Permit Fact Sheet

General Information

Permit Number:	WI-0000817-10-0
Permittee Name:	Lakeside Foods, Inc. - Belgium Plant
Address:	705 Main Street P O Box B
City/State/Zip:	Belgium WI 53004
Discharge Location:	Drainage ditch located on the northeast corner of the plant sprayfield and approx. 500 feet east of the northeast corner of the 8.0 MG lagoon
Receiving Water:	The headwaters of the East Branch of Belgium Creek
StreamFlow ($Q_{7,10}$):	0 cfs
Stream Classification:	Limited aquatic life (LAL) from the outfall to the Onion River. The Onion River is classified as a Warm water sport fish
Discharge Type:	Existing

Facility Description

Lakeside Foods operates a vegetable processing and canning plant for potatoes, green snap beans, and beets. Production activities and wastewater discharges occur year around, but higher volumes occur in the fall. Spray Irrigation occurs between the months of April through November.

Process wastewater is generated from washing and cooking vegetables and preparing food products. The treatment system consists of pre-treatment with coarse screening to remove vegetable by-product solids prior to discharge to a 0.5-MG Slurry Store Tank and/or, an 8-MG lagoon. A Dissolved Air Floatation (DAF) is operated adjacent to the 8-MG Lagoon and tank to remove vegetable solids and or/aerobically generated sludge. The lagoon provides aerobic pretreatment and storage prior to being spray irrigated in one of two fields. The 150-acre West Sprayfield is approximately 1.5 miles west/ southwest of the plant and is designated as groundwater discharge Outfall (007). The 66-acre Plant Sprayfield (Outfall 104) is located approximately 1,500 feet south of the plant, and discharges to groundwater and to surface water via two drain tile systems. The drain tile systems discharge to the headwaters of the East Branch of Belgium Creek, designated as surface water (Outfall 004 for the shallow drain tile, Outfall 008 for the deep drain tile and Outfall 009 to report the total pounds/day of phosphorus and total discharge flowrate).

Contact can cooling water runs through a cooling tower before discharge to the aerated lagoon along with other vegetable process wash waters as detailed above. Contact can cooling water used to be discharged via Outfall 002 but the outfall has been removed from the permit.

Substantial Compliance Determination

No enforcement actions were taken during the previous permit term.

After a desk top review of all: discharge monitoring reports, land app reports, compliance schedule items, and a site visit on 5/23/23, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Curtis Nickels, Wastewater Compliance Engineer on 7/30/24.

Sample Point Designation

Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
004	Maximum Day[1]: 0.978 MGD [10/08/18] Maximum 7-day Average[1]: 0.776 MGD [03/19] Maximum 30-day Average[1]: 0.376 MGD [5/18 - 6/18] Maximum Annual Average[1]: 0.099 MGD [2019]	OUTFALL: Shallow drain tile effluent from the 66-acre Plant Sprayfield (sample point 104) to the East Branch of the Belgium Holland Drainage Ditch. Tile flow from Plant Sprayfield to the East Branch of the Belgium Holland Drainage Ditch is located at the northeast corner of the Plant Sprayfield and ~500 feet east of 8MG Lagoon SE corner. The wash water is screened, pretreated (aerobic lagoon) and receives final treatment in the overlying Plant Sprayfield soil profile prior to discharge to groundwater, and/or collection and discharge to Outfall 004/Outfall 008. Flow monitoring is gathered from the electromagnetic flow meter and samples are taken from the shallow tile pump station prior to discharge to the drainage ditch.
005	Waste volume[1]: 0 Gallons/ year [2018 – 2022]	LAND APPLICATION: By-product solids from vegetable processing, consisting of peelings and trimmings collected by the rotary screens adjacent to the pump station east/adjacent to the plant. Usually, these wastes are taken by local farmers for animal feed. This outfall for land application may be used as an optional disposal method for by-product solids. Representative samples shall be collected from the transport wagon/truck trailer prior to land application.
006	Waste volume[1]: 0 Gallons/ year [2018 – 2022]	LAND APPLICATION: Sludge from the DAF unit are discharged at this outfall. DAF treats wastewater from the 0.5 MG equalization tank and the 8 MG aerated lagoon wastewater treatment system. Representative samples shall be collected prior to discharge of the land spreading equipment.
007	Average Flow[1]: 20 MG/year [2018 – 2022]	LAND TREATMENT: Spray irrigation of pretreated process wastewater onto the 150-acre West Sprayfield. Located in Section 20 and 29, T12N, R22E, Town of Belgium. The field is divided into 24 travel lanes of varying size, irrigated by traveling hose reels with a spray gun. Representative grab samples are collected between the pump house and prior to discharge from the spray gun cart. Flow is monitored via the Cadman spray reel irrigators with 4'' turbine type water meters.
008	Maximum Day[1]: 0.136 MGD [07/16/19] Maximum 7-day Average[1]: 0.099 MGD [07/19] Maximum 30-day Average[1]: 0.042 MGD [9/19 - 10/19] Maximum Annual Average[1]: 0.013 MGD [2022]	OUTFALL: Deep drain tile effluent from the 66-acre Plant Sprayfield (sample point 104) to the East Branch of the Belgium Holland Drainage Ditch. Tile flow from Plant Sprayfield to the East Branch of the Belgium Holland Drainage Ditch is located approximately 200 feet southeast from the base of the Plant Sprayfield pivot. The wash water is screened, pretreated (aerobic lagoon) and receives final treatment in the overlying Plant Sprayfield soil profile prior to discharge to groundwater, and/or collection and discharge to Outfall 008. Flow is gathered via a Siemens magmeter and samples are taken from the deep tile pump station prior to discharge to the drainage ditch.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
009	N/A [Theoretical Outfall]	OUTFALL: Virtual outfall. This outfall is for reporting the combined mass from outfalls 004 and 008 to determine compliance with mass based limits.
010	New Outfall. No data available.	LAND APPLICATION: Excess soil and grit from root crops which have historically been screened and discharged as byproduct solids at outfall 005 shall now be discharged from this outfall. Representative samples shall be collected from the transport vehicle once loaded.
011	New Outfall. No data available.	LAND APPLICATION: Beet and potato peeler waste which have historically been screened and discharged as byproduct solids at outfall 005 or used as animal feed, shall now be discharged from this outfall. Peeler waste are loaded adjacent to the plant and in an area where wastewater and commingled stormwater is collected and pumped/discharged to the lagoon/sprayfield treatment system. Representative samples shall be collected monthly from tankers being filled at the plant.
104	Average Flow[1]: 20 MG/year [2018 – 2022]	LAND TREATMENT: Spray irrigation of pretreated process wastewater onto the 66-acre Plant Sprayfield with underdrain tile systems that discharges to Outfalls 004 and 008. Located in S 1/2 of Section 22, T12N, R22E, Town of Belgium. The field is irrigated by a center pivot. Representative grab samples are collected between the pump and center pivot. Flow to the Plant Sprayfield center pivot is monitored via a turbine type flow meter located adjacent to the East Lagoon.
101	Maximum Day[2]: 1.635 MGD [09/22/18]	INPLANT: Process wastewater from vegetable processing to the aerated 8 MG aerated lagoon system. Flow data is gathered via electromagnetic flow meter located in the pump house, east of, and directly adjacent to the vegetable processing facility. The lagoon provides pretreatment/storage of the wastewater prior to spray irrigation from Sample Point 104 (discharge to Outfall 004/Outfall 008) and Outfall 007.

[1]: As reported in submitted application.

[2]: As seen in monitoring data records.

Sample Point Designation For Groundwater Monitoring Systems			
System	**Sample Pt Number**	**Well Name**	**Comments**
East Lagoon and Abandoned	818	MW-1 (818)	BACKGROUND: Monitoring well at old lagoon system for NR 213 evaluation. Upgradient water table well located 150 feet NE

Sample Point Designation For Groundwater Monitoring Systems			
System	**Sample Pt Number**	**Well Name**	**Comments**
Old Lagoons			of lagoon 4.
	819	MW-2 (819)	NON-POINT OF STANDARD: Monitoring well at old lagoon system for NR 213 evaluation. Downgradient water table well located 50 feet NW of lagoon 4.
	820	MW-3 (820)	POINT OF STANDARD: Monitoring well at old lagoon system for NR 213 evaluation. Downgradient water table well located 50 feet SW of lagoon 4.
	821	PZ-2 (821)	NON-POINT OF STANDARD: Monitoring well at old lagoon system for NR 213 evaluation. Downgradient piezometer located 50 feet NW of lagoon 4.
	822	PZ-3 (822)	POINT OF STANDARD: Monitoring well at old lagoon system for NR 213 evaluation. Downgradient piezometer located 50 feet SW of lagoon 4.
	830	MW-4 (830)	NON-POINT OF STANDARD: Additional well nest for NR 213 evaluation of lagoons 3 and 4. Water table well located 150 feet west of the lagoons on the other side of the Belgium Holland Drainage Ditch. Downgradient well.
	831	PZ-4 (831)	NON-POINT OF STANDARD: Additional well nest for NR 213 evaluation of lagoons 3 and 4. Piezomete located 150 feet west of the lagoons on the other side of the Belgium Holland Drainage Ditch. Downgradient well.
	833	PZ-5 (833)	NON-POINT OF STANDARD: Additional well nest for NR 213 evaluation of lagoons 3 and 4. Piezometer located downgradient 100 feet SE of lagoon 3.
	834	MW-6 (834)	POINT OF STANDARD: Additional well nest for NR 213 evaluation of lagoons 3 and 4. Additional well nest for NR 213 evaluation of lagoons 3 and 4. Water table well located downgradient 100 feet SE of lagoon 3.
	835	PZ-6 (835)	POINT OF STANDARD: Additional well nest for NR 213 evaluation of lagoons 3 and 4. Piezometer located downgradient 100 feet SW of lagoon 3.
Plant Sprayfield	802	Well 2-O.W (802)	BACKGROUND: Monitoring well at 66-acre Plant Sprayfield that receives the discharge from Sample Point 104. Background well located upgradient.
	804	Well 4-O.W (804)	NON-POINT OF STANDARD: Monitoring well at 66-acre Plant Sprayfield that receives the discharge from Sample Point 104. Upgradient/Sidegradient well.
	814	Well 14-O.W (814)	NON-POINT OF STANDARD: Monitoring well at 66-acre Plant Sprayfield that receives the discharge from Sample Point 104.

Sample Point Designation For Groundwater Monitoring Systems			
System	**Sample Pt Number**	**Well Name**	**Comments**
			Located sidegradient/downgradient.
	836	MW-36 (836)	POINT OF STANDARD: Located near East Property line of the Plant Field. Downgradient well.
West Sprayfield	823	MW-20 (823)	BACKGROUND: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Background well located upgradient.
	824	MW-21 (824)	NON-POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.
	825	MW-22 (825)	NON-POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.
	826	MW-23 (826)	NON-POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.
	827	MW-24 (827)	POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.
	828	MW-25 (828)	POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.
	829	MW-26 (829)	NON-POINT OF STANDARD: Monitoring well at 150-acre West Sprayfield that receives the discharge from Outfall 007. Downgradient well.

1 Inplant - Monitoring and Limitations

Sample Point Number: 101- PROCESS WASTEWATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	

Changes from Previous Permit:

Sample Point 101 monitoring requirements were re-evaluated for the proposed permit term and no changes were made from the previous permit. However, Sampling point naming was corrected from 701(intake) to 101(inplant).

2 Surface Water - Monitoring and Limitations

Sample Point Number: 004- Shallow Drain Tile

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	Flow monitoring and samples are taken from the flume prior to discharge to the drainage ditch while the systems are installed in 2024.
BOD5, Total	Monthly Avg	20 mg/L	Weekly	3-Grab Comp	
BOD5, Total	Weekly Avg	30 mg/L	Weekly	3-Grab Comp	
BOD5, Total		lbs/day	Weekly	Calculated	
Suspended Solids, Total	Monthly Avg	20 mg/L	Weekly	3-Grab Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	Weekly	3-Grab Comp	
Suspended Solids, Total		lbs/day	Weekly	Calculated	
pH (Maximum)	Daily Max	9.0 su	Daily	Grab	
pH (Minimum)	Daily Min	6.0 su	Daily	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	Daily	Grab	
Phosphorus, Total		mg/L	Weekly	3-Grab Comp	
Phosphorus, Total		lbs/day	Weekly	Calculated	
Copper, Total Recoverable		ug/L	Quarterly	3-Grab Comp	
Temperature Maximum		deg F	Daily	Continuous	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Weekly	3-Grab Comp	
Chloride		mg/L	Weekly	3-Grab Comp	
Chronic WET	Monthly Avg	5.0 TUc	See Listed Qtr(s)	3-Grab Comp	
Arsenic, Total Recoverable		ug/L	Once	3-Grab Comp	

Changes from Previous Permit

Sample Point 004 monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

Zinc, Total Recoverable: Monitoring removed. This is because the available data for zinc from the current permit term are all nondetects. See fact sheet Appendix A: Water Quality Effluent Limits Memo for more details.

Acute WET: Monitoring removed because it is no longer needed. See fact sheet Appendix A: Water Quality Effluent Limits Memo for more details.

Flow Rate: Sample type corrected from "total daily" to "continuous" in anticipation of the installation of an electromagnetic flow meter in 2024. A note was added under the notes column to explain how the flow is being measured while the electromagnetic flow meter is installed.

BOD5, Total: A weekly mass monitoring requirement added. This was done to track the mass contribution of BOD5 coming from this outfall and help in the calculations of BOD5 mass limit reporting at Outfall 009.

Suspended Solids, Total: A weekly mass monitoring requirement added. This was done to track the mass contribution of total suspended solids coming from this outfall and help in the calculations of total suspended solids mass limit reporting at Outfall 009.

pH (Maximum) and pH (Minimum): Correction from "pH field" to "pH (Maximum)" and "pH (Minimum)" since pH field is used for solids which does not apply here.

Dissolved Oxygen: Sample frequency change from weekly to daily**.** The department has determined that an increase in monitoring frequency is warranted because of multiple dissolved oxygen limit violations in the last permit term. The increase in sample frequency will bring the facility to sample frequency industry standards implemented across the state as recommended by the **Monitoring Frequencies for Individual Wastewater Permits** guidance (April 12, 2021).

Phosphorus, Total: Monthly average of 0.3 mg/L limit removed since it was an interim MDV limit that is no longer needed. Since it was an interim limit, an anti-degradation evaluation prior to removal was not required.

Chronic WET: Monthly average limit of 5.0 TUc added. This is because according to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. Accordingly, the IWC changed to 20%. See fact sheet Appendix A: Water Quality Effluent Limits Memo for more details.

Arsenic, Total Recoverable: Monitoring added. The sample that was collected for the previous permit reissuance application had a limit of detection (LOD) of 8.3 µg/L which is greater than 1/5th of the most stringent calculated limit of 40 µg/L based on the human cancer criteria. Because the LOD from the current permit application is greater than 1/5th of the most stringent calculated limit, reasonable potential can't be determined at this time. The arsenic test will have to be sensitive enough so that the LOD is below 8.0 µg/L and reasonable potential can be determined.

