BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

IN THE MATTER OF:	)	
	)	
CITGO HOLDING, INC.	)	
	)	
	)	**PCB No. 2018- ____**
Petitioner,	)	
	)	
v.	)	
	)	
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,	)	
	)	
Respondent.	)	
	)	

NOTICE OF FILING

To: See Attached Service List

PLEASE TAKE NOTICE that on July 24, 2018, CITGO HOLDING, INC. electronically filed with the Office of the Clerk of the Illinois Pollution Control Board an **Individual Submittal in Support of the Joint Petition for Chloride Time-Limited Water Quality Standard for the Defined Chicago Area Water System / Des Plaines River Watershed and a Motion to Consolidate**, a copies of which is hereby served upon you.

CITGO HOLDING, INC

By: /s/ Jeffrey C. Fort
One of Its Attorneys

Jeffrey C. Fort
Dentons US LLP
233 S. Wacker Drive
Suite 5900
Chicago, IL 60606-6404

BEFORE THE POLLUTION CONTROL BOARD

OF THE STATE OF ILLINOIS

IN THE MATTER OF:	)	
	)	
CITGO HOLDING, INC.	)	
Petitioner	)	
v.	)	
	)	**PCB No. 2018- ____; and**
	)	**PCB No. 2016-14,**
	)	
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,	)	
	)	
Respondent.	)	
	)	

MOTION TO CONSOLIDATE

Petitioner, CITGO HOLDING, INC, owns and operates a refinery in Lemont Illinois. The Lemont Refinery has participated in prior rulemaking before the Board which resulted in the Board adopting a winter time chloride standard for the Chicago Sanitary and Ship Canal. That action is referred to in the Joint Petition submitted by the Metropolitan Water Reclamation District of Greater Chicago (PCB 2016-14) as the "site specific rule" and certain testimony by Mr. James Huff, submitted by Citgo in the prior rulemaking, is referenced in the Joint Petition. Although the Citgo refinery does not require a stay of the winter - time chloride standard, it is choosing to participate and requests the Board consolidate Citgo's Individual Petition with the other pending Petitions for a Chloride Time-Limited Water Quality Standard for the Defined Chicago Area Waterway System/ Des Plaines River Watershed and has begun a proceeding with its Individual Submittal in Support of the Joint Petition for Chloride Time-Limited Water Quality Standard for the Defined Chicago Area Water System / Des Plaines River Watershed, a copy of which accompanies this Motion to Consolidate.

Respectfully submitted,

CITGO HOLDING, INC

By: /s/ Jeffrey C. Fort
One of Its Attorneys

Dated: July 24, 2018

Jeffrey C. Fort
Dentons US LLP
233 S. Wacker Drive
Suite 5900
Chicago, IL 60606-6404

PROOF OF SERVICE

The undersigned attorney certifies, under penalties of perjury pursuant to 735 ILCS 5/1-109, that he caused a copy of the **Individual Submittal in Support of the Joint Petition for Chloride Time-Limited Water Quality Standard for the Defined Chicago Area Water System / Des Plaines River Watershed and Motion to Consolidate** to be served via electronically and First Class Mail, postage paid, from 233 South Wacker Drive, Chicago, Illinois, on the 24th day of July, 2018 to the persons listed on the attached SERVICE LIST.

By: /s/ Jeffrey C. Fort
One of its Attorneys

ILLINOIS POLLUTION CONTROL BOARD

Docket Numbers: PCB 2016-14, PCB 2016-15, PCB 2016-16, PCB 2016-17, PCB 2016-18, PCB 2016-20, PCB 2016-21, PCB 2016-22, PCB 2016-23, PCB 2016-25, PCB 2016-26, PCB 2016-27, PCB 2016-29, PCB 2016-30, PCB 2016-31, PCB 2016-33
Time-Limited Water Quality Standard) (Consolidated)

Individual Submittal in Support of Petition for Chloride Time-Limited Water Quality Standard ("TLWQS") for the Defined Chicago Area Water System/Des Plaines River Watershed

This Individual Submittal supplements the Joint Submittal in Support of Petition for Chloride Time-Limited Water Quality Standard for the Defined Chicago Area Waterway System/Des Plaines River Watershed ("Joint Submittal"), submitted in the above-referenced docket numbers. The Joint Submittal incorporated by reference, together with this Individual Submittal, satisfies the requirements of 35 IAC Part 104, Subpart E for each Facility.

