

**Redesignation Request and Maintenance Plan  
for the  
Manitowoc County (Partial)  
2015 Ozone National Ambient Air Quality Standard  
Nonattainment Area**

**DRAFT FOR PUBLIC REVIEW**

**Developed By:  
The Wisconsin Department of Natural Resources**

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Redesignation Request and Maintenance Plan for the Manitowoc County, Wisconsin  
2015 Ozone NAAQS Nonattainment Area – DRAFT FOR PUBLIC REVIEW

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**List of Acronyms**

AQS	EPA's Air Quality System database
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CDD	Clean Data Determination
CSAPR	Cross-State Air Pollution Rule
CTG	Control Techniques Guideline
EGU	Electric Generating Unit
EPA	U.S. Environmental Protection Agency
I/M	Inspection and Maintenance
iSIP	Infrastructure SIP
LADCO	Lake Michigan Air Directors Consortium
MOVES3	EPA's Motor Vehicle Emission Simulator model, version 3
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>x</sub>	Nitrogen Oxides (NO and NO <sub>2</sub> )
NSR	New Source Review
PM <sub>2.5</sub>	fine particulates
PM <sub>10</sub>	coarse particulates
ppm	parts per million
PSD	Prevention of Significant Deterioration
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
RTA	Rural Transport Area
RTP	Regional Transportation Plan
SIP	State Implementation Plan
TIP	Transportation Improvement Program
tposd	tons per ozone season day
VOC	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources



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## **1. INTRODUCTION**

Wisconsin requests that the U.S. Environmental Protection Agency (EPA) redesignate the Manitowoc County 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS) nonattainment area, as revised by EPA on June 14, 2021, to attainment. Based on air quality monitoring data for the years 2018-2020, the Manitowoc County nonattainment area has demonstrated attainment of the 2015 ozone NAAQS.

### **1.1. Background**

The federal Clean Air Act (CAA) requires an area not meeting a NAAQS for a specified criteria pollutant to develop or revise its State Implementation Plan (SIP) to expeditiously attain and maintain the NAAQS in that area. When attainment of a NAAQS in a nonattainment area has been achieved, Section 107(d)(3)(D) of the CAA allows states to request the nonattainment area to be redesignated to attainment provided that certain criteria are met.

Historically, exceedances of the federal ozone standards have been monitored along the lakeshore of Lake Michigan, including Manitowoc County. The history of nonattainment in Manitowoc County is shown below in Table 1.1. The county was designated nonattainment for both the 1979 and 1997 ozone NAAQS, but was subsequently redesignated to attainment for both standards. The county was designated as attainment for the 2008 ozone NAAQS.

In October 2015, EPA finalized a revision to the 8-hour ozone NAAQS (80 FR 65291). The 2015 ozone NAAQS (0.070 parts per million, ppm) was more restrictive than the previous 2008 ozone NAAQS (0.075 ppm). In April 2018, EPA published a final rulemaking that designated part of Manitowoc County as marginal nonattainment for the 2015 ozone NAAQS (83 FR 25776). This rulemaking was based on EPA's review of ozone monitoring data collected during the years 2014 to 2016.

On June 14, 2021, in response to a July 10, 2020 decision by the D.C. Circuit Court, EPA published a final rule revising the 2015 ozone NAAQS designations for 13 counties, including Manitowoc County (86 FR 31438). The revised designations expanded the nonattainment area in Manitowoc County to include a larger part of the county's shoreline area. The revised designation was effective July 14, 2021. In this document, all references to the Manitowoc County 2015 ozone NAAQS nonattainment area refer to the area as revised by EPA in June 2021.

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**Table 1.1. Manitowoc County nonattainment history for ozone NAAQS.**

<b>Year Promulgated</b>	<b>1979</b>	<b>1997</b>	<b>2008</b>	<b>2015</b>
<b>Area</b>	Full County	Full County	N/A	Partial County*
<b>Level</b>	0.12 ppm	0.08 ppm	0.075 ppm	0.070 ppm
<b>Averaging Time</b>	1 hour	8 hours	8 hours	8 hours
<b>Classification</b>	Moderate	Former Subpart 1	Unclassifiable/Attainment	Marginal
<b>Redesignation to Attainment</b>	06/16/2003 68 FR 18883	07/31/2012 77 FR 45252	N/A	TBD

\* EPA's June 14, 2021 revised designation for Manitowoc County for the 2015 ozone NAAQS expanded the original partial county area to a slightly larger partial county area.

## **1.2. Geographical Description**

Manitowoc County is located in eastern Wisconsin along the western shoreline of Lake Michigan (Figure 1.1). The Manitowoc County 2015 ozone NAAQS nonattainment area consists of the easternmost part of the county, bordering Lake Michigan. The nonattainment area is comprised of a narrow strip of land located approximately four to ten miles inland from the lakeshore. A set of roadways defines the boundary of the nonattainment area.<sup>1</sup>

Manitowoc County's population was 81,359 in 2020. Almost half of the residents (34,626) live in the largest city, Manitowoc, almost all of which is located within the nonattainment area. Manitowoc County is mostly rural, with a population density of approximately 138 persons/square mile.<sup>2</sup> The county is located just south of Green Bay and north of the Milwaukee-Waukesha-West Allis Metropolitan Statistical Area.

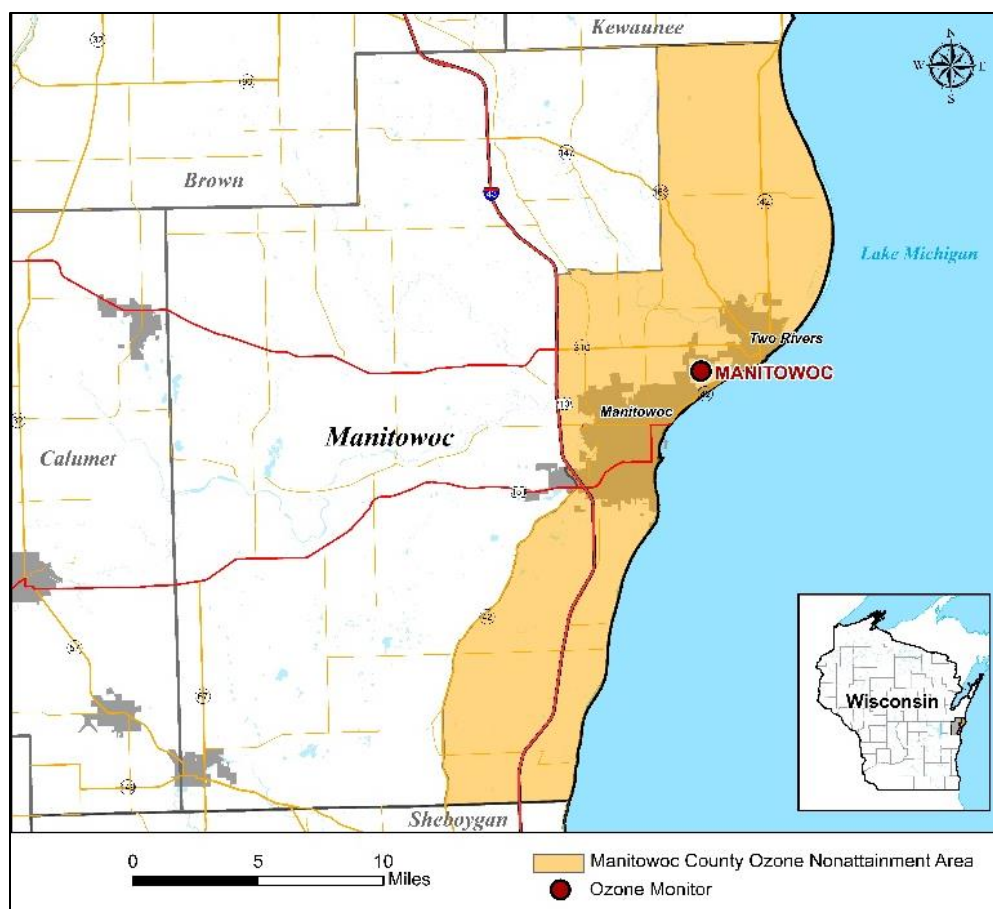
The Manitowoc County shoreline receives high concentrations of ozone transported from emissions sources in upwind regions located to the south, as described in greater detail in Section 4. Ozone transported from out of state is the dominant source of ozone in Manitowoc County, expecting to account for approximately 87 percent of the measured ozone concentrations at the Manitowoc Woodland Dunes air quality monitor in 2023 (Figure 4.1).

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<sup>1</sup> Specifically, the portion of Manitowoc County inclusive and east of the following roadways with the boundary starting from north to south: County Road B which turns into South State Street to County Road V which turns into Forest Home Drive to South Packer Drive to West Hillcrest Road to Highway 43 to West Custer Street to Dufek Drive which turns into Highway 42.

<sup>2</sup> <https://www.census.gov/quickfacts/fact/table/manitowoccountywisconsin,WI,US/PST120219>

**Figure 1.1. Map of the Manitowoc County 2015 ozone NAAQS nonattainment area<sup>3</sup> (in yellow), with air quality monitor location shown.**



### 1.3. Status of Ozone Air Quality

Ozone monitoring data from 2018 through 2020 demonstrates that the air quality meets the 2015 ozone NAAQS in the Manitowoc County nonattainment area, as discussed in more detail in Section 3. In addition, total summer emissions of ozone precursors—nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC)—are projected to continue declining in the areas upwind of Manitowoc that contribute to ozone nonattainment at the Manitowoc monitor. As a result, the Wisconsin Department of Natural Resources (WDNR) expects maintenance of the standard, as discussed in Sections 4 and 7, justifying a redesignation to attainment for the Manitowoc County 2015 ozone NAAQS nonattainment area based on Section 107(d)(3)(E) of the CAA.

<sup>3</sup> As revised by EPA on June 14, 2021.

#### **1.4. Requirements for Redesignation and Overview of this Redesignation Request**

Sections 107(d)(3)(E)(i) through (v) of the CAA establish the following criteria to be met in order for an area to be considered for redesignation of a NAAQS:

- (i) A determination by EPA that the area has attained the NAAQS;
- (ii) A fully approved SIP for the area under Section 110(k) of the CAA;
- (iii) A determination by EPA that the improvement in air quality is due to permanent and enforceable reductions in emissions;
- (iv) A fully approved maintenance plan, including a contingency plan, for the area under Section 175(A) of the CAA; and
- (v) A determination that all applicable requirements for the area under Section 110 and Part D of the CAA have been met.

Section 110 and Part D of the CAA list a number of criteria that must be met prior to consideration for redesignation of nonattainment areas to attainment. In addition, EPA has published detailed guidance in a document entitled “Procedures for Processing Requests to Redesignate Areas to Attainment,” issued September 4, 1992 as a memo sent to EPA Regional Air Directors (“Redesignation Guidance”). This redesignation request and maintenance plan is based on the Redesignation Guidance, supplemented by additional guidance received from staff at EPA Region 5.

This redesignation request and maintenance plan shows that the Manitowoc County 2015 ozone NAAQS nonattainment area has met these CAA criteria as demonstrated by all of the following:

- Ozone monitoring data demonstrate that the area has attained the 2015 ozone NAAQS (criterion (i), addressed in Section 3).
- Emissions inventories for the nonattainment base year (2017) and attainment year (2019), in combination with a discussion of the control measures in place, indicate that air quality improvements are consistent with observed reductions in NO<sub>x</sub> and VOC inventories due to permanent and enforceable emissions reductions (criterion (iii), addressed in Sections 4 and 6).
- Transportation conformity budgets and a description of how the state has met other Section 110 and Part D CAA requirements fulfill the state’s remaining requirements for a redesignation request (criteria (ii) and (v), addressed in Sections 2 and 5).
- Projected emissions inventories for the maintenance years (2025 and 2033) and a contingency plan provide a complete maintenance plan (criterion (iv), addressed in Sections 4 and 7).

## **2. CAA SECTION 110(a) AND PART D REQUIREMENTS**

As a precondition to redesignation of a nonattainment area to attainment, the CAA requires EPA to determine that the state has met all applicable requirements under section 110 and part D of Title I of the CAA (per CAA Section 107(d)(3)(E)(v)) and that the state has a fully approved SIP under Section 110(k) for the area (per CAA Section 107(d)(3)(E)(ii)).

### **2.1. Satisfying CAA Section 110(a) General SIP Requirements**

Section 110(a) of the CAA contains the general requirements for a SIP. Section 110(a)(2) provides that the implementation plan submitted by a state must have been adopted by the state after reasonable public notice and hearing, and, among other things, must:

- Include enforceable emission limitations and other control measures, means or techniques necessary to meet the requirements of the CAA;
- Provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor ambient air quality;
- Provide for implementation of a source permit program to regulate the modification and construction of any stationary source within the areas covered by the plan;
- Include provisions for the implementation of Part C, Prevention of Significant Deterioration (PSD), and Part D, New Source Review (NSR) permit programs;
- Include criteria for stationary source emission control measures, monitoring, and reporting; and
- Include provisions for air quality modeling; and provide for public and local agency participation in planning and emission control rule development.

Wisconsin submitted an infrastructure SIP (iSIP) to satisfy the Section 110(a) requirements for the 2015 ozone NAAQS to EPA on September 14, 2018. Appendix 1 includes Wisconsin's iSIP submittal.

### **2.2. Satisfying CAA Part D Requirements**

CAA Title I, Part D, Subpart 1 sets forth the basic nonattainment requirements applicable to all nonattainment areas. Subpart 2 of Part D, which includes Section 182 of the CAA, establishes additional required provisions for ozone nonattainment areas based on their level of nonattainment classification. Guidance from EPA states that, when submitting a redesignation request, states must meet all Part D requirements that were applicable at the time the redesignation request was submitted.<sup>4</sup>

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<sup>4</sup> "Procedures for Processing Requests to Redesignate Areas to Attainment," memo from John Calcagni to EPA Regional Air Directors, September 4, 1992.

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Subpart 1 Requirements

Section 172(c)(3) requires submittal and approval of a comprehensive, accurate and complete inventory of actual emissions for the area. This requirement was superseded by the inventory requirement in Section 182(a)(1), discussed in the Subpart 2 section below.

Section 172(c)(4) requires the identification and quantification of allowable emissions for major new and modified stationary sources in an area. Section 172(c)(5) requires permits for the construction and operation of new and modified major stationary sources in the nonattainment area. Wisconsin has an approved NSR program that meets these requirements. Furthermore, after redesignation, PSD requirements will apply. Wisconsin has an approved PSD program. The EPA approved additional provisions in Wisconsin's PSD rule on October 6, 2014 (79 FR 60064) and February 7, 2017 (82 FR 9515).

Section 172(c)(7) requires the SIP to meet the applicable provisions of CAA Section 110(a)(2). As noted in the previous section, Wisconsin submitted an affirmation of meeting the Section 110(a) requirements to the EPA on September 14, 2018. This submittal can be found in Appendix 1.

Section 176(c) of the CAA requires states to establish criteria and procedures to ensure that federally supported or funded activities, including highway projects, conform to the air quality planning goals in the applicable SIPs. The requirement to determine conformity applies to transportation plans, programs, and projects developed, funded, or approved under Title 23 of the U.S. Code and the Federal Transit Act (transportation conformity) as well as to all other federally-supported or funded projects (general conformity). Section 5 of this document includes a discussion of transportation conformity.

Subpart 2 Requirements

Section 182(a)(1) requires the submittal of a comprehensive inventory of actual emissions from all sources. The WDNR submitted this inventory to EPA as a SIP revision on August 3, 2020, the deadline established by EPA's 2015 Ozone NAAQS SIP Requirements Rule. However, since that inventory was developed for the original Manitowoc County nonattainment area and not the area as expanded by EPA in June 2021, EPA has elected not to take action on this submittal. An emissions inventory for the revised nonattainment area that meets Section 182(a)(1) requirements is included in Section 4 of this redesignation request.

Section 182(a)(2) requires the submittal of certain corrections to VOC Reasonably Available Control Technology (RACT) rules, vehicle inspection and maintenance (I/M) programs and permitting programs. These corrections were addressed for the Manitowoc County nonattainment area under the 1979 1-hour ozone standard and do not need to be addressed again under the 2015 8-hour ozone standard.

Section 182(a)(3)(B) requires the submittal of an emission statement SIP. The WDNR submitted this statement to EPA as a SIP revision on August 3, 2020, the deadline established by EPA's 2015 Ozone NAAQS SIP Requirements Rule, and has also included such a statement in Section 4.5.

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Section 182(b)(5) requires NO<sub>x</sub> and VOC emission offsets at a ratio of 1.1 to 1 for major source permits in marginal ozone nonattainment areas. These offset ratios are incorporated into Wisconsin's Nonattainment NSR permitting program, which was approved by EPA on January 18, 1995 (60 FR 3538).

When EPA approves the emissions statement, emissions inventory, and other marginal nonattainment area requirements submitted in this plan, Wisconsin will have met all the applicable SIP requirements for the purposes of redesignation for this area.

### 3. OZONE MONITORING

#### 3.1. Ozone Monitoring Network

The Manitowoc monitor is located at a rural site at the Woodland Dunes Nature Center and Preserve in Two Rivers, Wisconsin. (Figure 1.1) It collects samples 6 meters above ground level and is located 20 meters from the nearest road. This site has monitored ozone levels since 1994.

#### 3.2. Ambient Ozone Monitoring Data

The EPA's requirements for ozone air monitoring data are contained in Appendix U to 40 CFR Part 50 ("Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone"). The level of the 2015 ozone NAAQS is 0.070 ppm. A monitoring site measures compliance with the 2015 ozone NAAQS if it meets the following conditions:

1. There are three complete years of ozone monitoring data at the site.
2. The 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is equal to or less than 0.070 ppm. This value is called the "design value."

For an area to attain the standard, the design values for all monitoring sites within that area must be equal to or lower than the NAAQS.

Table 3.1 shows the fourth-highest daily maximum 8-hour average ozone values for the Manitowoc monitor for 2018 through 2020. Table 3.1 also shows the 2018-2020 design value, which meets the 2015 ozone NAAQS. This confirms that the Manitowoc County nonattainment area attained the 2015 ozone NAAQS.

Significant reductions in emissions of ozone precursors, NO<sub>x</sub> and VOCs, from upwind sources have resulted from permanent and enforceable control measures implemented during the time period associated with the 2015 ozone standard, as discussed in more detail in Sections 4 and 6.

**Table 3.1. Monitoring data for the Manitowoc County 2015 ozone NAAQS nonattainment area, showing annual fourth-highest 8-hour concentrations and design values (DV) in parts per million (ppm).** 2018 through 2020 data were downloaded from EPA's Air Quality System (AQS) database.

Site (Site ID)	4th high 8-hr ozone (ppm)			Design value (ppm) 2018-20
	2018	2019	2020	
Manitowoc (55-071-0007)	0.076	0.066	0.069	0.070



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### **3.3. Quality Assurance**

All available data for the Manitowoc ozone monitoring site for 2018 through 2020 has been quality assured and archived in EPA's Air Quality System (AQS). The WDNR has an approved Ozone Quality Assurance Project Plan and quality assures monitoring data in accordance with 40 CFR Part 58 to assure that the quality of the monitoring data submitted to the AQS meets federal criteria. The 2018 through 2020 datasets have been certified and are available to the public.

### **3.4. Data Completeness**

EPA requires that daily maximum 8-hour average concentrations be available for at least 90 percent of the days in the ozone season for a given site over the 3-year period and that no site have less than 75 percent data completeness for a given year. The data from the Manitowoc monitoring site meets EPA requirements for completeness (as described in Appendix P to 40 CFR Part 50) for the years 2018 through 2020. For these three years, the overall average data completeness for the Manitowoc monitor was 99 percent.

## **4. EMISSIONS INVENTORIES**

### **4.1. Overview and Choice of Inventory Years**

The CAA requires that a state demonstrate that the improvement in ozone air quality between the nonattainment and attainment years is based on permanent and enforceable emissions reductions in order for a nonattainment area to be redesignated to attainment.

Manitowoc County sources have little to no ability to influence ozone concentrations at monitors in the county. Emissions from upwind states contribute more ozone to the Manitowoc monitor than do sources in Wisconsin, as shown in Figure 4.1 and discussed below. Despite out-of-state transport contributing significantly to ozone concentrations measured at the Manitowoc monitor, the fourth-highest daily maximum 8-hour average ozone values within the Manitowoc County nonattainment area still meet the 2015 ozone NAAQS (Table 3.1).

The WDNR is submitting comprehensive inventories of actual and projected emissions for the Manitowoc County nonattainment area. These inventories fulfill the demonstration of improvement required under the CAA. Section 6 documents the specific programs responsible for making the emissions reductions permanent and enforceable. These programs are the foundation for the actual emission inventory data discussed in this section. It should be noted that these emissions inventories do not result in a limitation on emissions for any specific source or source category in the future. These inventories are a snapshot of recent emission levels and a best estimate of future emission levels and are used to demonstrate relative changes in total emissions and future maintenance of the standard.

EPA's Redesignation Guidance requires a state to submit emissions inventories for the following years:

1. A year in which the standard was not attained ("nonattainment year");
2. A year in which the standard was attained ("attainment year");
3. A year at least 10 years after the area has been redesignated to attainment to demonstrate maintenance of the standard ("maintenance year"); and
4. An intermediate year between the attainment year and maintenance year ("interim year").

The WDNR has developed the following NO<sub>x</sub> and VOC emission inventories as part of the redesignation request:

1. 2017 nonattainment year emissions inventory;
2. 2019 attainment year emissions inventory;
3. 2025 interim year emissions inventory; and
4. 2033 maintenance year emissions inventory.

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EPA guidance for redesignation inventories provides the flexibility to use any one of the three years contained in the attainment design value provided emissions from the season selected are found representative in terms of economic conditions, key sector emissions characteristics and weather/ozone conduciveness conditions. 2019 is the middle year in the attainment design value period (2018-2020) and also meets the other conditions. This year, therefore, forms a reasonable basis for assessing the “real and permanent” nature of attainment as required by the CAA. For more information on meteorological trends see Section 6.6.

Wisconsin is required to demonstrate continued maintenance of the NAAQS for ten years after redesignation. As part of this demonstration, WDNR is providing a projection of emissions for 2025 as the interim projection year and 2033 as the maintenance year. The emission projections through 2033 are relied upon in the maintenance demonstration presented in Section 7.

#### **4.2. Nonattainment Year (2017) and Attainment Year (2019) Inventories**

The WDNR developed the following emissions information to satisfy EPA’s redesignation requirements to submit nonattainment and attainment year inventories for NO<sub>x</sub> and VOC. Appendix 2 includes a discussion of the methodology used to estimate sector-specific emissions for 2017 and 2019 for the nonattainment area (shown in Tables 4.1 and 4.2). Between 2017 and 2019, NO<sub>x</sub> emissions decreased two percent, and VOC emissions decreased eight percent in the Manitowoc County 2015 ozone NAAQS nonattainment area. These reductions are due primarily to decreases in NO<sub>x</sub> and VOC emissions from the onroad mobile sector provided by the federal and state mobile source control programs detailed in Section 6.3.

#### **4.3. Maintenance Year Inventories (2025 and 2033)**

The WDNR developed emissions information to satisfy the EPA redesignation requirements to submit an interim maintenance year and maintenance year inventory for NO<sub>x</sub> and VOC. Appendix 3 includes information on sector-specific emissions projection methodologies for both 2025 and 2033 for the nonattainment area. Tables 4.1 and 4.2 show the projected NO<sub>x</sub> and VOC emissions in tons per ozone season day (tposd) in 2025 and 2033 for electric generating unit (EGU) point, non-EGU point, area, onroad mobile, and nonroad mobile sources.

Comparison of emissions from 2019 to projected emissions from the maintenance year (2033) for the Manitowoc County 2015 ozone NAAQS area shows that total NO<sub>x</sub> emissions in this area are projected to decrease by approximately 14 percent (0.74 tposd) over this time (Table 4.1). The largest reductions are projected from the onroad mobile sector (0.78 tposd). VOC emissions are projected to decrease in the Manitowoc County 2015 ozone NAAQS area by approximately 5 percent (or 0.23 tposd) from 2019 to 2033 (Table 4.2). As with NO<sub>x</sub> reductions, the largest VOC reductions are projected from the onroad mobile sector (0.24 tposd). This analysis shows that the Manitowoc County 2015 ozone NAAQS area is expected to maintain the air quality standard for more than ten years into the future.

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**Table 4.1. Manitowoc County 2015 ozone NAAQS area NO<sub>x</sub> emissions (tposd) by source type.**

<b>Sector</b>	<b>2017 nonattainment year</b>	<b>2019 attainment year</b>	<b>2025 interim year</b>	<b>2033 maintenance year</b>
Point - EGU	0.56	0.47	0.60	0.60
Point - Non-EGU	1.27	1.75	1.92	1.95
Area	0.75	0.71	0.63	0.61
Onroad	1.76	1.38	0.91	0.61
Nonroad	1.05	0.98	0.84	0.80
<b>TOTAL</b>	<b>5.39</b>	<b>5.30</b>	<b>4.90</b>	<b>4.56</b>
% Change from 2019			-8%	-14%

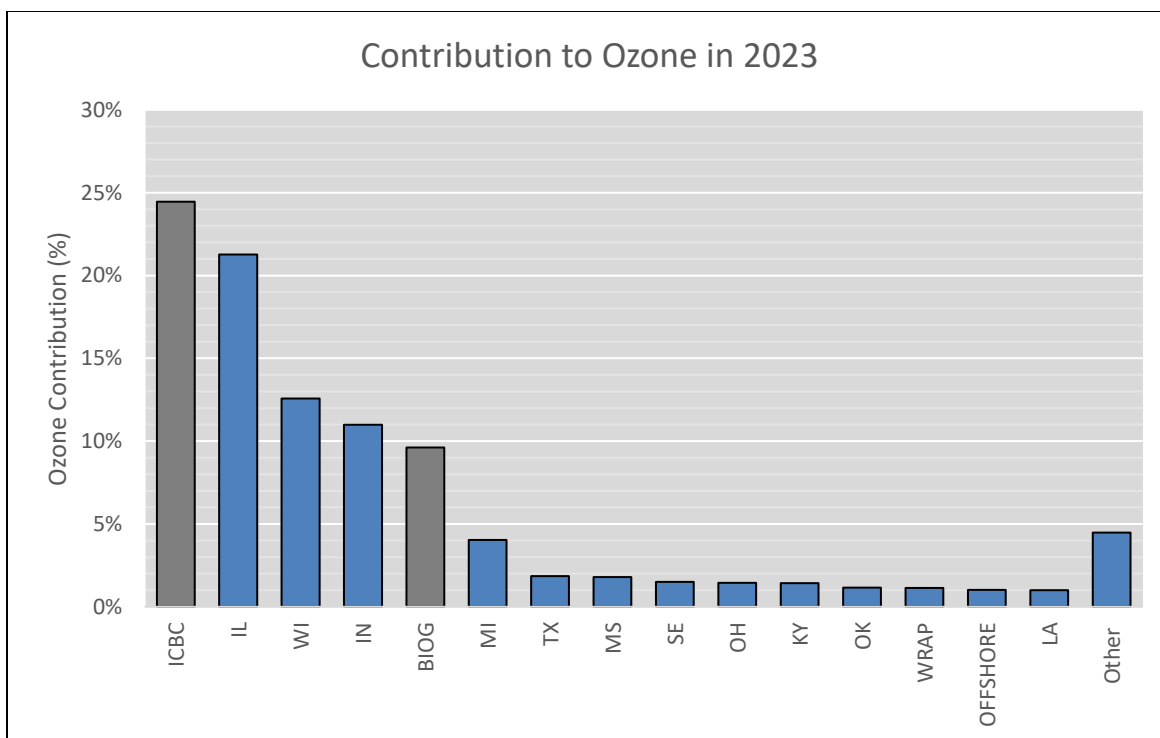
**Table 4.2. Manitowoc County 2015 ozone NAAQS area VOC emissions (tposd) by source type.**

<b>Sector</b>	<b>2017 nonattainment year</b>	<b>2019 attainment year</b>	<b>2025 interim year</b>	<b>2033 maintenance year</b>
Point - EGU	0.02	0.02	0.02	0.02
Point - Non-EGU	1.31	1.16	1.34	1.39
Area	2.56	2.45	2.25	2.35
Onroad	0.68	0.57	0.47	0.32
Nonroad	0.67	0.61	0.53	0.50
<b>TOTAL</b>	<b>5.23</b>	<b>4.82</b>	<b>4.60</b>	<b>4.58</b>
% Change from 2019			-4%	-5%

#### **4.4. Trends in Emissions from Upwind Areas**

NO<sub>x</sub> and VOC emissions from out-of-state sources located to the south are the largest contributors to ozone at the Manitowoc monitor (Figure 4.1). Figure 4.1 shows that emissions sources in Wisconsin are projected to contribute only about 13 percent to concentrations at the Manitowoc monitor in 2023. Reductions in emissions from upwind areas are therefore likely to have a greater impact on ozone concentrations measured at this monitor than are those from Wisconsin sources, including those in Manitowoc County.

**Figure 4.1. Ozone source apportionment modeling from the Lake Michigan Air Directors Consortium (LADCO) for the Manitowoc monitor.<sup>5</sup>**



#### 4.5. Emission Statement

Section 182(a)(3)(B) of the CAA requires marginal ozone nonattainment areas to submit an emission statement. The emission statement must:

... require that the owner or operator of each stationary source of oxides of nitrogen or volatile organic compounds provide the state with a statement, in such form as the Administrator may prescribe (or an equivalent alternative developed by the state), for classes or categories of sources, showing the actual emissions of oxides of nitrogen and volatile organic compounds from that source. The first such statement shall be submitted within 3 years after the date of the enactment of the CAA Amendments of 1990. Subsequent statements shall be submitted at least every year thereafter. The statement

<sup>5</sup> 2023 projected contributions comes from LADCO 2015 Interstate Transport Modeling (with water). For information on 2023 modeling methodology see: LADCO 2015 O3 NAAQS Transport Modeling TSD. [https://www.ladco.org/wp-content/uploads/Documents/Reports/TSDs/O3/LADCO\\_2015O3iSIP\\_TSD\\_13Aug2018.pdf](https://www.ladco.org/wp-content/uploads/Documents/Reports/TSDs/O3/LADCO_2015O3iSIP_TSD_13Aug2018.pdf). Source regions were grouped differently for the different modeling efforts and do not include states that are broken out specifically due to their significant independent contributions. The “SE” (Southeast) region includes MS, AL, GA, FL, TN, VA, NC and SC. The “WRAP” (West) region includes WA, OR, CA, NV, ID, MT, WY, UT, CO, AZ, NM, ND and SD. “ICBC” refers to “initial/boundary conditions”, which are contributions that cannot otherwise be attributed to a state or source region, such as emissions originating outside the U.S. “BIOG” represents biogenic emissions. “Offshore” represents commercial marine sources. “Other” represents other states or regions not otherwise listed.

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shall contain a certification that the information contained in the statement is accurate to the best knowledge of the individual certifying the statement.

Wisconsin has an approved emission statement program in place that covers the Manitowoc County 2015 ozone NAAQS nonattainment area. This is because the state had areas designated as nonattainment for earlier ozone NAAQS. EPA's 2015 Ozone NAAQS SIP Requirements Rule states that:

... a state may have an emissions statement regulation (per CAA section 182(a)(3)(B)) that has been previously approved by the EPA for a prior ozone NAAQS that covers all the state's nonattainment areas and relevant classes and categories of sources for the 2015 ozone NAAQS, and that is likely to be sufficient for purposes of meeting the emissions statement requirement for the 2015 ozone NAAQS (83 FR 62998, 63001).

The WDNR has the authority under Chapter NR 438 of the Wisconsin Administrative Code to require annual NO<sub>x</sub> and VOC emission reporting from any facility in the state that emits a pollutant above the thresholds specified in the code.<sup>6</sup> EPA approved Wisconsin's emission reporting program as satisfying the CAA emission statement requirement on December 6, 1993 (58 FR 64155). Therefore, Wisconsin has satisfied this requirement for the 2015 ozone NAAQS.

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<sup>6</sup> Chapter NR 438 is available at [http://docs.legis.wisconsin.gov/code/admin\\_code/nr/400/438.pdf](http://docs.legis.wisconsin.gov/code/admin_code/nr/400/438.pdf).

## **5. TRANSPORTATION CONFORMITY**

Transportation conformity is required by section 176(c) of the CAA (42 U.S.C. 7506(c)). Conformity to a SIP means that transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS (CAA 176(c)(1)(B)). The EPA’s conformity rule at 40 CFR part 93 requires that transportation plans, programs and projects conform to SIPs and establish the criteria and procedures for determining whether they conform. The conformity rule generally requires a demonstration that emissions from the Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP) are consistent with the motor vehicle emissions budget (MVEB) contained in the control strategy SIP revision or maintenance plan (40 CFR 93.101, 93.118, and 93.124). An MVEB is defined as “that portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions” (40 CFR 93.101). The WDNR is submitting MVEBs for the Manitowoc County 2015 ozone NAAQS area as part of this redesignation request.

### **5.1. Motor Vehicle Emissions Model**

The MVEBs were developed using EPA’s MOtor Vehicle Emission Simulator (MOVES3) model and a travel demand model. The MOVES3 model is used to derive estimates of hot summer day emissions for the ozone precursors NO<sub>x</sub> and VOC. Numerous variables can affect these emissions, especially the size of the vehicle fleet (the number of vehicles on the road), the fleet’s age, the distribution of vehicle types, and the vehicle miles of travel. The transportation information is derived from the travel demand model. Appendices 2 and 3 contains key data used to develop inputs to MOVES3.<sup>7</sup>

### **5.2. Motor Vehicle Emissions Budgets**

Table 5.1 describes the MVEBs developed by WDNR for the Manitowoc County 2015 ozone NAAQS area for the years 2025 and 2033. These budgets include a margin of safety to account for uncertainties in future mobile source emissions. 40 CFR 93.101 defines this safety margin as the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for RFP, attainment, or maintenance. To calculate a safety margin, the WDNR increased the on-road mobile source portions of the 2025 and 2033 projected emissions inventories by 15 percent in the Manitowoc County 2015 ozone NAAQS area.

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<sup>7</sup> The complete set of inputs to MOVES3 is too lengthy to include in this document. However, electronic copies of the inputs can be obtained from WDNR upon request.

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**Table 5.1. Motor vehicle emissions budgets (MVEBs) for the Manitowoc County 2015 ozone NAAQS maintenance area for 2025 and 2033.**

Year	Emissions (tons per hot summer day)	
	VOC	NO <sub>x</sub>
2025	0.47	0.91
2033	0.32	0.61



## 6. PERMANENT AND ENFORCEABLE CONTROL MEASURES

The CAA Section 107(d)(3)(E)(iv) specifies that improvements in air quality must be due to permanent and enforceable emission reductions. Additionally, EPA’s 1992 Calcagni memo indicates that attainment resulting from temporary reductions in emission rates (e.g., reduced production or shutdown due to temporary adverse economic conditions) or unusually favorable meteorology would not qualify as an air quality improvement due to permanent and enforceable emission reductions. This section outlines the permanent and enforceable control measures that apply to sources in the Manitowoc County 2015 ozone NAAQS area. These control measures reduced emissions in this area by the 2019 attainment year, leading to the emission reductions shown in Section 4. These control programs are described in greater detail in Appendix 9.

Table 6.1 lists the permanent and enforceable emission control programs implemented for each emission source sector. Many of the control measures have been implemented under long-standing programs that began prior to 2017 (the nonattainment year) and 2019 (the attainment year). This discussion highlights those control measures or emission reductions that have occurred since 2017.

**Table 6.1. Wisconsin emission control programs that have reduced NO<sub>x</sub> and VOC emissions in Manitowoc County 2015 ozone NAAQS area.<sup>a</sup>**

Sector	NO <sub>x</sub> Control Measures	VOC Control Measures
Point	- Wisconsin NO <sub>x</sub> RACM <sup>b</sup> and RACT <sup>c</sup> - Federal NO <sub>x</sub> Transport Rules	- VOC RACT/CTG <sup>d</sup> - Federal NESHAP <sup>e</sup> Rules
Area		- VOC RACT/CTG - Federal VOC emission standards for consumer/commercial products - Area source NESHAP Rules
Onroad	-Numerous federal onroad mobile source control programs (see Section 6.3) -Wisconsin vehicle inspection and maintenance program <sup>a</sup>	
Nonroad	-Numerous federal nonroad mobile source control programs (see Section 6.4) <sup>a</sup>	

<sup>a</sup> Table 6.1 lists emission control programs implemented within the Manitowoc County 2015 ozone NAAQS nonattainment area and/or throughout the state. Appendix 9 provides a detailed explanation of these programs.

<sup>b</sup> Reasonably Available Control Measures

<sup>c</sup> Reasonably Available Control Technology

<sup>d</sup> Control Techniques Guidelines

<sup>e</sup> National Emissions Standards for Hazardous Air Pollutants

It is important to note that most of the ozone measured at the Manitowoc monitoring site is due to ozone and ozone precursors that originate from upwind source regions, including upwind states. For this reason, even though pollution control programs continue to decrease emissions within the Manitowoc County 2015 ozone NAAQS area, emission reductions in upwind areas will have an outsized impact on the area’s air quality. Emission control programs specific to Manitowoc are described in the subsections below. Appendix 9 details emission control

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programs implemented within Wisconsin that may contribute to reduced ozone levels in Manitowoc.

### **6.1. Point Source Control Measures**

Wisconsin implemented Reasonably Available Control Measures (RACM) for NO<sub>x</sub> sources in the state's nonattainment areas for the 1997 ozone NAAQS. NO<sub>x</sub> emission units constructed on or before February 1, 2001 in Manitowoc County that meet the corresponding applicability criteria are subject to the NO<sub>x</sub> RACM requirements in s. NR 428.05, Wis. Adm. Code, which list the NO<sub>x</sub> emission rate limits for various types of NO<sub>x</sub> emission units. The affected NO<sub>x</sub> emission units are required to install continuous emission monitoring systems to demonstrate compliance with the NO<sub>x</sub> emission limits specified in s. NR 428.05, Wis. Adm. Code. NO<sub>x</sub> emission units constructed or modified after February 1, 2001 are subject to the federal transport requirements described below.

EGUs in 23 states east of the Mississippi, including 9 states that significantly contribute over the one percent significance threshold to the Manitowoc monitor, have been subject to a series of federal NO<sub>x</sub> transport rules since 2009.<sup>8</sup> These rules have included the Clean Air Interstate Rule (CAIR), the Cross-State Air Pollution Rule (CSAPR) and the CSAPR Update Rule. CSAPR implemented a first phase of NO<sub>x</sub> emission budgets in 2015 and 2016, and the CSAPR Update Rule established an additional phase of NO<sub>x</sub> emission budgets starting with the 2017 ozone season.

On April 30, 2021, EPA promulgated the Revised CSAPR Update rule in order to fully address 21 states' outstanding interstate pollution transport obligations for the 2008 ozone NAAQS (86 FR 23054).<sup>9</sup> The rule further reduced EGU NO<sub>x</sub> emissions in 12 states starting in the 2021 ozone season. Due to this rule and other changes already underway in the power sector, EPA expects ozone season NO<sub>x</sub> emissions will be nearly 25,000 tons lower in 2021 than in 2019, a reduction of 19 percent.<sup>10</sup>

Wisconsin implemented VOC RACT to fulfill Control Techniques Guidelines (CTG) requirements for applicable Wisconsin nonattainment areas under the 1997 and the 2008 ozone NAAQS. VOC RACT rules were adopted under chs. NR 419 through 424, Wis. Adm. Code, some of which apply to sources in Manitowoc County (Appendix 9). Appendix 9 summarizes Wisconsin's VOC RACT program, including program elements which are implemented outside of the Manitowoc County 2015 ozone NAAQS nonattainment area, which may contribute to reduced ozone concentrations along Wisconsin's Lake Michigan shoreline.

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<sup>8</sup> LADCO's 2023 source contribution modeling indicates that Illinois, Wisconsin, Indiana, Michigan, Mississippi, Kentucky, Texas, Ohio, Oklahoma, and Louisiana all contribute significantly to the ozone measured in Manitowoc County. Of those states all but Oklahoma are subject to federal NO<sub>x</sub> rules discussed.

<sup>9</sup> The rulemaking responds to a September 2019 ruling by the U.S. Court of Appeals for the D.C. Circuit, *Wisconsin v. EPA*, which remanded the CSAPR Update to EPA for failing to fully eliminate significant contribution to nonattainment and interference with maintenance of the 2008 ozone NAAQS from upwind states by downwind areas' attainment dates.

<sup>10</sup> [https://www.epa.gov/sites/default/files/2021-03/documents/revised\\_csapr\\_update\\_factsheet\\_for\\_final\\_rule.pdf](https://www.epa.gov/sites/default/files/2021-03/documents/revised_csapr_update_factsheet_for_final_rule.pdf).

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Non-combustion VOC point source emissions in the Manitowoc County area are subject to source-specific National Emission Standards for Hazardous Air Pollutant (NESHAP) requirements and/or VOC RACT rules, as applicable. The non-combustion NESHAP rules were implemented prior to 2017 with no additional reductions expected after 2017, however, combustion point sources are subject to several NESHAP rules that became effective in or after 2017. These NESHAP rules also apply to sources nationally, thereby reducing the transport of VOC emissions into the nonattainment area. See Section 1 of Appendix 9 for more information about all of these federally enforceable control programs.

## **6.2. Area Source Control Measures**

As noted for point sources, Wisconsin has implemented VOC RACT rules under chs. NR 419 through 424, Wis. Adm. Code (Appendix 9). In addition, national VOC emission standards for consumer and commercial products also limit VOC emissions from area sources, as do NESHAPs for gasoline distribution (Stage I vapor recovery requirements) and area source industrial, commercial and institutional boilers. See Section 2 of Appendix 9 for more information about these federally enforceable control programs.

## **6.3. Onroad Source Control Measures**

Both NO<sub>x</sub> and VOC emissions from on-road mobile sources are controlled through federal new vehicle emission standards programs and fuel standards. Although initial compliance dates in many cases were prior to 2017, these regulations have continued to reduce area-wide emissions as fleets turn over to newer vehicles. These programs apply nationally and have reduced emissions both within the nonattainment area and contributing ozone precursor transport areas. The Wisconsin-administered I/M program also limits on-road VOC and NO<sub>x</sub> emissions from on-road sources in the southeastern Wisconsin. See Section 3 of Appendix 9 for more information on these federally enforceable control programs.

## **6.4. Nonroad Source Control Measures**

VOC and NO<sub>x</sub> emitted by non-road mobile sources are significantly controlled via federal standards for new engines. The nonroad regulations continue to slowly lower average unit and total sector emissions as equipment fleets are replaced each year, pulling the highest emitting equipment out of circulation or substantially reducing its use. Fuel programs regulating fuel sulfur content also enable achievement of various new engine tier VOC and NO<sub>x</sub> emission limits. See Section 4 of Appendix 9 for more information about these federally enforceable control programs.

## **6.5. Section 110(l) Noninterference Requirements**

When revising rules and regulations in the SIP, the state is responsible for demonstrating that such a change will not interfere with any applicable requirement concerning attainment, RFP, or any other applicable CAA requirements for any of the criteria pollutants. This request for redesignation does not implement any changes in the control programs or requirements approved in the SIP and in place during the 2019 attainment year. Therefore, all requirements related to section 110(l) noninterference are fulfilled under this request. Further, Wisconsin will continue

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to implement all control programs currently in the SIP for emissions of ozone precursors in this maintenance area. As documented in Wisconsin's iSIP for the 2015 ozone NAAQS (Appendix 1), WDNR has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. Removal of any control program from the SIP will be subject to a public hearing process, a demonstration of noninterference, and approval by EPA.