Explanation of Limits and Monitoring Requirements

Refer to fact sheet attachment Appendix A: Water Quality Effluent Limits Memo for the detailed calculations, prepared by the Water Quality Bureau dated 05/30/2024 used for this reissuance.

Monitoring Frequencies: The **Monitoring Frequencies for Individual Wastewater Permits** guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. If the permittee's effluent data shows that a calculated WQBEL for chloride

cannot be met, then the permit will include a chloride effluent limitation. s. NR 106.83 of subchapter VII also provides for some permittees to obtain temporary relief from a chloride WQBEL through the use of a "chloride variance". (See chloride guidance dated March 2010 at this link: Implementation plan for the chloride rule)**.**

Whole Effluent Toxicity: Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html).

Sample Point Number: 008- Deep Drain Tile

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	20 mg/L	Weekly	3-Grab Comp	
BOD5, Total	Weekly Avg	30 mg/L	Weekly	3-Grab Comp	
BOD5, Total		lbs/day	Weekly	Calculated	
Suspended Solids, Total	Monthly Avg	20 mg/L	Weekly	3-Grab Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	Weekly	3-Grab Comp	
Suspended Solids, Total		lbs/day	Weekly	Calculated	
pH (Maximum)	Daily Max	9.0 su	Daily	Grab	
pH (Minimum)	Daily Min	6.0 su	Daily	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	Daily	Grab	
Phosphorus, Total		mg/L	Weekly	3-Grab Comp	
Phosphorus, Total		lbs/day	Weekly	Calculated	
Copper, Total Recoverable		ug/L	Quarterly	3-Grab Comp	
Temperature Maximum		deg F	Daily	Continuous	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Weekly	3-Grab Comp	
Chloride		mg/L	Weekly	3-Grab Comp	
Arsenic, Total		ug/L	Once	3-Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Recoverable				Comp	

Changes from Previous Permit

Sample Point 008 monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

Zinc, Total Recoverable: Monitoring removed. This is because the available data for zinc from the current permit term are all nondetects. See fact sheet Appendix A: Water Quality Effluent Limits Memo for more details.

Acute WET: Monitoring removed because it is no longer needed. See fact sheet Appendix A: Water Quality Effluent Limits Memo for more details.

Flow Rate: Sample type corrected from "total daily" to "continuous" since the flow is being measured with an electromagnetic flow meter.

BOD5, Total: A weekly mass monitoring requirement added. This was done to track the mass contribution of BOD5 coming from this outfall and help in the calculations of BOD5 mass limit reporting at Outfall 009.

Suspended Solids, Total: A weekly mass monitoring requirement added. This was done to track the mass contribution of total suspended solids coming from this outfall and help in the calculations of total suspended solids mass limit reporting at Outfall 009.

pH (Maximum) and pH (Minimum): Correction from "pH field" to "pH (Maximum)" and "pH (Minimum)" since pH field is used for solids which does not apply here.

Dissolved Oxygen: Sample frequency change from weekly to daily**.** The department has determined that an increase in monitoring frequency is warranted because of multiple dissolved oxygen limit violations in the last permit term. The increase in sample frequency will bring the facility to sample frequency industry standards implemented across the state as recommended by the **Monitoring Frequencies for Individual Wastewater Permits** guidance (April 12, 2021).

Phosphorus, Total: Monthly average of 0.3 mg/L limit removed since it was an interim MDV limit that is no longer needed. Since it was an interim limit, an anti-degradation evaluation prior to removal was not required.

Arsenic, Total Recoverable: Monitoring added. The sample that was collected for the previous permit reissuance application had a limit of detection (LOD) of 8.3 µg/L which is greater than 1/5th of the most stringent calculated limit of 40 µg/L based on the human cancer criteria. Because the LOD from the current permit application is greater than 1/5th of the most stringent calculated limit, reasonable potential can't be determined at this time. The arsenic test will have to be sensitive enough so that the LOD is below 8.0 µg/L and reasonable potential can be determined.

Explanation of Limits and Monitoring Requirements

Refer to fact sheet attachment Appendix A: Water Quality Effluent Limits Memo for the detailed calculations, prepared by the Water Quality Bureau dated 05/30/2024 used for this reissuance.

Monitoring Frequencies: The **Monitoring Frequencies for Individual Wastewater Permits** guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based

effluent limitations (WQBELs) for chloride. If the permittee's effluent data shows that a calculated WQBEL for chloride cannot be met, then the permit will include a chloride effluent limitation. s. NR 106.83 of subchapter VII also provides for some permittees to obtain temporary relief from a chloride WQBEL through the use of a "chloride variance". (See chloride guidance dated March 2010 at this link: Implementation plan for the chloride rule)**.**

Sample Point Number: 009- combined SW discharge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Calculated	
Phosphorus, Total	6-Month Avg	0.35 lbs/day	Weekly	Calculated	
Phosphorus, Total	Monthly Avg	1.1 lbs/day	Weekly	Calculated	
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL Calculations section below
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See TMDL Calculations section below
Suspended Solids, Total	Daily Max	26 lbs/day	Weekly	Calculated	See Permit subsection "TMDL Limitations for Total Suspended Solids" for limit information.
Suspended Solids, Total	Monthly Avg	16 lbs/day	Weekly	Calculated	See Permit subsection "TMDL Limitations for Total Suspended Solids" for limit information.
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations section below.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of TSS discharged and report on the last day of the month on the DMR. See

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					TMDL Calculations section below.
BOD5, Total	Annual Avg	52.1 lbs/day	Weekly	Calculated	
BOD5, Total	Daily Max	120.5 lbs/day	Weekly	Calculated	
BOD5, Total	Monthly Avg	73.5 lbs/day	Weekly	Calculated	

Changes from Previous Permit

Sample Point 009 monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

Phosphorus, Total: 6-month average of 0.35 lbs/day limit and a monthly average of 1.1 lbs/day limit added. The sample frequency for the lbs/year monitoring section changed from "annual" to "monthly". Additionally, notes were added to the lbs/month and lbs/year monitoring sections.

Suspended Solids, Total: Daily max of 26 lbs/day limit and monthly average of 16 lbs/day limit added. Additionally, lbs/month and lbs/year monitoring sections added. These limits are TMDL limits and will go into effect in accordance to the compliance schedule in Section 6 of the permit. In the interim, the existing weekly concentration limit of 30 mg/l that is individually monitored at outfalls 004 and 008 will be used. Note that categorical limits required an annual average limit to be established but since TMDL limits are more restrictive, the categorical annual average limit of 96.4 lbs/day is not included in the table.

BOD5, Total: Annual average of 52.1 lbs/day limit, daily max of 120.5 lbs/day limit and monthly average of 73.5 lbs/day limit added. These limits are categorical limits.

Narrative Requirements:

- "MDV (Multi-Discharger Variance) Requirements" and "MDV Reopener Clause" subsections removed since an MDV is no longer needed.
- "Northeast Lakeshore Total Maximum Daily Load (TMDL) Calculations," "TMDL Limitations for Total Phosphorus," and "TMDL Limitations for Total Suspended Solids" subsections added to further explain the new TMDL limits.

Explanation of Limits and Monitoring Requirements

Refer to fact sheet attachment Appendix A: Water Quality Effluent Limits Memo for the detailed calculations, prepared by the Water Quality Bureau dated 05/30/2024 used for this reissuance.

Categorical Limits: Limits for BOD5 were calculated in accordance to Chapter NR 225, Wis. Adm. Code and 40 CFR 407 and added to the permit. The WI-0000817-09-1 permit erroneously left these limits out of the permit and added a narrative explanation of the limits to the fact sheet instead. The narrative explanation in the fact sheet mistakenly made the calculations based on BAT standards which do not apply to conventional pollutants. Note that there are also mass categorical limits for suspended solids but since the TMDL limits are more stringent mass limits, only the TMDL mass limits for suspended solid were added to the table. See fact sheet attachment Appendix C: Categorical Limits for more information.

Monitoring Frequencies: The **Monitoring Frequencies for Individual Wastewater Permits** guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were

considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Phosphorus: 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. The code categorically limits industrial dischargers of more than 60 pounds of phosphorus per month and municipal dischargers of more than 150 pounds of phosphorus per month to 1.0 mg/L unless an alternative limit is approved. NR 217 also specifies WQBELs (water quality based effluent limits) for discharges of phosphorus to surface waters of the state from publicly and privately owned wastewater facilities, noncontact cooling water discharges which contain phosphorus, concentrated animal feeding operations that discharge through alternative treatment facilities and a facility/site that is regulated under NR 216 where the standards in NR151 and 216 are not sufficient to meet phosphorus criteria. WQBELs for phosphorus are needed whenever the discharge contains phosphorus at concentrations or loadings that will cause or contribute to an exceedance of the water quality standards.

For the reasons explained in the April 30, 2012 paper entitled 'Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin', WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly values. The final effluent limit for phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL. This final effluent limit was derived from and complies with the applicable water quality criterion and is consistent with the assumptions and requirements of the EPA-approved WLA for NE Lakeshore Basin.

Suspended Solids, Total: Mass based TSS limits of have been added to the permit to comply with requirements of the Northeast Lakeshore TMDL. Effluent concentration (mg/L) shall be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA.

TMDL(Total Maximum Daily Load) Derived Limits: TMDL Approved - Waste load allocations specified in TMDLs are expressed as WQBELs (water quality based effluent limits). The waste load allocated-derived WQBELs are consistent with the assumptions and requirements of the approved NE Lakeshore Basin TMDL.

3 Land Treatment – Monitoring and Limitations

Sample Point Number: 007- West Sprayfield and 104- Plant Sprayfield

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate	Daily Max	750,000 gpd	Daily	Continuous	
Loading Rate	Daily Max	0.4 in/hour	Daily	Calculated	
Hydraulic Application Rate	Monthly Avg	3,000 gal/ac/day	Monthly	Calculated	
Nitrogen, Max Applied On Any Zone	Annual Total	300 lbs/ac/yr	Annual	Total Annual	
Chloride		mg/L	Monthly	3-Grab Comp	
Nitrogen, Total		mg/L	Monthly	3-Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Kjeldahl				Comp	

Changes from Previous Permit:

Sample Points 007 and 104 monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

Flow rate: Sample type was corrected from "total daily" to "continuous" since a turbine type flow meter is used.

Nitrogen, Max Applied on Any Zone: Limit decreased from 400 lbs/ac/yr to 300 lbs/ac/yr. This is because the Department limits Nitrogen application to crop needs plus demonstrable denitrification and exceedances of that are only allowed under NR 214.06 exemptions, which require a demonstration of need. Since the facility can meet 300 lbs/ac/yr, no additional studies are needed. See the Guidance document "Establishing Nitrogen Limitations in WPDES Permits at Industrial Land Treatment Facilities" for more information.

Narrative Requirements:

- "Monthly Avg Hydraulic Application Rate Calculation" subsection added to clarify calculation procedure.
- "Nitrogen Loading Limitations" and "Nitrogen Loading Contingent on Groundwater Results" subsections deleted as they are no longer needed due to the change in limits. This change is an effort to phase out conditional language pertaining to Nitrogen as standard practice.

Explanation of Limits and Monitoring Requirements

Requirements for land treatment of industrial wastewater are determined in accordance with ch. NR 214 Wis. Adm. Code.

4 Groundwater – Monitoring and Limitations

4.1 Groundwater Monitoring System for Plant Sprayfield

Location of Monitoring system: Plant sprayfield (Sampling Point 104).

Groundwater Monitoring Well(s) to be Sampled: Well 2-O.W (802), Well 4-O.W (804), Well 14-O.W (814), MW-36 (836)

Groundwater Monitoring Well(s) Used to Evaluate Background Groundwater Quality: Well 2-O.W (802)

Groundwater Monitoring Well(s) Used for Point of Standards Application: MW-36 (836)

Parameter	**Units**	**Preventative Action Limit**	**Enforcement Standard**	**Frequency**
Depth To Groundwater	feet	N/A	N/A	Quarterly
Groundwater Elevation	feet MSL	N/A	N/A	Quarterly
pH Field	su	8.5	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	Quarterly
Nitrogen, Total Kjeldahl	mg/L	N/A	N/A	Quarterly

Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Quarterly
Nitrogen, Organic Dissolved	mg/L	2.2	N/A	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
COD, Filtered	mg/L	35	N/A	Quarterly
Solids, Total Dissolved	mg/L	865	N/A	Quarterly

Changes from Previous Permit:

Plant Sprayfield monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

MW 6-A (806): Removed. This well was approved for abandonment in 2024 because it is not deemed to provide representative data.

pH Field: Preventative action limit (PAL) changed from 8.2 su to 8.5 su. Additionally, it cannot go below 6.5 su.

Nitrogen, Nitrite + Nitrate (as N) Dissolved: PAL changed from 2.2 mg/l to 2.0 mg/l.

Nitrogen, Organic Dissolved: PAL changed from 2.3 mg/l to 2.2 mg/l.

Chloride Dissolved: PAL changed from 170 mg/l to 125 mg/l.

COD, Filtered: PAL changed from 37 mg/l to 35 mg/l.

Solids, Total Dissolved: PAL changed from 950 mg/l to 865 mg/l.

Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20 Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28 Wis. Adm. Code, are established on a case-by-case basis. See fact sheet attachment Appendix B: Groundwater Evaluation for more details.

4.2 Groundwater Monitoring System for West Sprayfield

Location of Monitoring system: West sprayfield (Outfall 007).

Groundwater Monitoring Well(s) to be Sampled: MW-20 (823), MW-21 (824), MW-22 (825), MW-23 (826), MW-24 (827), MW-25 (828), MW-26 (829)

Groundwater Monitoring Well(s) Used to Evaluate Background Groundwater Quality: MW-20 (823)

Groundwater Monitoring Well(s) Used for Point of Standards Application: MW-25 (828), MW-24 (827)

Parameter	Units	Preventative Action Limit	Enforcement Standard	Frequency
Depth To Groundwater	feet	N/A	N/A	Quarterly
Groundwater Elevation	feet MSL	N/A	N/A	Quarterly
pH Field	su	8.5	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as	mg/L	2.0	10	Quarterly

N) Dissolved				
Nitrogen, Total Kjeldahl	mg/L	N/A	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Quarterly
Nitrogen, Organic Dissolved	mg/L	2.2	N/A	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
COD, Filtered	mg/L	33	N/A	Quarterly
Solids, Total Dissolved	mg/L	725	N/A	Quarterly

Changes from Previous Permit:

West Sprayfield monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

pH Field: Preventative action limit (PAL) changed from 8.3 su to 8.5 su. Additionally, it cannot go below 6.5 su.

Nitrogen, Nitrite + Nitrate (as N) Dissolved: PAL changed from 2.1 mg/l to 2.0 mg/l.

Nitrogen, Organic Dissolved: PAL changed from 2.3 mg/l to 2.2 mg/l.

Chloride Dissolved: PAL changed from 150 mg/l to 125 mg/l.

Solids, Total Dissolved: PAL changed from 800 mg/l to 725 mg/l.

Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20 Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28 Wis. Adm. Code, are established on a case-by-case basis. See fact sheet attachment Appendix B: Groundwater Evaluation for more details.

