Annual Report for Year 2 (2023-2024) of the Time Limited Water Quality Standard for Chloride

June 2024

Prepared by ExxonMobil Joliet Refinery

ExxonMobil is a member of the Chicago Area Waterways Chloride Workgroup/Lower Des Plaines Watershed Group

1.0 Introduction

This Annual Report has been prepared by ExxonMobil Joliet Refinery to report on progress in meeting the requirements for the Time Limited Water Quality Standard for Chloride. ExxonMobil Joliet Refinery is a discharger covered under the Time Limited Water Quality Standard for Chloride for the Chicago Area Waterways System and Lower Des Plaines River watersheds. This Annual Report has been prepared to meet the requirements laid out in the Time Limited Water Quality Standard (TLWQS) for Chloride.

Chloride does not degrade over time and continues to accumulate in the environment. Proactive measures to reduce the amount of chloride discharged can help reduce the impacts from chloride on receiving waterways and the environment. Chloride impacts aquatic life, vegetation, and infrastructure. As the chloride concentrations increase and our waters become saltier, aquatic and plant biodiversity decreases and native species are overtaken by salt tolerant invasive species.

Chlorides are commonly found in road salt, fertilizers, water softeners, dust suppressants, and certain industrial processes. Chloride-based deicers, like rock salt, are used on parking lots, sidewalks, and roads to provide safe surfaces to the public during the winter months. These deicers are one of most common sources of chloride in the Chicago region.

The water quality standard for chloride for the Chicago Area Waterway System (CAWS) was updated as part of the rulemaking process related to changing the designated use of the CAWS. The chloride standard was updated from 1,500 mg/L during the winter and 500 mg/L during the summer to 500 mg/L all year round. The change in the chloride water quality standard took effect in 2018. Because portions of the CAWS were not going to meet this new standard due to the need to maintain public safety on roads, highways, sidewalks and parking lots during the winter months, a joint submittal and supporting individual petitions were submitted between 2015 and 2018 to the Illinois Pollution Control Board for a variance from the chloride standard. The joint petition laid out best management practices that can be achieved by the petitioners to reduce their chloride use while maintaining public safety during winter storms. In addition to the CAWS, portions of the Lower Des Plaines River watershed were included as it receives water from the CAWS.

On November 4, 2021, the IPCB issued an Opinion and Order for a Time Limited Water Quality Standard (TLWQS) for Chloride for portions of the CAWS and Lower Des Plains River watersheds. The TLWQS for Chloride watersheds are defined in the Opinion and Order as the Des Plaines River watershed from the Kankakee River to the Will County Line (except for the DuPage River watershed) and the CAWS watershed (except the North Branch Chicago River watershed upstream of the North Shore Channel and those portions of the watershed located in Indiana). This is a watershed-based approach to reduce the chloride concentrations in the CAWS and Lower Des Plaines River. The TLWQS for Chloride requires all dischargers covered under the TLWQS for Chloride to create PMPs and implement specific best management practices based on their operations to reduce their chloride discharges.

2.0 Organization, Facility Information

Agency Name: ExxonMobil		
Facility Name: Joliet Refinery		Facility Name: Joliet Refinery
Facility Address: 25915 South Frontage Road		
City: Channahon	City: Channahon	City: Channahon

The Joliet Refinery, is located on a 1,300-acre tract of land in Channahon Township in unincorporated Will County. The site is adjacent to Interstate 55 at the Arsenal Road exit, approximately 50 miles southwest of Chicago. To the immediate north of the Refinery is the Des Plaines River, while east and south of the Refinery is the former Joliet Army Arsenal, which has been redeveloped as an industrial complex, and the Midewin National Tallgrass Prairie. The Refinery employs approximately 630 full time employees, who operate, maintain, and manage the facility, which operates 24 hours a day. Built in 1972, the Joliet facility is one of the newest refineries in the United States and is also among the most energy-efficient refineries of its size in the country. The refinery uses state-of-the-art technology to process crude safely, reliably and efficiently. The Joliet Refinery discharges wastewater and storm water under NPDES Permit No. IL0002861 and has recently been issued general permit ILG103005 (Chloride Time Limited Water Quality Standard General Permit).

