. -April | | | >daily | 12 | |
| Chlorine | 38 ug/L | | 7.3 ug/L | | |
| Chloride*: WQBEL Interim | | | 400 mg/L (300 lbs/day) 440 mg/L (340 lbs/day) | | |
| Phosphorus: Water quality Interim limit | | | | 0.225 mg/L 6.7 mg/L | 0.075 mg/L |
| Temperature | See Page 9 for daily max. and weekly avg. limits | | | | |
| WET: Acute Chronic | Two tests (1 test every other year e.g. year 2, year 4, etc.) Three tests (1 test every other year e.g. year 1, year 3, year 5, etc.) | | | | |

*- In the absence of a variance request, Kieler S.D. would be subject to the water quality-based effluent limit other wise they could receive interim limit.

Footnotes: Along with the chemical-specific recommendations mentioned above, the need for acute and chronic whole effluent toxicity testing is also evaluated for this discharge . Following the guidance provided in the Department's July 1, 2008 *Whole Effluent Toxicity Program Guidance Document - Revision #8*, **two acute and three chronic whole effluent toxicity test batteries are recommended.**

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nasrin Mohajerani by telephone at (608) 275-3239, or by e-mail at nasrindokht.mohajerani@wisconsin.gov.

Attachments – Thermal Spreadsheet & Map

PREPARED BY:

N. Mohajerani

Nasrin Mohajerani
Water Resources Engineer, P.E.

Cc: Dave Carper – SCR/Dodgeville
Diane Figiel – WT/3

Water Quality-Based Effluent Limitations for
Kieler Sanitary District #1
WPDES Permit No. WI-0029289-09
Prepared by: Nasrin Mohajerani

PART 1 – BACKGROUND INFORMATION

Facility Description:

The plant provides secondary treatment utilizing the oxidation ditch process. The plant is designed for 0.0914 mgd. The actual annual flow in 2014 was 0.0566 mgd. The plant is a small oxidation ditch (activated sludge) system with a new screen to take place of a comminutor, and primary clarification. Effluent is disinfected via chlorination/dechlorination (seasonally) prior to discharge to the headwaters of Sinnipee Creek. Sludge handling and treatment consists of aerobic digestion and storage with final disposal to department approved application sites.

Existing Permit Limitations: The current permit, includes the following effluent limitations

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average |
|-----------------------------------|---------------|---------------|---------------------------|-----------------|
| BOD₅ & TSS: | | | | |
| May - Oct. | | | 15 mg/L (11.4 lb./day) | |
| Nov. - April | | | 30 mg/L (22.9 lb./day) | |
| pH | 9.0 s.u | 6.0 s.u | | |
| Dissolved Oxygen | | 4 mg/L | | |
| Chlorine | 38 ug/L | | 7.3 ug/L | |
| Chloride | | | 400 mg/L | |
| Ammonia Nitrogen: | | | | |
| Year-round | 17 mg/L | | | |
| May- September | | | 5.6 mg/L | 2.2 mg/L |
| October-April | | | | 12 mg/L |

Receiving Water Information

Name: The receiving water is the head waters of the Sinnipee Creek, located in the Platte River Watershed (GPO2) in the Grant-Platte River Basin in Grant County The location of the outfall is 60 feet from the SW corner of the WWTP building.

- Classification: From Kieler SD WWTF outfall to Bluff Road is Limited Forage Fish community according to ch. NR 104, Wis. Adm. Code. From Bluff Road to Mississippi River by default is fish and aquatic life. In order for the discharge to protect both uses of the receiving water as required in s. NR 104.02(5) Kieler would have to meet the lower of two sets of the limits.

- Low Flow: 7-Q₁₀ = 0.0 cfs, 7-Q₂ = 0.0 cfs (at Outfall Location)
- Low Flow Downstream: 7-Q₁₀ = 0.15 cfs, 7-Q₂ = 0.28 cfs (from NW ¼ of SW ¼ Sec. 4, T1N-R2W)
- The receiving water flows used in establishing effluent limitations at the location of discharge were estimated by the U.S.G.S.