4.3 Groundwater Monitoring System for East Lagoon and Abandoned Old Lagoons

Location of Monitoring system: East Lagoon and Abandoned Old Lagoons

Groundwater Monitoring Well(s) to be Sampled: MW-1 (818), MW-2 (819), MW-3 (820), PZ-2 (821), PZ-3 (822), MW-4 (830), PZ-4 (831), PZ-5 (833), MW-6 (834), PZ-6 (835)

Groundwater Monitoring Well(s) Used to Evaluate Background Groundwater Quality: MW-1 (818)

Groundwater Monitoring Well(s) Used for Point of Standards Application: PZ-6 (835), MW-6 (834), PZ-3 (822), MW-3 (820)

Parameter	**Units**	**Preventative Action Limit**	**Enforcement Standard**	**Frequency**
Depth To Groundwater	feet	N/A	N/A	Annual
Groundwater Elevation	feet MSL	N/A	N/A	Annual
pH Field	su	8.4	N/A	Annual

Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	Annual
Nitrogen, Total Kjeldahl	mg/L	N/A	N/A	Annual
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Annual
Nitrogen, Organic Dissolved	mg/L	2.2	N/A	Annual
Chloride Dissolved	mg/L	125	250	Annual
COD, Filtered	mg/L	93	N/A	Annual
Solids, Total Dissolved	mg/L	705	N/A	Annual

Changes from Previous Permit:

East Lagoon and Abandoned Old Lagoons monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

pH Field: Preventative action limit (PAL) changed from 8.3 su to 8.4 su. Additionally, it cannot go below 6.4 su.

Nitrogen, Nitrite + Nitrate (as N) Dissolved: PAL changed from 4.0 mg/l to 2.0 mg/l.

Chloride Dissolved: PAL changed from 150 mg/l to 125 mg/l.

COD, Filtered: PAL changed from 50 mg/l to 93 mg/l.

Solids, Total Dissolved: PAL changed from 700 mg/l to 705 mg/l.

Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20 Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28 Wis. Adm. Code, are established on a case-by-case basis. See fact sheet attachment Appendix B: Groundwater Evaluation for more details.

5 Land Application - Sludge/By-Product Solids (industrial only)

Sample Point Number: 005- BY-PRODUCT SOLIDS; 006- SLUDGE; 010- BY-PRODUCT OF SOIL AND GRIT, and 011- BY-PRODUCT of BEET AND POTATO

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chloride		Percent	Annual	Grab Comp	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab Comp	
Phosphorus, Total		Percent	Annual	Grab Comp	
Potassium, Total Recoverable		Percent	Annual	Grab Comp	
pH Field		su	Annual	Grab Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Annual	Grab Comp	
Solids, Total		tons/day	Daily	Total Daily	Record in a Daily Log.
Nitrogen, Total Kjeldahl		Percent	Annual	Grab Comp	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Grab Comp	
Nitrogen, Organic Total		Percent	Annual	Grab Comp	

Changes from Previous Permit:

Sample Points 005, 006, 010 and 011 monitoring requirements were re-evaluated for the proposed permit term and the following changes were made from the previous permit;

Solids, Total: Daily tons/day monitoring added. This was done to make sense of the rest of the data which is being reported in percentage.

Nitrogen, Ammonium (NH4-N) Total: Annual percent monitoring added. This is to understand plant available nitrogen.

Nitrogen, Organic Total: Annual percent monitoring added. This is to understand plant available nitrogen.

Sample Frequency: (Excluding Solids, Total) All sample frequencies were changed to annual since the characteristics of the sludge/by-product solid is expected to remain consistent because it's composition is not significantly changing throughout the year.

Sample Type: (Excluding Solids, Total) All sample types were corrected from "grab" to "grab comp". This is because a composite grab sample provides the most representative sample of everything being discharged.

Units: (Excluding Solids, Total) All of the changes for units were to correct from mg/kg to percent. This is to have consistency in units and because percentages clearly indicate the relative amount of a component in the total dry matter, which is useful for understanding the composition of the sample.

Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code.

Water Extractable Phosphorus: Water extractable phosphorus (WEP) is the coefficient for determining plant available phosphorus from measured total phosphorus. In Wisconsin, the Penn State Method is utilized and is expressed in percent. While a total P may be significant, the WEP may show that only a small percentage of the P is available to plants because of factors such as treatment processes and chemical addition that "tie-up" phosphorus limiting the amount of phosphorus that is plant available. As part of the Wisconsin's nutrient management plan (NMP) requirements, the accounting of all fertilizers must be included over the NMP cycle. The fertilizer value of the waste needs to be communicated to the farmer and accounted for in the NMP.

Nitrogen Compounds: TKN measures the total amount of organic nitrogen and ammonia nitrogen (NH_3) in the soil and it indicates a good reserve of nitrogen, which is essential for plant growth and development. Ammonium (NH_4-N) represents the nitrogen form readily available for plant uptake. Ammonium is a form of nitrogen that plants can directly absorb. Organic nitrogen is a part of soil organic matter, and it needs to be mineralized into ammonium and nitrate before plants can use it. The amount of organic nitrogen gives an indication of the potential future availability of nitrogen. All of these nitrogen parameters are essential for understanding soil needs.

6 Schedules

6.1 Total Suspended Solids - TMDL Derived WQBELs for TSS

The permittee shall comply with the TMDL (Total Maximum Daily Load) derived WQBELs (Water Quality Based Effluent Limits) for TSS as specified.

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 TSS discharges from the treatment plant during the period prior to complying with final TSS WQBELs and, where possible, enable compliance with final TSS WQBELs by 09/30/2027. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than 09/30/2027 and state whether the measures, improvements, and modifications will enable compliance with final TSS 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. If the operational evaluation report concludes that the facility can achieve final TSS WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final TSS WQBEL by 09/30/2027 and is not required to comply with the milestones identified below for years 3 through 4 of this compliance schedule. STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final TSS WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final TSS 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 TSS 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 TSS WQBELs sooner than 09/30/2028.	09/30/2025
Compliance Alternatives, Source Reduction, Improvements and Modifications Report: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' 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 TSS discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) Report of feasible alternatives for meeting TSS WQBELs. (3) If the plan concludes upgrading of the permittee’s wastewater treatment is necessary to meet final TSS WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, a facility plan if required pursuant to ch. NR 110, and a schedule for completing construction of the upgrades by 09/30/2028. 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 limits. If the plan concludes water quality trading will be used, the submittal shall identify potential trading	09/30/2026

partners. Alternative Approaches: Rather than upgrading the wastewater treatment facility to comply with WQBELs for TSS, the permittee may use Water Quality Trading or the Adaptive Management Option to achieve compliance, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. If the plan concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.	
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' above.	09/30/2027
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches' above.	03/31/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches' above.	06/30/2028
Achieve Compliance: The permittee shall achieve compliance with final TSS WQBELs. Note: See 'Alternative Approaches' above.	09/30/2028

6.2 Land Application Management Plan Update

Update needed to reflect added outfalls.

Required Action	Due Date
Update: Update the Land Application Management Plan to include information on the two new outfalls - Outfalls 010 and 011.	03/01/2025

Special Reporting Requirements

No special requirements.

Other Comments:

No comments.

Attachments:

Appendix A: Water Quality Effluent Limits Memo [May 30, 2024]
Appendix B: Groundwater Evaluation [August 23, 2024]
Appendix C: Categorical Limits [March 28, 2024]

Expiration Date:

September 30, 2029

Justification Of Any Waivers From Permit Application Requirements

No waivers were given from permit application monitoring and reporting requirements.

Prepared By: Laura Rodriguez Alvarez Wastewater Engineer Date: August 23, 2024

Appendix A

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 10/25/2023 – updated 05/30/2024

TO: Laura Rodriguez Alvarez – WY/3

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Lakeside Foods, Inc – Belgium Plant
WPDES Permit No. WI-0000817-10

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Lakeside Foods – Belgium Plant in Ozaukee County. This food processor facility discharges to a ditch to Belgium Creek, located in the Onion River Watershed in the Sheboygan River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

The following recommendations are made on a chemical-specific basis at Outfalls 004, 008, and 009.

Outfalls 004 and 008 – Drain Tile Effluent to Ditch

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5			30 mg/L	20 mg/L		1,3
TSS			30 mg/L	20 mg/L		1,3
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Phosphorus						2
Copper						1,2
Temperature						1,2
Ammonia Nitrogen						1,2
Chloride						1,2
WET						4,5
Arsenic						6

Outfall 009 – Combined surface water discharge

Parameter	Daily Maximum	Monthly Average	Six-Month Average	Footnotes
Flow Rate				1,2
Phosphorus		1.1 lbs/day	0.35 lbs/day	7
TSS	26 lbs/day	16 lbs/day		7

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Categorical limits based on ch. NR 225, Wis. Adm. Code for a Canned and Preserved Fruits and Vegetables facility may be needed. These limits are not addressed in this memo and are based on current production rates.

4. Outfall 004: 1x yearly chronic WET testing is recommended. **The chronic WET limit shall be expressed as 5.0 TUc as a monthly average.** The Instream Waste Concentration (IWC) to assess chronic test results is 20%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 004 shall be a grab sample collected from the Onion River.
5. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
6. Monitor arsenic once using an LOD lower than 8 µg/L.
7. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the NE Lakeshore Basin to address phosphorus water quality impairments within the TMDL area. The phosphorus limits are recommended to become effective immediately and a compliance schedule may be included for the TSS limits.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (2) – Narrative and Outfall Map

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Curt Nickels, Wastewater Engineer – SER
Bryan Hartsook, Regional Wastewater Supervisor – SER
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, Environmental Toxicologist – WY/3
Michael Polkinghorn, Water Resources Engineer – NOR/Rhinelander Service Center

Attachment #1

Water Quality-Based Effluent Limitations for
Lakeside Foods, Inc – Belgium Plant

WPDES Permit No. WI-0000817-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

Lakeside Foods Belgium ("Lakeside Foods") operates a vegetable processing and canning plant for potatoes, beans, beets, jelly, and preserves. Production activities and wastewater discharges occur year around, but higher volumes occur in the fall. Spray Irrigation occurs between the months of April through October.

Process wastewater is generated from washing and cooking vegetables and preparing other food products.

The treatment system consists of pre-treatment with coarse screening and dissolved air floatation to remove vegetable by-product solids, followed by biological treatment in a four-cell aerated lagoon system. The treated effluent is spray irrigated in one of two fields. The 150-acre west spray field located southwest of the plant is designated as groundwater discharge Outfall (007). Effluent can also be spray irrigated on a 66-acre Plant Spray Field adjacent to the plant, which is underlain by two drain tile systems. The 66-acre spray field is a land treatment system therefore has land treatment requirements (Outfall 104). The drain tile systems discharge to the headwaters of the East Branch of Belgium Creek, designated as surface water – Outfall 004 for the shallow drain tile and Outfall 008 for the deep drain tile. Outfall 009 is the combined Outfall for 004 and 008 and is used to report the total pounds/day of phosphorus and total discharge flowrate.

Outfall 004 is used intermittently, and Outfall 008 began use in 2022.

Contact can cooling water is either reused at the facility for washing or sent to the aerated lagoon system and discharged through Outfalls 004 and 008.

Currently, the discharge may be sent directly to the East Branch of Belgium Creek as a contingency (Outfall 002) which has not been used since 2009. **This outfall is being removed, so it is not evaluated in this memo.**

Attachment #2 is a map of the area showing the approximate location of the outfalls.

Existing Permit Limitations

The current permit, expiring on 09/30/2023, includes the following effluent limitations and monitoring requirements.

Outfalls 004 and 008 – Drain Tile Effluent to Ditch

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD_5			30 mg/L	20 mg/L		2,3
TSS			30 mg/L	20 mg/L		2,3
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2,3
Phosphorus MDV interim limit Final limits				 0.3 mg/L 0.225 mg/L	 0.075 mg/L 0.020 lbs/day	
Copper						1
Temperature						1
Ammonia Nitrogen						1
Zinc						1
Chloride						1
Acute WET						4

Outfall 009 – Combined surface water discharge

Parameter	Footnotes
Flow Rate	1
Phosphorus	1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
4. Acute WET tests are required 2x/permit term.

Receiving Water Information

- Name: Ditch draining to the East Branch of Belgium Creek
- Waterbody Identification Code (WBIC): 5030658
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited aquatic life (LAL) from the outfall to the Onion River, which is approximately 6 miles downstream of the Outfalls. The Onion River is classified as the warm water sport fish (WWSF). Note: Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following $7\text{-}Q_{10}$ and $7\text{-}Q_2$ values are estimates from USGS due to the noncontinuous nature of the stream:
  $7\text{-}Q_{10}$ = 0 cfs (cubic feet per second)
  $7\text{-}Q_2$ = 0 cfs
  Onion River at Highway I in Hingham (6 miles downstream of the outfalls):
  $7\text{-}Q_{10}$ = 3.3 cfs

$7\text{-}Q_2 = 5.4$ cfs

- Hardness = 347 mg/L as $CaCO_3$. This value represents the geometric mean of data from WET testing from 09/12/2017 – 09/25/2018. The receiving water collected for WET testing is Onion River.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero. The default mixing zone of 25% is used for downstream protection purposes.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: Belgium WWTF also discharges to Belgium Creek; however, they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, this discharge does not impact this evaluation.
- Impaired water status: The immediate receiving water is not impaired. The Onion River approximately 6 miles downstream is 303(d) listed as impaired for total phosphorus.

Effluent Information

- Flow rate(s):

Outfall 004

Annual maximum average = 0.136 MGD including days where zero flow is reported
Actual average (10/01/2018 – 05/31/2023) = 0.086 MGD

Outfall 008

Annual maximum average = 0.024 MGD excluding days where zero flow is reported
Actual average (10/01/2018 – 05/31/2023) = 0.017 MGD

- Hardness:

Outfall 004

499 mg/L as $CaCO_3$. This value represents the geometric mean of data from the previous permit application from 06/13/2017 – 08/10/2017. The hardness from Outfall 004 is expected to be substantially the same as Outfall 008.

- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Two private wells and municipal supply from the village of Belgium.
- Additives: Several additives are used prior to treatment and are removed before discharge.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code. Effluent data was unable to be collected because of the seasonal discharge so data from the previous application is used in this evaluation. Permit-required monitoring for zinc, copper, and ammonia is used in this evaluation. Data from Outfalls 004 and 008 are expected to be substantially the same.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Outfall 004 Data

	Copper µg/L	Chloride mg/L

1-day P_{99}	19.9	294
4-day P_{99}	10.9	189
30-day P_{99}	5.27	135
Mean*	2.82	110
Std	4.93	54.6
Sample size	43	164
Range	<3.4 – 25.5	10.8 – 278

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

Outfall 008 Data

Sample Date	Copper µg/L	Zinc µg/L
01/12/2023	<3.4	<11.6
03/28/2023	<3.4	<11.6

Outfall 008 Chloride Data

	Chloride mg/L
1-day P_{99}	181
4-day P_{99}	147
30-day P_{99}	128
Mean	118
Std	22.9
Sample size	28
Range	56 – 177

The following table presents the average concentrations and loadings for Outfalls 004 and 008, for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement Outfall 004	Average Measurement Outfall 008
BOD_5	1.86 mg/L*	0.346 mg/L*
TSS	5.21 mg/L*	0.45 mg/L*
pH field	6.9 s.u.	6.9 s.u.
Phosphorus	0.19 mg/L*	0.036 mg/L*
Ammonia Nitrogen	0.046 mg/L*	<0.14 mg/L

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

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

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm.

