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July 24, 2020

Mr. John M. Mooney, Acting Director, Air and Radiation Division  
United States Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard, Mail Code: A-18J  
Chicago, Illinois 60604-3507

Dear Mr. Mooney:

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) is requesting that the United States Environmental Protection Agency (USEPA) make a Clean Data Determination (CDD) for the sulfur dioxide (SO<sub>2</sub>) nonattainment area in a portion of Michigan's St. Clair County. EGLE has modeled the most recent three years of actual emissions from two power plant emission sources in the area with the results meeting the SO<sub>2</sub> National Ambient Air Quality Standard (NAAQS). In addition, DTE Energy (DTE) air monitoring for SO<sub>2</sub> over the most recent three years has recorded no violations of the NAAQS. The USEPA's Clean Data Policy allows a state with a nonattainment area meeting these criteria to request a CDD.

The enclosed document provides the technical data described above, including a report from DTE highlighting the impacts of their Belle River and St. Clair power plants, as well as large SO<sub>2</sub> sources located several miles away in Ontario, Canada.

If you have any questions regarding this CDD request, please contact Mr. Robert Irvine, Supervisor, SIP Development Unit, Air Quality Division, at 517-648-7367 or [IrvineR@Michigan.gov](mailto:IrvineR@Michigan.gov); or you may contact me.

Sincerely,

Mary Ann Dolehanty, Director  
Air Quality Division  
517-284-6773

Enclosure

cc: Dr. Eduardo Olaguer, EGLE  
Mr. Tom Shanley, EGLE  
Mr. Robert Irvine, EGLE  
Mr. Jim Haywood, EGLE

**EGLE Clean Data Determination  
for St. Clair County, Michigan  
SO<sub>2</sub> Nonattainment Area**



MICHIGAN DEPARTMENT OF  
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**July 2020**

## TABLE OF CONTENTS

	<u>Page</u>
Introduction .....	1
Clean Data Determination .....	1
Modeling Methodology Using 2017-2019 Emissions .....	2
Modeling Results .....	5
DTE SO <sub>2</sub> Monitors .....	6
Monitoring Data for 2017-2019 .....	7
Monitoring Results .....	7
Additional Monitoring Analysis .....	8
Emission Sources at the Power Plants .....	9
Emission Trends .....	10

Attachment: 1-Hour SO<sub>2</sub> State Implementation Plan for St. Clair County  
Air Quality Monitoring Data Analysis

# **EGLE Clean Data Determination for St. Clair County, Michigan SO<sub>2</sub> Nonattainment Area**

## **Introduction**

On July 1, 2016, the United States Environmental Protection Agency (USEPA) confirmed that the air in southeastern St. Clair County, Michigan, exceeded the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO<sub>2</sub>). The finding, based on the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) computer modeling and recommendation, designated the southeastern portion of the county in nonattainment with the Clean Air Act's NAAQS for SO<sub>2</sub>. EGLE's modeling of allowable (permitted) SO<sub>2</sub> emissions showed the emissions from two coal-fired power plants, DTE Energy (DTE) Belle River and DTE St. Clair, had the potential to cause SO<sub>2</sub> levels that exceed the 1-hour standard in the area.

The Clean Air Act required EGLE to develop a State Implementation Plan (SIP) by early 2018 to lower SO<sub>2</sub> allowable air pollution in the county. The plan must require SO<sub>2</sub> reductions in the area sufficient to attain the NAAQS within five years, which is mid-2021. EGLE has been working with DTE to develop the SIP but in doing so has exceeded the required submittal date. The USEPA has responded by issuing a Finding of Failure to Submit the SIP in autumn 2019. The first sanction for offsets takes effect 18 months later, in early 2021, if the SIP has not been submitted.

DTE recently announced that the St. Clair power plant will cease operating in mid-2022, which will significantly reduce SO<sub>2</sub> emission impacts in the area. However, the reduction is several months beyond the required compliance date for the area. To address this issue, as well as the pending sanction, EGLE is submitting for approval this Clean Data Determination. When approved, the requirement for a SIP submittal is suspended, stopping the sanction clock, and allowing time for the St. Clair power plant to shut down without additional consequences. This is further described below.

## **Clean Data Determination**

The USEPA has issued policy memoranda and implementation rules outlining their interpretations of the provisions of the Clean Air Act that apply to nonattainment areas that have subsequently attained the NAAQS. This interpretation of the Clean Air Act is known as the Clean Data Policy and is explained by the USEPA, as follows:

*In designated nonattainment areas where monitored data demonstrate that the National Ambient Air Quality Standards (NAAQS) have been achieved, EPA interprets certain requirements of the Clean Air Act as no longer applicable for so long as air quality continues to meet the standard. This interpretation of the Clean Air Act is known as the Clean Data Policy (CDP).*

- *Under the Clean Data Policy, EPA may issue a determination of attainment (known informally as a Clean Data Determination) after notice and comment rulemaking determining that a specific area is attaining the relevant standard.*
- *For such areas the requirement to submit to EPA those SIP elements related to attaining the NAAQS is suspended for so long as the area continues to attain the standard.*
- *These planning elements that are suspended include:*
  - *reasonable further progress (RFP) requirements;*
  - *attainment demonstrations;*
  - *Reasonably Available Control Measures (RACM);*
  - *contingency measures; and*
  - *other state planning requirements related to attainment of the NAAQS.*

For a clean data finding for a nonattainment area, the USEPA requires three years of monitoring data showing attainment and such “additional information” as necessary for the USEPA to determine the area is in attainment. One path the USEPA allows as additional information is modeling of the most recent three years of actual emissions for the area that shows attainment of the NAAQS.

#### Modeling Methodology Using 2017-2019 Emissions

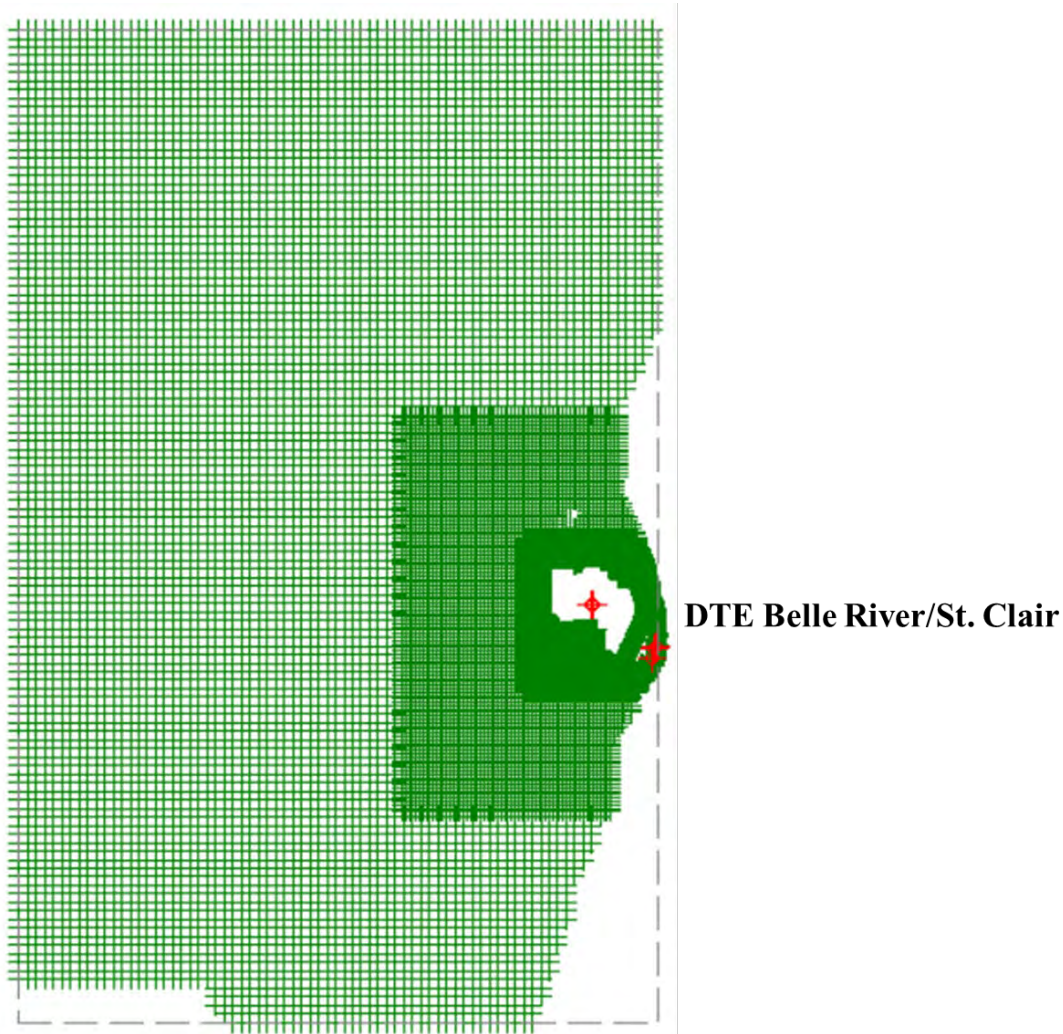
EGLE modeled SO<sub>2</sub> emissions for the years 2017-2019 to determine if the 1-hour NAAQS was met. Hourly continuous emissions monitoring system (CEMS) data for all Belle River and St. Clair stacks were provided to EGLE in AMS/EPA Regulatory Model (AERMOD) format by DTE. No other sources were explicitly modeled. Only two off-site sources were originally identified as having a significant contribution to the nonattainment area: Cargill Salt and E.B. Eddy. However, after further review, EGLE determined these facilities have decommissioned their coal-fired boilers and are no longer significant SO<sub>2</sub> emitters in the nonattainment area.

For meteorology, three years of meteorological data (2017-2019) from the Oakland County International Airport (i.e., Pontiac) was selected as the most representative for this analysis. The Pontiac meteorological data is collected by the National Weather Service and is in the prevailing upwind direction of the modeled SO<sub>2</sub> emission sources. One-minute data is also available from this first order collection station.

The modeling domain was the same as used in the original EGLE nonattainment designation recommendation to the USEPA. Receptor spacing was dense closest to the emission sources (50 m), then expands to 100 m and eventually 250 m on the outer region of the receptor grid for a total of 17,260 receptors, with non-ambient air receptors being excluded.

The topography in this area is generally flat with receptor terrain heights still included for modeling enhancement using AERMAP and 30 m NED GEOTIFF. The nonattainment receptor grid, with non-ambient receptors removed, is shown below.

### Modeled Nonattainment Receptor Grid



Determination of a representative background concentration is important in calculating the overall modeled impact. The Port Huron monitor is located approximately 20 km north of the DTE power plants. This monitor serves as the downwind monitor for the sources in this modeling analysis and is useful in determining a representative background concentration.

To derive a regional background devoid of the sources explicitly modeled in the analysis or from international sources, EGLE developed an SO<sub>2</sub> concentration spreadsheet to exclude hourly SO<sub>2</sub> concentrations when the wind is blowing from sources explicitly included in the modeling as well as international sources. Using this methodology, the spreadsheet ignores all hours (and associated preceding hour) when the wind direction

is between 0 degrees and 205 degrees. This excludes all modeled sources to the south (DTE Belle River/St. Clair) and international sources to the east. Then, using the remaining hours, a variable background matrix was developed based on season-of-year and hour-of-day (a method established in USEPA guidance titled, “User’s Guide for the AMS/EPA Regulatory Model – AERMOD”). The variable backgrounds by season-of-year and hour-of-day range from 1.3 ppb to 6.5 ppb.

The variable background table, as supplied to AERMOD, is provided below. There are 24 hourly values for each season in the table. Starting at the top left in the table, the value is the second highest recorded SO<sub>2</sub> value for all of the first hours of each 24-hour day throughout the season, so approximately 90 hours each season. The second value from the top left is the second highest recorded SO<sub>2</sub> value for all of the second hours of each 24-hour day throughout the season. Thus, the first row is hours 1-6, the second row is hours 7-12, etc. The 24 entries in the table for each season, therefore, are the second highest recorded SO<sub>2</sub> value for each hour for all of the days in the season.

**2017-2019 Variable Background Season-of-Year and Hour-of-Day (ppb)**

** Winter						
BACKGRND SEASHR	2.3	2.3	2.0	2.1	2.1	2.1
BACKGRND SEASHR	2.0	2.5	2.7	2.5	2.8	2.3
BACKGRND SEASHR	2.3	2.1	3.5	2.2	2.0	1.9
BACKGRND SEASHR	2.0	2.0	2.0	2.0	2.0	2.1
** Spring						
BACKGRND SEASHR	1.9	1.9	1.6	1.5	1.4	1.4
BACKGRND SEASHR	1.8	1.9	2.5	2.5	1.9	2.0
BACKGRND SEASHR	2.0	1.7	3.2	1.5	2.4	1.8
BACKGRND SEASHR	1.5	1.4	2.0	2.1	2.1	1.5
** Summer						
BACKGRND SEASHR	1.7	1.3	2.2	1.9	1.5	1.7
BACKGRND SEASHR	1.7	2.2	3.2	3.3	2.4	1.9
BACKGRND SEASHR	1.9	5.6	5.8	6.5	2.7	2.0
BACKGRND SEASHR	2.1	2.8	2.6	2.5	1.9	1.7
** Fall						
BACKGRND SEASHR	2.2	1.6	2.6	2.4	2.3	2.2
BACKGRND SEASHR	2.3	2.4	2.4	3.6	3.1	2.7
BACKGRND SEASHR	2.8	2.8	2.7	4.1	3.6	5.0
BACKGRND SEASHR	3.2	2.9	2.2	2.2	2.3	2.3

The spreadsheet used to determine this data has already been provided to the USEPA for review and validation along with the CEMS data provided by DTE, and therefore is not contained in this document.

Using the most recent version of AERMOD (v19191), 2017-2019 CEMS data, building downwash via BPIPPRM, corresponding one-minute meteorology data from the Oakland County International Airport, and the variable background, 99<sup>th</sup> percentile impacts were calculated for the full grid as well as monitor locations.

