Abbyland Foods Inc. at Abbotsford Public Noticed Permit Fact Sheet

General Information

Permit Number:	WI-0057436-07-0
Permittee:	Abbyland Foods Inc Abbotsford, 502 E Linden St, PO Box 69, Abbotsford WI 54405
Discharge Location:	Approximately 60 feet north of East Linden Street on Elm Brook Lat 44.94216º N, Long 90.30915º W
Receiving Water:	Elm Brook, located in the Upper Big Eau Pleine Watershed of the Upper Wisconsin River Basin in Marathon County, as well as the groundwaters of the Upper Wisconsin River Basin in Marathon County and the Black River Basin in Clark and Taylor Counties
StreamFlow ($Q_{7,10}$):	0 cfs
Stream Classification:	Limited Aquatic Life, Non-public Water Supply
Operator at Proper Grade?	Yes

Facility Description

Abbyland Foods, Inc operates a slaughtering facility, multiple production lines, two wastewater treatment facilities and receives domestic and process wastewater from Curtiss and numerous other Abbotsford facilities. The gross result is the production of approximately 0.289 MGD (2024) of wastewater per day. There are two wastewater treatment facilities (WWTF); WWTF1 receives and treats sanitary and process wastewater primarily from the production facilities onsite which include Ready to Eat 1, 2, 3 and Fresh Kitchen (uncooked products). WWTF1 also receives and treats wastewater from Specialty Sausage located across Elm Street. Sanitary wastewater from the human resources center and shipping and receiving are discharged to the sanitary sewer for treatment at the City of Abbotsford WWTF. Influent to WWTF1 begins at a screen lift station which can be diverted to WWTF2 lift station, if needed. WWTF2 was acquired by the City of Abbotsford in 2014 to primarily treat hauled wastewater from the Abbyland at Curtiss facilities. These facilities include the Distribution Center, Service Plaza Truck Wash, and barn & kill floor wastewater from the Pork Plant. Sanitary wastewater from Abbyland Distribution Center, Service Plaza, Travel Plaza, El Norteno Restaurant and Pork Plant are discharged to the Village of Curtiss WWTF. Influent from WWTF2 can be diverted to WWTF1 and vice versa.

Both wastewater treatment plants possess similar treatment processes including equalization, dissolved air flotation (DAF) aeration, and membrane bioreactor (MBR) treatment. Effluent from the two wastewater treatment facilities combine after MBR filtration, but prior to the cooling tower, and before discharging to Elm Brook. Sludge from DAF and MBR from both WWTF1 & WWTF2 discharge to the same aerobic digestor and anaerobic digestor prior to dewatering, storage and land application on Department approved sites. The “Low Hazardous Waste Exemption” was not renewed by the Department, therefore Outfall 004 (brine wastewater) has been removed from the permit and therefore can only be disposed of at other wastewater treatment facilities. During the last permit term, the facility removed the brine tank air relief valve (2022), installed a cooling tower (2020) and expanded storage for anaerobically stabilized and dewatered sludge. The Specialty Sausage Facility opened in 2016. In 2022 it was determined that although sanitary wastewater is intermingled with process wastewater, Abbyland qualifies for a NR 204 exemption therefore all land applied waste is regulated per NR 214 Wis. Adm. Code.

While slaughtering of animals does take place at this facility, this waste is segregated and slaughterhouse water is land applied or disposed at another facility. The solid screenings such as paunch manure is typically landfilled. Renderings from slaughtering activities are sold to a third party rendering facility. This wastewater is landspread or disposed of offsite. The categorical limits included in the permit are based on production rates and all new production lines were considered in determining these limitations. The new source date for the Meat Cutter category is September 22, 2004 (according to the Boornazian memo dated September 28, 2006).

Abbotsford Beef Plant constructed two Ready-To Eat lines (RTE 2 and RTE 3) in 2007 and 2008, respectively. Abbyland constructed a new Specialty Sausage Plant in 2016. In calendar year 2024, the facility also accepted 65,976 gpd of process wastewater from the Abbyland Curtiss Pork Plant constructed in 1995 and may accept all of the process wastewater from the Distribution Center constructed in 2014. Since the installation and construction of the RTE 2 and RTE 3 lines, Specialty Sausage Plant, and Distribution Center began after promulgation of the applicable effluent guidelines or after proposal of the applicable effluent guidelines (September 22, 2004), the department has determined that the RTE 2 and RTE 3 lines, the Specialty Sausage Plant, and Distribution Center would constitute new sources for Abbyland. Therefore, the production wastewater from these lines are subject to new source performance standards (NSPS) standards for the "Meat Cutter, and "Sausage and Luncheon Meat Processors" subcategories as specified in 40 CFR Part 432 Subparts F and G and ch. NR 258, Wis. Adm. Code.

The facility operates 365 days per year, and in calendar year 2024 treated 282,500 gpd of industrial and 6,500 gpd domestic waste from Abbyland. The Abbotsford Beef Plant processes beef slaughtered at the site (Beef Live Weight Kill is estimated to be 48,280,145 pounds in calendar year 2024) and boned beef from outside sources. Also in calendar year 2024, the Abbotsford Beef Plant produced 149,767,997 pounds of finished product, the Abbotsford Specialty Sausage Plant produced 25,256,387 pounds of finished product and the Curtiss Pork Plant produced 136,654,214 pounds of finished product.

After purchasing WWTF2, the following upgrades were made: grit and solids removal, wastewater pumping, DAF for oil and grease removal, flow equalization, aerobic membrane bioreactor, chemical phosphorus removal using ferric sulfate, aerobic and anaerobic sludge digestion, solids dewatering, and cake storage. The WWTF is currently undergoing plant modifications including a new headworks building for plant #2 and a new dehydrating building. Plant 2 headworks building will contain two rotary drum screens, two dewatering screws and a vortex style grit chamber. The new dehydrating building will contain two volute dewatering presses and two dehumidification units. The upgrade will also provide more storage for sludge at Outfalls 003, 006, 007 to eliminate the need for winter landspreading.

With the upgrades listed above, WWTF2 treats wastewater from slaughter operations and process wastewater from the Curtiss facility. Barn and paunch manure, barn floor rinse water and wastewater from the head wash area discharges by gravity to the head works of WWTF2. Grit and solids are removed prior to being pumped to the equalization tank. Grit and screen solids are collected and disposed offsite at a sanitary landfill. Wastewater from the equalization tank is pumped to the DAF unit for fats, oil, and grease removal prior to discharge to the aeration basin for aerobic biological treatment. The collected DAF sludge is pumped to the aerobic digester for further treatment. Treated DAF effluent discharges to the aeration basin and MBR. Treated effluent from the MBR discharges by gravity to the old chlorine contact basin prior to discharging to Elm Brook (Outfall 005).

See specific sections of this fact sheet for additional monitoring and limitation changes made in this permit term.

Substantial Compliance Determination

Enforcement During Last Permit: Numerous notices of noncompliance (NON) were issued throughout the previous permit term and two Notices of Violations (NOV) were issued. The first NOV was issued on 7/16/2018 for failure to notify the department of a hazardous waste spill. The second NOV was issued on 11/8/2022 for numerous violations including chloride and fecal coliform exceedances, misreporting of total nitrogen, and failure to report, amongst other violations. A NON was issued on 09/04/2024 for land application violations for not operating in accordance with the approved land management plan along with misreporting of acreage and nitrogen loadings. The most recent NON issued on February 25, 2025 was for nitrogen, ammonia limit violations. Abbyland is expected to provide explanation for the violations and current and future measures to be taken to ensure compliance going forth. Furthermore, Abbyland is undergoing a toxicity reduction evaluation (TRE) in order to determine and remove prevalent chronic toxicity within the effluent. Abbyland continues to violate permit limitations albeit, will be actively working on achieving compliance next permit term. If Abbyland foods fails to develop and effectively execute an operation and maintenance plan as outlined in the Enforcement Conference summary letter and/or fails to remediate land application violations, the department may choose to take additional enforcement action.

After a desk top review of all discharge monitoring reports, land application reports, compliance schedule items, and a site visit on 07/02/2024, Abbyland has not been found in substantial compliance. The aforementioned violations will be addressed in compliance schedules to ensure the permittee is working towards compliance. Abbyland's 11/08/2022 NOV is conditionally closed out and may be revisited if Abbyland fails to develop and implement an extensive Operation and Maintenance Plan. The 09/04/2024 NON will be closed out when an updated land management plan is department approved and revisions to the land application forms have been completed. The February 25, 2025 NON will be closed out upon DNR approved response to the NON. The TRE will not be closed out until all applicable reports have been completed and six consecutive monthly tests and two consecutive quarterly tests have passed.