Code)

2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Lakeside Foods.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	**004** MEAN EFFL. CONC.	**004** 1-day P_{99}	**004** 1-day MAX. CONC.	**008** MEAN EFFL. CONC.	**008** 1-day P_{99}	**008** 1-day MAX. CONC.
Arsenic		340	340	68.0	<8.3					
Cadmium	457	164.9	165	33.0	<1.3					
Chromium	301	4446	4446	889	<2.5					
Copper	495	70.2	70.2	14.0		19.9	25.5	<3.4		
Lead	356	365	365	72.9	<4.3					

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	**004** MEAN EFFL. CONC.	**004** 1-day P_{99}	**004** 1-day MAX. CONC.	**008** MEAN EFFL. CONC.	**008** 1-day P_{99}	**008** 1-day MAX. CONC.
Nickel	268	1080	1080	216	4.6					
Zinc	333	345	345	68.9	<9.3			<11.6		
Chloride (mg/L)		757	757			294	278		181	177

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

* * Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	**004** MEAN EFFL. CONC.	**004** 4-day P_{99}	**008** MEAN EFFL. CONC.	**008** 4-day P_{99}
Arsenic		152	152	30.4	<8.3			
Cadmium	175	3.82	3.82	0.76	<1.3			
Chromium	301	326	326	65.2	<2.5			
Copper	347	30.0	30.0	6.0		10.9	<3.4	
Lead	347	93.2	93.2	18.6	<4.3			
Nickel	268	169	169	33.8	4.6			
Zinc	333	345	345	68.9	<9.3		<11.6	
Chloride (mg/L)		395	395			189		147

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

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880	880	176	<1.3
Chromium (+3)	8400000	8400000	1680000	<2.5
Lead	2240	2240	448	<4.3
Nickel	110000	110000	22000	4.6

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

		MO'LY	1/5 OF	MEAN

Attachment #1

SUBSTANCE	HCC	AVE. LIMIT	EFFL. LIMIT	EFFL. CONC.
Arsenic	40	40.0	8.00	<8.3

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for any toxic substances in this section of the memo.

Chloride – Considering available effluent data from the current permit term, the 1-day P_{99} chloride concentration is 294 mg/L for Outfall 004 and 181 mg/L for Outfall 008, and the 4-day P_{99} of effluent data is 189 mg/L for Outfall 004 and 147 mg/L for Outfall 008.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Arsenic – The sample that was collected for the previous permit reissuance application had a limit of detection (LOD) of 8.3 µg/L which is greater than $1/5^{th}$ of the most stringent calculated limit of 40 µg/L based on the human cancer criteria. Because the LOD from the current permit application is greater than $1/5^{th}$ of the most stringent calculated limit, reasonable potential can't be determined at this time. **Monitoring once is recommended in the reissued permit. The arsenic test shall be sensitive enough so that the LOD is below 8.0 µg/L and reasonable potential can be determined.**

Copper – The effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Copper monitoring for Outfalls 004 and 008 is recommended to ensure that 11 sample results are available at the next permit issuance to determine reasonable potential for limits.**

Zinc – The available data for zinc from the current permit term are all nondetects and limits are not needed. **Monitoring is not recommended in the reissued permit.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, PFOS and PFOA monitoring is not recommended. PFOS and PFOA monitoring may be required in the future if information becomes available that indicates PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Lakeside Foods does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

Attachment #1

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L Outfall 004	Ammonia Nitrogen mg/L Outfall 008
1-day P_{99}	0.69	
4-day P_{99}	0.30	
30-day P_{99}	0.14	
Mean*	0.05	<0.14
Std	0.21	
Sample size	164	28
Range	<0.095 – 1	<0.14

*Values lower than the level of detection were substituted with a zero

These concentrations are low, and well below any of the calculated WQBELs based on the applicable acute and chronic ammonia criteria for the receiving water. Therefore, **no ammonia WQBELs are necessary. Ammonia monitoring is recommended to continue in the reissued permit.**

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Lakeside Foods currently has a monthly average limit of 0.3 mg/L which is more stringent than the TBEL, this limit should be included in the reissued permit.

TMDL Limits – Phosphorus
Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. This WLA found in Appendix K of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Northeast Lakeshore Region* report are expressed as maximum annual loads (lbs/year).

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the Northeast Lakeshore Basin TMDL are given monthly average mass limits and, if the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

TP Equivalent Effluent Concentration = WLA ÷ (365 days/yr * Flow Rate * Conversion Factor)
= 99 lbs/yr ÷ (365 days/yr * 0.16 MGD * 8.34)

= 0.20 mg/L

Since this value is less than 0.3 mg/L, both a six-month average mass limit and a monthly average mass limit are applicable for total phosphorus. The monthly average limit is set equal to three times the six-month average limit.

TP 6-Month Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (99 lbs/yr ÷ 365 days/yr) * 1.30
= 0.35 lbs/day

TP Monthly Average Permit Limit = TP 6-Month Average Permit Limit * 3
= 0.35 lbs/day * 3
= 1.1 lbs/day

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 1.3. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

Six-month average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 0.26 mg/L and 0.79 mg/L, respectively, at the maximum annual average flow of 0.16 MGD (flows from surface water outfalls combined).

The TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries in the Northeast Lakeshore Basin. Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 10/01/2018 – 05/31/2023 for combined data for Outfalls 004 and 008 as well as the well as the combined outfall 009 which Lakeside Foods uses to submit calculated combined effluent mass data.

Total Phosphorus Effluent Data

	Phosphorus mg/L Outfalls 004 & 008	**Phosphorus lbs/day Outfall 009**
1-day P_{99}	1.6	1.1
4-day P_{99}	0.87	0.58

Attachment #1

	Phosphorus mg/L Outfalls 004 & 008	**Phosphorus lbs/day Outfall 009**
30-day P_{99}	0.43	0.29
Mean	0.25	0.17
Std	0.34	0.23
Sample size	131	28
Range	0.021 – 2.5	0.002 – 1.085

Lakeside Foods can currently meet the monthly average phosphorus mass limit and a compliance schedule is not needed.

Lakeside Foods is currently covered under the MDV, but this is no longer necessary since they can meet the TMDL limits. Because the mass-based effluent limitations for phosphorus are consistent with the wasteload allocation and assumptions of a US EPA approved TMDL that is designed to achieve water quality standards in ch. NR 102, Wis. Adm. Code, This TMDL based limitation may be included in a permit in lieu of the current interim phosphorus limit of 0.3 mg/L. The current limit may be removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code.

PART 5 – TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (*April 2020). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Northeast Lakeshore Region* report are expressed as maximum annual loads (lbs/year).

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Lakeside Foods is an industrial facility and is therefore subject to daily maximum and monthly average TSS limits derived from TSS annual WLAs.

TSS Monthly Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (3,019 lbs/yr ÷ 365 days/yr) * 3.11
= 16 lbs/day

TSS Daily Maximum Permit Limit = WLA ÷ 365 days/yr * daily multiplier
= (3,019 lbs/yr ÷ 365 days/yr) * 1.90
= 26 lbs/day

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data,

to be 2.9. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

Daily maximum and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 19 mg/L and 12 mg/L, respectively, at the maximum annual average flow of 0.16 MGD (flows from surface water outfalls combined).

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total suspended solids monitoring data from 10/17/2018 – 05/25/2023.

Total Suspended Solids Effluent Data

	TSS mg/L	**TSS lbs/day**
1-day P_{99}	44	78
4-day P_{99}	24	45
30-day P_{99}	11	19
Mean*	5.2	7.5
Std	11	21.8
Sample size	164	164
Range	<0.95 – 64.4	0 – 118

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

A compliance schedule may be included in the reissued permit to meet the final TMDL limits.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120 °F. The 86 °F limit applies because the hydrologic classification is not listed as wetland in ch. NR 104, Wis. Adm. Code.

Reasonable Potential
Based on the available discharge temperature data from 10/01/2018 – 05/31/2023 shown below, the maximum daily effluent temperature reported was 78 °F for Outfalls 004 and 008; therefore, no reasonable potential for exceeding the daily maximum limit exists, and **no limits are recommended**. **Monitoring is recommended to continue in the reissued permit.**

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature Outfall 004		Representative Highest Monthly Effluent Temperature Outfall 008		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	43	48	48	50	-	86
FEB	39	40	48	51	-	86
MAR	40	69	46	49	-	86
APR	45	71	42	45	-	86
MAY	50	57			-	86
JUN	57	67			-	86
JUL	66	77			-	86
AUG	65	72			-	86
SEP	63	83			-	86
OCT	61	77			-	86
NOV	55	78	54	57	-	86
DEC	51	68	52	53	-	86

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (2022).*

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- **Outfall 008:** Chronic testing is usually not recommended where the ratio of the 7-Q_{10} to the effluent flow exceeds 100:1 For Lakeside Foods, that ratio is approximately 970:1 for the Onion River (the first downstream nonvariance water). With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the Onion River associated with the discharge from Lakeside

Foods, so the need for chronic WET testing will not be considered further.

- **Outfall 004:** Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **20%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100 = 20\%$$

Where:

Q_e = annual average flow = 0.136 MGD = 0.210 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 3.3 cfs ÷ 4 = 1.325 cfs

*The previous WQBEL memo calculated a "corrected" IWC of 1% using a maximum annual average flow of 0.0315 MGD and the dilution with the Onion River (3.3 cfs). The IWC before 2018 was 100% based on dilution with the immediate receiving water (0 cfs).

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic 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 004 and 008 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 004. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. There is not available data for Outfall 008.

WET Data History – Outfall 004

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
09/10/2013	>100	>100	Pass	Yes	29.3	>100	Fail	Yes	1
08/26/2014	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
09/16/2014					>100	>100	Pass	Yes	
09/29/2015					>100	>100	Pass	Yes	
10/22/2015					>100	>100	Pass	Yes	
05/12/2016					85.4	>100	Fail	Yes	1
08/23/2016					>100	>100	Pass	Yes	

09/27/2016					>100	>100	Pass	Yes	
06/14/2017	>100	>100	Pass	Yes					
09/12/2017					>100	>100	Pass	Yes	
09/26/2017					97.4	>100	Fail	Yes	1
10/10/2017					>100	>100	Pass	Yes	
09/25/2018					6.4	>100	Pass	Yes	2
11/06/2019	>100	>100	Pass	Yes					
08/24/2022	>100	>100	Pass	Yes					

Footnotes:

1. These would have been passes with the "corrected" IWC for the Onion River, the first downstream nonvariance water.
2. This would be considered a failure with the new IWC of 20%.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Outfall 004

  Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

  Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/6.4 = 15.6	2.6 Based on 4 detects	20%

[(TUc effluent) (B)(IWC)] = 8.13 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 09/10/2013 – 09/25/2018.

Expression of WET limits

Outfall 004
Chronic WET limit = [100/IWC] TU_c = 5.0 TU_c expressed as a monthly average

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary – Outfall 004

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 20%. **0 Points**
Historical Data	5 tests used to calculate RP. No tests failed. **0 Points**	12 tests used to calculate RP. 3 tests failed based on previous IWC. 1 test would be considered a failure based on the updated IWC. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	LAL classification, with approximately 6 miles to a warmwater sport fish classification. **0 Points**	Same as Acute. **0 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia, copper, nickel, and chloride detected. Additional Compounds of Concern: None. **3 Points**	No reasonable potential for limits based on CTC; Ammonia, copper, nickel, and chloride detected. Additional Compounds of Concern: None. **3 Points**
Additives	No additives. **0 Points**	No additives. **0 Points**
Discharge Category	Food processor. **5 Points**	Same as Acute. **5 Points**
Wastewater Treatment	Secondary treatment. **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**

	Acute	Chronic
Total Checklist Points:	**8 Points**	**8 Points**
Recommended Monitoring Frequency (from Checklist):	None	1x yearly
Limit Required?	No	Yes Limit = 5.0 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, 1x yearly chronic WET tests are recommended in the reissued permit. Tests should be done when spray irrigation is occurring. WET testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 5.0 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

WET Checklist Summary – Outfall 008

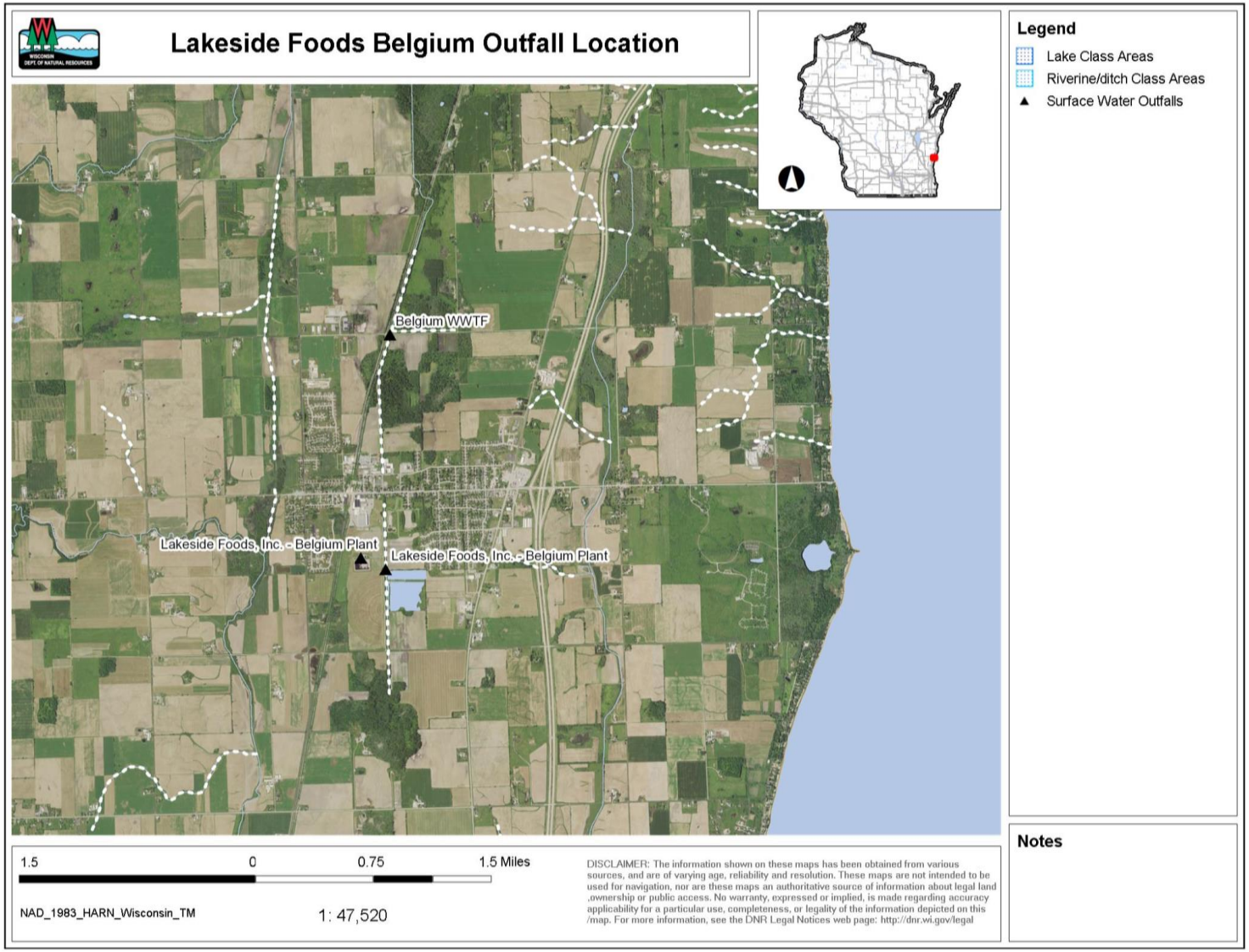
	Acute
AMZ/IWC	Not Applicable. **0 Points**
Historical Data	0 tests used to calculate RP. **5 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**
Receiving Water Classification	LAL classification, with approximately 6 miles to a warmwater sport fish classification. **0 Points**
Chemical-Specific Data	Reasonable potential for zero limits based on ATC; Chloride detected. Additional Compounds of Concern: None. **1 Point**
Additives	0 Biocides and 0 Water Quality Conditioners added. **0 Points**
Discharge Category	Food processor. **5 Points**
Wastewater	Secondary treatment.