## Modeling Results

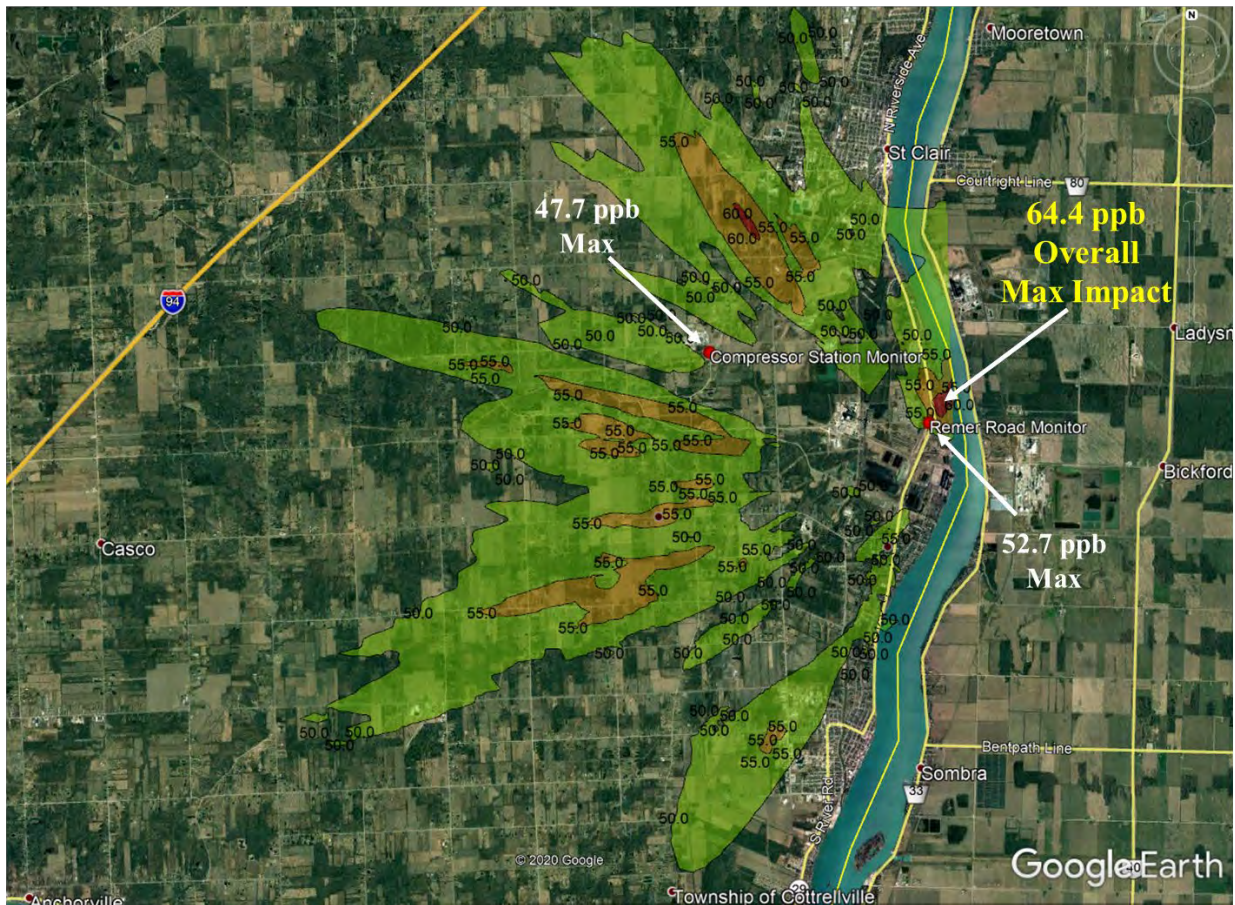
The 99<sup>th</sup> percentile impacts, with background concentrations, at the Mills and Remer monitors, along with the overall maximum 99<sup>th</sup> percentile impact is as follows:

### 99<sup>th</sup> Percentile Modeling Impacts Using Actual Emissions (CEMS)

Emission Source	Hotspot (ppb)
DTE Mills Monitor	47.7
DTE Remer Monitor	52.7
<b>Overall Maximum Impact</b>	<b>64.4</b>

Graphical depiction of the monitor impacts and associated overall hotspot impact is as follows.

### 2017-2019 CEMS Data – Pontiac 1-Minute Meteorology (99<sup>th</sup> Pctl Impact w/Background)



As shown, the modeled overall impact is extremely close to the Remer monitor. This helps to validate that DTE did locate the monitors generally at points of maximum SO<sub>2</sub> impact by the power plants.



More importantly, the results demonstrate that the area is attaining the 1-hour SO<sub>2</sub> NAAQS with the meteorology and emissions that actually occurred during the most recent 3-year timeframe, 2017-2019. Therefore, a key provision is met allowing EGLE to request the USEPA to make a Clean Data Determination for the St. Clair SO<sub>2</sub> nonattainment area.

### DTE SO<sub>2</sub> Monitors

The figure below shows the location of the two DTE SO<sub>2</sub> monitor/meteorological stations with respect to the two DTE power plants. The power plant stacks are identified with blue boxes, and the monitor/meteorological stations are identified with red boxes. The power plant nearest the river is the St. Clair plant and the other one is the Belle River plant. The monitor/meteorological station to the northwest of the power plants is known as the Mills monitor. The monitor/meteorological station between the power plants is the Remer monitor. The monitors have been operating since November 2016.

### **Location of Two DTE SO<sub>2</sub> Monitor/Meteorological Stations and Power Plants**



## Monitoring Data for 2017-2019

EGLE has more than three years of monitoring data that has been collected at two DTE SO<sub>2</sub> monitors near the Belle River and St. Clair power plants. To date there have been no violations of the NAAQS recorded at the two monitors. EGLE consulted with DTE during their process of installing and operating the monitors and associated meteorological (met) stations. The monitors and met stations have been operational since November 2016 and continue to operate. The SO<sub>2</sub> data is collected and quality assured by a contractor using EGLE-approved methods. It is submitted monthly to EGLE for uploading to the USEPA AIRs system.

The ambient air monitors are located in areas of modeled maximum SO<sub>2</sub> concentrations that are attributable to the power plants. One of the monitors called the Mills monitor is located generally in a line with the stacks from the two plants to the northwest. Modeling by DTE established the best location for the Mills monitor, placing it in the area of maximum concentration of SO<sub>2</sub> emitted from the two power plants together. This occurs when winds are from the southeast. The other monitor is called the Remer monitor and is located north of the St. Clair plant. It was placed to pick up impacts from the St. Clair plant alone when the winds are from a southerly direction. Being located near the St. Clair River also allows the monitor to pick up emissions that come from large SO<sub>2</sub> sources located along the river in Canada.

## Monitoring Results

The monitors have recorded no 4<sup>th</sup> high values above the 75 ppb NAAQS for the years 2017-2019. The highest 4<sup>th</sup> high was 65 ppb recorded at the Remer monitor. It should be noted that this value at the Remer monitor occurred when winds appear to transport SO<sub>2</sub> from Canada sources. A summary of the 4 highest SO<sub>2</sub> monitoring values for each monitor for the three-year time period is in the table below, with the maximum value in red and the 4<sup>th</sup> high value in green.

### Highest Four Annual Impacts at the DTE Monitors in 2017- 2019

Date (2017)	Mills monitor (ppb)	Date (2017)	Remer monitor (ppb)
Sept 10	89	May 9	70
May 27	73	Mar 28	56
May 10	54	Nov 27	52
June 14	46	April 23	51
Date (2018)		Date (2018)	
May 21	79	May 12	164
June 19	71	April 30	87
April 22	52	May 28	70
Aug 31	50	June 8	65
Date (2019)		Date (2019)	
June 17	69	June 19	53
June 18	57	June 7	50
June 29	47	June 29	50
June 30	40	May 28	45

To determine whether the NAAQS has been met at both SO<sub>2</sub> monitors, green values in the table are averaged for the 3 years (2017-2019) for each monitor. For the Mills monitor, the average of 46, 50, and 40 equals 45, which is well below the 75 ppb NAAQS. For the Remer monitor, the average of 51, 65, and 45 equals 54, also well below the NAAQS.

**These results demonstrate that the area is attaining the 1-hour SO<sub>2</sub> NAAQS with the SO<sub>2</sub> values measured at the two air monitors during the most recent 3-year timeframe, 2017-2019. Therefore, a second provision is met allowing EGLE to request the USEPA make a Clean Data Determination for the St. Clair SO<sub>2</sub> nonattainment area.**

#### Additional Monitoring Analysis

Attached to this report is a document titled, "1-Hour SO<sub>2</sub> SIP for St. Clair County Air Quality Monitoring Data Analysis July 2, 2020." The report was compiled by DTE to analyze impacts at SO<sub>2</sub> monitors in the area when winds come from a variety of directions. The report clearly shows, via SO<sub>2</sub> monitoring and wind data collected at the monitoring sites, the likely sources of SO<sub>2</sub> emissions when air monitors in and near the St. Clair SO<sub>2</sub> nonattainment area record higher SO<sub>2</sub> levels. The data analysis DTE provides in the report gives a detailed picture of the operations of the two power plants, their likely impacts on SO<sub>2</sub> monitoring data, as well as impacts by large SO<sub>2</sub> sources in the area of Sarnia, Ontario.

The table below was generated from data in the DTE report. It is like the previous table, but in this case it shows the four highest annual monitored values for each monitor **when the power plants** were culpable and excludes other large SO<sub>2</sub> sources in Canada that are generally north of the DTE power plants.

**Highest Four Annual Impacts from Belle River/St. Clair Recorded at the DTE Monitors in 2017- 2019**

Date (2017)	Mills monitor (ppb)	Date (2017)	Remer monitor (ppb)
Sept 10	89	May 9	70
May 10	54	Nov 27	52
June 14	46	Aug 10	23
Sept 11	42	July 21	20
Date (2018)		Date (2018)	
May 21	79	May 13	45
July 3	49	April 30	25
April 29	42	July 19	12
April 23	34	June 12	11
Date (2019)		Date (2019)	
May 22	33	Jan 11	24
Oct 5	30	April 21	20
Feb 23	23	April 6	10
Feb 10	23	July 4	10

The values in the table are lower because many of the higher values recorded at the monitors appear to reflect emissions from large sources in Canada. Thus, these large SO<sub>2</sub> sources in Sarnia, Ontario have some culpability for SO<sub>2</sub> impacts in addition to the power plants. EGLE has no jurisdiction over these international sources but continues dialogue with Canadian officials regarding the sources. Canadian officials expect SO<sub>2</sub> reductions to be occurring at these facilities as new regulations are adopted over the next several years.

Emission Sources at the Power Plants

*DTE Belle River Power Plant*

The Belle River power plant operates under Renewable Operating Permit (ROP) No. MI-ROP-B2796-2015b. The Belle River power plant has two electric generating units, each with a maximum gross design generating output of 697 megawatt (MW). Pulverized coal is the primary fuel for both boilers. The Belle River Peaking Units consist of five 2.5 MW each diesel electric generators and three 82.4 MW each combustion turbine electric generators. The DTE East China Peaking Units consist of four combustion turbine electric generators each 82.4 MW.

### Permitted 3-hr. SO<sub>2</sub> Limit for the Belle River Power Plant (2016)

Unit No.	3 hr. Limit	Hourly Rate, lbs/hour
1	1.2	8177
2	1.2	8177

### *DTE St. Clair Power Plant*

The St. Clair power plant operates under ROP No. MI-ROP-B2796-2015b. The St. Clair power plant has six electric generating units with a total maximum gross design generating output of 1,375 MW. Pulverized coal is the primary fuel for all boilers. The boilers can also be fired with fuel oil no. 6, fuel oil no. 2, off-specification recycled used oil, and biodiesel (Boiler 7 only). The St. Clair Peaking Units consist of a 23 MW combustion turbine electric generator and two 2.75 MW (each) diesel electric generators.

### Permitted Monthly SO<sub>2</sub> Limit for the St. Clair Power Plant (2016)

Unit No.	Monthly Limit, lbs/MMBtu	Hourly Rate, lbs/hr.
1-4	1.67	9,420
6	1.67	5,186
7	1.67	7,841

### Emission Trends

The newer Belle River plant was designed to burn primarily lower sulfur western coal, resulting in lower emissions than the St. Clair plant which burns a mix of eastern coal along with some western coal. SO<sub>2</sub> emissions from the two power plants combined for the past several years are listed in the table below. The emission trend over this period of time is generally downward, which is a result of more lower sulfur coal use at St. Clair and operational variations at both plants. The following explains the large decrease in emissions from 2018 to 2019:

The combined SO<sub>2</sub> emissions from the main units at both plants were:

- 41,384 tons in 2018
- 30,753 tons in 2019

The main differences between 2018 and 2019 were:

- St. Clair Unit 1 was retired in early 2019
  - 2018 SO<sub>2</sub> emissions were 2,433 tons versus 125 tons in 2019
- St. Clair Units 2 and 3 operated less in 2019 than in 2018 resulting in:
  - 2018 Unit 2 and Unit 3 combined SO<sub>2</sub> emissions of 4,617 tons dropping to 3,858 tons in 2019

- St. Clair Units 6 and 7 operated less in 2019 than in 2018 resulting in:
  - 2018 Unit 6 and 7 combined SO<sub>2</sub> emissions of 10,309 tons decreasing to 9,275 tons in 2019
- Belle River Unit 1 was in an outage for 7 months in 2019 leading to a reduction of 6,646 tons of SO<sub>2</sub> emissions from 2018 to 2019
- Belle River Unit 2 had nearly identical SO<sub>2</sub> emissions for both 2018 and 2019

*The biggest difference was the extended outage at Belle River Power Plant's Unit No. 1.*

<b>SO<sub>2</sub> Emissions</b>	Power Plant	Total lbs/year	Total tons/year
Year			
2010	Belle River/St. Clair	120,945,830	60,472
2011	Belle River/St. Clair	120,986,625	60,493
2012	Belle River/St. Clair	106,155,927	53,077
2013	Belle River/St. Clair	109,796,891	54,898
2014	Belle River/St. Clair	103,840,749	51,920
2015	Belle River/St. Clair	96,738,636	48,369
2016	Belle River/St. Clair	74,329,800	37,164
2017	Belle River/St. Clair	73,837,452	36,918
2018	Belle River/St. Clair	82,767,746	41,384
2019*	Belle River/St. Clair	61,506,000	30,753

\*Emissions for 2019 are not yet validated.

