Permit Fact Sheet

General Information

Permit Number	WI-0003085-10-0
Permittee Name and Address	Superior Refining Company LLC 2407 Stinson Avenue, Superior, WI 54880
Permitted Facility Name and Address	Superior Refining Company LLC 2407 Stinson Avenue, Superior, WI 54880
Permit Term	August 01, 2026 to July 31, 2031
Discharge Location	Outfall 001: N 46° 41.539' W 92° 03.919' Outfall 002: N 46° 41.542' W 92° 03.922'
Receiving Water	Newton Creek in St. Louis and Lower Nemadji River of Lake Superior in Douglas County
Stream Flow ($Q_{7,10}$)	0 cfs
Stream Classification	Limited Forage Fishery
Discharge Type	Existing Intermittent

Facility Description

Superior Refining Company LLC (Superior Refining) refines up to 50,000 barrels of crude oil via vacuum distillation, fluid catalytic cracking, and hydrotreating to produce gasoline, kerosene, diesel fuel, heating oils, fuel oils, liquid petroleum gas, asphalt and elemental sulfur. The activated sludge wastewater treatment system includes oil water separation, flow equalization, dissolved gas floatation, activated sludge, clarification, sand filtration, ultrafiltration (UF), granular activated carbon (GAC), ion exchange, pH neutralization, and mechanical sludge handling. The approved wastewater treatment system also includes two lagoons for storage of wastewater as needed such as for storage for retreatment to meet effluent limits or for other beneficial uses which may enhance effluent quality. The WWTF treats process area wastewater, cooling tower blowdown, boiler blowdown, process area stormwater, water softener reject, and storm water from other areas of the facility.

Superior Refining has multiple outfalls from the facility which all discharge to Newton Creek, approx. 20 ft inside the facility fence line along Stinson Ave. Effluent from the WWTF (wastewater that would be sent to Outfall 001 and occasionally Outfall 002) has been discharged to the Superior Sewage Disposal System WWTF since June 2021.

In April 2018, a fire occurred at the facility which halted refining processes at the site. Following a multi-year shutdown and rebuild of damaged equipment, the facility started processing crude oil again in March 2023. Aqueous film-forming foam (AFFF) was utilized during the incident,, and all of the recovered foam and water were held onsite in Fire Water Ponds 2 and 3, along with Stormwater Collection Pond 4, and WWTP Recycle Ponds 7 and 8. After determining that the AFFF contained per- and polyfluoroalkyl substances (PFAS), granular activated carbon (GAC) units and anion-exchange resin (IX) units were installed onsite to remove these substances prior to discharge to Newton Creek. To minimize the effect the discharge could have on public health and the environment, the department authorized this discharge under the Petroleum Contaminated Water General Permit (permit no. WI-0046531), with treatment for PFAS through the use of Granular Activated Carbon(GAC) followed by ion-specific exchange resin as necessary.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports and a site visit on **11/04/2025**, this facility could not be evaluated to be in substantial compliance with their current permit. The on-site WWTP is currently not being optimized

for surface water discharge; instead effluent is being discharged to the City of Superior's wastewater collection system through a pretreatment permit with the City.

Compliance determination made by Eric de Venecia, Wastewater Engineer on 11/25/2025.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701		All voluntary monitoring of the water supply for mercury shall be reported at this sample point. Sampling is performed at the city tap within Superior Refining Company's wastewater treatment plant.
001	Maximum Day: 0.357 MGD Maximum 7-Day Avg: 0.340 MGD Maximum 30-Day Avg: 0.251 MGD Maximum Annual Avg: 0.101 MGD	Process area wastewater, boiler blowdown, water softener reject, process area stormwater runoff, construction area stormwater runoff, and stormwater collected in Fire Water Pond 2, Fire Water Pond 3, Fire Water Pond 5, Stormwater Collection Pond 4, WWTP Recycle Pond 7, and WWTP Recycle Pond 8 prior to discharge to Newton Creek.
002	Maximum Day: 58 gpd Maximum 7-Day Avg: 8 gpd Maximum 30-Day Avg: 2 gpd Maximum Annual Avg: 0.16 gpd	Stormwater sampled after Storm Water Collection Pond 4 (emergency overflow conditions only). Water from Pond 4 is now routed through the treatment system with eventual monitoring and discharge through Outfall 001. Note: Discharge to surface water through this outfall would be considered a bypass and is prohibited. Monitoring requirements are provided to evaluate the impacts from any emergency overflow events should they occur.
004		Outfall 004 limits and requirements apply only to periodic direct discharge of treated hydrostatic test water to Newton Creek sampled prior to discharge. The hydrostatic test water shall be treated via an oil water separator prior to sampling and discharge.
105	N/A	DMR Sample Point for reporting results of mercury field blanks.
107		Samples are taken at the sample point inside SRC's WWTP prior to discharge to the pipe that connects to the City of Superior's sewer system.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- Water Supply Mercury Results

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Grab	

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

2 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 105- MERCURY FIELD BLANK

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Blank	

2.1.1 Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

2.1.2 Explanation of Limits and Monitoring Requirements

Mercury Field Blank- Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

2.2 Sample Point Number: 107 DISCHARGE TO CITY

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Estimated	
BOD_5, Total		mg/L	Weekly	Grab	
BOD_5, Total		lbs/day	Weekly	Calculated	
Suspended Solids, Total		mg/L	Weekly	Grab	

Suspended Solids, Total		lbs/day	Weekly	Calculated	
pH (Maximum)		su	Daily	Grab	
pH (Minimum)		su	Daily	Grab	
Dissolved Oxygen		mg/L	Weekly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Monthly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		lbs/day	Monthly	Calculated	
Phosphorus, Total		mg/L	Weekly	Grab	
Phosphorus, Total		lbs/day	Weekly	Calculated	
Barium, Total Recoverable		µg/L	Quarterly	Grab	
Barium, Total Recoverable		lbs/day	Quarterly	Calculated	
Arsenic, Total Recoverable		µg/L	Monthly	Grab	
Arsenic, Total Recoverable		grams/day	Monthly	Calculated	
Selenium, Total Recoverable		µg/L	Monthly	Grab	
Selenium, Total Recoverable		lbs/day	Monthly	Calculated	
Mercury, Total Recoverable		ng/L	Monthly	Grab	
Mercury, Total Recoverable		mg/day	Monthly	Calculated	
Chloride		mg/L	Weekly	Grab	
Chloride		lbs/day	Weekly	Calculated	
Temperature Maximum		deg F	Daily	Grab	
Acute WET		TU_a	Monthly	Grab	
Chronic WET		TUc	Monthly	Grab	
COD		mg/L	Weekly	Grab	
COD		lbs/day	Weekly	Calculated	
Oil & Grease (Hexane)		mg/L	Weekly	Grab	