Effluent Information

- Flow: Average Design Flow = 0.0914 MGD
- Monitoring data: data submitted by the facility to the department was used in this evaluation.
- Hardness = this value represent the geometric mean of all available data
- Water Source: Kieler municipal wells.
- This discharge occurs on a daily basis – year round
- Effluent characterization: This facility is categorized as a minor municipality so the permit application required effluent sample analyses for a limited number of common pollutants, primarily chloride and phosphorus.

Effluent Data: The following tables calculate the p99 values for chloride and zinc based on the data reported by the Kieler S.D. #1

| Statistical Analysis | Chloride mg/L | Zinc ug/L |
|----------------------|---------------|-----------|
| 1-day p99 | 543.04 | 150.89 |
| 4-day p99 | 439.10 | 118.62 |
| 30-day p99 | 381.09 | 88.91 |
| Mean | 350.54 | 74.53 |
| Std | 69.51 | 23.97 |
| Sample Size | 58 | 13 |
| Range | 203-491 | 41-111 |

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

The following tables list the water quality-based effluent limitations for this discharge along with the results of testing effluent samples. All concentrations are expressed in term of micrograms per Liter (µg/L), except for chloride and hardness values. Following the tables, permit recommendations are made where appropriate, based on a comparison between the effluent concentrations and the calculated limits pursuant to ss. NR 106.04 and 106.05. Only the detected substances are shown in the following tables.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

| EFFLUENT LIMIT CALCULATIONS FOR: | | Kieler | | |
|----------------------------------|---------------------|------------|------------|-------------------------|
| CLASSIFICATION: | Limited Forage Fish | | | Harmonic |
| FLOWS: (cfs) | | 7Q10 | 7Q2 | 90Q10 |
| | | 0 | 0 | 0 |
| HARDNESS | = | 423 | PPM | Current permit WET data |
| EFFLUENT INFORMATION: | | DAILY FLOW | | |
| OUTFALL NUMBER 001 | | 0.0914 mgd | 0.1417 cfs | |
| EFFLUENT HARDNESS | = | 423 | PPM | (application data) |

| CALCULATION OF EFFLUENT LIMITATIONS BASED ON ATC (µg/L) | | | | | | | |
|---|--------|--------|--|--------|--------|-------|-----------|
| | REF. | | | MAX. | 1/5 OF | MEAN | |
| | HARD.* | | | EFFL. | EFFL. | EFFL. | |
| SUBSTANCE | or pH | ATC | | LIMIT | LIMIT | CONC. | 1-day P99 |
| Chlorine | | 19.03 | | 38.06 | 7.61 | | |
| Copper | 423 | 60.50 | | 121.00 | | 1.8 | |
| Zinc | 333 | 344.68 | | 689.36 | | | 150.89 |
| Chloride (mg/L) | | 757 | | 1514 | | | 543.04 |

| CALCULATION OF EFFLUENT LIMITATIONS BASED ON CTC (µg/L) | | | | | | | |
|---|--------|--------|-------|--------|--------|-------|-----------|
| RECEIVING WATER FLOW | | | 0 cfs | | | | |
| | REF. | | MEAN | WEEKLY | 1/5 OF | MEAN | |
| | HARD.* | | BACK- | AVE. | EFFL. | EFFL. | |
| SUBSTANCE | or pH | CTC | GRD. | LIMIT | LIMIT | CONC. | 4-day P99 |
| Chlorine | | 7.28 | | 7.28 | 1.46 | | |
| Copper | 423 | 35.56 | | 35.56 | 7.11 | 1.8 | |
| Zinc | 333 | 344.68 | | 344.68 | | | 118.62 |
| Chloride (mg/L) | | 395 | | 395 | | | 439.10 |

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105 over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

There is no detected effluent result for Wildlife, Human threshold and Human Cancer tables.

Permit Recommendations:

Permit limits for toxic substances are recommended whenever any of the following occur:

1. Maximum effluent concentration exceeds the limit (only applies to daily maximum unless there are at least 4 consecutive days with data, which isn't the case here.)
2. If 11 or more detected results are available in the effluent, the 99th upper percentile (or P99) value exceeds the comparable calculated limit.
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit.

With that in mind, the following permit limits are recommended.

Conclusions and Recommendations: Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are apparently needed for chloride.