An Individual Submittal must be made for each permitted Facility discharging to a reach in the Watershed defined by the Joint Submittal that seeks to be covered by the TLWQS in this Docket.

This Individual Submittal must be made no later than July 26, 2018 for continued coverage (or initial coverage for new petitioners) under the current stay of effectiveness of the chlorides standards, found in 35 IAC 302.407(g)(2) and (g)(3).

Note: Discharges to General Use waters in the Watershed, which are subject to the chlorides standards in 35 IAC 302.208(g), can participate in the TLWQS, but the stay does not apply to those discharges.

Individual Discharger Information

1. Facility Name of Individual Discharger: CITGO Petroleum Corporation Lemont Refinery
2. Owner/Operator of Facility: CITGO HOLDING, INC.
3. Address of Facility: 135th Street and New Avenue, Lemont IL 60439
4. Contact Information for Facility's Responsible Official:
   Name: Michael Mee Title: Environmental Manager
   Mailing Address: 135th Street and New Avenue, Lemont IL 60439
   Phone Number: 630-257-4474 Email: mmee@citgo.com
5. Permit Number of Facility (include both National Pollutant Discharge Elimination System ("NPDES") Permits and Municipal Separate Storm Sewer System ("MS4") Permits that may be affected by the TLWQS): IL0001859

6. Are there any pending permit applications filed with Illinois Environmental Protection Agency that do not appear as part of the Joint Submittal's Appendices 5 and 6?

   ____ Yes ___✓__ No

   If Yes, provide the application number for the pending permit(s): _____

7. Select Category of Facility:

   ____ Publicly Owned Treatment Works ("POTW") ___✓__ Industrial Source

   ____ Illinois Department of Transportation/Illinois Tollway ____ Salt Storage Facility

   ____ Community with Combined Sewer Overflow ("CSO") Outfalls ____ MS4

Location of Individual Discharger

8. Each Individual Submittal must provide the specific location information in the Watershed for the Facility seeking coverage under the TLWQS. Select the location of the discharge from the Facility from the list below:

   The Chicago Area Waterway System ("CAWS") includes the following reaches:

   ____ Chicago River, ____ North Branch of the Chicago River,

   ____ South Branch of the Chicago River, ___✓__ Chicago Sanitary and Ship Canal,

   ____ Cal-Sag Channel, ____ Grand Calumet River, ____ Lake Calumet,

   ____ Lake Calumet Connecting Channel, ____ Calumet and Little Calumet Rivers, and

   ____ North Shore Channel

   The Lower Des Plaines River ("LDPR") includes the following areas:

   ____ Des Plaines River from the Kankakee River to the Will County Line,

   ____ Hickory Creek, ____ Union Ditch, ____ Spring Creek, ____ Marley Creek, and

   ____ East Branch of Marley Creek

9. The specific discharge locations for the Facility are:

   a. Outfall number(s): 001

   b. General description of outfall location:
      River Mile 296.8 (0.1 miles upstream of the Black Zone)

   c. Outfall(s) appears on CAWS or LDPR list of Discharge Points (Joint Submittal Appendices 5 and 6): ___✓__ Yes ____ No

TLWQS Requirements

10. Has any prior variance applied to the discharge from this Facility? ✓ Yes ____ No

    If yes, please identify the variance providing similar relief, including any Illinois Pollution Control Board docket number issued to the Individual Discharger, watershed, water body, waterbody segment, and if known, the Individual Discharger's predecessors.

    TDS Variance: 2205-085, PCB 2008-033, PCB 12-94

Facility-Specific TLWQS Requirements

11. The Facility agrees to implement all of the Best Management Practices ("BMPs") included for the Industrial Source Category (from #8, above) for the Facility that are specified for implementation in snow/deicing practices in Chapter 2 of the Joint Submittal.

12. Identify any past or currently in-use BMPs at the Facility for minimizing the discharge of chlorides.

    Best Management Practices Manual for Ice Control Measures - Attached

13. Will any additional BMPs, beyond those included for the Category of the Facility for implementation in snow/deicing practices in Chapter 2 of the Joint Submittal, be implemented?
    ✓ Yes ____ No

    If Yes, describe any additional BMPs:

    Best Management Practices Manual for Ice Control Measures - Attached

14. By six (6) months after the effective date of the TLWQS, each Facility covered by the TLWQS must have a Pollutant Minimization Plan (PMP) that contains specific details as to how the BMPs will be implemented and includes appropriate elements from the documentation procedures identified in Appendix 54 of the Joint Submittal. Chapter 9 of the Joint Submittal describes these requirements in more detail.