Attachment #1

	Acute
Treatment	**0 Points**
Downstream Impacts	No impacts known. **0 Points**
Total Checklist Points:	**11 Points**
Recommended Monitoring Frequency (from Checklist):	None
Limit Required?	No
TRE Recommended? (from Checklist)	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, no acute or chronic WET tests are recommended in the reissued permit.

Attachment #2



Appendix B

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: August 23, 2024 FILE REF: FIN 5600

TO: File

FROM: Zach Watson Hydrogeologist SCR

SUBJECT: Groundwater Evaluation and Exceedance Report for Lakeside Foods, Inc. – Belgium Plant WI-0000817-09-1

General Information and Treatment System Description

Lakeside Foods operates a vegetable processing and canning plant for potatoes, beans, and beets in Belgium, Wisconsin. Process wastewater is generated from washing and cooking vegetables and preparing other food products. Production activities and wastewater discharges occur throughout the year with higher volumes occurring in the fall. Spray Irrigation occurs between the months of April through October. The treatment system consists of pre-treatment with coarse screening and dissolved air floatation to remove vegetable by-product solids, followed by biological treatment in a four-cell aerated lagoon system. The treated effluent is spray irrigated in one of two fields. Outfall 104 (Plant Sprayfield) is a 66-acre field adjacent to the plant and Outfall 007 (West Sprayfield) is a 150-acre field located southwest of the plant. Groundwater monitoring systems are located surrounding the Plant Sprayfield, West Sprayfield and Lagoons. The groundwater monitoring system for the Lagoons monitors both the currently operating East Lagoon and the now abandoned Old Lagoons. The Old Lagoons are a source of continuing chloride and nitrogen ammonia contamination.

Table 1 - Outfall 104 (Plant Sprayfield) and Outfall 007 (West Sprayfield): Effluent Monitoring Parameters and Limits

Parameter	Current Permit WI-0000817-09-1 and Proposed Permit WI-0000817-10	
	Limits and Units	Limit Type
Flow Rate	750,000 GPD	Daily Max
Loading Rate	0.4 in/hour	Daily Max
Hydraulic Application Rate	3,000 gal/ac/day	Monthly Average
Nitrogen, Max Applied On Any Zone	300 lbs/ac/yr	Annual Total
Chloride	mg/l	N/A
Nitrogen, Total Kjeldahl	mg/l	N/A

No recommended changes from current permit

Table 2 - Groundwater Monitoring System Outfall 104 (Plant Sprayfield)

Sample Point	Well Name	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
		Well Location	Well Designation	Well Location	Well Designation
802	2-OW	Upgradient	Background	Upgradient	Background
804	4-OW	Downgradient	Non-Point of Standard	Upgradient/Sidegradient	Non-Point of Standard

*806	*6-A	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
814	14-OW	Downgradient	Non-Point of Standard	Sidegradient/Downgradient	Non-Point of Standard
836	36-OW	Downgradient	Point of Standard	Downgradient	Point of Standard

*Monitoring well 6-A is scheduled for abandonment in 2024.

Table 3 - Groundwater Monitoring System Outfall 007 (West Sprayfield)

Sample Point	Well Name	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
		Well Location	Well Designation	Well Location	Well Designation
823	MW-20	Upgradient	Background	Upgradient	Background
824	MW-21	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
825	MW-22	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
826	MW-23	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
827	MW-24	Downgradient	Point of Standard	Downgradient	Point of Standard
828	MW-25	Downgradient	Point of Standard	Downgradient	Point of Standard
829	MW-26	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard

No recommended changes from current permit

Table 4 - Groundwater Monitoring System Sampling Point 701 (Lagoons)

Sample Point	Well Name	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
		Well Location	Well Designation	Well Location	Well Designation
818	MW-1	Upgradient	Background	Upgradient	Background
819	MW-2	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
820	MW-3	Downgradient	Point of Standard	Downgradient	Point of Standard
821	PZ-2	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
822	PZ-3	Downgradient	Point of Standard	Downgradient	Point of Standard
830	MW-4	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
831	PZ-4	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
833	PZ-5	Downgradient	Non-Point of Standard	Downgradient	Non-Point of Standard
834	MW-6	Downgradient	Point of Standard	Downgradient	Point of Standard
835	PZ-6	Downgradient	Point of Standard	Downgradient	Point of Standard

No recommended changes from current permit

Table 5 - Groundwater Standards for Outfall 104 (Plant Sprayfield)

Parameter	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
pH Field	8.2 su	N/A	*6.5 – 8.5 su	N/A
Nitrogen, Nitrite + Nitrate	2.2 mg/l (ACL)	10 mg/l	*2.0 mg/l	10 mg/l
Nitrogen, Total Kjeldahl	N/A	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	0.97 mg/l	9.7 mg/l
Nitrogen, Organic Dissolved	2.3 mg/l	N/A	*2.2 mg/l	N/A
Chloride Dissolved	170 mg/l	250 mg/l	*125 mg/l	250 mg/l
COD, Filtered	37 mg/l	N/A	*35 mg/l	N/A
Solids, Total Dissolved	950 mg/l	N/A	*865 mg/l	N/A

*Recommended changes from current permit

Table 6 - Groundwater Standards for Outfall 007 (West Sprayfield)

Parameter	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
pH Field	8.3 su	N/A	*6.5 – 8.7 su	N/A
Nitrogen, Nitrite + Nitrate	2.1 mg/l (ACL)	10 mg/l	*2.0 mg/l	10 mg/l
Nitrogen, Total Kjeldahl	N/A	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	0.97 mg/l	9.7 mg/l
Nitrogen, Organic Dissolved	2.3 mg/l	N/A	*2.2 mg/l	N/A
Chloride Dissolved	150 mg/l	250 mg/l	*125 mg/l	250 mg/l
COD, Filtered	33 mg/l	N/A	33 mg/l	N/A
Solids, Total Dissolved	800 mg/l	N/A	*725 mg/l	N/A

*Recommended changes from current permit.

Table 7 - Groundwater Standards for Sampling Point 701 (Lagoons)

Parameter	Current Permit WI-0000817-09-1		Proposed Permit WI-0000817-10	
	PAL	ES	PAL	ES
Depth to Groundwater	N/A	N/A	N/A	N/A
Groundwater Elevation	N/A	N/A	N/A	N/A
pH Field	8.3 su	N/A	*6.4 – 8.4 su	N/A
Nitrogen, Nitrite + Nitrate	4.0 mg/l (ACL)	10 mg/l	*2.0 mg/l	10 mg/l
Nitrogen, Total Kjeldahl	N/A	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	0.97 mg/l	9.7 mg/l
Nitrogen, Organic Dissolved	2.2 mg/l	N/A	2.2 mg/l	N/A
Chloride Dissolved	150 mg/l	250 mg/l	*125 mg/l	250 mg/l
COD, Filtered	50 mg/l	N/A	*93 mg/l	N/A

Solids, Total Dissolved	700 mg/l	N/A	*705 mg/l	N/A

*Recommended changes from current permit

Geology

The bedrock underlying the sprayfield treatment systems and lagoons is the Silurian-aged Racine Formation which consists of dolomite (Preliminary bedrock geologic map of Ozaukee County, Wisconsin, Evans 2004). The depth to bedrock is expected to be 50 – 100 feet below ground surface (Preliminary depth to bedrock map of Ozaukee County, Wisconsin, Evans 2004). The soils are glacial deposits consisting of the Kewaunee and Manawa silt loams (USDA Soil Survey).

Hydrogeology

Groundwater elevation ranged approximately 725 – 737 feet above mean sea level (famsl) at the Plant Sprayfield, 757 – 781 famsl at the West Sprayfield and 723 – 740 famsl at the Lagoons. Groundwater flow at the Plant Sprayfield and Lagoons appear to be influenced by the drainage ditch running north-south throughout the treatment systems. Therefore, flow is generally from either side toward the ditch. Groundwater flow at the West Sprayfield is generally to the east with a divide going through the middle where flow is both to the southeast and northeast. Depth to groundwater is generally 4 – 12 feet below ground surface. **Figures 1 – 4** are groundwater flow maps and **Figures 5 – 7** are groundwater elevation trend plots. The groundwater flow maps are hand drawn due to the complex contours and are generated solely for the purpose of approximating the groundwater flow directions.

Land Treatment Effluent Quality and Loading Rates

The nitrogen and chloride loading rates for the Plant and West Sprayfields are provided in **Table 8A** and **8B**, respectively. The loading of nitrogen to each sprayfield was generally far below the 400 lbs/ac/yr loading limit. Average hydraulic application rates at both sprayfields were also well below their 3,000 gal/ac/day limit. Chloride averaged 244 mg/l and 247 mg/l at the Plant and West Sprayfields, respectively.

Table 8A - Sprayfield Annual Nitrogen Loading Rates (2019 – 2022)

Year	Nitrogen, Max Applied (lbs/ac/yr)	
	Plant Sprayfield	West Sprayfield
2019	18	61
2020	97	244
2021	74	96
2022	78	112

lbs/ac/yr = pounds per acre per year

As reported on the annual Wastewater Discharge Monitoring Short Reports.

Table 8B - Sprayfield Annual Chloride Loading Rates (2019 – 2022)

Year	Chloride Load (lbs/ac/yr)	
	Plant Sprayfield	West Sprayfield
2019	205	400
2020	684	305
2021	489	328
2022	567	411

As reported on the Annual Sprayfield Reports.

Background Groundwater Quality

Plant Sprayfield
Background groundwater quality is defined by the results from samples collected at monitoring well 2-OW. The concentration of most parameters analyzed are generally low and stable in concentration. The concentration of chloride was generally around 40 mg/l and exhibited a stable trend. Nitrogen parameters were generally at or near the limit of detection. Total dissolved solids was stable and averaged approximately 650 mg/l.

West Sprayfield
Background groundwater quality is defined by the results from samples collected at monitoring well MW-20. The concentration of most parameters analyzed are generally low and stable in concentration. The concentration of chloride was especially low and stable, averaging approximately 5 mg/l. Nitrogen parameters were generally at or near the limit of detection. Total dissolved solids was stable and averaged approximately 550 mg/l. While the groundwater elevations at monitoring wells MW-21 and MW-22 were consistently higher relative to MW-20, the results for chloride from samples collected at MW-20 appear to confirm that this well is most representative of background (i.e., unimpacted by the treatment system) conditions.

Lagoons
Background groundwater quality is defined by the results from samples collected at monitoring well MW-1. The concentration of most parameters analyzed are generally low and stable in concentration. The concentration of chloride was especially low and stable, averaging approximately 13 mg/l. Nitrogen parameters were generally at or near the limit of detection. Total dissolved solids was stable and averaged approximately 500 mg/l.

Downgradient Groundwater Quality
Plant Sprayfield
Downgradient groundwater quality is defined by the results from samples collected at monitoring wells 14-OW, 4-OW, 6-A and MW-36. The results for total dissolved solids are lowest at 6-A (~200 mg/l) and highest at 4-OW (~1,000 mg/l). The results for chloride are generally similar to those observed at background monitoring well 2-OW and all results were all below 60 mg/l except for one result at monitoring well 4-OW in October 2018 (**Figure 8**). Nitrogen parameters were generally non-detect. The highest result for nitrite+nitrate, nitrogen was 1.1 mg/l at monitoring well 14-OW in April 2022.

West Sprayfield
Downgradient groundwater quality is defined by the results from samples collected at monitoring wells MW-21 through MW-26. The results for chloride at downgradient wells MW-21 and MW-24 were generally above 100 mg/l during the current permit term. The results for chloride at monitoring wells MW-22, MW-23, MW-25 and MW-26 were most often between 40 – 80 mg/l (**Figure 9**). Nitrogen parameters were generally non-detect. The results for total dissolved solids were lowest at MW-25 (~500 mg/l) and highest at MW-23 (~1,000 mg/l).

Lagoons
Downgradient groundwater quality is defined by the results from samples collected at monitoring wells MW-2, MW-3, MW-4, MW-6, PZ-2, PZ-3, PZ-4, PZ-5, and PZ-6. The results for chloride are lower at the piezometers (PZ) than at the water table wells (MW) (**Figure 10**). The highest results for chloride were at MW-2 where the concentration ranged from 252 – 316 mg/l. Chloride was above the NR 140 PAL but below the ES at MW-3

and MW-4 except for the April 2020 result at MW-4. Nitrite+nitrate, nitrogen was generally low except for the anomalous result of 2.2 mg/l at monitoring well MW-4 in April 2020. The results for nitrogen ammonia at MW-3 are significantly elevated (14 – 19 mg/l) relative to the other monitoring wells. The concentration of ammonia at this monitoring well has remained relatively stable during the past 23 years of monitoring ranging 13.8 – 34 mg/l (**Figure 11**). The results for ammonia nitrogen at MW-6 were non-detect during the 2019 – 2021 monitoring events, but 3.5 mg/l during the 2022 monitoring event. The 2022 groundwater sampling results are not provided in **Figures 7, 10** and **11** due to data upload issues in SWAMP. However, this data is attached at the end of this report. It is noted here that there were no meaningful changes in concentrations in 2022 compared to prior reporting periods.

Table 9 - Exceedance Summary (October 1, 2018 – December 31, 2022)

Well Name	Parameter	ES Exceedances	PAL/ACL Exceedances
MW-2	Chloride	3/3	3/3
MW-3	Chloride	0/3	3/3
	Nitrogen Ammonia	3/3	3/3
MW-4	Chloride	0/3	2/3

Shown above are the number of sample result groundwater standard exceedances for the identified parameter over the number of samples analyzed for that parameter. For example, 1/3 means that there was one result for the specified parameter that exceeded the groundwater standard for a total of 3 samples analyzed for that parameter.