Compliance determination entered by Nick Lindstrom on 03/04/2025.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
101	Flow is not measured from this Inplant sample point.	At Sampling Point 101, the permittee shall take grab samples of the effluent from Wastewater Treatment Facility #1 (WWTF1) prior to mixing with the effluent from Wastewater Treatment Facility #2 (WWTF2).
102	Flow is not measured from this Inplant sample point.	At Sampling Point 102, the permittee shall take grab samples of the effluent from Wastewater Plant #2 (WWTF2) prior to comingling with the effluent from Wastewater Treatment Facility #1 (WWTF1).
005	0.289 MGD (2024)	Representative effluent samples shall be collected prior to discharge to Elm Brook. Discharge is limited to treated process wastewater from Wastewater Treatment Facility #1 (WWTF1) and Wastewater Treatment Facility #2 (WWTF2).
001	0.612 MG (2024)	At Sampling Point 001, the permittee shall collect representative samples of the barn manure, paunch manure, barn floor rinse, head wash area wastewater, and water softener backwash prior to landspreading on Department approved sites or prior to being hauled to approved manure

		storage structure via Outfall 001. The permittee is only required to sample the liquid wastes from Outfall 001 when the liquid wastes are being actively landspread on approved sites or discharged to an approved manure storage structure during any month. The permittee is not required to sample the liquid wastes from Outfall 001 if all the liquid wastes are hauled to another permitted facility, landfilled, or incinerated during any month.
003	10,998 (2024) cubic yards	At Sampling Point 003, the permittee shall collect representative samples of the combined sludges from Wastewater Treatment Facility #1 (WWTF1) and Wastewater Treatment Facility #2 (WWTF2) prior to landspreading on Department approved sites or prior to being hauled to approved manure storage structure via Outfall 003. The permittee is only required to sample the sludges from Outfall 003 when the sludges are being actively landspread on approved sites or discharged to an approved manure storage structure during any month. The permittee is not required to sample the sludges from Outfall 003 if all the sludges are hauled to another permitted facility, landfilled, or incinerated during any month.
006	N/A	At Sampling Point 006, the permittee shall collect representative samples of the NEW Volute Press sludge from WWTF1 and WWTF2 prior to landspreading on Department approved sites or prior to being hauled to an approved manure structure via Outfall 006. The permittee is only required to sample the sludges from Outfall 006 when the sludges are being actively landspread on approved sites or discharged to an approved manure storage structure during any month. The permittee is not required to sample the sludges from Outfall 006 if all the sludges are hauled to another permitted facility, landfilled or incinerated during any month.
007	N/A	At sample point 007, the permittee shall collect representative samples of the NEW Shincci Dehumidifyier combined sludge from WWTF1 and WWTF2 prior to landspreading on Department approved sites or prior to being hauled to approved manure structure via Outfall 007. The permittee is only required to sample the sludges from Outfall 007 when the sludges are being actively landspread on approved sites or discharged to an approved manure storage structure during any month. The permittee is not required to sample the sludges from Outfall 007 if all the sludges are hauled to another permitted facility, landfilled or incinerated during any month.

1 Inplant - Monitoring and Limitations

Sample Point Number: 101 - WWTF 1 Effluent and 102- WWTF 2 Effluent

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total		mg/L	2/Month	Grab	
pH Field		su	Weekly	Grab	
Dissolved Oxygen		mg/L	Weekly	Grab	
Chloride		mg/L	2/Month	Grab	
Temperature		deg F	Weekly	Grab	

Changes from Previous Permit:

Sampling for BOD5, pH, dissolved oxygen, chloride, and temperature added at newly created in-plant sample points 101 and 102.

Explanation of Limits and Monitoring Requirements

Collecting in-plant samples will help differentiate wastewater characteristics between plant 1 and 2. In-plant sampling is in response to parameter limitation exceedances throughout the previous permit term as referred to in the substantial compliance determination form (attached).

2 Surface Water - Monitoring and Limitations

Sample Point Number: 005- Final Combined Effluent

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
BOD5, Total	Daily Max	40 mg/L	5/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	20 mg/L	5/Week	24-Hr Flow Prop Comp	
BOD5, Total	Daily Max	199 lbs/day	5/Week	Calculated	
BOD5, Total	Monthly Avg	100 lbs/day	5/Week	Calculated	
Suspended Solids, Total	Daily Max	40 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	5/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Daily Max	242 lbs/day	5/Week	Calculated	
Suspended Solids, Total	Monthly Avg	121 lbs/day	5/Week	Calculated	
Dissolved Oxygen	Daily Min	4.0 mg/L	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
Fecal Coliform	Daily Max	400 #/100 ml	Weekly	Grab	Effective year-round.
Fecal Coliform	Monthly Avg	400 #/100 ml	Weekly	Grab	Effective year-round.
Chlorine, Total Residual	Daily Max	19 ug/L	5/Week	Grab	Limit and monitoring apply when chlorinating effluent for disinfection.
Chlorine, Total Residual	Weekly Avg	7.3 ug/L	5/Week	Grab	Limit and monitoring apply when chlorinating effluent for disinfection.
Chlorine, Total Residual	Monthly Avg	7.3 ug/L	5/Week	Grab	Limit and monitoring apply when chlorinating effluent for disinfection.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	2.4 lbs/day	3/Week	Calculated	This is a final TMDL based effluent limit and will go into effect immediately.
Phosphorus, Total	6-Month Avg	0.8 lbs/day	3/Week	Calculated	This is a final TMDL based effluent limit and will go into effect immediately. See Total Phosphorus Final Six-Month Limits section for averaging periods.
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 phosphorus section below.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-Month Rolling Sum of Total Monthly mass of phosphorus discharged and

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					report on the last day of the month on the DMR. See phosphorus section below.
Nitrogen, Ammonia Variable Limit		mg/L	5/Week	See Table	Limit varies with effluent pH. See ammonia section.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.7 mg/L	5/Week	24-Hr Flow Prop Comp	Effective January through April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.0 mg/L	5/Week	24-Hr Flow Prop Comp	Effective May through December.
Nitrogen, Total	Daily Max	194 mg/L	3/Week	24-Hr Flow Prop Comp	
Nitrogen, Total	Monthly Avg	134 mg/L	3/Week	24-Hr Flow Prop Comp	
Oil & Grease (Hexane)	Daily Max	71 lbs/day	3/Week	Calculated	Samples for hexane shall be collected at the same time samples are collected for WET tests.
Oil & Grease (Hexane)	Monthly Avg	35 lbs/day	3/Week	Calculated	
Chloride	Daily Max	544 mg/L	5/Week	24-Hr Flow Prop Comp	Samples for chloride shall be collected at the same time samples are collected for WET tests. See Chloride and Conductivity section
Chloride	Weekly Avg	400 mg/L	5/Week	24-Hr Flow Prop Comp	
Chloride	Monthly Avg	400 mg/L	5/Week	24-Hr Flow Prop Comp	
Chloride	Daily Max	3415 lbs/day	5/Week	Calculated	
Chloride	Weekly Avg	630 lbs/day	5/Week	Calculated	
Conductivity		umhos/cm	Continuous	Continuous	
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Monitoring only
Temperature Maximum	Daily Max	86 deg F	Daily	Continuous	
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET Testing section
Chronic WET	Monthly Avg	1.0 TUc	Quarterly	24-Hr Flow Prop Comp	Quarterly chronic WET testing required at the permit effective date. The

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					chronic WET limit becomes effective 12/31/2026. See WET testing section in permit and associated compliance schedule. Samples for WET tests shall be collected at the same time samples are collected for copper, chloride and hexane.

Changes from Previous Permit

The effluent monitoring frequency for all parameters with limits were considered. Monitoring frequencies are based on the size and type of the facility and are established to best characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Requirements in administrative code (NR 108, 205, 210 and 214 Wis. Adm. Code) and Section 283.55, Wis. Stats. were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. For more information see the March 22, 2021 version of the Bureau of Water Quality Program Guidance Document "Monitoring Frequencies for Individual Wastewater Permits". After consideration of the above factors, the monitoring frequency was increased for the following parameters: BOD, TSS, chloride, ammonia and total nitrogen. The increased monitoring frequencies will allow for a clear, comprehensive evaluation of effluent quality.

Other significant effluent monitoring and/or limits changes are as follows: 1) The single daily maximum ammonia limit has been replaced with a table of limits that vary with effluent pH, 2) the addition of daily maximum chloride limits, 3) the addition of a monthly average fecal coliform limit, 3) the daily max chlorine limit has been reduced and a monthly average chlorine limit was added, 4) mass based phosphorus limits of 0.8 lbs/day as a 6-month average and 2.4 lbs/day as a monthly average have been added to the permit to comply with requirements of the Wisconsin River TMDL, and 5) a chronic WET limit has been added.

Explanation of Limits and Monitoring Requirements

INDUSTRIAL EFFLUENT LIMITS –In accordance with the federal regulation 40 CFR 122.45(d), limits in this permit are to be expressed as daily maximum and monthly average limits whenever practicable.

For more information see the following memos:1) March 28, 2023 WQBEL memo from Benjamin Hartenbower to Holly Heldstab titled "Water Quality-Based Effluent Limitations for Abbyland Foods Inc. Abbotsford Plant, WPDES Permit No. WI-0057436", and 2) the October 16, 2024 TBEL memo from Ben Hartenbower to Holly Heldstab titled "Technology-Based Effluent Limitations for Abbyland Foods Inc. Abbotsford Plant WPDES Permit No. WI-0057436".

Categorical limitations are based "High Processing Packinghouse", "Meat Cutter, and "Sausage and Luncheon Meat Processors" subcategories as defined in s. NR 258.03, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 432 Subparts D, F, and G. Section NR 220.13, Wis. Adm. Code, includes provisions that address cases where federal and state rule differ.

BOD, TSS, DO, pH, Oil & Grease: Concentration and mass limits are needed in accordance with the categorical standards in 40 CFR 432 subparts D, F, and G. Categorial limits for BOD, total suspended solids and pH are based on past

and expected production data. The production-based mass limits for BOD5, TSS, and oil & grease are based on BPT (best practicable control technology) effluent limitations and production rates. Both s. NR 258.10 and s. NR 258.11, Wis. Adm. Code specify that the discharge pH shall be within the pH range of 6.0 to 9.0 s.u.**.**

Total Ammonia Nitrogen (NH3-N): Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Table 2C and Table 4B of ch. NR 105, Wis. Adm. Code (effective 3/1/04). Subchapter IV of ch. NR 106 establishes procedures for calculating water quality-based effluent limitations (WQBELs) for ammonia (effective 3/1/04). Daily maximum, weekly average, and monthly average ammonia limits are included in the proposed permit. In accordance with s. NR 106.32(5), Wis. Adm. Code, mass limits for ammonia are not included. Categorical limits based on 40 CFR §432.75(b).

Regulatory changes to s. NR 205.065, Wis. Adm. Code became effective 9/1/16 and require limits in this permit to be expressed as weekly average and monthly average limits whenever practicable. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, the table has been expanded from the table in the current permit to include ammonia nitrogen limits throughout the pH range indicated in the table below.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
pH ≤ 8.2	8.0	8.4 < pH ≤ 8.5	5.0	8.7 < pH ≤ 8.8	2.8
8.2 < pH ≤ 8.3	7.3	8.5 < pH ≤ 8.6	4.1	8.8 < pH ≤ 8.9	2.4
8.3 < pH ≤ 8.4	6.0	8.6 < pH ≤ 8.7	3.4	8.9 < pH ≤ 9.0	2.0

Total Nitrogen: The categorical limits for total nitrogen are based on based on 40 CFR §432.75(b).