The Transportation Group, a subset of the Refinery's Maintenance Department, is responsible for providing snow and ice control for approximately 57 lane miles consisting of roads and parking lots at the Refinery as well as associated sidewalks and walkways. The Joliet Refinery's goal is to make all streets, parking lots and walkways safe and accessible during and after a winter storm. Safety is the number one priority for the Joliet Refinery. As a result, deicing, anti-icing, and other snow removal activities must be sufficient to ensure employee safety. Currently, anti-icing practices (brine application) are employed at the Refinery in advance of winter weather events when feasible and appropriate. The Refinery utilizes plows, shovels and snow blowers on walkways to remove snow prior to the application of salt. Salt is used for deicing after snow removal to make streets and walkways safe. To minimize corrosion risks, an acetate product is currently used on bridges. Refinery personnel (and contractors) who conduct snow removal activities are trained annually on best practices for snow and ice removal.

2.1 Level of Service for Winter Maintenance Activities

The Joliet Refinery's goal is to make all streets, parking lots and walkways safe and accessible during and after a winter storm. Safety is the number one priority for the Joliet Refinery. As a result, deicing, anti-icing, and other snow removal activities must be sufficient to ensure employee, contractor and visitor safety.

A Refinery map of the roads, parking lots, and walkways that should be cleared and deiced is located in Appendix 1. The map colors indicate the priority levels of each of the areas. Below Table 2.1-1 provides the priority level, description, and approximate area. Roads are assumed to be 12 feet wide.

Table 2.1-1: Priority level description and area

Priority Level	Description	Area (Thousand Square Feet)	Area (Lane Miles)
1	Main entrance road and around main gate including the serpentine road blocks. Remove ice and snow from main roads around process block and roadways between units; east and west side of Fire Station, and boat house. At this time, clear snow from fire hydrants around process block, propane truck rack, scale house, sulfur loading racks, asphalt loading area when operational, MIC building and building #111 NSR Office area.	320	10
2	Clear and remove snow for both east and west Employee Parking lots. Each parking lot will be divided equally with designated sections approved for immediate snow removal.	220	7
3	Clear all other main blacktop roadways – to include all Mechanical shop buildings, main administration building and OM building, TCI shops, Transportation, product dock and Coke dock, tank farm roads, WWT Process building, Utilities Control building, Main Warehouse, Flour Warehouse, and 8 acres.	610	19
4	Clear contractor entrance roads from Gate A & B to Gate 5 to include contractor parking lot.	140	5
5	Clean contractor entrance road from Gate C & D to Gate 4 to include contractor parking lot. Clean gate 2 contractor parking lot	190	6
6	Clear all WWT roads. Clear fire hydrant and post indicator in off-sites. Clear roads to flares and flare K.O. Drum.	330	10

3.0 Best Management Practices

Details regarding ExxonMobil Joliet Refinery's implementation of the best management practices (BMPs) identified as part of the TLWQS for Chloride are included below.

Workgroup BMP

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
The permittee must participate in a Chlorides workgroup for the CAWS or LDPR, depending on	**Status -** Currently Implemented **Description of Current Implementation -** The ExxonMobil Joliet Refinery has been a member of the Lower Des Plaines Watershed

the watershed within which the facility's discharge is located.	Group/Chloride Workgroup since its inception in 2017. The Refinery continues to be a member.