SO<sub>2</sub> emissions will change substantially with changes planned to occur at the two plants. Allowable emissions at Belle River will be substantially reduced shortly when a federal consent order takes effect. St. Clair is scheduled to shut down permanently in mid-2022. Power generation from a new natural gas fired power plant will begin in 2021, replacing generation lost when the St. Clair plant closes. These changes will allow EGLE modeling to show attainment of the NAAQS using **allowable** emissions at Belle River after St. Clair shuts down. At that time, the Air Quality Division will prepare and submit a redesignation plan to the USEPA requesting redesignation of the nonattainment area to attainment of the 1-hour SO<sub>2</sub> NAAQS.

**ATTACHMENT**  
**1-Hour SO<sub>2</sub> State Implementation Plan for St. Clair County**  
**Air Quality Monitoring Data Analysis**  
**July 2, 2020**

**DTE Energy's SO<sub>2</sub> SIP Perspective**

DTE Energy believes that the sulfur dioxide (SO<sub>2</sub>) State Implementation Plan (SIP) for St. Clair County needs to utilize the recent SO<sub>2</sub> and meteorological data from its two new monitoring sites (Belle River Mills Compressor Station & Belle River PP [Remer Road]) as much as possible in developing reasonable emission limits for both of its power plants in the county. These monitors were located as close as practical to receptors where the SO<sub>2</sub> National Ambient Air Quality Standards (NAAQS) designation modeling predicted the highest design value impacts using 2012-2014 actual emission data from DTE Energy's two St. Clair County power plants.

DTE Energy has received a permit to install (PTI) for a large natural gas-combined cycle power plant on the eastern acreage of Belle River Power Plant to replace the electrical generation no longer available when St. Clair Power Plant's coal-fired units are scheduled to be retired in 2022. This new generation will ensure that adequate base-loaded generation will be available to meet projected electrical demands moving ahead into the future.

There are three critical concepts that need to be considered:

1. Acceptance of a weight-of-evidence demonstration that incorporates data from the new, and existing, SO<sub>2</sub> monitoring sites to properly account for real-world air pollutant transport and dispersion, instead of total reliance on impact predictions by the AERMOD Model.
2. Analyzing nearby SO<sub>2</sub> and meteorological data to determine whether DTE Energy, or large Canadian, SO<sub>2</sub> sources are most culpable on days when high 1-hour SO<sub>2</sub> is observed at the three St. Clair County monitoring sites. Days when the DTE power plants are primarily culpable will be compared against AERMOD runs for 2017 to determine whether the magnitude and frequency of high predicted SO<sub>2</sub> matches observed concentrations.
3. Because the 2010 SO<sub>2</sub> NAAQS is a probabilistic standard where high SO<sub>2</sub> only occurs from the two power plants when:
  - a. Most of the seven coal-fired units are operating near full load.
  - b. Each operating unit is burning its highest allowed sulfur coal.
  - c. Meteorological conditions are favorable (critical wind directions plus adequate vertical turbulence) for the units' SO<sub>2</sub> emissions to fumigate to ground-level close into the plant over US land or water (Canada's SO<sub>2</sub> standard is 250 ppb rather than 75 ppb).

- d. Air quality modeling analyses for SIP development assume a) and b) are occurring every hour of the meteorological data base modeled. This is extremely unrealistic and DTE Energy proposes to use the monitors to provide additional verification whether the NAAQS is maintained in St. Clair County with current plant operating conditions.

An additional complicating factor was a fire that broke out at St. Clair Power Plant in August 2016, three months before the new DTE monitoring network began collecting data. Some operation at the plant restarted within two months of the fire. Unit 6 and Unit 7 didn't restart until 2017. Unit 4 has not operated since the fire. Unit 6 and 7 are the two largest units at St. Clair Power Plant and tend to burn more bituminous coal than Units 1-3. This reduced the likelihood of all five main St. Clair Power Plant units being operated at full load, simultaneously, even more than before the fire. Belle River Power Plant's operation was not directly impacted by the nearby plant's fire. Table 1 illustrates operation of these two plants leading into the fire and moving into the recovery period.

### **Large Canadian Sources In Lambton County & Proximity to Port Huron Monitor**

Figure 1 illustrates the large SO<sub>2</sub> point sources and air quality monitors in Lambton County, the large SO<sub>2</sub> sources in St. Clair County (in 2014), the three St. Clair County monitoring sites and the 2014 annual SO<sub>2</sub> emissions from these sources.

Large Canadian and United States SO<sub>2</sub> source 2014 emissions, their distance and direction from the Port Huron monitoring site are listed in Table 2. Most of the SO<sub>2</sub> emissions came from DTE Energy's two power plants. However, the Canadian sources emitted 30 percent of the combined point sources' total along the St. Clair River. These Canadian SO<sub>2</sub> sources have much shorter stacks than DTE's power plants, and can have higher SO<sub>2</sub> impacts at the St. Clair County monitoring sites, as well as at the Canadian monitors. Table 3 provides SO<sub>2</sub> source distance and upwind direction from all three St. Clair County SO<sub>2</sub> monitoring sites. I assume that a source impacts a downwind monitor if it is within 20 degrees of the direct upwind wind direction. A range of wind directions are listed for the larger of the Canadian SO<sub>2</sub> sources in Lambton County that may impact at least one of the St. Clair County monitors.

### **Air Monitoring Summary from December 2016 – December 2019**

Overall, the maximum monthly 1-hour SO<sub>2</sub> concentrations are observed during the warmer months (Late March – September), with a few exceptions. Table 4 lists the maximum hourly SO<sub>2</sub> concentration during this 37-month period.



### **DTE Energy Monitoring Site Analysis (Belle River Mills & Remer Road)**

1. For each monitoring site, identify which large SO<sub>2</sub> source(s) is likely most culpable for the observed high 1-hour SO<sub>2</sub> impact assuming:
  - a. High SO<sub>2</sub> impacts from the DTE Energy power plants will most likely occur during the warm months (April – September), and be observed near the middle of the day (9AM-5PM) when the sun is highest in the sky.
  - b. High impacts from large Canadian sources are observed throughout the year and can occur at nighttime, due to their shorter stack heights than DTE Energy's power plants.
  - c. It is not always the large SO<sub>2</sub> source directly upwind of a specific monitoring site, during the hour, when the maximum daily SO<sub>2</sub> concentration is observed that is always most culpable. During light wind periods and especially in the late spring through early summer, recirculating flows due to lake breeze effects lead to SO<sub>2</sub> impacts from other upwind sources dominating the total SO<sub>2</sub> impact.
2. Modeled SO<sub>2</sub> impacts using AERMOD need to be compared against high monitored 1-hour SO<sub>2</sub> concentrations when DTE Energy SO<sub>2</sub> sources are clearly the most culpable source(s).
3. Focus the SO<sub>2</sub> monitoring data analysis on:
  - a. Days when the maximum daily observed 1-hour SO<sub>2</sub> concentration is above the 75 ppb NAAQS
4. Review the days with the top 10 measured maximum daily 1-hour SO<sub>2</sub> concentrations for each calendar year (2017 through 2019), to provide additional statistical power to the analysis.

### **DTE Energy Monitoring Site Data (December 2016 – December 2019)**

All maximum daily 1-hour SO<sub>2</sub> concentrations 10 parts per billion (ppb), or higher, are listed for both DTE Energy monitoring sites for the last month and a few days from 2016, and the 2017 calendar year in Table 5. Table 6 lists the same SO<sub>2</sub> and meteorological data for the January through December 2018 period, and Table 7 lists data for 2019. The maximum monthly value is listed for months where the highest SO<sub>2</sub> concentration was less than 10 ppb. The color coding in the table coincides with which source(s) are upwind of the monitor during the hour when the maximum hourly concentration was observed. The concentration and wind direction have the following background color based on which sources are upwind during the maximum SO<sub>2</sub> hour:

- Yellow – Canadian SO<sub>2</sub> source(s)
- Blue – DTE Power Plant(s)
- Orange – Maximum for the entire period in the table
- White – No specific large SO<sub>2</sub> source is upwind

Table 8 lists the highest (Top 10) daily maximum 1-hour average SO<sub>2</sub> concentrations measured during calendar years 2017, 2018 and 2019 at all three St. Clair County monitors, plus the River Bend monitor in Lambton County, Ontario (Canada). Because the River Bend monitoring site is between the DTE Energy power plants and the Port Huron monitor, it provides additional clarification regarding which source(s) are contributing to high SO<sub>2</sub> at each monitor. Many of the highest 1-hour SO<sub>2</sub> concentrations were observed with at least one DTE power plant upwind of the Belle River Mills Monitor. There were only a few cases where a DTE power plant was

upwind of the Remer Road Monitor during the maximum SO<sub>2</sub> concentration hour. Both sites had Canadian SO<sub>2</sub> sources upwind when the top 10 SO<sub>2</sub> levels were observed, especially for the Remer Road site. Canadian SO<sub>2</sub> sources were likely most culpable for nearly all of the top 10 1-hour SO<sub>2</sub> days at all four monitors in 2019.

### **MDEQ-AQD Port Huron Monitoring Site Data (December 2016 – December 2018)**

High measured SO<sub>2</sub> day data are listed for the Port Huron monitor from November 2016 through December 2017 in Table 9. Table 10 lists identical data for the January through December 2018 period at this Michigan EGLE (formerly MDEQ) monitor. Table 11 provides these high SO<sub>2</sub> concentration days for 2019. The same color coding scheme is used to identify which large SO<sub>2</sub> source(s) was upwind during the maximum 1-hour SO<sub>2</sub> concentration hour.

There are quite a few days where the maximum hourly SO<sub>2</sub> concentration exceeded 10 ppb with the DTE Energy power plants upwind of this monitor. However, most of these are in the lower range of the listed SO<sub>2</sub> concentrations. Days when the highest SO<sub>2</sub> concentrations are measured nearly always had large Canadian sources upwind during the hour when the highest SO<sub>2</sub> concentration was observed. Table 8, which lists the top 10 highest 1-hour SO<sub>2</sub> days for 2017 through 2019 clearly identifies Canadian SO<sub>2</sub> sources as being most culpable for these high measured concentrations. In fact, most of the top 10 1-hour SO<sub>2</sub> days occur when the Cabot Canada Ltd. Carbon Black Plant is directly upwind of the Port Huron monitor (direct upwind direction = 111 degrees). The only high SO<sub>2</sub> concentration day where the DTE Energy power plants are upwind of the Port Huron monitor is the 9<sup>th</sup> highest impact day in 2018 (July 1, 2018) when SO<sub>2</sub> peaked at 66 ppb.

A more detailed source culpability analysis is not necessary with the dominance of this Canadian source on maximum 1-hour SO<sub>2</sub> concentrations at the Port Huron monitoring site.

### **DTE Energy SO<sub>2</sub> Source Culpability Analysis for DTE Energy's Monitoring Sites**

A more detailed analysis was performed on each of the top 10 days with the highest measured 1-hour SO<sub>2</sub> concentrations to determine whether DTE Energy's two power plants were the primary source(s) impacting the monitor during the hour with the highest SO<sub>2</sub> concentration. Tables 12A (Belle River Mills Site) and 12B (Remer Road Site) display the critical criteria that were reviewed to ascertain which source(s) dominated, or shared, impacts during the critical maximum SO<sub>2</sub> hour for 2017 and 2018. Table 12C shows the same data for both DTE Energy monitors for 2019. The five key criteria for a DTE Energy power plant impacting a nearby monitor include:

1. Warm season month (April – September).
2. Midday hour when there is more vertical turbulence (9AM-5PM).
3. Low (< 10 ppb) SO<sub>2</sub> concentrations prior to, or during, the hour the maximum SO<sub>2</sub> concentration is measured **at the other DTE Energy monitor.**
4. Low (< 10 ppb) SO<sub>2</sub> concentrations prior to, or during, the hour the maximum SO<sub>2</sub> concentration is measured at the DTE Energy monitor **at the Canadian River Bend Monitor.**
5. One or both DTE Energy plants is upwind ( $\pm$  20 degrees of the direct upwind direction) of the monitor during the hour when the maximum SO<sub>2</sub> concentration is measured.

Eight of the 20 days at the Belle River Mills site have most of their SO<sub>2</sub> impact from DTE Energy

power plants for 2017 and 2018. Of these eight, four have some SO<sub>2</sub> coming from the nearby Canadian SO<sub>2</sub> sources. Also, on May 21, 2018, the exceedance (79 ppb) of the SO<sub>2</sub> NAAQS was primarily from DTE Energy's power plants.

At the Belle River Power Plant (Remer Road) site, DTE Energy's power plants are the most culpable SO<sub>2</sub> source(s) for only two of the 20 days listed for 2017 and 2018. There is some SO<sub>2</sub> impact from Canadian SO<sub>2</sub> sources on both days when it appears St. Clair Power Plant is impacting this monitor. When comparing monitored SO<sub>2</sub> levels against modeled impacts on days where there is some DTE Energy power plant SO<sub>2</sub> impact, it is important to account for the Canadian source contribution to the high SO<sub>2</sub> concentration measurement. The 2019 update to this data set, in Table 12C, shows an even greater dominance of Canadian SO<sub>2</sub> source(s) being upwind of these monitors when high 1-hour SO<sub>2</sub> was observed (19 out of 20 top 10 days).