Fecal Coliform: Monthly average limit added to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7). EPA effluent guidelines for meat processors contained in 40 CFR 432.82 require fecal coliform limits of 400 #/100 mL.

Total Residual Chlorine: In order to not exceed water quality criteria specified in ch. NR 105, Wis. Adm. Code, a daily maximum limit of 19 µg/L is required. The Acute Toxicity Criterion (ATC) is 19 µg/L and the receiving water for Abbyland, 1-Q_{10} flow is 0 cfs. The daily limit is set equal to ATC since the ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation. Monthly average limit added to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7).

Phosphorus and the Wisconsin River Total Maximum Daily Load (TMDL): Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. Abbyland at Abbotsford. however, is located within the Wisconsin River Basin Total Maximum Daily Load (TMDL), which was approved by EPA April 26, 2019. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus that can be discharged and still protect water quality. As outlined in Section 4.6 of the department's TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Program, mass limits must be given in the permit that are consistent with the TMDL WLA and the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175). The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLA in the TMDL.

The Wisconsin River TMDL Waste Load Allocation (WLA) for total phosphorus was approved by the U.S. Environmental Protection Agency on April 26, 2019 and the site-specific criteria (SSC) in Appendix K were adopted by rule in s. NR 102.06 (7), Wis. Adm. Code, on June 1, 2020, and approved by the U.S. Environmental Protection Agency on July 9, 2020. Abbyland at Abbotsford's approved TMDL SSC WLA limit for phosphorus is 198 lbs/yr, which equates to a calculated phosphorus mass limits of 2.40 lbs/day monthly average and 0.80 lbs/day 6-month average.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Program*, mass limits must be given in the permit that are consistent with the TMDL WLA and the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175). Continuously discharging facilities covered by the WRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The concentration limit of 1.0 mg/L as a monthly average also applies in this permit term to prevent backsliding.

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. Effluent data from the current permit term (August 2016 to January 2023), the 1-day P99 chloride concentration is 943 mg/L, and the 4-day P99 of effluent data is 577 mg/L.
Because these effluent concentrations exceed the calculated daily maximum and weekly average WQBELs, effluent limits are needed in accordance with s. NR 106.85, Wis. Adm. Code. The daily maximum and monthly average concentration limits were added to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7).

Conductivity: Conductivity monitoring is only required when water softener backwash is discharged to Outfall 005. The conductivity of the water softener brine discharge shall be monitored continuously, with the daily maximum value reported on the Wastewater Discharge Monitoring Report (DMR) form. Discharges with higher than normal conductivity, which would indicate high chloride concentrations, shall be ceased.

WET testing: Requirements are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised in August 2016. See current version of the WET Program Guidance Document, checklist, and WET information, guidance and test methods at **http://dnr.wi.gov/topic/wastewater/wet.html.** Chronic WET testing is required quarterly and the chronic WET limit becomes effective 12/31/2026 per the associated compliance schedule. Acute WET testing is required in the following quarters:

- 3rd quarter (July – Sept) 2025
- 1st quarter (Jan – March) 2026
- 2nd quarter (April – June) 2027
- 4th quarter (Oct – Dec) 2028
- 3rd quarter (July – Sept) 2029

Thermal Rules - Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. Based on the procedures in s. NR 106.56, Wis. Adm. Code, and an evaluation of available effluent data, daily maximum limits are required.

3 Land Application - Sludge/Process Wastewater

Sample Point Number: 001- LANDSPREADING PROCESS WW- WWTF 2

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Total Kjeldahl		mg/L	Monthly	Grab	
Chloride		mg/L	Monthly	Grab	
Phosphorus, Total		mg/L	Quarterly	Grab	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Grab	
Potassium, Total Recoverable		mg/L	Quarterly	Grab	

Changes from Previous Permit:

Addition of water extractable phosphorus and total potassium.

Explanation of Limits and Monitoring Requirements

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

Sample Point Number: 003- Industrial Belt Filter Press Cake Sludge; 006- Industrial Cake Sludge; 007- Industrial Heat Dried Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Monthly	Grab	
Nitrogen, Total Kjeldahl		Percent	Monthly	Grab	
Chloride		Percent	Monthly	Grab	
pH Field		su	Annual	Grab	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Grab	
Phosphorus, Total		Percent	Annual	Grab	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Potassium, Total Recoverable		Percent	Annual	Grab	
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

1) Addition of water extractable phosphorus (WEP), 2) addition of annual PFAS monitoring pursuant to s. NR 214.18(5)(b), Wis. Adm. Code, 3) Outfall 006 and 007 are new sludge sample points added at WWTF2 as a result of the solids treatment train upgrades as mentioned in the facility description above.

Explanation of Limits and Monitoring Requirements

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

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS".

Monitoring and limitations, along with Daily Log and Annual Reports, for these outfalls are given in accordance with ch. 214, Wis. Adm. Code.

It has been determined that Abbyland Foods qualifies for the generalized sewage sludge exemptions for industrial facilities per subd. NR 204.02 (1)(b)5., Wis. Adm. Code. Wastewater contributing to the sludge produced at WWTF1 contains an insignificant volume of sanitary waste (<2%), which is not a substantial enough contribution to treat as anything other than industrial waste with regards to sludge. For more information see the May 31, 2024 letter from Fred Hegeman to Abbyland Foods titled "Evaluation of sources of domestic (sanitary) wastewater at the Abbyland Foods Inc., Abbotsford Plant Wastewater Treatment Facilities No. 1 & No. 2 (relative to WPDES Permit No. WI-0057436)."

4 Schedules

4.1 Toxicity Reduction Evaluation (TRE)

Required Action	Due Date
Submit Progress Report: Submit a progress report identifying the progress and status of part two of the TRE plan.	06/30/2025
Toxicity Reduction Evaluation-Part 2: Continue to implement part two of the TRE Plan which includes actions to reduce and/or eliminate the toxicity identified in part one of the TRE and comply with the interim dates stated in the TRE by which those actions will be implemented.	12/31/2025
Submit Progress Report: Submit a progress report identifying the actions taken to date to implement part two of the TRE plan.	06/30/2026
Achieve Compliance: Complete all actions identified in the TRE Plan and achieve compliance with the whole effluent toxicity limitation. Chronic WET limit becomes effective 12/31/2026.	12/31/2026

Explanation of Schedule: This schedule outlines the revised TRE submittal requirements as outlined in "Part 1 of the Toxicity Reduction Evaluation Study Plan".

4.2 Land Application Management Plan

Required Action	Due Date
Land Application Management Plan: Submit a management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214. The plan shall specify information on pretreatment processes, site identification on plat and soil maps, aerial photographs, if available, description of all site limitations, vegetative cover management and removal, availability of storage, type of transporting and spreading vehicle, load and rest schedules, monitoring procedures, contingency plans for periods of adverse weather or odor or nuisance abatement, collecting and reporting other sources of nitrogen, and any other pertinent information. If operational changes are needed, the Land Application Management Plan shall be amended by submitting a written request to the Department for approval of such amendments.	09/30/2025

Explanation of Schedule: An up-to-date Land Application Management plan is a standard requirement in reissued industrial permits per s. NR 214.17(6)(c) Wis. Adm. Code. The September 04, 2024 Notice of Noncompliance required updates to the LMP to include explicit calculations and procedures regarding hydraulic loading rates, and procedures on obtaining and documenting "Other Sources of Nitrogen". Furthermore, with the addition of outfall 006 and 007, there have been conversations with between Abbyland and the department of stockpiling this sludge for more than 72 hours. For this timeframe to increase, steps to ensure runoff from the pile and other concerns are addressed within the LMP.

4.3 Operations and Maintenance Plan

Required Action	Due Date
Submit Operation and Maintenance (O & M) Plan: Submit an O & M Plan to ensure wastewater facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the WPDES permit are being properly operated and maintained. Proper operation and maintenance includes but is not limited to effective performance, training, adequate laboratory and process controls, and appropriate quality assurance procedures. The plan shall include production plant standard operating procedures (SOPs) to eliminate disruption or upset of the performance of the treatment plant, as well as optimization and utilization of hauled in activities. The plan shall also address proper sampling techniques to prevent mishandling of equipment and cross contamination. If operational changes are needed, the management plan shall be amended by submitting a written request to the Department for approval. An update to the management plan shall be submitted for approval at least 60 days prior to a change in operations.	09/30/2025

Explanation of Schedule: An Operations and Maintenance Plan is included as needed to demonstrate sustained operations and maintenance of the treatment plants. This requirement is outlined in the NOV Enforcement Conference Summary/closeout letter on February 27, 2023.

Special Reporting Requirements

None

Other Comments:

Publishing Newspaper: The Tribune Photograph, 103 W Spruce Street, PO Box 677, Abbotsford, WI, 54405-0677

Attachments:

Categorical Limits Calculations: October 16, 2024 TBEL memo from Ben Hartenbower to Holly Heldstab titled "Technology-Based Effluent Limitations for Abbyland Foods Inc. Abbotsford Plant WPDES Permit No. WI-0057436".

Water Quality Based Effluent Limits: March 28, 2023 WQBEL memo from Benjamin Hartenbower to Holly Heldstab titled "Water Quality-Based Effluent Limitations for Abbyland Foods Inc. Abbotsford Plant, WPDES Permit No. WI-0057436"

Proposed Expiration Date:

March 31, 2030

Justification Of Any Waivers From Permit Application Requirements

None

Prepared By: Holly Heldstab, Wastewater Specialist **Date:** April 1, 2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: October 16, 2024

TO: Holly Heldstab – WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Technology-Based Effluent Limitations for Abbyland Foods Inc Abbotsford Plant. WPDES Permit No. WI-0057436

Technology-Based Effluent Limitations (TBELs) Recommended for Outfall 005:

Parameter	**Daily Maximum**	**Daily Minimum**	**Monthly Average**
BOD_5, Total	199 lbs/day		100 lbs/day
TSS	242 lbs/day		121 lbs/day
Fecal Coliform	400 #/100 mL		
pH	9.0 su	6.0 su	
Oil & Grease	71 lbs/day		35 lbs/day
Ammonia	8.0 mg/L		4.0 mg/L
Total Nitrogen	194 mg/L		134 mg/L

PART 1 – BACKGROUND INFORMATION

The facility operates 365 days per year, treating about 230,000 gpd of industrial and 6,500 gpd domestic waste from Abbyland. The Abbotsford Beef Plant processes beef slaughtered at the site (Beef Live Weight Kill is estimated to be 48,000,000 pounds annually) and carcasses from outside sources. For Fiscal Year-End 2024 (September to August), the Abbotsford Beef Plant produced 149,767,997 pounds of finished product. For FYE 2024, the Abbotsford Specialty Sausage Plant produced 25,256,387 pounds of finished product. The Curtiss Distribution Center had 60,198,282 pounds of finished product.