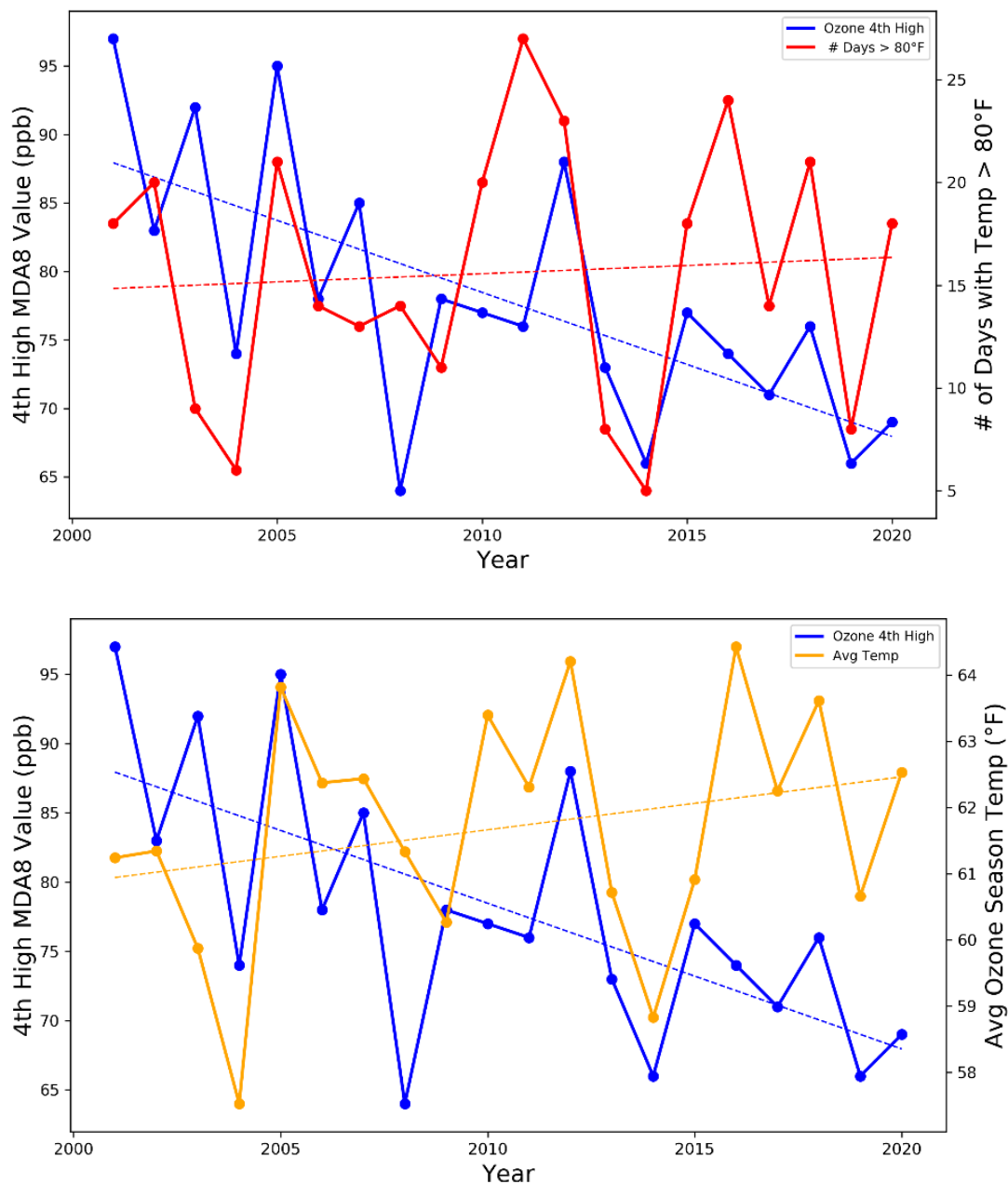
### **6.6. Impact of Permanent and Enforceable Control Measures**

Comparison of trends in ozone concentrations and temperature supports the conclusion that improvement in air quality shown in Section 3 are derived from the permanent and enforceable control measures described in this section, rather than from unusually favorable meteorology or adverse economic conditions. Since ozone typically has a positive correlation with temperature, WDNR analyzed the fourth highest daily maximum 8-hour average (MDA8) ozone concentrations for the months May through September. These data were compared with two measures of temperature: the number of days with temperatures above 80 °F and the average ozone season (May through September) temperature. Ozone concentration data is from the Manitowoc monitor. Temperature data is from the Two Rivers National Weather Service site located about two miles east of the Manitowoc monitor and within the Manitowoc County 2015 ozone NAAQS nonattainment area. The WDNR examined data for the last 19 years in order to differentiate the influence of other meteorological variables affecting ozone formation, such as wind direction and wind speed.

Figure 6.1 shows that over the last 19 years, ozone concentrations at the Manitowoc monitor have decreased substantially. In contrast, temperatures have increased slightly, with an increase in both the number of hot days and average season temperature. As noted above, high ozone concentrations are typically observed on relatively hot summer days. This relationship indicates that reductions in emissions, rather than suboptimal meteorology for ozone production, led to the long-term reduction in ozone concentrations. Similarly, adverse economic conditions cannot account for the downward trends in ozone levels.

Figure 6.1 also demonstrates that temperatures during the 2018 to 2020 design value years were not unusual. The number of hot days in 2018 were among the highest observed since 2001, those from 2019 were below average, and the number of hot days in 2020 were slightly above the average trend. This data demonstrates that temperatures in the Manitowoc County nonattainment area were not unusually low during this three-year period, so unusually cool temperatures were not a driver of the low ozone concentrations that were observed.

**Figure 6.1. Annual fourth highest maximum daily 8-hour average ozone concentrations plotted with (top) the number of days with temperatures over 80 °F and (bottom) the average May to September temperatures for the Manitowoc monitor. Dotted lines are best-fit linear regressions.**



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As has been discussed extensively, ozone along Lake Michigan is heavily impacted by land-lake wind circulation and other meteorological factors in addition to temperature. In order to account for the complex combination of meteorological influences on ozone, LADCO periodically conducts Classification and Regression Tree (CART) analyses for some monitors along the Lake Michigan shoreline. These analyses apply a statistical tool to ozone and meteorological data to group days together according to their unique meteorology.<sup>11</sup> This grouping allows evaluation of ozone concentration trends over time among days with similar meteorological conditions, providing insight into the impacts of non-meteorological factors, such as reductions in emissions, on ozone.

To provide additional evidence that improvements in air quality observed in the Manitowoc County 2015 ozone NAAQS nonattainment area are due to changes in emissions, rather than suboptimal meteorological conditions for ozone formation, Appendix 10 includes the results of a CART analysis conducted by LADCO for the Kohler Andrae monitoring site in neighboring Sheboygan County using data from 2005 to 2019.<sup>12</sup> The CART analysis shows that ozone concentrations for the meteorologically distinct types of days decreased over this period, with the largest reductions occurring during days experiencing the highest ozone concentrations. Sheboygan County is located directly south of the Manitowoc County 2015 ozone nonattainment area and the Sheboygan Kohler Andrae and Manitowoc monitors are located just 33 miles apart. Given that the lakeshores of both Sheboygan and Manitowoc counties experience very similar meteorology, it is reasonable and appropriate to consider the results of this CART analysis in this redesignation request. See Appendix 10 for more details about this analysis.

The analyses described in this section support the conclusion that the long-term decreases in ozone levels in the Manitowoc County area, including the reductions to attainment-level air quality monitored in 2018-2020, are due to the permanent and enforceable reductions in ozone precursor emissions discussed earlier in this section, rather than from unusual meteorology or adverse economic conditions.

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<sup>11</sup> For example, at the Kohler Andrae monitor, the group of days with the highest ozone concentrations had southerly transport, southerly winds in the morning and above-average temperatures.

<sup>12</sup> This analysis did not include data for 2020 because complete meteorological data for 2020 was not available at the time the analysis was completed..

## **7. MAINTENANCE PLAN**

Section 175A of the CAA sets forth the elements of a maintenance plan for areas seeking redesignation from nonattainment to attainment. The plan must demonstrate continued attainment of the applicable NAAQS for at least ten years after EPA approves a redesignation to attainment. Eight years after the redesignation, the state must submit a revised maintenance plan, which demonstrates attainment for the ten years following the initial ten-year period.

Based on the latest air quality monitoring data, the Manitowoc monitor's 2018-2020 design value meets the 2015 ozone NAAQS (Section 3). Comparison of nonattainment (2017) and attainment (2019) year inventories showed that attainment of the NAAQS was accompanied by significant reductions in ozone precursor emissions from the areas that contribute the nonattainment at this monitor (Section 4). These emissions reductions were due to permanent and enforceable measures, many of which will further reduce emissions during the maintenance period (Section 6). In this section, maintenance of the attainment status of the Manitowoc County area is demonstrated via reported and projected ozone summer day emissions provided on a sector-specific basis that show continued reductions in emissions during maintenance years. This section also includes contingency measures and commitments to continue monitoring and to revise this maintenance plan.

### **7.1. Comparison of Attainment and Maintenance Emissions Inventories**

Maintenance emission inventory projections are described in Section 4 and summarized in Tables 7.1 and 7.2. 2019 was chosen as the representative attainment year inventory. 2025 and 2033 were chosen as interim and final maintenance years.

The forecast maintenance inventories for 2025 and 2033 demonstrate that emissions of NO<sub>x</sub> and VOC are projected to decrease in future years relative to the 2019 attainment year in the Manitowoc County 2015 ozone NAAQS area (Tables 7.1 and 7.2). Nonattainment area emissions are projected to decrease by 14 percent for NO<sub>x</sub> and five percent for VOC from 2019 to 2033. Since the monitor attained the standard in 2018-2020 and contributing emissions are projected to decrease through 2033, this inventory analysis demonstrates that the Manitowoc County 2015 ozone NAAQS area is expected to maintain the 2015 ozone NAAQS for more than ten years into the future.

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**Table 7.1. NO<sub>x</sub> emissions in the Manitowoc County 2015 ozone NAAQS area.**

	Total NO <sub>x</sub> emissions (tons per ozone season day)			
	2019 attainment year	2025 interim year	2033 maintenance year	Net Change (2019-2033)
Point	2.23	2.52	2.54	0.32
Area	0.71	0.63	0.61	-0.10
Onroad	1.38	0.91	0.61	-0.78
Nonroad	0.98	0.84	0.80	-0.18
<b>Total</b>	<b>5.30</b>	<b>4.90</b>	<b>4.56</b>	<b>-0.74</b>

**Table 7.2. VOC emissions in the Manitowoc County 2015 ozone NAAQS area.**

	Total VOC emissions (tons per ozone season day)			
	2019 attainment year	2025 interim year	2033 maintenance year	Net Change (2019-2033)
Point	1.18	1.36	1.41	0.23
Area	2.45	2.25	2.35	-0.10
Onroad	0.57	0.47	0.32	-0.24
Nonroad	0.61	0.53	0.50	-0.12
<b>Total</b>	<b>4.82</b>	<b>4.60</b>	<b>4.58</b>	<b>-0.23</b>



## **7.2. Verification of Continued Attainment**

Per EPA’s redesignation request guidance<sup>3</sup>, WDNR will verify continued attainment of the 2015 8-hour ozone NAAQS in the Manitowoc County area during the maintenance period via continued ozone monitoring. The WDNR commits to continue monitoring ozone levels in this area and will discuss any changes in siting that may become necessary with EPA Region 5 staff. The WDNR will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58 and will enter all data into EPA’s Air Quality System database (AQS) on a timely basis in accordance with federal guidelines. Ozone concentration data will continue to be available on the WDNR website,<sup>13</sup> providing real-time data and information about any NAAQS exceedances to the public.

In addition, ozone precursor inventories will be prepared for 2023, 2026, 2029 and 2032 as part of the CAA-required National Emissions Inventory program. These inventories will be compared with the 2019 attainment year inventory and projected 2025 interim and 2033 maintenance year inventories, to assess emissions trends, as necessary, to assure continued attainment of the 2015 ozone NAAQS.

## **7.3. Maintenance Contingent Response Plan**

The EPA’s Redesignation Guidance says that a state’s “maintenance plan shall contain such contingency measures as the Administrator deems necessary to ensure prompt correction of any violation of the NAAQS.” As part of Wisconsin’s maintenance plan for the Manitowoc County 2015 ozone NAAQS area, Wisconsin commits to two separate levels of contingent response to any renewed exceedance and/or violation of the 2015 ozone NAAQS. The first step, a “warning level response,” initiates a study to investigate whether the observed exceedance requires further evaluation or action to ensure maintenance going forward. The second step, an “action level response,” would identify and implement any needed control measures necessary to ensure maintenance.

Specifics of Wisconsin’s contingency response are as follows:

### Warning Level Response

A warning level response would be required if an annual (1-year) 4<sup>th</sup> high monitored concentration is above the level of the 2015 ozone NAAQS (0.070 ppm). A warning level response would initiate a study to determine whether the high ozone concentrations indicate a trend towards higher ozone levels and whether emissions are significantly higher than projected in the maintenance plan. The study would include the following elements:

- An assessment of whether actual emissions have deviated significantly from the emissions projections contained in this maintenance plan for the nonattainment area, along with an evaluation of which sectors and states are responsible for any emissions increases; and

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<sup>13</sup> Select “Current Air Quality, Monitoring Data and Forecasts” from the webpage <http://dnr.wi.gov/topic/AirQuality>.

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- A study of whether unusual meteorological conditions during the high-ozone year led to the high monitored ozone concentrations.

Should it be determined through the warning level study that action is necessary to ensure maintenance, Wisconsin will follow the procedures for control selection and implementation outlined under the action level response below. The warning level study will be completed no later than the beginning of the following summer ozone control period (May 1).

#### Action Level Response

An action level response would be required if a three-year design value exceeds the level of the 2015 ozone NAAQS (0.070 ppm). This response would follow a study to determine whether additional control measures are needed to assure attainment and maintenance of the 2015 ozone NAAQS. This analysis will examine the following factors for the contributing area:

- The level, distribution, and severity of ambient ozone concentrations;
- The weather patterns contributing to ozone levels;
- Potential contributing emission sources;
- The geographic applicability of possible contingency measures;
- Upwind emission trends, including the impact of existing or forthcoming control measures that have not yet been implemented; and
- Air quality contributions from outside the maintenance area.

The selection of emission reduction measures to be implemented will be based upon their potential to reduce ozone concentrations at violating monitors in the nonattainment area, cost-effectiveness, emission reduction potential, economic and social considerations, ease and timing of implementation, and other appropriate factors. When considering these criteria, priority will be given to measures that can be in place within 18 months.

Potential additional control measures to be implemented in upwind areas are listed below. Because it is not possible to determine what control measures, if any, will be appropriate at an unspecified time in the future, this list is neither comprehensive nor in order of priority.

- Anti-idling control program for mobile sources, targeting diesel vehicles
- Diesel exhaust retrofits
- Traffic flow improvements
- Park and ride facilities
- Rideshare/carpool program
- Expansion of the vehicle emissions testing program

Wisconsin has an extremely limited ability to affect ozone concentrations in the Manitowoc County 2015 ozone NAAQS area due to the influence of emissions originating in upwind states. High ozone events at the Manitowoc monitor occur almost exclusively when these sites are downwind of Chicago and other source areas to the south. Out-of-state sources of ozone overwhelm local sources at the Manitowoc monitor (Figure 4.1). As a consequence, additional controls on NO<sub>x</sub> and VOC emissions from Wisconsin are likely to have very little, if any, impact

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on ozone concentrations in this area. When identifying additional controls for implementation, the state will have to consider the potential of those controls to reduce ozone concentrations at violating monitors in the maintenance area. Federal regulatory programs may be more appropriate to limit the transport of ozone and its precursors to the Manitowoc County 2015 ozone NAAQS area from upwind states. Examples of such programs include:

- Implementation of any federally promulgated rule regulating transport of ozone precursors.
- Updated federal NO<sub>x</sub> emission limits for heavy-duty vehicles.
- Updated (Phase 2) federal fuel efficiency standards for medium- and heavy-duty engines and vehicles.
- New federal regulations on the sale of aftermarket catalysts for vehicle catalytic converters.

Should it be determined through the action level study that existing and on-the-way measures are inadequate to return the area to attainment, WDNR will identify and implement candidate control measures as necessary to assure attainment and maintenance of the area within 18 months of certification of the monitoring data that prompted the action level response. Given the impact of upwind emissions on ozone formation along Wisconsin's Lake Michigan shoreline, WDNR notes that the action level study findings may indicate that additional Wisconsin control measures would do little to help the Manitowoc County area return to and maintain attainment.

Adoption of any additional control measures would be subject to the necessary Wisconsin administrative, legal, and legislative processes. The WDNR would solicit input from interested and affected parties in the area prior to selecting appropriate control measures. This process would include publication of notices, an opportunity for a public hearing, and other measures required by Wisconsin law.

#### **7.4. Commitment to Revise Maintenance Plan**

As required by Section 175A(b) of the CAA, WDNR commits to submit to EPA, eight years after redesignation, an additional revision of the SIP. The revision will contain Wisconsin's plan for maintaining the 2015 ozone NAAQS in this area for an additional ten years beyond the first ten-year maintenance period following redesignation.

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## **8. PUBLIC PARTICIPATION**

In accordance with section 110(a)(2) of the CAA, the WDNR published a notice on the internet on August 30, 2021 stating that it would hold a public hearing on the Redesignation Request and Maintenance Plan for the Manitowoc County, Wisconsin 2015 8-hour Ozone Nonattainment Area at 2 pm on October 5, 2021. A notice of availability was also posted on the website. The redesignation request will be available for public comment through October 6, 2021. The WDNR will respond to any public comments received in the version of this document submitted to EPA.

## **9. CONCLUSIONS**

Air quality measured at the Manitowoc monitor in the Manitowoc County nonattainment area in Wisconsin has attained the 2015 ozone NAAQS. As described within this document, applicable provisions of the CAA regarding redesignation to attainment have been met. Therefore, WDNR, on behalf of the State of Wisconsin, requests that EPA redesignate the partial Manitowoc County area from nonattainment to attainment for the 2015 ozone NAAQS and approve the associated maintenance plan for the area.

## **APPENDIX 1**

### **Wisconsin's Infrastructure State Implementation Plan (SIP) for the 2015 Ozone National Ambient Air Quality Standard (NAAQS)**

## **Wisconsin’s Infrastructure State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standard (NAAQS)**

### **Introduction**

The Wisconsin Department of Natural Resources (DNR) is submitting this SIP revision to confirm that the State of Wisconsin has the authority necessary to evaluate ambient air quality, develop plans to attain and maintain new and existing air quality standards, meet the requirements of the New Source Review (NSR) program, and effectively enforce all applicable requirements. Specifically, the current Wisconsin State Implementation Plan (SIP) contains the resources and authority to implement and satisfactorily complete the requirements set forth in Section 110 of the federal Clean Air Act (CAA), commonly referred to as the “infrastructure SIP,” for the 2015 Ozone National Ambient Air Quality Standard (NAAQS).

The SIP elements addressed in this document are required under CAA Sections 110(a)(1) and (2) and in accordance with the U.S. Environmental Protection Agency’s (EPA’s) guidance on infrastructure SIP elements<sup>1</sup>. Section 110(a)(1) provides the procedural and timing requirements for SIPs. Section 110(a)(2) specifies the basic elements and sub-elements that all SIPs must contain. An opportunity for public comment and hearing will be provided for this certification of SIP authority, in accordance with 40 CFR part 51, appendix V, paragraph 2.1(g), and 40 CFR 51.102.

### **Required SIP Elements under CAA Section 110(a)(2)**

The sections below include descriptions of the required SIP elements excerpted from the EPA guidance on infrastructure SIPs.<sup>1</sup> The italicized text is from the CAA. The DNR response follows each requirement.

#### **1. Element A – Section 110(a)(2)(A): Emission limits and other control measures**

*Each such plan shall [...] include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter.*

The DNR has authority under Chapters 227 and 285, *Wis. Stats.* to create new rules and implement existing emission limits and controls to meet the requirements of Section 110(a)(2)(A). The authority for DNR to develop rules and regulations is found in ss.

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<sup>1</sup> Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2), memo from Stephen D. Page to Regional Air Directors, Regions 1-10, September 13, 2013.

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227.11(2)(a), 285.11(1), 285.17(1)(a) and 285.21(1)(a), *Wis. Stats.* Section 227.11(2)(a), *Wis. Stats.*, expressly confers rule making authority to an agency. Section 285.11(1) and (6), *Wis. Stats.*, requires that DNR promulgate rules and establish control strategies in order to prepare and implement the SIP for the prevention, abatement and control of air pollution in the state. Section 285.17(1)(a), *Wis. Stats.*, requires DNR to classify sources or categories of sources that may cause or contribute to air pollution. Section 285.21(1)(a), *Wis. Stats.*, requires that DNR promulgate by rule ambient air quality standards that are similar to, but no more restrictive than, the federal NAAQS.

The following current Wisconsin administrative code contains existing emission limits and control requirements that apply to ozone:

- Chapters NR 419 through NR 425, *Wis. Adm. Code*, control VOC as an ozone precursor.
- Chapter NR 428, *Wis. Adm. Code*, controls nitrogen oxides (NO<sub>x</sub>) as an ozone precursor.

**2. Element B – Section 110(a)(2)(B): Ambient air quality monitoring/data system**

*Each such plan shall [...] provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to*

- (i) monitor, compile, and analyze data on ambient air quality, and*
- (ii) upon request, make such data available to the Administrator.*

The DNR operates a fully-approved air monitoring network in accordance with EPA's ambient air quality monitoring network requirements (40 CFR part 53 and 40 CFR part 58). After the monitoring data has been certified, it is used to determine compliance with the NAAQS. All monitored data is submitted to the EPA's Air Quality System in a timely manner in accordance with 40 CFR part 58. Authority for air monitoring efforts exists under general air pollution duties in s. 285.11, *Wis. Stats.* Funding for Wisconsin's air monitoring network comes from a variety of sources, including from EPA under its Section 103 and 105 grant programs supporting federal monitoring requirements specified in 40 CFR 58.10.

Wisconsin's most recently adopted annual network plan for 2018 was approved by EPA on September 1, 2017. The DNR continues to provide EPA Region 5 notice of any proposals to remove or move monitoring stations in its network plan, pursuant to 40 CFR part 58.10. In addition, DNR actively participates in the development of five-year regional network assessments for EPA Region 5 states; the most recent assessment was completed in 2015.



**3. Element C – Section 110(a)(2)(C): Programs for enforcement of control measures and for construction or modification of stationary sources**

*Each such plan shall [...] include a program to provide for the enforcement of the measures described in subparagraph (A), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program as required in parts C and D of this subchapter.*

The DNR Air Management and Environmental Enforcement programs work together to ensure compliance with Wisconsin SIP provisions, administrative code, and permit requirements. Authority to enforce violations and to assess penalties is contained in ss. 285.83 and 285.87, *Wis. Stats.* The DNR follows a stepped enforcement process to address violations. The enforcement response ranges from issuance of a Letter of Inquiry (the state counterpart to an EPA “114 request”) when additional information is needed to determine compliance or confirm the significance of a violation, up through referral to the Wisconsin Department of Justice for civil or criminal enforcement, as appropriate.

The Environmental Performance Partnership Agreement (EnPPA) between the Wisconsin Air Management Program and EPA Region 5 addresses implementation of the EPA’s High Priority Violation (HPV) and Federally Regulated Violations (FRV) policies. The process for prosecution of violations is also addressed in a May 22, 2015 Air Management Program Compliance and Enforcement Memorandum of Understanding (MOU) between EPA Region 5 and the DNR Air Management Program. Consistent with the provisions of this MOU, the two agencies conduct monthly compliance and enforcement conference calls to discuss program issues and specific cases.

The DNR regulates modification and construction of stationary sources through its EPA approved nonattainment NSR, Prevention of Significant Deterioration (PSD), and Title V permit programs under s. 285.11, s. 285.13, s. 285.17, s. 285.19, and ss. 285.60 through 285.69, *Wis. Stats.* The DNR collects revenue dedicated to the implementation of these permit programs through applicable fees under s. 285.69, *Wis. Stats.*

On February 7, 2017, EPA approved revisions to Wisconsin’s SIP that meet EPA’s requirements for Wisconsin’s PSD and NSR program (82 FR 9515). In this action, EPA fully approved the PSD-related infrastructure requirements for previous Wisconsin submittals. In addition, EPA’s approval confirmed that Wisconsin’s PSD program continues to require that PSD permits (that would otherwise be required based on emissions of pollutants other than greenhouse gases (GHGs)) contain limitations on GHG emissions based on the application of Best Available Control Technology, consistent with the June 23, 2014 U.S. Supreme Court decision in *Utility Air Regulatory Group v. Environmental Protection Agency*, 134 S.Ct. 2427. Wisconsin 2015 Act 33 modified language related to GHGs in ch. NR 405, *Wis. Adm. Code* to reflect the 2014 Supreme Court decision. DNR submitted a request to EPA on November 29, 2017 to incorporate the revised administrative code provision into the state SIP.

**4. Elements D(i)(I) and (II) – Section 110(a)(2)(D)(i): Interstate pollution transport**

*Each such plan shall [...] contain adequate provisions:*

*(i) prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the state from emitting any air pollutant in amounts which will-*

*(I) contribute significantly to nonattainment in, or*

*(II) interfere with maintenance by, any other state with respect to any such national primary or secondary ambient air quality standard, or interfere with measures required to be included in the applicable implementation plan for any other state under part C of this subchapter to prevent significant deterioration of air quality to protect visibility.”*

The DNR has adopted and implemented all federal programs required to date in addressing transport of NO<sub>x</sub> and sulfur dioxide (SO<sub>2</sub>) impacting ozone, fine particulate matter (PM<sub>2.5</sub>) and visibility in other states. These programs include the Clean Air Interstate Rule (CAIR), Cross State Air Pollution Rule (CSAPR), CSAPR Update Rule, and all regional haze rule requirements applicable for the 2008-2018 planning period.

In fulfilling CAIR program requirements, Wisconsin adopted ch. NR 432, *Wis. Adm. Code*, in 2007 for the annual distribution of NO<sub>x</sub> allowances. The SO<sub>2</sub> CAIR program is implemented through a federal implementation plan (FIP). EPA implemented CSAPR to replace CAIR requirements beginning January 1, 2015. CSAPR and the CSAPR Update are fully implemented through a FIP, and Wisconsin does not have to take any additional actions regarding this rule.

In August 2012, EPA approved Wisconsin’s regional haze SIP applicable for the 2008-2018 planning period. This haze SIP satisfied Reasonable Progress Goals required under Subpart P of 40 CFR Part 51 and Best Available Retrofit Technology required under Appendix Y of 40 CFR Part 51.

Wisconsin will continue to work in addressing the transport of pollutants which impede compliance with new and revised NAAQS and will continue regional haze work and planning for the 2018-2028 period and beyond. To do this, Wisconsin has entered into agreements and working relationships with the surrounding states of Illinois, Indiana, Michigan, Ohio and Minnesota through the Lake Michigan Air Directors Consortium (LADCO) to perform air quality assessments and develop control strategies for regional pollutants, such as NO<sub>x</sub> and SO<sub>2</sub> (PM<sub>2.5</sub> precursors). Together, continued implementation of federal regulations and cooperative work with other states will address Wisconsin’s transport and regional haze obligations.

If needed, section 285.11, 285.13 and 285.15, *Wis. Stats.*, address circumstances where interstate transport reduction agreements between states are needed to resolve SIP

development of cross-boundary nonattainment areas. As detailed in the section addressing Section 110(a)(2)(C), Wisconsin has adequate PSD regulations; these regulations satisfy the PSD-related elements of Section 110(a)(2)(D)(i), as well as those of Section 110(a)(2)(C).

**5. Element D(ii) – Section 110(a)(2)(D)(ii): Interstate pollution abatement and international air pollution**

*Each such plan shall [...] contain adequate provisions [...] ensuring compliance with the applicable requirements of sections 126 and 115 (relating to interstate and international pollution abatement).*

Wisconsin's SIP contains adequate provisions to ensure compliance with Section 126 of the CAA relating to interstate pollution abatement. Neighboring states and tribes are notified regarding new or modified sources per 285.61(5), *Wis. Stats.* No source or sources within Wisconsin are the subject of an active finding under section 126 of the CAA with respect to any NAAQS. There are no final findings under section 115 of the CAA against Wisconsin with respect to ozone.

**6. Element E – Section 110(a)(2)(E): Adequate resources and authority, conflict of interest, and oversight of local governments and regional agencies**

*Each such plan shall [...] provide:*

*(i) necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under state (and, as appropriate, local) law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof),*

*(ii) requirements that the state comply with the requirements respecting state boards under section 128,*

*(iii) necessary assurances that, where the State has relied on a local or regional government agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision.*

Wisconsin's basic air management duties and authorities are described in s. 285.11, *Wis. Stats.* Funding and personnel for the DNR is provided through the state's biennial budget process. The DNR Air Management Program has several funding sources, including program revenue (fees paid by businesses), tax revenue, and grants (federal and state). There are separate accounts affiliated with the different funding sources to ensure the funding and related personnel are used for the intended purpose.

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The primary federal grant the DNR Air Management Program receives is the Section 105 Air Pollution Control Grant. This grant is monitored extensively by EPA; in addition, DNR and EPA negotiate priorities and grant commitments under the EnPPA, which is a two-year agreement itemizing performance measures and outcomes across various funding sources and grants.

Section 128 of the CAA requires that:

- a. Any board or body which approves permits or enforcement orders under this chapter shall have at least a majority of members who represent the public interest and do not derive any significant portion of their income from persons subject to permits and enforcement orders under this Act; and
- b. Any potential conflicts of interest by members of such board or body or the head of an executive agency with similar powers be adequately disclosed.

Existing Wisconsin state statutes address these CAA Section 128 requirements. Section 15.05, *Wis. Stats.*, vests the administrative powers and duties of DNR in the secretary, including issuance of air permits or enforcement orders. Wisconsin's Natural Resources Board (NRB) functions are purely regulatory, advisory, and policy-making. The NRB cannot approve enforcement orders or permits under the statutes that govern its operations. Section 19.45(2), *Wis. Stats.*, prevents financial gain of a public official and Section 19.46, *Wis. Stats.*, prevents a public official from taking actions where there is a conflict of interest. The Secretary of DNR is a public official subject to these ethical obligations under ch. 19, *Wis. Stats.*

On February 22, 2016, EPA finalized approval of DNR's SIP revision incorporating ss. 15.05, 19.45(2) and 19.46, *Wis. Stats.* into the Wisconsin SIP to meet Section 128 requirements for state boards.

**7. Element F – Section 110(a)(2)(F): Stationary source monitoring and reporting**

*Each such plan shall [...] require, as may be prescribed by the Administrator:*

*(i) the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources,*

*(ii) periodic reports on the nature and amounts of emissions and emissions-related data from such sources, and*

*(iii) correlation of such reports by the state agency with any emission limitations or standards established pursuant to this chapter, which reports shall be available at reasonable times for public inspection."*

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The DNR requires regulated sources to monitor, keep records, and submit reports dependent on applicable requirements and the type of permit issued. Frequency and requirements for review are incorporated as part of chs. NR 438 and 439, *Wis. Adm. Code*. Emission reports are submitted to meet requirements of Wisconsin's emission statement SIP. Wisconsin has a web-based monitoring, reporting, permits and compliance database called the Wisconsin Air Resources Program to help ensure efficient operation of these functions. Authority for these activities is provided in s. 285.65, *Wis. Stats*. Public inspection of reports is available under Wisconsin's open records law contained in s. 19.35, *Wis. Stats*.

**8. Element G – Section 110(a)(2)(G): Emergency powers**

*Each such plan shall provide for authority comparable to that in section 303 of this Title and adequate contingency plans to implement such authority.*

Wisconsin Statute s. 285.85 requires DNR to act upon a finding that episode or emergency conditions exist. This language authorizes DNR to seek immediate injunctive relief in circumstances of substantial danger to the environment or to public health. Air pollution episode levels and episode emission control action programs are codified in ch. NR 493, *Wis. Adm. Code*.

**9. Element H – Section 110(a)(2)(H): SIP revisions**

*Each such plan shall [...] provide for revisions of such plan –*

*(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or expeditious methods of attaining such standard, and*

*(ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this chapter (CAA).*

Wisconsin Statute s. 285.11(6) provides DNR the authority to develop a plan for the prevention, abatement and control of air pollution that includes all rules, limits, and regulations necessary to meet NAAQS, which includes responding to any deficiencies that may be identified in these plans, rules, or control strategies.

**10. Element I – Section 110(a)(2)(I): Plan revisions for nonattainment areas**

*Each such plan shall –*

*(I) in the case of a plan or plan revision for an area designated as a nonattainment area, meet the applicable requirements of part D of this subchapter (relating to nonattainment areas).*

According to EPA’s interpretation of the CAA, this element is subject to a different submission schedule and will be reviewed and acted upon through a separate process. Therefore, the DNR is not addressing this element in this submission.

**11. Element J – Section 110(a)(2)(J): Consultation with government officials, public notification, and PSD and visibility protection**

*Each such plan shall [...] meet the applicable requirements of section 121 of this Title (relating to consultation), section 127 of this Title (relating to public notification), and part C of this subchapter (relating to prevention of significant deterioration of air quality and visibility protection).*

The DNR is given the authority in s. 285.13(5), *Wis. Stats.*, to "advise, consult, contract and cooperate with other agencies of the state, local governments, industries, other states, interstate or inter-local agencies, and the federal government, and with interested persons or groups" during the entire SIP revision process and for other elements related to air management for which DNR is the officially-charged agency.

DNR follows an administrative rulemaking process for public input, adoption by the Wisconsin NRB, and legislative review on rule-based SIP revisions for air quality control programs or measures. Non-rule SIP revisions also allow for public review and input under the authority of s. 285.13(1), *Wis. Stats.*, and as required by 40 CFR 51.102. In addition, for any SIP revision not related to a single source, DNR is required under 285.14(2), *Wis. Stats.*, to provide the proposed revision to the standing committees of the Wisconsin State Legislature with jurisdiction over environmental matters for their review at least 60 days prior to submittal to EPA and to respond within 15 days to any written comments received from the chairpersons of the committees.

These processes ensure that potentially impacted public entities are identified and have an opportunity to provide input in the SIP development process. In addition, the DNR Air Management Program routinely engages stakeholders (through formal bodies such as the Air Management Study Group, or otherwise) when developing SIP revisions.

As provided for under s. 285.11, *Wis. Stats.*, public notice (such as an air quality advisory) is provided at specified monitoring levels associated with the Air Quality Index as air quality conditions warrant. Public notification is provided through the department’s website and through a contracted e-mail subscription service known as “GovDelivery.”

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Wisconsin also actively participates in development of regional air quality forecasts and EPA's AirNow air quality data outreach program.

The DNR's satisfaction of the PSD and visibility requirements of this section have been previously addressed in the section addressing 110(a)(2)(C) and 110(a)(2)(D) requirements. Insofar as those provisions satisfy the applicable requirements of those sections, DNR intends the same provisions to satisfy the applicable requirements of Section 110(a)(2)(J).

**12. Element K – Section 110 (a)(2)(K): Air quality modeling and submission of modeling data**

*“Each such plan shall [...] provide for-*

*(i) the performance of such air quality modeling as the administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any pollutant for which the Administrator has established a national ambient air quality standard, and*

*(ii) the submission upon request, of data related to such air quality modeling to the Administrator.”*

The DNR has the authority and capacity to perform air quality modeling to predict the effect of emissions of pollutants covered by the NAAQS and/or their precursors. The DNR works with LADCO and EPA to perform regional modeling of ozone from consistent emissions inventory and meteorology platforms. This regional modeling supports SIP development for Wisconsin, quantifies interstate pollutant transport contributions, and supports visibility impact assessments. The DNR requires source-specific modeling or modeling-based assessments for permitting for the construction of major sources and some minor sources. The DNR also conducts source-specific modeling for some major and minor operation permits. These authorities reside under ss. 285.11, 285.13 and 285.60-285.69, *Wis. Stats.*

**13. Element L – Section 110(a)(2)(L): Permitting fees**

*Each such plan shall require the owner or operator of each major stationary source to pay to the permitting authority, as a condition of any permit required under this chapter, a fee sufficient to cover –*

*(i) the reasonable costs of reviewing and acting upon any application for such a permit, and*

*(ii) if the owner or operator receives a permit for such source, the reasonable costs of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action), until such fee*

*requirement is superseded with respect to such sources by the Administrator's approval of a fee program under subchapter Title V of this chapter.*

Major stationary sources receive permits under Wisconsin's Title V and NSR programs. The Title V program is funded by emission fees paid by sources and the level of funding is included in the state's biennial budget process. The NSR program is funded by application and review fees that vary based on the type and complexity of the permit. The NSR program fees were revised and effective on January 1, 2011. The annual emission fees for Title V sources were revised and effective on January 1, 2014. Authority for these activities is established under s. 285.69, *Wis. Stats.*

**14. Element M – Section 110(a)(2)(M): Consultation and participation by affected local entities**

*Each such plan shall [...] provide for consultation and participation by local political subdivisions affected by the plan.*

Consultative authorities and responsibilities are noted in response to Section 110(a)(2)(J) requirements above regarding intergovernmental consultation. The formal public processes used to develop and adopt both rule and non-rule SIP revisions allow for consultation and participation by the public, including local government entities and political subdivisions.



## **APPENDIX 2**

### **2017 and 2019 Emission Inventories Documentation**

## ABBREVIATIONS

AEI	Air Emissions Inventory
AADT	Average Annual Daily Traffic
CAMD	Clean Air Markets Division
DOE	Department of Energy
EGU	Electric Generating Unit
EIA	Energy Information Administration
EIs	Emission Inventories
EPA	Environmental Protection Agency
FID	Facility Identification Number
FIRE	Factor Information Retrieval
ICI	Industrial, Commercial and Institutional
LADCO	Lake Michigan Air Directors Consortium
MAR	Commercial Marine Aircraft and Rail Locomotive
MCD	Minor Civil Division
MOVES	MOtor Vehicle Emission Simulator
NAICS	North American Industrial Classification System
NEC	Not Elsewhere Classified
NO <sub>x</sub>	Nitrogen Oxides
ORVR	On-Board Refueling Vapor Recovery
oswd	Ozone Season Weekday
osd	Ozone Season Day
SCC	Source Classification Code
SEDS	State Energy Data System
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SIP	State Implementation Plan
tposd	Tons per Ozone Season Day
TSD	Technical Support Document
VHT	Vehicle-Hours of Travel
VMT	Vehicle-Miles of Travel
VOC	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation

## **1. Introduction**

This appendix provides additional information for the sector-specific nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) tons per ozone season day (tposd) emission estimates in section 4.2 of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area. This is accomplished in part by developing and comparing nonattainment year (2017) and attainment year (2019) emissions inventories.

## **2. Emissions Calculation Methodologies**

### **2.1. Point Sources**

Point sources are industrial, commercial or institutional stationary facilities which are normally located in permanent sites, and which emit specific air pollutants in great enough quantities to warrant individual quantification. To better enable detailed control evaluations, the point source emission inventories (EIs) include all reporting sources at that facility regardless of the magnitude of reported emissions. For this attainment demonstration, portable point sources, such as asphalt plants and rock crushers, were reported under nonpoint sources to be consistent with other states. The 2017 and 2019 point source emission inventories were created using annually reported point source emissions, the EPA's Clean Air Markets Division (CAMD) database and approved EPA techniques for emissions calculation (e.g., emission factors).

Whenever feasible, federal, state and local controls were factored into the emission calculations. Emissions were estimated by collecting process-level information from each facility that qualifies for inclusion into the state's point source database. In Wisconsin, this information is normally collected from facilities using web-based software and subsequently loaded into the point source database. Process, boiler, fugitive, and tank emissions are typically calculated using throughput information multiplied by an emission factor for that process. Emission factor sources included mass balance, stack testing, continuous emissions monitors, engineering judgment and EPA's WebFIRE database.<sup>1</sup> Missing data elements such as Source Classification Codes (SCC), North American Industrial Classification System (NAICS) codes and seasonal throughput percentages were added into the state's point source database. Process level confidential data were removed while retaining any associated emissions.

There are two electric generating unit (EGU) point source facilities located in the Manitowoc County 2015 ozone NAAQS nonattainment area: Nextera Energy Point Beach, LLC and Manitowoc Public Utilities. Appendix 4 provides the detailed methodology used to calculate EGU ozone season day emissions.

The 2017 and 2019 emissions inventories for non-EGU point sources were tabulated using the emissions data reported annually by each facility operator to the DNR air emissions inventory

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<sup>1</sup> WebFIRE is EPA's online emissions factor repository, retrieval, and development tool, found online at: <https://www.epa.gov/electronic-reporting-air-emissions/webfire>.

(AEI). The AEI calculates emissions for each individual emissions unit or process line by multiplying fuel or process throughput by the appropriate emission factor that is derived from mass balance analysis, stack testing, continuous emissions monitoring, engineering analysis, or EPA's WebFIRE database. Appendix 5 provides a list of non-EGU point source emissions by facility identification number (FID) and facility name for both 2017 and 2019.

The following procedure was used to determine an average day's emissions for a typical ozone season work weekday for non-EGU point sources. The WDNR obtained the quarterly operation schedule and the normal operating days per week information for each facility as collected by the WDNR AEI. The WDNR used emissions from the third quarter of the calendar year (i.e., July 1 to September 30) to represent the typical ozone season day emissions for these sources. The equation below was then used to calculate the emissions from typical ozone season days for each emission unit and process line. The emissions from each unit/process line at a facility were then summed to arrive at the total tons per ozone season day emissions for that facility.

$$EM = (Annual \times Third \text{ Quarter Percentage}) / (DPW \times N_{weeks})$$

Where:

EM = Typical ozone season day emissions in tons per day

Annual = Annual emissions of VOC or NO<sub>x</sub> in tons

Third Quarter Percentage = the percentage of time that the unit is in operation for the third quarter of the calendar year, compared to the total time the unit is in operation for the entire calendar year, as reported to the WDNR

DPW = Days per week the facility operates, as reported to the WDNR

N<sub>weeks</sub> = Number of weeks (13) from July 1 to September 30

This equation inherently accounts for ozone season work weekday emissions being higher if a facility only operates during the work week (i.e., five days) instead of the entire week (i.e., seven days), consistent with EPA guidance. This method is also consistent with that used by WDNR in its 2017 baseline emissions inventory for 2015 ozone NAAQS nonattainment areas.

## 2.2. Nonpoint (Area) Sources

Nonpoint sources are stationary sources that are too small and/or too numerous to be tracked individually in the point source inventory, and the nonpoint inventory quantifies emissions collectively. These sources include commercial/institutional, industrial and residential sources such as gasoline stations, dry cleaners, consumer and commercial products, industrial solvent use, auto refinishing and wood combustion.

For the 2017 nonattainment year, nonpoint source emissions inventory estimates were based on the 2017 National Emissions Inventory (NEI), except for the Stage II refueling category, as described below. Emission calculation methodologies used in developing 2017 nonpoint emissions inventory are available in the EPA's 2017 NEI, Technical Support Document (TSD).<sup>2</sup>

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<sup>2</sup> [https://www.epa.gov/sites/production/files/2020-04/documents/nei2017\\_tsd\\_full\\_30apr2020.pdf](https://www.epa.gov/sites/production/files/2020-04/documents/nei2017_tsd_full_30apr2020.pdf).

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For the 2019 attainment year, nonpoint source emissions inventory estimates were based on interpolating between EPA's 2017 NEI and 2023 projections from the 2016 emissions modeling platform,<sup>3</sup> except for the category "Gasoline Service Stations, Stage II: Total Refueling," as described below.

The WDNR updated EPA nonpoint emissions estimates for stationary nonpoint sources for the following sectors: fuel combustion for the industrial, commercial and institutional (ICI) sectors; degreasing; dry-cleaning; graphic arts; and most of the solvent utilization for industrial surface coating categories except industrial maintenance, traffic markings and other special purpose categories. The WDNR adopted EPA nonpoint estimates for commercial cooking, solvent utilization for non-industrial surface coating, miscellaneous non-industrial consumer and commercial solvent utilization, residential and commercial portable fuel containers, bulk gasoline terminals and gas stations, waste disposal categories, and miscellaneous non-industrial not elsewhere classified (NEC) categories.

For the WDNR-updated nonpoint fuel combustion sectors, the EPA provided SCC cross-walk between nonpoint and their corresponding point source SCCs. These adjustments were made by subtracting the activity assigned for point sources from the total activity to estimate the adjusted nonpoint source activity. Energy consumption of these sectors for the State of Wisconsin is obtained from the U.S. Department of Energy (DOE)'s Energy Information Administration (EIA). This survey data is the source of activity data for ICI fuel combustion. EIA's State Energy Data System (SEDS) data, as reported in EIA's most recent State Energy Consumption Estimates report, was used to determine total consumption for most fuel oil and kerosene.<sup>4</sup>

To update emission estimates for most of the solvent utilization for industrial surface coating categories, business pattern data from the U.S. Census Bureau's employment and county were used.<sup>5</sup>

In order to obtain the area source emissions for the partial Manitowoc County 2015 ozone NAAQS nonattainment area, emission estimates from the entire county were allocated to the partial county based on population data. Manitowoc County's population for 2017 and 2019 was estimated by interpolating between 2015 and 2020 population data from the Wisconsin Department of Administration. The partial county population was identified based on the relative population of the Minor Civil Divisions (MCDs) in the partial Manitowoc County 2015 ozone NAAQS nonattainment area as compared to the entire county. Using this methodology, for both 2017 and 2019, 66% of the county's population was estimated to live in the partial Manitowoc County 2015 ozone NAAQS nonattainment area. Appendix 6 includes table of area source emissions by source category.

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<sup>3</sup> <https://www.epa.gov/air-emissions-modeling/2016v1-platform>.

<sup>4</sup> [https://www.eia.gov/state/seds/sep\\_use/notes/use\\_print.pdf](https://www.eia.gov/state/seds/sep_use/notes/use_print.pdf).

<sup>5</sup> <https://www.census.gov/programs-surveys/cbp/data.html>.

### Gasoline Service Stations, Stage II: Total Refueling

The WDNR estimated emissions from vehicle refueling at gasoline stations (Stage II refueling) using EPA's MOVES3.0.1 model using the same inputs used for onroad modeling.