    Has the Facility already developed a PMP to address its discharge of chlorides?
    ✓ Yes ____ No

    If Yes, what is the date of the PMP? See attached

    If the Facility has not already developed the described PMP, does the Facility agree to develop the described PMP no later than six (6) months after the effective date of the TLWQS?
    ____ Yes ____ No

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name & Official Title: Michael G. Mee, Environmental Manager

Signature: _____

Date Signed: 7/23/2018

The Refinery is in compliance with the winter-time chloride water quality standard adopted by the Board in R008-09 for the Chicago Sanitary and Ship Canal. We are participating in this proceeding to assure unquestioned compliance with applicable water quality standards.

BEST MANAGEMENT PRACTICE MANUAL FOR ICE CONTROL MEASURES

Of

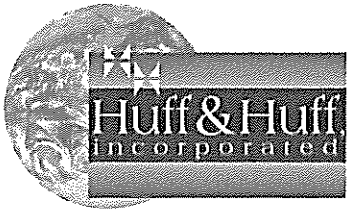
Roadways, Parking Lots, and Sidewalks at the Citgo Refinery Will County, Illinois

Prepared for

Citgo Petroleum Inc.

Prepared by
Huff & Huff, Inc.
Oak Brook, Illinois

December 2016



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Glossary

Anti-icing – The prevention of the bond of ice to pavement.

De-icing – Breaking the bond of ice to pavement.

Eutectic temperature – The lowest temperature in which a two compound mixture will exist in the liquid phase, in this case salt and water.

Lowest practical melting temperature – The lowest temperature in which a chemical compound or element melts in a reasonable time. As an example, at temperatures above 20°F both rock salt (NaCl) and calcium chloride can melt ice in a reasonable time. However, at 10°F it takes an hour for rock salt to melt 1/8" of ice.

Pre-treating – Addition of liquid to the dry de-icing chemical stockpile.

Pre-wetting – Addition of liquid to dry de-icing chemicals as they are applied to the pavement.

1. INTRODUCTION

This Best Management Practices (BMP) Manual for Ice Control Measures (BMP Manual) details the specification of ice control measures to the roadways, parking lots, and sidewalks within the Citgo Refinery (Refinery) located at 135th Street and New Avenue in the Village of Lemont, Illinois (T37N, R10E, Sections 25, 16, 35, and 36). Ice control measures refer to measures that prevent or break the bond of ice to paved surfaces. This specification shall only be used for paved surfaces (i.e. concrete, asphalt); ice control measures will NOT be applied to gravel surfaces.

The Lemont Refinery has traditionally applied rock salt to parking lots, sidewalks, and roadways within the Refinery. With an emphasis on safety, liberal salt application has been a standard practice at this facility. There has been wide variation in salt use, attributed to the number of storm events and weather conditions each winter, as well as incomplete record keeping.

Through training and the purchase of new equipment, refinery personnel have committed to implementing Best Management Practices to reduce de-icing salt use without compromising safety.

There are approximately 3,000,000 sq. ft. (68.9 acres) of asphalt and concrete within the refinery where rock salt is currently applied. Purchase of rock salt for de-icing purposes has ranged from 516,800 lbs/year to 1,510,840 lbs/year between 2009 and 2012. This four-year (2009-2012) average application has been 950,830 lbs/year (475 tons per year), and this value has been accepted by the Illinois EPA as the baseline from which progress will be measured.

Effectiveness of ice control measures are governed by factors including, but not limited to:

- Weather
- Pavement temperature
- Chemical type
- Application rate

One application type/rate will not fit all storm events. The Lemont Refinery has a written standard operating procedure entitled *Tier III Maintenance Guideline: Snow and Ice Control* included in Appendix A that details responsibilities and application rates.

It is important to document all utilized ice control measures, storm characteristics, and the result of the ice control measure employed. There is a Supervisor Storm Form Summary at the end of the Snow and Ice Guideline in Appendix A. Pertinent information to be noted include observations regarding the effectiveness of the ice control measures employed. This form is to be completed for each storm event or application of ice control measures, and the completed forms placed in a three-ring binder labeled *Ice Control Measures Journal* and stored with the standard operating procedure guideline.