PART 2 – INDUSTRIAL CATEGORIES

Chapter NR 258, Wis. Adm. Code, specifies effluent guidelines for discharges from meat and poultry product categories of point sources and subcategories. Abbyland Foods, Inc.-Abbotsford Plant would fall under the "High Processing Packinghouse", "Meat Cutters", and "Sausage and Luncheon Meat Processors" subcategories as defined in s. NR 258.03, Wis. Adm. Code. These guidelines are based on federal effluent guidelines in 40 CFR Part 432 Subparts D, F, and G. These effluent limit guidelines include:

- Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT) in s. NR 258.10, Wis. Adm. Code.
- Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT) in s. NR 258.11, Wis. Adm. Code.
- If determined to be a new source, new source performance standards (NSPS) in s. NR 258.12, Wis. Adm. Code.

If the calculated limits are less than or equal to the limits in the current permit, then the limits would be set equal to the recalculated limits. If the recalculated limits are less restrictive than the limits from the current permit, they cannot be increased unless the antidegradation and anti-backsliding provisions of ch. NR 207, Wis. Adm. Code, are met.

Section NR 220.13, Wis. Adm. Code, includes provisions that address cases where federal and state rule differ. Section 283.11, Wis. Stats., address compliance with federal standards. In this case, the state rules are consistent with federal rules with a few exceptions. In such cases, the permit will in all cases be based on the state rule notwithstanding the federal regulations. The omissions are described below.

- The state or federal rules do not specify a date for the definition for a new source. Therefore, it is necessary to review available federal guidance. The Boornazian memo (September 28, 2006) specifies the following new source dates for 40 CFR Part 432 Subparts A – L. The Department relies on the Boornazian memo to establish date of applicability for NSPS.
    - Subparts A-D
        - Small facilities: 02/28/1974
        - Others: 09/22/2004
    - Subparts E-I
        - Small facilities: 01/03/1975
        - Others: 09/22/2004
    - Subparts J-L: 09/22/2004

- State rules incorrectly list best available treatment (BAT) standards for BOD, TSS, pH, fecal coliform, and oil & grease. BAT applies to priority pollutants and nonconventional pollutants and does not apply to BOD, TSS, pH, fecal coliform, or oil & grease.
- The federal standard rule lists revised 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 258, Wis. Adm. Code, do not list standards for BCT.

PART 3 – LEVELS OF CONTROL

In addition to the industrial categories, the applicable technology-based limits are determined based on the selected level of control. A facility may be fall under best available treatment (BAT), best practicable technology (BPT), and/or new source performance standards (NSPS) based on the date that the facility was constructed.

Production lines which construction commenced prior to 09/22/2004 are not subject to NSPS standards. Therefore, BPT, BCT, and BAT standards for the "High Processing Packinghouse" and "Meat Cutter" subcategories are applicable as well as the RTE 1 "Sausage and Luncheon Meats Processors" subcategory as specified in 40 CFR Part 432 Subparts D, F, G, and ch. NR 258, Wis. Adm. Code.

The production lines at Abbotsford Specialty Sausage, the Curtiss Distributions Center, and the RTE 2 and RTE 3 lines at the Abbostford Beef Plant have processes which construction commenced after 09/22/2004. Therefore, the process wastewater from these lines is subject to BPT, BCT, BAT and NSPS standards for the "Sausage and Luncheon Meats Processors" subcategory are applicable as specified in 40 CFR Part 432 Subpart G and ch. NR 258.12, Wis. Adm. Code.

PART 4 – CURRENT PRODUCTION LEVELS

The current levels of production for each Subcategory are provided by Abbyland Foods, Inc.

Subcategory	Annual Production for BPT, BCT, and BAT (lbs/year)	Daily Production for BPT, BCT, and BAT (lbs/day)	Annual Production for NSPS (lbs/year)	Daily Production for NSPS (lbs/day)
High Procesing Packinghouse (Abbotsford Beef) [1]	48,280,145	131,913		
High Procesing Packinghouse (Curtiss Pork Plant) [1]	226,000,048	617,486		

Subcategory	Annual Production for BPT, BCT, and BAT (lbs/year)	Daily Production for BPT, BCT, and BAT (lbs/day)	Annual Production for NSPS (lbs/year)	Daily Production for NSPS (lbs/day)
Meat Cutters (Abbotsford Beef) [2]	51,025,058	139,413		
Sausage and Luncheon Meats Processors (Abbotsford Beef) [2]	7,787,626	21,278	98,735,331	269,769
Sausage and Luncheon Meats Processors (Specialty Sausage) [2]			25,256,387	69,007
Sausage and Luncheon Meats Processors (Distribution Center) [2]			60,198,282	164,476

Footnotes:
1. lbs of live weight killed (LWK) as defined in s. NR 258.03(13), Wis. Adm. Code.
2. lbs of finished product as defined in s. NR 258.03(19), Wis. Adm. Code.

PART 5 – TBEL CALCULATIONS FOR HIGH PROCESSING PACKINGHOUSES

pH

Any discharge subject to BPT, BAT, BCT, or NSPS limitations or standards in this part must remain within the pH range of 6.0 to 9.0.

Best Practicable Treatment (BPT)

Abbyland Foods, Inc. slaughters more than than 50 million pounds per year LWK, therefore, the BPT effluent limitations of 40 CFR Part 432.42(b) would apply.

Parameter	BPT Effluent Limitations		Calculated Limits	
	Max Daily (lbs/1000 lbs)[1]	Max Monthly (lbs/1000 lbs)[1]	Max Daily (lbs/day)[2]	Max Monthly (lbs/day)[2]
BOD_5	0.48	0.24	360	180
Fecal Coliform (#/100 mL)	400		400	
TSS	0.62	0.13	465	232
Oil & Grease	0.26	0.13	195	97
	Maximum Daily (mg/L)		**Maximum Monthly Average (mg/L)**	
Ammonia	8.0		4.0	

Footnotes:
1. The BPT effluent limitations are from 40 CFR 432.42(b)
2. Calculated limits (lbs/day) = daily production (lbs/day) / 1000 * BPT limitations

Best Available Treatment (BAT)
Abbyland Foods, Inc. slaughters more than than 50 million pounds per year LWK, therefore, the BAT effluent limitations of 40 CFR 432.43 would apply.

Parameter	BAT Effluent Limitations	
	Maximum Daily (mg/L)	Maximum Monthly Average (mg/L)
Ammonia (as N)	8.0	4.0
Total Nitrogen	194	134

Best Conventional Pollutant Control (BCT)
Per 40 CFR Part 432.47, the BCT limitations are set to be the same as BPT standards in 40 CFR Part 432.42.

PART 6 – TBEL CALCULATIONS FOR MEAT CUTTERS

pH
Any discharge subject to BPT, BAT, BCT, or NSPS limitations or standards in this part must remain within the pH range of 6.0 to 9.0.

Best Practicable Treatment (BPT)
Abbyland Foods, Inc. generates more than than 50 million pounds per year of finished products, therefore, the BPT effluent limitations of 40 CFR Part 432.62(b) would apply.

Parameter	BPT Effluent Limitations		Calculated Limits	
	Max Daily (lbs/1000 lbs)[1]	Max Monthly (lbs/1000 lbs)[1]	Max Daily (lbs/day)[2]	Max Monthly (lbs/day)[2]
BOD_5	0.036	0.018	5.0	2.5
Fecal Coliform (#/100 mL)	400		400	
TSS	0.044	0.022	6.1	3.1
Oil & Grease	0.012	0.006	1.7	0.8

Footnotes:
1. The BPT effluent limitations are from 40 CFR 432.62(b)
2. Calculated limits (lbs/day) = daily production (lbs/day) / 1000 * BPT limitations

Best Available Treatment (BAT)
Abbyland Foods, Inc. generates more than than 50 million pounds per year of finished products, therefore, the BAT effluent limitations of 40 CFR 432.63(b) would apply.

Parameter	BAT Effluent Limitations	
	Maximum Daily (mg/L)	Maximum Monthly Average (mg/L)
Ammonia (as N)	8.0	4.0
Total Nitrogen	194	134

Best Conventional Pollutant Control (BCT)
Per 40 CFR Part 432.67, the BCT limitations are set to be the same as BPT standards in 40 CFR Part 432.62.

PART 7 – TBEL CALCULATIONS FOR SAUSAGE AND LUNCHEON MEATS PROCESSORS

pH
Any discharge subject to BPT, BAT, BCT, or NSPS limitations or standards in this part must remain within the pH range of 6.0 to 9.0.

New Source Performance Standards (NSPS)
Abbyland Foods, Inc. generates more than 50 million pounds per year of finished products, therefore, the NSPS effluent limitations of 40 CFR Part 432.75(b) would apply.

Parameter	NSPS Effluent Limitations		Calculated Limits	
	Maximum Daily (lbs/1000 lbs)	Maximum Monthly Average (lbs/1000 lbs)	Max Daily (lbs/day)[2]	Max Monthly (lbs/day)[2]
BOD_5	0.56	0.28	281.8	140.9
Fecal Coliform (#/100 mL)	400		400	
TSS	0.68	0.34	342.2	171.1
Oil & Grease	0.20	0.10	100.7	50.3
	Maximum Daily (mg/L)		**Maximum Monthly Average (mg/L)**	
Ammonia (as N)	8.0		4.0	
Total Nitrogen	194		134	

Footnotes:
1. The NSPS effluent limitations are from 40 CFR 432.75(b) and 432.72(b)
2. Calculated limits (lbs/day) = daily production (lbs/day) / 1000 * NSPS limitations

Best Practicable Treatment (BPT)
Abbyland Foods, Inc. generates more than than 50 million pounds per year of finished products, therefore, the BPT effluent limitations of 40 CFR Part 432.72(b) would apply.