Beginning in the 1990s, a Stage II vapor recovery program (vapor recovery nozzles at gas pumps) was in effect in nine Wisconsin counties, including Manitowoc County. This program was effective in reducing refueling emissions in older vehicles, but was redundant or even counter-productive in reducing emissions for newer vehicles, because the newer vehicles controlled refueling emissions through on-board refueling vapor recovery (ORVR) systems.<sup>6</sup> Wisconsin submitted a state implementation plan (SIP) revision removing Stage II requirements, which EPA approved in November 2013. By 2017, most gasoline stations in the nine Wisconsin counties had removed or decommissioned their Stage II vapor recovery systems. To reflect this, WDNR inputted zero emissions reductions from a Stage II program in its MOVES runs for years 2017 and 2019. Since the MOVES modeling for onroad emissions used ozone season weekday (oswd) travel activity, whereas the nonpoint emissions are based on the average of all seven days of the week (osd), the WDNR, using travel data developed by the WDOT, adjusted the MOVES oswd outputted emissions to osd emissions, based on the ratio of average day (weekdays and weekends) to weekday travel during the ozone season. The adjustment factors used are 0.9573 for 2017 and 0.9568 for 2019.

### **2.3. Onroad Mobile Sources**

Onroad mobile sources are motorized mobile equipment that are primarily used on public roadways. Examples of onroad mobile sources are cars, trucks, buses and road motorcycles. The emissions reported in this document were estimated by the MOfor Vehicle Emission Simulator (MOVES), the EPA's recommended mobile source model. The model was run in inventory mode. The version used was MOVES3.0.1, the most recent version of the model, released in March 2021. All estimates were made in accordance with the following EPA technical guidance:

- MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity (76 pp, November 2020, EPA-420-B-20-052).

The onroad mobile NO<sub>x</sub> and VOC emissions for the Manitowoc County 2015 ozone NAAQS nonattainment area for 2017 and 2019 (as well as the 2025 and 2033 projections) are presented in Appendix 8, separated by source type (vehicle class), fuel type and road type. Tables summarizing vehicle activity data are presented in Appendix 8 after the emissions tables.<sup>7</sup>

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<sup>6</sup> The federally-required phase in for ORVR systems started with model year 1998 and was required for all light-duty vehicles by model year 2006.

<sup>7</sup> The complete set of inputs to MOVES3.0.1 is too lengthy to include in this document. However, electronic copies of the input files can be obtained from upon request.

### 2.3.1. Transportation Data

The modeling inputs to MOVES include detailed transportation data (e.g., vehicle-miles of travel by vehicle class, road class and hour of day, and average speed distributions), requiring support from the state agency responsible for transportation data in Manitowoc County, the Wisconsin Department of Transportation. WDOT maintains transportation network inventory data for the state. WDOT has developed and validated travel simulation models to estimate and forecast vehicle miles of travel (VMT) and average speed distributions for the state, including detailed data for both all of Manitowoc County and the partial Manitowoc County 2015 ozone NAAQS nonattainment area.

WDOT provided to WDNR its most recent transportation modeling data for both the entire county and the nonattainment area on July 28 and 29, 2021. Data were provided for 2010 (base year) and 2045 (projection year). (Data for intermediate years can be obtained by linear interpolation.) For each of these years, the data include average weekday VMT, vehicle-hours of travel (VHT) and average speed. This data was further broken down into 14 five-mph speed bins within 13 roadway classes within two general vehicle classes. For these data “weekday” includes only the three middle weekdays (Tuesday, Wednesday and Thursday).

The 14 speed bins are: 0-5 mph, 5-10 mph, etc., continuing through 60-65 mph and 65+ mph.

The 13 roadway classes are:

- Interstate
- Freeway
- Ramp
- Expressway
- Urban Principal Arterial
- Urban Minor Arterial
- Urban Collector
- Urban Local
- Rural Principal Arterial
- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Rural Local

The two general vehicle classes are: Auto and Truck

Besides WDOT transportation modeling data, WDNR utilized the following additional WDOT transportation data in developing inputs to MOVES:

- WDOT official VMT estimates posted at the WDOT webpage.<sup>8</sup> In addition, WDOT provided spreadsheets to WDNR which expand these posted estimates by breaking down each of the official county VMT estimates into roadway classes.

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<sup>8</sup> <http://wisconsindot.gov/Pages/projects/data-plan/veh-miles/default.aspx>

- Statewide day-of-week and month-of-year VMT adjustment factors developed by WDOT and provided to WDNR by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) for the ten year period of 2008 through 2017.

## 2.3.2. Descriptions of MOVES Modeling Inputs

### 2.3.2.1. Vehicle-Miles of Travel (VMT)

A summary of the procedures WDNR used to obtain ozone season weekday VMT estimates for input to MOVES follows.

- **Factors to Convert Annual Average Daily VMT (AADT) to Ozone Season Weekday VMT:** As specified in the EPA technical guidance, the onroad inventories for ozone SIPs should be based on ozone season *weekday* VMT, where “weekday” includes all five of the weekdays. WDNR has defined “ozone season” for the mobile sector as the three months of June, July and August. Using the WDOT day-of-week and month-of-year statewide VMT adjustment factors, SEWRPC and WDNR developed adjustment factors to convert from the AADT (annual VMT divided by 365) to ozone season weekday VMT (see Table A2.1). For the year 2017, adjustment factors were developed from the WDOT data from that specific year. For the year 2019 (as well as for the 2025 and 2033 projections), adjustment factors were developed from the WDOT data averaged over the 10-year-period of 2008 to 2017.

**Table A2.1. Factors to Convert AADT to Ozone Season Weekday VMT.**

MOVES Roadway Type	Year 2017	Year 2019
Rural Restricted	1.143	1.153
Rural Unrestricted	1.150	1.149
Urban Restricted	1.147	1.155
Urban Unrestricted	1.158	1.154

- **Estimation of Ozone Season Weekday VMT in the Manitowoc County 2015 Ozone NAAQS Nonattainment Area:** WDOT’s travel demand model does not provide full VMT coverage. For example, local travel is under-represented. Thus, WDNR adjusted the WDOT-modeled VMT to match WDOT official posted AADT<sup>9</sup>. When doing this adjustment, WDNR also increased 2017 travel on local roadways to equal WDOT estimates of 2017 local travel provided to WDNR on November 29, 2018. (Local travel for 2019 was increased proportionately.) A summary of the WDOT-provided VMTs and the resulting WDNR-estimated ozone season weekday VMTs is shown in Table A2.2. WDOT has previously agreed with these WDNR adjustment methods.

<sup>9</sup> <http://wisconsin.gov/Pages/projects/data-plan/veh-miles/default.aspx>



**Table A2.2. VMTs for Manitowoc County and the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.**

Year	Year 2017 and 2019 Vehicle-Miles of Travel (VMT)					
	Full Manitowoc County			Manitowoc Co. 2015 Ozone NAAQS Nonattainment Area		
	WDOT-Modeled (Tu-Th)	WDOT-Modeled (Tu-Th) with Additional Local	WDOT Official Posted AADT (Su-Sa)	WDOT-Modeled (Tu-Th)	WDOT-Modeled (Tu-Th) with Additional Local	WDNR-Estimated Ozone Season Weekday (Mo-Fr)
2017	1,939,828	2,140,602	2,380,216	1,249,276	1,378,418	1,764,670
2019	1,964,939	2,167,686	2,417,285 <sup>10</sup>	1,264,664	1,395,153	1,792,931

- 2017 Ozone Season Weekday VMT:** The WDOT-modeled VMT for an average weekday (Tuesday – Thursday) for the year 2017 is 1,249,276 for the Manitowoc County 2015 ozone NAAQS nonattainment area (interpolated between 2010 and 2045). This VMT increases to 1,378,418 when additional local travel is added. After adjusting to official WDOT annual average day VMT estimates ( $2,380,216/2,140,602 = \text{about } +11.19\%$ ) and then to ozone season weekday (about  $+15.13\%$ ), this value becomes  $1,378,418 * \sim 1.1119 * \sim 1.1513 = 1,764,670$ .
- 2019 Ozone Season Weekday VMT:** The WDOT-modeled VMT for an average weekday (Tuesday – Thursday) for the year 2019 is 1,264,664 for the Manitowoc County 2015 ozone NAAQS nonattainment area (interpolated between 2010 and 2045). This VMT increases to 1,395,153 when additional local travel is added. After adjusting to official WDOT annual average day VMT estimates ( $2,417,285/2,167,686 = \text{about } +11.51\%$ ) and then to ozone season weekday (about  $+15.24\%$ ), this value becomes  $1,395,153 * \sim 1.1151 * \sim 1.1524 = 1,792,931$ .
- Allocation of VMT to the 13 Vehicle Classes in MOVES:** WDOT provided VMT data for two general vehicle classes (Auto and Truck<sup>11</sup>). The MOVES model calculates emissions for 13 vehicle classes as shown in Table A2.3. WDNR used the MOVES3.0.1 default vehicle class distributions to further break down the VMT into the 13 MOVES classes. Table A2.3 shows the final VMT by vehicle class values WDNR used in MOVES3.0.1.

<sup>10</sup> Since WDOT did not conduct traffic counts in Manitowoc County in 2019, but did in 2017, the 2019 VMT in Manitowoc County was estimated by increasing the WDOT-estimated 2017 VMT in Manitowoc County by the WDOT-estimated statewide growth in VMT from 2017 to 2019.

<sup>11</sup> This truck class includes buses, but not passenger trucks or light commercial trucks.

**Table A2.3. Ozone Season Weekday VMT Inputted into MOVES3.0.1.**

MOVES Vehicle Class	Year	
	2017	2019
Motorcycles	16,197	16,437
Passenger Cars	638,148	650,960
Passenger Trucks	829,161	839,949
Light Commercial Trucks	96,471	96,725
Other Buses	5,125	5,262
Transit Buses	1,751	1,759
School Buses	2,558	2,611
Refuse Trucks	535	542
Single Unit Short-haul Trucks	55,455	56,404
Single Unit Long-haul Trucks	3,674	3,755
Motor Homes	2,137	2,151
Combination Short-haul Trucks	18,392	19,409
Combination Long-haul Trucks	95,065	96,969
<b>TOTAL</b>	<b>1,764,670</b>	<b>1,792,931</b>

The total ozone season weekday VMT in 2019 is 1.6% greater than the total ozone season weekday VMT in 2017.

#### **2.3.2.2. VMT by Hour of Day**

WDNR used the MOVES3.0.1 default hourly VMT distributions for Manitowoc County for the years 2017 and 2019 (as well as for the 2025 and 2033 projections).

#### **2.3.2.3. Vehicle Population**

WDNR estimated vehicle populations for each vehicle class by dividing ozone season weekday VMT by the MOVES3.0.1 default for average daily travel per vehicle. Table A2.4 shows the final vehicle population values WDNR inputted into MOVES3.0.1.

**Table A2.4. Vehicle Populations Inputted into MOVES3.0.1.**

MOVES Vehicle Class	Year	
	2017	2019
Motorcycles	1,588	1,592
Passenger Cars	19,100	19,150
Passenger Trucks	22,893	22,745
Light Commercial Trucks	2,516	2,499
Other Buses	60	59
Transit Buses	19	19
School Buses	85	84
Refuse Trucks	10	10
Single Unit Short-haul Trucks	1,420	1,416
Single Unit Long-haul Trucks	63	62
Motor Homes	145	145
Combination Short-haul Trucks	191	186
Combination Long-haul Trucks	387	376
<b>TOTAL</b>	<b>48,477</b>	<b>48,344</b>

The total vehicle population in 2019 is 0.3% less than the total vehicle population in 2017. The reason for this small decrease in population despite a 1.6% increase in VMT is that the MOVES3.0.1 defaults assume that per-vehicle travel is more in 2019 than in 2017.

#### **2.3.2.4. Vehicle Age Distribution**

**Year 2017:** Using data from WDOT’s registration database as of January 2018, WDNR calculated vehicle age distributions for the year 2017 for all vehicle classes except the two long-haul truck classes (MOVES classes 53 and 62, for which the MOVES3.0.1 default distributions were used). WDNR calculated two 2017 distributions: one for the seven-county vehicle inspection and maintenance program region (Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties) and the other for the remaining 65 Wisconsin counties. WDNR used the 65-county distribution for modeling the Manitowoc County 2015 ozone NAAQS nonattainment area.

**Year 2019:** WDNR projected the 2017 vehicle age distribution to 2019 using the methodology presented in the memorandum: “New Method to Project Age Distribution”, from Allison DenBleyker, ERG, to Alison Eyth, EPA, dated August 14, 2019. This new method does not attempt to predict any future growth, and only shifts the economic recession “dip” for model years 2009 to 2011 downstream while dampening the recession’s effect with increasing calendar year. No other features of the age distribution change, except for minor shifts due to re-normalizing the distribution. EPA used this same methodology to project age distributions to the years 2020, 2023 and 2028 for their 2016 Emissions Modeling Platform.

Table A2.5 presents the resulting average vehicle ages for 2017 and 2019.

**Table A2.5. Average Vehicle Ages (years old).**

MOVES Vehicle Class	Year	
	2017	2019
11 - Motorcycle	14.68	14.63
21 - Passenger Car	10.43	10.36
31 - Passenger Truck	8.25	8.18
32 - Light Commercial Truck	11.50	11.45
41 - Other Bus	12.40	12.40
42 - Transit Bus	11.87	11.87
43 - School Bus	9.43	9.43
51 - Refuse Truck	10.89	10.87
52 - Single Unit Short-haul Truck	13.47	13.35
53 - Single Unit Long-haul Truck	11.60	11.38
54 - Motor Home	17.79	17.78
61 - Combination Short-haul Truck	15.19	15.13
62 - Combination Long-haul Truck	10.18	10.03

The average ages in 2019 tend to be slightly less than those in 2017. The reason for this is that the effect of the “recession dip” for model years 2009 to 2011 on lowering the average age diminishes over time.

#### **2.3.2.5. Road Type Distribution**

MOVES requires that VMT for each of the 13 source types be allocated to the following four roadway classes:

- Rural – Restricted Access
- Rural – Unrestricted Access
- Urban – Restricted Access
- Urban – Unrestricted Access

WDNR calculated road type distributions for the Manitowoc County nonattainment area from the transportation modeling data provided by WDOT (described in section 2.3.1).

A detailed breakdown of VMT by roadway class by MOVES source type is provided in Appendix 8. The proportion of heavy-duty truck travel is significantly higher on restricted access roadways than on unrestricted access roadways.

#### **2.3.2.6. Average Speed Distribution**

For each of the four MOVES roadway classes, WDNR adjusted the 14-bin speed distribution obtained from WDOT to the 16-bin speed distribution required by the MOVES model.<sup>12</sup> This

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<sup>12</sup> These 16 bins are: 0-2.5 mph, 2.5-7.5 mph, 7.5-12.5 mph, etc., continuing through 67.5-72.5 mph and 72.5+ mph. In comparison to the WDOT 14 bins, the MOVES bins include both slower and faster average speeds and are offset from the WDOT bins by 2.5 mph.

adjustment was based on the average speeds within the WDOT bins.<sup>13</sup> The resulting distributions of VHT by average trip speed are provided in Appendix 8.

#### **2.3.2.7. Fuel Formulation and Supply**

The MOVES3.0.1 defaults currently provide the best available fuel data and therefore were used.

#### **2.3.2.8. Vehicle Inspection and Maintenance Program**

Manitowoc County is outside of the seven-county southeastern Wisconsin vehicle inspection program region. Thus, no inspection and maintenance program was modelled.

#### **2.3.2.9. Meteorology Data**

Temperatures conducive to peak ozone formation were assumed for the ozone season weekday modeling. To ensure consistent emission estimates over time, WDNR has consistently used the same minimum and maximum temperatures for onroad modeling for ozone SIPs since the early 1990s. The temperatures were developed from an analysis of peak ozone days and have minimum/maximum values of 65/93 degrees Fahrenheit for Manitowoc County.

### **2.4. Nonroad Mobile Sources**

Nonroad mobile sources are motorized mobile equipment and other small and large engines that are primarily used off public roadways. Examples of nonroad mobile sources include commercial marine, construction, lawn and garden, locomotive and agricultural equipment.

For purposes of inventory calculation, nonroad mobile sources are divided into two major groups:

- Commercial Marine, Aircraft and Rail Locomotive (MAR)
- All other nonroad categories

Nonroad categories other than MAR include:

- Recreational vehicles
- Construction equipment
- Industrial equipment
- Lawn and garden equipment
- Agricultural equipment
- Commercial equipment
- Logging equipment
- Underground mining equipment

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<sup>13</sup> For example, if the WDOT 30-35 mph bin has 1000 VHT at an average speed of 34 mph and the WDOT 35-40 mph bin has 1500 VHT at an average speed of 38 mph, then the VHT for the MOVES bin of 32.5-37.5 mph would equal:  $1000 \text{ VHT} * (34 \text{ mph} - 30 \text{ mph}) / (35 \text{ mph} - 30 \text{ mph}) + 1500 \text{ VHT} * (40 \text{ mph} - 38 \text{ mph}) / (40 \text{ mph} - 35 \text{ mph}) = 800 \text{ VHT} + 600 \text{ VHT} = 1400 \text{ VHT}$ .

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- Oil field equipment
- Pleasure craft
- Railway maintenance equipment

A detailed listing of the nonroad emissions for each of the over 200 nonroad source subcategories, which include both the MAR and non-MAR groups, is presented in Appendix 7.

#### **2.4.1. Non-MAR Sources**

The 2017 and 2019 nonroad emissions for the non-MAR categories were developed using the nonroad component of EPA's MOVES3.0.1 model.

The only change WDNR made to the MOVES3.0.1 nonroad defaults was an updated monthly distribution of agricultural activity, developed by the Lake Michigan Air Directors Consortium (LADCO) for Wisconsin and other Midwestern states. EPA also used these updated distributions for each Midwestern state for the 2016 emission modeling platform, version 1, and the 2017 NEI.

The model was run for Manitowoc County for the months of June, July and August, using the same hot ozone season day temperatures used for the onroad modeling. The countywide hot ozone season day emissions were then calculated by dividing the total emissions over these three months by 92 (the number of days in the three months).

WDNR then allocated the countywide hot ozone season day emissions to the Manitowoc County 2015 ozone NAAQS nonattainment area based on surrogates such as population, land area and water area, depending on the category, as described below in section 2.4.4

#### **2.4.2. MAR Sources – Aircraft and Rail Locomotive**

For the years 2017 and 2019, WDNR calculated emissions in Manitowoc County by linearly interpolating between emission estimates for the years 2016 and 2023 in EPA's 2016 emissions modeling platform, version 1. This interpolation used emissions only for the three months of June, July and August. WDNR then divided the interpolated emissions by 92 (the number of days in those three months) to obtain ozone season day emissions. The ratio of annual emissions to ozone season day emissions is 339.7 to 1 for aircraft and 361.4 to 1 for rail locomotive. These two ratios hold for all years (2017 and 2019, as well as the 2025 and 2033 projection years) as well as both pollutants (NO<sub>x</sub> and VOC).

The allocation of the full county emissions to the Manitowoc County 2015 ozone NAAQS nonattainment area is described in section 2.4.4.

#### **2.4.3. MAR Sources – Commercial Marine Vessels**

During May of 2020, EPA posted updated commercial marine annual emission estimates for the Great Lakes region in their 2016 emission modeling platform for the years 2016 and 2028. Thus,

to use EPA's most recent data, WDNR calculated annual emissions for the years 2017 and 2019 by linearly interpolating between these updated 2016 and 2028 estimates.

The EPA's May 2020 updated emissions did not include monthly emissions, so WDNR used earlier monthly estimates in EPA's 2016 emissions modeling platform to develop ratios between annual emissions and ozone season day emissions. Using the same procedures described in section 2.4.2 for aircraft and rail, WDNR determined that ozone season day emissions equal annual emissions divided by the following amounts:

- For category C1 and C2 engines:
  - 2017: 427.1 for NO<sub>x</sub> and 428.2 for VOC
  - 2019: 427.6 for NO<sub>x</sub> and 429.0 for VOC
- For category C3 engines:
  - 2017: 205.2 for NO<sub>x</sub> and 202.6 for VOC
  - 2019: 205.1 for NO<sub>x</sub> and 202.5 for VOC

#### **2.4.4. Allocation of Emissions to Manitowoc County Nonattainment Area**

Given the wide range of nonroad mobile sources, several surrogates were employed to estimate the proportion of countywide emissions in the Manitowoc County 2015 ozone NAAQS nonattainment area. The surrogates are described below.

##### **2.4.4.1. Land Area**

Based on geographic data for each city and township in Manitowoc County, the land area of the nonattainment area comprises 30% of the total county land area. But excluding the cities in Manitowoc County (Kiel, Manitowoc and Two Rivers), where no significant agricultural activity occurs, this percentage is 27%.

The nonroad categories allocated to the nonattainment area based on land area are agriculture, logging, oilfields, recreational, and underground mining. The 27% factor was used for agriculture and the 30% factor was used for the other categories. It should be noted that Manitowoc County has no emissions from oilfields or underground mining.

##### **2.4.4.2. Population**

As described in section 2.2 (Nonpoint (Area) Sources), the percentage of the county's population estimated to live in the nonattainment area is 66% for both 2017 and 2019.

The nonroad categories allocated to the nonattainment area based on this 66% population proportion are commercial, construction, industrial, and lawn & garden.

#### **2.4.4.3. Water Area**

WDNR obtained water area data from two tables in the MOVES3.0.1 nonroad data files: WI\_WIB.ALO, which provides the water area in each Wisconsin county applicable to pleasure craft having inboard engines, and WI\_WOB.ALO, which provides water area in each Wisconsin county applicable to pleasure craft having outboard engines. The difference between these two tables is that WI\_WIB.ALO includes water area along the Lake Michigan shore as well as inland water area, while WI\_WOB.ALO only includes the inland water area.

For Manitowoc County, WI\_WIB.ALO has 188 square kilometers of water area and WI\_WOB.ALO has 33 square kilometers of water area. The 188 square kilometer value for inboard engines contains Lake Michigan waters (155 square kilometers) and 33 square kilometers of water from several inland lakes (of which about four square kilometers are in the nonattainment area). The 33 square kilometer value for outboard engines contains only the water from the inland lakes. Thus, for pleasure craft with inboard engines  $(155+4)/188 = 85\%$  of the associated water area is in the nonattainment area and for pleasure craft with outboard engines  $4/33 = 12\%$  of the associated water area is in the nonattainment area.

The nonroad category allocated to the nonattainment area based on water area is pleasure craft. For pleasure craft with inboard engines, 85% of the full county emissions were allocated to the nonattainment area and for pleasure craft with outboard engines, 12% of the full county emissions were allocated to the nonattainment area.

#### **2.4.4.4. Lake Michigan Shoreline**

All (100.0%) of the Lake Michigan shoreline in Manitowoc County is in the nonattainment area. The nonroad category allocated to the nonattainment area based on Lake Michigan shoreline is commercial marine, since all commercial marine emissions attributable to Manitowoc County come from vessels traveling on Lake Michigan past the county or docking at the Port of Manitowoc along Lake Michigan.

#### **2.4.4.5. Airport Location**

WDNR obtained countywide annual aircraft emissions from the EPA's February 2020 release of 2017 NEI point source emissions. These summaries include the longitude and latitude of the airport associated with the emissions, allowing one to determine which of the airports are in the 2015 ozone NAAQS Manitowoc County nonattainment area. Almost all aircraft emissions in Manitowoc County originate from an airport within the nonattainment area (Manitowoc County Airport). WDNR calculated that the percentage for countywide aircraft emissions in the nonattainment area to be as follows:

- 99.7% of NO<sub>x</sub>
- 99.6% of VOCs

Thus, aircraft emissions in the nonattainment area are those percentages of the total Manitowoc County aircraft emissions.



#### **2.4.4.6. Railroad Link Location**

The EPA's 2014 NEI, version 2, provides the location (shape identifier) and the percentage of county rail travel for each link of railway in the United States. WDNR used these data to estimate the percentage of Manitowoc County rail travel that occurs within the nonattainment area. These percentages are 24% for Class I rail operations and 63% for Class II/III rail operations. After weighing in emissions, the average percentages for all countywide rail locomotive emissions in the nonattainment area were calculated to be:

- 35% of NO<sub>x</sub>
- 25% of VOCs

The percentage is lower for VOCs because Class II/III rail operations have very low VOC emissions. WDNR used these percentages to allocate both rail locomotive and railroad maintenance emissions to the nonattainment area.

## **APPENDIX 3**

### **2025 and 2033 Emissions Projections Documentation**

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This appendix provides information for the sector-specific NO<sub>x</sub> and VOC tons per ozone season day (tposd) emission estimates in section 4.3 of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area. As part of this demonstration, the WDNR is providing a projection of emissions for 2025 and 2033 as the maintenance years.

## **1. EGU Inventory Methodology for 2025 and 2033**

See Appendix 4 for the projection methodology related to electric generating units (EGUs).

## **2. Point Non-EGU Inventory Methodology for 2025 and 2033**

Non-EGU point source emissions are projected for 2025 and 2033 by applying growth factors to the 2019 attainment year inventory, as well as considering new and modified sources. A detailed description of the methodology is provided below, and a list of sources with the applied growth rates and calculated emissions is provided in Appendix 5.

### **2.1. Growth Factors from AEO 2019 for Existing Sources**

Non-EGU point source projected 2025 and 2033 emissions were derived by applying growth factors to the 2019 attainment year inventory. Growth factors were developed from Annual Energy Outlook (AEO) 2020 industry-specific energy consumption data, summarized in Table A3.1. Growth in energy consumption was assumed to correspond linearly with growth in emissions. A second step in projecting emissions – accounting for potential emissions increases resulting from the modification of existing sources or the installation of new sources – is described in section 2.2 below.

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**Table A3.1. Growth Factors from AEO 2019 Used for Projecting Wisconsin Non-EGU Point Source Emissions for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area**

NAICS	NAICS Description	AEO Industrial or Commercial Sub-sector	AEO Energy Consumption (trillion Btu) <sup>1</sup>			Growth Factors (from 2019) <sup>2</sup>	
			2019	2025	2033	2025 GF	2033 GF
331523	Nonferrous Metal Die-Casting Foundries	Aluminum Industry	219	219	225	1.00	1.03
321918	Other Millwork (including Flooring)	Other Manufacturing - Wood Products	456	512	559	1.12	1.23
337211	Wood Office Furniture Manufacturing	Other Manufacturing - Wood Products	456	512	559	1.12	1.23
321918	Other Millwork (including Flooring)	Other Manufacturing - Wood Products	456	512	559	1.12	1.23
221210	Natural Gas Distribution	Energy Consumption East North Central	0.081	0.082	0.096	1.01	1.19
326220	Rubber and Plastic Hoses and Belting Manufacturing	Other Manufacturing - Plastics	260	284	301	1.09	1.16
325991	Custom Compounding of Purchased Resins	Other Manufacturing - Plastics	260	284	301	1.09	1.16
311211	Flour Milling	Food Industry	1,154	1,250	1,322	1.08	1.15
311999	All Other Miscellaneous Food Manufacturing	Food Industry	1,154	1,250	1,322	1.08	1.15
311612	Meat Processed from Carcasses	Food Industry	1,154	1,250	1,322	1.08	1.15
311811	Retail Bakeries	Food Industry	1,154	1,250	1,322	1.08	1.15
311999	All Other Miscellaneous Food Manufacturing	Food Industry	1,154	1,250	1,322	1.08	1.15
336310	Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	Metal Based Durables Industry - Transportation Equipment	320	313	354	0.98	1.11
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	Metal Based Durables Industry - Electrical Equipment	85	89	94	1.04	1.10
332912	Fluid Power Valve and Hose Fitting Manufacturing	Metal Based Durables Industry - Machinery	152	161	167	1.06	1.10
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	Metal Based Durables Industry - Fabricated Metal Products	350	366	373	1.04	1.06

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332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	Metal Based Durables Industry - Fabricated Metal Products	350	366	373	1.04	1.06
332312	Fabricated Structural Metal Manufacturing	Metal Based Durables Industry - Fabricated Metal Products	350	366	373	1.04	1.06
32221	Paperboard Container Manufacturing	Paper Industry	1,483	1,515	1,570	1.02	1.06
331523	Nonferrous Metal Die-Casting Foundries	Aluminum Industry	219	219	225	1.00	1.03
332119	Metal Crown, Closure, and Other Metal Stamping (except Automotive)	Aluminum Industry	219	219	225	1.00	1.03
331314	Secondary Smelting and Alloying of Aluminum	Aluminum Industry	219	219	225	1.00	1.03
327410	Lime Manufacturing	Cement and Lime Industry	349	333	319	0.95	0.91
331511	Iron Foundries	Iron and Steel Industry	1,321	1,197	1,129	0.91	0.85
331523	Nonferrous Metal Die-Casting Foundries	Aluminum Industry	219	219	225	1.00	1.03

<sup>1</sup> Source: <http://www.eia.gov/forecasts/aeo/index.cfm>

<sup>2</sup> Growth factors for the entire 2019-2025 and 2019-2033 periods were calculated by dividing the 2025 or 2033 energy consumption values by the 2019 energy consumption value.

## 2.2. Modified and New Source Emissions

Section 172(c)(4) of the Clean Air Act (CAA) requires identification and quantification of potential emissions from new or modified sources when developing emission inventories for attainment and maintenance purposes. The point source emissions inventory described in section 2.1 above includes projections of emissions growth determined by applying general regional growth factors. However, this methodology alone does not distinguish emissions associated with modified and new sources. Therefore, as a second step the WDNR reviewed permitting actions for sources in the Manitowoc County 2015 ozone NAAQS nonattainment area from 2015 to 2019 (five years). A summary of the permitting activity and associated potential emissions is shown in Table A3.2. The resulting emissions from this exercise are added to the projected emissions for *existing* point source non-EGU, to yield the *total* projected point source non-EGU emissions for 2025 and 2033 found in section 4.3 of the redesignation request and maintenance plan (see also Appendix 3, Table A5.2 for the addition of new/modified sources to existing sources). This approach may add emissions which overlap with existing source grown emissions, but it provides a more conservative estimate of future emissions. It should be noted that this future projection of emissions does not limit the amount of future emissions allowed from modified and new sources.

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**Table A3.2. Permitting Actions for Existing Source and New Emission Sources in the Manitowoc County 2015 Ozone Nonattainment Area – 2015 to 2019.**

Construction Permit Class	Year	Potential Emissions Increase (tpy)		Estimated Ozone Season Emissions (tposd) <sup>1</sup>		Construction Permit #
		NOx	VOC	NOx	VOC	
Minor action <sup>2</sup>	2015	29.10	3.60	0.11	0.01	15-JJW-149-EXM; 15-DMM-061; 15-JJ-02-EXM
Minor action <sup>2</sup>	2016	1.98	2.91	0.01	0.01	16-JJW-058-EXM; 16-DMM-024; 16-JJW-122; 16-EVH-163-EXM; 16-JJW-027-EXM
Minor action <sup>2</sup>	2017	17.71	18.79	0.07	0.07	17-JJW-182-EXM; 17-JJW-131; 17-JJW-158; 17-DMM-095
Minor action <sup>2</sup>	2018	5.64	8.97	0.02	0.03	18-RAB-129-EXM; 18-ETE-081; 18-MMC-003-EXM; 18-CTS-037-EXM; 18-MBH-091-EXM; 18-BAP-093
Minor action <sup>2</sup>	2019	0.42	7.43	0.00	0.03	19-BAP-147-EXM; 19-POY-132; 19-MMC-111-EXM; 18-BAP-093-R1
<b>Total</b>		<b>54.43</b>	<b>34.27</b>	<b>0.21</b>	<b>0.13</b>	

<sup>1</sup> Tons per ozone season day emissions are calculated based on the annual potential emissions divided by 260 weekdays.

<sup>2</sup> A minor action is a permitting action that is not subject to PSD or nonattainment NSR review.

### 3. Area Source Inventory Methodology for 2025 and 2033

EPA's 2016 Emissions Modeling Platform, Version 1 includes base year 2016 and projections for the years 2023 and 2028.<sup>1</sup> Projection year 2025 emissions were estimated by interpolating EPA's 2023 and 2028 projections from EPA's 2016 Emissions Modeling Platform. Year 2033 area source emissions were estimated primarily by extrapolating EPA's 2017 NEI and 2023 and 2028 projections from the 2016 modeling inventory. Methodologies used to develop 2023 emissions modeling platform projection data are available in the EPA's National Emissions Inventory Collaborative Wiki v1 release page.<sup>2</sup> The exception is that WDNR staff projected emissions from vehicle refueling at gasoline stations (Stage II refueling) using EPA's MOVES3.0.1 model with the same inputs used for the onroad modeling.

As was done for 2017 and 2019, WDNR adjusted weekday emissions to average day (weekdays and weekends) emissions, based on the ratio of average day to weekday travel, resulting in adjustment factors of 0.9570 for 2025 and 0.9573 for 2033. Also, as was done for 2017 and 2019, no Stage II vapor recovery program was modeled for 2025 and 2033. Owing to most vehicles now having their own vapor recovery system, called on-board refueling vapor recovery or ORVR, Stage II controls at the pump are largely redundant or even counter-productive. Wisconsin submitted a SIP revision removing Stage II requirements, and EPA approved the revision in November 2013. Even without a Stage II program, emissions from Stage II refueling steadily decrease from 2017 to 2033, owing to the larger percentage of vehicles having ORVR.

In order to obtain the areas source emissions for the partial Manitowoc County 2015 ozone NAAQS nonattainment area, emission estimates from the entire county were allocated to the partial county area based on population data. The Manitowoc County population data projections for 2025 and 2033 from the Wisconsin Department of Administration were used to calculate the emission estimates. The partial county population was identified based on the relative population of the Minor Civil Divisions in the partial Manitowoc County 2015 ozone NAAQS nonattainment area compared with the entire county. For both 2025 and 2033, the county's population, estimated to live in the partial Manitowoc nonattainment area was 65%. Appendix 6 includes tables of projected area source emissions for partial Manitowoc County 2015 ozone NAAQS nonattainment area by source category.

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<sup>1</sup> <ftp://newftp.epa.gov/Air/emismod/2016/v1/>

<sup>2</sup> <http://views.cira.colostate.edu/wiki/wiki/10202>



#### 4. Onroad Inventory Methodology for 2025 and 2033

As was done for the 2017 and 2019 emissions, the 2025 and 2033 projected onroad emissions were developed using the MOVES3.0.1 model. Unless otherwise stated in this section, the methodology WDNR used for 2025 and 2033 is the same methodology WDNR used for years 2017 and 2019, as described in Appendix 2, section 2.3.

WDNR grew vehicle-miles of travel (VMT) from 2019 using the same growth rates provided in the transportation modeling data provided to WDNR by the Wisconsin Department of Transportation (WDOT). The WDOT data provides separate growth rates for the combined light-duty classes (“Autos”) and the combined heavy-duty classes (“Trucks”). After growing the VMT for these two general classes, WDNR allocated the VMT to the MOVES sub-classes based on the MOVES3.0.1 default VMT splits by vehicle class for Manitowoc County for 2025 and 2033. Table A3.3 shows the resulting ozone season weekday VMT.

**Table A3.3. Ozone Season Weekday VMT Inputted into MOVES3.0.1.**

MOVES Vehicle Class	Year			
	2017	2019	2025	2033
Motorcycles	16,197	16,437	17,010	17,793
Passenger Cars	638,148	650,960	680,844	748,310
Passenger Trucks	829,161	839,949	866,349	874,890
Light Commercial Trucks	96,471	96,725	96,643	95,526
Other Buses	5,125	5,262	5,573	5,952
Transit Buses	1,751	1,759	1,785	1,846
School Buses	2,558	2,611	2,737	2,893
Refuse Trucks	535	542	615	761
Single Unit Short-haul Trucks	55,455	56,404	61,408	70,567
Single Unit Long-haul Trucks	3,674	3,755	4,124	4,699
Motor Homes	2,137	2,151	2,365	2,872
Combination Short-haul Trucks	18,392	19,409	21,675	22,239
Combination Long-haul Trucks	95,065	96,969	97,879	98,755
<b>TOTAL</b>	<b>1,764,670</b>	<b>1,792,931</b>	<b>1,859,008</b>	<b>1,947,106</b>

The total ozone season weekday VMT increases by 1.6% from 2017 to 2019, increases by 3.7% from 2019 to 2025, and increases by 4.7% from 2025 to 2033. In terms of annual VMT growth rates, these rates are 0.80% from 2017 to 2019, 0.61% from 2019 to 2025, and 0.58% from 2025 to 2033.

The vehicle populations for each of the years are shown in Table A3.4.

**Table A3.4. Vehicle Populations Inputted into MOVES3.0.1.**

MOVES Vehicle Class	Year			
	2017	2019	2025	2033
Motorcycles	1,588	1,592	1,669	1,786
Passenger Cars	19,100	19,150	20,071	21,484
Passenger Trucks	22,893	22,745	23,456	23,529
Light Commercial Trucks	2,516	2,499	2,576	2,581
Other Buses	60	59	61	63
Transit Buses	19	19	19	20
School Buses	85	84	86	90
Refuse Trucks	10	10	11	12
Single Unit Short-haul Trucks	1,420	1,416	1,523	1,673
Single Unit Long-haul Trucks	63	62	67	74
Motor Homes	145	145	156	172
Combination Short-haul Trucks	191	186	180	171
Combination Long-haul Trucks	387	376	366	352
<b>TOTAL</b>	<b>48,477</b>	<b>48,344</b>	<b>50,240</b>	<b>52,007</b>

The total vehicle population decreases by 0.3% from 2017 to 2019, increases by 3.9% from 2019 to 2025, and increases by 3.5% from 2025 to 2033. In terms of annual population growth rates, these rates are -0.14% from 2017 to 2019, 0.64% from 2019 to 2025, and 0.43% from 2025 to 2033. The reason for the decrease in the populations for the combination trucks despite increases in VMT for these classes is that the MOVES3.0.1 defaults assume that the per-vehicle travel for combination trucks increases with time.<sup>3</sup>

WDNR projected the 2017 vehicle age distribution to 2025 and 2033 using the methodology done to project to 2019, which is described in section 2.3.2.5 in Appendix 2. Table A3.5 presents the resulting average vehicle ages for all four inventory years.

**Table A3.5. Average Vehicle Ages (years old).**

MOVES Vehicle Class	Year			
	2017	2019	2025	2033
Motorcycle	14.68	14.63	14.40	14.37
Passenger Car	10.43	10.36	10.24	10.31
Passenger Truck	8.25	8.18	8.15	8.22
Light Commercial Truck	11.50	11.45	11.35	11.39
Other Bus	12.40	12.40	12.40	12.40
Transit Bus	11.87	11.87	11.87	11.87
School Bus	9.43	9.43	9.43	9.43
Refuse Truck	10.89	10.87	10.47	10.62
Single Unit Short-haul Truck	13.47	13.35	13.07	13.06
Single Unit Long-haul Truck	11.60	11.38	11.21	11.18
Motor Home	17.79	17.78	17.60	17.47
Combination Short-haul Truck	15.19	15.13	15.18	15.16
Combination Long-haul Truck	10.18	10.03	10.22	10.88

<sup>3</sup> For example, for Combination Long-haul Trucks, the MOVES3.0.1 default per-vehicle daily travel for the years 2017, 2019, 2025 and 2033 are 246 miles, 258 miles, 267 miles and 280 miles, respectively.

Emissions for 2025 and 2033 were increased by a 15% safety margin, as agreed through the interagency transportation conformity consultative process.

Detailed listing of the projected onroad emissions and activity data are provided in Appendix 8.

## 5. Nonroad Inventory Methodology for 2025 and 2033

The methodology for determining 2025 and 2033 projected nonroad emissions is parallel to the methodology used to determine the 2017 and 2019 estimates, as described in Appendix 2, section 2.4.

For all source categories except commercial marine, aircraft and rail locomotive (MAR), the nonroad component of the MOVES3.0.1 model was run for Manitowoc County at hot ozone season day temperatures. As was done for 2017 and 2019, the only change made to the MOVES3.0.1 nonroad defaults was an updated monthly distribution of agricultural activity, developed by the Lake Michigan Air Directors Consortium (LADCO). The MOVES3.0.1 model's default growth projections were assumed.

For aircraft and rail locomotive, WDNR calculated emissions for 2025 by linearly interpolating between the 2023 and 2028 ozone season day emissions in the EPA's 2016 emissions modeling platform, version 1. WDNR calculated emissions for 2033 by linearly extrapolating from the 2023 and 2028 ozone season day values in the EPA's platform, with the constraint that if the 2028 emissions were less than the 2023 emissions, the 2033 emissions were set equal to the 2028 emissions. The intent of this constraint is to avoid an underestimation of 2033 emissions.

For commercial marine, WDNR calculated 2025 emissions by linearly interpolating between emission values for the years 2016 and 2028 in the EPA's May 2020 updated commercial marine estimates in their 2016 emissions modeling platform, version 1. WDNR calculated 2033 emissions by linearly extrapolating from 2016 to 2028, again with the constraint that if 2028 emissions were less than 2016 emissions, the 2033 emissions were set equal to the 2028 emissions.

The relationships between annual emissions and ozone season day emissions in EPA's 2016 emissions modeling platform, version 1, are shown in Table A3.6.

**Table A3.6. Annual Emissions Divided by Ozone Season Day Emissions for Manitowoc County Obtained from EPA's 2016 Emissions Modeling Platform, Version 1**

Emissions Category	NOx				VOC			
	2017	2019	2025	2033	2017	2019	2025	2033
Aircraft	339.7	339.7	339.7	339.7	339.7	339.7	339.7	339.7
Rail	361.4	361.4	361.4	361.4	361.4	361.4	361.4	361.4
Commercial Marine – C1/C2	427.1	427.6	428.9	428.9	428.2	429.0	431.2	431.2
Commercial Marine – C3	205.2	205.1	204.9	204.9	202.6	202.5	202.4	202.4

In allocating the full Manitowoc County emissions to the Manitowoc County 2015 ozone NAAQS nonattainment area, the only adjustment factor that changed from those used for 2017 and 2019 is the estimated population proportion for 2025 and 2033. Consistent with the

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allocation done for area sources, 66% was used for 2017 and 2019, but 65% was used for 2025 and 2033.

Detailed listings of the projected nonroad emissions for over 200 subcategories are provided in Appendix 7.

## **APPENDIX 4**

### **EGU Point Source Emissions for 2017, 2019, 2025 and 2033**

This appendix provides the methodology for electric generating unit (EGU) sector NO<sub>x</sub> and VOC tons per ozone season day (tposd) emission estimates in sections 4.2 and 4.3 of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.

Nextera Energy Point Beach LLC (Nextera) and Manitowoc Public Utilities (MPU) are the two point-source facilities with EGUs located in the Manitowoc County 2015 ozone NAAQS nonattainment area. Nextera is a nuclear power plant and the combustion EGUs at this plant are considered peaking units for emergency use. MPU is a coal-fired power plant that operates continuously and is considered a non-peaking plant. Different methodologies were used for estimating tposd emissions from peaking EGUs and non-peaking EGUs. Sections 1 and 2 of this appendix describe the method used to calculate the emissions for MPU (non-peaking EGUs). Sections 3 and 4 describe the method used to calculate the emissions from Nextera (peaking EGUs).

### **1. 2017 and 2019 Emissions for Manitowoc Public Utilities**

Manitowoc Public Utilities (FID # 436035930) is the only non-peaking EGU point source facility located in the partial Manitowoc County 2015 ozone NAAQS nonattainment area. The 2017 and 2019 NO<sub>x</sub> emissions, emission rates and fuel consumption for the generating units at these facilities were derived from data reported by the utility to EPA's Clean Air Markets Division (CAMD) database. WDNR used the ozone season (i.e., May 1 through September 30) day with the 99<sup>th</sup> percentile highest heat input for each unit during the ozone season to represent summer day operations during the 2017 and 2019 ozone seasons. Using this 99<sup>th</sup> percentile value provides a conservative, but reasonable, representation of maximum summer day operation. The ozone season day emissions were then calculated by multiplying the maximum summer day heat inputs in 2017 and 2019 by the average emission rates for the 2017 and 2019 ozone seasons. The NO<sub>x</sub> emission rates were derived from the CAMD emissions data for the 2017 and 2019 ozone seasons. This base data and the tposd emissions calculated from this data are provided in Table A4.1. The total NO<sub>x</sub> emissions were 0.46 tposd in 2017 and 0.37 tposd in 2019. It should be noted that coal boiler B09 operates a selective non-catalytic reduction (SNCR) system for controlling NO<sub>x</sub> emissions, and coal boiler B28 uses a low-NO<sub>x</sub> burner.

The 2017 and 2019 VOC ozone season day emissions are also derived by multiplying the maximum day heat inputs by average VOC emission rates. The base data used in the calculation and the resulting emissions are provided in Table A4.1. In this case, however, VOC emissions are not monitored by continuous emissions monitors and reported to the CAMD database as is done for NO<sub>x</sub>. Therefore, the VOC emission rates were derived by dividing the annual VOC emissions reported to the WDNR Air Emissions Inventory by the annual heat input reported to the CAMD database for 2017 and 2019. The data applied in deriving the VOC emission rates are shown in Table A4.2. Multiplying these VOC emission rates for each year by the maximum day heat inputs resulted in 0.01 tposd of VOC in 2017 and 2019.

Note: emissions from non-electric generating emission units at the plant (i.e., units other than the two coal boilers) are not included because they are insignificant (less than 5 tons per year) compared to the EGU emissions.