Salt Storage and Handling BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Store all salt on an impermeable pad that must be constructed to ensure that minimal stormwater is coming into contact with salt unless the salt is stored in a container that ensures stormwater does not come into contact with the salt.	**Status** - Currently Implemented **Description of Current Implementation –** In 2018, in anticipation of the need to implement of BMPs associated with deicing activities, the Refinery constructed a salt storage shed, which includes an impermeable paved floor and apron for salt storage.
Cover salt piles at all times except when in active use, unless stored indoors.	**Status** - Currently Implemented **Description of Current Implementation BMP -** In 2018, in anticipation of the need to implement of BMPs associated with deicing activities, the Refinery constructed a salt storage shed, which consists of a 30' W X 41' L X 24'H building located west of the Refinery garage building and Trans Drive. The building is constructed of concrete base walls, a steel barrel arch roof, asphalt paved floor and apron, with a steel and fiberglass side shed for storage of additional deicing chemicals such as acetate.
For working areas, provide berms and or sufficient slope to allow snow melt and stormwater to drain away from the area. If snow melt and stormwater cannot be drained away from the working area, channeling water to a collection point such as a sump, holding tank or lined basin for collection, discharge at a later time, use for prewetting, and use for make-up water for brine must be considered.	**Status** - Currently Implemented **Description of Current Implementation BMP -** The salt storage area/building at the Refinery (constructed in 2018) was designed to drain snow melt and stormwater away from the area.
Good housekeeping practices must be implemented at the site, including:	**Status** - Currently Implemented **Description of Current Implementation BMP –** The Refinery employs good housekeeping practices for winter road salt related work[1] including loading, salt deliveries, and facility inspections[2].

[1] For this plan, it is understood that the housekeeping requirements, such as daily cleanup, etc. are intended to be employed by the winter maintenance/snow removal team for the salt storage and handling area at the Refinery.
[2] Note - the Refinery does not routinely transport bulk chloride.

• cleanup of salt at the end of each day or conclusion of a storm event; • tarping of trucks for transportation of bulk chloride; • maintaining the pad and equipment; • good practices during loading and unloading; • cleanup of loading and spreading equipment after each snow/ice event; • a written inspection program for storage facility, structures and work area; • removing surplus materials from the site when winter activity finished where applicable; • annual inspection and repairs completed when practical; • evaluate the opportunity to reduce or reuse the wash water.	Housekeeping practices will be verified via routine inspections of the salt storage area. Modifications to housekeeping practices will be made based on inspection finding. Additionally, the effectiveness of housekeeping practices will reviewed annually and required modifications will be documented in and maintained with this plan at the Refinery

Winter Maintenance Operations BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Calibrate all salt spreading equipment at least annually before November 30th. Records of the calibration results must be maintained for each piece of spreading equipment.	**Status -** Currently Implemented **Description of Current Implementation -** Calibration is completed by Joliet Refinery staff or appropriate contractor staff each year. Calibration records will be kept for a period of 5 years.
Pre-wet road salt before use, either by applying liquids to the salt stockpile, or by applying liquids by way of the spreading equipment as the salt is deposited on the road.	**Status -** Will Implement 2024/2025 Snow Season **Description of Current Implementation BMP -** The Refinery has started a project to purchase or rent truck mounted equipment for pre-wetting of salt for the 2024/2025 winter season.
Use equipment to measure the pavement temperature unless such equipment has already	**Status -** Implemented **Description of Current Implementation -** A temperature gauge is used in the field. Snow captains are responsible for ensuring