Parameter	BPT Effluent Limitations		Calculated Limits	
	Max Daily (lbs/1000 lbs)[1]	Max Monthly (lbs/1000 lbs)[1]	Max Daily (lbs/day)[2]	Max Monthly (lbs/day)[2]
BOD_5	0.56	0.28	11.9	6.0
Fecal Coliform (#/100 mL)	400		400	
TSS	0.68	0.34	14.5	7.2
Oil & Grease	0.20	0.10	4.3	2.1

Footnotes:
1. The BPT effluent limitations are from 40 CFR 432.72(b)
2. Calculated limits (lbs/day) = daily production (lbs/day) / 1000 * BPT limitations

Best Available Treatment (BAT)
Abbyland Foods, Inc. generates more than than 50 million pounds per year of finished products, therefore, the BAT effluent limitations of 40 CFR 432.73(b) would apply.

Parameter	BAT Effluent Limitations	
	Maximum Daily (mg/L)	Maximum Monthly Average (mg/L)
Ammonia (as N)	8.0	4.0
Total Nitrogen	194	134

Best Conventional Pollutant Control (BCT)
Per 40 CFR Part 432.77, the BCT limitations are set to be the same as BPT standards in 40 CFR Part 432.72.

PART 8 – FINAL CALCULATED LIMITS

The total discharge limits shall be the total of the amounts calculated from all subcategories of this memo. For each production line, the most restrictive calculated set of limits are used in the calculation of the final total discharge limits.

Parameter	Daily Maximum	Daily Minimum	Monthly Average
BOD_5, Total	658.5		329.2
TSS	827.4		413.7
Fecal Coliform	400 #/100 mL		
pH	9.0 su	6.0 su	
Oil & Grease	301.4		150.7
Ammonia	8.0		4.0
Total Nitrogen	194		134

The Department has determined that calculated limits for BOD_5, TSS, and Oil & Grease are greater than the limits calculated in the previous permit. Therefore, the limits remain the same as in the current permit. If Abbyland Foods, Inc. would like to request an increase to the existing permit limits, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits should be continued in the reissued permit.

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: March 28, 2023

TO: Holly Heldstab – WCR/Eau Claire

FROM: Wade Strickland – WY/3 Diane Fisil for WS

SUBJECT: Water Quality-Based Effluent Limitations for Abbyland Foods Inc.
Abbotsford Plant
WPDES Permit No. WI-0057436

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 Abbyland Foods Inc. Abbotsford Plant in Marathon County. This industrial discharge is to Elm Brook, located in the Upper Big Eau Pleine Watershed in the Central Wisconsin River Basin. This discharge is included in the Wisconsin River TMDL as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 005:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5	40 mg/L 199 lbs/day			20 mg/L 100 lbs/day		3
TSS	40 mg/L 242 lbs/day			20 mg/L 121 lbs/day		3
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen January – April May – December	 Variable Variable			 3.7 mg/L 4.0 mg/L		4,5
Fecal Coliform Year-round	 400 #/100 mL			**400 #/100 mL** **geometric mean**		5,6
Residual Chlorine	19 µg/L		7.3 µg/L	**7.3 µg/L**		6
Chloride	**656 mg/L** 3415 lbs/day		400 mg/L 630 lbs/day	**400 mg/L**		6
Copper						2
Phosphorus TBEL Final				 1.0 mg/L 2.40 lbs/day	 0.80 lbs/day	7
Total Nitrogen	194 mg/L			134 mg/L		5
Oil & Grease (Hexane)	71 lbs/day			35 lbs/day		3
Conductivity						2
Temperature	86 deg F					1
Acute WET						8
Chronic WET				1.0 TUc		8,9

Footnotes:

1. No changes from the current permit
2. Monitoring only
3. The mass limits are categorical limits based on 40 CFR §432 and NR 258. These limits are not addressed in this memo and may need to be adjusted based on current production.
4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**
pH ≤ 8.2	8.0	8.4 < pH ≤ 8.5	5.0	8.7 < pH ≤ 8.8	2.8
8.2 < pH ≤ 8.3	7.3	8.5 < pH ≤ 8.6	4.1	8.8 < pH ≤ 8.9	2.4
8.3 < pH ≤ 8.4	6.0	8.6 < pH ≤ 8.7	3.4	8.9 < pH ≤ 9.0	2.0

5. Categorical limits based on 40 CFR §432.75(b)
6. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7) are included in bold.
7. The phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020.
8. Annual acute and quarterly chronic WET tests are recommended in the reissued permit. 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).
9. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. 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%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 005 shall be a grab sample collected from Elm Brook.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Benjamin Hartenbower at (715) 225-4705 (Benjamin.Hartenbower@wisconsin.gov) or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (2) – Narrative & Map

APPROVED BY: Diane Figiel Date: 04/14/2023

E-cc: Nick Lindstrom, Wastewater Engineer – Eau Claire
Geisa Thielen, Regional Wastewater Supervisor – Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Scott Provost, Water Quality Biologist– Wisconsin Rapids
Kari Fleming, Environmental Toxicologist – WY/3
Michael Polkinghorn, Water Resources Engineer – NOR/Rhinelander
Benjamin Hartenbower, Water Resources Engineer – WCR/Eau Claire
Laura Dietrich, Wastewater Specialist – Waukesha

Attachment #1

Water Quality-Based Effluent Limitations for
Abbyland Foods, Inc. Abbotsford Plant

WPDES Permit No. WI-0057436

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:
Abbyland Foods, Inc. operates the Abbotsford cattle slaughtering facility. The facility houses live animals prior to slaughter and processes the resulting beef into smoked sausage and de-boned meat. The facility slaughters and processes approximately 60-80 head of cattle per day, five days per week and 1200-1500 hogs per day. The treatment plant consists of an equalization tank, dissolved air flotation (DAF) for oil and grease removal, membrane biological reactor units (microfiltration with a suspended growth bioreactor) following anaerobic and anoxic treatment, alum chemical addition, jet aeration, effluent reuse storage, and 39,000 gallon sludge storage. If needed, the facility is equipped to chlorinate the effluent for disinfection to meet the fecal coliform limits, prior to discharge to Elm Brook. Discharge at this outfall is for process wastewater, minus the water softener backwash, which is segregated, and land applied at outfall 004. The outfall location is approximately 125 feet east of the wastewater plant.

Attachment #2 is a map of the area showing the approximate location of Outfall 005.

Existing Permit Limitations: The current permit, expiring on September 30, 2020, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,3
BOD_5	40 mg/L 199 lbs/day			20 mg/L 100 lbs/day		1,4
TSS	40 mg/L 242 lbs/day			20 mg/L 121 lbs/day		1,4
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen January – April May – December	 8.0 mg/L 8.0 mg/L			 3.7 mg/L 4.0 mg/L		4
Fecal Coliform Year-round	400#/100 mL					4
Residual Chlorine	38 µg/L		7.3 µg/L			
Chloride			400 mg/L 630 lbs/day			
Copper						3

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Phosphorus Interim Final				 1.0 mg/L 0.225 mg/L	 0.075 mg/L 0.12 lbs/day	2
Total Nitrogen	194 mg/L			134 mg/L		4
Oil & Grease (Hexane)	71 lbs/day			35 lbs/day		4
Conductivity						3
Temperature	86 deg F					
Acute WET						5
Chronic WET						6

Footnotes:

1. 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.
2. A compliance schedule is in the current permit to meet the final WQBEL by November 1, 2024.
3. Monitoring only
4. Categorical limits based on 40 CFR §432. These limits are not addressed in this memo and may need to be adjusted based on current production.
5. Acute WET testing required: Oct - Dec 2015 and Apr-June 2017
6. Chronic WET testing required: Oct - Dec 2015, Jan - March 2016, Apr - June 2017, July - Sept 2018, and Oct - Dec 2019. The IWC for chronic WET was 100%

Receiving Water Information:

- Name: Elm Brook
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
  - Limited Aquatic Life community (upstream from Lincoln Road, now named Huckleberry Rd), non-public water supply
  - Approximately 2.5 miles from the outfall: Limited Forage Fish from Lincoln Road to Dill Creek
  - Approximately 5 miles from the outfall: Dill Creek – Warm Water Sport Fisch Community, non-public water supply

- Low Flow: Due to the nature of the receiving water, the 7-Q_{10}, 7-Q_2, and Harmonic Mean are estimated to be zero.
  7-Q_{10} = 0 cfs (cubic feet per second)
  7-Q_2 = 0 cfs
  Harmonic Mean Flow = 0 cfs

- Downstream Water: Elm Brook (classification change at Huckleberry Road)
  - Classification: Limited Forage Fish community, non-public water supply.
  - Low Flow:
    7-Q_{10} = 0.01 cfs
    7-Q_2 = 0.02 cfs

- Downstream Water: Dill Creek (classification change at Blackberry Road)
  - Classification: Warm Water Forage Fish community, non-public water supply.
  - Low Flow:
    $7\text{-}Q_{10}$ = 0.10 cfs
    $7\text{-}Q_2$ = 0.24 cfs

- Hardness = 179 mg/L as $CaCO_3$. This value represents the geometric mean of effluent data from 06/20/2017 to 01/06/2020. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06 (4) (c) 5., Wis. Adm. Code: 25%
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: The Abbotsford Wastewater Treatment Facility also dischargers to Elm Brook, however with receiving water low flow equal to zero, this evaluation is not impacted
- Impaired water status: This discharge is located within the WI River TMDL for phosphorus

Effluent Information:

- Flow Rate(s):
  Maximum Annual Average = 0.271 MGD (Million Gallons per Day)
  Peak Daily = 0.541 MGD
  Peak weekly = 0.685 MGD
  Peak monthly = 0.360 MGD
  For reference, the overall average flow from August 2016 to January 2023 was 0.231 MGD.
- Hardness = 179 mg/L as $CaCO_3$. This value represents the geometric mean of effluent data from WET testing between 06/20/2017 and 01/06/2020.
- 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: 0.310 MGD of water supplied from the Abbotsford Waterworks and 60,000 gallons/day hauled in from hog butchering
- Additives: Alum for phosphorus removal and chlorine to disinfect
- Total Phosphorus Wasteload Allocation: 198 lbs/year = 0.542 lbs/day
  The wasteload allocations (WLA) found in Appendices J and K of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated April 26, 2019
- 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, primarily metal substances plus Hardness. The permit-required monitoring for Ammonia, Phosphorus, Cu, and Chloride from August 2016 to May 2020 is used in this evaluation.