**Table A4.1. Manitowoc Public Utilities Summer Day Operation and Emissions in 2017 and 2019.**

Variable	2017		2019	
	B09	B28	B09	B28
Ozone Season Day Heat Input (mmBtu) <sup>1</sup>	11,035	5,320	10,503	3,282
NOx Rate (lbs/mmBtu) <sup>2</sup>	0.039	0.092	0.045	0.081
NOx (tposd)	0.21	0.24	0.24	0.13
NOx Control	SNCR	Low-NOx Burner	SNCR	Low-NOx Burner
VOC Rate (lbs/mmBtu) <sup>3</sup>	0.002	0.003	0.002	0.003
VOC (tposd)	0.011	0.008	0.011	0.005

SNCR = Selective non-catalytic reduction

<sup>1</sup> Heat input is for the day with the 99<sup>th</sup> percentile highest heat input during each of the 2017 and 2019 ozone seasons. “Ozone Season” is defined here as May 1 through September 30.

<sup>2</sup> Emission rate derived from EPA CAMD ozone season NOx emissions and heat input.

<sup>3</sup> Calculated in Table A4.2.

**Table A4.2. Manitowoc Public Utilities VOC Annual Emissions and Emission Rates in 2017 and 2019.**

Variable	2017		2019	
	B09	B28	B09	B28
Annual VOC (tons) <sup>1</sup>	2.08	0.69	1.98	0.15
Annual Heat Input (mmBtu) <sup>2</sup>	2,127,141	445,669	1,896,367	91,849
VOC Rate (lbs/mmBtu)	0.002	0.003	0.002	0.003

<sup>1</sup> Emissions reported to the WDNR Air Emissions Inventory.

<sup>2</sup> Heat input reported to the CAMD database.

## 2. Projected 2025 and 2033 Emissions for Manitowoc Public Utilities

Following the same methodology as used in calculating 2017 and 2019 emissions, WDNR projected summer day emissions for MPU by multiplying a projected maximum daily heat input by a projected average ozone season emission rate. The data used in this calculation and resulting emissions are summarized in Table A4.3.

The WDNR determined the maximum ozone season day heat inputs representative of recent operation to be the highest 99<sup>th</sup> percentile daily value over the 2017-2020 period. The historical and maximum ozone season day values for 2017 through 2020 are listed in Table A4.4.

The projected ozone season NOx and VOC emission rates for each boiler are the average emission rates for the 2017-2020 period as listed in Table A4.4. These rates reflect controls as of 2020 and are reasonable, conservative representations of the future expected emission rates.

The projected tposd emissions were determined by multiplying maximum ozone season day heat input by the average emission rate for the 2017-2020 period. Based on the information in Tables

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A4.3 and A4.4, the total projected emissions for 2025 and 2033 from MPU are calculated to be 0.50 tposd for NO<sub>x</sub> and 0.02 tposd for VOC. It should be noted that these NO<sub>x</sub> and VOC tposd values are not intended to constitute daily enforceable emission limitations on the power plants. The values represent the best reasonable approximation of the controls in place, a compliance margin, and projected maximum actual summer day emissions that could be expected going into the future.

**Table A4.3. 2025 and 2033 Emissions for MPU.**

Variable	Projected Values			
	2025		2033	
	B09	B28	B09	B28
Summer Day Heat Input (mmBtu) <sup>1</sup>	11,035	5,320	11,035	5,320
NO <sub>x</sub> Rate (lbs/mmBtu) <sup>2</sup>	0.049	0.087	0.049	0.087
NO <sub>x</sub> (tposd)	0.27	0.23	0.27	0.23
NO <sub>x</sub> Control	SNCR	Low NO <sub>x</sub> Burner	SNCR	Low NO <sub>x</sub> Burner
VOC Rate (lbs/mmBtu) <sup>3</sup>	0.002	0.003	0.002	0.003
VOC (tposd)	0.011	0.008	0.011	0.008

SNCR = Selective non-catalytic reduction

<sup>1</sup> Heat input is the highest 99<sup>th</sup> percentile daily value over the 2017-2020 ozone seasons. “Ozone Season” is defined here as May 1 through September 30.

<sup>2</sup> The projected ozone season NO<sub>x</sub> emission rate is the average NO<sub>x</sub> emission rate over the 2017-2020 ozone seasons. See Table A4.4.

<sup>3</sup> The projected VOC emission rate is the average VOC emission rate over the 2017-2020 time period. See Table A4.4.



**Table A4.4. Ozone Season Maximum Daily Heat Input and Average NO<sub>x</sub> and VOC Emission Rates for MPU.**

Year	Ozone Season Maximum Daily Heat Input (mmBtu) <sup>1</sup>		Ozone Season Average NO <sub>x</sub> Emission Rate (lbs/mmBtu) <sup>2</sup>		Annual Average VOC Emission Rate (lbs/mmBtu) <sup>3</sup>	
	B09	B28	B09	B28	B09	B28
2017	11,035	5,320	0.039	0.092	0.002	0.003
2018	9,661	3,344	0.033	0.092	0.002	0.003
2019	10,503	3,282	0.045	0.081	0.002	0.003
2020	10,830	3,971	0.080	0.084	0.002	0.003
Max.	11,035	5,320	---	---	---	---
Ave.	---	---	0.049	0.087	0.002	0.003

<sup>1</sup> The heat input for the ozone season day with the 99<sup>th</sup> percentile highest daily heat input.

<sup>2</sup> Derived from ozone season heat input and NO<sub>x</sub> emissions reported to the CAMD database for each year. “Ozone Season” is defined here as May 1 through September 30. Note that the 2020 NO<sub>x</sub> emission rate for B09 was higher than in 2017-2019 due to firing a higher percentage of paper pellets in 2020. Projected emission rates for 2025 and 2033 are expected to be similar to the 2017-2019 rates, after MPU makes additional operational changes to address the higher NO<sub>x</sub> rate; however, the 2017-2020 average NO<sub>x</sub> rate is being used for projections in order to be conservative.

<sup>3</sup> Derived from the annual heat input reported to the CAMD database and the annual VOC emissions reported to the WDNR Air Emissions Inventory for each year.

### 3. 2017 and 2019 Emissions for Nextera Energy Point Beach

Nextera Energy Point Beach (FID # 436034500) is a nuclear power plant that also has the following combustion EGUs:

- P01 – One (1) 20 MW Fuel Oil Fired Combustion Turbine.
- P02 – Eight (8) Diesel Fired Emergency Generators.

These combustion EGUs do not operate continuously and are considered peaking EGUs. Since the electric generating capacities for the above units are less than 25 MW, the emissions from these units are not reported to EPA’s CAMD database. The annual emissions from this plant in 2017 and 2019 are based on the emissions data reported to the WDNR Air Emissions Inventory. The annual and ozone season day emissions from this plant in 2017 and 2019 are summarized in Table A4.5. The ozone season day emissions from this plant were calculated based on the operation information for the third quarter of the year using the same calculation methodology for non-EGU point sources that is detailed in Section 2.1 of Appendix 2 to this redesignation request.

**Table A4.5. 2017 and 2019 Emissions from Nextera Energy Point Beach.**

Pollutant	Annual Emissions (tons)		Ozone Season Day Emissions (tpsd)	
	2017	2019	2017	2019
NO <sub>x</sub>	11.84	6.67	0.10	0.10
VOC	0.29	0.17	0.001	0.003

#### 4. Projected 2025 and 2033 Emissions for Nextera Energy Point Beach

The projected 2025 and 2033 emissions from Nextera Energy Point Beach were calculated by applying growth factors to the 2019 attainment year inventory. The 2019 emission information for this plant is listed in Table A.4.5. The growth factors were developed from Annual Energy Outlook (AEO) 2020 industry-specific energy consumption data for nuclear power and are summarized in Table A4.6. Growth in energy consumption was assumed to correspond linearly with growth in emissions. The projected 2025 and 2033 emissions from this plant are summarized in Table A4.7.

**Table A4.6. Growth Factors from AEO 2019 Used for Nextera**

NAICS	NAICS Description	AEO Industrial or Commercial Sub-sector	AEO Energy Consumption (trillion Btu)			Growth Factors (from 2019)	
			2019	2025	2033	2025 GF	2033 GF
221113	Nuclear Electric Power Generation	East North Central Energy Consumption - Nuclear	1.625	1.574	1.428	0.97	0.88

**Table A4.7. Projected 2025 and 2033 Emissions for Nextera.**

Pollutant	Projected Emissions (tons)		Projected Ozone Season Day Emissions (tpsd)	
	2025	2033	2025	2033
NO <sub>x</sub>	6.46	5.86	0.10	0.09
VOC	0.17	0.15	0.003	0.002

#### 5. Summary of Emissions from EGUs

Based on the information in sections 1 through 4, the total ozone season day emissions from the sources with EGUs located in the Manitowoc County 2015 ozone NAAQS nonattainment area are summarized in Table A4.8.

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**Table A4.8. Total 2017, 2019, 2025, and 2033 Emissions from EGUs.**

<b>Facility Name</b>	<b>Pollutant</b>	<b>2017 (tposd)</b>	<b>2019 (tposd)</b>	<b>2025 (tposd)</b>	<b>2033 (tposd)</b>
NEXTERA ENERGY POINT BEACH LLC (FID #436034500)	NO <sub>x</sub>	0.10	0.10	0.10	0.09
	VOC	0.001	0.003	0.003	0.002
MANITOWOC PUBLIC UTILITIES (FID #436035930)	NO <sub>x</sub>	0.46	0.37	0.50	0.50
	VOC	0.02	0.02	0.02	0.02
<b>Total EGU</b>	<b>NO<sub>x</sub></b>	<b>0.56</b>	<b>0.47</b>	<b>0.60</b>	<b>0.60</b>
	<b>VOC</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>

## **APPENDIX 5**

### **Non-EGU Point Source Emissions for 2017, 2019, 2025 and 2033**

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This appendix provides a list of the Manitowoc County 2015 ozone NAAQS nonattainment area non-electric generating unit (non-EGU) point source tons per ozone season day (tposd) emissions by facility identification number (FID) and facility name for 2017, 2019, 2025 and 2033. The sums of NO<sub>x</sub> and VOC emissions from these facilities were used for the non-EGU sector NO<sub>x</sub> and VOC tposd emission estimates sections 4.2 (Nonattainment Year and Attainment Year Inventories) and 4.3 (Maintenance Year Inventories) of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 ozone NAAQS nonattainment area.

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**Table A5.1 2017 and 2019 Point Non-EGU Emissions for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area<sup>1,2</sup>**

FID	Facility Name	NAICS	Pollutant	2017 (tpod)	2019 (tpod)	2017 (tons)	2019 (tons)
436006890	WISCONSIN ALUMINUM FOUNDRY	331523	NOx	4.37E-02	5.23E-02	10.93	13.08
436010190	SPARTECH	325991	NOx	1.30E-03	1.46E-03	1.18	1.34
436017670	JACOBSON PAINT FINISHES LLC	332812	NOx	5.00E-04	1.21E-03	0.21	0.46
436022950	ECK INDUSTRIES INC	331523	NOx	5.09E-02	5.39E-02	13.66	16.21
436025700	EGGERS DIVISION, LLC - TWO RIVERS	321918	NOx	4.00E-04	3.79E-04	0.53	0.57
436030210	TRAMONTINA US COOKWARE INC	332119	NOx	4.67E-02	9.71E-04	12.15	7.44
436034170	HERESITE PROTECTIVE COATINGS LLC	332812	NOx	5.00E-04	6.15E-04	0.36	0.40
436034280	PARKER HANNIFIN CORP - HPD	332912	NOx	1.70E-03	2.02E-03	2.60	3.06
436034720	BRIESS INDUSTRIES INC	311211	NOx	Not Reporting	3.74E-04	Not Reporting	0.14
436036700	KERRY, INC.	311999	NOx	6.46E-02	8.14E-02	23.52	29.64
436039010	FEDERAL MOGUL PISTON RING INC	336310	NOx	4.37E-02	9.21E-03	15.90	6.85
436039670	BROADWIND TOWERS AND HEAVY FABRICATIONS	332312	NOx	2.70E-03	3.01E-03	1.73	2.45
436040550	MANITOWOC GREY IRON FOUNDRY INC	331511	NOx	5.20E-03	5.70E-03	1.34	1.48
436041430	CHER-MAKE SAUSAGE CO	311612	NOx	3.60E-03	3.69E-03	1.30	1.34
436041870	MANITOWOC CRANES INC	333120	NOx	3.10E-03	Shutdown	5.66	Shutdown
436041980	JAGEMANN PLATING CO INC	332813	NOx	5.80E-03	6.05E-03	1.80	1.89
436077070	NATURAL OVENS BAKERY	311811	NOx	5.20E-03	4.96E-03	1.56	1.45
436079600	INTERNATIONAL PAPER CO	32221	NOx	8.80E-03	1.02E-02	3.27	3.66
436106110	SKANA ALUMINUM CO	331314	NOx	8.08E-02	7.28E-02	30.65	26.94
436108530	ARCHITECTURAL FOREST PRODUCTS LLC	321918	NOx	Not Reporting	5.68E-04	Not Reporting	0.21
436034390	CARMEUSE LIME AND STONE – ROCKWELL OPERATIONS	327410	NOx	9.03E-01	1.10	370.80	401.88
436115020	PARKER HANNIFIN CORP - PARAFLEX DIVISION	326220	NOx	6.33E-04	6.60E-04	0.44	0.5
436136800	CALUMET RENEWABLE ENERGY LLC	221210	NOx	Not Reporting	3.40E-01	Not Reporting	11.29
436006890	WISCONSIN ALUMINUM FOUNDRY	331523	VOC	2.45E-01	3.47E-01	61.3	96.83
436010190	SPARTECH	325991	VOC	1.59E-02	2.33E-02	6.92	10.12
436017670	JACOBSON PAINT FINISHES LLC	332812	VOC	1.43E-02	9.69E-03	3.33	2.53
436022950	ECK INDUSTRIES INC	331523	VOC	7.97E-02	8.80E-02	21.7	25.85
436025700	EGGERS DIVISION, LLC - TWO RIVERS	321918	VOC	2.46E-02	2.44E-02	6.42	6.37
436030210	TRAMONTINA US COOKWARE INC	332119	VOC	1.49E-01	5.34E-05	38.8	17.91
436034170	HERESITE PROTECTIVE COATINGS LLC	332812	VOC	9.69E-02	4.93E-02	19.3	11.09

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FID	Facility Name	NAICS	Pollutant	2017 (tposd)	2019 (tposd)	2017 (tons)	2019 (tons)
436034280	PARKER HANNIFIN CORP - HPD	332912	VOC	3.80E-03	3.87E-03	1.12	1.14
436034720	BRIESS INDUSTRIES INC	311211	VOC	3.40E-03	5.13E-03	1.23	1.87
436036700	KERRY, INC.	311999	VOC	6.26E-02	6.85E-02	22.8	24.92
436039010	FEDERAL MOGUL PISTON RING INC	336310	VOC	4.91E-02	4.24E-02	17.9	15.42
436039670	BROADWIND TOWERS AND HEAVY FABRICATIONS	332312	VOC	2.12E-01	1.23E-01	77.3	62.37
436040550	MANITOWOC GREY IRON FOUNDRY INC	331511	VOC	3.11E-02	2.88E-02	8.09	7.49
436041430	CHER-MAKE SAUSAGE CO	311612	VOC	3.40E-03	3.58E-03	0.89	0.95
436041870	MANITOWOC CRANES INC	333120	VOC	1.00E-03	Shutdown	1.01	Shutdown
436041980	JAGEMANN PLATING CO INC	332813	VOC	1.00E-03	3.33E-04	0.31	0.10
436047480	SHOTO CORP	337211	VOC	2.16E-02	2.24E-02	5.61	5.82
436077070	NATURAL OVENS BAKERY	311811	VOC	2.17E-01	2.11E-01	63.3	59.04
436079600	INTERNATIONAL PAPER CO	32221	VOC	7.30E-03	1.59E-02	2.30	4.99
436106110	SKANA ALUMINUM CO	331314	VOC	3.84E-02	4.03E-02	11.8	14.60
436108530	ARCHITECTURAL FOREST PRODUCTS LLC	321918	VOC	1.55E-02	1.57E-02	3.23	3.27
436133390	KERRY, INC.	311999	VOC	3.60E-03	Not Reporting	0.57	Not Reporting
436034390	CARMEUSE LIME AND STONE – ROCKWELL OPERATIONS	327410	VOC	1.55E-04	3.15E-04	0.07	0.13
436115020	PARKER HANNIFIN CROP – PARAFLEX DIVISION	326220	VOC	9.87E-03	8.02E-03	2.72	2.20
436136800	CALUMET RENEWABLE ENERGY LLC	221220	VOC	Not Reporting	2.90E-02	Not Reporting	8.30
<b>TOTAL</b>			<b>NOx</b>	<b>1.27</b>	<b>1.75</b>	<b>500</b>	<b>532</b>
			<b>VOC</b>	<b>1.31</b>	<b>1.16</b>	<b>378</b>	<b>383</b>

<sup>1</sup> Tons per ozone season day (tposd) emissions were calculated by WI AEI using the 3<sup>rd</sup> quarter operation information.

<sup>2</sup> According to Wisconsin State Code Chapter NR 438.03(a), facilities that emit less than 3 tons of VOC or less than 5 tons of NOx per year are not required to submit annual emission inventory reports. Sources that chose not to report NOx and/or VOC for a certain year are thus listed as “Not Reporting” for that year.

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**Table A5.2 2025 and 2033 Point Non-EGU Emissions for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area<sup>1</sup>**

FID	Facility Name	NAICS	Pollutant	2025 (tposd)	2033 (tposd)	2025 (tons)	2033 (tons)
436006890	WISCONSIN ALUMINUM FOUNDRY	331523	NOx	5.20E-02	5.35E-02	13.01	13.38
436010190	SPARTECH	325991	NOx	1.57E-03	1.65E-03	1.44	1.52
436017670	JACOBSON PAINT FINISHES LLC	332812	NOx	1.26E-03	1.26E-03	0.48	0.48
436022950	ECK INDUSTRIES INC	331523	NOx	5.36E-02	5.51E-02	16.12	16.58
436025700	EGGERS DIVISION, LLC - TWO RIVERS	321918	NOx	4.06E-04	4.67E-04	0.62	0.71
436030210	TRAMONTINA US COOKWARE INC	332119	NOx	9.65E-04	9.93E-04	7.40	7.61
436034170	HERESITE PROTECTIVE COATINGS LLC	332812	NOx	6.42E-04	6.44E-04	0.41	0.41
436034280	PARKER HANNIFIN CORP - HPD	332912	NOx	2.15E-03	2.18E-03	3.26	3.30
436034720	BRIESS INDUSTRIES INC	311211	NOx	4.00E-04	4.21E-04	0.15	0.15
436036700	KERRY, INC.	311999	NOx	8.71E-02	9.16E-02	31.70	33.33
436039010	FEDERAL MOGUL PISTON RING INC	336310	NOx	9.15E-03	9.83E-03	6.80	7.31
436039670	BROADWIND TOWERS AND HEAVY FABRICATIONS	332312	NOx	3.15E-03	3.15E-03	2.56	2.56
436040550	MANITOWOC GREY IRON FOUNDRY INC	331511	NOx	5.20E-03	4.97E-03	1.35	1.29
436041430	CHER-MAKE SAUSAGE CO	311612	NOx	3.94E-03	4.15E-03	1.43	1.50
436041870	MANITOWOC CRANES INC	333120	NOx	Shutdown	Shutdown	Shutdown	Shutdown
436041980	JAGEMANN PLATING CO INC	332813	NOx	6.17E-03	6.47E-03	1.93	2.02
436077070	NATURAL OVENS BAKERY	311811	NOx	5.30E-03	5.58E-03	1.55	1.63
436079600	INTERNATIONAL PAPER CO	32221	NOx	1.02E-02	1.07E-02	3.68	3.87
436106110	SKANA ALUMINUM CO	331314	NOx	7.23E-02	7.44E-02	26.79	27.56
436108530	ARCHITECTURAL FOREST PRODUCTS LLC	321918	NOx	6.08E-04	7.00E-04	0.22	0.25
436034390	CARMEUSE LIME AND STONE – ROCKWELL OPERATIONS	327410	NOx	1.05	1.00	381.79	365.71
436115020	PARKER HANNIFIN CROP – PARAFLEX DIVISION	326220	NOx	7.19E-04	7.66E-04	0.55	0.58
436136800	CALUMET RENEWABLE ENERGY LLC	221220	NOx	3.43E-01	4.05E-01	11.40	13.44
436006890	WISCONSIN ALUMINUM FOUNDRY	331523	VOC	3.45E-01	3.55E-01	96.29	99.06
436010190	SPARTECH	325991	VOC	2.51E-02	2.64E-02	10.90	11.48
436017670	JACOBSON PAINT FINISHES LLC	332812	VOC	1.01E-02	1.01E-02	2.64	2.64
436022950	ECK INDUSTRIES INC	331523	VOC	8.75E-02	9.00E-02	25.71	26.44



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FID	Facility Name	NAICS	Pollutant	2025 (tposd)	2033 (tposd)	2025 (tons)	2033 (tons)
436025700	EGGERS DIVISION, LLC - TWO RIVERS	321918	VOC	2.61E-02	3.00E-02	6.82	7.84
436030210	TRAMONTINA US COOKWARE INC	332119	VOC	5.31E-05	5.46E-05	17.81	18.32
436034170	HERESITE PROTECTIVE COATINGS LLC	332812	VOC	5.15E-02	5.16E-02	11.58	11.60
436034280	PARKER HANNIFIN CORP - HPD	332912	VOC	4.12E-03	4.17E-03	1.22	1.24
436034720	BRIESS INDUSTRIES INC	311211	VOC	5.48E-03	5.77E-03	2.00	2.10
436036700	KERRY, INC.	311999	VOC	7.32E-02	7.70E-02	26.65	28.02
436039010	FEDERAL MOGUL PISTON RING INC	336310	VOC	4.20E-02	4.52E-02	15.31	16.45
436039670	BROADWIND TOWERS AND HEAVY FABRICATIONS	332312	VOC	1.29E-01	1.29E-01	65.13	65.25
436040550	MANITOWOC GREY IRON FOUNDRY INC	331511	VOC	2.63E-02	2.51E-02	6.83	6.53
436041430	CHER-MAKE SAUSAGE CO	311612	VOC	3.82E-03	4.02E-03	1.02	1.07
436041870	MANITOWOC CRANES INC	333120	VOC	Shutdown	Shutdown	Shutdown	Shutdown
436041980	JAGEMANN PLATING CO INC	332813	VOC	3.39E-04	3.56E-04	0.11	0.11
436047480	SHOTO CORP	337211	VOC	2.40E-02	2.76E-02	6.24	7.17
436077070	NATURAL OVENS BAKERY	311811	VOC	2.26E-01	2.37E-01	63.14	66.40
436079600	INTERNATIONAL PAPER CO	32221	VOC	1.59E-02	1.68E-02	5.00	5.27
436106110	SKANA ALUMINUM CO	331314	VOC	4.01E-02	4.13E-02	14.52	14.94
436108530	ARCHITECTURAL FOREST PRODUCTS LLC	321918	VOC	1.68E-02	1.94E-02	3.51	4.03
436133390	KERRY, INC. <sup>1</sup>	311999	VOC	3.85E-03	4.05E-03	0.61	0.64
436034390	CARMEUSE LIME AND STONE – ROCKWELL OPERATIONS	327410	VOC	2.99E-04	2.87E-04	0.13	0.12
436115020	PARKER HANNIFIN CROP – PARAFLEX DIVISION	326220	VOC	8.74E-03	9.30E-03	2.40	2.55
436136800	CALUMET RENEWABLE ENERGY LLC	221220	VOC	2.93E-02	3.45E-02	8.38	9.88
Sub-total – Existing Sources			NOx	1.71	1.74	515	507
			VOC	1.20	1.26	397	413

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<i>New &amp; Modified Sources<sup>2</sup></i>							
N/A	N/A	N/A	NOx	0.21	0.21	54.43	54.43
N/A	N/A	N/A	VOC	0.13	0.13	34.27	34.27
<b>TOTAL (Existing + New/Modified Sources)</b>			<b>NOx</b>	1.92	1.95	569.85	561.04
			<b>VOC</b>	1.34	1.39	431.01	447.97

<sup>1</sup> Since the 2019 emissions were not reported, the 2025 and 2033 projected emissions for this facility were estimated based on the 2017 emissions multiplied by the growth factors.

<sup>2</sup> For new and modified sources, the tpsod emissions are calculated based on the annual potential emissions divided by 260 weekdays.

## **APPENDIX 6**

### **Area Source Emissions for 2017, 2019, 2025 and 2033**

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This appendix provides a list of the area source tons per ozone season day (tposd) emissions by source classification code (SCC) for 2017, 2019, 2025 and 2033 for the Manitowoc County 2015 ozone NAAQS nonattainment area. The sum of NO<sub>x</sub> and VOC emissions from the different SCCs were used for the area source sector NO<sub>x</sub> and VOC tposd emission estimates in sections 4.2 (Nonattainment Year and Attainment Year Inventories) and 4.3 (Interim Year and Maintenance Year Inventories) of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.

SCCs are used to classify different types of activities that generate emissions. Each SCC represents a unique source category-specific process or function that emits air pollutants. For example, SCC 2102002000 represents a stationary industrial coal boiler. A searchable database of SCC codes can be found on this EPA website:

<https://sor-scc-api.epa.gov/sccwebservices/sccsearch/>.

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**Table A6.1. Area Source 2017 and Projected 2019, 2025 and 2033 Emissions for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area**

FIPS	SCC	POLLUTANT	2017(tposd)	2019(tposd)	2025(tposd)	2033(tposd)
55071	2102001000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102002000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102004001	NOX	0.00E+00	7.38E-04	2.20E-03	3.72E-03
55071	2102004002	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102005000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102006000	NOX	2.35E-01	1.79E-01	6.55E-02	1.12E-02
55071	2102007000	NOX	2.63E-03	2.59E-03	2.50E-03	2.42E-03
55071	2102008000	NOX	1.45E-01	1.47E-01	1.54E-01	1.64E-01
55071	2102011000	NOX	8.48E-05	5.64E-05	0.00E+00	0.00E+00
55071	2103001000	NOX	8.00E-06	5.33E-06	0.00E+00	0.00E+00
55071	2103002000	NOX	1.08E-03	7.17E-04	0.00E+00	0.00E+00
55071	2103004001	NOX	4.73E-04	3.15E-04	0.00E+00	0.00E+00
55071	2103004002	NOX	7.52E-04	9.79E-04	1.41E-03	1.85E-03
55071	2103005000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2103006000	NOX	7.29E-02	7.21E-02	6.75E-02	6.08E-02
55071	2103007000	NOX	3.86E-03	3.94E-03	4.10E-03	4.27E-03
55071	2103008000	NOX	4.53E-03	4.63E-03	4.80E-03	4.99E-03
55071	2103011000	NOX	3.53E-05	3.07E-05	2.15E-05	1.21E-05
55071	2104001000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2104002000	NOX	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2104004000	NOX	7.99E-03	8.91E-03	1.07E-02	1.25E-02
55071	2104006000	NOX	1.77E-01	1.84E-01	1.97E-01	2.11E-01
55071	2104007000	NOX	4.12E-02	4.57E-02	5.42E-02	6.32E-02
55071	2104008100	NOX	3.90E-03	3.14E-03	1.64E-03	1.47E-04
55071	2104008210	NOX	2.49E-04	4.75E-04	9.03E-04	1.33E-03
55071	2104008220	NOX	6.63E-04	6.08E-04	4.99E-04	3.93E-04
55071	2104008230	NOX	3.87E-04	3.02E-04	1.34E-04	9.07E-06
55071	2104008310	NOX	2.03E-03	2.90E-03	4.52E-03	6.12E-03
55071	2104008320	NOX	5.41E-03	5.13E-03	4.59E-03	4.08E-03
55071	2104008330	NOX	3.15E-03	3.03E-03	2.81E-03	2.61E-03
55071	2104008400	NOX	2.84E-03	3.39E-03	4.57E-03	5.88E-03
55071	2104008510	NOX	1.96E-03	1.36E-03	1.33E-04	7.43E-05
55071	2104008530	NOX	4.13E-03	2.75E-03	0.00E+00	0.00E+00
55071	2104008610	NOX	2.12E-03	1.67E-03	7.65E-04	9.11E-05
55071	2104008620	NOX	1.35E-03	9.00E-04	0.00E+00	0.00E+00
55071	2104008630	NOX	1.12E-04	7.43E-05	0.00E+00	0.00E+00
55071	2104008700	NOX	4.20E-03	6.40E-03	1.08E-02	1.54E-02
55071	2104009000	NOX	1.27E-04	1.30E-04	1.37E-04	1.46E-04

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FIPS	SCC	POLLUTANT	2017(tposd)	2019(tposd)	2025(tposd)	2033(tposd)
55071	2104011000	NOX	1.51E-04	1.60E-04	1.78E-04	1.97E-04
55071	2610000100	NOX	3.39E-04	3.56E-04	3.88E-04	4.22E-04
55071	2610000400	NOX	3.39E-04	3.31E-04	3.13E-04	2.95E-04
55071	2610000500	NOX	7.67E-03	8.29E-03	9.48E-03	1.07E-02
55071	2610030000	NOX	1.72E-02	1.79E-02	1.91E-02	2.04E-02
55071	2810025000	NOX	1.03E-03	1.72E-03	3.07E-03	4.48E-03
55071	2810060100	NOX	1.44E-04	2.94E-04	5.89E-04	8.95E-04
55071	2810060200	NOX	2.54E-08	1.69E-08	0.00E+00	0.00E+00
55071	2102001000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102002000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102004001	VOC	0.00E+00	7.38E-06	2.20E-05	3.72E-05
55071	2102004002	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102005000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2102006000	VOC	1.29E-02	1.02E-02	4.73E-03	6.85E-04
55071	2102007000	VOC	9.60E-05	9.47E-05	9.15E-05	8.86E-05
55071	2102008000	VOC	1.12E-02	1.14E-02	1.19E-02	1.26E-02
55071	2102011000	VOC	8.35E-07	5.56E-07	0.00E+00	0.00E+00
55071	2103001000	VOC	2.67E-07	1.78E-07	0.00E+00	0.00E+00
55071	2103002000	VOC	4.90E-06	3.26E-06	0.00E+00	0.00E+00
55071	2103004001	VOC	8.04E-06	5.35E-06	0.00E+00	0.00E+00
55071	2103004002	VOC	5.23E-05	6.81E-05	9.81E-05	1.28E-04
55071	2103005000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2103006000	VOC	4.01E-03	4.12E-03	4.29E-03	4.46E-03
55071	2103007000	VOC	1.41E-04	1.44E-04	1.50E-04	1.56E-04
55071	2103008000	VOC	3.50E-04	3.58E-04	3.71E-04	3.85E-04
55071	2103011000	VOC	6.00E-07	5.23E-07	3.67E-07	2.09E-07
55071	2104001000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2104002000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2104004000	VOC	3.17E-04	3.50E-04	4.15E-04	4.83E-04
55071	2104006000	VOC	1.03E-02	1.08E-02	1.15E-02	1.24E-02
55071	2104007000	VOC	1.60E-03	1.78E-03	2.11E-03	2.46E-03
55071	2104008100	VOC	2.83E-02	2.28E-02	1.20E-02	1.07E-03
55071	2104008210	VOC	4.71E-03	9.00E-03	1.71E-02	2.52E-02
55071	2104008220	VOC	3.49E-03	3.20E-03	2.63E-03	2.07E-03
55071	2104008230	VOC	2.90E-03	2.26E-03	1.00E-03	6.80E-05
55071	2104008310	VOC	3.85E-02	5.52E-02	8.65E-02	1.18E-01
55071	2104008320	VOC	2.85E-02	2.70E-02	2.41E-02	2.15E-02
55071	2104008330	VOC	2.37E-02	2.27E-02	2.11E-02	1.96E-02
55071	2104008400	VOC	1.64E-03	1.96E-03	2.64E-03	3.40E-03
55071	2104008510	VOC	1.27E-02	8.84E-03	8.50E-04	4.73E-04

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FIPS	SCC	POLLUTANT	2017(tposd)	2019(tposd)	2025(tposd)	2033(tposd)
55071	2104008530	VOC	2.39E-03	1.59E-03	0.00E+00	0.00E+00
55071	2104008610	VOC	7.13E-02	5.62E-02	2.58E-02	3.07E-03
55071	2104008620	VOC	4.56E-02	3.03E-02	0.00E+00	0.00E+00
55071	2104008630	VOC	6.46E-05	4.30E-05	0.00E+00	0.00E+00
55071	2104008700	VOC	3.05E-02	4.65E-02	7.86E-02	1.12E-01
55071	2104009000	VOC	6.52E-04	6.70E-04	7.06E-04	7.51E-04
55071	2104011000	VOC	5.89E-06	6.25E-06	6.92E-06	7.64E-06
55072	2201000062	VOC	9.87E-02	7.70E-02	5.00E-02	4.01E-02
55071	2302002100	VOC	1.59E-03	1.40E-03	9.99E-04	5.97E-04
55071	2302002200	VOC	3.80E-03	3.47E-03	2.79E-03	2.12E-03
55071	2302003000	VOC	1.02E-03	8.36E-04	4.57E-04	7.13E-05
55071	2302003100	VOC	5.04E-04	4.66E-04	3.89E-04	3.12E-04
55071	2302003200	VOC	3.65E-05	2.94E-05	1.53E-05	8.73E-07
55071	2401001000	VOC	1.68E-01	1.69E-01	1.69E-01	1.70E-01
55071	2401005000	VOC	2.32E-02	2.38E-02	2.49E-02	2.61E-02
55071	2401008000	VOC	2.88E-02	2.93E-02	3.01E-02	3.10E-02
55071	2401015000	VOC	7.69E-03	5.12E-03	0.00E+00	0.00E+00
55071	2401020000	VOC	5.57E-02	5.70E-02	5.92E-02	6.17E-02
55071	2401025000	VOC	1.12E-01	1.44E-01	2.06E-01	2.70E-01
55071	2401055000	VOC	4.72E-02	3.14E-02	0.00E+00	0.00E+00
55071	2401060000	VOC	7.29E-03	7.26E-03	7.16E-03	7.08E-03
55071	2401070000	VOC	9.35E-02	8.75E-02	7.52E-02	6.28E-02
55071	2401080000	VOC	2.01E-02	1.68E-02	1.01E-02	3.33E-03
55071	2401090000	VOC	1.47E-02	9.80E-03	0.00E+00	0.00E+00
55071	2401100000	VOC	2.60E-02	3.19E-02	4.35E-02	5.56E-02
55071	2401200000	VOC	4.19E-04	4.25E-04	4.33E-04	4.44E-04
55071	2415000000	VOC	2.39E-01	1.59E-01	0.00E+00	0.00E+00
55071	2420000000	VOC	1.20E-04	7.96E-05	0.00E+00	0.00E+00
55071	2425000000	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2460100000	VOC	1.40E-01	1.42E-01	1.44E-01	1.48E-01
55071	2460200000	VOC	1.42E-01	1.48E-01	1.59E-01	1.71E-01
55071	2460400000	VOC	1.35E-02	4.20E-02	9.82E-02	1.56E-01
55071	2460500000	VOC	6.78E-02	6.81E-02	6.86E-02	6.94E-02
55071	2460600000	VOC	1.30E-01	1.00E-01	4.12E-02	5.09E-03
55071	2460800000	VOC	1.27E-01	1.28E-01	1.29E-01	1.30E-01
55071	2460900000	VOC	4.99E-03	5.02E-03	5.05E-03	5.11E-03
55071	2461021000	VOC	8.21E-02	8.55E-02	9.17E-02	9.84E-02
55071	2461022000	VOC	4.56E-02	4.75E-02	5.09E-02	5.46E-02
55071	2461850000	VOC	8.23E-02	7.48E-02	5.94E-02	4.39E-02
55071	2501011011	VOC	3.73E-03	3.73E-03	3.71E-03	3.70E-03

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55071	2501011012	VOC	4.18E-03	4.18E-03	4.16E-03	4.15E-03
55071	2501011013	VOC	5.33E-03	5.33E-03	5.30E-03	5.30E-03
55071	2501011014	VOC	7.78E-04	7.78E-04	7.74E-04	7.73E-04
55071	2501011015	VOC	1.47E-04	1.47E-04	1.46E-04	1.46E-04
55071	2501012011	VOC	1.63E-04	1.63E-04	1.62E-04	1.62E-04
55071	2501012012	VOC	1.34E-04	1.34E-04	1.33E-04	1.33E-04
55071	2501012013	VOC	7.27E-03	7.27E-03	7.23E-03	7.22E-03
55071	2501012014	VOC	2.24E-03	2.24E-03	2.23E-03	2.23E-03
55071	2501012015	VOC	2.83E-04	2.83E-04	2.82E-04	2.81E-04
55071	2501060051	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2501060052	VOC	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55071	2501060053	VOC	3.45E-02	3.12E-02	2.34E-02	1.43E-02
55071	2501060201	VOC	3.91E-02	3.55E-02	2.69E-02	1.68E-02
55071	2501080050	VOC	2.18E-02	2.01E-02	1.68E-02	1.33E-02
55071	2501080100	VOC	3.14E-05	1.58E-04	4.06E-04	6.63E-04
55071	2505030120	VOC	2.56E-03	2.32E-03	1.76E-03	1.10E-03
55071	2610000100	VOC	1.53E-03	1.61E-03	1.75E-03	1.90E-03
55071	2610000400	VOC	1.53E-03	1.42E-03	1.19E-03	9.56E-04
55071	2610000500	VOC	2.17E-02	2.18E-02	2.20E-02	2.23E-02
55071	2610030000	VOC	1.80E-02	1.81E-02	1.84E-02	1.87E-02
55071	2630020000	VOC	0.00E+00	6.56E-04	1.95E-03	3.29E-03
55071	2680003000	VOC	4.14E-02	4.32E-02	4.66E-02	5.02E-02
55071	2805002000	VOC	8.04E-03	8.03E-03	7.86E-03	7.64E-03
55071	2805007100	VOC	1.47E-02	1.51E-02	1.63E-02	1.78E-02
55071	2805009100	VOC	4.53E-05	4.66E-05	4.94E-05	5.31E-05
55071	2805010100	VOC	3.17E-06	3.17E-06	3.16E-06	3.18E-06
55071	2805018000	VOC	2.00E-01	2.00E-01	2.00E-01	2.01E-01
55071	2805025000	VOC	3.37E-04	3.45E-04	3.62E-04	3.84E-04
55071	2805035000	VOC	1.99E-03	1.99E-03	1.97E-03	1.96E-03
55071	2805040000	VOC	6.44E-04	6.43E-04	6.37E-04	6.34E-04
55071	2805045000	VOC	2.92E-04	2.91E-04	2.89E-04	2.87E-04
55071	2810025000	VOC	2.74E-03	2.72E-03	2.67E-03	2.64E-03
55071	2810060100	VOC	1.21E-05	8.74E-06	2.06E-06	2.06E-06
55071	2810060200	VOC	2.13E-09	1.42E-09	0.00E+00	0.00E+00
<b>TOTAL</b>		<b>NOx</b>	<b>0.75</b>	<b>0.71</b>	<b>0.63</b>	<b>0.61</b>
		<b>VOC</b>	<b>2.56</b>	<b>2.45</b>	<b>2.25</b>	<b>2.35</b>

\* Values marked in red font indicate WDNR staff estimates.



## **APPENDIX 7**

### **Nonroad Emissions for 2017, 2019, 2025 and 2033**

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This appendix provides detailed listings of the estimated nonroad tons per ozone season day (tposd) emissions for over 200 subcategories for the Manitowoc County 2015 ozone NAAQS nonattainment area, as well as the entirety of Manitowoc County, for 2017, 2019, 2025 and 2033. The sum of NO<sub>x</sub> and VOC emissions from these nonroad subcategories were used for the nonroad sector NO<sub>x</sub> and VOC tposd emission estimates in sections 4.2 (Nonattainment Year and Attainment Year Inventories) and 4.3 (Maintenance Year Inventories) of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.

These inventories are based on two primary sources of data:

MOVES model estimates

EPA's MOVES3.0.1 model was used for most source categories, with exceptions listed below.

EPA's National Emissions Inventory and modeling projections

Emissions for commercial marine, aircraft and rail locomotive were obtained using the EPA's 2017 National Emissions Inventory (NEI) and the EPA's 2016 emissions modeling platform, version 1 (which includes projections to 2023 and 2028).