Additional SO<sub>2</sub> and wind direction and wind speed data are provided in Tables 13A, 13B and 13C to illustrate days when:

1. DTE Energy SO<sub>2</sub> sources are clearly culpable
2. Canadian sources are clearly the dominant SO<sub>2</sub> source(s)
3. DTE Energy and Canadian SO<sub>2</sub> sources both contribute to the high observed SO<sub>2</sub> level

Table 1

Belle River & St. Clair PP - Operating Days (January 2015 - December 2017)									
Month	Year	Belle River Unit 1	Belle River Unit 2	St. Clair Unit 1	St. Clair Unit 2	St. Clair Unit 3	St. Clair Unit 4	St. Clair Unit 6	St. Clair Unit 7
Jan	2015	28	16	31	31	0	14	25	17
Feb	2015	28	0	28	28	0	21	28	23
Mar	2015	24	0	23	29	20	31	13	31
Apr	2015	24	26	30	13	30	30	0	27
May	2015	29	31	14	29	31	31	0	0
June	2015	20	30	30	17	30	17	3	16
July	2015	31	31	31	21	31	31	23	26
Aug	2015	25	22	31	31	10	31	23	25
Sep	2015	30	30	11	30	30	30	30	30
Oct	2015	19	31	14	23	31	31	24	31
Nov	2015	30	21	30	0	23	21	18	30
Dec	2015	31	26	31	0	31	31	31	3
Jan	2016	31	26	31	0	31	31	31	21
Feb	2016	19	28	22	26	15	25	4	29
Mar	2016	0	31	31	31	24	18	31	31
Apr	2016	0	4	30	30	30	30	7	7
May	2016	4	22	31	31	31	31	28	10
June	2016	29	30	24	30	25	10	15	30
July	2016	27	31	30	22	31	31	19	26
Aug	2016	31	22	5	11	9	11	11	11
Sep	2016	30	30	4	0	0	0	0	0
Oct	2016	16	31	31	4	7	0	0	0
Nov	2016	30	25	30	30	10	0	0	0
Dec	2016	31	25	19	25	19	0	0	0
Jan	2017	21	31	31	31	25	0	7	0
Feb	2017	28	28	28	28	25	0	14	0
Mar	2017	31	25	31	31	31	0	13	0
Apr	2017	30	27	30	22	30	0	29	0
May	2017	22	31	31	14	31	0	19	0
June	2017	28	20	4	30	30	0	0	0
July	2017	31	31	27	31	31	0	18	0
Aug	2017	21	31	31	31	31	0	31	1
Sept	2017	27	9	30	30	27	0	20	16
Oct	2017	31	0	31	7	29	0	24	11
Nov	2017	28	0	30	28	12	0	27	22
Dec	2017	NA	4	31	14	31	0	31	0

Table 1 (Continued)

Belle River & St. Clair PP - Operating Days (January 2018 - December 2019)									
		Belle River	Belle River	St. Clair	St. Clair	St. Clair	St. Clair	St. Clair	St. Clair
Month	Year	Unit 1	Unit 2	Unit 1	Unit 2	Unit 3	Unit 4	Unit 6	Unit 7
Jan	2018	31	17	31	31	31	0	26	10
Feb	2018	28	24	17	28	19	0	4	0
Mar	2018	16	31	16	19	20	0	6	12
Apr	2018	22	26	30	21	30	0	29	18
May	2018	13	22	31	19	17	0	22	25
June	2018	15	29	30	20	25	0	25	27
July	2018	31	30	31	31	31	0	25	31
Aug	2018	31	31	31	31	31	0	31	27
Sept	2018	26	12	25	30	28	0	7	29
Oct	2018	10	31	31	5	31	0	0	22
Nov	2018	30	25	30	22	30	0	0	30
Dec	2018	25	23	31	31	31	0	10	31

Jan	2019	29	20	23	31	31	0	25	16
Feb	2019	6	28	2	27	20	0	26	7
Mar	2019	0	31	0	31	20	0	1	31
Apr	2019	0	24	0	27	30	0	15	30
May	2019	0	24	0	23	17	0	17	27
June	2019	0	27	0	29	30	0	30	21
July	2019	23	31	0	31	22	0	24	29
Aug	2019	29	27	0	7	28	0	31	31
Sept	2019	30	30	0	13	30	0	30	27
Oct	2019	20	22	0	8	31	0	9	31
Nov	2019	0	30	0	27	29	0	14	30
Dec	2019	0	31	0	20	14	0	25	31

Notes: 1) Green - Operated every day in the month, Red - Did not operate entire month

2) Key Dates: Fire at St. Clair PP - Aug 11 2016, SO2 Network Start Date - Nov 23 2016

3) Allowable SO2 Emission Rates (lbs/hr):

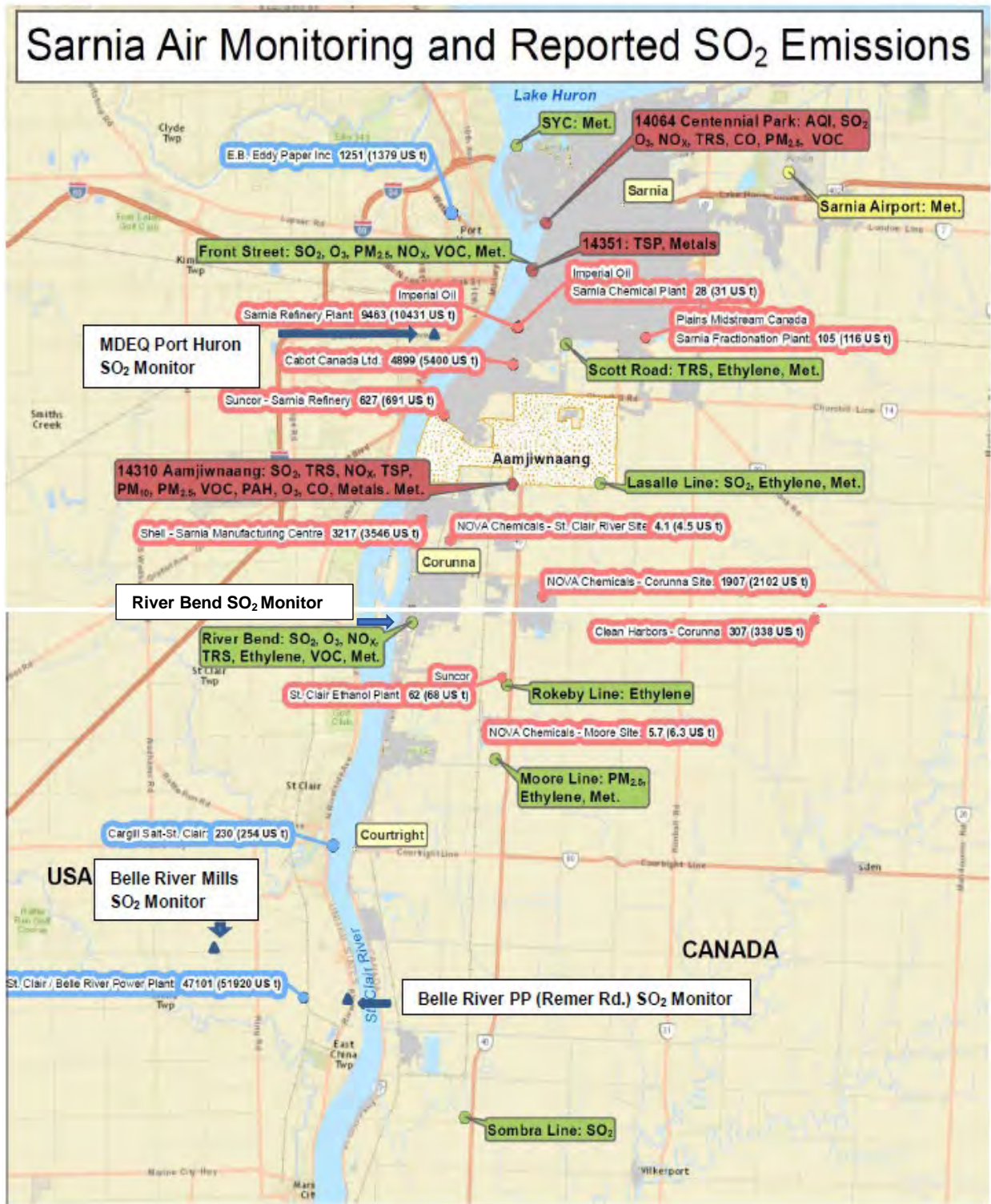
Belle River Units 1 & 2: 8,177

St. Clair Units 1-4: 2,355

St. Clair Unit 6: 5,187

St. Clair Unit 7: 7,841

Figure 1



**Table 2**

<b>Large SO<sub>2</sub> Sources in Vicinity of MDEQ's Port Huron Monitor</b>				
<b>(2014 Actual Emissions &amp; Proximity to the Monitor)</b>				
<b>Large SO<sub>2</sub> Point Source</b>	<b>Country</b>	<b>2014</b>	<b>MDEQ Port Huron Monitor</b>	
		<b>Annual SO<sub>2</sub> Emissions (tons/year)</b>	<b>Source Distance to Monitor (km)</b>	<b>Source Upwind Wind Direction (degrees)</b>
Imperial Oil-Sarnia Refinery & Chemical Plant	Canada	10,462	3.29	75
Cabot Canada Ltd. - Sarnia Plant	Canada	5,400	3.27	111
Shell - Sarnia Manufacturing Centre	Canada	3,546	5.65	182
NOVA Chemicals - Corunna Site	Canada	2,102	8.89	155
Suncor - Sarnia Refinery	Canada	691	2.70	160
Clean Harbors - Corunna Site	Canada	338	15.1	125
Suncor - St. Clair Ethanol Plant	Canada	68	11.1	167
Smaller Canadian SO <sub>2</sub> Sources	Canada	117	NA	NA
St. Clair Power Plant	USA	27,454	21.3	185
Belle River Power Plant	USA	24,466	20.0	191
EB Eddy Paper	USA	1,379	3.64	17
Cargill Salt Company	USA	254	15.2	191
<b>Canadian &amp; US SO<sub>2</sub> Emissions</b>	<b>Both</b>	<b>76,277</b>		
<b>Canadian SO<sub>2</sub> Emissions</b>	<b>Canada</b>	<b>22,724</b>		
<b>US SO<sub>2</sub> Emissions</b>	<b>USA</b>	<b>53,553</b>		

Notes:

- The key SO<sub>2</sub> source upwind of nearly all highest 1-hour concentrations at the Port Huron monitor is Cabot Canada Ltd.
- Two other large SO<sub>2</sub> sources have similar directly upwind directions as Belle River & St. Clair Power Plants:
  - Shell - Sarnia Manufacturing Centre
  - Cargill Salt Company
- In 2014, US SO<sub>2</sub> sources emitted 70 % of the total emissions from both sides of the border along the St. Clair River

**Table 3**

**St. Clair County Source / Monitor Orientation**

<b>Monitoring Site</b>	<b>Belle River PP</b>		<b>St. Clair PP</b>		<b>Large Canadian SO<sub>2</sub> Sources</b>	
	<b>Upwind Distance (km)</b>	<b>Upwind Direction (deg)</b>	<b>Upwind Distance (km)</b>	<b>Upwind Direction (deg)</b>	<b>Upwind Distance (km)</b>	<b>Upwind Direction (deg)</b>
Belle River Mills	3.01	114	5.31	122	14.2-21.6	25 - 44
Belle River PP (Remer)	1.52	279	1.32	167	13.3-21.4	8 - 27
MDEQ Port Huron	20.0	191	21.3	185	2.2 -15	75 - 160

Cabot Canada Ltd. - 3.3 km & 111°

**Table 4**

<b>Maximum Monthly SO<sub>2</sub> Concentrations for Monitors in St. Clair &amp; Lambton Counties</b>					
<b>From Startup of DTE Energy's Monitors (Nov. 23, 2016) Through Dec. 2019</b>					
		<b><u>St. Clair County SO<sub>2</sub> Monitoring Site</u></b>			<b>Canadian SO<sub>2</sub></b>
		<b><u>Belle River Mills</u></b>	<b><u>Belle River PP</u></b>	<b><u>Port Huron</u></b>	<b><u>River Bend</u></b>
		<b>Maximum Hourly</b>	<b>Maximum Hourly</b>	<b>Maximum Hourly</b>	<b>Maximum Hourly</b>
		<b>SO<sub>2</sub> Concentration</b>	<b>SO<sub>2</sub> Concentration</b>	<b>SO<sub>2</sub> Concentration</b>	<b>SO<sub>2</sub> Concentration</b>
<b>Month</b>	<b>Year</b>	<b>(ppb)</b>	<b>(ppb)</b>	<b>(ppb)</b>	<b>(ppb)</b>
December	2016	3	4	46	NA
January	2017	9	9	40	60
February	2017	45	5	54	27
March	2017	73	30	51	45
April	2017	38	51	66	77
May	2017	54	70	43	39
June	2017	46	22	51	36
July	2017	21	23	34	44
August	2017	33	23	58	23
September	2017	89	29	49	59
October	2017	6	13	55	40
November	2017	15	52	28	22
December	2017	10	11	76	15
January	2018	28	5	16	28
February	2018	25	15	38	46
March	2018	38	87	84	43
April	2018	52	50	54	75
May	2018	79	164	72	230
June	2018	71	65	89	101
July	2018	49	53	66	56
August	2018	50	58	64	37
September	2018	46	42	46	106
October	2018	10	9	82	37
November	2018	13	4	70	28
December	2018	18	4	109	23
January	2019	20	24	45	39
February	2019	23	10	60	20
March	2019	31	28	53	45
April	2019	24	25	63	48
May	2019	34	45	55	82
June	2019	69	53	44	114
July	2019	37	34	30	90
August	2019	23	26	48	100
September	2019	23	28	64	36
October	2019	30	45	50	28
November	2019	17	6	73	23
December	2019	37	14	71	31