Attachment #1

Chemical Specific Effluent Data at Outfall 005

	Copper µg/L	Chloride mg/L
1-day P_{99}	22.7	943
4-day P_{99}	13.8	577
30-day P_{99}	8.9	393
Mean	6.8	308
Std	4.5	181
Sample size	24	339
Range	<0.718 – 17.0	15 - 2426

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.".

The following table presents the average concentrations and loadings at Outfall 005 from August 2016 to January 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

	Average Measurement	Average Mass Discharged
BOD_5	3.6 mg/L*	7.9 lbs/day
TSS	0.87 mg/L*	1.8 lbs/day*
Chloride	308 mg/L	283 lbs/day
Oil & Grease		0.61 lbs/day*
pH field	7.61 s.u.	
Dissolved Oxygen	7.21 mg/L	
Phosphorus	0.19 mg/L*	
Ammonia Nitrogen	0.99 mg/L*	
Total Nitrogen	7.74 mg/L*	
Temperature Max	76.3 Deg F	
Fecal Coliform	153#/100 mL*	

*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. Adm. 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.

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

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105

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 Abbyland Foods, Inc. Abbotsford Plant.

The following tables list the calculated water quality-based effluent limitations for this discharge along with the results of effluent sampling for all the detected substances. 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	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Chlorine		19.03		19.03	3.81	<20		
Arsenic		340		340	68.0	<0.88		
Cadmium	179	56.2		56.2	11.2	<0.01		
Chromium	179	2903		2903	581	<0.6		
Copper	179	26.9		26.9			22.7	17.0
Lead	179	188		188	37.5	<1.4		
Nickel	179	767		767	153	<0.03		
Zinc	179	200		200	40.0	<0.02		
Chloride (mg/L)		757		757			**943**	**2426**

* * 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	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chlorine		7.28		7.28	1.46	<20	
Arsenic		152		152	30.4	<0.88	
Cadmium	175	3.82		3.82	0.76	<0.01	
Chromium	179	213		213	42.5	<0.6	
Copper	179	17.0		17.0			13.8
Lead	179	49.1		49.1	9.8	<1.4	
Nickel	179	120		120	24.0	<0.03	
Zinc	179	200		200	40.0	<0.02	
Chloride (mg/L)		395		395			**577**

* 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	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880		880	176	<0.01
Chromium (+3)	8400000		8400000	1680000	<0.6
Lead	2240		2240	448	<1.4
Nickel	110000		110000	22000	<0.03

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.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40		40	8.0	<0.88

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 required for chlorine and chloride.

Total Residual Chlorine – Because chlorine is used as an additive, effluent limitations are recommended to assure proper de-chlorination. In order to not exceed water quality criteria specified in ch. NR 105, Wis. Adm. Code, a daily maximum limit of 19 µg/L (19.03, rounded to two significant figures) is required. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required. The weekly average effluent limitation of 7.3 µg/L should be included in the permit because it is more restrictive than the daily maximum limit. Additional limits are discussed in the expression of limits section of this memo.

Chloride – Considering available effluent data from the current permit term (August 2016 to January 2023), the 1-day P_{99} chloride concentration is 943 mg/L, and the 4-day P_{99} of effluent data is 577 mg/L.

Because these effluent concentrations exceed the calculated daily maximum and weekly average WQBELs, effluent limits are needed in accordance with s. NR 106.85, Wis. Adm. Code.

The acute mass limitation of **3415 lbs/day** is based on the calculated concentration limit and the maximum effluent flow rate of 0.541 MGD (757 mg/L * 0.541 MGD * 8.34) in accordance with s. NR 106.07(2)(b), Wis. Adm. Code. The calculated mass limit of 892 lbs/day based on the weekly average concentration limit was based on the maximum annual average (400 mg/L × 0.271 MGD × 8.34) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code. However, the current **weekly average mass limit of 630 lbs/day** is recommended to continue because it is more restrictive.

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. Based on the type of discharge, it is unlikely that the effluent will contain PFOS or PFOA. **Therefore, monitoring is not recommended**. If information becomes available that indicates PFOS or PFOA may be present in the effluent or source water, the monitoring requirements may change.

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. The current permit has daily maximum and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

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

Where:

A = 0.633 and B = 90.0 for Limited Aquatic Life, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 2374 sample results were reported from August 2016 to January 2023. The maximum reported value was 9.30 s.u. (Standard pH Units). The effluent pH was 8.70 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.70 s.u. and the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.64 s.u. Therefore, a value of 8.70 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.70 s.u. into the equation above yields an ATC = 3.40 mg/L.

Potential changes to daily maximum Ammonia Nitrogen effluent limitations:
Subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) specifies methods for the use of the 1-Q_{10} receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

	Ammonia Nitrogen Limit mg/L
2×ATC	6.8
1-Q_{10}	3.4

The 1-Q_{10} method yields the most stringent limits for the Abbyland Foods, Inc. Abbotsford Plant.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values to be included in the permit. Because the permit includes a categorical daily max limit of 8.0 mg/L, any less restrictive water quality-based ammonia limits would not be listed in the permit. This table does not extend beyond the categorical daily maximum of 8.0 mg/L.

Daily Maximum Ammonia Nitrogen Limits – LAL

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
pH ≤ 8.2	8.0	8.4 < pH ≤ 8.5	5.0	8.7 < pH ≤ 8.8	2.8
8.2 < pH ≤ 8.3	7.3	8.5 < pH ≤ 8.6	4.1	8.8 < pH ≤ 8.9	2.4
8.3 < pH ≤ 8.4	6.0	8.6 < pH ≤ 8.7	3.4	8.9 < pH ≤ 9.0	2.0

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 1.0,
$C = 8.09 \times 10^{(0.028 \times (25 - T))}$
T = the temperature of the receiving (ºC)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Limited Forage Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 1.0,
C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
$C = 3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
$C = 1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

At Outfall 005:

		Jan. – Apr.	May – Sep.	Oct. – Dec.
Effluent Flow	Qe (MGD)	0.271	0.271	0.271
Background Information	7-Q_{10} (cfs)	0	0	0
	7-Q_2 (cfs)	0	0	0
	Ammonia (mg/L)	N/A		N/A
	Temperature (°C)	7	23	7
	pH (s.u.)	7.8	7.8	7.8
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic	84.39	30.08	84.39
	30-day Chronic	33.76	12.03	33.76
Effluent Limits mg/L	Weekly Average	84.39	30.08	84.39
	Monthly Average	33.76	12.03	33.76

At the classification change downstream to LFF (Huckleberry Road):

		Jan. – Apr.	May – Sep.	Oct. – Dec.
Effluent Flow	Qe (MGD)	0.271	0.271	0.271
Background Information	7-Q_{10} (cfs)	0.01	0.01	0.01
	7-Q_2 (cfs)	0.02	0.02	0.02
	Ammonia (mg/L)	0.26	0.08	0.26
	Temperature (°C)	7	23	7
	pH (s.u.)	7.8	7.8	7.8
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	0.0025	0.01	0.0025
	Reference Monthly Flow (cfs)	0.00425	0.017	0.00425
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	10.10	10.10	10.10
	Early Life Stages Absent	38.91	13.87	38.91
	30-day Chronic			
	Early Life Stages Present	4.04	4.04	4.04
	Early Life Stages Absent	15.56	5.55	15.56
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present		10.34	
	Early Life Stages Absent	39.14		39.14
	Monthly Average			
	Early Life Stages Present		4.20	
	Early Life Stages Absent	15.72		15.72

At the classification change downstream to WWFF (Blackberry Road):

		Jan. – Apr.	May – Sep.	Oct. – Dec.
Effluent Flow	Qe (MGD)	0.238	0.238	0.238
Background Information	7-Q_{10} (cfs)	0.1	0.1	0.1
	7-Q_2 (cfs)	0.24	0.24	0.24
	Ammonia (mg/L)	0.26	0.08	0.26
	Temperature (°C)	7	23	7
	pH (s.u.)	7.8	7.8	7.8
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	0.025	0.1	0.025
	Reference Monthly Flow (cfs)	0.051	0.204	0.051
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	7.96	4.60	7.96
	Early Life Stages Absent	12.92	4.60	12.92
	30-day Chronic			
	Early Life Stages Present	3.18	1.84	3.18
	Early Life Stages Absent	5.17	1.84	5.17
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	8.43	5.69	
	Early Life Stages Absent			13.67
	Monthly Average			
	Early Life Stages Present	3.57		
	Early Life Stages Absent		2.70	5.76

Ammonia Decay: The Department must establish limits to protect downstream uses, according to s. NR 106.32 (1) (b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32 (4) (c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_{.t} = k_{20}\,\theta^{(T-20)}$).