Oil & Grease (Hexane)		lbs/day	Weekly	Calculated	
Phenols, Total		mg/L	Weekly	Grab	
Phenols, Total		lbs/day	Weekly	Calculated	
Sulfide, Total		mg/L	Weekly	Grab	
Sulfide, Total		lbs/day	Weekly	Calculated	
Chromium, Total Recoverable		mg/L	Weekly	Grab	
Chromium, Total Recoverable		lbs/day	Weekly	Calculated	
Chromium $^{+6}$		mg/L	Weekly	Grab	
Chromium $^{+6}$		lbs/day	Weekly	Calculated	
PFOA		ng/L	Monthly	Grab	
PFOS		ng/L	Monthly	Grab	

2.2.1 Changes from Previous Permit:

Sample Point – Sample point and all associated monitoring requirements added

2.2.2 Explanation of Limits and Monitoring Requirements:

These monitoring requirements have been added to ensure that all limits at outfall 001 can be met prior to the permittee initiating the discharge through outfall 001. These monitoring requirements will come back into effect after any exceedance of limits at outfall 001.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 001- PRIMARY OUTFALL

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Daily Max	30 mg/L	Weekly	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	Weekly	24-Hr Flow Prop Comp	
BOD5, Total	Daily Max	860 lbs/day	Weekly	Calculated	
BOD5, Total	Monthly Avg	478 lbs/day	Weekly	Calculated	
Suspended Solids,	Daily Max	30 mg/L	Weekly	24-Hr Flow	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Total				Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	599 lbs/day	Weekly	Calculated	
Suspended Solids, Total	Monthly Avg	382 lbs/day	Weekly	Calculated	
pH (Maximum)	Daily Max	9.0 su	Daily	Continuous	
pH (Minimum)	Daily Min	6.0 su	Daily	Continuous	
Dissolved Oxygen	Daily Min	4.0 mg/L	Weekly	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	9.0 mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.6 mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	573 lbs/day	Monthly	Calculated	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	261 lbs/day	Monthly	Calculated	
Phosphorus, Total	6-Month Avg	0.15 lbs/day	Weekly	Calculated	
Phosphorus, Total	6-Month Avg	0.075 mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	0.225 mg/L	Weekly	24-Hr Flow Prop Comp	
Barium, Total Recoverable	Weekly Avg	170 ug/L	Quarterly	Grab	
Barium, Total Recoverable	Weekly Avg	0.52 lbs/day	Quarterly	Calculated	
Arsenic, Total Recoverable	Monthly Avg	13 ug/L	Monthly	24-Hr Flow Prop Comp	
Arsenic, Total Recoverable	Monthly Avg	17.6 grams/day	Monthly	Calculated	
Selenium, Total Recoverable	Weekly Avg	47 ug/L	Monthly	24-Hr Flow Prop Comp	
Selenium, Total Recoverable	Weekly Avg	63.5 grams/day	Monthly	Calculated	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable	Monthly Avg	1.3 ng/L	Monthly	Grab	
Mercury, Total Recoverable	Monthly Avg	1.76 mg/day	Monthly	Calculated	
Chloride	Weekly Avg	400 mg/L	Weekly	24-Hr Flow Prop Comp	
Chloride	Weekly Avg	1,190 lbs/day	Weekly	Calculated	
Temperature Maximum	Daily Max	81 deg F	Daily	Continuous	This limit applies in April
Temperature Maximum	Weekly Avg	54 deg F	Daily	Continuous	This limit applies in January, February, November, and December
Temperature Maximum	Weekly Avg	57 deg F	Daily	Continuous	This limit applies in March
Temperature Maximum	Weekly Avg	63 deg F	Daily	Continuous	This limit applies in April and October
Temperature Maximum	Weekly Avg	70 deg F	Daily	Continuous	This limit applies in May
Temperature Maximum	Weekly Avg	77 deg F	Daily	Continuous	This limit applies in June
Temperature Maximum	Weekly Avg	81 deg F	Daily	Continuous	This limit applies in July
Temperature Maximum	Weekly Avg	79 deg F	Daily	Continuous	This limit applies in August
Temperature Maximum	Weekly Avg	73 deg F	Daily	Continuous	This limit applies in September
Acute WET		TUa	Monthly	24-Hr Flow Prop Comp	
Chronic WET	Monthly Avg	1.0 TUc	Monthly	24-Hr Flow Prop Comp	
COD		mg/L	Weekly	24-Hr Flow Prop Comp	
COD	Daily Max	6,426 lbs/day	Weekly	Calculated	
COD	Monthly Avg	3,335 lbs/day	Weekly	Calculated	
Oil & Grease (Hexane)		mg/L	Weekly	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Oil & Grease (Hexane)	Daily Max	261 lbs/day	Weekly	Calculated	
Oil & Grease (Hexane)	Monthly Avg	139 lbs/day	Weekly	Calculated	
Phenols, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Phenols, Total	Daily Max	6.4 lbs/day	Weekly	Calculated	
Phenols, Total	Monthly Avg	3.1 lbs/day	Weekly	Calculated	
Sulfide, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Sulfide, Total	Daily Max	5.6 lbs/day	Weekly	Calculated	
Sulfide, Total	Monthly Avg	2.5 lbs/day	Weekly	Calculated	
Chromium, Total Recoverable		mg/L	Weekly	24-Hr Flow Prop Comp	
Chromium, Total Recoverable	Daily Max	13 lbs/day	Weekly	Calculated	
Chromium, Total Recoverable	Monthly Avg	7.6 lbs/day	Weekly	Calculated	
Chromium +6		mg/L	Weekly	24-Hr Flow Prop Comp	
Chromium +6	Daily Max	1.04 lbs/day	Weekly	Calculated	
Chromium +6	Monthly Avg	0.49 lbs/day	Weekly	Calculated	
4,4'-DDE		µg/L	Once	Grab	
4,4'-DDT		µg/L	Once	Grab	
BHC, alpha		µg/L	Once	Grab	
Chlordane		µg/L	Once	Grab	
Dieldrin		µg/L	Once	Grab	
Dioxin, 2,3,7,8-TCDD		ng/L	Once	Grab	
Heptachlorepoxide		µg/L	Once	Grab	
Hexachlorobenzene		µg/L	Once	Grab	
PCB Total		µg/L	Once	Grab	
Toxaphene		µg/L	Once	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PFOA		ng/L	Monthly	Grab	
PFOS	Monthly Avg	8 ng/L	Monthly	Grab	

3.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

BOD, TSS, and Nitrogen – Daily max and monthly average limits added

Arsenic and Mercury – Monthly average concentration and mass limits added

Selenium and Chloride – Weekly average concentration and mass limits added

Temperature – Daily max limit added

Acute WET – Monthly monitoring added

Chronic WET – Limit and sample frequency changed

COD, Oil & Grease, Phenols, Sulfide, Total Chromium, and Chromium +6 = Weekly monitoring, daily max limits, and monthly average limits added

PFOA – Monthly monitoring added

PFOS – Monthly average limit and monthly monitoring added

3.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated **June 10, 2025** and the attached technology based effluent limits (TBEL) document.

These limits come into effect once the department has provided the permittee with approval to initiate or resume the discharge to surface water.

