Facility Specific Standard Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: Village of Turtle Lake

B. Facility Name: Village of Turtle Lake Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Chloride **Date completed:** October 6, 2014

E. Permit #: WI-0025631-10-1 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** Anticipated 7/1/15 **End Date:** Anticipated 06/30/2019

G. Date of Variance Application: September 5, 2014

H. Is this permit a: ☒ **First time submittal for variance**
☐ **Renewal of a previous submittal for variance** *(Complete Section IX)*

I. Description of proposed variance: Variance for Chloride from the chronic water quality based limit of 400 mg/L to (weekly average) an interim limit of 1530.5 mg/L. Permit will have source reduction measures and a target value of 1377.45 mg/L.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Sheri Snowbank	Sheri.snowbank@wisconsin.gov	715-635-4131	Various sections and questions
Michelle Balk	Michelle.Balk@wisconsin.gov	715-635-4054	Various sections and questions
Jim Schmidt	Jamesw.schmidt@wisconsin.gov	608-267-7658	Environmental Analysis portions of datasheet

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: 395 mg/L chronic chloride toxicity criterion

B. List other criteria likely to be affected by variance: 757 mg/L acute chloride toxicity criterion

C. Source of Substance: Local industry

D. Ambient Substance Concentration: 0mg/L ☐ **Measured** ☒ **Estimated** ☐ **Default** ☐ **Unknown**

If measured or estimated, what was the basis? Include citation. The low flow rate (7Q10) at the outfall location is assumed to be 0 cfs, which leads to an estimation of any substance in its flow to also be estimated as negligible.

E. Average effluent discharge rate: 0.546 MGD (design), 0.382 MGD (measured) **Maximum effluent discharge rate:** 0.761 MGD (design)

F. Effluent Substance Concentration: 694 mg/L ☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

H. If measured or estimated, what was the basis? Include Citation. Data starting after the removal of another industrial chloride source (12/23/2014) through the latest received data at the point of this writing (1-26-15) was averaged.

I. Level currently achievable (LCA): 920 mg/L

J. Variance Limit: 920 mg/L weekly average proposed in WPDES permit (target value is 830 mg/L)

K. What data were used to calculate the LCA, and how was the LCA derived? (*Immediate compliance with LCA is required.)*

The LCA was calculated using data starting after the removal of the highest contributor of chlorides to the system, GreenWhey Energy, (12/23/2014) through the latest received data at the point of this writing (1-26-15). The LCA value of 920 mg/L is equal to 105% of the highest representative sample collected (878 mg/L), as per NR 106.82(9)(b). The small dataset was used because contribution from GreenWhey was so great, inclusion of any data from the industry could skew the current LCA by as much as 950 mg/L. The Village was consulted and there was a consensus that with the remaining industry contributions 920mg/L was achievable.

L. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.
The variance limit was set equal to the calculated LCA as per NR106.82

M. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ 6

Use of reverse osmosis was evaluated. The cost was estimated to result in an average cost to household that would be 46.22% of the MHI.
Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

Section III: Location Information

A. Counties in which water quality is potentially impacted: Barron

B. Receiving waterbody at discharge point: An unnamed wetland to an unnamed stream

C. Flows into which stream/river? Moon Creek **How many miles downstream?** 3.4

D. Coordinates of discharge point (UTM or Lat/Long): 45.388/-92.131

E. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?
8 miles

F. Provide the equation used to calculate that distance *(Include definitions of all variables, identify the values used for the clarification, and include citation):*
Moon Creek is considered to have a 7Q10 low flow of zero. The Turtle Lake tributary enters Moon Creek 3.4 miles from the outfall, but less than a mile from its mouth into Turtle Creek. The 7Q10 of Turtle Creek at highway 8 is 0.48 cfs, which is a few miles upstream of Moon Creek but no other large tributaries enters Turtle creek over that distance. The nearest downstream location in Turtle Creek with low flow information is at highway D which is about 4 miles further downstream of the mouth of Moon Creek. At that location the estimated 7Q10 is 5.2 cfs. This is assumed to provide a sufficient amount of dilution with Turtle Lake's discharge of 0.546 MGD (0.845 cfs) at the variance limit of 920 mg/L to enable compliance with the 395 mg/L chronic toxicity criterion.