$$N_{Limit} = \left(\frac{N_{down}}{EXP(-k_t T)} \right)$$

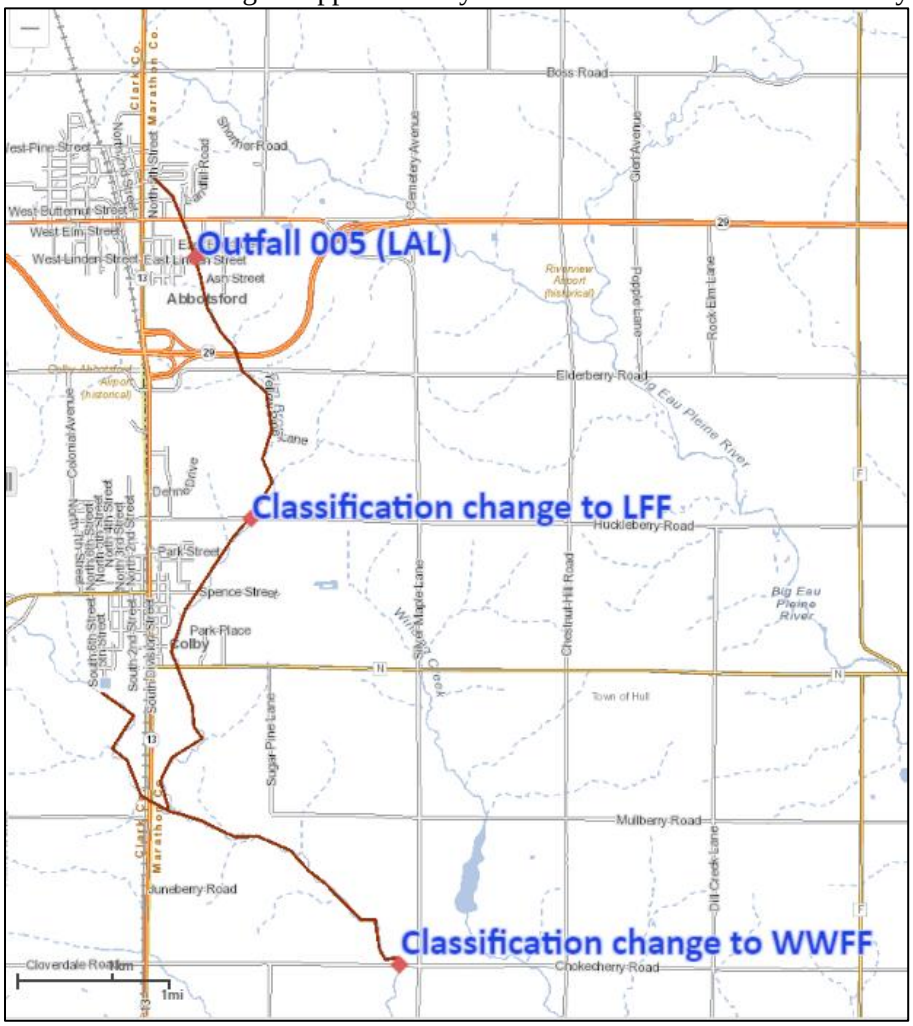
Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
N_{down} = Ammonia limit calculated based on downstream classification and flow (mg/L)
$-k_t$ = Ammonia decay rate at background stream temperature (day^{-1})
T = Travel time from outfall to downstream use (day)

Elm Brook is currently classified as limited aquatic life (LAL) from outfall 005, downstream to Lincoln Road (Huckleberry Road, approximately 2.2 miles). The stream receives the limited forage fish (LFF) classification from Huckleberry Road downstream to the confluence with Dill Creek. Elm Brook flows into Dill Creek in the LFF reach. Dill Creek is classified as a warm water forage fish stream below Blackberry Road which is downstream from the confluence of Elm Brook. The distance from

Huckleberry Road to Blackberry Road is approximately 5.6 miles. The classification of the streams and outfall locations are shown in Figure 1.

Classification change to LFF:
There is limited travel time data from the 1970's for Elm Brook and Dill Creek. Based on that data, a stream velocity of 2.7 miles/day will be used for both streams and all segments. The distance from the point of discharge to the classification change is approximately 2.2 miles for a travel time of 0.81 days.

Classification change to WWFF:
The velocity of receiving water is assumed to be 2.7 miles per day and the distance from the point of discharge to the classification change is approximately 7.8 miles for a travel time of 2.9 days.



After decay, the limits are increased as shown in the following table.

	LAL		LFF		LFF after decay		WWSF		WWSF after decay		Current Limits
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Monthly Average mg/L
Jan. – Apr.	84	34	39	16	42	17	8.4	3.6	11	4.7	3.7
May – Sep.	30	12	10	4.2	13	5.5	5.7	2.7	14	7.0	4.0
Oct. – Dec.	84	34	39	16	42	17	14	5.8	18	7.5	4.0

Effluent Data
The following table evaluates the statistics based upon ammonia data reported from August 2016 to January 2023 with those results being compared to the calculated limits to determine the need to include ammonia limits in the Abbyland Foods, Inc. Abbotsford Plant permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the values to the calculated limits.

Ammonia Nitrogen mg/L	January – April	May – September	October – December
1-day P_{99}	12.99	6.74	6.52
4-day P_{99}	7.70	3.74	3.78
30-day P_{99}	3.26	1.70	1.62
Mean*	1.36	0.87	0.72
Std	3.26	1.52	1.59
Sample size	334	412	264
Range	<0.022 - 25	<0.022 - 7.6	<0.022 - 14

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

Based on this comparison, daily limits are required throughout the year.

The permit currently has daily maximum and monthly limits. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Antidegradation:
The calculated monthly average limit of 4.7 mg/L for January-April is less restrictive than the limit of 3.7 mg/L in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR207.04 Wis. Adm. Code, the current limit of 3.7 mg/L must be continued in the reissued permit.

Conclusions and Recommendations:
In summary, after rounding to two significant figures, the single limit of 3.4 mg/L or the variable limit table may be included in the permit. The current 4.0 mg/L monthly average limit in May-December is a categorical limit and should be continued in the reissued permit because the calculated WQBELs are less restrictive. The following ammonia nitrogen limitations would be included with the variable limit table. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

	Daily Maximum mg/L	Monthly Average mg/L
January – April	Variable	3.7
May – December	Variable	4.0

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are addressed in the expression of limits section of this memo.

PART 4 – PHOSPHORUS

Technology Based Phosphorus 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 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because the Abbyland Foods, Inc. Abbotsford Plant currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent water quality-based concentration limit is given.

In addition, the need for a WQBEL for phosphorus must be considered.

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 (*May 2020). The wasteload allocations (WLA) that implement site-specific criteria for Lakes Petenwell, Castle Rock, and Wisconsin are found in Appendix K of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated April 26, 2019 and are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). The WLA that implement statewide criteria found in Appendix J of the TMDL report are no longer applicable following approval of these site-specific criteria. The daily WLAs in the WRB TMDL equals the annual WLA divided by the number of days in the year. Therefore, the daily WLA is an annual average. Since the derivation of daily WLAs from annual WLAs does not take effluent variability or monitoring frequency into consideration, maximum daily WLAs from the WRB TMDL should not be used directly as permit effluent limits.

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 continuously discharging facilities covered by the WRB TMDL are given monthly average mass limits. 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:

$$\text{TP Equivalent Effluent Concentration} = \text{Daily WLA} \div (\text{Flow Rate} * \text{Conversion Factor})$$
$$= 0.542 \text{ lbs/day} \div (0.271 \text{ MGD} * 8.34)$$
$$= 0.24 \text{ mg/L}$$

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.

$$\text{TP 6-Month Average Permit Limit} = \text{Daily WLA} * \text{6-monthly average multiplier}$$
$$= 0.542 \text{ lbs/day} * 1.48$$
$$= 0.80 \text{ lbs/day}$$

$$\text{TP Monthly Average Permit Limit} = \text{TP 6-Month Average Permit Limit} * 3$$
$$= 0.80 \text{ lbs/day} * 3$$
$$= 2.40 \text{ lbs/day}$$

The multiplier used in the six-month average calculation was determined according to TMDL implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 1.55. The facility is able to meet the permit limits based on the WLA, so the current CV is used. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as thrice weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

The WRB TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Wisconsin River. 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. Six-month average limits apply in the periods May – October and November – April.

Interim Limit – Phosphorus

The following table lists the statistics for effluent phosphorus levels from August 2016 to January 2023 for informational purposes. In the cases where reporting the mass discharge is not required in the current permit, the mass is calculated using the reported phosphorus concentration and the effluent flow rate for that day.

Total Phosphorus Statistics

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P_{99}	1.30	3.21
4-day P_{99}	0.71	1.76
30-day P_{99}	0.34	0.82
Mean	0.19	0.44
Std	0.28	0.71
Sample Size	1013	1013
Range	<0.02 - 2.8	0 - 8.17

Conclusions:
In summary, the following limits are recommended by this evaluation:

- 12-month rolling average Total Phosphorus concentration limit of 1.0 mg/L

- Monthly average Total Phosphorus mass limit of 2.40 lbs/day
- Six-month average Total Phosphorus mass limit of 0.80 lbs/day

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 [s. NR 106.55(2), Wis. Adm. Code] which has a daily maximum effluent temperature limitation of 120 ºF.

Reasonable Potential
The available discharge temperature data from August 2016 to January 2023 is shown below. The daily maximum effluent limit of 86 °F and temperature monitoring in the permit should continue.

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	78	85	-	86
FEB	83	85	-	86
MAR	81	85	-	86
APR	85	86	-	86
MAY	84	86	-	86
JUN	84	86	-	86
JUL	86	88	-	86
AUG	84	86	-	86
SEP	85	88	-	86
OCT	85	85	-	86
NOV	83	85	-	86
DEC	80	85	-	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.

- 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 100% 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:

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

Where:

Q_e = annual average flow = 0.271 MGD = 0.419 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} at the 1st downstream waterbody to support diverse fish and aquatic life
= 0.01 cfs ÷ 4 = 0.0025 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 005 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 005. 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.

WET Data History

Date Test Initiated	Acute Results LC_{50} % (% survival in 100% effluent)				Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC_{50}%)	Pass or Fail?	Use in RP?	
06/20/2017	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
08/14/2018					>100	>100		Pass	Yes	
10/28/2019					**85.9**	>100		Fail	Yes	
12/09/2019					>100	>100		Pass	Yes	
01/06/2020					>100	>100		Pass	Yes	
10/20/2020	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
03/15/2022	>100	>100	Pass	Yes	**66.5**	>100		Fail	Yes	
04/19/2022					**14.6**	>100		Fail	Yes	
12/06/2022					**71.7**	>100		Fail	Yes	

- 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)]

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 $IC_{50} \geq 100\%$).