Information from the Ice Control Measures Journal can be used to revise the standard operating procedure if an application technique, product, or application rate is shown to reduce the amount of chloride based ice control measures used. Close attention should be made to provide detailed notes

on the Storm Characteristic/Ice Control Measures form as these will assist in revisions to this BMP Manual and reduce the amount of chloride based ice control measures used.

This BMP Manual outlines the factors that influence the effectiveness of ice control measures and how the factors are determined (Section II); details the application of chloride based ice control measures to the roadways, parking lots, and sidewalks within the Refinery (Section III); and includes additional specifications to reduce the concentration of chloride based ice control measures in the Refinery's effluent (Section IV).

2. FACTORS THAT INFLUENCE EFFECTIVENESS OF ICE CONTROL MEASURES

2.1 Weather

Weather will be monitored to determine the expected weather conditions and will aid in the determination of the correct type and amount of ice control. Weather information can be gathered from one or more sources, including but not limited to:

- Lewis University Airport
- National Oceanic and Atmosphere Administration (NOAA) (http://www.noaa.gov/)
- Local TV station
- Other weather websites and apps. (i.e. http://www.wunderground.com/ and the weather channel app.)
- Radar high resolution App for phone, *Radarscope*

Existing and potential weather conditions are important factors in determining the amount and type of effective ice control. Information from the weather forecast will be documented on the Storm Characteristic/Ice Control Measures form. Information to be collected from weather forecasts includes but is not limited to:

- Start of event
- Event duration
- Type of precipitation (rain, freezing rain, snow, etc.)
- Total precipitation expected
- Wind conditions (speed, gusts, direction, etc.)
- Temperature trend (increasing, decreasing, steady)

Weather predictions do not always result in real-world conditions. Information regarding the storm shall be recorded on the Storm Characteristic/Ice Control Measures form. Information on the storm characteristics can be obtained from the same resources as detailed above or from visual observation. As the pavement temperatures decline, the need for more chemical (salt) increases.

2.2 Pavement Temperature

Reported air temperatures are measured at a height of approximately 30 feet above the ground, and generally tend to be colder in the winter months than at ground surface. No direct correlation between air and pavement temperatures exists. Therefore, air temperatures obtained from the weather resources will not be substituted for pavement temperatures. The temperature of the pavement will be used to determine the type and amount of ice control measure to be employed. Pavement temperature will be taken for each pavement type within the Refinery using one of three infrared temperature guns purchased in 2016, scrapping away any snow to record the pavement temperature. Shaded areas may well have colder temperatures than the areas that receive more radiant heat from the sun. Pavement temperatures will be used to set salt application rates (See Appendix A) and recorded on the Storm Characteristic/Ice Control Measures form.

2.3 Ice Control Measure Type

The ice control measure to be employed will depend on the factors described in Sections 2.1 and 2.2. The Ice Control Application Rate Guidelines is included in *Tier III Maintenance Guideline: Snow and Ice Control* included in Appendix A. The effectiveness of ice control measures is based on pavement temperature and weather conditions. Table 2-1, Melting Characteristics of De-icing Chemicals, presents the lowest practical melting temperatures of common deicers.

TABLE 2-1
MELTING CHARACTERISTICS OF DE-ICING CHEMICALS

Chemical	Lowest Practical Melting Temp (^{o}F)
$CaCl_2$ (Calcium Chloride)	-20
KAc (Potassium Acetate)	-15
$MgCl_2$ (Magnesium Chloride)	-10
NaCl (Sodium Chloride)	15
CMA (Calcium Magnesium Acetate)	20
Acetates[1]	--

[1]Acetates are generally available in a solution and not in pure form, lowest practical melting temperatures vary and shall be obtained from the acetate supplier.

De-icing chemicals shall not be applied where pavement temperatures are below the lowest practical melting temperatures listed above. The Refinery has historically relied on sodium chloride for de-icing, with the exception of sidewalks. After the application of the ice control measure, observations should be made in the area where it has been applied to note the effectiveness of ice control. The selected ice control measure shall be recorded on the Storm Characteristic/Ice Control Measures form.