G. What are the designated uses associated with the direct receiving waterbody, and the designated uses for any downstream waterbodies until the water quality standard is met?
The direct receiving water is classified as limited aquatic life. The downstream waters are similarly classified, with the exception of a 0.1 mile segment immediately downstream of the wetland that is classified as a limited forage fish community.

H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody: None identified

I. Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet

J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☐ Yes ☒ No ☐ Unknown

K. Please list any contributors to the POTW in the following categories:

Food processors (cheese, vegetables, meat, pickles, soy sauce, etc.)	World Food Processing, Lake Country Dairy (GreenWhey was removed as of 12/18/2014, but there is a very low potential they may return)
Metal Plating/Metal Finishing	
Car Washes	Holiday Station

Municipal Maintenance Sheds (salt storage, truck washing, etc.)	
Laundromats	Turtle Lake Laundromat
Other presumed commercial or industrial chloride contributors to the POTW	

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing chloride to the POTW? If so, please list.
N/A

B. Are all industrial users in compliance with local pretreatment limits for chloride? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
N/A

C. When were local pretreatment limits for chloride last calculated? N/A

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW

N/A

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☒ **Yes** ☐ **No**

B. If yes, was a public hearing held as well? ☐ **Yes** ☒ **No** ☐ **N/A**

C. What type of notice was given? ☒ **Notice of variance included in notice for permit** ☐ **Separate notice of variance**

D. Date of public notice: 3/5/15 **Date of hearing:** N/A

E. Were comments received from the public in regards to this notice or hearing? *(If yes, please attach on a separate sheet)* ☐ **Yes** ☒ **No**

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☐ **Yes** ☒ **No**

B. Applicable criteria affected by variance: No human health criteria are available for chloride in NR 105 which would be applicable in Moon Creek or further downstream.

C. Identify any expected impacts that the variance may have upon human health, and include any citations:
None

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: Limited aquatic life

B. Applicable criteria affected by variance: Chronic toxicity criterion for chloride is 395 mg/L from NR 105, applicable in all Wisconsin waters regardless of use designation.

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:
Estimated instream concentration at the outfall is equal to the proposed interim limits and target value since the 7Q10 at the outfall is zero. Interim limit = 920 mg/L. Target value = 830 mg/L. Those concentrations exceed the 395 mg/L criterion. The proposed interim limit and target value exceed the genus mean chronic value for *Ceriodaphnia* (417 mg/L), *Daphnia* (639 mg/L), *Physa* (663 mg/L), and *Lirceus* (770 mg/L). These organisms are two genera of water fleas and one genus each of snail and aquatic sowbug, respectively. No genus mean acute values are exceeded by the interim limit and target value, as the lowest one is 1,596 mg/L for *Ceriodaphnia.*

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations: None that would affect the water quality criterion, as the chronic toxicity criterion for chloride is

more stringent than all genus mean chronic values for organisms with chloride toxicity data. As a result, no endangered species with data would need more protection than already provided by the existing criterion.

County	Species	Status

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System (http://www.fws.gov/endangered/) and National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. What modifications would be necessary to comply with the current limits? Include any citations.
Reverse osmosis would need to be added as a tertiary process or the high strength wastewater from the food processors would need to be sent to a different facility.

B. How long would it take to implement these changes?
Time frame was not determined by the Department.

C. Estimate the capital cost *(Citation)***:** $628,140 (Municipal Preliminary Screener Calculation spreadsheet)

D. Estimate additional O & M cost *(Citation)***:** $208,050 (Municipal Preliminary Screener Calculation spreadsheet)

E. Estimate the impact of treatment on the effluent substance concentration, and include any citations:
Reverse osmosis would generate a reject flow that would contain concentrations of chloride higher than those currently present in the effluent, which would need to be disposed of. At this time it is unknown if a wastewater treatment facility in the area would be willing to accept the reject water, or if other alternative disposal methods exist.

F. Identify any expected environmental impacts that would result from further treatment, and include any citations:
There would be some impacts based on disposal of brine from RO. These include air pollution impacts from trucking brine and increased chloride impacts at the point where brine is discharged.

G. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ **Yes** ☒ **No** ☐ **Unknown**
(Provide the basis for this conclusion, including citations. If treatment is technically infeasible, provide an analysis of the factors that demonstrates technical infeasibility. If treatment is economically infeasible, provide an analysis of the economic cost to ratepayers that demonstrate economic infeasibility. Attach additional sheets if necessary.)
It is not economically feasible for this permittee to modify the treatment process because of the limited funds available to the village. Instead, the village plans to focus on source reduction form local the cheese industry and food processor. Installation of RO would result in a sewer rate of 46.22% of median household income (assuming the municipality would be paying 100% of the costs). Sewer costs would increase from the existing $300 per household to $18,927 after installation of RO treatment, an increase of $18,627 per household. This could cause adverse social and economic impacts.

H. If treatment is possible, is it possible to comply with the limits on the substance? ☒ **Yes** ☐ **No** ☐ **Unknown**

I. If yes, what prevents this from being done? Include any citations.
End of pipe Reverse Osmosis (RO) treatment could reduce effluent chloride concentrations to chronic toxicity criterion; however, attaining this applicable water quality standards specified in chs. NR 102 to 105 would cause substantial and widespread adverse social and economic impacts in the area where the discharger is located.

J. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:
Reverse Osmosis – Not economically feasible

Section IX: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance

into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.
The Village has begun preliminary discussions with the local cheese factory and food processor about chloride reuse and reduction. The major contributor, pre-December 2014, GreenWhey Energy, is currently seeking an individual WPDES permit to discharge wastewater to a surface water. Due to considerable disagreements between the two facilities, there is only a small chance the industry will resume discharging to the Village. If they do, technology to reduce chlorides will be required prior to discharge.

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.
From Turtle Lake's permit:

Tier 1

Activities that identify sources of chloride, educate salt users and other activities similar in nature.

Residential Sources

1) Identify sources of chloride in effluent from the wastewater treatment facility.
2) Complete a survey of all residents to document water softener usage such as type (time or flow-based), the amount of salt used, and other pertinent information. Develop a list of action items (with a timeline) for potential corrective actions.
3) Develop a series of informational/educational materials for homeowners on the impact of chloride from residential softeners. Discuss options available for increasing softener salt efficiency and request voluntary compliance.

Street Maintenance

1) Investigate streets and other areas that require high salt use in winter whereby salt is entering the collection system and conduct appropriate maintenance.
2) Complete an inventory of all manhole covers. Upgrade manholes as needed.

Industrial Sources

1) Identify sources of chloride in effluent from the wastewater treatment facility.
2) Educate plant personnel on the need to minimize salt and softened water demands and promote better housekeeping practices that will reduce chloride and softened water consumption.

Tier 2

Require significant industrial and commercial contributors to evaluate their water treatment systems with regard to softened water requirements, with the results of that evaluation being the basis for potential restrictions of chloride inputs.

Dairies

1) Improve the handling of salt brines and the handling of cheese into and out of brine systems. Consider capital improvements such as automating the brine system, properly designed drip pans and splash guards.
2) Optimize softener operation to ensure the appropriate regeneration interval and salt dosage are used.
3) If the regeneration is manual or timer-initiated, evaluate the feasibility of switching to a DIR controller.
4) Evaluate the feasibility of softener brine reclamation.
5) Determine which subprocesses can tolerate unsoftened water, and make appropriate changes.
6) Determine whether once-through cooling systems can be close-looped, and make appropriate changes.
7) For plants that condense whey, evaluate the feasibility of using condensate of whey (COW) water for the first rinse for clean-in-place (CIP) systems and for boiler makeup water.

Section X: Compliance with Previous Permit *(Variance Reissuances Only)*

A.	**Date of previous submittal:** N/A	**Date of EPA Approval:**	
B.	**Previous Permit #:**	**Previous WQSTS #:**	(EPA USE ONLY)
C.	**Effluent substance concentration:**	**Variance Limit:**	
D.	**Target Value(s):**	**Achieved?**	☐ **Yes** ☐ **No** ☐ **Partial**

E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.

Condition of Previous Variance	Compliance
N/A	☐ **Yes** ☐ **No**