**Table 5**

Maximum Monthly & SO2 Concentrations ≥ 10 ppb for St. Clair County Monitors DTE Energy Air Quality Monitoring Sites - Startup (Nov. 23 2016) Through Dec. 2017									
		Belle River Mills Monitoring Site				Belle River PP (Remer Road) Monitoring Site			
		Maximum Hourly	Hour	Wind	Maximum Hourly	Hour	Wind		
Month	Year	SO2 Concentration (ppb)	Date	Beginning (EST)	Direction (deg)	SO2 Concentration (ppb)	Date	Beginning (EST)	Direction (deg)
November	2016	5	30-Nov	1500	204	4	30-Nov	1500	197
December	2016	3	4-Dec	2000	113	4	16-Dec	1100	210
January	2017	9	23-Jan	1800	13	9	12-Jan	1100	9
February	2017	45	19-Feb	1700	39	5	19-Feb	1600	337
February	2017	29	23-Feb	1600	31				
March	2017	10	4-Mar	1700	89	30	29-Mar	1500	6
March	2017	13	24-Mar	1900	33	24	28-Mar	0200	1
March	2017	16	25-Mar	0300	16	21	24-Mar	2000	358
March	2017	73 (2nd high)	27-Mar	2200	33				
March	2017	22	29-Mar	1000	53				
April	2017	10	1-Apr	1700	75	10	14-Apr	2000	12
April	2017	25	3-Apr	1000	121	18	17-Apr	1000	358
April	2017	22	5-Apr	1500	34	25	19-Apr	1700	360
April	2017	19	11-Apr	0500	42	23	22-Apr	1700	356
April	2017	12	12-Apr	1800	43	51 (4th high)	23-Apr	1900	3
April	2017	20	13-Apr	1200	128	28	24-Apr	1900	2
April	2017	22	14-Apr	1300	124	29	29-Apr	0200	10
April	2017	28	17-Apr	0000	36				
April	2017	15	18-Apr	0800	116				
April	2017	14	19-Apr	1900	23				
April	2017	33	20-Apr	0200	35				
April	2017	26	22-Apr	1900	30				
April	2017	38	24-Apr	1100	103				
April	2017	13	25-Apr	0000	110				
April	2017	14	29-Apr	2200	32				
May	2017	13	7-May	1500&1800	35-37	70 (1st high)	9-May	1400	186
May	2017	13	8-May	2000	37	13	11-May	1500	350
May	2017	33	9-May	1200	198	12	12-May	1800	2
May	2017	54 (3rd high)	10-May	1100	136	56 (2nd high)	13-May	1100	116
May	2017	12	11-May	1300	27	30	15-May	1200	126
May	2017	29	12-May	1900	30	14	27-May	1500	97
May	2017	23	15-May	1600	65				
May	2017	16	20-May	1300	119				
May	2017	11	23-May	2200	23				
May	2017	15	27-May	1000	142				
May	2017	17	28-May	1000	137				
June	2017	10	8-Jun	1300 & 1700	214	17	4-Jun	2300	6
June	2017	46 (4th high)	14-Jun	1000	127	14	5-Jun	0000	359
June	2017	12	15-Jun	1400	143	11	6-Jun	2100	357
June	2017					22	8-Jun	1200	118
June	2017					18	13-Jun	1400	345
June	2017					19	15-Jun	1400	130
June	2017					10	21-Jun	1600	103
July	2017	19	3-Jul	1900	24	23	4-Jul	1700	349
July	2017	11	4-Jul	1900	20	22	19-Jul	1500	355
July	2017	10	17-Jul	1800	41	20	21-Jul	1700	180
July	2017	21	19-Jul	1700	34	13	25-Jul	14-1600	339-358
July	2017	16	21-Jul	0900	33	17	27-Jul	1900	3
July	2017	11	25-Jul	1400	15				
July	2017	10	29-Jul	0900	30				
August	2017	12	3-Aug	0900	99	17	7-Aug	1000&1300	351-360
August	2017	13	7-Aug	1200	10	23	10-Aug	1200	173
August	2017	33	16-Aug	1200	179	22	13-Aug	1300	113
August	2017	10	20-Aug	1000	221	10	14-Aug	1200	168
August	2017	14	26-Aug	1700	25	11	16-Aug	1400	156
August	2017	23	27-Aug	1000	102	13	26-Aug	1000	357
September	2017	21	2-Sep	1300 & 1500	128	29	10-Sep	1500	90
September	2017	89 (1st high)	10-Sep	1200	109	16	11-Sep	1200	106
September	2017	42	11-Sep	1300	127	13	12-Sep	1100	22
September	2017	21	12-Sep	1700	9	22	18-Sep	1200	5
September	2017	14	18-Sep	1700	23	19	23-Sep	1500	222
September	2017	13	22-Sep	1300	206	18	24-Sep	1500	172
September	2017					21	25-Sep	1200	117
October	2017	6	6-Oct	1300	71	13	10-Oct	1500	6
November	2017	15	27-Nov	1300	133	11	7-Nov	1200	354
November	2017	11	29-Nov	1500	46	52 (3rd high)	27-Nov	1200	170
December	2017	10	21-Dec	1300	129	11	16-Dec	1300	358

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

**Table 6**

**Maximum Monthly & SO2 Concentrations ≥ 10 ppb for St. Clair County Monitors  
DTE Energy Air Quality Monitoring Sites (January - June 2018)**

		<u>Belle River Mills Monitoring Site</u>				<u>Belle River PP (Remer Road) Monitoring Site</u>			
		Maximum Hourly	Hour	Wind	Maximum Hourly	Hour	Wind		
		SO2 Concentration	Beginning	Direction	SO2 Concentration	Beginning	Direction		
Month	Year	(ppb)	Date	(EST)	(deg)	(ppb)	Date	(EST)	(deg)
January	2018	28	15-Jan	1400	111	5	9-Jan	1500	149
January	2018	10	28-Jan	1500	42				
February	2018	25	22-Feb	1700	26	14	10-Feb	2000	8
February	2018					15	16-Feb	0000	2
February	2018					14	28-Feb	1900	8
March	2018	15	1-Mar	0700	31	14	1-Mar	0000	5
March	2018	18	4-Mar	1100	22	10	5-Mar	1400	6
March	2018	22	5-Mar	1400	38	16	17-Mar	1600	13
March	2018	18	18-Mar	1800	26	17	19-Mar	1600	360
March	2018	10	19-Mar	1400	27	12	21-Mar	1100	4
March	2018	14	20-Mar	2000	25	10	23-Mar	1800	13
March	2018	10	21-Mar	0800	22	14	24-Mar	1300	359
March	2018	12	22-Mar	1800	47	87 (2nd High)	28-Mar	1700	100
March	2018	11	25-Mar	2000	41				
March	2018	38	28-Mar	1800	71				
April	2018	22	11-Apr	1800	24	50	2-Apr	1100	135
April	2018	17	13-Apr	1200	33	17	13-Apr	1200	359
April	2018	38	20-Apr	1800	31	19	20-Apr	1400	3
April	2018	18	21-Apr	1300	198	30	22-Apr	1600	4
April	2018	52 (3rd High)	22-Apr	1900	26	11	28-Apr	1500	16
April	2018	34	23-Apr	0800	113	19	29-Apr	1600	13
April	2018	18	27-Apr	1500	46	25	30-Apr	1100	297
April	2018	42	29-Apr	2000	109				
May	2018	36	6-May	1100	21	14	3-May	1500	12
May	2018	20	7-May	0900&1500	56 & 80	43	6-May	1200	354
May	2018	49 (4th High)	10-May	1900	26	31	7-May	0800	351
May	2018	25	11-May	1900	30	22	11-May	0200	5
May	2018	35	12-May	2300	348	164 (1st High)	12-May	1800	354
May	2018	30	13-May	1200	55	45	13-May	1500	163
May	2018	35	15-May	2300	343	53	15-May	1800	2
May	2018	25	16-May	0000	341	31	17-May	0800&2200	351&357
May	2018	19	18-May	0100&0200	17 & 16	12	18-May	0100-0400	0-9
May	2018	29	20-May	1800	20	24	20-May	1900	349
May	2018	79 (1st High)	21-May	1100	121	20	22-May	1600	353
May	2018	41	23-May	1600	33	26	23-May	1600	357
May	2018	26	28-May	2000	11	24	24-May	1100	116
May	2018	33	29-May	1600&1700	22 & 23	70 (3rd High)	28-May	1500	139
May	2018					29	29-May	1600	349
June	2018	20	1-Jun	1300	30	41	1-Jun	1000	353
June	2018	20	2-Jun	1700	14	26	2-Jun	1600	354
June	2018	19	5-Jun	1000	31	18	5-Jun	1400&1500	357
June	2018	34	6-Jun	1700	90	11	6-Jun	0800	358
June	2018	30	7-Jun	2000	27	38	7-Jun	1500	127
June	2018	34	8-Jun	1900	37	65 (4th High)	8-Jun	1500	345
June	2018	31	11-Jun	1800	14	35	11-Jun	1900	349
June	2018	24	14-Jun	1400	28	11	12-Jun	1100	149
June	2018	23	15-Jun	0800&0900	44	21	14-Jun	1300	354
June	2018	71 (2nd High)	19-Jun	1700	23	20	15-Jun	1500	358
June	2018	17	20-Jun	0800	55	29	19-Jun	0300	355
June	2018	36	21-Jun	1900	19	28	20-Jun	0500	360
June	2018	20	23-Jun	1300	73	58	21-Jun	1400	1
June	2018	12	25-Jun	1900	16	10	24-Jun	1800	6
June	2018	25	26-Jun	0900	113	15	25-Jun	1400&1800	355

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

Table 6 (Continued)

Maximum Monthly & SO2 Concentrations ≥ 10 ppb for St. Clair County Monitors DTE Energy Air Quality Monitoring Sites (January - December 2018)									
		Belle River Mills Monitoring Site				Belle River PP (Remer Road) Monitoring Site			
Month	Year	Maximum Hourly	Hour	Wind	Maximum Hourly	Hour	Wind		
		SO2 Concentration (ppb)	Date	Beginning (EST)	Direction (deg)	SO2 Concentration (ppb)	Date	Beginning (EST)	Direction (deg)
July	2018	49	2-Jul	1800	23	26	2-Jul	1500	354
July	2018	49	3-Jul	1100	121	27	4-Jul	1300	116
July	2018	31	4-Jul	1300	192	11	6-Jul	1800	7
July	2018	21	7-Jul	1000	109	53	10-Jul	1900	359
July	2018	11	11-Jul	1400	20	32	11-Jul	1900	15
July	2018	12	17-Jul	1700	24	15	18-Jul	0900	344
July	2018	12	18-Jul	1700	39	12	19-Jul	1600	152
July	2018	14	25-Jul	1700	27	23	25-Jul	0900	3
July	2018	18	30-Jul	1700	17				
July	2018	16	31-Jul	1700	29				
August	2018	23	10-Aug	1800	20	22	7-Aug	1200	69
August	2018	11	11-Aug	1600&1700	226-227	18	8-Aug	1500	7
August	2018	18	12-Aug	1700	28	15	10-Aug	1600	357
August	2018	21	13-Aug	1000	18	53	11-Aug	1400	107
August	2018	21	18-Aug	1400	19	15	12-Aug	1600	352
August	2018	21	19-Aug	1300	91	11	13-Aug	1300	3
August	2018	13	20-Aug	1300	122	11	18-Aug	1300	17
August	2018	16	30-Aug	0900	23	58	31-Aug	1100	64
August	2018	50 (4th High)	31-Aug	1000	169				
September	2018	30	11-Sep	1700	30	12	11-Sep	1700	352
September	2018	14	13-Sep	1900	13	16	14-Sep	1300	5
September	2018	12	14-Sep	2200	41	42	15-Sep	1300&1500	349-352
September	2018	21	15-Sep	1400	24	21	17-Sep	1100	119
September	2018	11	16-Sep	1000	132	13	18-Sep	1500	357
September	2018	46	17-Sep	1200	87	12	19-Sep	1700	20
September	2018	14	18-Sep	1700	26	11	23-Sep	1600	358
September	2018	26	23-Sep	1700	22				
October	2018	10	7-Oct	1300	25	9	18-Oct	1000	260
November	2018	13	4-Nov	1200	112	4	14-Nov	1600	118
November	2018	10	22-Nov	1600	124				
December	2018	17	15-Dec	2000	28	4	4-Dec	1800	266
December	2018	18	27-Dec	1100	118				

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years

2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

**Table 7**

Maximum Monthly & SO2 Concentrations ≥ 10 ppb for St. Clair County Monitors DTE Energy Air Quality Monitoring Sites (January - June 2019)									
		Belle River Mills Monitoring Site				Belle River PP (Remer Road) Monitoring Site			
Month	Year	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)
January	2019	12	7-Jan	0900	126	24	11-Jan	1400	175
January	2019	20	11-Jan	1400	178				
January	2019	12	13-Jan	1300	19				
February	2019	23	10-Feb	1300	137	10	9-Feb	1200	115
February	2019	13	20-Feb	1500	123				
February	2019	15	22-Feb	1500	112				
February	2019	23	23-Feb	1300	112				
March	2019	18	1-Mar	1400	72	21	1-Mar	1300	64
March	2019	19	9-Mar	1300	119	11	25-Mar	1600	7
March	2019	16	24-Mar	1900	19	11	26-Mar	1400	6
March	2019	12	25-Mar	0500	32	28	29-Mar	1600	353
March	2019	31	29-Mar	1800	23				
April	2019	15	4-Apr	1700	29	10	6-Apr	1300	149
April	2019	24	6-Apr	1900	350	25	10-Apr	1900	6
April	2019	11	10-Apr	2200	21	20	21-Apr	1400	160
April	2019	13	17-Apr	1600	127	13	30-Apr	1800	3
April	2019	21	25-Apr	1100	115				
April	2019	14	27-Apr	2100	16				
May	2019	23	2-May	1800	24	13	2-May	0700&1200	20/124
May	2019	16	4-May	1700	41	22	5-May	1600	131
May	2019	21	11-May	1300	21	23	6-May	1900	3
May	2019	12	12-May	1300	27	16	7-May	2300	360
May	2019	19	17-May	1600&1700	31	13	8-May	0000	359
May	2019	10	20-May	1900	84	40	11-May	2000	9
May	2019	29	21-May	1900	30	16	12-May	1300	356
May	2019	33	22-May	0800	120	26	17-May	0600	358
May	2019	15	24-May	0800	31	28	21-May	1200	350
May	2019	34	26-May	1300	25	14	24-May	0900	349
May	2019	25	27-May	1500	40	14	26-May	0400	3
May	2019	10	31-May	0000	7	28	27-May	1500	345
May	2019					45 (4th High)	28-May	2000	17
June	2019	36	6-Jun	1500	161	10	2-Jun	1100	49
June	2019	20	7-Jun	2000	25	38	6-Jun	1800	349
June	2019	10	8-Jun	1200	114	50 (2nd High)	7-Jun	1800	356
June	2019	18	15-Jun	2300	26	40	16-Jun	1600	360
June	2019	22	16-Jun	1100	32	41	17-Jun	1600	346
June	2019	69 (1st High)	17-Jun	1900	41	37	18-Jun	1300	112
June	2019	57 (2nd High)	18-Jun	1000	80	53 (1st High)	19-Jun	2000	357
June	2019	14	19-Jun	1600	131	32	20-Jun	1100	354
June	2019	24	20-Jun	1000	6	19	21-Jun	1900&2000	6
June	2019	33	21-Jun	1900	358	25	22-Jun	1900	19
June	2019	27	22-Jun	1900	49	16	28-Jun	1300	245
June	2019	47 (3rd High)	29-Jun	1900	43	50 (3rd High)	29-Jun	1400	357
June	2019	40 (4th High)	30-Jun	1700	26	34	30-Jun	1500	360