been installed on road salt spreading vehicles.	weather/pavement temperatures are recorded for each event and for providing this information to the snow removal team and appropriate contractors.
Develop and implement a protocol to vary the salt application rate based on pavement temperature, existing weather conditions, and forecasted weather conditions.	**Status -** Currently Implemented **Description of Current Implementation –** The Refinery utilizes a "plow first" approach and does not apply salt to roads/parking lots until snow has been removed/plowed. The Refinery utilizes the chart documenting guidelines for the snow team to aid in salt application. Information regarding use of temperature and weather conditions to vary salt application rates is included in the annual training. A copy of the chart is placed in each truck at the beginning of the winter season.
Track and record salt quantity used and storm conditions from each call-out.	**Status** - Currently Implemented **Description of Current Implementation** - When salt or other material is distributed from trucks, the material usage is determined by using the on-site truck scale. If the material is distributed using hand-spreading equipment, the amount of material used is based on the capacity of the instrument and/or the package size of the material used.
Develop a written plan for implementation of anti-icing, with milestones. The plan should consider increased use of liquids (e.g., carbohydrate products) beginning with critical locations such as bridges over streams.	**Status** - Currently Implemented **Description of Current Implementation** The Joliet Refinery purchased an AccuBatch Brine Maker[3] in 2018. The brine maker produces brine in batches with a NaCl concentration of approximately 20%-25%. Brine is transferred from the brine-making tank to a plastic tank in the truck when it is ready for application. The brine is applied to roads/parking lots with trucks and is applied with a spray pattern that leaves bare pavement between sprayed areas. When feasible, brine is used for anti-icing and is applied prior to snow/ice events based on weather forecasting when appropriate. Brine is not applied when rain is forecast nor is brine applied to gravel roads/parking lots.
Provide employees involved in winter maintenance operations with annual training before November 30th on best management practices in the use of road salt in operations, including the practice of plowing first and applying salt only after snow has been cleared.	**Status** - Currently Implemented **Description of Current Implementation** Annual training is used to reinforce the Refinery's commitment to safety, reeducate the snow removal team of their operational responsibilities and chloride reduction objectives as well as provide any new guidance. Training of all appropriate snow removal staff is performed annually before November 30th.

[3] The Refinery will continue to utilize this brine maker or similar

Be responsible for complying with all applicable BMPs even when deicing practices are contracted out and ensure that contractors are property trained and comply with all applicable BMPs.	**Status** - Currently Implemented **Description of Current Implementation** Contracted services used at the Refinery are held to the same standard as Refinery staff and will be required to comply with the training requirements and BMPs as outlined.
Complete an annual report, as required by paragraph 3(B) of this order, which is standardized in an electronic format and submitted to the IEPA's website and to the watershed group.	**Status –** Currently Implemented **Description of Current Implementation –** This is the second annual report.

Additional BMPs Identified for Facility

BMP	Agency Description of Current Implementation
Water Treating/Softening Salt Storage	The Refinery uses salt for water softening operations. The refinery has constructed salt storage facilities for salt in water treating/softening operations that is covered and stored on an impermeable pad. This construction was completed in June 2023

3.1 Analysis of BMPs Implemented

All of the BMPs have been implemented at the Refinery for the 2022 – 2023 winter season except the use of pre-wetting equipment. This BMP will be implemented for the 2024 – 2025 winter season.

3.2 Analysis of Alternative Treatments or New Technology

Evaluation of alternative or new treatment technologies is an ongoing priority, none have yet been identified for use or trial at the Site.

4.0 Deicing/Anti-Icing Agents Used

Materials used by ExxonMobil Joliet Refinery for the 2023-2024 winter season are included as Appendix 1.

4.1 Application Rates

The application rates used by ExxonMobil Joliet Refinery for the 2023-2024 winter season are included as Appendix 2.

4.1.1 Application Rate Analysis

4.2 Application Practices

ExxonMobil uses the following practices to apply deicing and anti-icing materials:

Pavement Temperature (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Application Rate in lbs. per 1000 Square Foot Area	
			Salt Pre-wetted/ Pretreated with Salt Brine	Winter Sand (abrasives)
>30° ↑	Snow	Plow, treat intersections only	0.75	Not Recommended
	Frz. Rain	Apply chemical	1.25	Not Recommended
30° ↓	Snow	Plow & apply chemical	1.25	Not Recommended
	Frz. Rain	Apply chemical	1.50	Not Recommended
25 - 30° ↑	Snow	Plow & apply chemical	1.25	Not Recommended
	Frz. Rain	Apply chemical	1.50	Not Recommended
25 - 30° ↓	Snow	Plow & apply chemical	1.25	Not Recommended
	Frz. Rain	Apply chemical	1.75	3.25
20 - 25° ↑	Snow or Frz. Rain	Plow & apply chemical	1.75	3.25 for frz. rain
20 - 25° ↓	Snow	Plow & apply chemical	2.00	Not Recommended
	Frz. Rain	Apply chemical	2.50	3.25
15 - 20° ↑	Snow	Plow & apply chemical	2.00	Not Recommended
	Frz. Rain	Apply chemical	2.50	3.25
15 - 20° ↓	Snow or Frz. Rain	Plow & apply chemical	2.50	3.25 for frz. rain
0 to 15° ↑↓	Snow	Plow, treat with blends, and hazardous areas	Consider alternative	5.00 spot treat as needed
< 0°	Snow	Plow, treat with blends, and hazardous areas	Consider alternative	5.00 spot treat as needed