Treatment System Impact to Groundwater Quality

The results from samples collected at downgradient monitoring wells for both the Plant and West Sprayfields do not indicate any significant or concerning trends in the concentration of nitrogen parameters. The results for chloride at the West Sprayfield indicate some impact from wastewater discharge as the concentration of chloride is generally above background at all monitoring wells and periodically above the NR 140 PAL at MW-21 and MW-24.

The 2004 Permit Fact Sheet (WI-0000817-07-0) stated that "The groundwater monitoring wells from the lagoon evaluation, required under ch. NR 213, Wis. Adm. Code, are included in the permit for the purpose of continuing monitoring because of groundwater contamination caused by the leaking lagoons, evident especially by elevated concentrations of chloride and ammonia. The monitoring frequency was reduced from three times per year to annual, because the lagoons are in the process of being abandoned. Sludge will be removed to eliminate the source of groundwater contamination. Annual monitoring will be adequate to monitor long term trends for the recovery of groundwater quality. In the next permit reissuance, we will evaluation the need for the continuation of groundwater monitoring, and whether any wells may be abandoned.". The results from downgradient monitoring wells near the Old Lagoon indicate ongoing contamination of ammonia nitrogen and chloride. The concentration of ammonia nitrogen has remained effectively stable at MW-3 at more than two times the concentration of the NR 140 ES despite the lagoons having been abandoned more than 15 years ago. The results for ammonia nitrogen at MW-6 have been generally declining over the past decade. Ammonia nitrogen is no longer a concern at other monitoring wells. Decreases in the concentration of chloride have occurred at most of the down gradient monitoring wells except for MW-2 and MW-4 during the past two decades. While progress has been made, monitoring will continue to be required until, at a minimum, concentrations of ammonia nitrogen and chloride consistently be reported below their respective NR 140 PALs at all monitoring wells associated with the old lagoons.

Proposed Groundwater Monitoring Requirements

Table 10 - Groundwater Quality Sampling Frequency and Standards - Outfall 104 (Plant Sprayfield) WI-0000817-10

Sample Point	Well Name	Sample Frequency	Well Designation
802	2-OW	Quarterly	Background
804	4-OW	Quarterly	Non-Point of Standard
814	14-OW	Quarterly	Non-Point of Standard
836	36-OW	Quarterly	Point of Standard
Parameter	**PAL**	**ES**	**Source**
Depth to Groundwater	N/A	N/A	Measured
Groundwater Elevation	N/A	N/A	Measured
pH Field	*6.5 – 8.5 su	N/A	Calculated
Nitrogen, Nitrite + Nitrate	*2.0 mg/l	10 mg/l	NR 140 Table 1
Nitrogen, Total Kjeldahl	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	NR 140 Table 1
Nitrogen, Organic Dissolved	*2.2 mg/l	N/A	Calculated
Chloride Dissolved	*125 mg/l	250 mg/l	NR 140 Table 2
COD, Filtered	*35 mg/l	N/A	Calculated
Solids, Total Dissolved	*865 mg/l	N/A	Calculated

* Proposed permit changes

Table 11 - Groundwater Quality Sampling Frequency and Standards - Outfall 007 (West Sprayfield) WI-0000817-10

Sample Point	Well Name	Sample Frequency	Well Designation
823	MW-20	Quarterly	Background
824	MW-21	Quarterly	Non-Point of Standard
825	MW-22	Quarterly	Non-Point of Standard
826	MW-23	Quarterly	Non-Point of Standard
827	MW-24	Quarterly	Point of Standard
828	MW-25	Quarterly	Point of Standard
829	MW-26	Quarterly	Non-Point of Standard
Parameter	**PAL**	**ES**	**Source**
Depth to Groundwater	N/A	N/A	Measured
Groundwater Elevation	N/A	N/A	Measured
pH Field	*6.5 – 8.5 su	N/A	Calculated
Nitrogen, Nitrite + Nitrate	*2.0 mg/l	10 mg/l	NR 140 Table 1
Nitrogen, Total Kjeldahl	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	NR 140 Table 1
Nitrogen, Organic Dissolved	*2.2 mg/l	N/A	Calculated
Chloride Dissolved	*125 mg/l	250 mg/l	NR 140 Table 2
COD, Filtered	33 mg/l	N/A	Calculated
Solids, Total Dissolved	*725 mg/l	N/A	Calculated

* Proposed permit changes

Table 12 - Groundwater Quality Sampling Frequency and Standards – Sampling Point 701 (Lagoons) WI-0000817-10

Sample Point	Well Name	Sample Frequency	Well Designation
818	MW-1	Annual	Background
819	MW-2	Annual	Non-Point of Standard
820	MW-3	Annual	Point of Standard
830	MW-4	Annual	Non-Point of Standard
834	MW-6	Annual	Point of Standard
821	PZ-2	Annual	Non-Point of Standard
822	PZ-3	Annual	Point of Standard
831	PZ-4	Annual	Non-Point of Standard
833	PZ-5	Annual	Non-Point of Standard
835	PZ-6	Annual	Point of Standard
Parameter	**PAL**	**ES**	**Source**
Depth to Groundwater	N/A	N/A	Measured
Groundwater Elevation	N/A	N/A	Measured
pH Field	*6.4 – 8.4 su	N/A	Calculated
Nitrogen, Nitrite + Nitrate	*2.0 mg/l	10 mg/l	NR 140 Table 1
Nitrogen, Total Kjeldahl	N/A	N/A	N/A
Nitrogen, Ammonia Dissolved	0.97 mg/l	9.7 mg/l	NR 140 Table 1
Nitrogen, Organic Dissolved	*2.2 mg/l	N/A	Calculated
Chloride Dissolved	*125 mg/l	250 mg/l	NR 140 Table 2
COD, Filtered	*93 mg/l	N/A	Calculated
Solids, Total Dissolved	*705 mg/l	N/A	Calculated

* Proposed permit changes

Indicator Parameter PALs

Indicator Parameter PALs are developed following the procedures described in s. NR 140.20(2), Wis. Adm. Code. Indicator parameters do not have Enforcement Standards. The PAL for an indicator parameter is a benchmark for evaluating site specific trends. When significant increases in the trends are observed, the facility and the department's response action under s. NR 140.24 Wis. Adm. Code should be to investigate the source of the compound. The indicator PALs for this facility were calculated using whichever of the two following methods provides a greater PAL. The indicator parameter PALs for use in the upcoming permit WI-0000817-10 are calculated using results from 2-OW (Plant Sprayfield), MW-20 (West Sprayfield) and MW-1 (Lagoons) during the current permit term (October 1, 2018 – December 31, 2022 (2021 for the Lagoons)).

- ∑ [Background groundwater quality + (Standard Deviation of results x 3)]
- ∑ [Background groundwater quality + Minimum Increase (NR 140.20 Table 3)]

Alternative Concentration Limits

Alternative concentration Limits (ACLs) can be developed and provided for a groundwater monitoring system utilizing the procedures described in s. NR 140.28, Wis. Adm. Code. ACLs for use in the upcoming permit WI-0000817-10 are not provided due to there being a negligible difference between the ACL and NR 140 PAL for

nitrite+nitrate, nitrogen, ammonia nitrogen and chloride and the relatively small list of exceedances during the prior permit term (i.e., groundwater quality is generally good at these treatment systems). Put another way, ACLs are not granted solely because they can.

Recommendations and Schedule Requirements

Continue to annually monitor the Lagoon groundwater monitoring system to evaluate the progress of groundwater remediation. No changes in monitoring frequency or monitoring well abandonments are made here.

The Plant and West Sprayfields appear to act as an effective means of wastewater treatment. The concentration of chloride in the Sprayfield effluent is the most concerning parameter as it generally averages 250 mg/l. Reducing the concentration of chloride in the Sprayfield effluent should help keep groundwater concentrations below both the NR 140 ES and PAL.

Figure 1 – Groundwater Flow Map (Elevations in feet above mean sea level)

Figure 2 – Groundwater Flow Map (Elevations in feet above mean sea level)

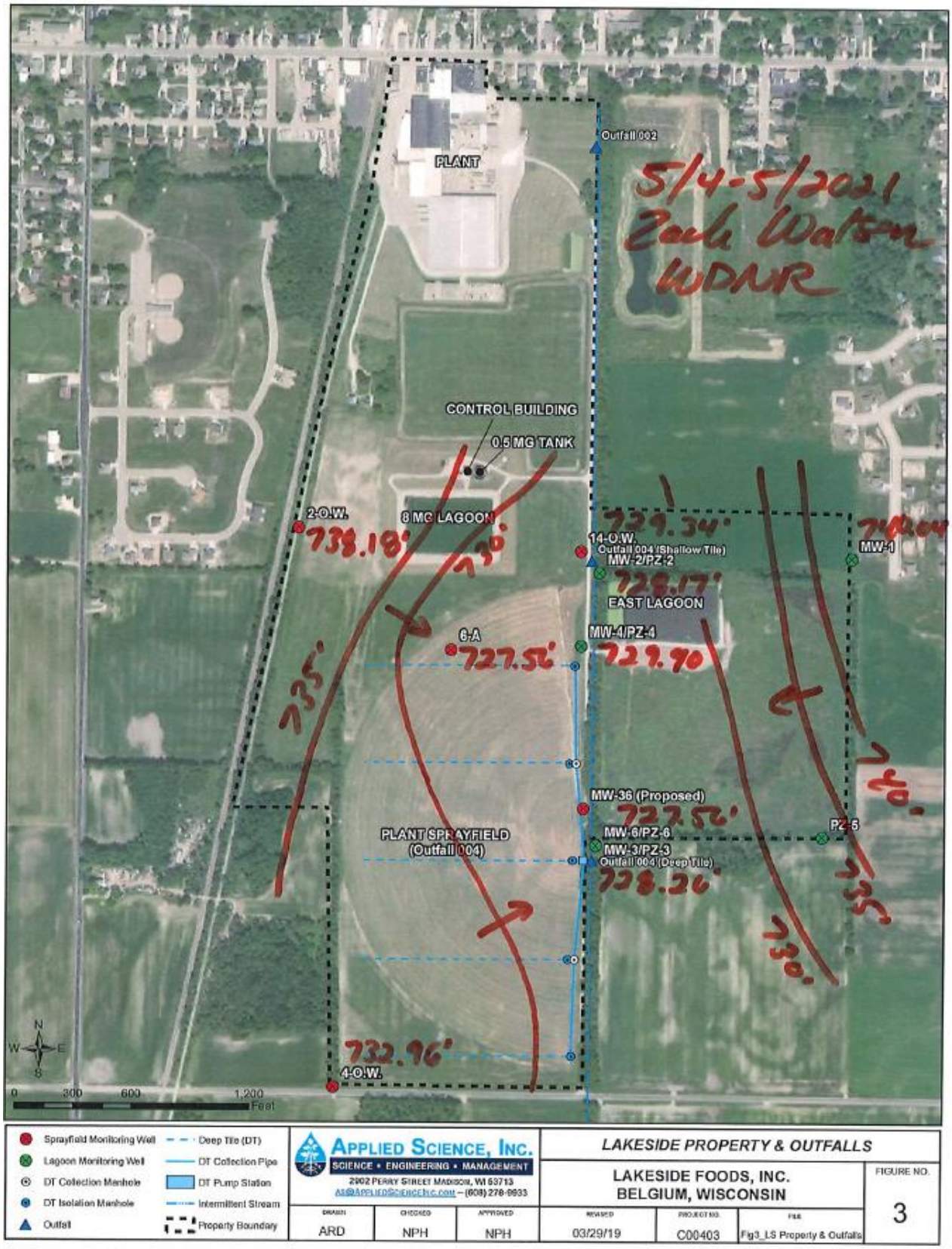


Figure 3 – Groundwater Flow Map (Elevations in feet above mean sea level)

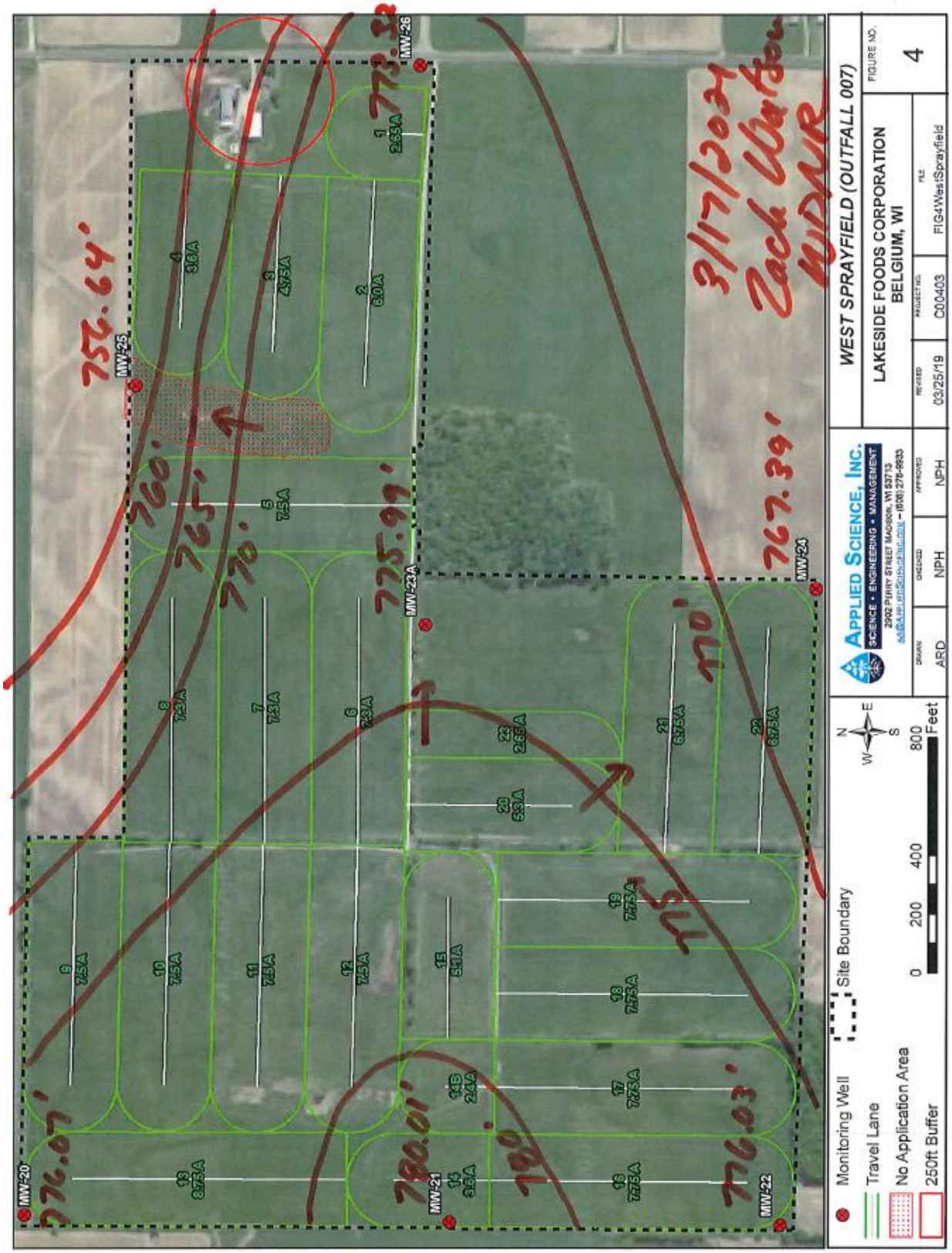


Figure 4 – Groundwater Flow Map (Elevations in feet above mean sea level)