Chloride – Weekly average calculated limitations of 400 mg/L (395, rounded) and 300 lb./day (395 mg/L x 0.0914 MGD x 8.34 = 300 rounded) are apparently needed, in accordance with s. NR 106.05(4)(b), because the upper ninety-ninth percentile of the 4-day concentration (439 mg/L) exceeds the calculated limit. However, Subchapter VII of ch. NR 106 provides for a variance from water quality standards for this substance, if Keiler request such a variance. That variance may be granted subject to the following conditions: The permit shall include an “Interim” limitation intended to prevent an increase in the discharge of Chlorides;

- 2) The permit shall specify “Source Reduction Measures” to be implemented during the course of the

- permit term, with periodic progress reports; and
- 3) The permit shall include a “Target Limit” or “Target Value” to gage the effectiveness of the Source Reduction Measures, and progress toward the water quality-based effluent limitations. A target value is suggested for the first iteration of a permit with such a variance.

Interim Limit for Chloride: Section NR 106.82(9) defines a “Weekly average interim limitation” as either the 4-Day P₉₉ concentration or 105% of the highest weekly average concentration of the representative data. The 4-Day P₉₉ is 439 mg/L while 105% of the highest weekly average (a single datum for most weeks in which sampling was performed) is 520 mg/L (1.05 x 491 mg/L = 515.55 mg/L (rounded to 520 mg/L). Since the data is limited to a single sample collected once per month, there is insufficient data with which to calculate a weekly average concentration. **Therefore, an interim limit of 440 mg/L(rounded) expressed as a weekly average, is recommended for the reissued permit.**

A target limit and permit language for Source Reduction Measures are not recommended as part of this evaluation. These should follow contact with permittee. Though it should be understood that if the department and the Kieler S.D. are unable to reach agreement on all the terms of a Chloride Variance, the calculated limits described earlier should be included in the permit, in accordance with s. NR 106.83(3).

In the absence of a variance request, Kieler S.D. would be subject to the water quality-based effluent limit of 400 mg/l as a weekly average and the weekly average mass limit of 300 lbs/day (395 mg/L x 0.0914 MGD x 8.34).

PART 3 – UPDATED AMMONIA NITROGEN

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

Daily maximum limitations are based on acute toxicity criteria, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

$$A = 0.411$$

$$B = 58.4 \text{ for a Limited Forage Fishery}$$

The effluent pH data for the current permit was examined as part of this evaluation. A total of 462 sample results were reported from January 2011 through September 2015. The maximum reported value was 8.4 su (Standard pH Units) reported only 2 times. The one-day P₉₉, calculated in accordance with s. NR 106.05(5), is 8.11 su. And the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.09 su. therefore, a value of 8.1 is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.1 into the equation above yields an ATC = 6.95 and a computed daily maximum limit of 13.9 mg/L.

The following table evaluates the statistics based upon pH data reported from 2011 – 2015.

| Statistical Analysis | Effluent pH s.u. |
|----------------------|------------------|
| Date | 1/03/11-9/23/15 |
| 1-day p99 | 8.1 |
| 4-day p99 | 7.83 |
| 30-day p99 | 7.66 |
| Mean | 7.56 |
| Std | 0.227 |
| Sample Size | 462 |
| Range | 6.9 - 8.4 |

Weekly Average and monthly Average Limits based on Chronic Criteria(CTC):

The following table shows the ammonia limitations using the LFF and downstream WWSF classifications.