4.3 Call Outs

A total of 12 inches of snow was reported at the ExxonMobil Joliet Refinery for the 2023-2024 winter. There were 4 freezing rain event(s) and 7 snow event(s) for the 2023-2024 winter. ExxonMobil Joliet Refinery is a 24-hour operation and hence there are no call outs as staff is on site.

4.4 Use of Liquids

A brine solution for pre-treating the roads when a forecasted event indicates that it would be needed. The 2023 – 2024 season there were no events that used pre-treating.

5.0 Training

ExxonMobil completed annual training for 3 of employees out of 3 of employees who are part of the winter maintenance operations on October 3, 2023. A list of annual training topics by type of employee is included as Appendix 4.

6.0 Deicing and Snow Removal Equipment and Maintenance

ExxonMobil Joliet Refinery uses truck mounted spreading equipment and hand spreading during winter maintenance activities.

7.0 Material Storage

ExxonMobil Joliet Refinery maintains two covered salt storage areas on site. One is for water treatment salt, the other is for deicing. The area around the material storage is swept back into the cover storage on a regular basis, that at a minimum is each day the facility is used.

8.0 Capital Purchases

Identified capital purchases from ExxonMobil's PMP to implement the BMPs and reduce chlorides in our operations over the first 5-year term of the Chloride TLWQS is the purchase of pre-wetting equipment.

8.1 Explanation of Capital Purchases Unable to Be Made According to the Reported Plan

Pre-wetting equipment will be rented instead of purchased based on a cost analysis completed, the cost analysis will be reevaluated periodically.

9.0 Environmental Monitoring Data

Chloride monitoring data is collected for the CAWS and Lower Des Plaines River watersheds per the IPCB order. The data is maintained by the workgroups. Chloride data for the CAWS is collected by MWRD for the CAWS watershed and provided to the workgroups as part of the annual reporting as required by the IPCB order. The Lower Des Plaines Watershed Group also maintains a USGS monitoring station in the Des Plaines River at Channahon, IL that collects continuous conductivity data to estimate chloride concentrations.

Chloride monitoring data reports are posted to https://www.cawswatershed.org/reports/ and https://ldpwatersheds.org/about-us/lower-des-plaines-watershed-group/our-work/chloride-tlwqs/.

9.1 Organization Specific Chloride Monitoring Data

ExxonMobil Joliet Refinery collects chloride monitoring data as part of its NPDES effluent data and the data is included in the monthly NetDMR Report.

9.2 Changes to the Facility's NPDES Treatment Technologies for Chloride

No changes have been made to the facility's treatment technologies for chloride.

10.0 Program Evaluation

The 2023 – 2024 winter season is the second year of implementing the BMPs. These BMPs are cost effective. The 2023-2024 winter season was a mild one with few winter precipitation events and hence an evaluation of salt usage compared to the 2022-2023 winter season would not be a good statistical representation of improvements.

10.1 Proposed Steps for the Coming Year

Pre-wetting equipment is planned for 2024 – 2025 winter season.