Acute and Chronic WET

The WQBEL memo recommends quarterly chronic WET tests and 2x/yr acute WET tests, however due to concerns over toxicity in Newton Creek monthly acute and chronic WET testing has been included for at least the first year of the permit term.

PFOA and PFOS

Monitoring for PFOA and PFOS has been added due to the fire suppression pond being known to contain these pollutants of concern. Due to this contamination, the department's understanding is that source reduction beyond treatment is not feasible. To ensure the existing PFAS treatment system operates effectively, a PFOS limit will be in effect upon permit reissuance.

3.2 Sample Point Number: 002- POND 4 EMERGENCY BYPASS

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PFOA		ng/L	Per Occurrence	Grab	Monitoring required whenever discharging
PFOS		ng/L	Per Occurrence	Grab	Monitoring required whenever discharging
Flow Rate		MGD	Per Occurrence	Estimated	Monitoring required whenever discharging
Oil & Grease (Hexane)		mg/L	Per Occurrence	Grab	Monitoring required whenever discharging

3.2.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

Oil & Grease – Daily max and monthly average limits removed

3.2.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated **June 10, 2025.**

Oil & Grease

Since discharging to surface water via this outfall is prohibited, and the monitoring requirements at this outfall are provided to evaluate the impacts from any emergency overflow event, the limits for oil & grease have been removed.

3.3 Sample Point Number: 004- HYDROSTATIC TEST WATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Per Occurrence	Estimated	
Suspended Solids, Total	Daily Max	30 mg/L	Per Occurrence	Grab	
Suspended Solids, Total	Monthly Avg	20 mg/L	Per Occurrence	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	Per Occurrence	Grab	
Oil & Grease (Hexane)	Daily Max	15 mg/L	Per Occurrence	Grab	
pH Field	Daily Max	9.0 su	Per	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
			Occurrence		
pH Field	Daily Min	6.0 su	Per Occurrence	Grab	

3.3.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit.

3.3.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated **June 10, 2025**.

4 Schedules

4.1 Toxicity Evaluation

Required Action	Due Date
Toxicity Reduction Evaluation Plan: Submit part one of a Toxicity Reduction Evaluation (TRE) plan describing procedures to be used to identify the source(s) responsible for the effluent toxicity. This action shall be completed within one month of a failed WET test.	
Toxicity Reduction Evaluation #1: Implement part one of the TRE plan, make a reasonable attempt to identify the source(s) of the toxicity, and submit a report to the Department presenting the results of the evaluation. This action shall be completed within 13 months of a failed WET test.	
Toxicity Reduction Evaluation Plan : Submit part two of a Toxicity Reduction Evaluation (TRE) plan describing actions to be taken to reduce or eliminate the toxicity identified in part one of the TRE and the dates by which those actions will be implemented. This action shall be completed within 14 months of a failed WET test.	
Toxicity Reduction Evaluation #2: Complete all actions identified in the TRE plan and achieve compliance with the effluent toxicity limitation. This action shall be completed within 24 months of a failed WET test.	

4.1.1 Explanation of Schedule

Toxicity Evaluation

A schedule for completing a Toxicity Reduction Evaluation has been included as part of this reissuance due to concerns over fin erosion in Newton Creek. The actions in this schedule only need to be completed if the results of a WET test are a failure.

Attachments

Technology Based Effluent Limits

Water Quality Based Effluent Limits

Prepared By: Sawyer Hanson Wastewater Engineer **Date: Enter Date**

Attachment #1: Technology Based Effluent Limits (TBELs)

Size Factor: Based on a throughput of 50,000 bbl/day and in accordance with s. NR 279.22(2)(a), the size factor for this facility has been determined to be 1.04.

1000 bbl. of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

Process Configuration:

Process	Total Throughput (bbl/day)	Capacity Relative to Total	Weighting Factor	Processing Configuration
Atmospheric Crude Distillation	50,000	1	1	1
Crude Desalting	50,000	1	1	1
Vacuum Crude Distillation	32,000	0.64	1	0.64
Fluid Catalytic Cracking	11,323	0.22646	6	1.3588
Asphalt Production	19,500	0.39	12	4.68

The total processing configuration for this facility is 8.68, which in accordance with s. NR 279.22(2)(b) corresponds to a process factor of 1.67.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.0
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

TBELs: To calculate the mass limits for this permit reissuance the effluent limits under s. NR 279.22(1) are multiplied by the size factor and the process factor and converted from lbs/1,000 bbl of feedstock to lbs/day. The following effluent limits are applicable at Outfall 001:

Pollutant or Pollutant Property	Maximum Daily Limit (lbs/1,000 bbl of feedstock)	Monthly Average Limit (lbs/1,000 bbl of feedstock)
BOD_5	9.9	5.5
TSS	6.9	4.4
COD	74.0	38.4
Oil & Grease	3.0	1.6
Phenolic Compounds	0.074	0.036
Ammonia as N	6.6	3.0
Sulfide	0.065	0.029
Total Chromium	0.15	0.088
Hexavalent Chromium	0.012	0.0056

In addition to the limits above pH limits of less than 6.0 and greater than 9.0 are also applicable.

The formula used to determine the mass limits for the permit as well as an example calculation are shown below:

Mass limit × Process Factor × Size Factor × Max Daily Feedstock = Calculated Mass Limit

9.9 lbs/1,000 bbl of feedstock × 1.67 × 1.04 × 50,000 bbl of feedstock/day = 860 lbs/day

The following table provides the calculated mass limits that are included in the permit:

Pollutant or Pollutant Property	Maximum Daily Limit (lbs/day)	Monthly Average Limit (lbs/day)
BOD_5	860	478
TSS	599	382
COD	6,426	3,335
Oil & Grease	261	139
Phenolic Compounds	6.4	3.1
Ammonia as N	573	261
Sulfide	5.6	2.5
Total Chromium	13	7.6
Hexavalent Chromium	1.04	0.49

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 10, 2025

TO: Sawyer Hanson – WY/3

FROM: Michael Polkinghorn – NOR/Rhinelander Service Center Michael Polkinghorn

SUBJECT: Water Quality-Based Effluent Limitations for Superior Refining Company LLC
WPDES Permit No. WI-0003085-10-0

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 Superior Refining Company LLC in Douglas County. This industrial facility discharges to Newton Creek, located in the St. Louis and Lower Nemadji Rivers Watershed in the Lake Superior Basin. 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 the following outfalls and/or sample points:

Outfall 001 – Primary Outfall

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	6-Month Average	12-Month Rolling Average	Footnotes
Flow Rate							1
BOD_5	30 mg/L			15 mg/L			1, 2
TSS	30 mg/L			20 mg/L			1, 2
pH	9.0 s.u.	6.0 s.u.					1, 2, 3
Dissolved Oxygen		4.0 mg/L					1, 2
Ammonia Nitrogen	9.0 mg/L			5.6 mg/L			1
Phosphorus				0.225 mg/L	0.075 mg/L 0.15 lbs/day	1.0 mg/L	1, 4
Barium (Total Recoverable)			170 µg/L 0.52 lbs/day				1
Arsenic (Total Recoverable)				13 µg/L			5
Selenium (Total Recoverable)			47 µg/L				5
Mercury (Total Recoverable)				1.3 ng/L			5
Chloride			400 mg/L				5
Temperature January February March April May June July August	81 °F		 54 °F 54 °F 57 °F 63 °F 70 °F 77 °F 81 °F 79 °F				6