| AMMONIA (as N) LIMITS | | | | | |
|-----------------------------------|--|------------|--------------|-------------|--------------|
| CLASSIFICATION: | | LFF | LFF | WWSF | WWSF |
| EFFLUENT FLOW (mgd): | | 0.0914 | | 0.0914 | |
| EFFLUENT FLOW (cfs): | | 0.141 | | 0.141 | |
| MAX. EFFLUENT pH (s.u.): | | 8.10 | | 8.10 | |
| BACKGROUND INFORMATION: | | May – Oct. | Nov. - April | May – Oct. | Nov. - April |
| 7Q10 (cfs) | | 0 | 0 | 0.15 | 0.15 |
| 7Q2 (cfs) | | 0 | 0 | 0.28 | 0.28 |
| Ammonia (mg/L) | | 0.06 | 0.48 | 0.06 | 0.48 |
| Temperature (deg C) | | 23 | 3 | 23 | 3 |
| pH (std. units) | | 8.21 | 7.97 | 8.21 | 7.82 |
| % of river flow used: | | 100 | 25 | 100 | 25 |
| Reference weekly flow: | | 0 | 0 | 0.15 | 0.0375 |
| Reference monthly flow: | | 0 | 0 | | 0.238 |
| CRITERIA (in mg/L): | | | | | |
| Acute (@ effl. pH): | | 6.95 | 6.95 | 6.95 | 6.95 |
| 4-day Chronic (@ backgrd. pH): | | | | | |
| early life stages present | | 5.60 | 8.06 | 2.55 | 7.76 |
| early life stages absent | | 7.69 | 31.06 | 2.55 | 12.60 |
| 30-day Chronic (@ backgrd. pH) | | | | | |
| early life stages present | | 2.24 | 3.22 | 1.02 | 3.10 |
| early life stages absent | | 3.08 | 12.42 | 1.02 | 5.04 |
| EFFLUENT LIMITS (in mg/L): | | | | | |
| Daily maximum | | 13.90 | 13.90 | 13.90 | 13.90 |
| Weekly average | | | | | |
| early life stages present | | 5.60 | 8.06 | 15.01 | 16.86 |
| early life stages absent | | 7.69 | 31.06 | | 27.74 |
| Monthly average | | | | | |
| early life stages present | | 2.24 | 3.22 | 8.64 | 8.31 |
| early life stages absent | | 3.08 | 12.42 | | 14.08 |

After comparison of calculated weekly and monthly average limitations based on LFF at the outfall location and downstream reach based on WWSF the limitation at the outfall are more stringent than downstream warm water sport fish classification therefore, Evaluation of ammonia decay rates are not applicable.

The following table evaluates the statistics based upon ammonia data reported during permit period with those results being compared to the calculated limits to determine the need to include ammonia limits in the Kieler permit.

| Statistical Analysis | Ammonia mg/L |
|----------------------|--------------|
| 1-day p99 | 32.30 |
| 4-day p99 | 17.65 |
| 30-day p99 | 8.37 |
| Mean | 4.61 |
| Std | 7.00 |
| Sample Size | 460 |
| Range | 0.02-28 |

Conclusions and Recommendations:

A daily maximum limit of 14 mg/L (rounded from 13.9 mg/L) is recommended along with weekly and monthly limitations in the following table. These limitations are the same as existing limitations in the current permit.

Therefore, no changes are recommended to the ammonia limits for weekly and monthly average because there have been no changes in the effluent and receiving water flows.

| Months Applicable | Daily Maximum | Weekly Average | Monthly Average |
|-------------------|---------------|----------------|-----------------|
| May – October | 14 | 5.6 mg/L | 2.2 mg/L |
| November – April | 14 | ----- | 12 mg/L |

Note: if the daily maximum limits are more stringent than the weekly or monthly limits, than the weekly and monthly limits do not need to be included in the permit.

PART 3 –PHOSPHORUS

Technology Based Limits (TBL)

Kieler has no TBL Phosphorus limit in their current permit.

Water Quality Based Limit – Phosphorus

Revisions to the administrative rules for phosphorus discharges took effect on December 1, 2010. These rule revisions include additions to ch. NR 102 (s. NR 102.05), which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (s. NR 217, Subchapter III) establish procedures for determining water quality based effluent limits for phosphorus, based on the applicable standards in ch. NR 102.

Section NR 102.06(3)(a) specifically names reaches of rivers for which a phosphorus criterion of 0.1 mg/l applies. For other stream segments that are not specified in s. NR 102.06(3)(a), s. NR 102.06(3)(b)

specifies a phosphorus criterion of 0.075 mg/l. The phosphorus criterion of 0.075 mg/l applies for Sinnipee Creek.