11.0 Workgroup Participation

ExxonMobil participates in the Lower Des Plaines Watershed Group by:

- Attending bi-monthly membership meetings via Zoom and in person
- Participated in Chloride TLWQS Mentoring Sessions
- Sent key staff to Winter Deicing Workshops
- Utilized Seasonal Outreach Materials available on the Member tab of the website and provide input on other outreach needs or formats.

Organization Name: ExxonMobil

Chloride TLWQS Annual Report
Appendix 1 - Annual Training

	A	B
1	**Role in Winter Operations**	**Training Topics Covered**
2	Salt use optimization	Importance of pavement temperature in deicing
3	Calibration of spreading euipment	Correct application rate
4	Parking lots and sidewalks	Correct application rate

Organization Name: ExxonMobil

Chloride TLWQS Annual Report
Appendix 2 - Equipment

Location of Storage Area	Material Stored (Rock Salt, Salt Brine, etc)	Amount of Material Stored 2022-2023	Amount of Material Stored 2023-2024	Material stored under permanent cover? (yes/describe other)	Material stored in a fully enclosed structure? (yes/describe other)	Material stored on an impervious pad? (yes/describe other)	Good housekeeping practices followed at storage area? (yes/describe other)
Road Salt	Rock Salt	65 tons	50 tons	Yes	No - open front with appron	yes	yes
Water Softening	Water softening	1800 tons	1800 tons	Yes	No - open front with appron	yes	yes

Organization Name: ExxonMobil

Chloride TLWQS Annual Report
Appendix 3 - Capital Purchases

Capital Purchase Description	Plan/Schedule for Purchase
New Salt Storage, covered	60K - purchased

Organization Name: ExxonMobil

Chloride TLWQS Annual Report
Appendix 4 - Deicing/Anti-Icing Agents Used

Material or Product	Dry, Pre-Wet, Pretreated, or Liquid	Lane Miles Treated with the Product for 2022-2023	Parking Lot and Sidewalk Area (Sq. Ft.) Treated with the Product for 2022-2023	Lane Miles Treated with the Product for 2023-2024	Parking Lot and Sidewalk Area (Sq. Ft.) Treated with the Product for 2023-2024	Total Amount used for 2022-2023 (Year 1) in Tons or Gallons	Total Amount used for 2023-2024 (Year 2) in Tons or Gallons	Total Amount used for 2023-2024 (Year 3) in Tons or Gallons	Total Amount used for 2023-2024 (Year 4) in Tons or Gallons	Total Amount used for 2023-2024 (Year 5) in Tons or Gallons	Total Amount Used Over First 5-Year Term
salt	Dry	57	1,810,000	57	1,810,000	45 tons	20				20
brine	Pretreated	0	0	0	0	0 gallons	0				0
											0
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Estimates of Relative Material Amounts Applied and Coverage Achieved

Year	Total Lane Miles Maintained	Total Parking Lot and Sidewalk Area (Sq. Ft.) Maintained	Percent of Total Lane Miles Treated with Dry Materials	Percent of Total Lane Miles Treated with Pre-Wet or Pretreated Materials	Percent of Total Lane Miles Treated with Liquids	Percent of Total Parking Lot and Sidewalk Area Treated with Dry	Percent of Total Parking Lot and Sidewalk Area Treated with Pre-wet or Pretreated Materials	Percent of Total Parking Lot and Sidewalk Area Treated with Liquids			
2022-2023	57	1,810,000	100%	0%	0%	100%	0%	0%			
2023-2024	57	1,810,000	100%	0%	0%	100%	0%	0%			

Organization Name:

Chloride TLWQS Annual Report
Appendix X - Equipment

Type of Equipment	Equipment/Vehicle Number	Type of Spreader (mechanically controlled, computer controlled, etc.)	Type of Material Used with Equipment (Dry, Pre-Wet, Pretreated, Liquids)	Any Other Important Equipment Information
Truck with plow		mechanically controlled	dry	
Truck with plow		mechanically controlled	dry	
Truck with plow		mechanically controlled	dry	
AccuBatch Brine Maker		mechanically controlled	Liquid	