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	6-Month Average	12-Month Rolling Average	Footnotes
September October November December			73 °F 63 °F 54 °F 54 °F				
Chloride							7
Mercury (Total Recoverable)							7
Acute WET							8, 10
Chronic WET				1.0 TUc			9, 10

Footnotes:

1. No changes from the current permit.
2. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
3. This is a technology based effluent limit (TBEL) applicable to discharges with continuous pH monitoring. Conditions of the effluent limit are outlined in section 3.2.1.5 of the current permit. TBEL pH limits are consistent with sections NR 102.04(4)(c), and s. NR 102.05(3)(h), Wis. Adm. Codes.
4. The 12-month rolling average limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is a WQBEL as described in s. NR 217.14, Wis. Adm. Code. The remaining limits are WQBELs as described in s. 217.13, Wis. Adm. Code.
5. In the absence of a variance, a mass limit as described in s. NR 106.07(2)(c), Wis. Adm. Code, would also be required.
6. Options to explore potential relief from temperature limits are explained in detail in the August 15, 2013 department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards* http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf
7. Monthly monitoring for 1 year is recommended during the reissued permit term.
8. Twice/yr acute whole effluent toxicity (WET) testing is recommended during the reissued permit term. 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. Acute 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). Sampling WET concurrently with any chemical-specific toxic substances is recommended.
9. Quarterly chronic WET testing is recommended during the reissued permit term. According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. 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 001 shall be a grab sample collected from Newton Creek upstream of the discharge. If flow is not available upstream of the discharge to Newton Creek, another surface water with similar characteristics or a synthetic (standard) laboratory water may be used for dilution. Sampling WET concurrently with any chemical-specific toxic substances is recommended.
10. Superior Refining currently sends its effluent to the Superior Sewage Disposal System WWTF with the option of discharging to Newton Creek when discharge to the municipality is not allowed due to a high flow event. Due to concerns related to effluent toxicity and the uncertainty

of the duration and frequency of discharges to Newton Creek, WET monitoring will be required on the effluent at an in-plant sample point before reaching the sewershed. This will ensure that WET data is available to characterize the effluent toxicity of potential discharges to Newton Creek and allow the facility to investigate and remove any sources of toxicity in their effluent before consideration of a creek discharge.

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

Outfall 002 – Pond 4 Emergency Overflow

Parameter	Daily Maximum	Monthly Average	Footnotes
Flow Rate			1, 2
Oil & Grease (Hexane)	30 mg/L	15 mg/L	1, 2
PFOS and PFOA			1, 2

Footnotes:

1. No changes from the current permit.
2. Monitoring whenever the discharge occurs.

Outfall 003 – Stormwater Runoff

Parameter	Daily Maximum	Monthly Average	Footnotes
Flow Rate			1, 2
Oil & Grease (Hexane)	30 mg/L	15 mg/L	1, 2

Footnotes:

1. No changes from the current permit.
2. Monitoring whenever the discharge occurs.

Outfall 004 – Hydrostatic Test Water

Parameter	Daily Maximum	Daily Minimum	Monthly Average	Footnotes
Flow Rate				1, 2
Oil & Grease (Hexane)	30 mg/L		15 mg/L	1, 2
TSS	30 mg/L		20 mg/L	1, 2, 3
Dissolved Oxygen		4.0 mg/L		1, 2, 3
pH field	9.0 s.u.	6.0 s.u.		1, 2, 3

Footnotes:

1. No changes from the current permit.
2. Monitoring whenever the discharge occurs.
3. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, discharge area map, & thermal table.

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Attachment #1

Water Quality-Based Effluent Limitations for
Superior Refining Company LLC

WPDES Permit No. WI-0003085-10-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

Superior Refining Company LLC (Superior Refining) refines up to 50,000 barrels of crude oil via vacuum distillation, fluid catalytic cracking, and hydrotreating to produce gasoline, kerosene, diesel fuel, heating oils, fuel oils, liquid petroleum gas, asphalt and elemental sulfur.

The activated sludge wastewater treatment system includes oil water separation, flow equalization, dissolved gas floatation, activated sludge, clarification, sand filtration, ultrafiltration (UF), granular activated carbon (GAC), ion exchange, pH neutralization, and mechanical sludge handling. The approved wastewater treatment system also includes two lagoons for storage of wastewater as needed such as for storage for retreatment to meet effluent limits or for other beneficial uses which may enhance effluent quality. The WWTF treats process area wastewater, cooling tower blowdown, boiler blowdown, process area stormwater, water softener reject, and storm water from other areas of the facility.

Superior Refining has multiple discharges from the facility which all discharge to Newton Creek, approx. 20 ft inside the facility fence line along Stinson Ave. Effluent from the WWTF (wastewater that would be sent to Outfall 001 and occasionally Outfall 002) has been discharged to the Superior Sewage Disposal System WWTF since June 2021 but the facility is planning installation of additional treatment to allow for effluent discharge to resume. These discharges are as follows:

- Outfall 001 consists of boiler blowdown, water softener reject, process area stormwater runoff, construction area stormwater runoff, and stormwater collected in Fire Water Pond 2, Fire Water Pond 3, Fire Water Pond 5, Stormwater Collection Pond 4, WWTP Recycle Pond 7, and WWTP Recycle Pond 8.
- Outfall 002 consists of stormwater sampled after Stormwater Collection Pond 4 (overflow conditions only). Water from Pond 4 is routed through the WWTP for treatment with eventual monitoring and discharge through Outfall 001.
- Outfall 003 consists of stormwater from the tank farm secondary containment.
- Outfalls 004 consists of hydrostatic test water treated via an oil/water separator prior to sampling and discharge.

Outfalls 002, 003, and 004 are not addressed in this evaluation due to the simple composition and/or emergency nature of those discharges. The remainder of this evaluation will consider Outfall 001 only.

Attachment #2 is a discharge area map of the various outfalls.

In April 2018, a fire occurred at the facility which halted production. The facility started processing crude oil again in March 2023 following a multi-year shutdown and rebuild. Aqueous film-forming foam

(AFFF) was used to manage the fire, and all of the recovered foam and water were held onsite in Fire Water Ponds 2 and 3, along with Stormwater Collection Pond 4, and WWTP Recycle Ponds 7 and 8. After determining that the AFFF contained per- and polyfluoroalkyl substances (PFAS), granular activated carbon (GAC) units and anion-exchange resin (IX) units were installed onsite to remove these substances prior to discharge to Newton Creek. To minimize the effect the discharge could have on public health and the environment, the department authorized this discharge under the Petroleum Contaminated Water General Permit (permit no. WI-0046531), with an understanding that PFOA and PFOS would be treated to non-detectable levels prior to discharge. That permit and those conditions remain effective, separate from this individual permit.