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**Table A7.1. 2017 Nonroad NO<sub>x</sub> and VOC Emissions: tons per ozone season day (tposd) for Manitowoc County and the Manitowoc County 2015 ozone NAAQS nonattainment area**

SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2017 Emissions		% in NAA		Allocate by	Manitowoc NAA 2017 Emissions	
				NO <sub>x</sub>	VOC	NO <sub>x</sub>	VOC		NO <sub>x</sub>	VOC
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	MOVES	0.0008	0.0779	30.0%	30.0%	land area	0.0002	0.0234
2260001020	Recreational	2-Stroke Snowmobiles	MOVES	0.0000	0.0337	30.0%	30.0%	land area	0.0000	0.0101
2260001030	Recreational	2-Stroke All Terrain Vehicles	MOVES	0.0004	0.0211	30.0%	30.0%	land area	0.0001	0.0063
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	MOVES	0.0003	0.0016	30.0%	30.0%	land area	0.0001	0.0005
2260002006	Construction	2-Stroke Tampers/Rammers	MOVES	0.0000	0.0019	66.0%	66.0%	population	0.0000	0.0013
2260002009	Construction	2-Stroke Plate Compactors	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0000
2260002021	Construction	2-Stroke Paving Equipment	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2260002027	Construction	2-Stroke Signal Boards	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	MOVES	0.0001	0.0049	66.0%	66.0%	population	0.0001	0.0032
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2260003040	Industrial	2-Stroke Other General Industrial Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0000	0.0009	66.0%	66.0%	population	0.0000	0.0006
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0001	0.0022	66.0%	66.0%	population	0.0001	0.0014
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	MOVES	0.0002	0.0082	66.0%	66.0%	population	0.0002	0.0054
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	MOVES	0.0005	0.0245	66.0%	66.0%	population	0.0004	0.0162
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0006	0.0174	66.0%	66.0%	population	0.0004	0.0115
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0010	0.0247	66.0%	66.0%	population	0.0006	0.0163
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0004	0.0122	66.0%	66.0%	population	0.0003	0.0080
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0009	0.0247	66.0%	66.0%	population	0.0006	0.0163
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0013	66.0%	66.0%	population	0.0000	0.0008
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260005035	Agriculture	2-Stroke Sprayers	MOVES	0.0000	0.0004	27.0%	27.0%	land area (1)	0.0000	0.0001
2260006005	Commercial	2-Stroke Light Commercial Generator Set	MOVES	0.0000	0.0006	66.0%	66.0%	population	0.0000	0.0004
2260006010	Commercial	2-Stroke Light Commercial Pumps	MOVES	0.0001	0.0040	66.0%	66.0%	population	0.0001	0.0027
2260006015	Commercial	2-Stroke Light Commercial Air Compressors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws > 6 HP	MOVES	0.0000	0.0004	30.0%	30.0%	land area	0.0000	0.0001
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	MOVES	0.0005	0.0040	30.0%	30.0%	land area	0.0001	0.0012
2265001030	Recreational	4-Stroke All Terrain Vehicles	MOVES	0.0035	0.0417	30.0%	30.0%	land area	0.0010	0.0125
2265001050	Recreational	4-Stroke Golf Carts	MOVES	0.0029	0.0097	30.0%	30.0%	land area	0.0009	0.0029
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	MOVES	0.0004	0.0017	30.0%	30.0%	land area	0.0001	0.0005
2265002003	Construction	4-Stroke Asphalt Pavers	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002009	Construction	4-Stroke Plate Compactors	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0002

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				NOx	VOC	NOx	VOC		NOx	VOC
2265002015	Construction	4-Stroke Rollers	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002021	Construction	4-Stroke Paving Equipment	MOVES	0.0001	0.0005	66.0%	66.0%	population	0.0001	0.0003
2265002024	Construction	4-Stroke Surfacing Equipment	MOVES	0.0000	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002027	Construction	4-Stroke Signal Boards	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002030	Construction	4-Stroke Trenchers	MOVES	0.0001	0.0003	66.0%	66.0%	population	0.0001	0.0002
2265002033	Construction	4-Stroke Bore/Drill Rigs	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002039	Construction	4-Stroke Concrete/Industrial Saws	MOVES	0.0002	0.0007	66.0%	66.0%	population	0.0001	0.0004
2265002042	Construction	4-Stroke Cement & Mortar Mixers	MOVES	0.0001	0.0008	66.0%	66.0%	population	0.0001	0.0005
2265002045	Construction	4-Stroke Cranes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002072	Construction	4-Stroke Skid Steer Loaders	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0001	0.0001
2265002078	Construction	4-Stroke Dumpers/Tenders	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2265002081	Construction	4-Stroke Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265003010	Industrial	4-Stroke Aerial Lifts	MOVES	0.0022	0.0030	66.0%	66.0%	population	0.0015	0.0020
2265003020	Industrial	4-Stroke Forklifts	MOVES	0.0040	0.0022	66.0%	66.0%	population	0.0026	0.0014
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	MOVES	0.0008	0.0017	66.0%	66.0%	population	0.0006	0.0011
2265003040	Industrial	4-Stroke Other General Industrial Equipment	MOVES	0.0017	0.0067	66.0%	66.0%	population	0.0011	0.0044
2265003050	Industrial	4-Stroke Other Material Handling Equipment	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0001	0.0001
2265003060	Industrial	4-Stroke Industrial AC/Refrigeration	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	MOVES	0.0003	0.0002	66.0%	66.0%	population	0.0002	0.0001
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	MOVES	0.0046	0.0459	66.0%	66.0%	population	0.0030	0.0303
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	MOVES	0.0021	0.0131	66.0%	66.0%	population	0.0014	0.0087
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0004	0.0040	66.0%	66.0%	population	0.0003	0.0026
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0011	0.0081	66.0%	66.0%	population	0.0007	0.0053
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0000	0.0004	66.0%	66.0%	population	0.0000	0.0003
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0021	0.0083	66.0%	66.0%	population	0.0014	0.0055
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0030	66.0%	66.0%	population	0.0000	0.0020
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.)	MOVES	0.0010	0.0073	66.0%	66.0%	population	0.0006	0.0048
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm.)	MOVES	0.0002	0.0009	66.0%	66.0%	population	0.0002	0.0006
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	MOVES	0.0004	0.0013	66.0%	66.0%	population	0.0002	0.0009
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	MOVES	0.0001	0.0010	66.0%	66.0%	population	0.0001	0.0006
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residential)	MOVES	0.0128	0.0716	66.0%	66.0%	population	0.0085	0.0473
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commercial)	MOVES	0.0031	0.0109	66.0%	66.0%	population	0.0021	0.0072
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	MOVES	0.0005	0.0012	66.0%	66.0%	population	0.0003	0.0008

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2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm.)	MOVES	0.0100	0.0325	66.0%	66.0%	population	0.0066	0.0214
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Res.)	MOVES	0.0005	0.0038	66.0%	66.0%	population	0.0004	0.0025
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Com.)	MOVES	0.0004	0.0027	66.0%	66.0%	population	0.0003	0.0018
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	MOVES	0.0001	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005020	Agriculture	4-Stroke Combines	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005025	Agriculture	4-Stroke Balers	MOVES	0.0009	0.0011	27.0%	27.0%	land area (1)	0.0002	0.0003
2265005030	Agriculture	4-Stroke Agricultural Mowers	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005035	Agriculture	4-Stroke Sprayers	MOVES	0.0011	0.0020	27.0%	27.0%	land area (1)	0.0003	0.0005
2265005040	Agriculture	4-Stroke Tillers > 5 HP	MOVES	0.0018	0.0078	27.0%	27.0%	land area (1)	0.0005	0.0021
2265005045	Agriculture	4-Stroke Swathers	MOVES	0.0014	0.0015	27.0%	27.0%	land area (1)	0.0004	0.0004
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	MOVES	0.0015	0.0014	27.0%	27.0%	land area (1)	0.0004	0.0004
2265005060	Agriculture	4-Stroke Irrigation Sets	MOVES	0.0002	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265006005	Commercial	4-Stroke Light Commercial Generator Set	MOVES	0.0036	0.0212	66.0%	66.0%	population	0.0023	0.0140
2265006010	Commercial	4-Stroke Light Commercial Pumps	MOVES	0.0009	0.0038	66.0%	66.0%	population	0.0006	0.0025
2265006015	Commercial	4-Stroke Light Commercial Air Compressors	MOVES	0.0005	0.0015	66.0%	66.0%	population	0.0003	0.0010
2265006025	Commercial	4-Stroke Light Commercial Welders	MOVES	0.0010	0.0032	66.0%	66.0%	population	0.0006	0.0021
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	MOVES	0.0014	0.0078	66.0%	66.0%	population	0.0010	0.0051
2265006035	Commercial	4-Stroke Hydro Power Units	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0002
2265007010	Logging	4-Stroke Logging Equipment Shredders > 6 HP	MOVES	0.0000	0.0001	30.0%	30.0%	land area	0.0000	0.0000
2265007015	Logging	4-Stroke Logging Equipment Skidders	MOVES	0.0000	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	MOVES	0.0001	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267002003	Construction	LPG Asphalt Pavers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002015	Construction	LPG Rollers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002021	Construction	LPG Paving Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002024	Construction	LPG Surfacing Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002030	Construction	LPG Trenchers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002045	Construction	LPG Cranes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002060	Construction	LPG Rubber Tire Loaders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002072	Construction	LPG Skid Steer Loaders	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267002081	Construction	LPG Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267003010	Industrial	LPG Aerial Lifts	MOVES	0.0020	0.0004	66.0%	66.0%	population	0.0013	0.0003
2267003020	Industrial	LPG Forklifts	MOVES	0.0645	0.0096	66.0%	66.0%	population	0.0425	0.0063
2267003030	Industrial	LPG Sweepers/Scrubbers	MOVES	0.0004	0.0001	66.0%	66.0%	population	0.0003	0.0000
2267003040	Industrial	LPG Other General Industrial Equipment	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000

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2267003050	Industrial	LPG Other Material Handling Equipment	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267003070	Industrial	LPG Terminal Tractors	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0002	0.0000
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial)	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267005055	Agriculture	LPG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267005060	Agriculture	LPG Irrigation Sets	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	MOVES	0.0018	0.0003	66.0%	66.0%	population	0.0012	0.0002
2267006010	Commercial	LPG Light Commercial Pumps	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006015	Commercial	LPG Light Commercial Air Compressors	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006025	Commercial	LPG Light Commercial Welders	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006030	Commercial	LPG Light Commercial Pressure Washers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267006035	Commercial	LPG Hydro Power Units	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	MOVES	0.0052	0.0028	66.0%	66.0%	population	0.0034	0.0018
2268003030	Industrial	CNG Sweepers/Scrubbers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003060	Industrial	CNG AC/Refrigeration	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003070	Industrial	CNG Terminal Tractors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	MOVES	0.0003	0.0001	27.0%	27.0%	land area (1)	0.0001	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	MOVES	0.0007	0.0004	66.0%	66.0%	population	0.0005	0.0003
2268006010	Commercial	CNG Light Commercial Pumps	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268006015	Commercial	CNG Light Commercial Air Compressors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268006020	Commercial	CNG Light Commercial Gas Compressors	MOVES	0.0003	0.0001	66.0%	66.0%	population	0.0002	0.0001
2270001060	Recreational	Diesel Specialty Vehicle Carts	MOVES	0.0011	0.0003	30.0%	30.0%	land area	0.0003	0.0001
2270002003	Construction	Diesel Pavers	MOVES	0.0014	0.0001	66.0%	66.0%	population	0.0010	0.0001
2270002006	Construction	Diesel Tampers/Rammers (unused)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270002009	Construction	Diesel Plate Compactors	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002015	Construction	Diesel Rollers	MOVES	0.0041	0.0002	66.0%	66.0%	population	0.0027	0.0002
2270002018	Construction	Diesel Scrapers	MOVES	0.0037	0.0002	66.0%	66.0%	population	0.0024	0.0001
2270002021	Construction	Diesel Paving Equipment	MOVES	0.0003	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270002024	Construction	Diesel Surfacing Equipment	MOVES	0.0003	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270002027	Construction	Diesel Signal Boards	MOVES	0.0008	0.0001	66.0%	66.0%	population	0.0005	0.0001
2270002030	Construction	Diesel Trenchers	MOVES	0.0027	0.0002	66.0%	66.0%	population	0.0018	0.0001
2270002033	Construction	Diesel Bore/Drill Rigs	MOVES	0.0037	0.0003	66.0%	66.0%	population	0.0024	0.0002
2270002036	Construction	Diesel Excavators	MOVES	0.0121	0.0006	66.0%	66.0%	population	0.0080	0.0004
2270002039	Construction	Diesel Concrete/Industrial Saws	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002042	Construction	Diesel Cement & Mortar Mixers	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002045	Construction	Diesel Cranes	MOVES	0.0041	0.0002	66.0%	66.0%	population	0.0027	0.0001
2270002048	Construction	Diesel Graders	MOVES	0.0028	0.0002	66.0%	66.0%	population	0.0019	0.0001
2270002051	Construction	Diesel Off-highway Trucks	MOVES	0.0148	0.0006	66.0%	66.0%	population	0.0098	0.0004

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2270002054	Construction	Diesel Crushing/Proc. Equipment	MOVES	0.0009	0.0000	66.0%	66.0%	population	0.0006	0.0000
2270002057	Construction	Diesel Rough Terrain Forklifts	MOVES	0.0058	0.0004	66.0%	66.0%	population	0.0039	0.0003
2270002060	Construction	Diesel Rubber Tire Loaders	MOVES	0.0202	0.0011	66.0%	66.0%	population	0.0133	0.0007
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	MOVES	0.0193	0.0036	66.0%	66.0%	population	0.0128	0.0024
2270002069	Construction	Diesel Crawler Tractors	MOVES	0.0149	0.0007	66.0%	66.0%	population	0.0098	0.0005
2270002072	Construction	Diesel Skid Steer Loaders	MOVES	0.0148	0.0033	66.0%	66.0%	population	0.0098	0.0022
2270002075	Construction	Diesel Off-Highway Tractors	MOVES	0.0025	0.0001	66.0%	66.0%	population	0.0016	0.0001
2270002078	Construction	Diesel Dumpers/Tenders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270002081	Construction	Diesel Other Construction Equipment	MOVES	0.0026	0.0002	66.0%	66.0%	population	0.0017	0.0001
2270003010	Industrial	Diesel Aerial Lifts	MOVES	0.0047	0.0011	66.0%	66.0%	population	0.0031	0.0007
2270003020	Industrial	Diesel Forklifts	MOVES	0.0282	0.0012	66.0%	66.0%	population	0.0186	0.0008
2270003030	Industrial	Diesel Sweepers/Scrubbers	MOVES	0.0144	0.0009	66.0%	66.0%	population	0.0095	0.0006
2270003040	Industrial	Diesel Other General Industrial Equipment	MOVES	0.0180	0.0013	66.0%	66.0%	population	0.0119	0.0008
2270003050	Industrial	Diesel Other Material Handling Equipment	MOVES	0.0012	0.0002	66.0%	66.0%	population	0.0008	0.0001
2270003060	Industrial	Diesel AC/Refrigeration	MOVES	0.0220	0.0013	66.0%	66.0%	population	0.0145	0.0009
2270003070	Industrial	Diesel Terminal Tractors	MOVES	0.0132	0.0007	66.0%	66.0%	population	0.0087	0.0005
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	MOVES	0.0061	0.0006	66.0%	66.0%	population	0.0040	0.0004
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercial)	MOVES	0.0012	0.0001	66.0%	66.0%	population	0.0008	0.0001
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commercial)	MOVES	0.0092	0.0008	66.0%	66.0%	population	0.0061	0.0005
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	MOVES	0.0007	0.0000	66.0%	66.0%	population	0.0004	0.0000
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	MOVES	0.2601	0.0208	27.0%	27.0%	land area (1)	0.0702	0.0056
2270005020	Agriculture	Diesel Combines	MOVES	0.0395	0.0032	27.0%	27.0%	land area (1)	0.0107	0.0009
2270005025	Agriculture	Diesel Balers	MOVES	0.0002	0.0000	27.0%	27.0%	land area (1)	0.0001	0.0000
2270005030	Agriculture	Diesel Agricultural Mowers	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005035	Agriculture	Diesel Sprayers	MOVES	0.0032	0.0003	27.0%	27.0%	land area (1)	0.0009	0.0001
2270005040	Agriculture	Diesel Tillers > 6 HP	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005045	Agriculture	Diesel Swathers	MOVES	0.0028	0.0003	27.0%	27.0%	land area (1)	0.0008	0.0001
2270005055	Agriculture	Diesel Other Agricultural Equipment	MOVES	0.0069	0.0006	27.0%	27.0%	land area (1)	0.0019	0.0002
2270005060	Agriculture	Diesel Irrigation Sets	MOVES	0.0024	0.0002	27.0%	27.0%	land area (1)	0.0006	0.0000
2270006005	Commercial	Diesel Light Commercial Generator Sets	MOVES	0.0108	0.0011	66.0%	66.0%	population	0.0071	0.0008
2270006010	Commercial	Diesel Light Commercial Pumps	MOVES	0.0026	0.0003	66.0%	66.0%	population	0.0017	0.0002
2270006015	Commercial	Diesel Light Commercial Air Compressors	MOVES	0.0051	0.0004	66.0%	66.0%	population	0.0034	0.0003
2270006025	Commercial	Diesel Light Commercial Welders	MOVES	0.0034	0.0008	66.0%	66.0%	population	0.0022	0.0005
2270006030	Commercial	Diesel Light Commercial Pressure Washer	MOVES	0.0004	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270006035	Commercial	Diesel Hydro Power Units	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	MOVES	0.0011	0.0000	30.0%	30.0%	land area	0.0003	0.0000

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SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2017 Emissions		% in NAA		Allocate by	Manitowoc NAA 2017 Emissions	
				NOx	VOC	NOx	VOC		NOx	VOC
2275000000	Airport	All Aircraft	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
2280002101	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002102	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002103	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002104	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002201	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Main Eng.	EPA	0.0720	0.0023	100.0%	100.0%	Lk. Mich. Shoreline	0.0720	0.0023
2280002202	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Aux. Eng.	EPA	0.0519	0.0015	100.0%	100.0%	Lk. Mich. Shoreline	0.0519	0.0015
2280002203	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Main Eng.	EPA	0.1469	0.0065	100.0%	100.0%	Lk. Mich. Shoreline	0.1469	0.0065
2280002204	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Aux. Eng.	EPA	0.0523	0.0021	100.0%	100.0%	Lk. Mich. Shoreline	0.0523	0.0021
2282005010	Pleasure Craft	2-Stroke Outboards	MOVES	0.0549	0.3669	12.0%	12.0%	water area	0.0066	0.0440
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	MOVES	0.0244	0.0631	85.0%	85.0%	water area	0.0208	0.0536
2282010005	Pleasure Craft	4-Stroke Inboards	MOVES	0.1984	0.2183	85.0%	85.0%	water area	0.1686	0.1855
2282020005	Pleasure Craft	Diesel Inboards	MOVES	0.1855	0.0095	85.0%	85.0%	water area	0.1577	0.0081
2282020010	Pleasure Craft	Diesel Outboards	MOVES	0.0001	0.0000	12.0%	12.0%	water area	0.0000	0.0000
228500200x	Railroad	All Diesel Locomotives	EPA	0.0093	0.0004	35.0%	25.0%	rail links	0.0033	0.0001
2285002015	Railway Maint.	Diesel Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285004015	Railway Maint.	4-Stroke Gasoline Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285006015	Railway Maint.	LPG Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.5461</b>	<b>1.3493</b>	<b>67.7%</b>	<b>49.6%</b>		<b>1.0474</b>	<b>0.6697</b>
22xx005xxx	Agriculture	All	MOVES	0.3225	0.0403	27.0%	27.0%	land area (1)	0.0871	0.0109
22750xxxxx	Airport	All	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
22xx006xxx	Commercial	All	MOVES	0.0334	0.0460	66.0%	66.0%	population	0.0221	0.0304
2280002xxx	Comm. Mar	All	EPA	0.3231	0.0124	100.0%	100.0%	Lk. Mich. Shoreline	0.3231	0.0124
22xx002xxx	Construction	All	MOVES	0.1338	0.0231	66.0%	66.0%	population	0.0883	0.0152
22xx003xxx	Industrial	All	MOVES	0.1835	0.0337	66.0%	66.0%	population	0.1211	0.0223
22xx004xxx	Lawn/Garden	All	MOVES	0.0607	0.3347	66.0%	66.0%	population	0.0400	0.2209
22xx007xxx	Logging	All	MOVES	0.0011	0.0006	30.0%	30.0%	land area	0.0003	0.0002
22820xxxxx	Pleasure Craft	All	MOVES	0.4634	0.6577	76.3%	44.3%	water area	0.3537	0.2912
228500200x	Railroad	All	EPA	0.0093	0.0004	35.0%	25.0%	rail links	0.0033	0.0001
228500x015	Railway Maint.	All	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
22xx001xxx	Recreational	All	MOVES	0.0099	0.1916	30.0%	30.0%	land area	0.0030	0.0575
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.5461</b>	<b>1.3493</b>	<b>67.7%</b>	<b>49.6%</b>		<b>1.0474</b>	<b>0.6697</b>

(1) Cities in Manitowoc County (Kiel, Manitowoc and Two Rivers) excluded.



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**Table A7.2. 2019 Nonroad NO<sub>x</sub> and VOC Emissions: tons per ozone season day (tposd) for Manitowoc County and the Manitowoc County 2015 ozone NAAQS nonattainment area**

SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2019 Emissions		% in NAA		Allocate by	Manitowoc NAA 2019 Emissions	
				NO <sub>x</sub>	VOC	NO <sub>x</sub>	VOC		NO <sub>x</sub>	VOC
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	MOVES	0.0008	0.0716	30.0%	30.0%	land area	0.0003	0.0215
2260001020	Recreational	2-Stroke Snowmobiles	MOVES	0.0000	0.0307	30.0%	30.0%	land area	0.0000	0.0092
2260001030	Recreational	2-Stroke All Terrain Vehicles	MOVES	0.0004	0.0142	30.0%	30.0%	land area	0.0001	0.0043
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	MOVES	0.0003	0.0015	30.0%	30.0%	land area	0.0001	0.0004
2260002006	Construction	2-Stroke Tampers/Rammers	MOVES	0.0001	0.0021	66.0%	66.0%	population	0.0000	0.0014
2260002009	Construction	2-Stroke Plate Compactors	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2260002021	Construction	2-Stroke Paving Equipment	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2260002027	Construction	2-Stroke Signal Boards	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	MOVES	0.0001	0.0053	66.0%	66.0%	population	0.0001	0.0035
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2260003040	Industrial	2-Stroke Other General Industrial Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0000	0.0009	66.0%	66.0%	population	0.0000	0.0006
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0001	0.0022	66.0%	66.0%	population	0.0001	0.0014
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	MOVES	0.0002	0.0082	66.0%	66.0%	population	0.0002	0.0054
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	MOVES	0.0005	0.0245	66.0%	66.0%	population	0.0004	0.0162
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0006	0.0173	66.0%	66.0%	population	0.0004	0.0114
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0010	0.0247	66.0%	66.0%	population	0.0006	0.0163
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0004	0.0121	66.0%	66.0%	population	0.0003	0.0080
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0009	0.0247	66.0%	66.0%	population	0.0006	0.0163
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0012	66.0%	66.0%	population	0.0000	0.0008
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260005035	Agriculture	2-Stroke Sprayers	MOVES	0.0000	0.0004	27.0%	27.0%	land area (1)	0.0000	0.0001
2260006005	Commercial	2-Stroke Light Commercial Generator Set	MOVES	0.0000	0.0006	66.0%	66.0%	population	0.0000	0.0004
2260006010	Commercial	2-Stroke Light Commercial Pumps	MOVES	0.0002	0.0042	66.0%	66.0%	population	0.0001	0.0028
2260006015	Commercial	2-Stroke Light Commercial Air Compressors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws > 6 HP	MOVES	0.0000	0.0004	30.0%	30.0%	land area	0.0000	0.0001
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	MOVES	0.0005	0.0038	30.0%	30.0%	land area	0.0001	0.0011
2265001030	Recreational	4-Stroke All Terrain Vehicles	MOVES	0.0033	0.0399	30.0%	30.0%	land area	0.0010	0.0120
2265001050	Recreational	4-Stroke Golf Carts	MOVES	0.0029	0.0097	30.0%	30.0%	land area	0.0009	0.0029
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	MOVES	0.0004	0.0015	30.0%	30.0%	land area	0.0001	0.0004
2265002003	Construction	4-Stroke Asphalt Pavers	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002009	Construction	4-Stroke Plate Compactors	MOVES	0.0001	0.0003	66.0%	66.0%	population	0.0000	0.0002

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				NOx	VOC	NOx	VOC		NOx	VOC
2265002015	Construction	4-Stroke Rollers	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002021	Construction	4-Stroke Paving Equipment	MOVES	0.0001	0.0006	66.0%	66.0%	population	0.0001	0.0004
2265002024	Construction	4-Stroke Surfacing Equipment	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002027	Construction	4-Stroke Signal Boards	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002030	Construction	4-Stroke Trenchers	MOVES	0.0001	0.0003	66.0%	66.0%	population	0.0001	0.0002
2265002033	Construction	4-Stroke Bore/Drill Rigs	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0001
2265002039	Construction	4-Stroke Concrete/Industrial Saws	MOVES	0.0002	0.0007	66.0%	66.0%	population	0.0001	0.0005
2265002042	Construction	4-Stroke Cement & Mortar Mixers	MOVES	0.0001	0.0008	66.0%	66.0%	population	0.0001	0.0005
2265002045	Construction	4-Stroke Cranes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0000	0.0002
2265002072	Construction	4-Stroke Skid Steer Loaders	MOVES	0.0001	0.0001	66.0%	66.0%	population	0.0001	0.0001
2265002078	Construction	4-Stroke Dumpers/Tenders	MOVES	0.0000	0.0001	66.0%	66.0%	population	0.0000	0.0001
2265002081	Construction	4-Stroke Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265003010	Industrial	4-Stroke Aerial Lifts	MOVES	0.0020	0.0028	66.0%	66.0%	population	0.0013	0.0019
2265003020	Industrial	4-Stroke Forklifts	MOVES	0.0038	0.0020	66.0%	66.0%	population	0.0025	0.0013
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	MOVES	0.0009	0.0018	66.0%	66.0%	population	0.0006	0.0012
2265003040	Industrial	4-Stroke Other General Industrial Equipment	MOVES	0.0018	0.0073	66.0%	66.0%	population	0.0012	0.0048
2265003050	Industrial	4-Stroke Other Material Handling Equipment	MOVES	0.0001	0.0002	66.0%	66.0%	population	0.0001	0.0001
2265003060	Industrial	4-Stroke Industrial AC/Refrigeration	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	MOVES	0.0003	0.0002	66.0%	66.0%	population	0.0002	0.0001
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	MOVES	0.0043	0.0416	66.0%	66.0%	population	0.0028	0.0274
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	MOVES	0.0020	0.0131	66.0%	66.0%	population	0.0014	0.0086
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0004	0.0036	66.0%	66.0%	population	0.0002	0.0024
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0011	0.0077	66.0%	66.0%	population	0.0007	0.0051
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0000	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0000	0.0004	66.0%	66.0%	population	0.0000	0.0003
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0020	0.0082	66.0%	66.0%	population	0.0013	0.0054
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0028	66.0%	66.0%	population	0.0000	0.0019
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0002	66.0%	66.0%	population	0.0000	0.0002
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.)	MOVES	0.0009	0.0069	66.0%	66.0%	population	0.0006	0.0046
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm.)	MOVES	0.0002	0.0008	66.0%	66.0%	population	0.0001	0.0006
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	MOVES	0.0003	0.0012	66.0%	66.0%	population	0.0002	0.0008
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	MOVES	0.0001	0.0009	66.0%	66.0%	population	0.0001	0.0006
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residential)	MOVES	0.0118	0.0679	66.0%	66.0%	population	0.0078	0.0448
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commercial)	MOVES	0.0031	0.0108	66.0%	66.0%	population	0.0020	0.0071
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	MOVES	0.0005	0.0012	66.0%	66.0%	population	0.0003	0.0008

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				NOx	VOC	NOx	VOC		NOx	VOC
2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm.)	MOVES	0.0099	0.0324	66.0%	66.0%	population	0.0065	0.0214
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Res.)	MOVES	0.0005	0.0034	66.0%	66.0%	population	0.0003	0.0023
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Com.)	MOVES	0.0004	0.0025	66.0%	66.0%	population	0.0002	0.0016
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	MOVES	0.0001	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005020	Agriculture	4-Stroke Combines	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005025	Agriculture	4-Stroke Balers	MOVES	0.0008	0.0010	27.0%	27.0%	land area (1)	0.0002	0.0003
2265005030	Agriculture	4-Stroke Agricultural Mowers	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005035	Agriculture	4-Stroke Sprayers	MOVES	0.0010	0.0018	27.0%	27.0%	land area (1)	0.0003	0.0005
2265005040	Agriculture	4-Stroke Tillers > 5 HP	MOVES	0.0016	0.0069	27.0%	27.0%	land area (1)	0.0004	0.0019
2265005045	Agriculture	4-Stroke Swathers	MOVES	0.0012	0.0013	27.0%	27.0%	land area (1)	0.0003	0.0004
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	MOVES	0.0014	0.0012	27.0%	27.0%	land area (1)	0.0004	0.0003
2265005060	Agriculture	4-Stroke Irrigation Sets	MOVES	0.0002	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265006005	Commercial	4-Stroke Light Commercial Generator Set	MOVES	0.0034	0.0210	66.0%	66.0%	population	0.0023	0.0139
2265006010	Commercial	4-Stroke Light Commercial Pumps	MOVES	0.0009	0.0039	66.0%	66.0%	population	0.0006	0.0026
2265006015	Commercial	4-Stroke Light Commercial Air Compressors	MOVES	0.0005	0.0015	66.0%	66.0%	population	0.0003	0.0010
2265006025	Commercial	4-Stroke Light Commercial Welders	MOVES	0.0010	0.0033	66.0%	66.0%	population	0.0006	0.0022
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	MOVES	0.0015	0.0080	66.0%	66.0%	population	0.0010	0.0053
2265006035	Commercial	4-Stroke Hydro Power Units	MOVES	0.0001	0.0003	66.0%	66.0%	population	0.0000	0.0002
2265007010	Logging	4-Stroke Logging Equipment Shredders > 6 HP	MOVES	0.0000	0.0001	30.0%	30.0%	land area	0.0000	0.0000
2265007015	Logging	4-Stroke Logging Equipment Skidders	MOVES	0.0000	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	MOVES	0.0001	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267002003	Construction	LPG Asphalt Pavers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002015	Construction	LPG Rollers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002021	Construction	LPG Paving Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002024	Construction	LPG Surfacing Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002030	Construction	LPG Trenchers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002045	Construction	LPG Cranes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002060	Construction	LPG Rubber Tire Loaders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002072	Construction	LPG Skid Steer Loaders	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267002081	Construction	LPG Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267003010	Industrial	LPG Aerial Lifts	MOVES	0.0017	0.0003	66.0%	66.0%	population	0.0011	0.0002
2267003020	Industrial	LPG Forklifts	MOVES	0.0603	0.0078	66.0%	66.0%	population	0.0398	0.0051
2267003030	Industrial	LPG Sweepers/Scrubbers	MOVES	0.0004	0.0001	66.0%	66.0%	population	0.0003	0.0000
2267003040	Industrial	LPG Other General Industrial Equipment	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000

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				NOx	VOC	NOx	VOC		NOx	VOC
2267003050	Industrial	LPG Other Material Handling Equipment	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267003070	Industrial	LPG Terminal Tractors	MOVES	0.0003	0.0000	66.0%	66.0%	population	0.0002	0.0000
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial)	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267005055	Agriculture	LPG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267005060	Agriculture	LPG Irrigation Sets	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	MOVES	0.0015	0.0003	66.0%	66.0%	population	0.0010	0.0002
2267006010	Commercial	LPG Light Commercial Pumps	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006015	Commercial	LPG Light Commercial Air Compressors	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006025	Commercial	LPG Light Commercial Welders	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2267006030	Commercial	LPG Light Commercial Pressure Washers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2267006035	Commercial	LPG Hydro Power Units	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	MOVES	0.0049	0.0023	66.0%	66.0%	population	0.0032	0.0015
2268003030	Industrial	CNG Sweepers/Scrubbers	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003060	Industrial	CNG AC/Refrigeration	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268003070	Industrial	CNG Terminal Tractors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	MOVES	0.0003	0.0001	27.0%	27.0%	land area (1)	0.0001	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	MOVES	0.0006	0.0004	66.0%	66.0%	population	0.0004	0.0002
2268006010	Commercial	CNG Light Commercial Pumps	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268006015	Commercial	CNG Light Commercial Air Compressors	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2268006020	Commercial	CNG Light Commercial Gas Compressors	MOVES	0.0003	0.0001	66.0%	66.0%	population	0.0002	0.0001
2270001060	Recreational	Diesel Specialty Vehicle Carts	MOVES	0.0010	0.0002	30.0%	30.0%	land area	0.0003	0.0001
2270002003	Construction	Diesel Pavers	MOVES	0.0012	0.0001	66.0%	66.0%	population	0.0008	0.0000
2270002006	Construction	Diesel Tampers/Rammers (unused)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270002009	Construction	Diesel Plate Compactors	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002015	Construction	Diesel Rollers	MOVES	0.0036	0.0002	66.0%	66.0%	population	0.0024	0.0001
2270002018	Construction	Diesel Scrapers	MOVES	0.0025	0.0001	66.0%	66.0%	population	0.0017	0.0001
2270002021	Construction	Diesel Paving Equipment	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002024	Construction	Diesel Surfacing Equipment	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270002027	Construction	Diesel Signal Boards	MOVES	0.0008	0.0001	66.0%	66.0%	population	0.0005	0.0000
2270002030	Construction	Diesel Trenchers	MOVES	0.0024	0.0001	66.0%	66.0%	population	0.0016	0.0001
2270002033	Construction	Diesel Bore/Drill Rigs	MOVES	0.0033	0.0002	66.0%	66.0%	population	0.0022	0.0002
2270002036	Construction	Diesel Excavators	MOVES	0.0090	0.0004	66.0%	66.0%	population	0.0059	0.0003
2270002039	Construction	Diesel Concrete/Industrial Saws	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002042	Construction	Diesel Cement & Mortar Mixers	MOVES	0.0001	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270002045	Construction	Diesel Cranes	MOVES	0.0032	0.0002	66.0%	66.0%	population	0.0021	0.0001
2270002048	Construction	Diesel Graders	MOVES	0.0021	0.0001	66.0%	66.0%	population	0.0014	0.0001
2270002051	Construction	Diesel Off-highway Trucks	MOVES	0.0133	0.0005	66.0%	66.0%	population	0.0088	0.0003

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				NOx	VOC	NOx	VOC		NOx	VOC
2270002054	Construction	Diesel Crushing/Proc. Equipment	MOVES	0.0008	0.0000	66.0%	66.0%	population	0.0005	0.0000
2270002057	Construction	Diesel Rough Terrain Forklifts	MOVES	0.0050	0.0003	66.0%	66.0%	population	0.0033	0.0002
2270002060	Construction	Diesel Rubber Tire Loaders	MOVES	0.0161	0.0008	66.0%	66.0%	population	0.0106	0.0006
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	MOVES	0.0174	0.0031	66.0%	66.0%	population	0.0115	0.0020
2270002069	Construction	Diesel Crawler Tractors	MOVES	0.0117	0.0005	66.0%	66.0%	population	0.0077	0.0004
2270002072	Construction	Diesel Skid Steer Loaders	MOVES	0.0141	0.0029	66.0%	66.0%	population	0.0093	0.0019
2270002075	Construction	Diesel Off-Highway Tractors	MOVES	0.0020	0.0001	66.0%	66.0%	population	0.0013	0.0001
2270002078	Construction	Diesel Dumpers/Tenders	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270002081	Construction	Diesel Other Construction Equipment	MOVES	0.0022	0.0001	66.0%	66.0%	population	0.0015	0.0001
2270003010	Industrial	Diesel Aerial Lifts	MOVES	0.0045	0.0009	66.0%	66.0%	population	0.0030	0.0006
2270003020	Industrial	Diesel Forklifts	MOVES	0.0228	0.0007	66.0%	66.0%	population	0.0151	0.0005
2270003030	Industrial	Diesel Sweepers/Scrubbers	MOVES	0.0116	0.0006	66.0%	66.0%	population	0.0076	0.0004
2270003040	Industrial	Diesel Other General Industrial Equipment	MOVES	0.0145	0.0009	66.0%	66.0%	population	0.0096	0.0006
2270003050	Industrial	Diesel Other Material Handling Equipment	MOVES	0.0010	0.0002	66.0%	66.0%	population	0.0007	0.0001
2270003060	Industrial	Diesel AC/Refrigeration	MOVES	0.0222	0.0011	66.0%	66.0%	population	0.0147	0.0007
2270003070	Industrial	Diesel Terminal Tractors	MOVES	0.0091	0.0005	66.0%	66.0%	population	0.0060	0.0003
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	MOVES	0.0057	0.0006	66.0%	66.0%	population	0.0037	0.0004
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercial)	MOVES	0.0012	0.0001	66.0%	66.0%	population	0.0008	0.0001
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commercial)	MOVES	0.0084	0.0007	66.0%	66.0%	population	0.0055	0.0005
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	MOVES	0.0006	0.0000	66.0%	66.0%	population	0.0004	0.0000
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment	MOVES	0.0000	0.0000	66.0%	66.0%	population	0.0000	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	MOVES	0.2064	0.0153	27.0%	27.0%	land area (1)	0.0557	0.0041
2270005020	Agriculture	Diesel Combines	MOVES	0.0343	0.0027	27.0%	27.0%	land area (1)	0.0092	0.0007
2270005025	Agriculture	Diesel Balers	MOVES	0.0002	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005030	Agriculture	Diesel Agricultural Mowers	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005035	Agriculture	Diesel Sprayers	MOVES	0.0028	0.0003	27.0%	27.0%	land area (1)	0.0007	0.0001
2270005040	Agriculture	Diesel Tillers > 6 HP	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005045	Agriculture	Diesel Swathers	MOVES	0.0024	0.0003	27.0%	27.0%	land area (1)	0.0007	0.0001
2270005055	Agriculture	Diesel Other Agricultural Equipment	MOVES	0.0058	0.0005	27.0%	27.0%	land area (1)	0.0016	0.0001
2270005060	Agriculture	Diesel Irrigation Sets	MOVES	0.0020	0.0001	27.0%	27.0%	land area (1)	0.0005	0.0000
2270006005	Commercial	Diesel Light Commercial Generator Sets	MOVES	0.0101	0.0010	66.0%	66.0%	population	0.0067	0.0007
2270006010	Commercial	Diesel Light Commercial Pumps	MOVES	0.0024	0.0002	66.0%	66.0%	population	0.0016	0.0002
2270006015	Commercial	Diesel Light Commercial Air Compressors	MOVES	0.0044	0.0003	66.0%	66.0%	population	0.0029	0.0002
2270006025	Commercial	Diesel Light Commercial Welders	MOVES	0.0032	0.0006	66.0%	66.0%	population	0.0021	0.0004
2270006030	Commercial	Diesel Light Commercial Pressure Washer	MOVES	0.0003	0.0000	66.0%	66.0%	population	0.0002	0.0000
2270006035	Commercial	Diesel Hydro Power Units	MOVES	0.0002	0.0000	66.0%	66.0%	population	0.0001	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	MOVES	0.0006	0.0000	30.0%	30.0%	land area	0.0002	0.0000

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				NOx	VOC	NOx	VOC		NOx	VOC
2275000000	Airport	All Aircraft	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
2280002101	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002102	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002103	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002104	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002201	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Main Eng.	EPA	0.0664	0.0021	100.0%	100.0%	Lk. Mich. Shoreline	0.0664	0.0021
2280002202	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Aux. Eng.	EPA	0.0479	0.0014	100.0%	100.0%	Lk. Mich. Shoreline	0.0479	0.0014
2280002203	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Main Eng.	EPA	0.1517	0.0068	100.0%	100.0%	Lk. Mich. Shoreline	0.1517	0.0068
2280002204	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Aux. Eng.	EPA	0.0540	0.0022	100.0%	100.0%	Lk. Mich. Shoreline	0.0540	0.0022
2282005010	Pleasure Craft	2-Stroke Outboards	MOVES	0.0563	0.3009	12.0%	12.0%	water area	0.0068	0.0361
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	MOVES	0.0259	0.0454	85.0%	85.0%	water area	0.0220	0.0386
2282010005	Pleasure Craft	4-Stroke Inboards	MOVES	0.1806	0.2022	85.0%	85.0%	water area	0.1535	0.1719
2282020005	Pleasure Craft	Diesel Inboards	MOVES	0.1824	0.0099	85.0%	85.0%	water area	0.1551	0.0084
2282020010	Pleasure Craft	Diesel Outboards	MOVES	0.0001	0.0000	12.0%	12.0%	water area	0.0000	0.0000
228500200x	Railroad	All Diesel Locomotives	EPA	0.0090	0.0004	35.0%	25.0%	rail links	0.0032	0.0001
2285002015	Railway Maint.	Diesel Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285004015	Railway Maint.	4-Stroke Gasoline Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285006015	Railway Maint.	LPG Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.4145</b>	<b>1.2072</b>	<b>69.2%</b>	<b>50.9%</b>		<b>0.9796</b>	<b>0.6149</b>
22xx005xxx	Agriculture	All	MOVES	0.2605	0.0325	27.0%	27.0%	land area (1)	0.0703	0.0088
22750xxxxx	Airport	All	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
22xx006xxx	Commercial	All	MOVES	0.0310	0.0459	66.0%	66.0%	population	0.0205	0.0303
2280002xxx	Comm. Mar	All	EPA	0.3200	0.0125	100.0%	100.0%	Lk. Mich. Shoreline	0.3200	0.0125
22xx002xxx	Construction	All	MOVES	0.1131	0.0215	66.0%	66.0%	population	0.0747	0.0142
22xx003xxx	Industrial	All	MOVES	0.1626	0.0301	66.0%	66.0%	population	0.1073	0.0198
22xx004xxx	Lawn/Garden	All	MOVES	0.0573	0.3236	66.0%	66.0%	population	0.0378	0.2135
22xx007xxx	Logging	All	MOVES	0.0007	0.0006	30.0%	30.0%	land area	0.0002	0.0002
22820xxxxx	Pleasure Craft	All	MOVES	0.4453	0.5584	75.8%	45.7%	water area	0.3374	0.2550
228500200x	Railroad	All	EPA	0.0090	0.0004	35.0%	25.0%	rail links	0.0032	0.0001
228500x015	Railway Maint.	All	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
22xx001xxx	Recreational	All	MOVES	0.0096	0.1732	30.0%	30.0%	land area	0.0029	0.0519
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.4145</b>	<b>1.2072</b>	<b>69.2%</b>	<b>50.9%</b>		<b>0.9796</b>	<b>0.6149</b>

(1) Cities in Manitowoc County (Kiel, Manitowoc and Two Rivers) excluded.