Ambient phosphorus data used is from Kieler Creek at Kieler at SWIMS Station ID 223340 taken during 2001 in Grant County. The rolling median concentrations (Cs) is 0.101 mg/L. Water quality-based effluent limitations are evaluated in this report for phosphorus using the procedures in s. NR 217.13. For discharges of phosphorus to flowing streams and rivers, the water quality based effluent limitation shall be calculated using the following conservation of mass equation:

$$\text{Limitation} = [(WQC) (Q_s + (1-f) Q_e) - (Q_s - fQ_e) (C_s)] / Q_e$$

Where:

Limitation = Water quality based effluent limitation (in ug/L)

WQC = The applicable water quality criterion (0.075 mg/L)

Qs = Receiving water flow (Q7,2) = 0.0 cfs)

Qe = Effluent flow = 0.0914 mgd / cfs

f = Fraction of the effluent flow that is withdrawn from the receiving water (zero)

Cs = Background concentration of the substance (0.101 mg/L)

Based on available background data it is believed that the receiving water concentration exceeds criterion (0.075 mg/L). Therefore, it is recommended that water quality based effluent limit be set equal to criterion (s. NR 217.13(7)).

Pursuant to ss. NR 217.14(2) and (3), Wis. Adm. Code, a monthly average limit equal to three times the calculated limit, or 0.225 mg/L, should be included in the permit when the calculated water quality-based limit is less than 0.3 mg/L. The 0.075 mg/L limit shall be expressed in the permit as a six-month seasonal average limit (May-October and November – April).

An evaluation of monitoring data that were collected during the current permit is shown in the following table. Those data indicated that the calculated 30-day p99 (6.7 mg/L) exceeds the calculated water quality based limitation, therefore a limit is warranted per s. NR 217.15(1).

| Statistical Analysis | Phosphorus mg/L |
|----------------------|-----------------|
| 1-day p99 | 16.73 |
| 4-day p99 | 10.06 |
| 30-day p99 | 6.7 |
| Mean | 5.17 |
| Std | 3.24 |
| Sample Size | 54 |
| Range | 0.37-17.88 |

Phosphorus Interim Limit:

Compliance with an effluent phosphorus concentration limit as stringent as 0.075 mg/L may not be technically or economically feasible; but the new rules allow alternatives for achieving comparable reductions in phosphorus loading. Options for the facility to consider may include requesting an alternate

phosphorus limitation (APL) with compliance schedule, pollutant trading with other phosphorus discharges (point and/or nonpoint sources) that may be controlled more effectively, stream monitoring above and below the outfall to document actual instream changes related to the effluent discharge, and development of an adaptive management strategy that combine a broader range of efforts to reduce phosphorus loading.

Based on current guidance, interim phosphorus limits may be applied to this discharge during a compliance schedule period. Since sufficient effluent phosphorus data is available to calculate 30-day p99 we could use this value as a monthly average interim limit. Therefore, a monthly average phosphorus limit of 6.7 mg/L is recommended for permit reissuance.

PART 4 – EVALUATION OF THERMAL LIMITS

Chapter NR 102, Subchapter II of the Wisconsin Administrative Code establishes water quality standards for temperature, in order to protect fish and other aquatic life from lethal and sub lethal effects.

In accordance with s. NR 106.53(2)(b), the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based on actual flow reported during 2014-2015.

| Month | Representative Highest Monthly Effluent Temperature | | Calculated Effluent Limits | |
|-------|---|------------|----------------------------|------------------|
| | Weekly Avg. | Daily Max. | Weekly Avg. Limit | Daily Max. Limit |
| | (°F) | (°F) | (°F) | (°F) |
| JAN | 49 | 50 | 54 | 78 |
| FEB | 47 | 47 | 54 | 79 |
| MAR | 50 | 51 | 57 | 80 |
| APR | 54 | 55 | 63 | 81 |
| MAY | 61 | 65 | 70 | 84 |
| JUN | 64 | 65 | 77 | 85 |
| JUL | 68 | 69 | 81 | 86 |
| AUG | 69 | 71 | 79 | 86 |
| SEP | 68 | 70 | 73 | 85 |
| OCT | 64 | 66 | 63 | 83 |
| NOV | 65 | 66 | 54 | 80 |
| DEC | 52 | 54 | 54 | 79 |

The table above summarizes the maximum temperatures reported during monitoring from 01/01/2014-09/30/2015. Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which effluent limitations are recommended are highlighted.