Existing Permit Limitations

The current permit, expired on 12/31/2024, includes the following effluent limitations and monitoring requirements.

Outfall 001 – Primary Outfall

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	6-Month Average	12-Month Rolling Average	Footnotes
Flow Rate							1
BOD_5	30 mg/L			15 mg/L			2, 3
TSS	30 mg/L			20 mg/L			2, 3
pH	9.0 s.u.	6.0 s.u.					2, 3, 4
Dissolved Oxygen		4.0 mg/L					2, 3
Ammonia Nitrogen	9.0 mg/L			5.6 mg/L			
Phosphorus				0.225 mg/L	0.075 mg/L 0.15 lbs/day	1.0 mg/L	3, , 5
Barium (Total Recoverable)			170 µg/L 0.52 lbs/day				6
Temperature February March April May June July August September November			 54 °F 57 °F 63 °F 70 °F 77 °F 81 °F 79 °F 73 °F 54 °F				7
Toxic substances – multiple							8
Chronic WET				11 TUc			9

Footnotes:

1. Monitoring only.
2. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.

3. **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.
4. This is a technology based effluent limit (TBEL) applicable to discharges with continuous pH monitoring. Conditions of the effluent limit are outlined in section 3.2.1.5 of the current permit. TBEL pH limits are consistent with sections NR 102.04(4)(c), and s. NR 102.05(3)(h), Wis. Adm. Codes.
5. The 12-month rolling average limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is a WQBEL as described in s. NR 217.14, Wis. Adm. Code. The remaining limits are WQBELs as described in s. 217.13, Wis. Adm. Code. All WQBELs became effective in the current permit on 07/01/2021.
6. These limits became effective in the current permit on 07/01/2021.
7. These limits became effective in the current permit on 08/01/2021.
8. The current permit required monitoring for the following substances: oil & grease (hexane), chloride, mercury (total recoverable (TR)), sulfur as sulfide, total phenols, chromium (+6), chromium (TR), arsenic (TR), cadmium (TR), copper (TR), amenable cyanide, lead (TR), nickel (TR), selenium (TR), silver (TR), zinc (TR), hardness, PAHs, alpha BHC, chlordane, 4,4'-DDT, 4,4'-DDE, heptachlorepoxide, hexachlorobenzene, total PCB, 2,3,7,8-TCDD dioxin, dieldrin, and toxaphene.
9. Annual chronic whole effluent toxicity (WET) tests were required during the current permit term. The IWC for chronic WET was 9.1%.

Outfall 002 – Pond 4 Emergency Overflow

Parameter	Daily Maximum	Monthly Average	Footnotes
Flow Rate			1
Oil & Grease (Hexane)	30 mg/L	15 mg/L	1
PFOS and PFOA			1

Footnotes:

1. Monitoring whenever the discharge occurs.

Outfall 003 – Stormwater Runoff

Parameter	Daily Maximum	Monthly Average	Footnotes
Flow Rate			1
Oil & Grease (Hexane)	30 mg/L	15 mg/L	1

Footnotes:

1. Monitoring whenever the discharge occurs.

Outfall 004 – Hydrostatic Test Water

Parameter	Daily Maximum	Daily Minimum	Monthly Average	Footnotes
Flow Rate				1
Oil & Grease (Hexane)	30 mg/L		15 mg/L	1
TSS	30 mg/L		20 mg/L	1, 2
Dissolved Oxygen		4.0 mg/L		1, 2
pH field	9.0 s.u.	6.0 s.u.		1, 2

Footnotes:

1. Monitoring whenever the discharge occurs.
2. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.

Receiving Water Information

- Name: Newton Creek
- Waterbody Identification Code (WBIC):
  - Newton Creek: 2843650
  - Superior Bay (Lake Superior): 2751220
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
  - Newton Creek: Limited Forage Fish (LFF) community as described in s. NR 104.10(3)(b), Wis. Adm. Code.
  - Superior Bay (Lake Superior): Cold Water (CW) community, public water supply, outstanding resource water (ORW). This surface waterbody is approx. 1.7 mi downstream of the outfalls.
  - Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharges are within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: Low flows for Newton Creek are zero. For Superior Bay, a ten-to-one dilution ratio will be used for calculating effluent limitations based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because the receiving water does not exhibit a unidirectional flow at the point of discharge.
  - A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
- Hardness: 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: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None for Newton Creek. There are several other dischargers to Superior Bay, however, they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: Newton Creek is on the Clean Water Act (CWA) Section 303(d) list for foam, flocs, scum, oil slicks, polycyclic aromatic hydrocarbons (PAHs), and metals impairments. Lake Superior is on the CWA Section 303(d) list for mercury, polychlorinated biphenols (PCBs), and

perfluorinated alkylated substances (PFOS) contamination in fish tissue. These pollutants do not impact the WQBELs due to the concerned concentrations being limited to the fish tissue.

Effluent Information

- Flow rate(s):
  365-day maximum annual average: 0.295 million gallons per day (MGD)
  For reference, the actual average flow from January 2020 – June 2021 was 0.219 MGD excluding days discharge did not occur.
- Hardness = 134 mg/L as $CaCO_3$. This value represents the geometric mean of samples (n = 2, March 2021 – June 2024) from application and current permit monitoring.
- 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: Superior municipal supply.
- Additives: The facility has included 12 additives in the permit application that will be used in the process waste stream to Outfall 001. These additives are listed below:
  - Veolia Steamate LSA1791 – Stream condensate treatment.
  - Veolia Solus AP24 – Internal boiler water treatment.
  - Veolia Polyfloc AE1702 – Flocculant.
  - Hawkins Phosphoric acid 75% - Microbial nutrient.
  - Veolia Klaraid CDP2727 – Coagulant.
  - Veolia Cortrol OS5700 – Water-based dissolved oxygen scavenger and metal passivator.
  - Hawkins Sodium Hydroxide 50% - NA.
  - Veolia Bioplus BA3971 – Bioaugmentation aid.
  - Veolia FoamTrol AF3031 – Defoaming agent.
  - Veolia MPH2500 (Sodium hydroxide) – pH control and membrane cleaner.
  - Azone 15 (Sodium hypochlorite) – Membrane cleaner.
  - Veolia BETZ MPH5000 Citric acid – Membrane cleaner.
  - An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. In this case, the facility has an extensive amount of treatment steps in their WWTF including multiple steps of tertiary treatment. It is very unlikely any detectable amounts of these additives will be present in Outfall 001. **Therefore, an additive review is not needed at this time.**
- Effluent characterization: This facility is categorized as a primary industrial discharger, so the permit application required effluent sample analyses for all the "priority pollutants" except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for multiple toxic substances.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the columns titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.
- Mercury field blanks (Sample Point 105) have not indicated contamination was present from either sample transportation or environmental sources. Therefore, no effluent mercury samples were excluded from this evaluation due to this consideration.
- Magnesium was detected in Outfall 001 (9.76 mg/L, 06/13/2024). Because there are no promulgated state water quality standards or secondary values for this substance, limits cannot be determined at this time.