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**Table A7.3. 2025 Nonroad NO<sub>x</sub> and VOC Emissions: tons per ozone season day (tposd) for Manitowoc County and the Manitowoc County 2015 ozone NAAQS nonattainment area**

SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2025 Emissions		% in NAA		Allocate by	Manitowoc NAA 2025 Emissions	
				NO <sub>x</sub>	VOC	NO <sub>x</sub>	VOC		NO <sub>x</sub>	VOC
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	MOVES	0.0009	0.0648	30.0%	30.0%	land area	0.0003	0.0194
2260001020	Recreational	2-Stroke Snowmobiles	MOVES	0.0000	0.0266	30.0%	30.0%	land area	0.0000	0.0080
2260001030	Recreational	2-Stroke All Terrain Vehicles	MOVES	0.0004	0.0066	30.0%	30.0%	land area	0.0001	0.0020
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	MOVES	0.0003	0.0014	30.0%	30.0%	land area	0.0001	0.0004
2260002006	Construction	2-Stroke Tampers/Rammers	MOVES	0.0001	0.0022	65.0%	65.0%	population	0.0000	0.0014
2260002009	Construction	2-Stroke Plate Compactors	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260002021	Construction	2-Stroke Paving Equipment	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260002027	Construction	2-Stroke Signal Boards	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	MOVES	0.0001	0.0056	65.0%	65.0%	population	0.0001	0.0036
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	MOVES	0.0000	0.0004	65.0%	65.0%	population	0.0000	0.0003
2260003040	Industrial	2-Stroke Other General Industrial Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0000	0.0009	65.0%	65.0%	population	0.0000	0.0006
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0001	0.0021	65.0%	65.0%	population	0.0001	0.0014
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	MOVES	0.0002	0.0081	65.0%	65.0%	population	0.0001	0.0053
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	MOVES	0.0005	0.0244	65.0%	65.0%	population	0.0004	0.0158
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0006	0.0172	65.0%	65.0%	population	0.0004	0.0112
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0010	0.0245	65.0%	65.0%	population	0.0006	0.0159
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0004	0.0120	65.0%	65.0%	population	0.0003	0.0078
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0009	0.0246	65.0%	65.0%	population	0.0006	0.0160
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0012	65.0%	65.0%	population	0.0000	0.0008
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260005035	Agriculture	2-Stroke Sprayers	MOVES	0.0000	0.0004	27.0%	27.0%	land area (1)	0.0000	0.0001
2260006005	Commercial	2-Stroke Light Commercial Generator Set	MOVES	0.0000	0.0007	65.0%	65.0%	population	0.0000	0.0004
2260006010	Commercial	2-Stroke Light Commercial Pumps	MOVES	0.0002	0.0046	65.0%	65.0%	population	0.0001	0.0030
2260006015	Commercial	2-Stroke Light Commercial Air Compressors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws > 6 HP	MOVES	0.0000	0.0004	30.0%	30.0%	land area	0.0000	0.0001
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	MOVES	0.0004	0.0036	30.0%	30.0%	land area	0.0001	0.0011
2265001030	Recreational	4-Stroke All Terrain Vehicles	MOVES	0.0031	0.0377	30.0%	30.0%	land area	0.0009	0.0113
2265001050	Recreational	4-Stroke Golf Carts	MOVES	0.0028	0.0096	30.0%	30.0%	land area	0.0009	0.0029
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	MOVES	0.0003	0.0011	30.0%	30.0%	land area	0.0001	0.0003
2265002003	Construction	4-Stroke Asphalt Pavers	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002009	Construction	4-Stroke Plate Compactors	MOVES	0.0001	0.0003	65.0%	65.0%	population	0.0000	0.0002

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2265002015	Construction	4-Stroke Rollers	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002021	Construction	4-Stroke Paving Equipment	MOVES	0.0001	0.0006	65.0%	65.0%	population	0.0001	0.0004
2265002024	Construction	4-Stroke Surfacing Equipment	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002027	Construction	4-Stroke Signal Boards	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002030	Construction	4-Stroke Trenchers	MOVES	0.0001	0.0003	65.0%	65.0%	population	0.0001	0.0002
2265002033	Construction	4-Stroke Bore/Drill Rigs	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002039	Construction	4-Stroke Concrete/Industrial Saws	MOVES	0.0002	0.0008	65.0%	65.0%	population	0.0002	0.0005
2265002042	Construction	4-Stroke Cement & Mortar Mixers	MOVES	0.0001	0.0008	65.0%	65.0%	population	0.0001	0.0005
2265002045	Construction	4-Stroke Cranes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0002
2265002072	Construction	4-Stroke Skid Steer Loaders	MOVES	0.0001	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002078	Construction	4-Stroke Dumpers/Tenders	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002081	Construction	4-Stroke Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265003010	Industrial	4-Stroke Aerial Lifts	MOVES	0.0015	0.0026	65.0%	65.0%	population	0.0010	0.0017
2265003020	Industrial	4-Stroke Forklifts	MOVES	0.0045	0.0023	65.0%	65.0%	population	0.0029	0.0015
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	MOVES	0.0011	0.0022	65.0%	65.0%	population	0.0007	0.0014
2265003040	Industrial	4-Stroke Other General Industrial Equipment	MOVES	0.0023	0.0089	65.0%	65.0%	population	0.0015	0.0058
2265003050	Industrial	4-Stroke Other Material Handling Equipment	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0001	0.0001
2265003060	Industrial	4-Stroke Industrial AC/Refrigeration	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	MOVES	0.0004	0.0002	65.0%	65.0%	population	0.0003	0.0001
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	MOVES	0.0041	0.0391	65.0%	65.0%	population	0.0027	0.0254
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	MOVES	0.0020	0.0130	65.0%	65.0%	population	0.0013	0.0085
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0004	0.0034	65.0%	65.0%	population	0.0002	0.0022
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0010	0.0076	65.0%	65.0%	population	0.0007	0.0049
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0000	0.0003	65.0%	65.0%	population	0.0000	0.0002
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0000	0.0003	65.0%	65.0%	population	0.0000	0.0002
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0000	0.0004	65.0%	65.0%	population	0.0000	0.0003
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0019	0.0081	65.0%	65.0%	population	0.0012	0.0053
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0028	65.0%	65.0%	population	0.0000	0.0018
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0002	65.0%	65.0%	population	0.0000	0.0002
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.)	MOVES	0.0008	0.0067	65.0%	65.0%	population	0.0005	0.0043
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm.)	MOVES	0.0002	0.0008	65.0%	65.0%	population	0.0001	0.0005
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	MOVES	0.0003	0.0011	65.0%	65.0%	population	0.0002	0.0007
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	MOVES	0.0001	0.0009	65.0%	65.0%	population	0.0001	0.0006
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residential)	MOVES	0.0111	0.0655	65.0%	65.0%	population	0.0072	0.0426
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commercial)	MOVES	0.0030	0.0107	65.0%	65.0%	population	0.0020	0.0070
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	MOVES	0.0005	0.0012	65.0%	65.0%	population	0.0003	0.0008



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2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm.)	MOVES	0.0098	0.0322	65.0%	65.0%	population	0.0064	0.0209
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Res.)	MOVES	0.0004	0.0030	65.0%	65.0%	population	0.0003	0.0020
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Com.)	MOVES	0.0003	0.0022	65.0%	65.0%	population	0.0002	0.0014
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	MOVES	0.0001	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005020	Agriculture	4-Stroke Combines	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005025	Agriculture	4-Stroke Balers	MOVES	0.0004	0.0006	27.0%	27.0%	land area (1)	0.0001	0.0002
2265005030	Agriculture	4-Stroke Agricultural Mowers	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005035	Agriculture	4-Stroke Sprayers	MOVES	0.0006	0.0014	27.0%	27.0%	land area (1)	0.0002	0.0004
2265005040	Agriculture	4-Stroke Tillers > 5 HP	MOVES	0.0011	0.0044	27.0%	27.0%	land area (1)	0.0003	0.0012
2265005045	Agriculture	4-Stroke Swathers	MOVES	0.0007	0.0007	27.0%	27.0%	land area (1)	0.0002	0.0002
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	MOVES	0.0008	0.0008	27.0%	27.0%	land area (1)	0.0002	0.0002
2265005060	Agriculture	4-Stroke Irrigation Sets	MOVES	0.0002	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265006005	Commercial	4-Stroke Light Commercial Generator Set	MOVES	0.0035	0.0219	65.0%	65.0%	population	0.0023	0.0142
2265006010	Commercial	4-Stroke Light Commercial Pumps	MOVES	0.0009	0.0042	65.0%	65.0%	population	0.0006	0.0027
2265006015	Commercial	4-Stroke Light Commercial Air Compressors	MOVES	0.0005	0.0017	65.0%	65.0%	population	0.0003	0.0011
2265006025	Commercial	4-Stroke Light Commercial Welders	MOVES	0.0010	0.0036	65.0%	65.0%	population	0.0007	0.0024
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	MOVES	0.0016	0.0087	65.0%	65.0%	population	0.0010	0.0057
2265006035	Commercial	4-Stroke Hydro Power Units	MOVES	0.0001	0.0003	65.0%	65.0%	population	0.0000	0.0002
2265007010	Logging	4-Stroke Logging Equipment Shredders > 6 HP	MOVES	0.0000	0.0001	30.0%	30.0%	land area	0.0000	0.0000
2265007015	Logging	4-Stroke Logging Equipment Skidders	MOVES	0.0000	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	MOVES	0.0001	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267002003	Construction	LPG Asphalt Pavers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002015	Construction	LPG Rollers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002021	Construction	LPG Paving Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002024	Construction	LPG Surfacing Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002030	Construction	LPG Trenchers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002045	Construction	LPG Cranes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002060	Construction	LPG Rubber Tire Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002072	Construction	LPG Skid Steer Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002081	Construction	LPG Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267003010	Industrial	LPG Aerial Lifts	MOVES	0.0011	0.0002	65.0%	65.0%	population	0.0007	0.0001
2267003020	Industrial	LPG Forklifts	MOVES	0.0692	0.0081	65.0%	65.0%	population	0.0450	0.0053
2267003030	Industrial	LPG Sweepers/Scrubbers	MOVES	0.0005	0.0001	65.0%	65.0%	population	0.0003	0.0000
2267003040	Industrial	LPG Other General Industrial Equipment	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000

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2267003050	Industrial	LPG Other Material Handling Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267003070	Industrial	LPG Terminal Tractors	MOVES	0.0003	0.0000	65.0%	65.0%	population	0.0002	0.0000
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial)	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267005055	Agriculture	LPG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267005060	Agriculture	LPG Irrigation Sets	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	MOVES	0.0009	0.0001	65.0%	65.0%	population	0.0006	0.0001
2267006010	Commercial	LPG Light Commercial Pumps	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006015	Commercial	LPG Light Commercial Air Compressors	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006025	Commercial	LPG Light Commercial Welders	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006030	Commercial	LPG Light Commercial Pressure Washers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267006035	Commercial	LPG Hydro Power Units	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	MOVES	0.0056	0.0024	65.0%	65.0%	population	0.0037	0.0016
2268003030	Industrial	CNG Sweepers/Scrubbers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003060	Industrial	CNG AC/Refrigeration	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003070	Industrial	CNG Terminal Tractors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	MOVES	0.0003	0.0001	27.0%	27.0%	land area (1)	0.0001	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	MOVES	0.0004	0.0002	65.0%	65.0%	population	0.0002	0.0001
2268006010	Commercial	CNG Light Commercial Pumps	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268006015	Commercial	CNG Light Commercial Air Compressors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268006020	Commercial	CNG Light Commercial Gas Compressors	MOVES	0.0003	0.0002	65.0%	65.0%	population	0.0002	0.0001
2270001060	Recreational	Diesel Specialty Vehicle Carts	MOVES	0.0007	0.0001	30.0%	30.0%	land area	0.0002	0.0000
2270002003	Construction	Diesel Pavers	MOVES	0.0007	0.0000	65.0%	65.0%	population	0.0004	0.0000
2270002006	Construction	Diesel Tampers/Rammers (unused)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270002009	Construction	Diesel Plate Compactors	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002015	Construction	Diesel Rollers	MOVES	0.0021	0.0001	65.0%	65.0%	population	0.0014	0.0001
2270002018	Construction	Diesel Scrapers	MOVES	0.0011	0.0001	65.0%	65.0%	population	0.0007	0.0000
2270002021	Construction	Diesel Paving Equipment	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002024	Construction	Diesel Surfacing Equipment	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002027	Construction	Diesel Signal Boards	MOVES	0.0008	0.0001	65.0%	65.0%	population	0.0005	0.0000
2270002030	Construction	Diesel Trenchers	MOVES	0.0019	0.0001	65.0%	65.0%	population	0.0012	0.0000
2270002033	Construction	Diesel Bore/Drill Rigs	MOVES	0.0023	0.0001	65.0%	65.0%	population	0.0015	0.0001
2270002036	Construction	Diesel Excavators	MOVES	0.0036	0.0002	65.0%	65.0%	population	0.0023	0.0001
2270002039	Construction	Diesel Concrete/Industrial Saws	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002042	Construction	Diesel Cement & Mortar Mixers	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002045	Construction	Diesel Cranes	MOVES	0.0013	0.0001	65.0%	65.0%	population	0.0008	0.0000
2270002048	Construction	Diesel Graders	MOVES	0.0006	0.0000	65.0%	65.0%	population	0.0004	0.0000
2270002051	Construction	Diesel Off-highway Trucks	MOVES	0.0110	0.0002	65.0%	65.0%	population	0.0071	0.0001

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2270002054	Construction	Diesel Crushing/Proc. Equipment	MOVES	0.0004	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270002057	Construction	Diesel Rough Terrain Forklifts	MOVES	0.0032	0.0001	65.0%	65.0%	population	0.0021	0.0001
2270002060	Construction	Diesel Rubber Tire Loaders	MOVES	0.0080	0.0003	65.0%	65.0%	population	0.0052	0.0002
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	MOVES	0.0090	0.0012	65.0%	65.0%	population	0.0059	0.0008
2270002069	Construction	Diesel Crawler Tractors	MOVES	0.0061	0.0002	65.0%	65.0%	population	0.0040	0.0002
2270002072	Construction	Diesel Skid Steer Loaders	MOVES	0.0116	0.0019	65.0%	65.0%	population	0.0075	0.0012
2270002075	Construction	Diesel Off-Highway Tractors	MOVES	0.0014	0.0000	65.0%	65.0%	population	0.0009	0.0000
2270002078	Construction	Diesel Dumpers/Tenders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270002081	Construction	Diesel Other Construction Equipment	MOVES	0.0010	0.0001	65.0%	65.0%	population	0.0006	0.0000
2270003010	Industrial	Diesel Aerial Lifts	MOVES	0.0041	0.0006	65.0%	65.0%	population	0.0027	0.0004
2270003020	Industrial	Diesel Forklifts	MOVES	0.0215	0.0004	65.0%	65.0%	population	0.0140	0.0003
2270003030	Industrial	Diesel Sweepers/Scrubbers	MOVES	0.0072	0.0003	65.0%	65.0%	population	0.0047	0.0002
2270003040	Industrial	Diesel Other General Industrial Equipment	MOVES	0.0082	0.0004	65.0%	65.0%	population	0.0053	0.0003
2270003050	Industrial	Diesel Other Material Handling Equipment	MOVES	0.0008	0.0001	65.0%	65.0%	population	0.0005	0.0001
2270003060	Industrial	Diesel AC/Refrigeration	MOVES	0.0248	0.0008	65.0%	65.0%	population	0.0162	0.0005
2270003070	Industrial	Diesel Terminal Tractors	MOVES	0.0042	0.0002	65.0%	65.0%	population	0.0027	0.0001
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	MOVES	0.0049	0.0004	65.0%	65.0%	population	0.0032	0.0002
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercial)	MOVES	0.0011	0.0001	65.0%	65.0%	population	0.0007	0.0001
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commercial)	MOVES	0.0058	0.0004	65.0%	65.0%	population	0.0037	0.0003
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	MOVES	0.0004	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	MOVES	0.1115	0.0072	27.0%	27.0%	land area (1)	0.0301	0.0019
2270005020	Agriculture	Diesel Combines	MOVES	0.0178	0.0014	27.0%	27.0%	land area (1)	0.0048	0.0004
2270005025	Agriculture	Diesel Balers	MOVES	0.0001	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005030	Agriculture	Diesel Agricultural Mowers	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005035	Agriculture	Diesel Sprayers	MOVES	0.0015	0.0001	27.0%	27.0%	land area (1)	0.0004	0.0000
2270005040	Agriculture	Diesel Tillers > 6 HP	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005045	Agriculture	Diesel Swathers	MOVES	0.0014	0.0001	27.0%	27.0%	land area (1)	0.0004	0.0000
2270005055	Agriculture	Diesel Other Agricultural Equipment	MOVES	0.0025	0.0002	27.0%	27.0%	land area (1)	0.0007	0.0001
2270005060	Agriculture	Diesel Irrigation Sets	MOVES	0.0012	0.0001	27.0%	27.0%	land area (1)	0.0003	0.0000
2270006005	Commercial	Diesel Light Commercial Generator Sets	MOVES	0.0082	0.0007	65.0%	65.0%	population	0.0054	0.0005
2270006010	Commercial	Diesel Light Commercial Pumps	MOVES	0.0019	0.0002	65.0%	65.0%	population	0.0013	0.0001
2270006015	Commercial	Diesel Light Commercial Air Compressors	MOVES	0.0031	0.0001	65.0%	65.0%	population	0.0020	0.0001
2270006025	Commercial	Diesel Light Commercial Welders	MOVES	0.0028	0.0004	65.0%	65.0%	population	0.0018	0.0002
2270006030	Commercial	Diesel Light Commercial Pressure Washer	MOVES	0.0003	0.0000	65.0%	65.0%	population	0.0002	0.0000
2270006035	Commercial	Diesel Hydro Power Units	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	MOVES	0.0001	0.0000	30.0%	30.0%	land area	0.0000	0.0000

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SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2025 Emissions		% in NAA		Allocate by	Manitowoc NAA 2025 Emissions	
				NOx	VOC	NOx	VOC		NOx	VOC
2275000000	Airport	All Aircraft	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
2280002101	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002102	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002103	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002104	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002201	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Main Eng.	EPA	0.0496	0.0016	100.0%	100.0%	Lk. Mich. Shoreline	0.0496	0.0016
2280002202	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Aux. Eng.	EPA	0.0357	0.0010	100.0%	100.0%	Lk. Mich. Shoreline	0.0357	0.0010
2280002203	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Main Eng.	EPA	0.1662	0.0077	100.0%	100.0%	Lk. Mich. Shoreline	0.1662	0.0077
2280002204	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Aux. Eng.	EPA	0.0591	0.0025	100.0%	100.0%	Lk. Mich. Shoreline	0.0591	0.0025
2282005010	Pleasure Craft	2-Stroke Outboards	MOVES	0.0582	0.1730	12.0%	12.0%	water area	0.0070	0.0208
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	MOVES	0.0277	0.0324	85.0%	85.0%	water area	0.0235	0.0276
2282010005	Pleasure Craft	4-Stroke Inboards	MOVES	0.1189	0.1551	85.0%	85.0%	water area	0.1011	0.1318
2282020005	Pleasure Craft	Diesel Inboards	MOVES	0.1726	0.0112	85.0%	85.0%	water area	0.1467	0.0095
2282020010	Pleasure Craft	Diesel Outboards	MOVES	0.0001	0.0000	12.0%	12.0%	water area	0.0000	0.0000
228500200x	Railroad	All Diesel Locomotives	EPA	0.0081	0.0004	35.0%	25.0%	rail links	0.0028	0.0001
2285002015	Railway Maint.	Diesel Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285004015	Railway Maint.	4-Stroke Gasoline Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285006015	Railway Maint.	LPG Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.1555</b>	<b>0.9741</b>	<b>72.3%</b>	<b>54.3%</b>		<b>0.8356</b>	<b>0.5285</b>
22xx005xxx	Agriculture	All	MOVES	0.1403	0.0179	27.0%	27.0%	land area (1)	0.0379	0.0048
22750xxxxx	Airport	All	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
22xx006xxx	Commercial	All	MOVES	0.0263	0.0477	65.0%	65.0%	population	0.0171	0.0310
2280002xxx	Comm. Mar	All	EPA	0.3106	0.0127	100.0%	100.0%	Lk. Mich. Shoreline	0.3106	0.0127
22xx002xxx	Construction	All	MOVES	0.0681	0.0169	65.0%	65.0%	population	0.0443	0.0110
22xx003xxx	Industrial	All	MOVES	0.1577	0.0305	65.0%	65.0%	population	0.1025	0.0198
22xx004xxx	Lawn/Garden	All	MOVES	0.0523	0.3155	65.0%	65.0%	population	0.0340	0.2051
22xx007xxx	Logging	All	MOVES	0.0002	0.0005	30.0%	30.0%	land area	0.0001	0.0001
22820xxxxx	Pleasure Craft	All	MOVES	0.3775	0.3718	73.7%	51.0%	water area	0.2783	0.1897
228500200x	Railroad	All	EPA	0.0081	0.0004	35.0%	25.0%	rail links	0.0028	0.0001
228500x015	Railway Maint.	All	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
22xx001xxx	Recreational	All	MOVES	0.0090	0.1516	30.0%	30.0%	land area	0.0027	0.0455
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.1555</b>	<b>0.9741</b>	<b>72.3%</b>	<b>54.3%</b>		<b>0.8356</b>	<b>0.5285</b>

(1) Cities in Manitowoc County (Kiel, Manitowoc and Two Rivers) excluded.

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**Table A7.4. 2033 Nonroad NO<sub>x</sub> and VOC Emissions: tons per ozone season day (tposd) for Manitowoc County and the Manitowoc County 2015 ozone NAAQS nonattainment area**

SCC	Segment Description	SCC Description	Emissions from	Manitowoc Co. 2033 Emissions		% in NAA		Allocate by	Manitowoc NAA 2033 Emissions	
				NO <sub>x</sub>	VOC	NO <sub>x</sub>	VOC		NO <sub>x</sub>	VOC
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	MOVES	0.0009	0.0626	30.0%	30.0%	land area	0.0003	0.0188
2260001020	Recreational	2-Stroke Snowmobiles	MOVES	0.0000	0.0252	30.0%	30.0%	land area	0.0000	0.0076
2260001030	Recreational	2-Stroke All Terrain Vehicles	MOVES	0.0004	0.0044	30.0%	30.0%	land area	0.0001	0.0013
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	MOVES	0.0003	0.0014	30.0%	30.0%	land area	0.0001	0.0004
2260002006	Construction	2-Stroke Tampers/Rammers	MOVES	0.0001	0.0022	65.0%	65.0%	population	0.0000	0.0015
2260002009	Construction	2-Stroke Plate Compactors	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260002021	Construction	2-Stroke Paving Equipment	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260002027	Construction	2-Stroke Signal Boards	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	MOVES	0.0001	0.0056	65.0%	65.0%	population	0.0001	0.0037
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	MOVES	0.0000	0.0006	65.0%	65.0%	population	0.0000	0.0004
2260003040	Industrial	2-Stroke Other General Industrial Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0000	0.0008	65.0%	65.0%	population	0.0000	0.0006
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0001	0.0021	65.0%	65.0%	population	0.0001	0.0014
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	MOVES	0.0002	0.0080	65.0%	65.0%	population	0.0001	0.0052
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	MOVES	0.0005	0.0240	65.0%	65.0%	population	0.0003	0.0156
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0006	0.0169	65.0%	65.0%	population	0.0004	0.0110
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0009	0.0242	65.0%	65.0%	population	0.0006	0.0157
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0004	0.0118	65.0%	65.0%	population	0.0003	0.0077
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0009	0.0242	65.0%	65.0%	population	0.0006	0.0157
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0012	65.0%	65.0%	population	0.0000	0.0008
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260005035	Agriculture	2-Stroke Sprayers	MOVES	0.0000	0.0004	27.0%	27.0%	land area (1)	0.0000	0.0001
2260006005	Commercial	2-Stroke Light Commercial Generator Set	MOVES	0.0000	0.0008	65.0%	65.0%	population	0.0000	0.0005
2260006010	Commercial	2-Stroke Light Commercial Pumps	MOVES	0.0002	0.0052	65.0%	65.0%	population	0.0001	0.0034
2260006015	Commercial	2-Stroke Light Commercial Air Compressors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws > 6 HP	MOVES	0.0000	0.0004	30.0%	30.0%	land area	0.0000	0.0001
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	MOVES	0.0004	0.0035	30.0%	30.0%	land area	0.0001	0.0011
2265001030	Recreational	4-Stroke All Terrain Vehicles	MOVES	0.0030	0.0367	30.0%	30.0%	land area	0.0009	0.0110
2265001050	Recreational	4-Stroke Golf Carts	MOVES	0.0028	0.0095	30.0%	30.0%	land area	0.0008	0.0028
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	MOVES	0.0002	0.0008	30.0%	30.0%	land area	0.0001	0.0003
2265002003	Construction	4-Stroke Asphalt Pavers	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002009	Construction	4-Stroke Plate Compactors	MOVES	0.0001	0.0003	65.0%	65.0%	population	0.0000	0.0002

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				NOx	VOC	NOx	VOC		NOx	VOC
2265002015	Construction	4-Stroke Rollers	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002021	Construction	4-Stroke Paving Equipment	MOVES	0.0001	0.0006	65.0%	65.0%	population	0.0001	0.0004
2265002024	Construction	4-Stroke Surfacing Equipment	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002027	Construction	4-Stroke Signal Boards	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002030	Construction	4-Stroke Trenchers	MOVES	0.0001	0.0004	65.0%	65.0%	population	0.0001	0.0002
2265002033	Construction	4-Stroke Bore/Drill Rigs	MOVES	0.0000	0.0002	65.0%	65.0%	population	0.0000	0.0001
2265002039	Construction	4-Stroke Concrete/Industrial Saws	MOVES	0.0002	0.0008	65.0%	65.0%	population	0.0002	0.0005
2265002042	Construction	4-Stroke Cement & Mortar Mixers	MOVES	0.0001	0.0008	65.0%	65.0%	population	0.0001	0.0005
2265002045	Construction	4-Stroke Cranes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0000	0.0002
2265002072	Construction	4-Stroke Skid Steer Loaders	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002078	Construction	4-Stroke Dumpers/Tenders	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0001
2265002081	Construction	4-Stroke Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2265003010	Industrial	4-Stroke Aerial Lifts	MOVES	0.0016	0.0030	65.0%	65.0%	population	0.0011	0.0020
2265003020	Industrial	4-Stroke Forklifts	MOVES	0.0058	0.0030	65.0%	65.0%	population	0.0038	0.0020
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	MOVES	0.0014	0.0029	65.0%	65.0%	population	0.0009	0.0019
2265003040	Industrial	4-Stroke Other General Industrial Equipment	MOVES	0.0029	0.0117	65.0%	65.0%	population	0.0019	0.0076
2265003050	Industrial	4-Stroke Other Material Handling Equipment	MOVES	0.0001	0.0002	65.0%	65.0%	population	0.0001	0.0002
2265003060	Industrial	4-Stroke Industrial AC/Refrigeration	MOVES	0.0000	0.0001	65.0%	65.0%	population	0.0000	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	MOVES	0.0005	0.0003	65.0%	65.0%	population	0.0003	0.0002
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	MOVES	0.0041	0.0386	65.0%	65.0%	population	0.0026	0.0251
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	MOVES	0.0020	0.0128	65.0%	65.0%	population	0.0013	0.0083
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Residential)	MOVES	0.0004	0.0034	65.0%	65.0%	population	0.0002	0.0022
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commercial)	MOVES	0.0010	0.0075	65.0%	65.0%	population	0.0007	0.0049
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Res.)	MOVES	0.0000	0.0003	65.0%	65.0%	population	0.0000	0.0002
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters (Com.)	MOVES	0.0000	0.0003	65.0%	65.0%	population	0.0000	0.0002
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residential)	MOVES	0.0000	0.0004	65.0%	65.0%	population	0.0000	0.0003
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial)	MOVES	0.0018	0.0080	65.0%	65.0%	population	0.0012	0.0052
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	MOVES	0.0000	0.0028	65.0%	65.0%	population	0.0000	0.0018
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	MOVES	0.0000	0.0002	65.0%	65.0%	population	0.0000	0.0002
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.)	MOVES	0.0008	0.0066	65.0%	65.0%	population	0.0005	0.0043
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm.)	MOVES	0.0002	0.0008	65.0%	65.0%	population	0.0001	0.0005
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	MOVES	0.0002	0.0010	65.0%	65.0%	population	0.0002	0.0007
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	MOVES	0.0001	0.0009	65.0%	65.0%	population	0.0001	0.0006
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residential)	MOVES	0.0109	0.0646	65.0%	65.0%	population	0.0071	0.0420
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commercial)	MOVES	0.0030	0.0106	65.0%	65.0%	population	0.0019	0.0069
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	MOVES	0.0005	0.0012	65.0%	65.0%	population	0.0003	0.0008

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				NOx	VOC	NOx	VOC		NOx	VOC
2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm.)	MOVES	0.0097	0.0317	65.0%	65.0%	population	0.0063	0.0206
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Res.)	MOVES	0.0004	0.0029	65.0%	65.0%	population	0.0003	0.0019
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equip. (Com.)	MOVES	0.0003	0.0021	65.0%	65.0%	population	0.0002	0.0014
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	MOVES	0.0001	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005020	Agriculture	4-Stroke Combines	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005025	Agriculture	4-Stroke Balers	MOVES	0.0002	0.0002	27.0%	27.0%	land area (1)	0.0001	0.0001
2265005030	Agriculture	4-Stroke Agricultural Mowers	MOVES	0.0000	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265005035	Agriculture	4-Stroke Sprayers	MOVES	0.0004	0.0011	27.0%	27.0%	land area (1)	0.0001	0.0003
2265005040	Agriculture	4-Stroke Tillers > 5 HP	MOVES	0.0007	0.0028	27.0%	27.0%	land area (1)	0.0002	0.0008
2265005045	Agriculture	4-Stroke Swathers	MOVES	0.0003	0.0003	27.0%	27.0%	land area (1)	0.0001	0.0001
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	MOVES	0.0004	0.0004	27.0%	27.0%	land area (1)	0.0001	0.0001
2265005060	Agriculture	4-Stroke Irrigation Sets	MOVES	0.0002	0.0001	27.0%	27.0%	land area (1)	0.0000	0.0000
2265006005	Commercial	4-Stroke Light Commercial Generator Set	MOVES	0.0039	0.0248	65.0%	65.0%	population	0.0026	0.0161
2265006010	Commercial	4-Stroke Light Commercial Pumps	MOVES	0.0010	0.0048	65.0%	65.0%	population	0.0007	0.0031
2265006015	Commercial	4-Stroke Light Commercial Air Compressors	MOVES	0.0005	0.0019	65.0%	65.0%	population	0.0003	0.0012
2265006025	Commercial	4-Stroke Light Commercial Welders	MOVES	0.0012	0.0041	65.0%	65.0%	population	0.0007	0.0027
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	MOVES	0.0018	0.0099	65.0%	65.0%	population	0.0012	0.0065
2265006035	Commercial	4-Stroke Hydro Power Units	MOVES	0.0001	0.0003	65.0%	65.0%	population	0.0001	0.0002
2265007010	Logging	4-Stroke Logging Equipment Shredders > 6 HP	MOVES	0.0000	0.0001	30.0%	30.0%	land area	0.0000	0.0000
2265007015	Logging	4-Stroke Logging Equipment Skidders	MOVES	0.0000	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	MOVES	0.0000	0.0000	30.0%	30.0%	land area	0.0000	0.0000
2267002003	Construction	LPG Asphalt Pavers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002015	Construction	LPG Rollers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002021	Construction	LPG Paving Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002024	Construction	LPG Surfacing Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002030	Construction	LPG Trenchers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002045	Construction	LPG Cranes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002060	Construction	LPG Rubber Tire Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002072	Construction	LPG Skid Steer Loaders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267002081	Construction	LPG Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267003010	Industrial	LPG Aerial Lifts	MOVES	0.0010	0.0001	65.0%	65.0%	population	0.0007	0.0001
2267003020	Industrial	LPG Forklifts	MOVES	0.0906	0.0106	65.0%	65.0%	population	0.0589	0.0069
2267003030	Industrial	LPG Sweepers/Scrubbers	MOVES	0.0007	0.0001	65.0%	65.0%	population	0.0005	0.0001
2267003040	Industrial	LPG Other General Industrial Equipment	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000

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				NOx	VOC	NOx	VOC		NOx	VOC
2267003050	Industrial	LPG Other Material Handling Equipment	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267003070	Industrial	LPG Terminal Tractors	MOVES	0.0004	0.0001	65.0%	65.0%	population	0.0003	0.0000
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial)	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267005055	Agriculture	LPG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267005060	Agriculture	LPG Irrigation Sets	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	MOVES	0.0006	0.0001	65.0%	65.0%	population	0.0004	0.0001
2267006010	Commercial	LPG Light Commercial Pumps	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006015	Commercial	LPG Light Commercial Air Compressors	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006025	Commercial	LPG Light Commercial Welders	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2267006030	Commercial	LPG Light Commercial Pressure Washers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2267006035	Commercial	LPG Hydro Power Units	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	MOVES	0.0074	0.0031	65.0%	65.0%	population	0.0048	0.0020
2268003030	Industrial	CNG Sweepers/Scrubbers	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003060	Industrial	CNG AC/Refrigeration	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268003070	Industrial	CNG Terminal Tractors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	MOVES	0.0003	0.0001	27.0%	27.0%	land area (1)	0.0001	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	MOVES	0.0002	0.0001	65.0%	65.0%	population	0.0002	0.0001
2268006010	Commercial	CNG Light Commercial Pumps	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268006015	Commercial	CNG Light Commercial Air Compressors	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2268006020	Commercial	CNG Light Commercial Gas Compressors	MOVES	0.0004	0.0002	65.0%	65.0%	population	0.0003	0.0001
2270001060	Recreational	Diesel Specialty Vehicle Carts	MOVES	0.0005	0.0001	30.0%	30.0%	land area	0.0001	0.0000
2270002003	Construction	Diesel Pavers	MOVES	0.0005	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270002006	Construction	Diesel Tampers/Rammers (unused)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270002009	Construction	Diesel Plate Compactors	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002015	Construction	Diesel Rollers	MOVES	0.0016	0.0001	65.0%	65.0%	population	0.0010	0.0000
2270002018	Construction	Diesel Scrapers	MOVES	0.0004	0.0000	65.0%	65.0%	population	0.0002	0.0000
2270002021	Construction	Diesel Paving Equipment	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002024	Construction	Diesel Surfacing Equipment	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002027	Construction	Diesel Signal Boards	MOVES	0.0007	0.0001	65.0%	65.0%	population	0.0005	0.0000
2270002030	Construction	Diesel Trenchers	MOVES	0.0016	0.0000	65.0%	65.0%	population	0.0010	0.0000
2270002033	Construction	Diesel Bore/Drill Rigs	MOVES	0.0011	0.0001	65.0%	65.0%	population	0.0007	0.0000
2270002036	Construction	Diesel Excavators	MOVES	0.0028	0.0001	65.0%	65.0%	population	0.0018	0.0001
2270002039	Construction	Diesel Concrete/Industrial Saws	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270002042	Construction	Diesel Cement & Mortar Mixers	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270002045	Construction	Diesel Cranes	MOVES	0.0005	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270002048	Construction	Diesel Graders	MOVES	0.0003	0.0000	65.0%	65.0%	population	0.0002	0.0000
2270002051	Construction	Diesel Off-highway Trucks	MOVES	0.0108	0.0002	65.0%	65.0%	population	0.0070	0.0001



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				NOx	VOC	NOx	VOC		NOx	VOC
2270002054	Construction	Diesel Crushing/Proc. Equipment	MOVES	0.0003	0.0000	65.0%	65.0%	population	0.0002	0.0000
2270002057	Construction	Diesel Rough Terrain Forklifts	MOVES	0.0021	0.0000	65.0%	65.0%	population	0.0014	0.0000
2270002060	Construction	Diesel Rubber Tire Loaders	MOVES	0.0046	0.0002	65.0%	65.0%	population	0.0030	0.0001
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	MOVES	0.0057	0.0004	65.0%	65.0%	population	0.0037	0.0003
2270002069	Construction	Diesel Crawler Tractors	MOVES	0.0041	0.0001	65.0%	65.0%	population	0.0026	0.0001
2270002072	Construction	Diesel Skid Steer Loaders	MOVES	0.0079	0.0007	65.0%	65.0%	population	0.0051	0.0004
2270002075	Construction	Diesel Off-Highway Tractors	MOVES	0.0011	0.0000	65.0%	65.0%	population	0.0007	0.0000
2270002078	Construction	Diesel Dumpers/Tenders	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270002081	Construction	Diesel Other Construction Equipment	MOVES	0.0004	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270003010	Industrial	Diesel Aerial Lifts	MOVES	0.0041	0.0003	65.0%	65.0%	population	0.0027	0.0002
2270003020	Industrial	Diesel Forklifts	MOVES	0.0281	0.0005	65.0%	65.0%	population	0.0183	0.0003
2270003030	Industrial	Diesel Sweepers/Scrubbers	MOVES	0.0080	0.0003	65.0%	65.0%	population	0.0052	0.0002
2270003040	Industrial	Diesel Other General Industrial Equipment	MOVES	0.0061	0.0002	65.0%	65.0%	population	0.0040	0.0001
2270003050	Industrial	Diesel Other Material Handling Equipment	MOVES	0.0005	0.0000	65.0%	65.0%	population	0.0003	0.0000
2270003060	Industrial	Diesel AC/Refrigeration	MOVES	0.0322	0.0010	65.0%	65.0%	population	0.0210	0.0006
2270003070	Industrial	Diesel Terminal Tractors	MOVES	0.0050	0.0002	65.0%	65.0%	population	0.0033	0.0001
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	MOVES	0.0043	0.0003	65.0%	65.0%	population	0.0028	0.0002
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercial)	MOVES	0.0010	0.0001	65.0%	65.0%	population	0.0007	0.0001
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commercial)	MOVES	0.0029	0.0002	65.0%	65.0%	population	0.0019	0.0001
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	MOVES	0.0004	0.0000	65.0%	65.0%	population	0.0002	0.0000
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment	MOVES	0.0000	0.0000	65.0%	65.0%	population	0.0000	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	MOVES	0.0508	0.0025	27.0%	27.0%	land area (1)	0.0137	0.0007
2270005020	Agriculture	Diesel Combines	MOVES	0.0066	0.0005	27.0%	27.0%	land area (1)	0.0018	0.0001
2270005025	Agriculture	Diesel Balers	MOVES	0.0001	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005030	Agriculture	Diesel Agricultural Mowers	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005035	Agriculture	Diesel Sprayers	MOVES	0.0006	0.0000	27.0%	27.0%	land area (1)	0.0002	0.0000
2270005040	Agriculture	Diesel Tillers > 6 HP	MOVES	0.0000	0.0000	27.0%	27.0%	land area (1)	0.0000	0.0000
2270005045	Agriculture	Diesel Swathers	MOVES	0.0007	0.0001	27.0%	27.0%	land area (1)	0.0002	0.0000
2270005055	Agriculture	Diesel Other Agricultural Equipment	MOVES	0.0010	0.0001	27.0%	27.0%	land area (1)	0.0003	0.0000
2270005060	Agriculture	Diesel Irrigation Sets	MOVES	0.0006	0.0000	27.0%	27.0%	land area (1)	0.0002	0.0000
2270006005	Commercial	Diesel Light Commercial Generator Sets	MOVES	0.0064	0.0004	65.0%	65.0%	population	0.0042	0.0003
2270006010	Commercial	Diesel Light Commercial Pumps	MOVES	0.0015	0.0001	65.0%	65.0%	population	0.0009	0.0001
2270006015	Commercial	Diesel Light Commercial Air Compressors	MOVES	0.0026	0.0001	65.0%	65.0%	population	0.0017	0.0000
2270006025	Commercial	Diesel Light Commercial Welders	MOVES	0.0025	0.0002	65.0%	65.0%	population	0.0016	0.0001
2270006030	Commercial	Diesel Light Commercial Pressure Washer	MOVES	0.0002	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270006035	Commercial	Diesel Hydro Power Units	MOVES	0.0001	0.0000	65.0%	65.0%	population	0.0001	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	MOVES	0.0001	0.0000	30.0%	30.0%	land area	0.0000	0.0000

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				NOx	VOC	NOx	VOC		NOx	VOC
2275000000	Airport	All Aircraft	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
2280002101	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002102	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C1&C2, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002103	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Main Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002104	Comm. Mar.	CM Vessels, Diesel, Port, Cat. C3, Aux. Eng.	EPA	0.0000	0.0000	100.0%	100.0%	Lk. Mich. Shoreline	0.0000	0.0000
2280002201	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Main Eng.	EPA	0.0413	0.0013	100.0%	100.0%	Lk. Mich. Shoreline	0.0413	0.0013
2280002202	Comm. Mar.	CM Vessels, Diesel, Underway, C1&C2, Aux. Eng.	EPA	0.0298	0.0008	100.0%	100.0%	Lk. Mich. Shoreline	0.0298	0.0008
2280002203	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Main Eng.	EPA	0.1853	0.0089	100.0%	100.0%	Lk. Mich. Shoreline	0.1853	0.0089
2280002204	Comm. Mar.	CM Vessels, Diesel, Underway, C3, Aux. Eng.	EPA	0.0659	0.0029	100.0%	100.0%	Lk. Mich. Shoreline	0.0659	0.0029
2282005010	Pleasure Craft	2-Stroke Outboards	MOVES	0.0597	0.1203	12.0%	12.0%	water area	0.0072	0.0144
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	MOVES	0.0285	0.0317	85.0%	85.0%	water area	0.0242	0.0269
2282010005	Pleasure Craft	4-Stroke Inboards	MOVES	0.0749	0.1237	85.0%	85.0%	water area	0.0637	0.1051
2282020005	Pleasure Craft	Diesel Inboards	MOVES	0.1788	0.0126	85.0%	85.0%	water area	0.1520	0.0107
2282020010	Pleasure Craft	Diesel Outboards	MOVES	0.0001	0.0000	12.0%	12.0%	water area	0.0000	0.0000
228500200x	Railroad	All Diesel Locomotives	EPA	0.0078	0.0003	35.0%	25.0%	rail links	0.0027	0.0001
2285002015	Railway Maint.	Diesel Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285004015	Railway Maint.	4-Stroke Gasoline Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
2285006015	Railway Maint.	LPG Railway Maintenance	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.0663</b>	<b>0.8813</b>	<b>75.3%</b>	<b>56.3%</b>		<b>0.8032</b>	<b>0.4963</b>
22xx005xxx	Agriculture	All	MOVES	0.0630	0.0089	27.0%	27.0%	land area (1)	0.0170	0.0024
22750xxxxx	Airport	All	EPA	0.0054	0.0086	99.7%	99.6%	airport location	0.0054	0.0086
22xx006xxx	Commercial	All	MOVES	0.0236	0.0532	65.0%	65.0%	population	0.0154	0.0346
2280002xxx	Comm. Mar	All	EPA	0.3222	0.0139	100.0%	100.0%	Lk. Mich. Shoreline	0.3222	0.0139
22xx002xxx	Construction	All	MOVES	0.0484	0.0143	65.0%	65.0%	population	0.0315	0.0093
22xx003xxx	Industrial	All	MOVES	0.1970	0.0385	65.0%	65.0%	population	0.1281	0.0250
22xx004xxx	Lawn/Garden	All	MOVES	0.0482	0.3106	65.0%	65.0%	population	0.0313	0.2019
22xx007xxx	Logging	All	MOVES	0.0001	0.0005	30.0%	30.0%	land area	0.0000	0.0001
22820xxxxx	Pleasure Craft	All	MOVES	0.3420	0.2883	72.2%	54.5%	water area	0.2471	0.1572
228500200x	Railroad	All	EPA	0.0078	0.0003	35.0%	25.0%	rail links	0.0027	0.0001
228500x015	Railway Maint.	All	MOVES	0.0000	0.0000	35.0%	25.0%	rail links	0.0000	0.0000
22xx001xxx	Recreational	All	MOVES	0.0085	0.1442	30.0%	30.0%	land area	0.0026	0.0433
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>		<b>1.0663</b>	<b>0.8813</b>	<b>75.3%</b>	<b>56.3%</b>		<b>0.8032</b>	<b>0.4963</b>

(1) Cities in Manitowoc County (Kiel, Manitowoc and Two Rivers) excluded.

## **APPENDIX 8**

### **Onroad Emissions and Activity Data for 2017, 2019, 2025 and 2033**

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This appendix provides detailed listings of onroad tons per ozone season weekday (tposwd) emissions and activity data by source type, fuel type and road type for 2017, 2019, 2025 and 2033 for the Manitowoc County 2015 ozone NAAQS nonattainment area. The sum of NO<sub>x</sub> and VOC emissions from these onroad categories were used for the onroad sector NO<sub>x</sub> and VOC tposwd emission estimates in sections 4.2 (Nonattainment Year and Attainment Year Inventories) and 4.3 (Maintenance Year Inventories) of the Wisconsin Department of Natural Resources (WDNR) Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.