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

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

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(5)(c), Wis. Adm. Code, Table 4)	IWC
100/14.6 = 6.8 TUc	2.6 Based on three detects	100%

[(TUc effluent) (B)(IWC)] = 17.8 > 1.0

Therefore, reasonable potential is shown and a chronic WET limit is required using the procedures in s. NR 106.08(6) and representative data from 06/20/2017 to 12/06/2022.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 1.0 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: http://dnr.wi.gov/topic/wastewater/WETguidance.html.

WET Checklist Summary

	Acute	**Chronic**
AMZ/IWC	Not Applicable. **0 Points**	IWC = 100%. **15 Points**
Historical Data	Three tests used to calculate RP. No tests failed. **0 Points**	Nine tests used to calculate RP. Four tests failed. Quarterly monitoring recommended due to 45% failure rate **0 Points**
Effluent Variability	Limit exceedances in 2016, 2017, 2019 and 2020	Same as Acute.

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	Acute	Chronic
	5 Points	**5 Points**
Receiving Water Classification	< 4 mi to the point where Dill Creek supports diverse fish and aquatic life (5 pts) **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No limits based on ATC; Ammonia, Copper, and Chloride detected. (3 pts) Additional Compounds of Concern: None **3 Points**	Limits for Chloride based on CTC;(5 pts) Ammonia, Chlorine, and Copper detected. (3pts) Additional Compounds of Concern: None **8 Points**
Additives	One Biocide (3 pts) and one Water Quality Conditioner added. (1 pt) Permittee does not have proper P chemical SOPs in place. (15 pts) **19 Points**	Additive used more than once per 4 days. **19 Points**
Discharge Category	Industrial Discharger **5 Points**	Same as Acute. **5 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	37 **Points**	57 **Points**
Recommended Monitoring Frequency (from Checklist):	1x yearly	Quarterly
Limit Required?	No	Yes Limit = 1.0 TU_c
TRE Recommended? (from Checklist)	No	Yes

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above annual acute and quarterly chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. 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 1.0 TUc as a monthly average in the effluent limits table of the permit.

- Toxicity has been measured in four of nine chronic tests conducted on this effluent, as shown in the WET Data History table above. Due to this repeated toxicity, it is recommended that a schedule be included in the permit which allows time to complete the toxicity reduction evaluation (TRE) that was initiated in 2022 to find and fix the source of the toxicity and achieve compliance with the new WET limit. The WET limit should become effective and monitoring recommended above should begin after the TRE schedule has been completed. Guidance related to TRE schedules is provided in Chapter 1.12 of the WET Guidance Document.

PART 7 – EXPRESSION OF LIMITS

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin's water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits 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.

The Abbyland Foods, Inc. Abbotsford Plant is an industrial discharge and is therefore subject to daily maximum and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, and pH, among other parameters. Mass limitations are not subject to the limit expression requirements if concentrations limits are given.

The methods for calculating limitations for industrial discharges to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(4), Wis. Adm. Code, as follows:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. Whenever a weekly average limitation is determined necessary to protect water quality:
    - A monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.
    - A daily maximum limitation shall also be included in the permit and set equal to the daily maximum WQBEL calculated under s. NR 106.06 or a daily maximum limitation calculated using the following procedure, whichever is more restrictive:

      Daily Maximum Limitation= WQBELc × DMF

      Where:

      DMF = Daily Multiplication Factor as defined in Table 2

      CV = coefficient of variation (CV) as calculated in s. NR 106.07(5m)

s. NR 106.07 (4) (e). Table 2 — Daily Multiplication Factor

CV	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DMF	1.114	1.235	1.359	1.460	1.557	1.639	1.712	1.764	1.802	1.828

CV	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
DMF	1.842	1.849	1.851	1.843	1.830	1.815	1.801	1.781	1.751	1.744

    - The monthly average chlorine limit of is recommended in the permit set equal to the weekly average limit of 7.3 μg/L

- The monthly average chloride limit of is recommended in the permit set equal to the weekly average limit of 400 mg/L.
- The daily maximum chloride limit is of 656 mg/L is recommended in the permit. This limit is more restrictive than the limit based on the ATC of 757 mg/L and is calculated using the chloride CV of 0.6 and a DMF of 1.639.

3. Whenever a monthly average limitation is determined necessary to protect water quality, a daily maximum limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

   Daily Maximum Limit = (Monthly Average Limitation × MF)

   Where:

   MF= Multiplication factor as defined in Table 1

   CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m)

   n= the number of samples per month required in the permit

s. NR 106.07 (3) (e) 4. Table 1 — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

Summary of Additional Limitations:

In conclusion, the following additional limitations are required to comply with ss. NR 106.07 and NR 205.065(7) Expression of Limits. These limits assume that the table of variable daily max ammonia limits is included in the permit.

Parameter	Daily Maximum	Weekly Average	Monthly Average	Weekly Geometric Mean	Monthly Geometric Mean	Multiplication Factor (CV)	Assumed Monitoring Frequency (n)
Ammonia Nitrogen January - April	Variable		3.7 mg/L				
Ammonia Nitrogen May - December	Variable		4.0 mg/L				
Chloride	**656 mg/L**	400 mg/L	**400 mg/L**			1.639 (0.6)	
Fecal Coliform	400 #/100 mg/L				**400 #/100 mg/L**		
Chlorine	19 µg/L	7.3 µg/L	**7.3 µg/L**				

Ammonia Nitrogen Alternative

If the pH variable daily maximum limit table is applied, calculated monthly average limits are more restrictive than the highest daily maximum limit allowed dependent on pH. Therefore, the recommended ammonia limits would meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7). However, if the single ammonia limit of 3.4 mg/L is applied as the daily maximum limit, the current monthly average limits are less restrictive. Therefore, **daily maximum and monthly average limits of 3.4 mg/L** would be required in the permit.

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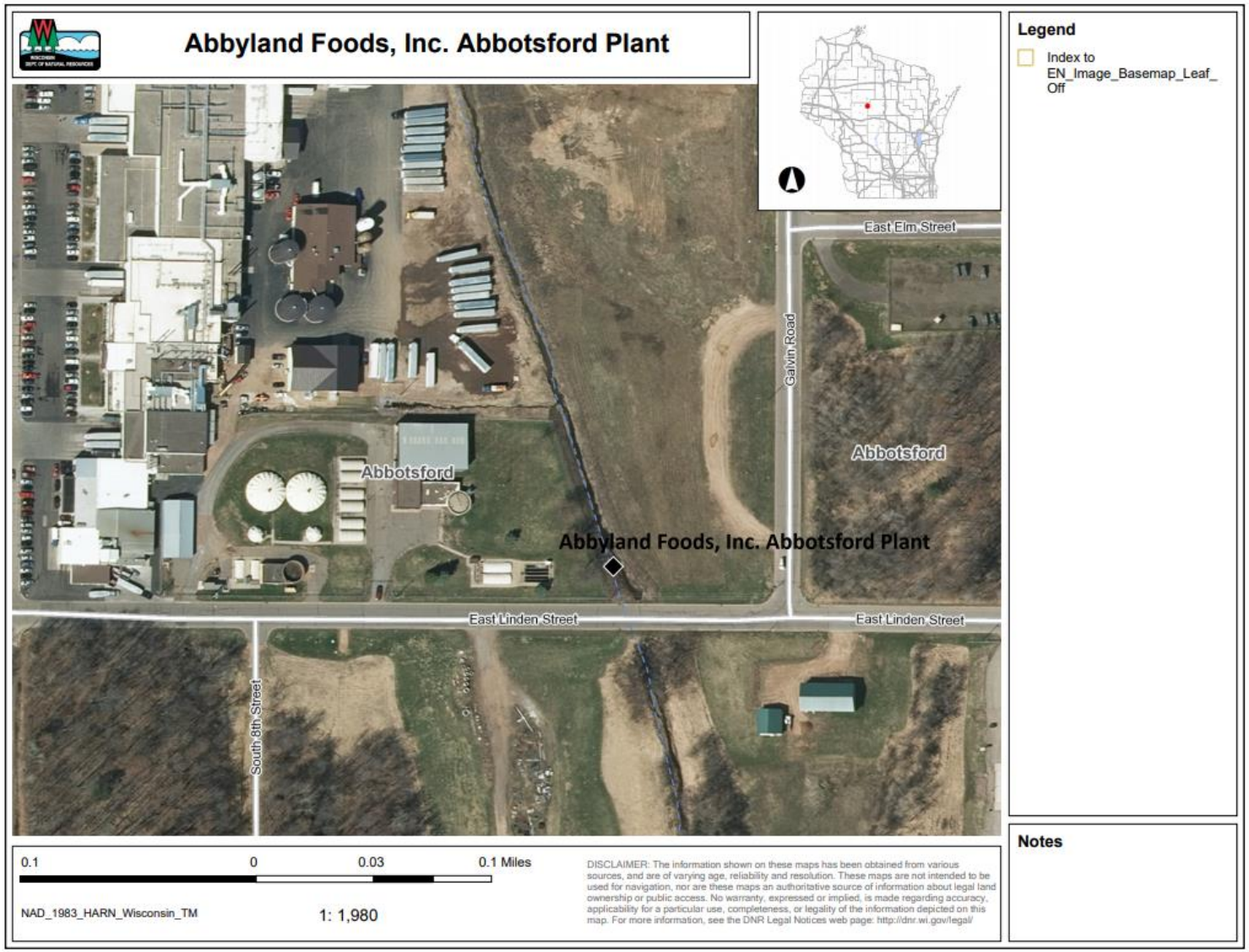
Parameter	Daily Maximum	Monthly Average
Ammonia Nitrogen	3.4 mg/L	**3.4 mg/L**


Abbyland Foods, Inc. Abbotsford Plant
Legend
Index to EN_Image_Basemap_Leaf_ Off
East Elm Street
Galvin Road
Abbotsford
Abbotsford
Abbyland Foods, Inc. Abbotsford Plant
East Linden Street
East Linden Street
South 8th Street
0.1
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NAD_1983_HARN_Wisconsin_TM
1: 1,980
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