Recommendation for Outfall 001:

Based on the comparison of the daily maximum and weekly average limitations and effluent quality, **weekly average limits are necessary for the month of October and November as shown in the above**

table. The complete thermal table used for this calculation is in Attachment #1.

PART 6 – WHOLE EFFLUENT TOXICITY

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 and effects are recorded.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. In order to assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. In order to assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (25% Inhibition Concentration) greater than the instream waste concentration (IWC). Chronic testing is not recommended where the ratio of the 7-Q₁₀ to the effluent flow exceeds 100:1. For the Kieler Sanitary District #1 that a ratio is approximately 0.0:1.
- The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 79% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6):

$$\text{IWC (as \%)} = 100 \times Q_e \div \{(1 - f)Q_e + Q_s\}$$

Where:

Q_e = annual average design flow = 0.0914 MGD = 0.141 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = ¼ of the 7-Q₁₀ = 0.15 cfs ÷ 4 = 0.0375 cfs (non variance downstream water body)

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (referenced in s. NR 219.04, Wis. Adm. Code), the default acute dilution series is: 6.25, 12.5, 25, 50, 100%. The permittee or Department staff may choose other dilution series, 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.
- Also according to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual*, receiving water must be used as the dilution water and primary control in WET tests, unless the use of different 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 the Receiving water, upstream/out of the influence of the mixing zone and any other known discharge. The receiving water location must be specified in the WPDES permit.
- Evaluation of WET data:
- Below is a tabulation of all representative available WET data for Outfall 001. Efforts are made to insure that decisions about WET monitoring and limits are made based on representative data. Data which is no longer believed to be representative of the discharge is not included in Reasonable Potential

Factor (RPF) calculations. The table below differentiates between tests used and not used in RPF calculations.

| Date Initiated | Acute Results LC ₅₀ % (% survival in 100% effluent) | | | | Chronic Results IC ₂₅ % | | | | |
|----------------|---|----------------|---------------|-------------|---------------------------------------|----------------|-------|---------------|-------------|
| | <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? |
| 06/16/2015 | >100 | >100 | Pass | Yes | 79 | >100 | | Pass | Yes |

- The WET Checklist has been developed to assist DNR staff when deciding whether WET limits and monitoring are needed. 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. Monitoring frequencies are based on points accumulated during the Checklist analysis. As toxicity potential increases, more points accumulate and more monitoring is needed to insure that toxicity is not occurring. 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.state.wi.us/org/water/wm/ww/biomon/>).

Whole Effluent Toxicity (WET) Checklist Summary

| | Acute | Chronic |
|-----------------------------------|---|---|
| 1. IWC | Not Applicable 0 Points | IWC = >65% 15 Points |
| 2. Historical Data | One test used in RPF, it passed; RPF =0 0 Points | One test used in RPF, it passed; RPF =0 0 Points |
| 3. Effluent Variability | Little variability, no violations or upsets, consistent WWTF operations 0 Points | Same as Acute 0 Points |
| 4. Receiving Water Classification | Variance stream within 4 miles of an FFAL 5 Points | Same as Acute 5 Points |
| 5. Chemical Specific Data | Chlorine limit Ammonia limits are carried over from previous permit; Cl, Cu & Zn detected 8 Points | Chloride & chlorine limits Ammonia limits are carried over from previous permit; Cl, Cu & Zn detected 9 Points |
| 6. Additives | Chlorine & dechlorination 4 Points | Same as Acute 4 Points |
| 7. Discharge Category | No Industrial Contributors 0 Points | No Industrial Contributors 0 Points |
| 8. Wastewater Treatment | Secondary Treatment 0 Points | Same as Acute 0 Points |
| 9. Downstream Impacts | None attributable to this discharge 0 Points | Same as Acute 0 Points |
| Total Points | 17 | 33 |