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**Table A8.1. 2017 Onroad NO<sub>x</sub> and VOC Emissions: tons per ozone season weekday (tposwd) for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2017			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motorcycle	Gasoline	Off-Network	0.0000	0.0001	0.0246	0.0247
Motorcycle	Gasoline	Rural Restricted	0.0030	0.0030	0.0012	0.0042
Motorcycle	Gasoline	Rural Unrestricted	0.0027	0.0037	0.0023	0.0060
Motorcycle	Gasoline	Urban Restricted	0.0002	0.0002	0.0001	0.0003
Motorcycle	Gasoline	Urban Unrestricted	0.0043	0.0068	0.0042	0.0110
Passenger Car	Gasoline	Off-Network	0.0411	0.0461	0.1403	0.1864
Passenger Car	Gasoline	Rural Restricted	0.0506	0.0101	0.0035	0.0136
Passenger Car	Gasoline	Rural Unrestricted	0.0331	0.0093	0.0052	0.0145
Passenger Car	Gasoline	Urban Restricted	0.0051	0.0010	0.0004	0.0014
Passenger Car	Gasoline	Urban Unrestricted	0.0742	0.0224	0.0128	0.0352
Passenger Car	Diesel	Off-Network	0.0002	0.0004	0.0000	0.0004
Passenger Car	Diesel	Rural Restricted	0.0003	0.0001	0.0000	0.0001
Passenger Car	Diesel	Rural Unrestricted	0.0002	0.0001	0.0000	0.0001
Passenger Car	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0004	0.0002	0.0000	0.0002
Passenger Car	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0001
Passenger Car	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Gasoline	Off-Network	0.0698	0.0584	0.1020	0.1603
Passenger Truck	Gasoline	Rural Restricted	0.0827	0.0122	0.0031	0.0152
Passenger Truck	Gasoline	Rural Unrestricted	0.0578	0.0132	0.0051	0.0183
Passenger Truck	Gasoline	Urban Restricted	0.0061	0.0009	0.0002	0.0011
Passenger Truck	Gasoline	Urban Unrestricted	0.0914	0.0227	0.0088	0.0315
Passenger Truck	Diesel	Off-Network	0.0157	0.0014	0.0000	0.0014
Passenger Truck	Diesel	Rural Restricted	0.0125	0.0019	0.0000	0.0019
Passenger Truck	Diesel	Rural Unrestricted	0.0142	0.0024	0.0000	0.0024
Passenger Truck	Diesel	Urban Restricted	0.0009	0.0001	0.0000	0.0001
Passenger Truck	Diesel	Urban Unrestricted	0.0234	0.0042	0.0000	0.0042
Passenger Truck	Ethanol (E-85)	Off-Network	0.0001	0.0001	0.0002	0.0003
Passenger Truck	Ethanol (E-85)	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Gasoline	Off-Network	0.0192	0.0141	0.0188	0.0329
Light Commercial Truck	Gasoline	Rural Restricted	0.0221	0.0032	0.0007	0.0039
Light Commercial Truck	Gasoline	Rural Unrestricted	0.0165	0.0044	0.0011	0.0055
Light Commercial Truck	Gasoline	Urban Restricted	0.0022	0.0003	0.0001	0.0004
Light Commercial Truck	Gasoline	Urban Unrestricted	0.0335	0.0099	0.0024	0.0124

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			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Light Commercial Truck	Diesel	Off-Network	0.0059	0.0006	0.0000	0.0006
Light Commercial Truck	Diesel	Rural Restricted	0.0049	0.0008	0.0000	0.0008
Light Commercial Truck	Diesel	Rural Unrestricted	0.0049	0.0009	0.0000	0.0009
Light Commercial Truck	Diesel	Urban Restricted	0.0005	0.0001	0.0000	0.0001
Light Commercial Truck	Diesel	Urban Unrestricted	0.0103	0.0021	0.0000	0.0021
Light Commercial Truck	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Off-Network	0.0001	0.0001	0.0000	0.0002
Other Buses	Gasoline	Rural Restricted	0.0002	0.0001	0.0000	0.0001
Other Buses	Gasoline	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Unrestricted	0.0004	0.0002	0.0000	0.0002
Other Buses	Diesel	Off-Network	0.0042	0.0006	0.0000	0.0006
Other Buses	Diesel	Rural Restricted	0.0121	0.0005	0.0000	0.0005
Other Buses	Diesel	Rural Unrestricted	0.0056	0.0003	0.0000	0.0003
Other Buses	Diesel	Urban Restricted	0.0016	0.0001	0.0000	0.0001
Other Buses	Diesel	Urban Unrestricted	0.0193	0.0012	0.0000	0.0012
Other Buses	CNG	Off-Network	0.0001	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Restricted	0.0008	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Unrestricted	0.0004	0.0001	0.0000	0.0001
Other Buses	CNG	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Unrestricted	0.0012	0.0003	0.0000	0.0003
Transit Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0001
Transit Bus	Gasoline	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Diesel	Off-Network	0.0015	0.0002	0.0000	0.0002
Transit Bus	Diesel	Rural Restricted	0.0035	0.0002	0.0000	0.0002
Transit Bus	Diesel	Rural Unrestricted	0.0017	0.0001	0.0000	0.0001
Transit Bus	Diesel	Urban Restricted	0.0006	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Unrestricted	0.0064	0.0005	0.0000	0.0005
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0002	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0003	0.0001	0.0000	0.0001
School Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Diesel	Off-Network	0.0008	0.0001	0.0000	0.0001
School Bus	Diesel	Rural Restricted	0.0028	0.0002	0.0000	0.0002
School Bus	Diesel	Rural Unrestricted	0.0017	0.0002	0.0000	0.0002

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2017			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
School Bus	Diesel	Urban Restricted	0.0003	0.0000	0.0000	0.0000
School Bus	Diesel	Urban Unrestricted	0.0050	0.0007	0.0000	0.0007
School Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Off-Network	0.0005	0.0001	0.0000	0.0001
Refuse Truck	Diesel	Rural Restricted	0.0011	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Unrestricted	0.0006	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Unrestricted	0.0017	0.0001	0.0000	0.0001
Refuse Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	Gasoline	Off-Network	0.0077	0.0047	0.0106	0.0153
Single Unit Short-haul Truck	Gasoline	Rural Restricted	0.0044	0.0008	0.0001	0.0009
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	0.0026	0.0008	0.0001	0.0009
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.0006	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	0.0061	0.0024	0.0003	0.0027
Single Unit Short-haul Truck	Diesel	Off-Network	0.0228	0.0031	0.0000	0.0031
Single Unit Short-haul Truck	Diesel	Rural Restricted	0.0357	0.0028	0.0000	0.0028
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	0.0236	0.0025	0.0000	0.0025
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.0047	0.0004	0.0000	0.0004
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	0.0636	0.0069	0.0000	0.0069
Single Unit Short-haul Truck	CNG	Off-Network	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0002	0.0003
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.0002	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.0003	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Off-Network	0.0009	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.0017	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.0013	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	0.0038	0.0004	0.0000	0.0004
Single Unit Long-haul Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	Gasoline	Off-Network	0.0003	0.0004	0.0037	0.0041

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			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motor Home	Gasoline	Rural Restricted	0.0017	0.0003	0.0001	0.0004
Motor Home	Gasoline	Rural Unrestricted	0.0010	0.0003	0.0001	0.0004
Motor Home	Gasoline	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Motor Home	Gasoline	Urban Unrestricted	0.0023	0.0010	0.0002	0.0011
Motor Home	Diesel	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	Diesel	Rural Restricted	0.0013	0.0001	0.0000	0.0001
Motor Home	Diesel	Rural Unrestricted	0.0008	0.0001	0.0000	0.0001
Motor Home	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Motor Home	Diesel	Urban Unrestricted	0.0020	0.0003	0.0000	0.0003
Motor Home	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Diesel	Off-Network	0.0103	0.0012	0.0000	0.0012
Combination Short-haul Truck	Diesel	Rural Restricted	0.0527	0.0021	0.0000	0.0021
Combination Short-haul Truck	Diesel	Rural Unrestricted	0.0265	0.0015	0.0000	0.0015
Combination Short-haul Truck	Diesel	Urban Restricted	0.0057	0.0002	0.0000	0.0002
Combination Short-haul Truck	Diesel	Urban Unrestricted	0.0454	0.0027	0.0000	0.0027
Combination Short-haul Truck	CNG	Off-Network	0.0001	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Combination Long-haul Truck	Diesel	Off-Network	0.0431	0.0053	0.0000	0.0053
Combination Long-haul Truck	Diesel	Rural Restricted	0.3873	0.0137	0.0000	0.0137
Combination Long-haul Truck	Diesel	Rural Unrestricted	0.0757	0.0035	0.0000	0.0035
Combination Long-haul Truck	Diesel	Urban Restricted	0.0224	0.0008	0.0000	0.0008
Combination Long-haul Truck	Diesel	Urban Unrestricted	0.1159	0.0055	0.0000	0.0055
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.7622</b>	<b>0.3290</b>	<b>0.3524</b>	<b>0.6814</b>
Motorcycle	ALL	ALL	0.0103	0.0139	0.0324	0.0463
Passenger Car	ALL	ALL	0.2053	0.0898	0.1622	0.2519
Passenger Truck	ALL	ALL	0.3748	0.1174	0.1193	0.2367
Light Commercial Truck	ALL	ALL	0.1201	0.0365	0.0231	0.0595
Other Buses	ALL	ALL	0.0462	0.0037	0.0000	0.0037
Transit Bus	ALL	ALL	0.0146	0.0013	0.0000	0.0013
School Bus	ALL	ALL	0.0109	0.0014	0.0000	0.0014
Refuse Truck	ALL	ALL	0.0041	0.0003	0.0000	0.0003
Single Unit Short-haul Truck	ALL	ALL	0.1723	0.0245	0.0111	0.0356
Single Unit Long-haul Truck	ALL	ALL	0.0087	0.0010	0.0003	0.0013
Motor Home	ALL	ALL	0.0098	0.0026	0.0040	0.0066
Combination Short-haul Truck	ALL	ALL	0.1408	0.0079	0.0000	0.0079
Combination Long-haul Truck	ALL	ALL	0.6444	0.0287	0.0000	0.0287
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.7622</b>	<b>0.3290</b>	<b>0.3524</b>	<b>0.6814</b>



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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2017			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
ALL	Gasoline	ALL	0.6446	0.2538	0.3522	0.6060
ALL	Diesel	ALL	1.1133	0.0739	0.0000	0.0739
ALL	CNG	ALL	0.0039	0.0011	0.0000	0.0011
ALL	Ethanol (E-85)	ALL	0.0004	0.0002	0.0003	0.0004
ALL	Electricity	ALL	0.0000	0.0000	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.7622</b>	<b>0.3290</b>	<b>0.3524</b>	<b>0.6814</b>
ALL	ALL	Off-Network	0.2447	0.1374	0.3005	0.4378
ALL	ALL	Rural Restricted	0.6823	0.0525	0.0086	0.0612
ALL	ALL	Rural Unrestricted	0.2713	0.0440	0.0138	0.0578
ALL	ALL	Urban Restricted	0.0520	0.0044	0.0008	0.0052
ALL	ALL	Urban Unrestricted	0.5120	0.0907	0.0288	0.1194
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.7622</b>	<b>0.3290</b>	<b>0.3524</b>	<b>0.6814</b>

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**Table A8.2. 2019 Onroad NO<sub>x</sub> and VOC Emissions: tons per ozone season weekday (tposwd) for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2019			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motorcycle	Gasoline	Off-Network	0.0000	0.0001	0.0241	0.0242
Motorcycle	Gasoline	Rural Restricted	0.0030	0.0028	0.0012	0.0040
Motorcycle	Gasoline	Rural Unrestricted	0.0027	0.0034	0.0023	0.0057
Motorcycle	Gasoline	Urban Restricted	0.0002	0.0002	0.0001	0.0003
Motorcycle	Gasoline	Urban Unrestricted	0.0043	0.0061	0.0043	0.0104
Passenger Car	Gasoline	Off-Network	0.0337	0.0400	0.1252	0.1653
Passenger Car	Gasoline	Rural Restricted	0.0350	0.0076	0.0032	0.0108
Passenger Car	Gasoline	Rural Unrestricted	0.0226	0.0069	0.0047	0.0116
Passenger Car	Gasoline	Urban Restricted	0.0036	0.0008	0.0003	0.0011
Passenger Car	Gasoline	Urban Unrestricted	0.0504	0.0164	0.0114	0.0279
Passenger Car	Diesel	Off-Network	0.0002	0.0003	0.0000	0.0003
Passenger Car	Diesel	Rural Restricted	0.0002	0.0001	0.0000	0.0001
Passenger Car	Diesel	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Passenger Car	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0001
Passenger Car	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Gasoline	Off-Network	0.0532	0.0472	0.0878	0.1351
Passenger Truck	Gasoline	Rural Restricted	0.0507	0.0084	0.0028	0.0111
Passenger Truck	Gasoline	Rural Unrestricted	0.0352	0.0088	0.0045	0.0133
Passenger Truck	Gasoline	Urban Restricted	0.0038	0.0006	0.0002	0.0008
Passenger Truck	Gasoline	Urban Unrestricted	0.0553	0.0150	0.0077	0.0227
Passenger Truck	Diesel	Off-Network	0.0133	0.0011	0.0000	0.0011
Passenger Truck	Diesel	Rural Restricted	0.0093	0.0013	0.0000	0.0013
Passenger Truck	Diesel	Rural Unrestricted	0.0106	0.0016	0.0000	0.0016
Passenger Truck	Diesel	Urban Restricted	0.0007	0.0001	0.0000	0.0001
Passenger Truck	Diesel	Urban Unrestricted	0.0174	0.0028	0.0000	0.0028
Passenger Truck	Ethanol (E-85)	Off-Network	0.0001	0.0001	0.0002	0.0003
Passenger Truck	Ethanol (E-85)	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Gasoline	Off-Network	0.0154	0.0114	0.0158	0.0272
Light Commercial Truck	Gasoline	Rural Restricted	0.0157	0.0023	0.0006	0.0029
Light Commercial Truck	Gasoline	Rural Unrestricted	0.0117	0.0032	0.0009	0.0041
Light Commercial Truck	Gasoline	Urban Restricted	0.0016	0.0002	0.0001	0.0003
Light Commercial Truck	Gasoline	Urban Unrestricted	0.0236	0.0071	0.0020	0.0091

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2019			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Light Commercial Truck	Diesel	Off-Network	0.0048	0.0004	0.0000	0.0004
Light Commercial Truck	Diesel	Rural Restricted	0.0040	0.0006	0.0000	0.0006
Light Commercial Truck	Diesel	Rural Unrestricted	0.0040	0.0007	0.0000	0.0007
Light Commercial Truck	Diesel	Urban Restricted	0.0004	0.0001	0.0000	0.0001
Light Commercial Truck	Diesel	Urban Unrestricted	0.0084	0.0016	0.0000	0.0016
Light Commercial Truck	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Off-Network	0.0001	0.0001	0.0000	0.0002
Other Buses	Gasoline	Rural Restricted	0.0002	0.0001	0.0000	0.0001
Other Buses	Gasoline	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Unrestricted	0.0003	0.0001	0.0000	0.0002
Other Buses	Diesel	Off-Network	0.0037	0.0005	0.0000	0.0005
Other Buses	Diesel	Rural Restricted	0.0099	0.0004	0.0000	0.0004
Other Buses	Diesel	Rural Unrestricted	0.0046	0.0003	0.0000	0.0003
Other Buses	Diesel	Urban Restricted	0.0013	0.0001	0.0000	0.0001
Other Buses	Diesel	Urban Unrestricted	0.0163	0.0010	0.0000	0.0010
Other Buses	CNG	Off-Network	0.0001	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Restricted	0.0006	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Unrestricted	0.0003	0.0001	0.0000	0.0001
Other Buses	CNG	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Unrestricted	0.0010	0.0002	0.0000	0.0002
Transit Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0001
Transit Bus	Gasoline	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Diesel	Off-Network	0.0012	0.0001	0.0000	0.0001
Transit Bus	Diesel	Rural Restricted	0.0028	0.0002	0.0000	0.0002
Transit Bus	Diesel	Rural Unrestricted	0.0014	0.0001	0.0000	0.0001
Transit Bus	Diesel	Urban Restricted	0.0005	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Unrestricted	0.0053	0.0004	0.0000	0.0004
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0003	0.0001	0.0000	0.0001
School Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Diesel	Off-Network	0.0008	0.0001	0.0000	0.0001
School Bus	Diesel	Rural Restricted	0.0022	0.0002	0.0000	0.0002
School Bus	Diesel	Rural Unrestricted	0.0014	0.0002	0.0000	0.0002

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2019			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
School Bus	Diesel	Urban Restricted	0.0003	0.0000	0.0000	0.0000
School Bus	Diesel	Urban Unrestricted	0.0041	0.0005	0.0000	0.0005
School Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Off-Network	0.0005	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Restricted	0.0009	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Unrestricted	0.0005	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Unrestricted	0.0014	0.0001	0.0000	0.0001
Refuse Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	Gasoline	Off-Network	0.0063	0.0040	0.0087	0.0127
Single Unit Short-haul Truck	Gasoline	Rural Restricted	0.0029	0.0006	0.0001	0.0007
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	0.0017	0.0005	0.0001	0.0006
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.0004	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	0.0039	0.0017	0.0003	0.0020
Single Unit Short-haul Truck	Diesel	Off-Network	0.0214	0.0022	0.0000	0.0022
Single Unit Short-haul Truck	Diesel	Rural Restricted	0.0279	0.0020	0.0000	0.0020
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	0.0190	0.0018	0.0000	0.0018
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.0037	0.0003	0.0000	0.0003
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	0.0520	0.0048	0.0000	0.0048
Single Unit Short-haul Truck	CNG	Off-Network	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0003	0.0004
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.0002	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Off-Network	0.0008	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.0012	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.0009	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	0.0028	0.0002	0.0000	0.0002
Single Unit Long-haul Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	Gasoline	Off-Network	0.0003	0.0004	0.0032	0.0035

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2019			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motor Home	Gasoline	Rural Restricted	0.0014	0.0003	0.0001	0.0003
Motor Home	Gasoline	Rural Unrestricted	0.0008	0.0003	0.0000	0.0003
Motor Home	Gasoline	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Motor Home	Gasoline	Urban Unrestricted	0.0019	0.0008	0.0001	0.0009
Motor Home	Diesel	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	Diesel	Rural Restricted	0.0014	0.0001	0.0000	0.0001
Motor Home	Diesel	Rural Unrestricted	0.0008	0.0001	0.0000	0.0001
Motor Home	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Motor Home	Diesel	Urban Unrestricted	0.0021	0.0003	0.0000	0.0003
Motor Home	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Diesel	Off-Network	0.0102	0.0010	0.0000	0.0010
Combination Short-haul Truck	Diesel	Rural Restricted	0.0462	0.0017	0.0000	0.0017
Combination Short-haul Truck	Diesel	Rural Unrestricted	0.0236	0.0012	0.0000	0.0012
Combination Short-haul Truck	Diesel	Urban Restricted	0.0050	0.0002	0.0000	0.0002
Combination Short-haul Truck	Diesel	Urban Unrestricted	0.0409	0.0021	0.0000	0.0021
Combination Short-haul Truck	CNG	Off-Network	0.0001	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Unrestricted	0.0001	0.0001	0.0000	0.0001
Combination Long-haul Truck	Diesel	Off-Network	0.0402	0.0042	0.0000	0.0042
Combination Long-haul Truck	Diesel	Rural Restricted	0.3191	0.0112	0.0000	0.0112
Combination Long-haul Truck	Diesel	Rural Unrestricted	0.0641	0.0028	0.0000	0.0028
Combination Long-haul Truck	Diesel	Urban Restricted	0.0184	0.0006	0.0000	0.0006
Combination Long-haul Truck	Diesel	Urban Unrestricted	0.1004	0.0043	0.0000	0.0043
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.3820</b>	<b>0.2557</b>	<b>0.3125</b>	<b>0.5682</b>
Motorcycle	ALL	ALL	0.0102	0.0127	0.0319	0.0447
Passenger Car	ALL	ALL	0.1460	0.0723	0.1449	0.2172
Passenger Truck	ALL	ALL	0.2497	0.0871	0.1032	0.1903
Light Commercial Truck	ALL	ALL	0.0895	0.0276	0.0194	0.0470
Other Buses	ALL	ALL	0.0386	0.0030	0.0001	0.0031
Transit Bus	ALL	ALL	0.0120	0.0011	0.0000	0.0011
School Bus	ALL	ALL	0.0088	0.0010	0.0000	0.0010
Refuse Truck	ALL	ALL	0.0034	0.0002	0.0000	0.0002
Single Unit Short-haul Truck	ALL	ALL	0.1396	0.0183	0.0092	0.0275
Single Unit Long-haul Truck	ALL	ALL	0.0065	0.0007	0.0003	0.0011
Motor Home	ALL	ALL	0.0091	0.0023	0.0034	0.0057
Combination Short-haul Truck	ALL	ALL	0.1262	0.0063	0.0000	0.0063
Combination Long-haul Truck	ALL	ALL	0.5423	0.0231	0.0000	0.0231
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.3820</b>	<b>0.2557</b>	<b>0.3125</b>	<b>0.5682</b>

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2019			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
ALL	Gasoline	ALL	0.4429	0.1982	0.3122	0.5104
ALL	Diesel	ALL	0.9352	0.0563	0.0000	0.0563
ALL	CNG	ALL	0.0035	0.0011	0.0000	0.0011
ALL	Ethanol (E-85)	ALL	0.0003	0.0002	0.0003	0.0005
ALL	Electricity	ALL	0.0000	0.0000	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.3820</b>	<b>0.2557</b>	<b>0.3125</b>	<b>0.5682</b>
ALL	ALL	Off-Network	0.2067	0.1137	0.2655	0.3792
ALL	ALL	Rural Restricted	0.5353	0.0401	0.0079	0.0480
ALL	ALL	Rural Unrestricted	0.2064	0.0323	0.0125	0.0448
ALL	ALL	Urban Restricted	0.0405	0.0034	0.0007	0.0041
ALL	ALL	Urban Unrestricted	0.3930	0.0663	0.0259	0.0922
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>1.3820</b>	<b>0.2557</b>	<b>0.3125</b>	<b>0.5682</b>

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**Table A8.3. 2025 Onroad NO<sub>x</sub> and VOC Emissions: tons per ozone season weekday (tposwd) for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2025			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motorcycle	Gasoline	Off-Network	0.0000	0.0002	0.0238	0.0239
Motorcycle	Gasoline	Rural Restricted	0.0030	0.0025	0.0013	0.0037
Motorcycle	Gasoline	Rural Unrestricted	0.0026	0.0029	0.0024	0.0053
Motorcycle	Gasoline	Urban Restricted	0.0002	0.0002	0.0001	0.0003
Motorcycle	Gasoline	Urban Unrestricted	0.0042	0.0052	0.0044	0.0096
Passenger Car	Gasoline	Off-Network	0.0208	0.0276	0.1032	0.1308
Passenger Car	Gasoline	Rural Restricted	0.0149	0.0039	0.0028	0.0067
Passenger Car	Gasoline	Rural Unrestricted	0.0096	0.0035	0.0040	0.0075
Passenger Car	Gasoline	Urban Restricted	0.0015	0.0004	0.0003	0.0007
Passenger Car	Gasoline	Urban Unrestricted	0.0214	0.0083	0.0097	0.0180
Passenger Car	Diesel	Off-Network	0.0002	0.0003	0.0000	0.0003
Passenger Car	Diesel	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Passenger Car	Diesel	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Passenger Car	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0001	0.0001
Passenger Car	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Gasoline	Off-Network	0.0291	0.0302	0.0693	0.0995
Passenger Truck	Gasoline	Rural Restricted	0.0168	0.0043	0.0024	0.0066
Passenger Truck	Gasoline	Rural Unrestricted	0.0113	0.0041	0.0038	0.0079
Passenger Truck	Gasoline	Urban Restricted	0.0013	0.0003	0.0002	0.0005
Passenger Truck	Gasoline	Urban Unrestricted	0.0178	0.0069	0.0065	0.0134
Passenger Truck	Diesel	Off-Network	0.0107	0.0007	0.0000	0.0007
Passenger Truck	Diesel	Rural Restricted	0.0032	0.0003	0.0000	0.0003
Passenger Truck	Diesel	Rural Unrestricted	0.0041	0.0004	0.0000	0.0004
Passenger Truck	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Passenger Truck	Diesel	Urban Unrestricted	0.0068	0.0007	0.0000	0.0007
Passenger Truck	Ethanol (E-85)	Off-Network	0.0001	0.0001	0.0002	0.0003
Passenger Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Gasoline	Off-Network	0.0074	0.0063	0.0121	0.0184
Light Commercial Truck	Gasoline	Rural Restricted	0.0056	0.0010	0.0005	0.0014
Light Commercial Truck	Gasoline	Rural Unrestricted	0.0041	0.0012	0.0007	0.0019
Light Commercial Truck	Gasoline	Urban Restricted	0.0006	0.0001	0.0000	0.0001
Light Commercial Truck	Gasoline	Urban Unrestricted	0.0082	0.0028	0.0015	0.0043

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2025			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Light Commercial Truck	Diesel	Off-Network	0.0028	0.0002	0.0000	0.0002
Light Commercial Truck	Diesel	Rural Restricted	0.0017	0.0002	0.0000	0.0002
Light Commercial Truck	Diesel	Rural Unrestricted	0.0017	0.0002	0.0000	0.0002
Light Commercial Truck	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Light Commercial Truck	Diesel	Urban Unrestricted	0.0036	0.0005	0.0000	0.0005
Light Commercial Truck	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Off-Network	0.0001	0.0001	0.0001	0.0002
Other Buses	Gasoline	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Other Buses	Gasoline	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
Other Buses	Diesel	Off-Network	0.0032	0.0002	0.0000	0.0002
Other Buses	Diesel	Rural Restricted	0.0052	0.0002	0.0000	0.0002
Other Buses	Diesel	Rural Unrestricted	0.0027	0.0001	0.0000	0.0001
Other Buses	Diesel	Urban Restricted	0.0007	0.0000	0.0000	0.0000
Other Buses	Diesel	Urban Unrestricted	0.0101	0.0004	0.0000	0.0004
Other Buses	CNG	Off-Network	0.0001	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Restricted	0.0003	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Unrestricted	0.0005	0.0002	0.0000	0.0002
Transit Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0001
Transit Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Diesel	Off-Network	0.0009	0.0001	0.0000	0.0001
Transit Bus	Diesel	Rural Restricted	0.0015	0.0001	0.0000	0.0001
Transit Bus	Diesel	Rural Unrestricted	0.0008	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Restricted	0.0002	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Unrestricted	0.0031	0.0002	0.0000	0.0002
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0002	0.0001	0.0000	0.0001
School Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Diesel	Off-Network	0.0008	0.0000	0.0000	0.0000
School Bus	Diesel	Rural Restricted	0.0010	0.0000	0.0000	0.0000
School Bus	Diesel	Rural Unrestricted	0.0007	0.0000	0.0000	0.0000



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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2025			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
School Bus	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
School Bus	Diesel	Urban Unrestricted	0.0023	0.0001	0.0000	0.0001
School Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Off-Network	0.0004	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Restricted	0.0003	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Unrestricted	0.0002	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Unrestricted	0.0007	0.0000	0.0000	0.0000
Refuse Truck	CNG	Off-Network	0.0001	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Unrestricted	0.0000	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Off-Network	0.0045	0.0032	0.0059	0.0091
Single Unit Short-haul Truck	Gasoline	Rural Restricted	0.0010	0.0004	0.0001	0.0005
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	0.0005	0.0003	0.0001	0.0004
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	0.0013	0.0009	0.0002	0.0011
Single Unit Short-haul Truck	Diesel	Off-Network	0.0192	0.0010	0.0000	0.0010
Single Unit Short-haul Truck	Diesel	Rural Restricted	0.0141	0.0007	0.0000	0.0007
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	0.0112	0.0006	0.0000	0.0006
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.0018	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	0.0329	0.0018	0.0000	0.0018
Single Unit Short-haul Truck	CNG	Off-Network	0.0002	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Unrestricted	0.0002	0.0002	0.0000	0.0002
Single Unit Long-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0002	0.0002
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.0001	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Off-Network	0.0007	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.0007	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.0006	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	0.0021	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	Gasoline	Off-Network	0.0002	0.0003	0.0021	0.0024

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2025			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motor Home	Gasoline	Rural Restricted	0.0008	0.0002	0.0000	0.0002
Motor Home	Gasoline	Rural Unrestricted	0.0004	0.0002	0.0000	0.0002
Motor Home	Gasoline	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Motor Home	Gasoline	Urban Unrestricted	0.0010	0.0005	0.0001	0.0006
Motor Home	Diesel	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	Diesel	Rural Restricted	0.0013	0.0001	0.0000	0.0001
Motor Home	Diesel	Rural Unrestricted	0.0008	0.0001	0.0000	0.0001
Motor Home	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Motor Home	Diesel	Urban Unrestricted	0.0020	0.0002	0.0000	0.0002
Motor Home	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Diesel	Off-Network	0.0101	0.0006	0.0000	0.0006
Combination Short-haul Truck	Diesel	Rural Restricted	0.0286	0.0010	0.0000	0.0010
Combination Short-haul Truck	Diesel	Rural Unrestricted	0.0160	0.0007	0.0000	0.0007
Combination Short-haul Truck	Diesel	Urban Restricted	0.0030	0.0001	0.0000	0.0001
Combination Short-haul Truck	Diesel	Urban Unrestricted	0.0296	0.0012	0.0000	0.0012
Combination Short-haul Truck	CNG	Off-Network	0.0002	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Unrestricted	0.0001	0.0002	0.0000	0.0002
Combination Long-haul Truck	Diesel	Off-Network	0.0327	0.0022	0.0000	0.0022
Combination Long-haul Truck	Diesel	Rural Restricted	0.1941	0.0065	0.0000	0.0065
Combination Long-haul Truck	Diesel	Rural Unrestricted	0.0428	0.0015	0.0000	0.0015
Combination Long-haul Truck	Diesel	Urban Restricted	0.0110	0.0004	0.0000	0.0004
Combination Long-haul Truck	Diesel	Urban Unrestricted	0.0711	0.0023	0.0000	0.0023
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.7917</b>	<b>0.1471</b>	<b>0.2580</b>	<b>0.4050</b>
Motorcycle	ALL	ALL	0.0102	0.0110	0.0319	0.0429
Passenger Car	ALL	ALL	0.0689	0.0442	0.1201	0.1643
Passenger Truck	ALL	ALL	0.1013	0.0481	0.0824	0.1305
Light Commercial Truck	ALL	ALL	0.0359	0.0125	0.0148	0.0274
Other Buses	ALL	ALL	0.0234	0.0017	0.0001	0.0018
Transit Bus	ALL	ALL	0.0070	0.0006	0.0000	0.0007
School Bus	ALL	ALL	0.0050	0.0003	0.0000	0.0003
Refuse Truck	ALL	ALL	0.0019	0.0002	0.0000	0.0002
Single Unit Short-haul Truck	ALL	ALL	0.0873	0.0095	0.0062	0.0157
Single Unit Long-haul Truck	ALL	ALL	0.0045	0.0004	0.0002	0.0006
Motor Home	ALL	ALL	0.0068	0.0016	0.0023	0.0038
Combination Short-haul Truck	ALL	ALL	0.0877	0.0040	0.0000	0.0040
Combination Long-haul Truck	ALL	ALL	0.3518	0.0129	0.0000	0.0129
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.7917</b>	<b>0.1471</b>	<b>0.2580</b>	<b>0.4050</b>

Redesignation Request and Maintenance Plan for the Manitowoc County, Wisconsin  
2015 Ozone NAAQS Nonattainment Area – DRAFT FOR PUBLIC REVIEW

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2025			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
ALL	Gasoline	ALL	0.1916	0.1185	0.2576	0.3761
ALL	Diesel	ALL	0.5971	0.0268	0.0000	0.0268
ALL	CNG	ALL	0.0027	0.0016	0.0000	0.0016
ALL	Ethanol (E-85)	ALL	0.0002	0.0002	0.0004	0.0005
ALL	Electricity	ALL	0.0000	0.0000	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.7917</b>	<b>0.1471</b>	<b>0.2580</b>	<b>0.4050</b>
ALL	ALL	Off-Network	0.1448	0.0737	0.2169	0.2906
ALL	ALL	Rural Restricted	0.2948	0.0219	0.0070	0.0289
ALL	ALL	Rural Unrestricted	0.1108	0.0164	0.0110	0.0274
ALL	ALL	Urban Restricted	0.0215	0.0018	0.0006	0.0024
ALL	ALL	Urban Unrestricted	0.2198	0.0333	0.0224	0.0557
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.7917</b>	<b>0.1471</b>	<b>0.2580</b>	<b>0.4050</b>
Safety Margin			15%			15%
<b>Emissions Budget</b>			<b>0.9104</b>			<b>0.4658</b>

Redesignation Request and Maintenance Plan for the Manitowoc County, Wisconsin  
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**Table A8.4. 2033 Onroad NO<sub>x</sub> and VOC Emissions: tons per ozone season weekday (tposwd) for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2033			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motorcycle	Gasoline	Off-Network	0.0000	0.0002	0.0215	0.0217
Motorcycle	Gasoline	Rural Restricted	0.0032	0.0024	0.0013	0.0038
Motorcycle	Gasoline	Rural Unrestricted	0.0027	0.0028	0.0025	0.0053
Motorcycle	Gasoline	Urban Restricted	0.0003	0.0002	0.0001	0.0003
Motorcycle	Gasoline	Urban Unrestricted	0.0043	0.0050	0.0045	0.0095
Passenger Car	Gasoline	Off-Network	0.0134	0.0163	0.0745	0.0909
Passenger Car	Gasoline	Rural Restricted	0.0041	0.0020	0.0023	0.0043
Passenger Car	Gasoline	Rural Unrestricted	0.0025	0.0017	0.0032	0.0049
Passenger Car	Gasoline	Urban Restricted	0.0004	0.0002	0.0002	0.0004
Passenger Car	Gasoline	Urban Unrestricted	0.0055	0.0039	0.0077	0.0115
Passenger Car	Diesel	Off-Network	0.0002	0.0002	0.0000	0.0002
Passenger Car	Diesel	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0001	0.0001	0.0000	0.0001
Passenger Car	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0001	0.0001
Passenger Car	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Car	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Gasoline	Off-Network	0.0165	0.0167	0.0514	0.0681
Passenger Truck	Gasoline	Rural Restricted	0.0046	0.0024	0.0020	0.0044
Passenger Truck	Gasoline	Rural Unrestricted	0.0030	0.0021	0.0031	0.0052
Passenger Truck	Gasoline	Urban Restricted	0.0003	0.0002	0.0001	0.0003
Passenger Truck	Gasoline	Urban Unrestricted	0.0047	0.0035	0.0052	0.0087
Passenger Truck	Diesel	Off-Network	0.0103	0.0006	0.0000	0.0006
Passenger Truck	Diesel	Rural Restricted	0.0013	0.0001	0.0000	0.0001
Passenger Truck	Diesel	Rural Unrestricted	0.0020	0.0002	0.0000	0.0002
Passenger Truck	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Passenger Truck	Diesel	Urban Unrestricted	0.0034	0.0003	0.0000	0.0003
Passenger Truck	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0002	0.0002
Passenger Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Passenger Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Gasoline	Off-Network	0.0033	0.0033	0.0091	0.0124
Light Commercial Truck	Gasoline	Rural Restricted	0.0012	0.0003	0.0004	0.0007
Light Commercial Truck	Gasoline	Rural Unrestricted	0.0008	0.0004	0.0006	0.0009
Light Commercial Truck	Gasoline	Urban Restricted	0.0001	0.0000	0.0000	0.0001
Light Commercial Truck	Gasoline	Urban Unrestricted	0.0016	0.0009	0.0012	0.0020

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2033			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Light Commercial Truck	Diesel	Off-Network	0.0017	0.0001	0.0000	0.0001
Light Commercial Truck	Diesel	Rural Restricted	0.0004	0.0000	0.0000	0.0000
Light Commercial Truck	Diesel	Rural Unrestricted	0.0005	0.0001	0.0000	0.0001
Light Commercial Truck	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Diesel	Urban Unrestricted	0.0010	0.0001	0.0000	0.0001
Light Commercial Truck	Ethanol (E-85)	Off-Network	0.0000	0.0000	0.0000	0.0001
Light Commercial Truck	Ethanol (E-85)	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Ethanol (E-85)	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Off-Network	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Light Commercial Truck	Electricity	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Off-Network	0.0001	0.0001	0.0001	0.0002
Other Buses	Gasoline	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Other Buses	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	Gasoline	Urban Unrestricted	0.0001	0.0001	0.0000	0.0001
Other Buses	Diesel	Off-Network	0.0031	0.0001	0.0000	0.0001
Other Buses	Diesel	Rural Restricted	0.0028	0.0001	0.0000	0.0001
Other Buses	Diesel	Rural Unrestricted	0.0016	0.0000	0.0000	0.0000
Other Buses	Diesel	Urban Restricted	0.0003	0.0000	0.0000	0.0000
Other Buses	Diesel	Urban Unrestricted	0.0068	0.0002	0.0000	0.0002
Other Buses	CNG	Off-Network	0.0002	0.0001	0.0000	0.0001
Other Buses	CNG	Rural Restricted	0.0001	0.0000	0.0000	0.0000
Other Buses	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Other Buses	CNG	Urban Unrestricted	0.0002	0.0002	0.0000	0.0002
Transit Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0001
Transit Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	Diesel	Off-Network	0.0007	0.0000	0.0000	0.0000
Transit Bus	Diesel	Rural Restricted	0.0008	0.0000	0.0000	0.0000
Transit Bus	Diesel	Rural Unrestricted	0.0004	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Transit Bus	Diesel	Urban Unrestricted	0.0019	0.0001	0.0000	0.0001
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0001	0.0000	0.0000	0.0000
School Bus	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	Diesel	Off-Network	0.0009	0.0000	0.0000	0.0000
School Bus	Diesel	Rural Restricted	0.0006	0.0000	0.0000	0.0000
School Bus	Diesel	Rural Unrestricted	0.0005	0.0000	0.0000	0.0000

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			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
School Bus	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
School Bus	Diesel	Urban Unrestricted	0.0016	0.0000	0.0000	0.0000
School Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
School Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Off-Network	0.0005	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Restricted	0.0003	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Rural Unrestricted	0.0002	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	Diesel	Urban Unrestricted	0.0007	0.0000	0.0000	0.0000
Refuse Truck	CNG	Off-Network	0.0001	0.0001	0.0000	0.0001
Refuse Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Refuse Truck	CNG	Urban Unrestricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Off-Network	0.0040	0.0031	0.0027	0.0058
Single Unit Short-haul Truck	Gasoline	Rural Restricted	0.0005	0.0004	0.0001	0.0004
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	0.0002	0.0002	0.0001	0.0003
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.0001	0.0000	0.0000	0.0001
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	0.0005	0.0006	0.0002	0.0008
Single Unit Short-haul Truck	Diesel	Off-Network	0.0197	0.0005	0.0000	0.0005
Single Unit Short-haul Truck	Diesel	Rural Restricted	0.0089	0.0002	0.0000	0.0002
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	0.0085	0.0002	0.0000	0.0002
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.0011	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	0.0267	0.0007	0.0000	0.0007
Single Unit Short-haul Truck	CNG	Off-Network	0.0003	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0001	0.0000	0.0001
Single Unit Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Short-haul Truck	CNG	Urban Unrestricted	0.0003	0.0003	0.0000	0.0003
Single Unit Long-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0001	0.0001
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0001
Single Unit Long-haul Truck	Diesel	Off-Network	0.0007	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.0005	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.0005	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	0.0018	0.0001	0.0000	0.0001
Single Unit Long-haul Truck	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Single Unit Long-haul Truck	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	Gasoline	Off-Network	0.0002	0.0002	0.0007	0.0009

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2033			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
Motor Home	Gasoline	Rural Restricted	0.0003	0.0001	0.0000	0.0001
Motor Home	Gasoline	Rural Unrestricted	0.0001	0.0001	0.0000	0.0001
Motor Home	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	Gasoline	Urban Unrestricted	0.0003	0.0002	0.0000	0.0002
Motor Home	Diesel	Off-Network	0.0001	0.0000	0.0000	0.0000
Motor Home	Diesel	Rural Restricted	0.0009	0.0001	0.0000	0.0001
Motor Home	Diesel	Rural Unrestricted	0.0007	0.0001	0.0000	0.0001
Motor Home	Diesel	Urban Restricted	0.0001	0.0000	0.0000	0.0000
Motor Home	Diesel	Urban Unrestricted	0.0018	0.0001	0.0000	0.0001
Motor Home	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Motor Home	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Off-Network	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	Diesel	Off-Network	0.0099	0.0004	0.0000	0.0004
Combination Short-haul Truck	Diesel	Rural Restricted	0.0186	0.0006	0.0000	0.0006
Combination Short-haul Truck	Diesel	Rural Unrestricted	0.0116	0.0004	0.0000	0.0004
Combination Short-haul Truck	Diesel	Urban Restricted	0.0019	0.0001	0.0000	0.0001
Combination Short-haul Truck	Diesel	Urban Unrestricted	0.0223	0.0006	0.0000	0.0006
Combination Short-haul Truck	CNG	Off-Network	0.0002	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Rural Restricted	0.0001	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Rural Unrestricted	0.0001	0.0001	0.0000	0.0001
Combination Short-haul Truck	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000
Combination Short-haul Truck	CNG	Urban Unrestricted	0.0002	0.0002	0.0000	0.0002
Combination Long-haul Truck	Diesel	Off-Network	0.0277	0.0013	0.0000	0.0013
Combination Long-haul Truck	Diesel	Rural Restricted	0.1366	0.0043	0.0000	0.0043
Combination Long-haul Truck	Diesel	Rural Unrestricted	0.0336	0.0009	0.0000	0.0009
Combination Long-haul Truck	Diesel	Urban Restricted	0.0076	0.0002	0.0000	0.0002
Combination Long-haul Truck	Diesel	Urban Unrestricted	0.0577	0.0014	0.0000	0.0014
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.5266</b>	<b>0.0869</b>	<b>0.1953</b>	<b>0.2822</b>
Motorcycle	ALL	ALL	0.0105	0.0106	0.0299	0.0405
Passenger Car	ALL	ALL	0.0264	0.0245	0.0880	0.1125
Passenger Truck	ALL	ALL	0.0463	0.0262	0.0621	0.0883
Light Commercial Truck	ALL	ALL	0.0108	0.0052	0.0113	0.0165
Other Buses	ALL	ALL	0.0155	0.0011	0.0001	0.0012
Transit Bus	ALL	ALL	0.0042	0.0003	0.0000	0.0004
School Bus	ALL	ALL	0.0036	0.0001	0.0000	0.0001
Refuse Truck	ALL	ALL	0.0020	0.0002	0.0000	0.0002
Single Unit Short-haul Truck	ALL	ALL	0.0709	0.0067	0.0030	0.0097
Single Unit Long-haul Truck	ALL	ALL	0.0038	0.0003	0.0001	0.0004
Motor Home	ALL	ALL	0.0045	0.0009	0.0008	0.0017
Combination Short-haul Truck	ALL	ALL	0.0649	0.0026	0.0000	0.0026
Combination Long-haul Truck	ALL	ALL	0.2632	0.0082	0.0000	0.0082
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.5266</b>	<b>0.0869</b>	<b>0.1953</b>	<b>0.2822</b>

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area – Year 2033			
			NO <sub>x</sub> Emissions (tposwd)	VOC Emissions (tposwd)		
			Total	Exhaust	Evaporative	Total
ALL	Gasoline	ALL	0.0795	0.0701	0.1950	0.2651
ALL	Diesel	ALL	0.4448	0.0148	0.0000	0.0148
ALL	CNG	ALL	0.0022	0.0019	0.0000	0.0019
ALL	Ethanol (E-85)	ALL	0.0001	0.0001	0.0003	0.0004
ALL	Electricity	ALL	0.0000	0.0000	0.0000	0.0000
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.5266</b>	<b>0.0869</b>	<b>0.1953</b>	<b>0.2822</b>
ALL	ALL	Off-Network	0.1139	0.0438	0.1604	0.2042
ALL	ALL	Rural Restricted	0.1862	0.0136	0.0061	0.0197
ALL	ALL	Rural Unrestricted	0.0700	0.0096	0.0094	0.0190
ALL	ALL	Urban Restricted	0.0128	0.0011	0.0005	0.0016
ALL	ALL	Urban Unrestricted	0.1437	0.0188	0.0189	0.0376
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>0.5266</b>	<b>0.0869</b>	<b>0.1953</b>	<b>0.2822</b>
Safety Margin			15%			15%
<b>Emissions Budget</b>			<b>0.6055</b>			<b>0.3245</b>



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**Table A8.5. Vehicle Activity Data Output from the MOVES3.0.1 Model for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
Motorcycle	Gasoline	Off-Network	1,588	1,592	1,669	1,786				
Motorcycle	Gasoline	Rural Restricted					4,173	4,292	4,509	4,810
Motorcycle	Gasoline	Rural Unrestricted					4,233	4,289	4,428	4,632
Motorcycle	Gasoline	Urban Restricted					320	330	349	374
Motorcycle	Gasoline	Urban Unrestricted					7,471	7,526	7,724	7,976
Passenger Car	Gasoline	Off-Network	18,958	19,010	19,901	21,188				
Passenger Car	Gasoline	Rural Restricted					170,958	176,745	187,495	208,785
Passenger Car	Gasoline	Rural Unrestricted					134,001	136,512	142,309	155,370
Passenger Car	Gasoline	Urban Restricted					17,342	17,953	19,187	21,451
Passenger Car	Gasoline	Urban Unrestricted					310,667	314,582	325,989	351,365
Passenger Car	Diesel	Off-Network	132	129	157	284				
Passenger Car	Diesel	Rural Restricted					1,293	1,298	1,505	3,085
Passenger Car	Diesel	Rural Unrestricted					1,013	1,003	1,142	2,296
Passenger Car	Diesel	Urban Restricted					131	132	154	317
Passenger Car	Diesel	Urban Unrestricted					2,349	2,311	2,616	5,191
Passenger Car	Ethanol (E-85)	Off-Network	11	12	13	13				
Passenger Car	Ethanol (E-85)	Rural Restricted					106	116	124	127
Passenger Car	Ethanol (E-85)	Rural Unrestricted					83	90	94	95
Passenger Car	Ethanol (E-85)	Urban Restricted					11	12	13	13
Passenger Car	Ethanol (E-85)	Urban Unrestricted					193	207	216	214
Passenger Car	Electricity	Off-Network	0	0	0	0				
Passenger Car	Electricity	Rural Restricted					0	0	0	0
Passenger Car	Electricity	Rural Unrestricted					0	0	0	0
Passenger Car	Electricity	Urban Restricted					0	0	0	0
Passenger Car	Electricity	Urban Unrestricted					0	0	0	0
Passenger Truck	Gasoline	Off-Network	22,131	21,929	22,318	22,026				
Passenger Truck	Gasoline	Rural Restricted					238,467	243,734	250,888	254,234
Passenger Truck	Gasoline	Rural Unrestricted					206,763	208,242	210,645	209,280
Passenger Truck	Gasoline	Urban Restricted					17,726	18,141	18,813	19,140
Passenger Truck	Gasoline	Urban Unrestricted					338,854	339,221	341,093	334,558
Passenger Truck	Diesel	Off-Network	707	760	1,077	1,447				
Passenger Truck	Diesel	Rural Restricted					7,478	8,556	13,041	17,297
Passenger Truck	Diesel	Rural Unrestricted					6,484	7,310	10,949	14,238
Passenger Truck	Diesel	Urban Restricted					556	637	978	1,302
Passenger Truck	Diesel	Urban Unrestricted					10,626	11,908	17,729	22,762

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
Passenger Truck	Ethanol (E-85)	Off-Network	56	56	61	56				
Passenger Truck	Ethanol (E-85)	Rural Restricted					656	663	676	647
Passenger Truck	Ethanol (E-85)	Rural Unrestricted					569	566	568	533
Passenger Truck	Ethanol (E-85)	Urban Restricted					49	49	51	49
Passenger Truck	Ethanol (E-85)	Urban Unrestricted					933	922	919	852
Passenger Truck	Electricity	Off-Network	0	0	0	0				
Passenger Truck	Electricity	Rural Restricted					0	0	0	0
Passenger Truck	Electricity	Rural Unrestricted					0	0	0	0
Passenger Truck	Electricity	Urban Restricted					0	0	0	0
Passenger Truck	Electricity	Urban Unrestricted					0	0	0	0
Light Commercial Truck	Gasoline	Off-Network	2,342	2,331	2,414	2,422				
Light Commercial Truck	Gasoline	Rural Restricted					24,996	25,441	25,835	25,964
Light Commercial Truck	Gasoline	Rural Unrestricted					20,277	20,337	20,294	19,997
Light Commercial Truck	Gasoline	Urban Restricted					2,495	2,543	2,602	2,625
Light Commercial Truck	Gasoline	Urban Unrestricted					42,467	42,335	41,994	40,852
Light Commercial Truck	Diesel	Off-Network	169	163	154	152				
Light Commercial Truck	Diesel	Rural Restricted					1,657	1,632	1,605	1,696
Light Commercial Truck	Diesel	Rural Unrestricted					1,344	1,305	1,261	1,306
Light Commercial Truck	Diesel	Urban Restricted					165	163	162	171
Light Commercial Truck	Diesel	Urban Unrestricted					2,815	2,716	2,609	2,668
Light Commercial Truck	Ethanol (E-85)	Off-Network	6	6	7	7				
Light Commercial Truck	Ethanol (E-85)	Rural Restricted					71	71	80	72
Light Commercial Truck	Ethanol (E-85)	Rural Unrestricted					57	57	63	55
Light Commercial Truck	Ethanol (E-85)	Urban Restricted					7	7	8	7
Light Commercial Truck	Ethanol (E-85)	Urban Unrestricted					120	119	130	113
Light Commercial Truck	Electricity	Off-Network	0	0	0	0				
Light Commercial Truck	Electricity	Rural Restricted					0	0	0	0
Light Commercial Truck	Electricity	Rural Unrestricted					0	0	0	0
Light Commercial Truck	Electricity	Urban Restricted					0	0	0	0
Light Commercial Truck	Electricity	Urban Unrestricted					0	0	0	0
Other Buses	Gasoline	Off-Network	7	7	8	9				
Other Buses	Gasoline	Rural Restricted					186	206	237	262
Other Buses	Gasoline	Rural Unrestricted					98	107	121	130
Other Buses	Gasoline	Urban Restricted					24	26	30	32
Other Buses	Gasoline	Urban Unrestricted					317	346	390	415
Other Buses	Diesel	Off-Network	50	48	49	50				
Other Buses	Diesel	Rural Restricted					1,239	1,266	1,352	1,482
Other Buses	Diesel	Rural Unrestricted					651	658	689	735
Other Buses	Diesel	Urban Restricted					159	162	171	183