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years

2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

**Table 7 (Continued)**

Maximum Monthly & SO2 Concentrations $\geq$ 10 ppb for St. Clair County Monitors DTE Energy Air Quality Monitoring Sites (July - December 2019)									
		Belle River Mills Monitoring Site				Belle River PP (Remer Road) Monitoring Site			
Month	Year	Maximum Hourly SO2 Concentration (ppb)	Hour Beginning Date (EST)	Hour Beginning Date (EST)	Wind Direction (deg)	Maximum Hourly SO2 Concentration (ppb)	Hour Beginning Date (EST)	Hour Beginning Date (EST)	Wind Direction (deg)
July	2019	23	2-Jul	1800	87	33	3-Jul	1700	4
July	2019	37	3-Jul	1900	3	10	4-Jul	1200	180
July	2019	17	6-Jul	0900	51	34	6-Jul	1400	355
July	2019	14	7-Jul	0600	16	10	7-Jul	1100	350
July	2019	30	8-Jul	1800	16	18	8-Jul	1300	345
July	2019	35	9-Jul	1300	28	18	9-Jul	1000	24
July	2019	23	11-Jul	1700	19	18	11-Jul	1300&1400	350
July	2019	14	14-Jul	1600	27	18	14-Jul	1600	354
July	2019	10	17-Jul	1000	14	15	17-Jul	1700	9
July	2019	19	21-Jul	1500	34	13	21-Jul	1400	4
July	2019	12	31-Jul	0200	28	10	24-Jul	1100&1200	12
July	2019					17	31-Jul	1700	360
August	2019	11	1-Aug	1000	12	17	1-Aug	1600-1700	356-1
August	2019	17	2-Aug	1000	18	13	2-Aug	1300	350
August	2019	18	4-Aug	1200&1500	42 & 29	12	4-Aug	1200	34
August	2019	13	7-Aug	1700	143	26	13-Aug	1400	358
August	2019	23	13-Aug	1200	31	16	14-Aug	1700	8
August	2019	18	14-Aug	2100	24	10	16-Aug	1200	176
August	2019	15	15-Aug	1700	20	12	19-Aug	1300	103
August	2019	22	16-Aug	1200	150				
August	2019	15	24-Aug	1700	31				
August	2019	14	25-Aug	1200	107				
August	2019	10	31-Aug	1600	11				
September	2019	10	4-Sep	1700	48	28	16-Sep	1700	7
September	2019	23	9-Sep	1200	76				
September	2019	20	16-Sep	1200	33				
October	2019	30	5-Oct	1200	115	23	8-Oct	1300	95
October	2019	22	8-Oct	1100	96	45	18-Oct	1400	98
October	2019	18	9-Oct	1000&1100	109 & 101				
October	2019	15	10-Oct	1500	121				
November	2019	17	18-Nov	1200&1300	143-150	6	26-Nov	1200&1300	30-60
December	2019	37	16-Dec	1500	48	14	16-Dec	1400&1500	47-50
December	2019	19	20-Dec	1200	146				
December	2019	11	29-Dec	0800	139				

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years

2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

Table 8

<b><u>Top 10 Maximum 1-Hour Daily SO2 Concentrations - 2017</u></b>					
<b><u>DTE Energy Belle River Mills Monitor</u></b>			<b><u>EGLE Port Huron Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2017 Rank	(ppb)	Date	2017 Rank	(ppb)	Date
1	89	10-Sep	1	76	17-Dec
2	73	27-Mar	2	66	3-Apr
3	54	10-May	3	58	28-Aug
4	46	14-Jun	4	55	12-Oct
5	45	19-Feb	5	54	7-Feb
6	42	11-Sep	6	51	4-Mar
7	38	24-Apr	7	51	3-Jun
8	33	20-Apr	8	50	13-Dec
9	33	9-May	9	49	2-Sep
10	33	16-Aug	10	48	13-Mar
			Maximum Blue	35	21-Sep
<b><u>DTE Energy Belle River PP (Remer) Monitor</u></b>			<b><u>Lambton County (Canada) River Bend Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2017 Rank	(ppb)	Date	2017 Rank	(ppb)	Date
1	70	9-May	1	77	22-Apr
2	56	13-May	2	60	12-Jan
3	52	27-Nov	3	59	21-Sep
4	51	23-Apr	4	54	24-Apr
5	30	29-Mar	5	51	22-Sep
6	30	15-May	6	45	29-Mar
7	29	29-Apr	7	44	19-Jul
8	29	10-Sep	8	42	29-Jul
9	28	24-Apr	9	41	19-Apr
10	25	19-Apr	10	41	12-Sep
			Maximum Blue	40	20-Oct

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years

2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
Neither DTE nor Canadian SO2 sources directly upwind - White

Table 8 (Continued)

<b>Top 10 Maximum 1-Hour Daily SO2 Concentrations - 2018</b>					
<b><u>DTE Energy Belle River Mills Monitor</u></b>			<b><u>EGLE Port Huron Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2018 Rank	(ppb)	Date	2018 Rank	(ppb)	Date
1	79	21-May	1	109	1-Dec
2	71	19-Jun	2	89	22-Jun
3	52	22-Apr	3	84	6-Mar
4	50	31-Aug	4	82	26-Oct
5	49	10-May	5	76	5-Oct
6	49	2-Jul	6	74	20-Dec
7	49	3-Jul	7	72	16-May
8	46	17-Sep	8	70	4-Nov
9	42	29-Apr	9	66	1-Jul
10	41	23-May	10	64	20-Aug
<b><u>DTE Energy Belle River PP (Remer) Monitor</u></b>			<b><u>Lambton County (Canada) River Bend Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2018 Rank	(ppb)	Date	2018 Rank	(ppb)	Date
1	164	12-May	1	230	12-May
2	87	28-Mar	2	106	15-Sep
3	70	28-May	3	101	8-Jun
4	65	8-Jun	4	81	1-Jun
5	58	21-Jun	5	80	15-May
6	58	31-Aug	6	78	21-Jun
7	53	15-May	7	75	22-Apr
8	53	10-Jul	8	72	7-Jun
9	53	11-Aug	9	69	20-May
10	50	2-Apr	10	68	6-May
Maximum Blue	45	13-May	Maximum Blue	61	9-May
Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years					
2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue					
Neither DTE nor Canadian SO2 sources directly upwind - White					

Table 8 (Continued)

<b>Top 10 Maximum 1-Hour Daily SO2 Concentrations - 2019</b>					
<b><u>DTE Energy Belle River Mills Monitor</u></b>			<b><u>EGLE Port Huron Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2019 Rank	(ppb)	Date	2019 Rank	(ppb)	Date
1	69	17-Jun	1	73	17-Nov
2	57	18-Jun	2	71	30-Dec
3	47	29-Jun	3	64	9-Sep
4	40	30-Jun	4	63	11-Apr
5	37	3-Jul	5	60	27-Feb
6	37	16-Dec	6	57	20-Feb
7	36	6-Jun	7	57	12-Sep
8	35	9-Jul	8	55	8-May
9	34	26-May	9	55	16-Nov
10	33	22-May	10	53	9-Mar
			Maximum Blue	45	11-Jan
<b><u>DTE Energy Belle River PP (Remer) Monitor</u></b>			<b><u>Lambton County (Canada) River Bend Monitor</u></b>		
	Maximum Hourly SO2 Concentration			Maximum Hourly SO2 Concentration	
2019 Rank	(ppb)	Date	2019 Rank	(ppb)	Date
1	53	19-Jun	1	114	30-Jun
2	50	7-Jun	2	112	29-Jun
3	50	29-Jun	3	100	13-Aug
4	45	28-May	4	90	8-Jul
5	45	18-Oct	5	88	7-Jun
6	41	17-Jun	6	82	11-May
7	40	11-May	7	73	6-Jul
8	40	16-Jun	8	72	17-Jun
9	38	6-Jun	9	65	17-May
10	37	18-Jun	10	60	16-Jun
Maximum Blue	24	11-Jan	Maximum Blue	48	22-Apr

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years

2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
Neither DTE nor Canadian SO2 sources directly upwind - White



Table 9

MDEQ Port Huron Monitoring Site Data - Days with SO2 ≥ 10 ppb									
Since Start of DTE Energy Air Quality Monitoring Sites (Nov. 23, 2016) Through Dec. 2017									
MDEQ Port Huron Monitoring Site					MDEQ Port Huron Monitoring Site				
Month	Year	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)
November	2016	54	23-Nov	0900	111	17	24-Nov	0100	119
November	2016	11	27-Nov	2000	172	12	29-Nov	2000	172
December	2016	37	4-Dec	2100	113	14	6-Dec	1000	93
December	2016	46	25-Dec	2300	108	30	26-Dec	0000	115
January	2017	40	2-Jan	1200	115	11	3-Jan	0400	140
January	2017	14	10-Jan	1900	190	12	14-Jan	1000	107
January	2017	39	17-Jan	0400	113	15	19-Jan	1900	175
January	2017	23	20-Jan	1400	94				
February	2017	28	6-Feb	2200	85	54	7-Feb	1100	110
February	2017	35	20-Feb	2000	115	12	28-Feb	1700	187
March	2017	51	4-Mar	2200	107	13	5-Mar	0600	132
March	2017	11	6-Mar	2000	189	20	12-Mar	2200	109
March	2017	48	13-Mar	0500	106	20	17-Mar	1300	185
March	2017	24	26-Mar	0700	100	47	30-Mar	0500	105
March	2017	16	31-Mar	0000	95				
April	2017	66 (2nd high)	3-Apr	0700	105	18	9-Apr	1800	189
April	2017	10	10-Apr	0400	177	11	11-Apr	1000	155
April	2017	26	13-Apr	0400	134	15	15-Apr	1100	117
April	2017	12	18-Apr	0800	130	10	23-Apr	1700	191
April	2017	27	24-Apr	1000	105	36	25-Apr	0600	114
April	2017	20	27-Apr	1000	187	14	30-Apr	1400	87
May	2017	15	1-May	1700	194	14	4-May	1000	137
May	2017	10	10-May	1600	102	28	11-May	0400	115
May	2017	21	16-May	1700	186	43	20-May	2400	112
May	2017	25	21-May	0200	122	24	24-May	1100	101
May	2017	10	25-May	0200	87	15	27-May	1100	87
May	2017	13	28-May	1800	186				
June	2017	51	3-Jun	1300	111	12	8-Jun	1900	152
June	2017	13	13-Jun	0800	112	14	14-Jun	1000	109
July	2017	20	18-Jul	1900	189	11	22-Jul	1800	33
July	2017	34	26-Jul	1200	189				
August	2017	14	3-Aug	1100	53	11	14-Aug	1700	191
August	2017	27	16-Aug	1200	156	12	20-Aug	1800	192
August	2017	18	21-Aug	1600	190	26	27-Aug	0800	100
August	2017	58 (3rd high)	28-Aug	0300&0400	105-107	13	29-Aug	1000	112
September	2017	49	2-Sep	0900	101	16	10-Sep	1100	84
September	2017	19	11-Sep	1300	170	11	13-Sep	1200	104
September	2017	17	14-Sep	1400	184	13	16-Sep	1500-1600	188
September	2017	15	20-Sep	1700	194	35	21-Sep	1300	186
September	2017	22	22-Sep	1200	198	29	25-Sep	1300	149
September	2017	25	26-Sep	1300	166				
October	2017	12	6-Oct	1400	45	55 (4th high)	12-Oct	2100	102
October	2017	24	20-Oct	1300	185	13	21-Oct	1500	180
October	2017	20	22-Oct	1400	185	18	23-Oct	0300	174
October	2017	10	27-Oct	1000	176				
November	2017	14	14-Nov	1700	168	21	15-Nov	1300	179
November	2017	20	17-Nov	2300	176	11	18-Nov	0100	181
November	2017	28	27-Nov	1400	174	11	28-Nov	0300	171
December	2017	16	4-Dec	2100	181	10	11-Dec	1400	148
December	2017	50	13-Dec	1900	96	76 (1st high)	17-Dec	1800	111
December	2017	28	21-Dec	2000	82				

Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

**Table 10**

**MDEQ Port Huron Monitoring Site Days with SO<sub>2</sub> ≥ 10 ppb  
January - December 2018**

		MDEQ Port Huron Monitoring Site				MDEQ Port Huron Monitoring Site			
Month	Year	Maximum Hourly SO <sub>2</sub> Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	Maximum Hourly SO <sub>2</sub> Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)
January	2018	13	10-Jan	1500	183	16	15-Jan	2000	107
January	2018	15	31-Jan	0600	177				
February	2018	23	7-Feb	2100	81	32	9-Feb	1300	99
February	2018	11	18-Feb	1400&1700	178-180	38	23-Feb	0300	104
February	2018	34	24-Feb	2300	108				
March	2018	84 (3rd High)	6-Mar	0500	102	28	7-Mar	0100	88
March	2018	50	25-Mar	2300	94	58	26-Mar	0000&0300	103 & 108
March	2018	17	28-Mar	1800	38				
April	2018	54	3-Apr	0500	101	11	9-Apr	1400	118
April	2018	13	12-Apr	0000	134	34	15-Apr	1900	92
April	2018	14	21-Apr	1200	192	24	23-Apr	0800	115
April	2018	11	24-Apr	0900	127				
May	2018	16	7-May	1200	32	17	8-May	1900	182
May	2018	36	9-May	1000	187	25	13-May	1300	42
May	2018	30	14-May	1500	186	72	16-May	1100	59
May	2018	60	18-May	2300	106	16	24-May	1300	97
May	2018	20	26-May	1600	190	17	27-May	0800	181
May	2018	20	28-May	1200	234	40	30-May	0500	111
May	2018	12	31-May	0300	176				
June	2018	25	10-Jun	1000	100	13	12-Jun	1700	185
June	2018	10	16-Jun	1300	144	16	17-Jun	1500	180
June	2018	89 (2nd High)	22-Jun	0900	103	15	26-Jun	0800	123
June	2018	12	29-Jun	1700	183				
July	2018	66	1-Jul	1200	183	12	3-Jul	1100	101
July	2018	11	4-Jul	0900	118	12	7-Jul	0900	116
July	2018	16	8-Jul	1500	182	31	12-Jul	1100	190
July	2018	23	13-Jul	1800	183	15	15-Jul	1000	246
July	2018	30	19-Jul	1000	181	18	20-Jul	1300	194
July	2018	37	21-Jul	2300	95	14	29-Jul	1900	108
July	2018	10	30-Jul	1700	202	12	31-Jul	1200	90
August	2018	28	2-Aug	1700	186	15	3-Aug	1800	184
August	2018	13	4-Aug	1500	176	14	11-Aug	1900	355
August	2018	64	20-Aug	2300	104	40	21-Aug	0000	110
August	2018	11	24-Aug	1600	185				
September	2018	13	1-Sep	1600	188	21	3-Sep	1800	190
September	2018	15	16-Sep	1000	107	46	17-Sep	1300	156
September	2018	25	20-Sep	0800	123	42	24-Sep	1000	102
September	2018	20	27-Sep	1300	198				
October	2018	13	1-Oct	1800	120	15	3-Oct	1900	157
October	2018	76	5-Oct	0800	105	32	8-Oct	0100	106
October	2018	11	9-Oct	1700	185	33	10-Oct	1300	187
October	2018	20	14-Oct	1600	183	82 (4th High)	26-Oct	1100	107
October	2018	14	28-Oct	1600	82	39	30-Oct	1300	185
October	2018	24	31-Oct	0000	180				
November	2018	70	4-Nov	1000	103	42	6-Nov	0400	111
November	2018	55	15-Nov	0300	106	44	22-Nov	0400	104
December	2018	109 (1st High)	1-Dec	1100	101	47	2-Dec	0000	107
December	2018	16	7-Dec	1500	170	74	20-Dec	2200	106
December	2018	32	27-Dec	0600	109	15	28-Dec	0100	177
December	2018	12	31-Dec	1600	78				