Magnesium chloride has been implicated as more corrosive than the sodium and calcium chlorides, and vendors have reported that the addition of carbohydrates can lower both the lowest practical temperature and reduce the corrosive impact of chlorides in general.

2.4 Application Rates

For the anti-icing of the roadways, both trucks are set to apply 30 gallons of brine per lane mile, or 0.5 gallons per 1,000 square feet. This rate should generally not be varied, unless it is determined a higher dosage is necessary to prevent ice bonding to the roadway/parking lot surfaces.

The application rate for the rock salt is a function of weather conditions. The Ice Control Application Rate Guidelines in included in Appendix A for the various weather condition. The application rates selected for the road ways will also apply to the parking lots. The speed control

salt application rate used is based on 15 mph, which is hard to maintain in parking areas, so the rates may need to be adjusted downward in parking lots.

The application rates presented in Appendix A are guidelines, and may be adjusted from time-to-time based on the documented level of service provided during previous storms.

Calibration of equipment is important in determining the selected application rate. Calibration of equipment ensures that the application rate selected is applied. Calibration of equipment shall be conducted in accordance with manufacture recommendations. If no such recommendations are available, calibration shall occur, at a minimum, before the first storm event of the season and after any application where the applied amount is determined to be greater than the calculated amount of material required. Calibration shall also be conducted when there is a change in ice control materials.

3. APPLICATION OF ICE CONTROL MEASURES TO ROADWAYS, PARKING LOTS, AND SIDEWALKS

Application of ice control measures to roadways, parking lots, and sidewalks typically occur in the following steps; 1) Anti-icing, 2) Mechanical Removal, 3) De-icing, and 4) Additional Mechanical Removal (if required) and are detailed below. These steps are not required but are guidelines as weather conditions may or may not require certain steps. The Ice Control Measure Type selection, in Section 2.3, and the Ice Control Application Rate Guidelines, in Appendix B, will help determine the steps to be taken.

3.1 Anti-Icing

Anti-icing is the best way to reduce the amount of chloride used to manage the accumulation of ice and shall be the primary ice control method selected when possible. Anti-icing can only be applied to dry pavement ahead of the storm and should not be used when rain or wet snow is predicted. The Refinery is committed to implementing anti-icing practices to the maximum extent practical, with the purchase of the following anti-icing equipment:

- 3-SnowEX SI-80SS Push Sprayers for applying anti-icing solution to sidewalks in 2015
- 2-Liqui Maxx Spray systems mounted on Chevrolet 3500 trucks in 2016,
- 2-5,000 gallon brine tanks.

Anti-icers work by preventing snow and ice bonding to the pavement. Preventing the bond of snow and ice to pavement reduces the need to apply chloride based de-icers. Anti-icing refers to the prevention of the bond of ice to pavement. Anti-icing is generally the application of salt brine at a chloride concentration of 23.3 percent. A 23.3 percent concentration of chloride provides the lowest practical melting temperature for salt brine. Application rates indicate anti-icing requires less salt as compared to dry rock salt application. Agriculture-based liquid products, such as sugar beet by-products are commonly added at 10% to the liquid brine to reduce salt usage. The reduction in chloride concentration makes anti-icing a key tool in ice control. Once snow becomes packed or turns into ice, it takes four times the salt to break its bond with the pavement.

Anti-icing measures shall only be applied **before** the start of a precipitation event. Anti-icing materials can be applied several days in advance of a storm event and may persist for several days depending on weather conditions. When pavement temperatures are less than 20 degrees F or rain is forecast, anti-icing should not be applied. If a second storm event is predicted within several days of the application of anti-icers, the area should be inspected to determine the presence of residual material. Presence of residual anti-icing material will negate the need for re-application of anti-icers. Observations of the effectiveness of anti-icing and residual material shall be documented on the Storm Characteristic/Ice Control Measures form. Observations of anti-icing may include degree of slipperiness and duration of residual material.

Solid stream nozzles are preferred for the application of anti-icers. Fan nozzles for anti-icing nozzles may result in slippery conditions. Salt spray can also cause damage to adjacent vegetation. Care shall be taken to apply anti-icing chemicals to paved surfaces only. The two trucks are

mounted with three different nozzles, that can be selected by merely turning each nozzle set to the appropriate rate. The factory calibrated setting is to apply 30 gallons of brine per lane mile. Early results indicate that with the smallest of the three nozzles, a speed of 15 mph can be maintained and the application rate is reached. There is an alarm system on each truck that tells the driver to slow down or speed up to achieve the desired setting. Depending upon the anti-icing results in the 2016/2017 season, the application rate will be adjusted.