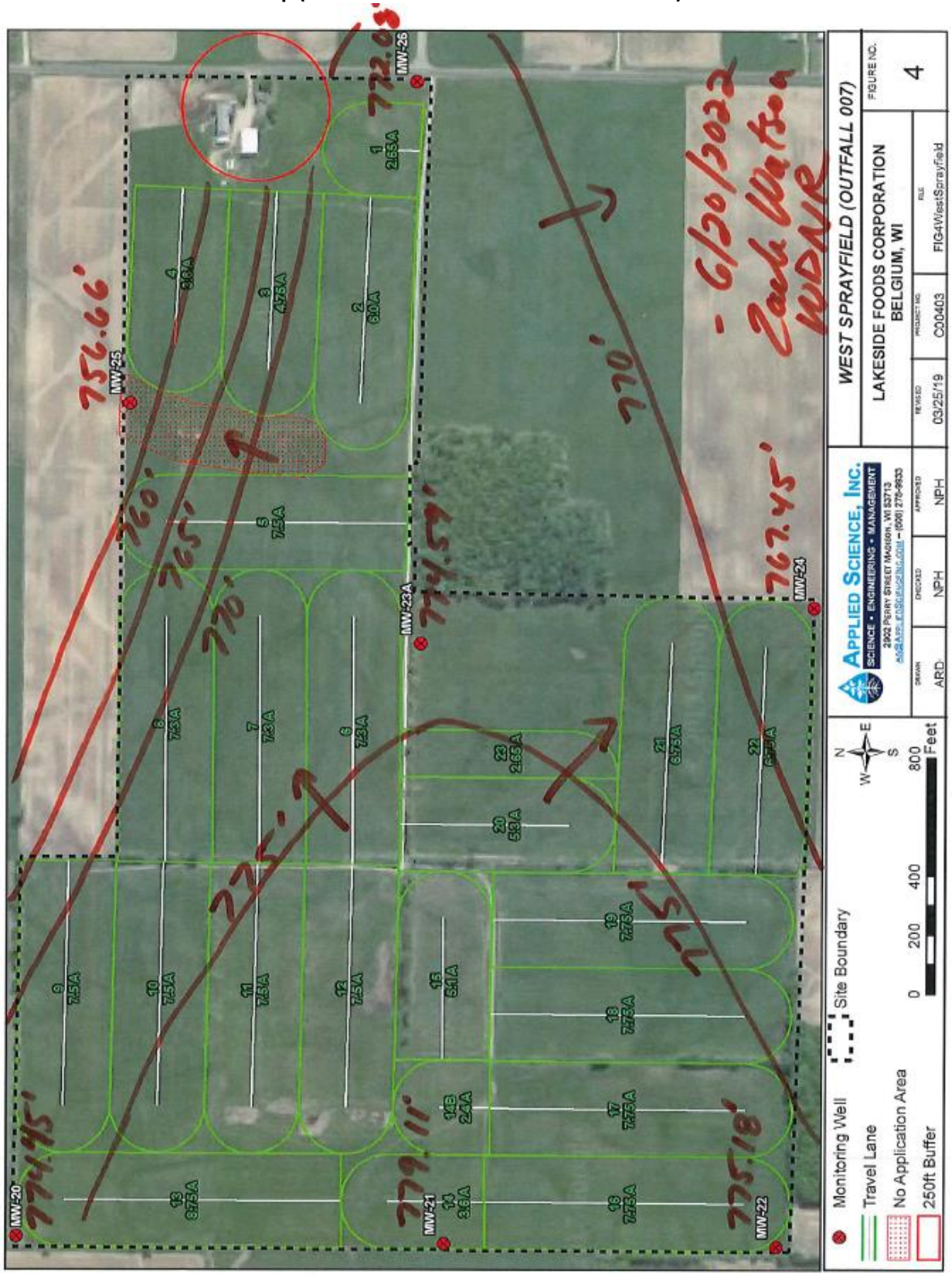


Figure 5

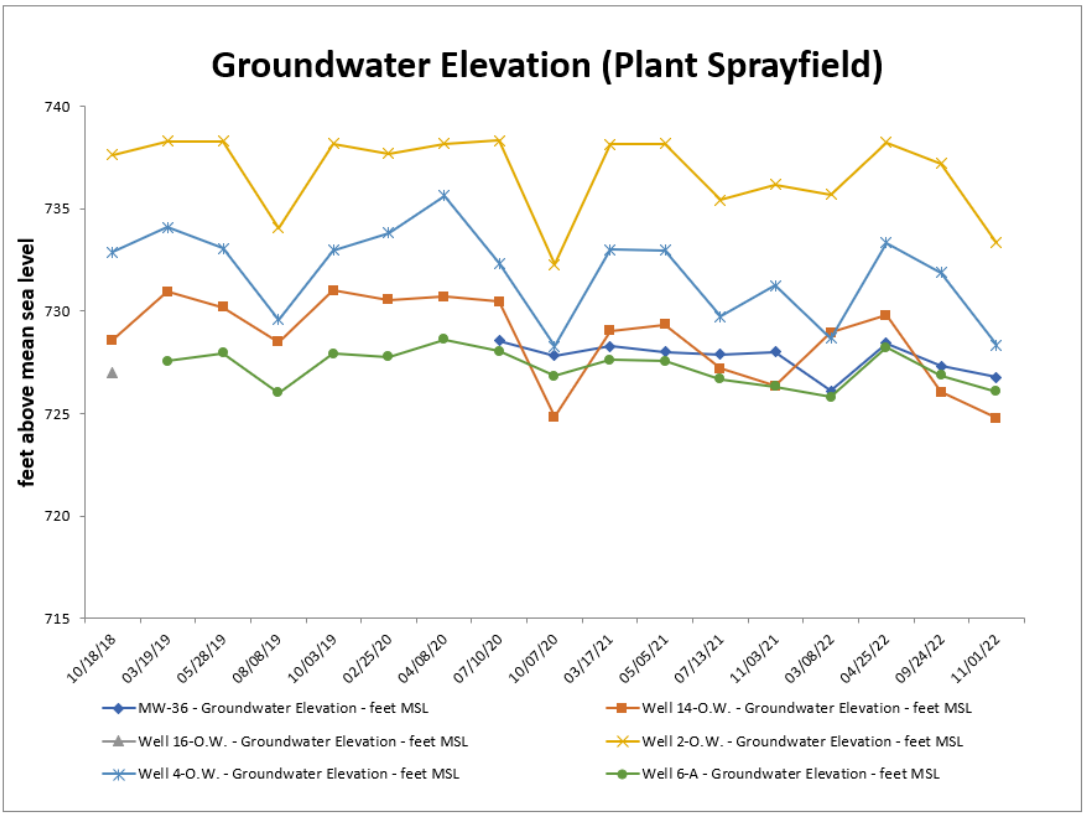


Figure 6

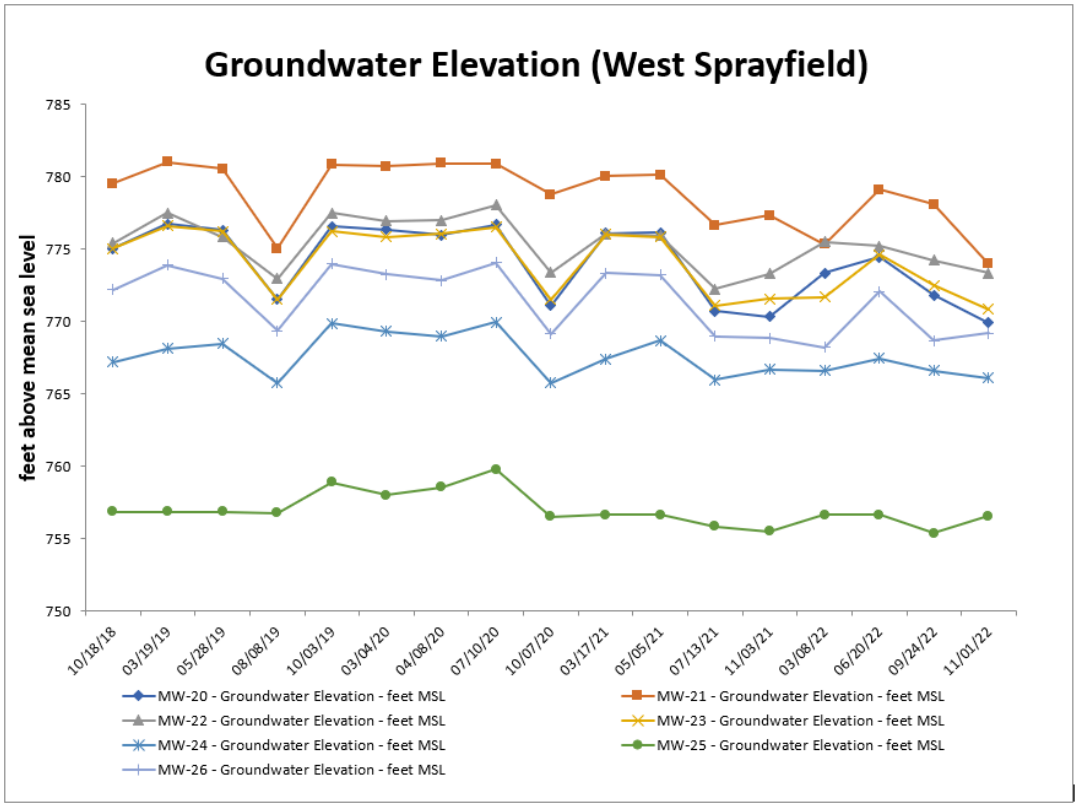


Figure 7

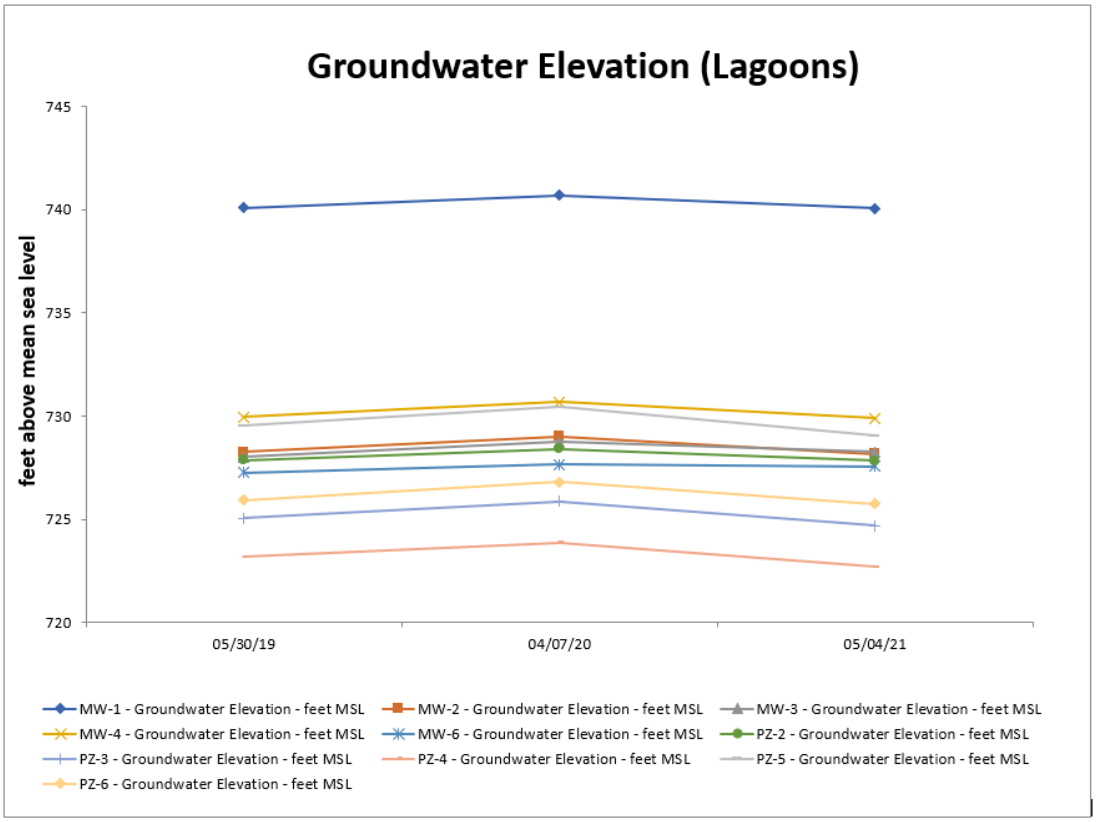


Figure 8

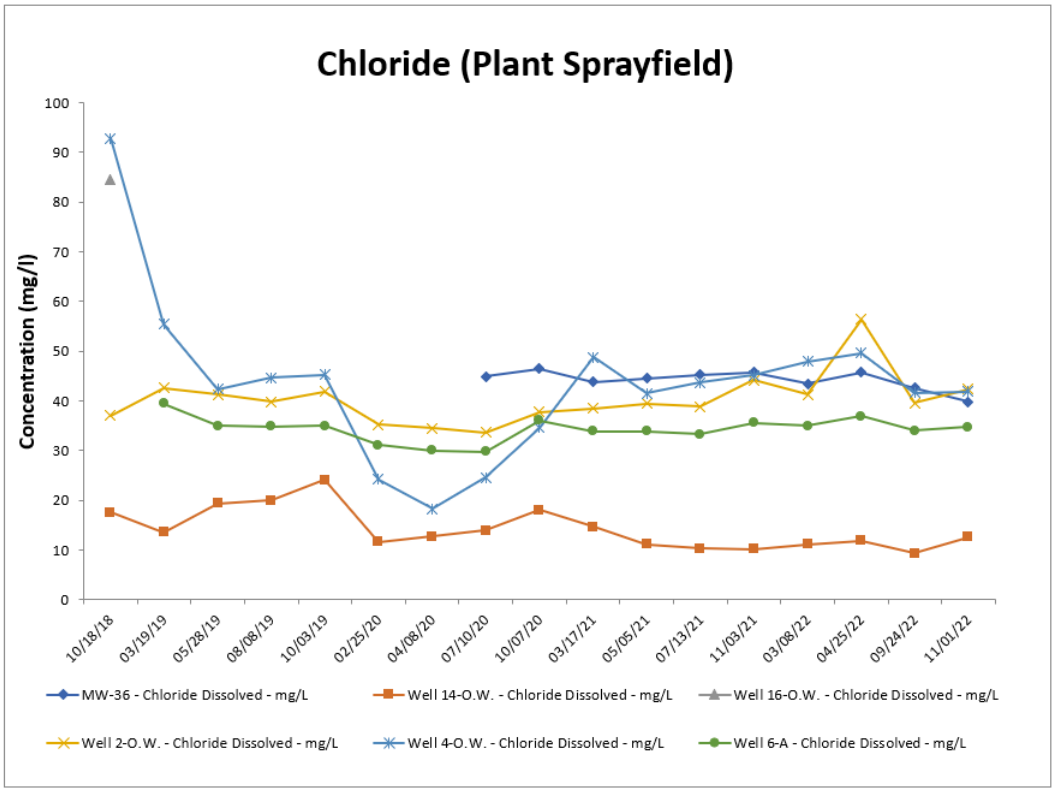


Figure 9

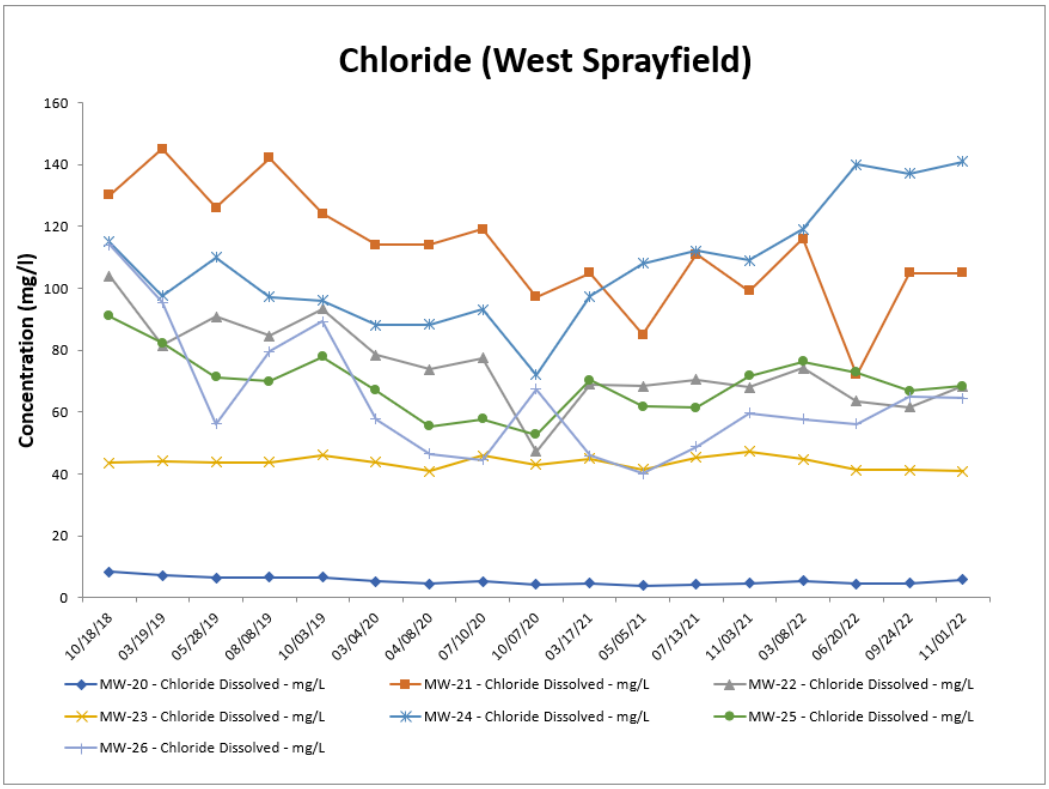


Figure 10

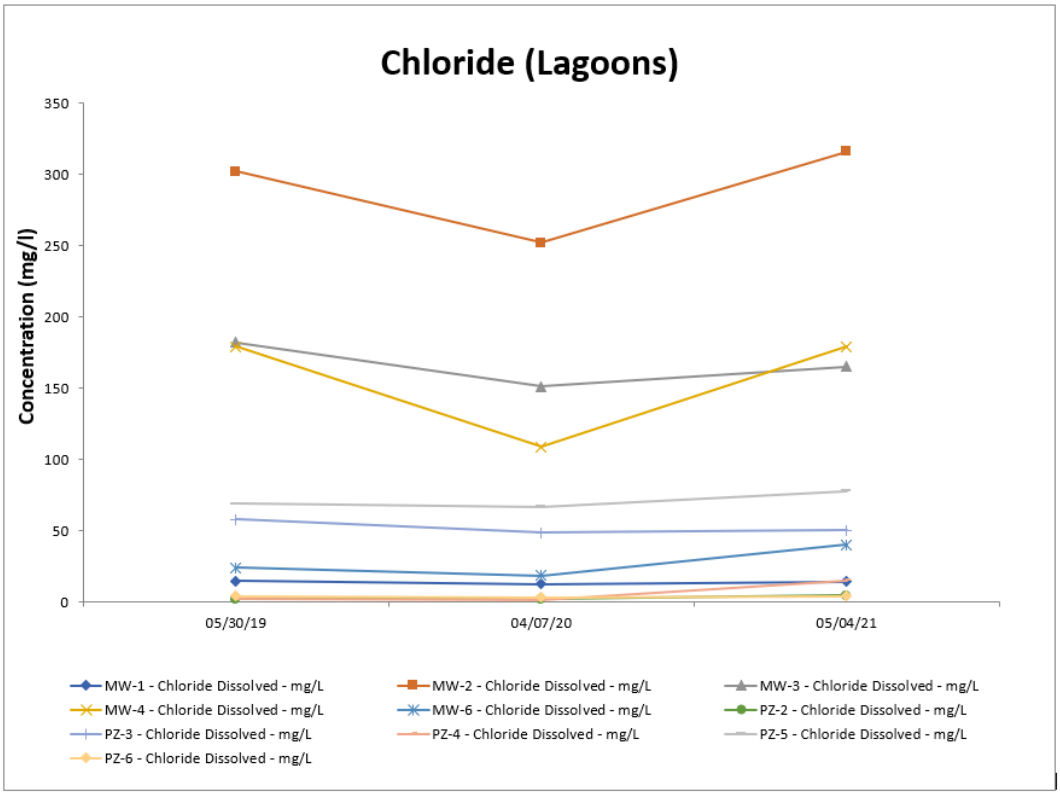
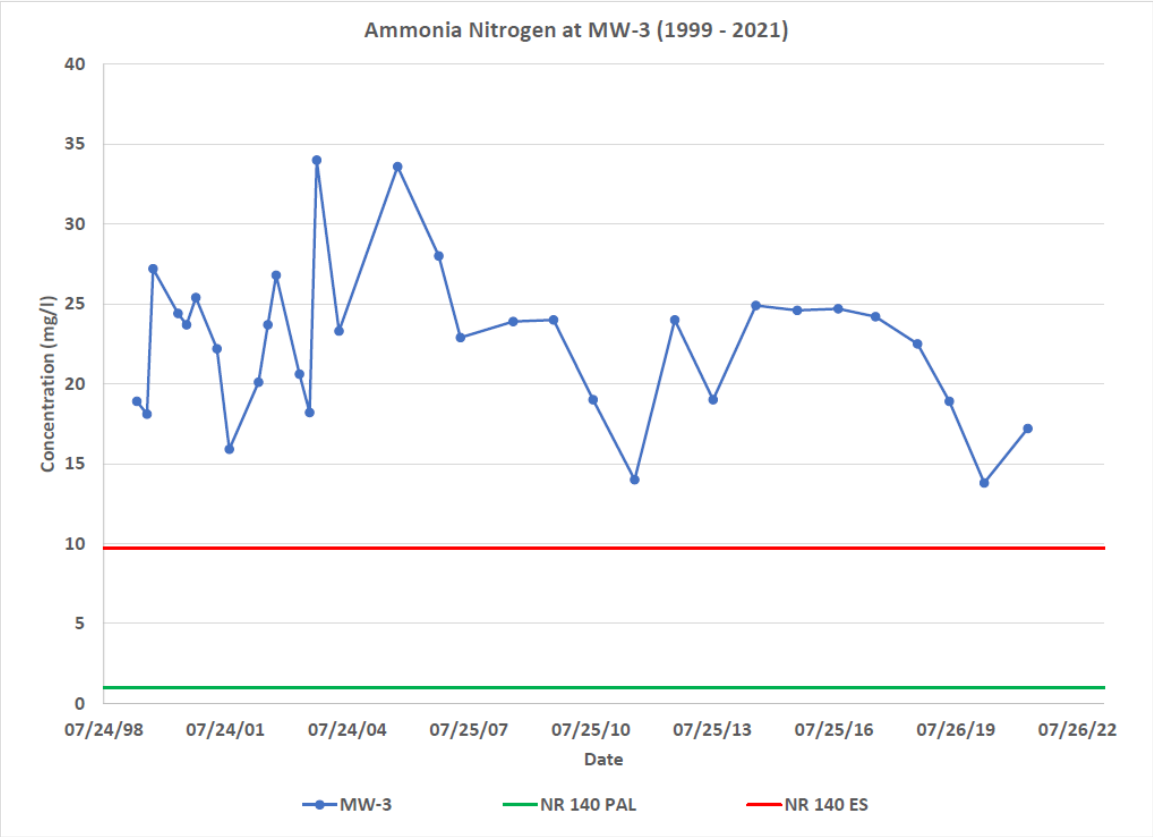


Figure 11


Ammonia Nitrogen at MW-3 (1999 - 2021)
Concentration (mg/l)
40
35
30
25
20
15
10
5
0
07/24/98
07/24/01
07/24/04
07/25/07
07/25/10
07/25/13
07/25/16
07/26/19
07/26/22
Date
MW-3
NR 140 PAL
NR 140 ES

Appendix C: Categorical Limits

Background:

The surface water discharged to the ditch drains to the East Branch of Belgium Creek and is composed of wastewater generated from washing and cooking and preparing vegetables. Lakeside Foods Belgium ("Lakeside Foods") operates a vegetable processing and canning plant. Production activities and wastewater discharges occur year around, but higher volumes occur in the fall. Spray Irrigation occurs between the months of April through October. Lakeside Foods is a "large" vegetable processing and canning facility because it processes a total annual raw material production of vegetables that exceeds 10,000 tons per year Therefore, the facility is subject to the effluent limitations and standards of performance for dischargers of process wastes from canned and preserved fruits and vegetables and subcategories thereof ch NR 225 Wis Adm. Code. The plant processes and cans potatoes, green snap beans, and beets, which are regulated by Subpart G and Subpart H of 40 CFR 407. Chapter NR 225, Wis. Adm. Code is based on 40 CFR 407, and the state rules are consistent with federal rules with a few omissions. The omissions are described below:

- State rules incorrectly list best available technology (BAT) standards for BOD, TSS, and pH. BAT does not apply to such conventional pollutants.
- The federal standard rule lists best conventional pollutant control technology (BCT) standards requirements. All BCT limitations are set to be the same as the best practicable control technology (BPT) standards. State rules in ch. NR 225, Wis. Adm. Code, do not list standards for BCT.

Current Production Data:

Lakeside Foods reported that from 2018 – 2022, their plant processed approximately 18,509 - 25,622 tons of beans, 5,422 – 8,033 tons of beets, and 3,337 – 4,842 tons of potatoes per year. The production used to determine limitations is the maximum production for each commodity during the calendar year, per ch. NR 225, Wis. Adm. Code. Below is a summary of the production data utilized in limit calculations.

Product	tons/year	lbs/day (using 365 days)
Snap Beans	93,645	140,395
Beets	19,930	44,019
Potatoes	4,967	26,533

Categorical-based Effluent Limit Calculations:

This facility is subject to effluent limitations covering more than one commodity or subcategory, therefore plant discharge limitations are the sum of limitations determined for the individual commodities or subcategories. The daily maximum, daily average and annual average limits for BOD_5, TSS, and pH for each commodity are shown in the tables below. It shows the limits

calculated using the highest production rates of the last 5 years (2018-2022). Since only a portion of wastewater is surface water discharged, limits were reduced accordingly. Flow data from 2019-2022 shows that an average of 38 MG/Year are discharged via center pivot or by a traveling hose reel with a spray gun(land treatment) and an average of 29 MG/Year is surface discharged. This means that of 67 MG of wastewater produced each year, 43% is surface discharged. To make the categorical limits representative of this, the limits calculated using peak raw material processed values are multiplied by a 0.43 factor.

BPT Limits:

A. Snap Beans

		Snap Beans		
		BPT Standard	Permit Limit Using Peak Raw Material Processed [2018 - 2022]	Limit With Surface Discharge Factor
Parameter	Limit Type	lbs/1,000 lbs raw material processed	lbs/day	lbs/day
BOD_5	Daily Max	1.51	212	91.2
	Daily Avg	0.87	122	52.5
	Annual Avg	0.58	81	35.0
TSS	Daily Max	2.67	375	161.2
	Daily Avg	1.8	253	108.7
	Annual Avg	1.04	146	62.8
pH	within the range of 6.0 - 9.0 su			

B. Beets

		Beets		
		BPT Standard	Permit Limit Using Peak Raw Material Processed [2018 - 2022]	Limit With Surface Discharge Factor
Parameter	Limit Type	lbs/1,000 lbs raw material processed	lbs/day	lbs/day
BOD_5	Daily Max	1.01	44	19.1
	Daily Avg	0.71	31	13.4
	Annual Avg	0.57	25	10.8

TSS	Daily Max	1.88	83	35.6
	Daily Avg	1.47	65	27.8
	Annual Avg	1.12	49	21.2
pH	within the range of 6.0 - 9.0 su			

C. Potatoes

		Potatoes		
		BPT Standard	Permit Limit Using Peak Raw Material Processed [2018 - 2022]	Limit With Surface Discharge Factor
Parameter	Limit Type	lbs/1,000 lbs raw material processed	lbs/day	lbs/day
BOD_5	Daily Max	0.9	24	10.3
	Daily Avg	0.66	17.5	7.5
	Annual Avg	0.55	14.6	6.3
TSS	Daily Max	1.69	45	19.3
	Daily Avg	1.37	36	15.6
	Annual Avg	1.09	28.9	12.4
pH	within the range of 6.0 - 9.0 su			

Conclusion:

In conclusion, BPT loadings were calculated and final limitations were determined. Categorical limits are missing in the current permit however, the final limits referenced in the table below will now be appropriately added to Sample Point 009, as required by Chapter NR 225, Wis. Adm. Code.

Final Limits:

		Final Limits				
		Snap Beans Limit	Beets Limit	Potatoes Limit	Total Limit	Current Limit in WI-0000817-09-1 Permit
Parameter	Limit Type	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
BOD_5	Daily Max	91.2	19.1	10.3	**120.5**	-

	Daily Avg	52.5	13.4	7.5	**73.5**	-
	Annual Avg	35.0	10.8	6.3	**52.1**	-
TSS	Daily Max	161.2	35.6	19.3	**216.1**	-
	Daily Avg	108.7	27.8	15.6	**152.1**	-
	Annual Avg	62.8	21.2	12.4	**96.4**	-
pH	within the range of 6.0 - 9.0 su					

By: Laura Rodriguez Alvarez

Date: March 28, 2024