Attachment #1

Outfall 001 Chloride Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	273
4-day P_{99}	209
30-day P_{99}	175
Mean	157
Std	40
Sample size	47
Range	91 - 255

Outfall 001 Multiple Toxic Substances Effluent Data

Sample Date	Chromium (µg/L)	Chromium (+6, µg/L)	Barium (µg/L)	Arsenic (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Mercury (ng/L)
02/12/2020	<0.16	<0.54	39				
04/02/2020	0.45	<0.54	42				
08/10/2020	<0.16	<0.54	38.3				
11/17/2020	<0.16	<0.54	55.2				
01/14/2021	0.30	<0.54	52.4				
03/23/2021				1.7	1.7	0.72	
04/16/2021	0.80	0.37	51.1				
03/18/2020							<0.10
06/10/2020							0.10
09/17/2020							<0.10
12/15/2020							<0.10
03/18/2021							<0.10
05/13/2021							0.11
05/29/2024			123				
06/13/2024				7.5	3.5	26.1	0.698
Mean*	0.26	0.062	57	4.6	2.6	13	0.13

"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

The following table presents the average concentrations and loadings at Outfall 001 from January 2020 – June 2021 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement*	Average Mass Discharged
BOD_5	0.18 mg/L	
TSS	0.19 mg/L	
pH field	8.0 s.u.	
Dissolved Oxygen	9.0 mg/L	
Ammonia Nitrogen	0.044 mg/L	
Phosphorus	0.058 mg/L	NA**

Barium	57 mg/L	0.092 lbs/day
Temperature	70 °F	

*Any results for a substance below the level of detection (LOD) were included as zeroes in calculation of average.
** Parameter not reported during the current permit term.

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

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

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

Acute Limits based on 1-Q_{10}

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

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

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.
Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).
Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.
f = Fraction of the effluent flow that is withdrawn from the receiving water, and
Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

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

The following tables list the calculated WQBELs 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) and mercury (ng/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
RECEIVING WATER FLOW = 0 cfs.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	340	68	4.6		7.5
Mercury (ng/L)**		830	830	166	0.13		0.698
Nickel	134	602	602	120	2.6		3.5
Chloride (mg/L)		757	757			273	255
Barium***		3,077.3	3,077.3	615	57		123
Naphthalene***		344.26	344.26	69	0.031		0.031

* 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.
** A mixing zone is not allowed for discharges of BCCs in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
*** The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q_{10} s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6), Wis. Adm Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)
RECEIVING WATER FLOW = 0 cfs.

SUBSTANCE	REF. HARD. mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152	152	30	4.6	
Mercury (ng/L)*		440	440	88	0.13	
Nickel	134	67	67	13	2.6	
Chloride (mg/L)		395	395			209
Selenium		47	47	**9.3**	**13**	
Barium**		170.96	170.96	**34**	**57**	
Naphthalene**		19.12	19.12	3.8	0.031	

* A mixing zone is not allowed for discharges of BCCs in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
** The limit for this substance is based on a secondary value.

Monthly Average Limits based on Wildlife Criteria (WC)
RECEIVING WATER FLOW = 0 cfs.

SUBSTANCE	WC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Mercury (ng/L)*	1.3	1.3	0.26	0.13

* A mixing zone is not allowed for discharges of BCCs in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.

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.

		MO'LY	1/5 OF	MEAN

Attachment #1

SUBSTANCE	HTC	AVE. LIMIT	EFFL. LIMIT	EFFL. CONC.
Nickel	43,000	43,000	8,600	2.6
Selenium	2,600	2,600	520	13
Mercury (ng/L)*	1.5	1.5	0.3	0.13
Antimony	373	373	75	0.9
Thallium**	3.5	3.5	0.7	0.094
Naphthalene**	1,950	1.950	390	0.031

* A mixing zone is not allowed for discharges of BCCs in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
** The limit for this substance is based on a secondary value.

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0 cfs.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	**2.7**	**4.6**
Chloroform	1,960	1,960	392	0.33

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 selenium, barium, arsenic, mercury, and chloride.** Limits and/or monitoring recommendations are made in the paragraphs below:

Arsenic – Considering available effluent data from March 2021 – June 2024, the mean effluent concentration is 4.6 µg/L. This concentration is greater than the calculated arsenic WQBEL based on HCC; **therefore, the monthly average limit of 13 µg/L is recommended during the reissued permit term. In the absence of an arsenic variance, a mass limit as described in s. NR 106.07(2)(c), Wis. Adm. Code, would also be required.**

Barium – Considering available effluent data from February 2020 – May 2024, the mean effluent concentration is 57 µg/L. This concentration is greater than the calculated barium WQBEL based on CTC secondary value; **therefore, the weekly average limit of 170 µg/L is recommended to continue during the reissued permit term. The weekly average mass limit of 0.52 lbs/day as described in s. NR 106.07(2)(c), Wis. Adm. Code, is also recommended to continue during the reissued permit term.**

Selenium – Considering available effluent data from March 2021 – June 2024, the mean effluent concentration is 13 µg/L. This concentration is greater than the calculated selenium WQBEL based on CTC; **therefore, the weekly average limit of 47 µg/L is recommended during the reissued permit term. In the absence of a selenium variance, a mass limit as described in s. NR 106.07(2)(c), Wis. Adm. Code, would also be required.**

Mercury – Considering available effluent data from the current permit term (March 2020 – June 2024, June 2024), the mean effluent concentration is 0.13 ng/L. These effluent concentrations are below the calculated mercury WQBELs so effluent limits would typically not be recommended. However the previous limit evaluation (September 2019) determined a mercury limit based on WC was not necessary based on the facility process change of ceasing petroleum mining operations in June 2018. Because mining operations resumed in March 2023 and are expected to continue into the reissued permit term; there is reason to believe mercury concentrations will increase to the point where mercury water quality standards will be exceeded. **Therefore, the monthly average limit of 1.3 ng/L is recommended during the reissued permit term under the authority of s. NR 106.05(8), Wis. Adm. Code. In the absence of a mercury variance, a mass limit as described in s. NR 106.07(2)(c), Wis. Adm. Code, would also be required.**

Chloride – Considering available effluent data from the current permit term (January 2020 – June 2021, June 2024), the 1-day and 4-day P_{99} concentrations are 273 and 209 mg/L respectively. These effluent concentrations are below the calculated chloride WQBELs so effluent limits would typically not be recommended. However the previous limit evaluation (September 2019) determined the chloride limit based on CTC was not necessary based on the facility process change of ceasing petroleum mining operations in June 2018, specifically the desalting process to remove impurities in petroleum. Because mining operations resumed in March 2023 and are expected to continue into the reissued permit term; there is reason to believe chloride concentrations will increase to the point where chloride water quality standards will be exceeded. **Therefore, the weekly average limit of 400 mg/L is recommended during the reissued permit term under the authority of s. NR 106.05(8), Wis. Adm. Code. In the absence of a chloride variance, a mass limit as described in s. NR 106.07(2)(c), Wis. Adm. Code, would also be required.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Previous monitoring produced a PFOS result of nondetectable at <0.32 ng/L and a PFOA result of 0.50 ng/L. These results are less than one fifth of the respective criteria for each substance. Based on the type of discharge and the available PFOS/PFOA monitoring data, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum and monthly average limits year round.