3.2 Mechanical Removal

One of the primary factors in the accumulation of ice is compaction of snow. Mechanical removal of snow shall be used to reduce the potential for snow compaction. When mechanical removal is necessary, application of ice control chemicals shall not be applied before mechanical removal. Therefore mechanical removal of snow will reduce the potential for snow and ice compaction. Mechanical snow removal shall be conducted using plows, snow blowers, shovels, brooms, etc. The implementation of the anti-icing is expected to make snow removal more efficient, as compacted snow will not bond to the pavement making removal easier.

Mechanical removal will occur through the duration of the storm event (if necessary): not just after the storm. Mechanical removal frequency will depend on the intensity of the storm. Mechanical removal shall occur at a frequency that minimizes snow compaction and binding of ice to the pavement to the greatest extent practical. Mechanical removal methods and observations on ice accumulation shall be entered on the Storm Characteristic/Ice Control Measures form. Snow pile location shall follow the requirements outlined in Section 4.3.

3.3 De-icing

De-icing refers to breaking the bond of ice to pavement. De-icing chemicals shall only be used where anti-icing and mechanical removal of snow has not prevented the bond of ice to pavement. De-icing chemicals shall be applied to ice bonded to pavement as mechanical removal of ice may damage equipment and/or pavement. The goal of de-icing is to break the bond of ice to pavement in order to facilitate the mechanical removal of ice. The weather conditions and application rates of de-icing chemicals are located in Appendix A. The selected de-icing chemical shall have the lowest practical melting temperature.

De-icing chemicals consist of application of dry or pre-treated/pre-wetted material. The application rates of de-icers indicate that pre-treated/pre-wetted de-icers reduce the amount of chloride applied and are the preferred method. Pre-treated/pre-wetted de-icers are detailed in Section 3.3.1.

De-icing chemicals shall be applied by an appropriate method. Mechanical salt spreaders that have been calibrated (Section 2.4) shall be used for de-icing applications. Handspreaders or walk behind salt spreaders shall be used for walkways. Cups, scoops, or hand application should not be used for de-icing chemicals. Observations of the effectiveness of de-icers shall be documented on the Storm Characteristic/Ice Control Measures form.

Pre-treating refers to adding of liquid to the dry de-icing chemical stockpile. Pre-wetting refers to adding of liquid to dry de-icing chemicals as they are applied to the pavement. Pre-treated/pre-wetted de-icers break the ice to pavement bond faster than dry de-icing chemicals as salt only melts snow and ice when in solution. Pre-treated/pre-wetted deicers start the salt melting process prior to application. An added benefit of pre-treated/pre-wetted deicers is that wet material sticks to pavement surfaces and reduces the bounce and scatter of dry deicers, resulting in less salt being applied.

The pre-treated/pre-wetted deicers liquid may consist of salt brine (sodium chloride), magnesium chloride, calcium chloride, or other blends For guidelines on application rates for salt pre-treated/pre-wetted with "other blends" see Section 4.7. Observations of the effectiveness of pre-treated/pre-wetted de-icers shall be documented on the Storm Characteristic/Ice Control Measures form.

The Lemont Refinery has installed two brine tanks for both anti-icing and for pre-wetting the rock salt. In addition, one salt truck is outfitted with a pre-wetting tank. The brine is purchased from an outside supplier and is not produced at the Refinery.

3.4 Additional Mechanical Removal (if required)

After applying de-icing materials, additional mechanical removal may be necessary to remove ice and snow. The de-iced area shall be monitored to determine when the ice to pavement bond has been broken. The additional mechanical removal will prevent refreezing and the additional use of de-icers. The snow and ice pile location shall follow the requirements outlined in Section 4.3.