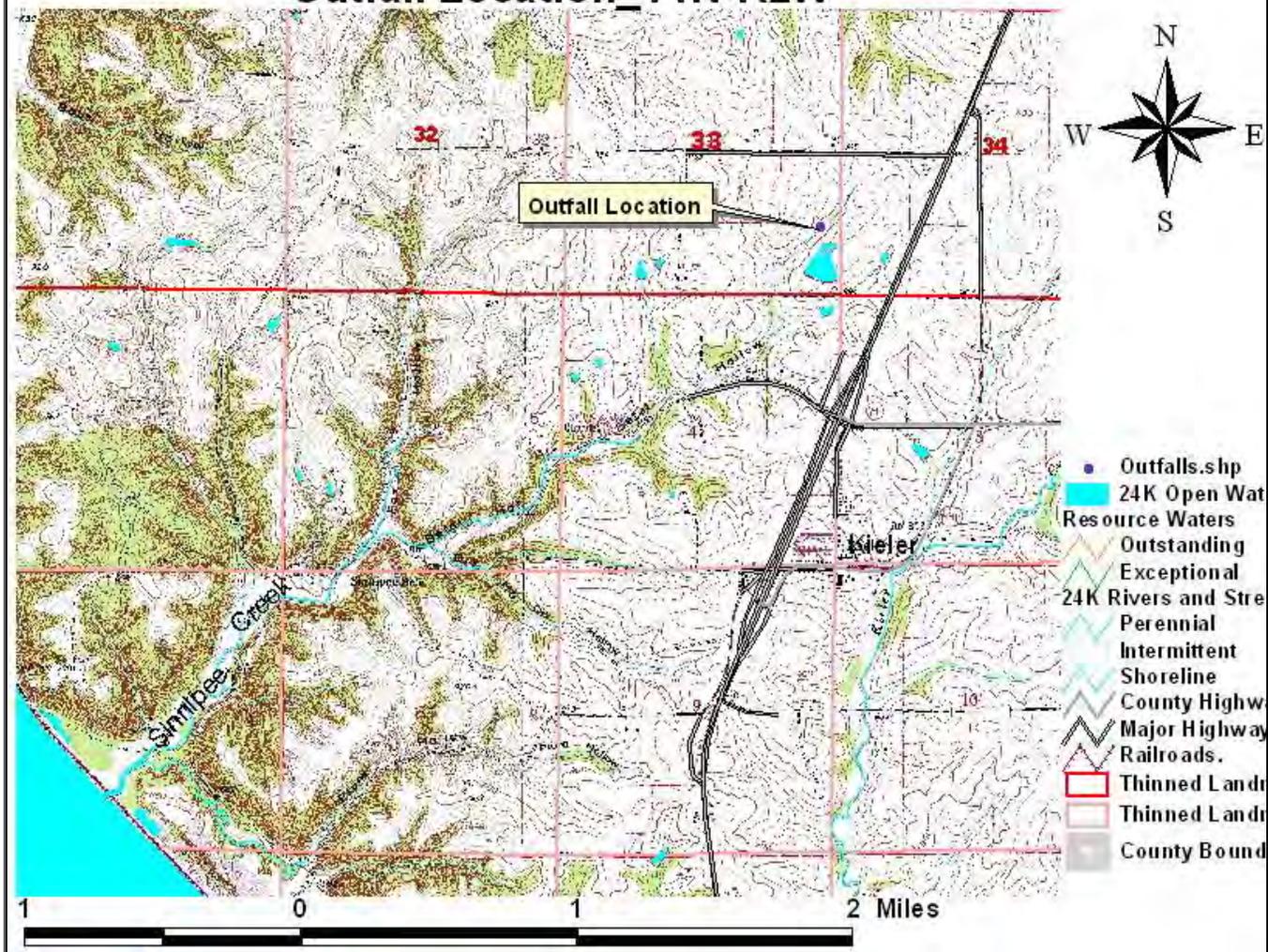
WET Monitoring Recommendations:

Based upon the point totals generated by the WET Checklist, other information given above, and Chapter 1.3 of the WET Guidance Document, **two acute tests (1 test every other year e.g. year 2, year 4, etc.) and three chronic tests (1 test every other year e.g. year 1, year 3, year 5, etc.) are recommended** during the permit term. Tests should be done in rotating quarters, in order to collect seasonal information about this discharge.