Effluent ammonia nitrogen samples (n = 22, January 2020 – April 2021) ranged from <0.028 – 0.48 mg/L. Based on this effluent data, there is no reasonable potential to exceed the most stringent ammonia nitrogen limits that would be calculated. **Therefore, ammonia nitrogen limits are not recommended during the reissued permit term. The daily maximum and monthly average ammonia nitrogen limit are required to continue during the reissued permit term as described in s. NR 106.33(1)(b), Wis. Adm. Code.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. Because the receiving water flow is zero, temperature limits are set equal to thermal water quality criteria.

The table below summarizes temperature monitoring during January 2020 – June 2021 along with the calculated limits. The complete temperature limit calculations are included as attachment #3.

Monthly Temperature Effluent Data & Limits

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	68	72	**54**	78
FEB	63	66	**54**	79
MAR	70	72	**57**	80
APR	72	85	**63**	**81**
MAY	78	78	**70**	84
JUN	82	83	**77**	85
JUL	82	84	**81**	86
AUG	83	84	**79**	86
SEP	76	76	**73**	85
OCT	66	69	**63**	83
NOV	67	71	**54**	80
DEC	69	69	**54**	79

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. **Based on this analysis, a daily maximum limit is needed for April and weekly average limits are needed year round**.

The following general options are available for a facility to explore potential relief from the temperature limits:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013 department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standards*
http://dnr.wi.gov/topic/surfacewater/documents/ThermalGuidance2edition8152013.pdf

PART 5 – 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 = 0.295 MGD = 0.456 cfs.
f = fraction of the Q_e withdrawn from the receiving water = 0.
Q_s = ¼ of the 7-Q_{10} = 0 cfs.

- The previous limit evaluation (September 2019) utilized an IWC of 9.1% based on the protection of Superior Bay. The natural community of Newton Creek is a "Warm Headwater" using the Natural Communities layer of Surface Water Data Viewer. Because this implies the presence of a fish and aquatic life community beyond solely macroinvertebrates, the need of WET limits and testing should also account for the protection of Newton Creek and not only Superior Bay. Therefore, the IWC of 100% will be used in this evaluation. Additionally, toxicity-related impacts expressed in the form of fin erosion have been documented in Newton Creek in recent years. Published literature shows that fin erosion is associated with exposure to chemicals found in crude oil production and refinement. Therefore, chronic WET testing endpoints must be set to protect against these impacts in Newton Creek.

- 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 001 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. If flow is not available upstream of the discharge to Newton Creek, another surface water with similar characteristics or a synthetic (standard) laboratory water may be used for dilution. The dilution water to be used must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. 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. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, WET tests performed after June 2005 to present are included in the table below:

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
07/12/2005	>100	>100	Pass	Yes	>88	>88	Pass	Yes	

10/11/2005	>100	>100	Pass	Yes	37.8	>88	Pass	Yes	
01/10/2006	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
04/18/2006	>100	>100	Pass	Yes	40	>88	Pass	Yes	
08/15/2006	>100	>100	Pass	Yes	70.5	>88	Pass	Yes	
08/15/2006					48	>100	Pass	Yes	1
10/24/2006	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
01/16/2007	>100	>100	Pass	Yes	NA	NA	Fail	No	2
02/06/2007					>88	>88	Pass	Yes	Retest
04/12/2007	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
06/12/2007	NA	NA	NA	No	NA	NA	NA	No	3
07/24/2007	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
11/01/2007	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
02/14/2008	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
04/01/2008	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
08/07/2008	>100	>100	Pass	Yes	NA	>88	NA	No	2
09/16/2008					>88	>88	Pass	Yes	Retest
10/30/2008	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
01/27/2009	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
05/26/2009	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
08/17/2009	>100	>100	Pass	Yes	NA	>88	Pass	Yes	2
09/22/2009					>88		Pass		Retest
11/05/2009	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
01/21/2010	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
04/13/2010	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
08/24/2010	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
12/14/2010	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
02/15/2011	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
04/19/2011	>100	>100	Pass	Yes	NA	NA	NA	No	3
09/13/2011	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
11/17/2011	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
12/12/2011	>100	>100	Pass	Yes					
12/13/2011	>100	>100	Pass	Yes	>88	>88	Fail	No	2
12/13/2011					>88	48	Pass	Yes	1
02/21/2012	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
05/15/2012	>100	>100	Pass	Yes	58.4	>88	Pass	Yes	
08/14/2012	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
10/29/2012	>100	>100	Pass	Yes					
10/30/2012					82.5	>88	Pass	Yes	
01/10/2013	>100	>100	Pass	Yes	NA	>88	Fail	No	2
01/29/2013					>88	NA	Pass	Yes	Retest
06/04/2013	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
09/05/2013	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
11/19/2013	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
01/07/2014	>100	>100	Pass	Yes	NA	>88	Fail	No	2
02/05/2014					>88	NA	Pass	Yes	Retest
04/15/2014	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
08/19/2014	>100	>100	Pass	Yes	>88	>88	Pass	Yes	

04/14/2015	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
07/28/2015	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
05/03/2016	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
12/06/2016	>100	>100	Pass	Yes	>88	>88	Pass	Yes	
02/14/2017	>100	>100	Pass	Yes	NA	>88	Fail	No	2
03/21/2017					NA		Fail	No	Retest
04/25/2017					67.9		Fail	No	Retest
10/24/2017					54.9	83.2	Pass	Yes	
04/17/2018	>100	>100	Pass	No	53.1	>88	Pass	No	4
05/14/2019	>100	>100	Pass	No	25	>88	Pass	No	4
02/18/2020					>100	>100	Pass	No	4
06/14/2021					>100	21.5	Pass	No	4

Footnotes:
1. *Split Samples.* Tests were conducted concurrently on the same effluent samples by two different labs, as a check on lab performance or sampling procedures. Split samples cannot be double counted and the test with the most stringent toxicity results will be used and counted as a single test.
2. *Qualified or Inconclusive Data.* Data quality concerns were noted during testing which calls into question the reliability of the test results.
3. No data reported.
4. *Not representative of discharge.* Facility was performing minimal refining operations, maintaining side processes running, testing new equipment, etc., since the facility fire in April 2018. Crude oil production did not resume until March 2023. Therefore, any WET data during April 2018 – March 2023 is excluded from this evaluation.

- 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 = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/37.8 = 2.65	1.9 Based on 8 detects	100%

[(TUc effluent) (B)(IWC)] = 5.0 > 1.0

Therefore, reasonable potential is shown for a chronic WET limit using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from July 2005 – October 2017.