4. NON-CHEMICAL BMPs TO REDUCE CHLORIDE CONENTRATIONS

4.1 Non-Chloride Based Ice Control Measures

Non-chloride based ice control measures, such as sand and acetates and agriculture plant-based additives, are also be effective ice control measures. Sand is an abrasive that improves vehicle traction and is effective on gravel roadways, with or without calcium chloride. Sand with crushed or angular particles shall be used as they provide better traction. In addition, sand particles larger than the #50 sieve and less than 3/8 inch diameter should be specified as this range provides better traction and minimize windshield damage. Sand is to be used on the gravel roadways. As necessary, typical application rates are 2 cubic yards per lane mile. Sodium chloride at 75 pounds per cubic yard of sand will prevent the sand moisture from freezing. At temperatures below 10 degrees F, calcium chloride is a better additive.

Acetates and plant-based additives are organic substances that have different melting characteristics than chlorides. These substances are safer for vegetation and are readily biodegraded in water. Plant-based additives include corn, beet, molasses or other organic additives. The compositions of plant-based additives have a consistency of "thick molasses" at low temperatures and at become even thicker at extremely low temperatures (e.g. below 0° F.). Therefore, plant-based additives are generally in solution with water or sodium chloride. Several manufactures produce plant-based additive anti-icing and de-icing products. Use of such products is considered a BMP. Each of these products has specified application characteristics. Ice control products with plant-based additives may be utilized where the product's chloride concentration is lower than the concentration identified in Ice Control Application Rate Guidelines in Appendix A.

Application rates for products with plant-based additives shall follow the manufacturer's guidelines. Observations on the concentration and effectiveness of the products shall be noted on the Storm Characteristic/Ice Control Measures form. Care should be taken to follow the manufactures recommendation for spreading equipment as plant-based additives are have a high suspended solids concentration and may clog conventional spraying or spreading devices.

The Lemont Refinery's plan is to start with sodium chloride solutions for pre-wetting, pre-treating, and anti-icing, and then introduce the blends in the coming winter seasons, so as to have a baseline for comparison.

4.2 Storage of Chloride Based Ice Control Measures

Chemical ice control materials shall not be stored out-of-doors on Refinery property. Chemical ice control materials shall be transported to the Refinery for application. Excess chemical ice control materials shall be removed from the Refinery after application. Section 2.4 presents the calculation of material needed to reduce the potential for excess or shortage of material.

4.3 Snow Piles

Snow and ice removed by mechanical means shall be stored on-site in designated areas. Designated snow pile areas shall NOT to be located:

- Directly adjacent to drain inlets
- Within vegetated areas
- Adjacent to rain gardens, wetlands, lakes/ponds, streams, and swales

Snow piles shall be stored in an area where excess de-icing materials and sand can be collected by sweeping after the snow and ice melts.

4.4 Snow Compaction

Snow compaction shall be restricted by mechanical removal of snow, to the extent practical, as presented in Section 3.2.

4.5 Spills

Excess accumulation of rock salt, occasionally observed where salt trucks slow down for turns, shall be swept up as soon as possible, and the salt re-used. Through training, the awareness of the damage of this excessive salt will be developed.

4.6 Sweeping

Following a storm event where de-icing materials were applied, sweeping will occur as needed. Sweeping of excess materials and snow pile areas will reduce the concentration of chloride in the Refinery's effluent. Excess material shall be removed from the site and disposed of properly or screened and reused. Sweeping shall be conducted when the application of sand and chemical mixture has been applied. Excess sand may be reused in subsequent applications.

4.7 Documentation/Charting

Documentation/charting of storm event characteristics and materials and methods utilized to control snow and ice shall be documented on the Storm Characteristic/Ice Control Measures form. Documentation shall include comments and observations on the type, application rate, and effectiveness of ice control measures. These observations will aid in documenting the reduction in amount of chloride based de-icers used and assist in determining types and lowest practical concentration of ice control measures to be employed at a given condition.

As not all pavement within the Refinery carry the same level of traffic, the level of service can vary, from the expectation of bare pavement to applying salt only when 5 percent or more of the roadway surface is slippery or icy.

4.8 Tracking

The Lemont Refinery currently tracks the daily manpower devoted to snow removal/de-icing as well as the salt products purchased each winter. Beginning with the 2015/2016 season, the refinery also tracked the salt usage daily. With the BMPs outlined herein, the Refinery anticipates that it can reduce its de-icing salt usage by an average 127 tons per year during the current permit cycle, based on a 4-year running average. The equipment purchased in 2016 will go a long way toward achieving this goal.

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APPENDIX A

Tier III Maintenance Guideline: Snow and Ice Control

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