Attachment # 1

| Temperature limits for receiving waters with unidirectional flow | | | | | | | | | | | | |
|--|------------------------|----------------|---------------|--------------------------------|--|--|---|-----------|--|------------|----------------------------|-----------------|
| (calculation using default ambient temperature data) | | | | | | | | | | | | |
| Facility: | Kieler | | | Data Range | 7Q10 or 4Q3: | 0 | cfs | | | | | |
| Outfall(s): | 001 | | Start: | 01/01/14 | Dilution: | | | | | | | |
| Date Prepared: | 22-Oct-15 | | End: | 09/30/15 | f: | 0 | | | | | | |
| Design Flow (Qe): | 0.0914 | mgd | | | Stream type: | <input type="text" value="Limited forage fish community"/> | | | | | | |
| Region: | SC | | | | Qs:Qe ratio: | 0.0 | :1 | | | | | |
| | | | | | Calculation Needed? | YES | | | | | | |
| Month | Water Quality Criteria | | | Receiving Water Flow Rate (Qs) | Representative Highest Effluent Flow Rate (Qe) | | Representative Highest Monthly Effluent Temperature | | 99th Percentile of Representative Data | | Calculated Effluent Limits | |
| | Ta (default) | Sub-Lethal WQC | Acute WQC | | 7-day Rolling Ave (Qesl) | Daily Max Flow Rate (Qea) | Weekly Ave | Daily Max | Weekly Ave | Daily Max* | Weekly Ave Limit | Daily Max Limit |
| | (°F) | (°F) | (°F) | (cfs) | (mgd) | (mgd) | (°F) | (°F) | (°F) | (°F) | (°F) | (°F) |
| JAN | 37 | 54 | 78 | 0.00 | 0.044 | 0.059 | 49 | 50 | 50 | 51 | 54 | 78 |
| FEB | 39 | 54 | 79 | 0.00 | 0.049 | 0.079 | 47 | 47 | 47 | 49 | 54 | 79 |
| MAR | 43 | 57 | 80 | 0.00 | 0.089 | 0.130 | 50 | 51 | 49 | 52 | 57 | 80 |
| APR | 50 | 63 | 81 | 0.00 | 0.078 | 0.135 | 54 | 55 | 54 | 56 | 63 | 81 |
| MAY | 59 | 70 | 84 | 0.00 | 0.063 | 0.091 | 61 | 65 | 61 | 64 | 70 | 84 |
| JUN | 64 | 77 | 85 | 0.00 | 0.084 | 0.172 | 64 | 65 | 65 | 68 | 77 | 85 |
| JUL | 69 | 81 | 86 | 0.00 | 0.076 | 0.105 | 68 | 69 | 67 | 69 | 81 | 86 |
| AUG | 68 | 79 | 86 | 0.00 | 0.062 | 0.084 | 69 | 71 | 69 | 71 | 79 | 86 |
| SEP | 63 | 73 | 85 | 0.00 | 0.055 | 0.072 | 68 | 70 | 68 | 71 | 73 | 85 |
| OCT | 55 | 63 | 83 | 0.00 | 0.054 | 0.075 | 64 | 66 | 64 | 67 | 63 | 83 |
| NOV | 46 | 54 | 80 | 0.00 | 0.054 | 0.075 | 65 | 66 | 64 | 67 | 54 | 80 |
| DEC | 40 | 54 | 79 | 0.00 | 0.044 | 0.057 | 52 | 54 | 52 | 55 | 54 | 79 |

Grant_Cnty Kieler_WWTP Outfall Location_T1N-R2W



Substantial Compliance Determination

| | | |
|--|---|---|
| Permittee Name: KIELER SANITARY DISTRICT No 1 | | Permit Number: 0029289-08-0 |
| | Compliance? | Comments |
| Discharge Limits | No | continued problems with staying within effluent limits for total nitrogen ammonia |
| Sampling/testing requirements | Yes | |
| Groundwater standards | NA | |
| Reporting requirements | Yes | |
| Compliance schedules | Yes | |
| Management plan | NA | |
| Other: | NA | |
| Enforcement Considerations | Two Notice of Noncompliance have been issued related to effluent violations, the facility is making efforts to correct | |
| In substantial compliance? | <p>Yes</p> <p>Comments: currently total nitrogen ammonia effluent limits not being met due to recent plant upset, inspected May 27, 2015</p> <p>Signature: Dave Carper Date: 06/03/2015</p> <p>Concurrence: _____ Date: _____</p> | |