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: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not applicable. **0 Points**	IWC = 100%. **15 Points**
Historical Data	44 tests used to calculate RP. No acute tests within last 5 years. **5 Points**	40 tests used to calculate RP. No tests failed. Multiple tests would be failures given the updated IWC. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as acute. **0 Points**
Receiving Water Classification	Warm Headwater Natural community. **5 Points**	Same as acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC; Multiple substances detected. Additional Compounds of Concern: Yes. **5 Points**	Reasonable potential for limits for selenium and barium based on CTC; Multiple substances detected. Additional Compounds of Concern: Yes. **11 Points**
Additives	One biocide and eleven water quality conditioners added. Permittee has proper P chemical SOPs in place: Not in use. **14 Points**	Ten additives used more than once per 4 days. **14 Points**
Discharge Category	Petroleum refining. **15 Points**	Same as acute. **15 Points**
Wastewater Treatment	Secondary or better. **0 Points**	Same as acute. **0 Points**

Attachment #1

	Acute	Chronic
Downstream Impacts	Fin erosion found in Newton Creek caused by discharger. See discussion above under the IWC calculation. **20 Points**	Same as acute. **20 Points**
Total Checklist Points:	**64 Points**	**80 Points**
Recommended Monitoring Frequency (from Checklist):	Twice/yr acute tests recommended.	Quarterly chronic tests recommended.
Limit Required?	No.	Limit = 1.0 TU_c
TRE Recommended? (from Checklist)	No.	No.

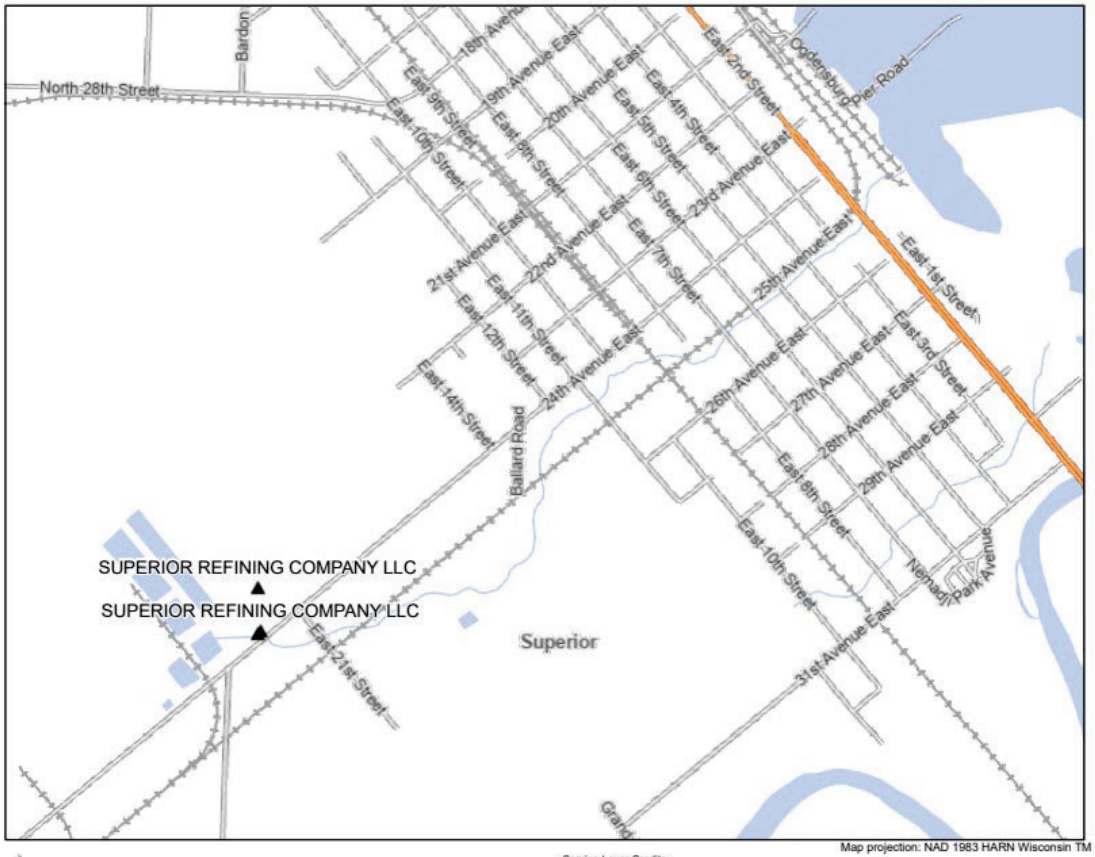
- After consideration of the guidance provided in the department's WET Program Guidance Document (2022) and other information described above, **2x/yr acute and quarterly chronic WET tests are recommended in the reissued permit.** Acute tests should be done in rotating quarters to collect seasonal information 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.** A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

- Superior Refining currently sends its effluent to the Superior Sewage Disposal System WWTF with the option of discharging to Newton Creek when discharge to the municipality is not allowed due to a high flow event. Due to concerns related to effluent toxicity and the uncertainty of the duration and frequency of discharges to Newton Creek, WET monitoring will be required on the effluent at an in-plant sample point before reaching the sewershed. This will ensure that WET data is available to characterize the effluent toxicity of potential discharges to Newton Creek and allow the facility to investigate and remove any sources of toxicity in their effluent before consideration of a creek discharge.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Superior Refining Outfalls Discharge Area



Legend: (some map layers may not be displayed)

- Surface Water Outfalls
- Rivers and Streams
- Intermittent Streams
- Open Water
- water

Notes:
WPDES viewer, WDNR

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 1,000 2,000 Feet
0 330 660 Meters

Service Layer Credits:
Basic Basemap (Cached):

This map is a product generated by a DNR web mapping application.

This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: https://dnr.wisconsin.gov/legal.

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Attachment #3

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Superior Refining		**7-Q_{10}:**	0	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:**	01/01/20	01/01/20
Date Prepared:	4/18/2025		**f:**	0		**End:**	06/30/21	01/31/24
Design Flow (Qe):	0.295	MGD	**Stream type:**	Limited forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.0	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0	0.232	0.263	0	68	72	54	78
FEB	39	54	79	0	0.197	0.222	0	63	66	54	79
MAR	43	57	80	0	0.250	0.305	0	70	72	57	80
APR	50	63	81	0	0.305	0.331	0	72	85	63	81
MAY	59	70	84	0	0.226	0.240	0	78	78	70	84
JUN	64	77	85	0	0.185	0.300	0	82	83	77	85
JUL	69	81	86	0	0.280	0.300	0	82	84	81	86
AUG	68	79	86	0	0.340	0.357	0	83	84	79	86
SEP	63	73	85	0	0.122	0.225	0	76	76	73	85
OCT	55	63	83	0	0.094	0.218	0	66	69	63	83
NOV	46	54	80	0	0.279	0.293	0	67	71	54	80
DEC	40	54	79	0	0.209	0.225	0	69	69	54	79