Notes: 1. The SO<sub>2</sub> 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO<sub>2</sub> sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

Table 11

MDEQ Port Huron Monitoring Site Days with SO <sub>2</sub> ≥ 10 ppb									
January - December 2019									
		EGLE Port Huron Monitoring Site				EGLE Port Huron Monitoring Site			
Month	Year	Maximum Hourly	Hour	Wind	Maximum Hourly	Hour	Wind		
		SO <sub>2</sub> Concentration (ppb)	Date	Beginning (EST)	Direction (deg)	SO <sub>2</sub> Concentration (ppb)	Date	Beginning (EST)	Direction (deg)
January	2019	27	7-Jan	0100	104	45	11-Jan	1700	203
January	2019	29	12-Jan	1100	96	10	22-Jan	2000	176
January	2019	45	28-Jan	1000	109				
February	2019	13	1-Feb	1600	177	39	6-Feb	0800	109
February	2019	15	10-Feb	2200	106	41	12-Feb	1000	100
February	2019	16	14-Feb	1400	183	20	17-Feb	1100	101
February	2019	57	20-Feb	14-Apr	104	15	23-Feb	1300	101
February	2019	60	27-Feb	1000	104	17	28-Feb	1600	160
March	2019	41	1-Mar	1300	145	11	8-Mar	1600	172
March	2019	53	9-Mar	2000	105	13	13-Mar	0700	156
March	2019	14	14-Mar	1300	188	12	17-Mar	1300	179
March	2019	18	27-Mar	1700	185				
April	2019	13	2-Apr	1600&1900	184	45	5-Apr	0700	111
April	2019	63 (4th High)	11-Apr	2300	106	41	12-Apr	0000	110
April	2019	28	22-Apr	1200	183	10	23-Apr	0000	171
April	2019	39	29-Apr	0600	105				
May	2019	27	1-May	0300	101	22	2-May	1300	146
May	2019	49	5-May	1100	61	55	8-May	2300	111
May	2019	11	9-May	0000	118	30	16-May	1100	190
May	2019	10	18-May	2000	155	13	22-May	0600	118
May	2019	15	24-May	1800	92	12	29-May	1200	39
June	2019	33	8-Jun	2300	95	44	9-Jun	0500	107
June	2019	16	12-Jun	1000&1100	179-180	10	23-Jun	1100	183
June	2019	10	24-Jun	0100	153	33	27-Jun	1200	173
July	2019	26	10-Jul	1000	187	30	15-Jul	1700	190
July	2019	13	18-Jul	1600	181				
August	2019	13	5-Aug	1500	106	14	7-Aug	1700	156
August	2019	40	15-Aug	0900	91	10	16-Aug	1500	187
August	2019	15	18-Aug	1800	187	16	20-Aug	1300	180
August	2019	41	25-Aug	2200	109	48	26-Aug	0000	106
August	2019	10	27-Aug	0400	176	14	31-Aug	0900	138
September	2019	22	1-Sep	1500	81	12	3-Sep	1100	185
September	2019	25	5-Sep	0900	165	13	6-Sep	1600	121
September	2019	64 (3rd High)	9-Sep	0500	107	12	10-Sep	1000	189
September	2019	57	12-Sep	2300	102	13	13-Sep	0000	126
September	2019	27	17-Sep	1200	108	13	18-Sep	1100	151
September	2019	37	20-Sep	1500	182	17	27-Sep	1400	191
September	2019	32	29-Sep	2000	105	33	30-Sep	1500	194
October	2019	34	3-Oct	1000	117	38	5-Oct	1000	97
October	2019	18	8-Oct	1200	102	50	9-Oct	0700	112
October	2019	34	10-Oct	2200	110	13	15-Oct	1600	182
October	2019	13	16-Oct	0000	167	46	26-Oct	1800	96
October	2019	15	28-Oct	1700	188				
November	2019	10	13-Nov	2000	197	55	16-Nov	1000&1400	106-108
November	2019	73 (1st High)	17-Nov	0300	109	14	21-Nov	1000	184
November	2019	13	23-Nov	1600	166	10	25-Nov	1500	188
November	2019	12	26-Nov	1500	155	36	30-Nov	2100	108
December	2019	42	1-Dec	0400	98	11	8-Dec	0100	175
December	2019	30	12-Dec	2100	178	17	13-Dec	0000	178
December	2019	10	16-Dec	1300	194	43	24-Dec	1000	105
December	2019	30	28-Dec	1200	186	28	29-Dec	0100	122
December	2019	71 (2nd High)	30-Dec	0500	109				

Notes: 1. The SO<sub>2</sub> 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO<sub>2</sub> sources upwind - Yellow DTE Energy Power Plants upwind - Blue Overall 1st High - Orange

**Table 12A**

**Culpability Analysis for Top 10 SO2 Impact Days for 2017 & 2018**

Culpability Analysis for Top 10 SO2 Impact Days for 2017 & 2018											
Year											
2017	DTE Energy Source Culpability Criterion										
Belle River Mills Monitoring Site						1	2	3	4	5	
Initial Rank	Revised Rank	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	Warm Season (April-Sept.)	Midday Hours (0900-1700)	Low Peak SO2 at Remer Road (< 10 ppb)	Low Peak SO2 at River Bend (< 10 ppb)	DTE Power Plant Upwind During Max SO2 Hour	Culpable SO2 Source(s)
1	1	89	10-Sep	1200	109	X	X	No (14 ppb)	X	X	DTE & Canadian
2		73	27-Mar	2200	33			No (12 ppb)	No (17 ppb)		Canadian
3	2	54	10-May	1100	136	X	X	X	X	X	DTE Power Plants
4	3	46	14-Jun	1000	127	X	X	X	X	X	DTE Power Plants
5		45	19-Feb	1700	39		X	X	No (24 ppb)		Canadian
6	4	42	11-Sep	1300	127	X	X	No (16 ppb)	No (19 ppb)	X	DTE & Canadian
7	5	38	24-Apr	1100	103	X	X	No (28 ppb)	No (27 ppb)	X	DTE & Canadian
8		33	20-Apr	0200	35	X		X	No (26 ppb)		Canadian
9		33	9-May	1200	198	X	X	No (70 ppb)	No (11 ppb)		DTE & Canadian
10		33	16-Aug	1200	179	X	X	No (11 ppb)	X		DTE & Canadian
Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years											
2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue											
3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor											
Year											
2018	DTE Energy Source Culpability Criterion										
Belle River Mills Monitoring Site						1	2	3	4	5	
Initial Rank	Revised Rank	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	Warm Season (April-Sept.)	Midday Hours (0900-1700)	Low Peak SO2 at Remer Road (< 10 ppb)	Low Peak SO2 at River Bend (< 10 ppb)	DTE Power Plant Upwind During Max SO2 Hour	Culpable SO2 Source(s)
1	1	79	21-May	1100	121	X	X	X	X	X	DTE Power Plants
2		71	19-Jun	1700	23	X	X	No (36 ppb)	No (59 ppb)		Canadian
3		52	22-Apr	1900	26	X		No (30 ppb)	No (75 ppb)		Canadian
4		50	31-Aug	1000	169	X	X	No (58 ppb)	X		Canadian
5		49	10-May	1900	26	X		X	No (44 ppb)		Canadian
6		49	2-Jul	1800	23	X		No (26 ppb)	No (55 ppb)		Canadian
7	2	49	3-Jul	1100	121	X	X	X	X	X	DTE Power Plants
8		46	17-Sep	1200	87	X	X	No (21 ppb)	No (12 ppb)		Canadian
9	3	42	29-Apr	2000	109	X		No (19 ppb)	No (55 ppb)	X	DTE & Canadian
10		41	23-May	1600	33	X	X	No (26 ppb)	No (34 ppb)		Canadian
Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years											
2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue											
3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor											

**Table 12B**

**Culpability Analysis for Top 10 SO2 Impact Days for 2017 & 2018**

Culpability Analysis for Top 10 SO2 Impact Days for 2017 & 2018											
Year 2017											
Belle River PP (Remer Road) Monitoring Site						DTE Energy Source Culpability Criterion					
Maximum Hourly SO2 Concentration			Hour Beginning	Wind Direction	1	2	3	4	5		
Initial Rank	Revised Rank	SO2 Concentration (ppb)	Date	(EST)	(deg)	Warm Season (April-Sept.)	Midday Hours (0900-1700)	Low Peak SO2 at BR Mills (< 10 ppb)	Low Peak SO2 at River Bend (< 10 ppb)	DTE Power Plant Plant Upwind During Max SO2 Hour	Culpable SO2 Source(s)
1	1	70	9-May	1400	186	X	X	No (33 ppb)	X	X	DTE & Canadian
2		56	13-May	1100	116	X	X	X	X		Canadian
3	2	52	27-Nov	1200	170		X	No (15 ppb)	No (22 ppb)	X	DTE & Canadian
4		51	23-Apr	1900	3	X		X	No (38 ppb)		Canadian
5		30	29-Mar	1500	6		X	No (22ppb)	No (45 ppb)		Canadian
6		30	15-May	1200	126	X	X	X	X		Canadian
7		29	29-Apr	0200	10	X		X	X		Canadian
8		29	10-Sep	1500	90	X	X	No (89 ppb)	X		Canadian
9		28	24-Apr	1900	2	X		No (29 ppb)	No (29 ppb)		Canadian
10		25	19-Apr	1700	360	X	X	X	No (41 ppb)		Canadian

- Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
 3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor

Year 2018											
Belle River PP (Remer Road) Monitoring Site						DTE Energy Source Culpability Criterion					
Maximum Hourly SO2 Concentration			Hour Beginning	Wind Direction	1	2	3	4	5		
Initial Rank	Revised Rank	SO2 Concentration (ppb)	Date	(EST)	(deg)	Warm Season (April-Sept.)	Midday Hours (0900-1700)	Low Peak SO2 at BR Mills (< 10 ppb)	Low Peak SO2 at River Bend (< 10 ppb)	DTE Power Plant Plant Upwind During Max SO2 Hour	Culpable SO2 Source(s)
1		164	12-May	1800	354	X		No (34 ppb)	No (230 ppb)		Canadian
2		87	28-Mar	1700	100		X	No (38 ppb)	No (29 ppb)		Canadian
3		70	28-May	1500	139	X	X	No (10 ppb)	X		Canadian
4		65	8-Jun	1500	345	X	X	No (21 ppb)	No (101 ppb)		Canadian
5		58	21-Jun	1400	1	X	X	No (19 ppb)	No (58 ppb)		Canadian
6		58	31-Aug	1400	1	X	X	No (50 ppb)	X		Canadian
7		53	15-May	1800	2	X		No (22 ppb)	No (80 ppb)		Canadian
8		53	10-Jul	1900	359	X		X	No (23 ppb)		Canadian
9		53	11-Aug	1400	107	X	X	No (11 ppb)	X		Canadian
10		50	2-Apr	1100	135	X	X	X	X		Canadian

- Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
 3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor

**Table 12C**

**Culpability Analysis for Top 10 SO2 Impact Days for 2019**

Culpability Analysis for Top 10 SO2 Impact Days for 2019											
Year 2019											
Belle River Mills Monitoring Site						DTE Energy Source Culpability Criterion					
Initial Rank	Revised Rank	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	1 Warm Season (April-Sept.)	2 Midday Hours (0900-1700)	3 Low Peak SO2 at Remer Road (< 10 ppb)	4 Low Peak SO2 at River Bend (< 10 ppb)	5 DTE Power Plant During Max SO2 Hour	Culpable SO2 Source(s)
1		69	17-Jun	1900	41	X		No (41 ppb)	No (72 ppb)		Canadian
2		57	18-Jun	1000	80	X	X	No (37 ppb)	No (57 ppb)		Canadian
3		47	29-Jun	1900	43	X		No (50 ppb)	No (111 ppb)		Canadian
4		40	30-Jun	1700	26	X	X	No (34 ppb)	No (114 ppb)		Canadian
5		37	3-Jul	1800	3	X		No (33 ppb)	No (48 ppb)		Canadian
6		37	16-Dec	1500	48		X	No (14 ppb)	No (12 ppb)		Canadian
7		36	6-Jun	1500	161	X	X	No (20 ppb)	No (16 ppb)		Canadian
8		35	9-Jul	1300	28	X	X	No (18 ppb)	No (51 ppb)		Canadian
9		34	26-May	1300	25	X	X	No (11 ppb)	No (46 ppb)		Canadian
10	1	33	22-May	0800	120	X	X	X	X	X	DTE Power Plants

- Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
 3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor

Year 2019											
Belle River PP (Remer Road) Monitoring Site						DTE Energy Source Culpability Criterion					
Initial Rank	Revised Rank	Maximum Hourly SO2 Concentration (ppb)	Date	Hour Beginning (EST)	Wind Direction (deg)	1 Warm Season (April-Sept.)	2 Midday Hours (0900-1700)	3 Low Peak SO2 at BR Mills (< 10 ppb)	4 Low Peak SO2 at River Bend (< 10 ppb)	5 DTE Power Plant During Max SO2 Hour	Culpable SO2 Source(s)
1		53	19-Jun	2000	357	X		No (14 ppb)	No (49 ppb)		Canadian
2		50	7-Jun	1800	356	X		No (20 ppb)	No (88 ppb)		Canadian
3		50	29-Jun	1400	357	X	X	No (26 ppb)	No (104 ppb)		Canadian
4		45	28-May	2000	17	X		X	No (23 ppb)		Canadian
5		45	18-Oct	1400	98		X	X	X		Canadian
6		41	17-Jun	1600	346	X	X	No (69 ppb)	No (72 ppb)		Canadian
7		40	11-May	2000	9	X		No (21 ppb)	No (82 ppb)		Canadian
8		40	16-Jun	1600	360	X	X	No (22 ppb)	No (52 ppb)		Canadian
9		38	6-Jun	1800	349	X		No (36 ppb)	No (37 ppb)		Canadian
10		37	18-Jun	1300	112	X	X	No (57 ppb)	No (57 ppb)		Canadian
	1	24	11-Jan	1400	175		X	No (20 ppb)	No (39 ppb)	X	DTE & Canadian

- Notes: 1. The SO2 1-hour NAAQS is 75 parts per billion (ppb) expressed as the 99% maximum daily 1-hour average, averaged over 3 years  
 2. Canadian SO2 sources upwind - Yellow DTE Energy Power Plants upwind - Blue  
 3. Revised rank reflects when DTE Energy power plants were entirely, or partially, culpable for high SO2 concentrations at the monitor

Table 13A

First Case Day – DTE Energy SO2 Source Most Culpable

Date Hour Beginning (EST)	DTE-Belle River Mills Monitor			DTE-Remer Road Monitor			MDEQ-Port Huron Monitor			Pontiac Airport		Port Huron Airport		River Bend Monitor-Canada		
	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	Wind Speed (knots)	Wind Direction (deg)	Wind Speed (knots)	Wind Direction (deg)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)
5/21/18 00:00	1	322	2.5	1	315	2.7	0	321	2	3	160	Calm	NA	4	330	1.3
5/21/18 01:00	1	321	2.3	1	310	2.2	0	302	1	Calm	NA	Calm	NA	2	355	2.5
5/21/18 02:00	0	19	2.7	1	351	3.0	NA	343	2	4	20	Calm	NA	2	349	1.8
5/21/18 03:00	0	350	2.7	1	17	2.5	0	331	2	Calm	NA	Calm	NA	1	360	2.5
5/21/18 04:00	0	309	2.1	1	336	1.5	0	332	1	3	20	Calm	NA	1	18	2.1
5/21/18 05:00	0	18	3.0	1	8	3.5	0	307	2	5	50	Calm	NA	2	40	1.7
5/21/18 06:00	1	33	3.7	2	30	3.1	0	350	2	Calm	NA	Calm	NA	2	338	0.6
5/21/18 07:00	3	75	4.4	2	69	3.0	0	32	3	7	70	Calm	NA	1	37	2.9
5/21/18 08:00	1	62	5.8	2	59	3.8	0	51	4	7	80	Calm	NA	2	52	4.4
5/21/18 09:00	1	76	7.0	1	80	4.6	0	31	2	9	80	5	70	1	66	5.0
5/21/18 10:00	48	122	5.5	1	123	5.0	1	39	3	8	70	6	90	2	74	5.2
5/21/18 11:00	79	120	6.6	1	114	5.5	2	18	3	8	110	4	110	3	74	6.8
5/21/18 12:00	75	121	7.8	1	117	6.2	6	31	3	9	100	5	130	2	144	3.2
5/21/18 13:00	10	139	7.4	2	125	6.7	0	20	4	9	130	8	120	1	146	3.5
5/21/18 14:00	2	152	7.3	2	136	6.2	2	25	3	9	120	Calm	NA	1	125	4.4
5/21/18 15:00	6	146	5.6	1	114	5.7	2	28	3	6	100	3	40	1	129	4.4
5/21/18 16:00	2	113	4.7	1	94	3.7	1	39	4	6	120	3	80	11	170	1.2
5/21/18 17:00	10	47	5.3	6	19	4.7	3	10	4	8	80	4	10	24	6	3.6
5/21/18 18:00	9	49	6.1	2	36	3.4	1	32	3	5	130	7	60	10	12	5.5
5/21/18 19:00	4	25	4.5	1	2	4.4	1	23	3	7	110	3	30	14	36	5.1
5/21/18 20:00	5	48	3.2	1	25	3.1	0	15	3	7	80	4	300	NA	55	5.4
5/21/18 21:00	3	67	3.7	1	66	2.4	0	301	1	6	90	Calm	NA	5	21	3.9
5/21/18 22:00	2	97	6.6	1	95	4.9	0	195	1	4	110	Calm	NA	5	NA	NA
5/21/18 23:00	2	93	3.4	1	111	3.8	8	126	5	4	100	4	120	2	NA	NA

Notes:

1. Maximum SO<sub>2</sub> (79 ppb) at Belle River Mills Monitor at Hour Beginning 1100
2. Low SO<sub>2</sub> (1-2 ppb) at Remer Road at 1100 and previous hours
3. Low SO<sub>2</sub> (1-2 ppb) at River Bend at 1100 and previous hours (Higher SO<sub>2</sub> later in the day)
4. Light NW to NE winds in early AM, lake effects begin at 1000, and lead to four prime impact hours (1000-1300) close to 120 degrees (Monitor downwind of Belle River & St. Clair power plants)
5. Maximum hourly SO<sub>2</sub> was during midday hours

**Table 13B**  
**Second Case Day – Canadian SO<sub>2</sub> Sources Most Culpable**

Date Hour Beginning (EST)	DTE-Belle River Mills Monitor			DTE-Remer Road Monitor			MDEQ-Port Huron Monitor			Pontiac Airport		Port Huron Airport		River Bend Monitor-Canada		
	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	Wind Speed (knots)	Wind Direction (deg)	Wind Speed (knots)	Wind Direction (deg)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)
5/12/18 00:00	1	48	5.3	0	33	3.2	0	40	4	9	100	4	20	1	51	6.5
5/12/18 01:00	1	37	6.5	1	21	4.0	0	30	3	10	70	Calm	NA	1	50	6.4
5/12/18 02:00	2	34	7.6	1	26	5.9	NA	21	5	9	40	5	360	0	47	5.2
5/12/18 03:00	7	16	6.0	0	6	5.3	0	20	5	8	40	5	10	1	40	6.7
5/12/18 04:00	11	19	6.5	1	3	5.3	0	7	4	16	110	5	10	9	37	6.4
5/12/18 05:00	6	30	6.9	1	20	5.3	0	26	4	6	50	5	350	9	20	5.7
5/12/18 06:00	11	24	7.5	0	15	5.6	0	25	5	7	40	5	10	NA	36	6.4
5/12/18 07:00	8	31	6.3	0	23	4.7	0	27	5	8	60	6	30	10	33	6.2
5/12/18 08:00	3	30	6.9	1	27	4.8	0	27	4	6	50	6	10	10	35	6.8
5/12/18 09:00	6	23	6.4	1	14	4.1	0	29	5	5	10	4	20	2	44	6.7
5/12/18 10:00	10	26	6.7	1	18	5.2	1	30	4	5	50	5	20	2	42	7.1
5/12/18 11:00	27	21	5.7	2	345	4.7	1	24	5	5	20	8	360	9	34	5.9
5/12/18 12:00	9	20	5.2	32	357	5.6	1	9	5	Calm	NA	Calm	NA	8	38	7.1
5/12/18 13:00	29	28	9.4	17	14	7.2	1	2	4	8	10	5	350	79	32	7.9
5/12/18 14:00	33	40	8.1	28	357	7.2	1	22	6	4	40	9	40	32	29	5.3
5/12/18 15:00	13	39	9.3	25	8	7.1	1	19	6	5	60	7	20	46	32	9.6
5/12/18 16:00	34	47	7.1	48	354	6.7	1	24	6	5	360	6	40	35	36	9.5
5/12/18 17:00	25	39	7.1	130	347	8.0	1	40	5	7	160	6	50	92	35	11.0
5/12/18 18:00	6	38	6.7	164	354	6.7	1	31	5	5	170	8	40	230	32	9.1
5/12/18 19:00	2	36	4.5	141	18	4.3	1	16	4	3	210	3	20	215	27	7.1
5/12/18 20:00	30	48	3.8	24	26	2.6	1	9	3	Calm	NA	Calm	NA	170	36	7.3
5/12/18 21:00	5	50	6.3	3	32	3.3	1	35	3	6	90	3	30	40	34	5.6
5/12/18 22:00	11	356	3.0	2	337	2.0	1	36	4	4	180	3	30	13	50	5.4
5/12/18 23:00	35	348	3.5	17	329	2.5	0	354	3	3	100	Calm	NA	3	47	7.1

**Notes:**

1. Maximum SO<sub>2</sub> concentration (164 ppb) at Remer Road Monitor during Hour Beginning 1800
2. Moderate SO<sub>2</sub> concentration (34 ppb) at Belle River Mills Monitor at Hour Beginning 1600
3. Extremely high SO<sub>2</sub> concentrations (230 ppb) at the Canadian River Bend Monitor during Hour Beginning 1800 (River Bend is upwind of the Remer Road site with NNE winds (~30 degrees))
4. Light to moderate wind speeds the entire day from NNE to ENE



**Table 13C**  
**Third Case Day – DTE Energy & Canadian SO<sub>2</sub> Sources Culpable**

Date Hour Beginning (EST)	DTE-Belle River Mills Monitor			DTE-Remer Road Monitor			MDEQ-Port Huron Monitor			Pontiac Airport		Port Huron Airport		River Bend Monitor-Canada		
	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)	Wind Speed (knots)	Wind Direction (deg)	Wind Speed (knots)	Wind Direction (deg)	SO2 Concentration (ppb)	Wind Direction (deg)	Wind Speed (mph)
9/10/2017 0:00	0	278	1.0	0	303	2.3	0	281	1	Calm	NA	Calm	NA	1	338	0.4
9/10/2017 1:00	0	314	1.2	0	339	2.2	0	77	4	Calm	NA	Calm	NA	1	NA	NA
9/10/2017 2:00	0	319	1.8	0	4	2.3	0	71	2	Calm	NA	Calm	NA	0	88	1.7
9/10/2017 3:00	0	321	1.9	0	2	2.3	0	335	2	Calm	NA	Calm	NA	0	85	1.7
9/10/2017 4:00	0	341	2.3	0	347	2.1	0	310	2	Calm	NA	Calm	NA	0	79	0.5
9/10/2017 5:00	0	337	2.6	0	345	2.6	0	291	2	3	360	Calm	NA	0	82	0.7
9/10/2017 6:00	0	356	1.3	0	320	2.6	0	318	2	3	360	Calm	NA	0	357	0.9
9/10/2017 7:00	0	348	2.4	1	5	3.3	0	316	2	Calm	NA	Calm	NA	0	22	NA
9/10/2017 8:00	0	74	3.5	1	56	2.7	0	345	1	3	30	Calm	NA	0	25	0.5
9/10/2017 9:00	0	69	3.3	1	39	2.5	1	87	3	7	70	Calm	NA	0	51	0.7
9/10/2017 10:00	3	75	4.9	1	60	3.8	1	70	4	8	60	3	60	1	89	2.8
9/10/2017 11:00	34	85	3.7	1	114	3.8	16	84	3	4	NA	4	100	1	81	3.5
9/10/2017 12:00	89	109	3.4	14	120	3.3	8	96	2	4	130	Calm	NA	2	77	1.5
9/10/2017 13:00	48	89	3.5	4	88	3.2	2	179	2	5	NA	7	100	1	203	0.6
9/10/2017 14:00	40	129	4.5	5	86	3.2	7	55	3	5	NA	6	110	1	56	0.6
9/10/2017 15:00	33	134	3.9	29	90	4.4	4	26	4	5	NA	Calm	NA	1	56	2.7
9/10/2017 16:00	27	103	4.2	1	127	3.8	2	40	4	4	NA	4	50	1	92	4.9
9/10/2017 17:00	5	139	2.6	1	60	3.2	1	38	4	4	NA	5	30	4	63	4.5
9/10/2017 18:00	2	96	3.3	1	64	2.7	1	39	4	4	NA	4	30	7	25	5.8
9/10/2017 19:00	1	109	1.7	1	60	1.3	1	37	3	4	100	Calm	NA	3	52	5.1
9/10/2017 20:00	1	72	2.3	1	44	1.6	0	65	2	Calm	NA	Calm	NA	NA	58	3.4
9/10/2017 21:00	0	62	2.1	0	26	1.4	0	154	4	Calm	NA	Calm	NA	0	160	2.4
9/10/2017 22:00	0	24	0.7	0	32	1.4	0	116	1	Calm	NA	Calm	NA	0	107	2.6
9/10/2017 23:00	0	21	1.4	0	342	1.4	0	330	1	Calm	NA	Calm	NA	0	106	1.9

**Notes:**

1. Maximum SO<sub>2</sub> (89 ppb) at Belle River Mills Monitor at Hour Beginning 1200
2. Moderately low SO<sub>2</sub> (14 ppb) at Remer Road Monitor at 1200 and previous hours
3. Low SO<sub>2</sub> (1-2 ppb) at the Canadian River Bend site at 1200 and previous hours (Wind direction is never in the prime Canadian SO<sub>2</sub> source “sweet spot” of 20-40 degrees during the midday part of the day)
4. Very light winds in the early AM, and remaining very light throughout the day (conducive to more vertical turbulence)
5. Some Canadian source impact at the Remer Road site (14-29 ppb) with neither DTE Energy power plant upwind from Hour Beginning 1200-1500