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
Other Buses	Diesel	Urban Unrestricted					2,110	2,130	2,224	2,349
Other Buses	CNG	Off-Network	4	4	4	4				
Other Buses	CNG	Rural Restricted					102	108	109	114
Other Buses	CNG	Rural Unrestricted					53	56	56	56
Other Buses	CNG	Urban Restricted					13	14	14	14
Other Buses	CNG	Urban Unrestricted					173	182	180	180
Transit Bus	Gasoline	Off-Network	2	2	3	3				
Transit Bus	Gasoline	Rural Restricted					66	71	73	79
Transit Bus	Gasoline	Rural Unrestricted					35	38	38	40
Transit Bus	Gasoline	Urban Restricted					11	11	12	12
Transit Bus	Gasoline	Urban Unrestricted					117	125	125	130
Transit Bus	Diesel	Off-Network	15	15	15	16				
Transit Bus	Diesel	Rural Restricted					405	404	419	445
Transit Bus	Diesel	Rural Unrestricted					217	214	217	225
Transit Bus	Diesel	Urban Restricted					66	65	67	69
Transit Bus	Diesel	Urban Unrestricted					720	709	718	735
Transit Bus	CNG	Off-Network	1	1	1	1				
Transit Bus	CNG	Rural Restricted					33	35	34	34
Transit Bus	CNG	Rural Unrestricted					18	19	18	17
Transit Bus	CNG	Urban Restricted					5	6	5	5
Transit Bus	CNG	Urban Unrestricted					59	62	59	56
School Bus	Gasoline	Off-Network	2	2	1	1				
School Bus	Gasoline	Rural Restricted					15	14	11	8
School Bus	Gasoline	Rural Unrestricted					9	8	7	5
School Bus	Gasoline	Urban Restricted					2	2	1	1
School Bus	Gasoline	Urban Unrestricted					23	22	17	12
School Bus	Diesel	Off-Network	83	82	84	87				
School Bus	Diesel	Rural Restricted					755	776	827	897
School Bus	Diesel	Rural Unrestricted					461	469	490	517
School Bus	Diesel	Urban Restricted					87	90	94	100
School Bus	Diesel	Urban Unrestricted					1,184	1,204	1,254	1,310
School Bus	CNG	Off-Network	1	1	1	1				
School Bus	CNG	Rural Restricted					7	8	11	14
School Bus	CNG	Rural Unrestricted					4	5	7	8
School Bus	CNG	Urban Restricted					1	1	1	2
School Bus	CNG	Urban Unrestricted					10	12	17	20
Refuse Truck	Gasoline	Off-Network	0	0	0	0				
Refuse Truck	Gasoline	Rural Restricted					1	0	0	0
Refuse Truck	Gasoline	Rural Unrestricted					1	0	0	0

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
Refuse Truck	Gasoline	Urban Restricted					0	0	0	0
Refuse Truck	Gasoline	Urban Unrestricted					2	1	0	0
Refuse Truck	Diesel	Off-Network	10	10	9	9				
Refuse Truck	Diesel	Rural Restricted					165	163	161	194
Refuse Truck	Diesel	Rural Unrestricted					97	96	93	108
Refuse Truck	Diesel	Urban Restricted					23	23	22	26
Refuse Truck	Diesel	Urban Unrestricted					235	230	223	258
Refuse Truck	CNG	Off-Network	0	0	2	3				
Refuse Truck	CNG	Rural Restricted					4	9	37	58
Refuse Truck	CNG	Rural Unrestricted					2	5	21	32
Refuse Truck	CNG	Urban Restricted					1	1	5	8
Refuse Truck	CNG	Urban Unrestricted					5	13	52	77
Single Unit Short-haul Truck	Gasoline	Off-Network	394	369	356	352				
Single Unit Short-haul Truck	Gasoline	Rural Restricted					3,942	3,937	4,169	4,819
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted					2,404	2,377	2,467	2,775
Single Unit Short-haul Truck	Gasoline	Urban Restricted					524	522	544	615
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted					5,666	5,593	5,788	6,446
Single Unit Short-haul Truck	Diesel	Off-Network	1,021	1,041	1,156	1,305				
Single Unit Short-haul Truck	Diesel	Rural Restricted					13,393	13,799	15,373	18,123
Single Unit Short-haul Truck	Diesel	Rural Unrestricted					8,168	8,331	9,097	10,437
Single Unit Short-haul Truck	Diesel	Urban Restricted					1,779	1,828	2,006	2,312
Single Unit Short-haul Truck	Diesel	Urban Unrestricted					19,249	19,603	21,343	24,239
Single Unit Short-haul Truck	CNG	Off-Network	5	6	11	16				
Single Unit Short-haul Truck	CNG	Rural Restricted					104	131	200	263
Single Unit Short-haul Truck	CNG	Rural Unrestricted					64	79	118	152
Single Unit Short-haul Truck	CNG	Urban Restricted					14	17	26	34
Single Unit Short-haul Truck	CNG	Urban Unrestricted					150	186	277	352
Single Unit Long-haul Truck	Gasoline	Off-Network	15	16	16	15				
Single Unit Long-haul Truck	Gasoline	Rural Restricted					234	242	262	299
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted					152	156	165	183
Single Unit Long-haul Truck	Gasoline	Urban Restricted					32	33	35	39
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted					382	390	413	453
Single Unit Long-haul Truck	Diesel	Off-Network	47	46	51	58				
Single Unit Long-haul Truck	Diesel	Rural Restricted					833	855	959	1,125
Single Unit Long-haul Truck	Diesel	Rural Unrestricted					542	550	605	690
Single Unit Long-haul Truck	Diesel	Urban Restricted					115	117	130	149
Single Unit Long-haul Truck	Diesel	Urban Unrestricted					1,359	1,379	1,511	1,708
Single Unit Long-haul Truck	CNG	Off-Network	0	0	1	1				
Single Unit Long-haul Truck	CNG	Rural Restricted					8	10	13	16

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
Single Unit Long-haul Truck	CNG	Rural Unrestricted					5	6	8	10
Single Unit Long-haul Truck	CNG	Urban Restricted					1	1	2	2
Single Unit Long-haul Truck	CNG	Urban Unrestricted					12	15	21	25
Motor Home	Gasoline	Off-Network	105	100	97	96				
Motor Home	Gasoline	Rural Restricted					495	478	491	562
Motor Home	Gasoline	Rural Unrestricted					283	270	272	303
Motor Home	Gasoline	Urban Restricted					55	53	53	60
Motor Home	Gasoline	Urban Unrestricted					656	626	629	693
Motor Home	Diesel	Off-Network	40	46	59	76				
Motor Home	Diesel	Rural Restricted					216	242	312	435
Motor Home	Diesel	Rural Unrestricted					123	137	173	235
Motor Home	Diesel	Urban Restricted					24	27	34	46
Motor Home	Diesel	Urban Unrestricted					286	318	400	537
Motor Home	CNG	Off-Network	0	0	0	0				
Motor Home	CNG	Rural Restricted					0	0	0	0
Motor Home	CNG	Rural Unrestricted					0	0	0	0
Motor Home	CNG	Urban Restricted					0	0	0	0
Motor Home	CNG	Urban Unrestricted					0	0	0	0
Combination Short-haul Truck	Gasoline	Off-Network	0	0	0	0				
Combination Short-haul Truck	Gasoline	Rural Restricted					1	1	0	0
Combination Short-haul Truck	Gasoline	Rural Unrestricted					0	0	0	0
Combination Short-haul Truck	Gasoline	Urban Restricted					0	0	0	0
Combination Short-haul Truck	Gasoline	Urban Unrestricted					1	0	0	0
Combination Short-haul Truck	Diesel	Off-Network	190	184	177	167				
Combination Short-haul Truck	Diesel	Rural Restricted					7,318	7,738	8,668	9,012
Combination Short-haul Truck	Diesel	Rural Unrestricted					3,913	4,096	4,497	4,550
Combination Short-haul Truck	Diesel	Urban Restricted					793	836	922	938
Combination Short-haul Truck	Diesel	Urban Unrestricted					6,091	6,367	6,969	6,981
Combination Short-haul Truck	CNG	Off-Network	1	1	3	5				
Combination Short-haul Truck	CNG	Rural Restricted					111	150	255	318
Combination Short-haul Truck	CNG	Rural Unrestricted					60	79	132	161
Combination Short-haul Truck	CNG	Urban Restricted					12	16	27	33
Combination Short-haul Truck	CNG	Urban Unrestricted					93	124	205	247
Combination Long-haul Truck	Diesel	Off-Network	387	376	366	352				
Combination Long-haul Truck	Diesel	Rural Restricted					62,095	63,558	64,620	65,899
Combination Long-haul Truck	Diesel	Rural Unrestricted					12,415	12,581	12,535	12,441
Combination Long-haul Truck	Diesel	Urban Restricted					3,592	3,668	3,671	3,662
Combination Long-haul Truck	Diesel	Urban Unrestricted					16,963	17,163	17,053	16,753

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Source Type	Fuel Type	Road Type	Manitowoc County 2015 Ozone NAAQS Nonattainment Area							
			Vehicle Population				Vehicle-Miles of Travel Ozone Season Weekday			
			2017	2019	2025	2033	2017	2019	2025	2033
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>48,477</b>	<b>48,344</b>	<b>50,240</b>	<b>52,007</b>	<b>1,764,670</b>	<b>1,792,930</b>	<b>1,859,007</b>	<b>1,947,106</b>
Motorcycle	ALL	ALL	1,588	1,592	1,669	1,786	16,197	16,437	17,010	17,793
Passenger Car	ALL	ALL	19,100	19,150	20,071	21,484	638,148	650,959	680,844	748,309
Passenger Truck	ALL	ALL	22,893	22,745	23,456	23,529	829,161	839,948	866,349	874,891
Light Commercial Truck	ALL	ALL	2,516	2,499	2,576	2,581	96,471	96,725	96,643	95,526
Other Buses	ALL	ALL	60	59	61	63	5,125	5,262	5,573	5,952
Transit Bus	ALL	ALL	19	19	19	20	1,751	1,759	1,785	1,846
School Bus	ALL	ALL	85	84	86	90	2,558	2,611	2,737	2,893
Refuse Truck	ALL	ALL	10	10	11	12	535	542	615	761
Single Unit Short-haul Truck	ALL	ALL	1,420	1,416	1,523	1,673	55,455	56,404	61,408	70,568
Single Unit Long-haul Truck	ALL	ALL	63	62	67	74	3,674	3,755	4,124	4,699
Motor Home	ALL	ALL	145	145	156	172	2,137	2,151	2,365	2,872
Combination Short-haul Truck	ALL	ALL	191	186	180	171	18,392	19,409	21,675	22,239
Combination Long-haul Truck	ALL	ALL	387	376	366	352	95,065	96,969	97,879	98,755
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>48,477</b>	<b>48,344</b>	<b>50,240</b>	<b>52,007</b>	<b>1,764,670</b>	<b>1,792,930</b>	<b>1,859,007</b>	<b>1,947,106</b>
ALL	Gasoline	ALL	45,543	45,357	46,783	47,898	1,556,940	1,577,878	1,620,506	1,679,788
ALL	Diesel	ALL	2,850	2,899	3,353	4,003	203,749	210,821	233,649	262,234
ALL	CNG	ALL	12	14	22	31	1,124	1,352	1,910	2,307
ALL	Ethanol (E-85)	ALL	72	74	82	76	2,856	2,878	2,942	2,777
ALL	Electricity	ALL	0	0	0	0	0	0	0	0
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>48,477</b>	<b>48,344</b>	<b>50,240</b>	<b>52,007</b>	<b>1,764,670</b>	<b>1,792,930</b>	<b>1,859,007</b>	<b>1,947,106</b>
ALL	ALL	Off-Network	48,477	48,344	50,240	52,007				
ALL	ALL	Rural Restricted					541,581	556,749	584,354	621,175
ALL	ALL	Rural Unrestricted					404,599	410,049	423,578	441,613
ALL	ALL	Urban Restricted					46,133	47,487	50,188	53,792
ALL	ALL	Urban Unrestricted					772,357	778,646	800,888	830,526
<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>ALL (Total)</b>	<b>48,477</b>	<b>48,344</b>	<b>50,240</b>	<b>52,007</b>	<b>1,764,670</b>	<b>1,792,930</b>	<b>1,859,007</b>	<b>1,947,106</b>

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**Table A8.6. Average Speed Distributions Inputted into the MOVES3.0.1 Model for the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Road Type	Average Trip Speed	Percent of Vehicle-Hours of Travel (VHT)							
		Light-Duty Classes (1)				Heavy-Duty Classes (2)			
		2017	2019	2025	2033	2017	2019	2025	2033
Rural Restricted Access	0.0 to 2.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	2.5 to 7.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	7.5 to 12.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	12.5 to 17.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	17.5 to 22.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	22.5 to 27.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	27.5 to 32.5 mph	0.02%	0.02%	0.03%	0.04%	0.02%	0.02%	0.03%	0.03%
Rural Restricted Access	32.5 to 37.5 mph	4.73%	4.74%	4.75%	4.76%	4.54%	4.54%	4.52%	4.50%
Rural Restricted Access	37.5 to 42.5 mph	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%
Rural Restricted Access	42.5 to 47.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	47.5 to 52.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	52.5 to 57.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	57.5 to 62.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	62.5 to 67.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Restricted Access	67.5 to 72.5 mph	4.70%	5.28%	6.88%	8.79%	3.40%	3.72%	4.63%	5.73%
Rural Restricted Access	72.5+ mph	90.55%	89.97%	88.34%	86.40%	92.04%	91.72%	90.82%	89.74%
Rural Restricted Access	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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Road Type	Average Trip Speed	Percent of Vehicle-Hours of Travel (VHT)							
		Light-Duty Classes (1)				Heavy-Duty Classes (2)			
		2017	2019	2025	2033	2017	2019	2025	2033
Rural Unrestricted Access	0.0 to 2.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	2.5 to 7.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	7.5 to 12.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	12.5 to 17.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	17.5 to 22.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	22.5 to 27.5 mph	25.79%	25.81%	25.84%	25.89%	3.85%	3.88%	3.96%	4.08%
Rural Unrestricted Access	27.5 to 32.5 mph	1.50%	1.51%	1.54%	1.57%	1.19%	1.20%	1.22%	1.24%
Rural Unrestricted Access	32.5 to 37.5 mph	6.72%	6.74%	6.78%	6.84%	5.07%	5.05%	5.00%	4.94%
Rural Unrestricted Access	37.5 to 42.5 mph	23.44%	23.60%	24.04%	24.59%	21.53%	21.64%	21.94%	22.31%
Rural Unrestricted Access	42.5 to 47.5 mph	30.56%	30.59%	30.70%	30.83%	44.84%	45.25%	46.40%	47.77%
Rural Unrestricted Access	47.5 to 52.5 mph	11.44%	11.22%	10.60%	9.83%	22.23%	21.74%	20.34%	18.68%
Rural Unrestricted Access	52.5 to 57.5 mph	0.55%	0.54%	0.51%	0.46%	1.30%	1.25%	1.13%	0.98%
Rural Unrestricted Access	57.5 to 62.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	62.5 to 67.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	67.5 to 72.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	72.5+ mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rural Unrestricted Access	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



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Road Type	Average Trip Speed	Percent of Vehicle-Hours of Travel (VHT)							
		Light-Duty Classes (1)				Heavy-Duty Classes (2)			
		2017	2019	2025	2033	2017	2019	2025	2033
Urban Restricted Access	0.0 to 2.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	2.5 to 7.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	7.5 to 12.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	12.5 to 17.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	17.5 to 22.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	22.5 to 27.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	27.5 to 32.5 mph	0.02%	0.03%	0.03%	0.05%	0.05%	0.05%	0.06%	0.03%
Urban Restricted Access	32.5 to 37.5 mph	4.72%	4.73%	4.74%	4.75%	4.48%	4.47%	4.46%	4.50%
Urban Restricted Access	37.5 to 42.5 mph	0.01%	0.01%	0.01%	0.01%	0.04%	0.04%	0.03%	0.00%
Urban Restricted Access	42.5 to 47.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	47.5 to 52.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	52.5 to 57.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	57.5 to 62.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	62.5 to 67.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Restricted Access	67.5 to 72.5 mph	4.70%	5.28%	6.88%	8.79%	3.40%	3.72%	4.63%	5.73%
Urban Restricted Access	72.5+ mph	90.55%	89.97%	88.34%	86.40%	92.04%	91.72%	90.82%	89.74%
Urban Restricted Access	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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Road Type	Average Trip Speed	Percent of Vehicle-Hours of Travel (VHT)							
		Light-Duty Classes (1)				Heavy-Duty Classes (2)			
		2017	2019	2025	2033	2017	2019	2025	2033
Urban Unrestricted Access	0.0 to 2.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	2.5 to 7.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	7.5 to 12.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	12.5 to 17.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	17.5 to 22.5 mph	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Urban Unrestricted Access	22.5 to 27.5 mph	20.49%	20.48%	20.45%	20.41%	25.93%	25.92%	25.90%	25.92%
Urban Unrestricted Access	27.5 to 32.5 mph	1.32%	1.33%	1.34%	1.36%	0.88%	0.88%	0.88%	0.89%
Urban Unrestricted Access	32.5 to 37.5 mph	26.54%	26.81%	27.57%	28.53%	20.38%	20.71%	21.62%	22.69%
Urban Unrestricted Access	37.5 to 42.5 mph	43.29%	42.97%	42.03%	40.85%	45.00%	44.62%	43.55%	42.27%
Urban Unrestricted Access	42.5 to 47.5 mph	3.58%	3.58%	3.57%	3.56%	3.82%	3.80%	3.72%	3.63%
Urban Unrestricted Access	47.5 to 52.5 mph	4.58%	4.65%	4.85%	5.10%	3.75%	3.83%	4.08%	4.36%
Urban Unrestricted Access	52.5 to 57.5 mph	0.17%	0.18%	0.18%	0.18%	0.24%	0.24%	0.23%	0.23%
Urban Unrestricted Access	57.5 to 62.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	62.5 to 67.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	67.5 to 72.5 mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	72.5+ mph	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Urban Unrestricted Access	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

(1) The Light-Duty Classes are the following four MOVES Source Types:

- a. Motorcycle
- b. Passenger
- c. Passenger Truck
- d. Light Commercial Truck

(2) The Heavy-Duty Classes are the following nine MOVES Source Types:

- a. Other Buses
- b. Transit Bus
- c. School Bus
- d. Refuse Truck
- e. Single Unit Short-haul Truck
- f. Single Unit Long-haul Truck
- g. Motor Home
- h. Combination Short-haul Truck
- i. Combination Long-haul Truck

## **APPENDIX 9**

### **Permanent and Enforceable Control Measures in the Manitowoc County 2015 Ozone NAAQS Nonattainment Area**

This appendix provides additional details about the permanent and enforceable control measures that have reduced emissions of ozone precursors in the Manitowoc County nonattainment area for the 2015 ozone NAAQS. This information expands upon that presented in Section 6 of the Redesignation Request and Maintenance Plan for the Manitowoc County 2015 Ozone NAAQS Nonattainment Area.

## **1. Point Source Control Measures**

### Control Measures for Nitrogen Oxides (NO<sub>x</sub>)

*Wisconsin NO<sub>x</sub> Reasonably Available Control Technology (RACT)* – Wisconsin has implemented RACT for major NO<sub>x</sub> sources in nonattainment areas in southeastern Wisconsin to meet requirements for the 1997 ozone NAAQS and the 2008 ozone NAAQS. The NO<sub>x</sub> RACT requirements are codified under ss. NR 428.20 to 428.26, Wis. Adm. Code. While the NO<sub>x</sub> RACT requirements do not apply to the facilities located in Manitowoc County, WDNR expects that NO<sub>x</sub> RACT control measures implemented in southeastern Wisconsin counties positively impact air quality in the Manitowoc County 2015 ozone NAAQS nonattainment area.

*Wisconsin NO<sub>x</sub> Reasonably Available Control Measures (RACM)* – Wisconsin has implemented RACM for NO<sub>x</sub> sources in nonattainment areas to meet requirements for the 1997 ozone NAAQS. The NO<sub>x</sub> RACM requirements are codified under ss. NR 428.01 to 428.12, Wis. Adm. Code, and apply to new and existing NO<sub>x</sub> emission units located in southeastern Wisconsin. Section NR 428.04, Wis. Adm. Code, lists NO<sub>x</sub> performance standards for the NO<sub>x</sub> emission units that are constructed or modified after February 1, 2001 and have design capacities greater than the capacity thresholds listed in this provision. Manitowoc County is not one of the affected counties listed under s. NR 428.04, Wis. Adm. Code; however, similar to NO<sub>x</sub> RACT, WDNR expects these control measures to contribute positively to air quality in the Manitowoc County 2015 ozone NAAQS nonattainment area. Section NR 428.05, Wis. Adm. Code, which applies to all of Manitowoc County, includes NO<sub>x</sub> performance standards for NO<sub>x</sub> emission units constructed on or before February 1, 2001 that exceed the provision's capacity threshold. All emission units subject to this section are required to install continuous emission monitoring equipment to demonstrate compliance with the NO<sub>x</sub> emission limit specified in this rule.

In 2019, the attainment year, there were 58.9 tons of NO<sub>x</sub> from EGU sources (including 52.2 tons of NO<sub>x</sub> from Manitowoc Public Utilities and 6.67 tons of NO<sub>x</sub> from Nextera Energy Point Beach) and 532.3 tons of NO<sub>x</sub> from 88 other emission units. The NO<sub>x</sub> emissions from these units are limited by:

- NO<sub>x</sub> RACM,
- federal emission standards, e.g., New Source Performance Standards (NSPS), and/or
- the federal New Source Review (NSR) permitting program.

Since 2015, point source NO<sub>x</sub> emissions from the Manitowoc County nonattainment area have increased 10.6% (Table A9.1).

**Table A9.1. 2015-2019 NO<sub>x</sub> emissions and requirements for point sources in the Manitowoc County 2015 ozone NAAQS nonattainment area.**

Facility		2015	2017	2019	2015-2019 Change	Permanent and Enforceable Control Measures for NO <sub>x</sub>
Manitowoc Public Utilities (FID #436035930)	Annual NO <sub>x</sub> Emissions (TPY)	57.7	74.1	52.2	-9.5%	<b>For coal fired boilers:</b> <b>B09</b> < 0.155 lbs/MMBtu [NSPS, Subpart Da] <b>B28</b> < 0.55 lbs/MMBtu [PSD BACT Limit] < 0.6 lbs/MMBtu [NSPS, Subpart Db] < 0.2 lbs/MMBtu during ozone season [NO <sub>x</sub> RACM]
Nextera Energy Point Beach (FID #436034500)	Annual NO <sub>x</sub> Emissions (TPY)	10.5	11.8	6.67	-36.5%	<b>Fuel oil fired turbine</b> <b>P01</b> < 123.2 lbs/kgal [CP #18-ETE-081; emission factor limit]
Other NO <sub>x</sub> Emissions Units	Annual NO <sub>x</sub> Emissions (TPY)	466.5	499.5	532.3	14.1%	NO <sub>x</sub> RACM
	Number of Units	90	87	88	-2.2%	
<b>Total NO<sub>x</sub> Emissions (TPY)</b>		534.7	585.4	591.2	10.6%	

*Federal NO<sub>x</sub> Transport Rules* – EGUs in 23 states east of the Mississippi, including 9 states that significantly contribute over the 1 percent significance threshold to the Manitowoc monitor, have been subject to a series of federal NO<sub>x</sub> transport rules since 2009.<sup>1</sup> These rules have included the Clean Air Interstate Rule (CAIR), the Cross-State Air Pollution Rule (CSAPR) and the CSAPR Update Rule.

Beginning January 1, 2009, EGUs in 22 states (including Wisconsin) became subject to ozone season NO<sub>x</sub> emission budgets under CAIR. CAIR addresses the broad regional interstate transport of NO<sub>x</sub> affecting attainment and maintenance of the 1997 ozone NAAQS as required

<sup>1</sup> LADCO's 2023 source contribution modeling indicates that Illinois, Wisconsin, Indiana, Michigan, Mississippi, Kentucky, Texas, Ohio, Oklahoma, and Louisiana all contribute significantly to the ozone measured in Manitowoc County. Of those states, all but Oklahoma are subject to federal NO<sub>x</sub> transport rules discussed.

under CAA s. 110(a)(2)(D). For the three states contributing most to ozone concentrations in the Manitowoc County 2015 ozone NAAQS nonattainment area ozone concentrations (Illinois, Indiana, and Wisconsin), CAIR resulted in a 35% reduction of total EGU NO<sub>x</sub> emissions across the three states during the ozone season over the 2009-2014 period (Table A9.2).

Starting with the 2015 ozone season, CSAPR replaced CAIR to reduce interstate NO<sub>x</sub> transport relative to the 1997 ozone NAAQS. CSAPR implemented NO<sub>x</sub> budgets for the impacted states in two phases. Phase I limited NO<sub>x</sub> emissions in 2015 and 2016. EPA published the CSAPR Update (81 FR 74504) in 2016 to address NO<sub>x</sub> transport affecting the attainment and maintenance of the 2008 ozone NAAQS (79 FR 16436). The CSAPR Update established Phase II NO<sub>x</sub> budgets starting with the 2017 ozone season. For the three-state area of Illinois, Indiana and Wisconsin, CSAPR and the CSAPR Update resulted in a 39% reduction of total EGU NO<sub>x</sub> emissions across the three states during the ozone season over the 2014-2017 period, and a 19% reduction over the 2017-2019 period (Table A9.2).

On April 30, 2021, EPA finalized the Revised CSAPR Update rule in order to fully address 21 states' outstanding interstate pollution transport obligations for the 2008 ozone NAAQS (86 FR 23054).<sup>2</sup> The rule would further reduce EGU NO<sub>x</sub> emissions in 12 states starting in the 2021 ozone season. Due to this rule and other changes already underway in the power sector, EPA expects ozone season NO<sub>x</sub> emissions will be nearly 25,000 tons lower in 2021 than in 2019, a reduction of 19 percent.<sup>3</sup>

**Table A9.2. EGU NO<sub>x</sub> emitted under the CAIR and CSAPR programs in Illinois, Indiana and Wisconsin**

State	Ozone Season NO <sub>x</sub> Emissions (Tons)				Percent Reduction		
	2008	2014	2017	2019	2008 – 2014	2014 – 2017	2017 – 2019
Illinois	31,106	18,489	13,039	11,877	41%	29%	9%
Indiana	53,016	40,247	20,396	16,594	24%	49%	19%
Wisconsin	19,951	9,087	8,103	5,186	55%	11%	36%
<b>Total</b>	<b>104,073</b>	<b>67,823</b>	<b>41,538</b>	<b>33,657</b>	<b>35%</b>	<b>39%</b>	<b>19%</b>

Source: EPA Clean Air Markets Division, Database of reported emissions.

#### Control Measures for Volatile Organic Compounds (VOC)

*VOC RACT* – Wisconsin has implemented permanent and enforceable control measures to fulfill VOC RACT requirements for Wisconsin nonattainment areas under the 1997 ozone NAAQS and the 2008 ozone NAAQS. In moderate (and higher) ozone nonattainment areas, RACT is required for sources covered in Control Technique Guidelines (CTGs) issued by EPA, as well as sources that meet the major stationary source definition after subtracting their CTG-applicable emissions

<sup>2</sup> The rulemaking responds to a September 2019 ruling by the U.S. Court of Appeals for the D.C. Circuit, *Wisconsin v. EPA*, which remanded the CSAPR Update to EPA for failing to fully eliminate significant contribution to nonattainment and interference with maintenance of the 2008 ozone NAAQS from upwind states by downwind areas' attainment dates.

<sup>3</sup> [https://www.epa.gov/sites/default/files/2021-03/documents/revised\\_csapr\\_update\\_factsheet\\_for\\_final\\_rule.pdf](https://www.epa.gov/sites/default/files/2021-03/documents/revised_csapr_update_factsheet_for_final_rule.pdf).

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(non-CTG major sources). Wisconsin’s VOC RACT requirements are codified under chapters NR 419 through 424, Wis. Adm. Code, and are based on EPA’s CTGs (Table A9.3). Due to its “marginal” classification, the Manitowoc County nonattainment area is not required to implement VOC RACT under the 2015 ozone NAAQS. However, some of the VOC RACT rules apply to Manitowoc County; these rules are indicated by an “X” in the rightmost column of Table A9.3.

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**Table A9.3. VOC Control Technique Guidelines Incorporated into Wisconsin Administrative Code.**

Source	Title (Description)	EPA CTG Report No.	Wis. Adm. Code Incorporation	Emissions Inventory Classification <sup>1</sup>	Implemented within Manitowoc County
<b>Petroleum and Gasoline Sources</b>					
Bulk Gasoline Plants	Control of Volatile Organic Emissions from Bulk Gasoline Plants [bulk gasoline plant unloading, loading and storage]	EPA-450/2-77-035	NR 420.04(2)	Stationary Point Source	
Refinery Equipment - Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds	Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds	EPA-450/2-77-025	NR 420.05(1), (2) and (3)	Stationary Point Source	
Refinery Equipment - Control of VOC Leaks	Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment	EPA-450/2-78-036	NR 420.05(4)	Stationary Point Source	
Refinery Equipment - Control of VOC Leaks	Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants	EPA-450/3-83-007	NR 420.05(4)	Stationary Point Source	
Tanks - Fixed Roof	Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks	EPA-450/2-77-036	NR 420.03(5)	Stationary Point Source	
Tanks - External Floating Roofs	Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks	EPA-450/2-78-047	NR 420.03(6) and (7)	Stationary Point Source	
Gasoline Loading Terminals	Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals	EPA-450/2-77-026	NR 420.04(1)	Stationary Point Source	X
Tank Trucks	Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems	EPA-450/2-78-051	NR 420.04(4)	Stationary Area Source	X
Gasoline Delivery - Stage I Vapor Control Systems	Design Criteria for Stage I Vapor Control Systems – Gasoline Service Stations	EPA-450/R-75-102	NR 420.04(3)	Stationary Area Source	
<b>Surface Coating</b>					



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Source	Title (Description)	EPA CTG Report No.	Wis. Adm. Code Incorporation	Emissions Inventory Classification <sup>1</sup>	Implemented within Manitowoc County
Automobile & Light-duty Truck	Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings	EPA 453/R-08-006	NR 422.09	Stationary Point Source	X
Cans	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks	EPA-450/2-77-008	NR 422.05	Stationary Point Source	X
Coils	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks	EPA-450/2-77-008	NR 422.06	Stationary Point Source	X
Fabric & Vinyl	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks	EPA-450/2-77-008	NR 422.08	Stationary Point Source	X
Flat Wood Paneling	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume VII: Factory Surface Coating of Flat Wood Paneling	EPA-450/2-78-032	NR 422.13	Stationary Point Source	X
	Control Techniques Guidelines for Flat Wood Paneling Coatings	EPA-453/R-06-004	NR 422.131	Stationary Point Source	
Large Appliances	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume V: Surface Coating of Large Appliances	EPA-450/2-77-034	NR 422.11	Stationary Point Source	X
	Control Techniques Guidelines for Large Appliance Coatings	EPA 453/R-07-004	NR 422.115	Stationary Point Source	
Magnet Wire	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume IV: Surface Coating of Insulation of Magnet Wire	EPA-450/2-77-033	NR 422.12	Stationary Point Source	X
Metal Furniture	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume III: Surface Coating of Metal Furniture	EPA-450/2-77-032	NR 422.1	Stationary Point Source	X

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Source	Title (Description)	EPA CTG Report No.	Wis. Adm. Code Incorporation	Emissions Inventory Classification <sup>1</sup>	Implemented within Manitowoc County
	Control Techniques Guidelines for Metal Furniture Coatings	EPA 453/R-07-005	NR 422.105	Stationary Point Source	
Metal Parts, miscellaneous	Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings	EPA 453/R-08-003	NR 422.15	Stationary Point Source	
	Fire Truck and Emergency Response Vehicle Manufacturing - surface coating	(covered under Misc. Metal Parts CTG)	NR 422.151	Stationary Point Source	
Paper, Film and Foil	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks	EPA-450/2-77-008	NR 422.07	Stationary Point Source	X
	Control Techniques Guidelines for Paper, Film, and Foil Coatings	EPA 453/R-07-003	NR 422.075	Stationary Point Source	
Plastic Parts - Coatings	Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings	EPA 453/R-08-003	NR 422.083	Stationary Point Source	
Traffic Markings	Reduction of Volatile Organic Compound Emissions from the Application of Traffic Markings	EPA-450/3-88-007	NR 422.17	Stationary Area Source	X
Wood Furniture	Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations	EPA-453/R-96-007	NR 422.125	Stationary Point Source	X
<b>Graphic Arts</b>					
Rotogravure & Flexography	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume VIII: Graphic Arts-Rotogravure and Flexography	EPA-450/2-78-033	NR 422.14	Stationary Point Source	X
Flexible Packaging	Control Techniques Guidelines for Flexible Package Printing	EPA-453/R-06-003	NR 422.141	Stationary Point Source	
Letterpress	Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing	EPA-453/R-06-002	NR 422.144	Stationary Point Source	

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Source	Title (Description)	EPA CTG Report No.	Wis. Adm. Code Incorporation	Emissions Inventory Classification <sup>1</sup>	Implemented within Manitowoc County
Lithographic	Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing	EPA-453/R-06-002	NR 422.142 and 422.143	Stationary Point Source	X
<b>Solvents</b>					
Dry Cleaning	Control of Volatile Organic Emissions from Perchloroethylene Dry Cleaning Systems	EPA-450/2-78-050	NR 423.05	Stationary Area Source	X
Dry Cleaning	Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners	EPA-450/3-82-009	NR 423.05	Stationary Area Source	X
Industrial Cleaning	Control Techniques Guidelines for Industrial Cleaning Solvents	EPA-453/R-06-001	NR 423.035 and 423.037	Stationary Area Source	X (NR 423.035 only)
Metal Cleaning	Control of Volatile Organic Emissions from Solvent Metal Cleaning	EPA-450/2-77-022	NR 423.03	Stationary Area Source	X
<b>Chemical</b>					
Pharmaceutical	Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products	EPA-450/2-78-029	NR 421.03	Stationary Point Source	X
Polystyrene	Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins	EPA-450/3-83-008	NR 421.05	Stationary Point Source	X
Rubber	Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires	EPA-450/2-78-030	NR 421.04	Stationary Point Source	X
Synthetic Organic	Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry	EPA-450/3-84-015	NR 421.07	Stationary Point Source	
Synthetic Organic	Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations in Synthetic Organic Chemical Manufacturing Industry	EPA-450/4-91-031	NR 421.07	Stationary Point Source	

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Source	Title (Description)	EPA CTG Report No.	Wis. Adm. Code Incorporation	Emissions Inventory Classification <sup>1</sup>	Implemented within Manitowoc County
Synthetic Resin	Control of Volatile Organic Compound Leaks from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment	EPA-450/3-83-006	NR 421.05	Stationary Point Source	X
<b>Manufacturing</b>					
Asphalt	Control of Volatile Organic Emissions from Use of Cutback Asphalt	EPA-450/2-77-037	NR 422.16	Stationary Area Source	

<sup>1</sup>For purposes of this table, an “Area” source is defined as a nonpoint or fugitive emission source.

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There are several CTGs which have not been incorporated into state administrative code that have been addressed through administrative orders for nonattainment areas within Kenosha County and Sheboygan County (Kenosha County 2008 ozone NAAQS moderate area VOC RACT approval (85 FR 57729); Shoreline Sheboygan County 2008 ozone NAAQS moderate area VOC RACT approval (85 FR 41405)). As noted above for NO<sub>x</sub> control measures, WDNR expects that VOC RACT control measures implemented within Wisconsin, particularly those implemented in southeastern Wisconsin, positively impact air quality in the Manitowoc County 2015 ozone NAAQS nonattainment area.

*Point source VOC emissions in the nonattainment area* – Table A9.4 lists VOC point sources and emissions in the Manitowoc County 2015 ozone NAAQS nonattainment area for the attainment year 2019. This assessment shows that approximately 96% of 2019 VOC emissions come from non-combustion sources. Metal and plastic parts manufacturing (17.2%); coating, printing, adhesives, and general solvent use (56.7%); and food production (21.2%) accounted for most of the associated VOC emissions. Combustion-related VOC emissions only accounted for about 4% of the nonattainment area's VOC emissions, and were from Industrial, Commercial and Institutional (ICI) boilers and process heaters, which used various fuel sources.

**Table A9.4. 2019 VOC emissions and requirements for point sources in the Manitowoc County 2015 ozone NAAQS nonattainment area.**

<b>Emission Source Category</b>	<b>Annual VOC (Tons)</b>	<b>Percent of Total</b>	<b>Permanent and Enforceable Control Measures</b>
<b>Combustion Sources</b>			
Industrial, Commercial and Institutional (ICI) Boilers and Process Heaters	15.4	4.0%	ICI Boiler and process heater NESHAP combustion requirements <sup>1</sup>
<b>Subtotal =</b>	<b>15.4</b>	<b>4.0%</b>	
<b>Non-Combustion Sources</b>			
Metal/Plastic Parts Manufacturing	66.5	17.2%	Iron and Steel Foundries, Secondary Aluminum Production NESHAP requirements <sup>1</sup>
Coatings, Printing, Adhesives, Solvent Use	218.8	56.7%	Individual emission units subject to Wisconsin VOC RACT Administrative Rules <sup>2</sup> and NESHAP requirements <sup>1</sup>
Paper/Wood Manufacturing	3.1	0.8%	Plywood and Composite Wood Products NESHAP requirements <sup>1</sup> ; Individual emission units subject to Wisconsin VOC RACT Administrative Rules <sup>2</sup>
Food Production	82.0	21.2%	Individual emission units subject to Wisconsin VOC RACT Administrative Rules <sup>2</sup>
Printing	0.2	0.1%	Printing and Publishing industry NESHAP requirements <sup>1</sup> ; Individual emission units subject to Wisconsin VOC RACT Administrative Rules <sup>2</sup>
<b>Subtotal =</b>	<b>370.5</b>	<b>96.0%</b>	
<b>Total =</b>	<b>385.9</b>	<b>100.0%</b>	

<sup>1</sup> The emissions units are subject to either major source or area source NESHAP emission requirements based on applicability criteria. The applicability of requirements and exemptions for each unit has not been determined for purposes of this assessment.

<sup>2</sup> The emissions units are subject to VOC RACT/CTG rules under chs. NR 419 through 424, Wis. Adm. Code, based on applicability criteria. The applicability of requirements and exemptions for each unit has not been determined for purposes of this assessment.

As indicated in Table A9.4, the majority of the VOC point source emission units in the Manitowoc County 2015 ozone NAAQS nonattainment area are potentially subject to various National Emission Standards for Hazardous Air Pollutant (NESHAP) rules. These NESHAP rules implement good combustion practices that minimize VOC emissions or apply direct emission limitations on total hydrocarbons (including VOCs), and are discussed in more detail below. Although NESHAP requirements are expected to minimize VOC emissions, the incremental emission reductions due to these rules are expected to be relatively small and difficult to quantify. Table A9.4 also shows that several emission source categories within the Manitowoc County 2015 ozone NAAQS nonattainment area are potentially subject to VOC RACT rules codified under chapters NR 419 through 424, Wis. Adm. Code (Table A9.3).

#### Federal VOC Control Measures for Point Sources

Federal NESHAP rules are implemented nationally to control hazardous air pollutants. These rules include requirements to control hazardous organic pollutants through ensuring complete combustion of fuels or implementing requirements for emissions of total hydrocarbons. Under either approach, the rules act to reduce total VOC emitted by the affected sources. These NESHAP rules apply to both major and area source facilities. Major sources are those facilities emitting more than 10 tons per year of a single hazardous air pollutant or more than 25 tons per year of all hazardous air pollutants in total. Area sources are those facilities that emit less than the major source thresholds for hazardous air pollutants. NESHAP measures apply to sources within the Manitowoc County 2015 ozone NAAQS nonattainment area but also apply nationally, thereby reducing the transport of VOC emissions into the nonattainment area.

### **2. Area Source Control Measures**

As noted for point sources, Wisconsin has implemented the necessary VOC RACT/CTG rules under chs. NR 419 through 424, Wis. Adm. Code (Table A9.3). A number of these rules limit VOC emissions from area sources. Wisconsin previously had a Stage 2 vehicle refueling vapor recovery program in place. However, this program was removed from Wisconsin's ozone SIP on November 4, 2013 (78 FR 65875) with EPA approval because the equipment was found to defeat onboard vapor recovery systems for some new vehicles. As stage 2 equipment is removed, actual VOC emissions are anticipated to decrease slightly. This SIP revision was based on a technical demonstration showing a net benefit as required under the CAA to prevent SIP backsliding.

There are also a number of federal programs in place which reduce area source VOC emissions. VOC emission standards for consumer and commercial products were promulgated under 40 CFR Part 59. This program continues to limit VOC emitted from the applicable source categories. Actual emission levels going into the future will depend on population and activity use factors. Various NESHAP rules apply to source categories within the Manitowoc County 2015 ozone NAAQS nonattainment area as well (Table A9.4).

### **3. Onroad Source Control Measures**

Both NO<sub>x</sub> and VOC emissions from onroad mobile sources are substantially controlled through federal new vehicle emission standards programs and fuel standards. Although initial compliance dates in many cases were prior to the 2017 nonattainment year, these regulations have continued to reduce area-wide emissions as fleets turn over to newer vehicles. All of these programs apply

nationally and have reduced emissions both within the ozone nonattainment area and within contributing upwind source regions. The federal programs contributing to attainment of the 2015 ozone NAAQS include those listed in Table A9.5.

The Wisconsin-administered I/M program also limits on-road VOC and NO<sub>x</sub> emissions from onroad sources and is required for seven counties in southeastern Wisconsin (Sheboygan, Washington, Ozaukee, Waukesha, Milwaukee, Racine and Kenosha). As is true for other emission control measures, WDNR expects that Wisconsin's I/M program positively impacts air quality in the Manitowoc County 2015 ozone NAAQS nonattainment area. The Wisconsin I/M program was first implemented in 1984 and has gone through several modifications and enhancements since that time. The I/M program requirements are codified in chs. NR 485 and Trans 131, Wis. Adm. Code. The I/M program reduces average vehicle VOC and NO<sub>x</sub> emissions and garners some level of continued incremental reduction as fleets turn over to new vehicles.

**Table A9.5. Federal onroad mobile source regulations contributing to attainment.**

On-road Control Program	Pollutants	Model Year <sup>1</sup>	Regulation
Passenger vehicles, SUVs, and light duty trucks – emissions and fuel standards	VOC & NO <sub>x</sub>	2004 – 2009+ (Tier 2) 2017+ (Tier 3)	40 CFR Part 85 & 86
Light-duty trucks and medium duty passenger vehicle – evaporative standards	VOC	2004 - 2010	40 CFR Part 86
Heavy-duty highway compression engines	VOC & NO <sub>x</sub>	2007+	40 CFR Part 86
Heavy-duty spark ignition engines	VOC & NO <sub>x</sub>	2005 – 2008+	40 CFR Part 86
Motorcycles	VOC & NO <sub>x</sub>	2006 – 2010 (Tier 1 & 2)	40 CFR Part 86
Mobile Source Air Toxics – fuel formulation, passenger vehicle emissions, and portable container emissions	Organic Toxics & VOC	2009 - 2015 <sup>2</sup>	40 CFR Part 59, 80, 85, & 86
Light duty vehicle corporate average fuel economy (CAFE) standards	Fuel efficiency (VOC and NO <sub>x</sub> )	2012-2016 & 2017-2025	40 CFR Part 600

<sup>1</sup> The range in model years affected can reflect phasing of requirements based on engine size or initial years for replacing earlier tier requirements.

<sup>2</sup> The range in model years reflects phased implementation of fuel, passenger vehicle, and portable container emission requirements as well as the phasing by vehicle size and type.

#### 4. Nonroad Source Control Measures

Similar to onroad sources, VOC and NO<sub>x</sub> emitted by nonroad mobile sources are significantly controlled via federal standards for new engines. These programs therefore reduce ozone precursor emissions generated within the Manitowoc County 2015 ozone NAAQS nonattainment area and in the broader regional areas contributing to ozone transport. Table A9.6 lists the nonroad source categories and applicable federal regulations. The nonroad regulations continue to slowly lower average unit and total sector emissions as equipment fleets are replaced each year (approximately 20 years for complete fleet turnover) pulling the highest emitting equipment

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out of circulation or substantially reducing its use. The new engine tier requirements are implemented in conjunction with fuel programs regulating fuel sulfur content. The fuel programs enable achievement of various new engine tier VOC and NO<sub>x</sub> emission limits.

**Table A9.6. Federal nonroad mobile source regulations contributing to attainment.**

Nonroad Control Program	Pollutants	Model Year <sup>1</sup>	Regulation
Aircraft	HC & NO <sub>x</sub>	2000 – 2005+	40 CFR Part 87
Compression Ignition <sup>2</sup>	NMHC & NO <sub>x</sub>	2000 – 2015+ (Tier 4)	40 CFR Part 89 & 1039
Large Spark Ignition	HC & NO <sub>x</sub>	2007+	40 CFR Part 1048
Locomotive Engines	HC & NO <sub>x</sub>	2012 – 2014 (Tier 3) 2015+ (Tier 4)	40 CFR Part 1033
Marine Compression Ignition	HC & NO <sub>x</sub>	2012 – 2018	40 CFR Part 1042
Marine Spark Ignition	HC & NO <sub>x</sub>	2010+	40 CFR Part 1045
Recreational Vehicle <sup>3</sup>	HC & NO <sub>x</sub>	2006 – 2012 (Tier 1 – 3) (phasing dependent on vehicle type)	40 CFR Part 1051
Small Spark Ignition Engine <sup>4</sup> < 19d Kw – emission standards	HC & NO <sub>x</sub>	2005 – 2012 (Tier 2 & 3)	

HC – Hydrocarbon (VOCs)

NMHC – Non-Methane Hydrocarbon (VOCs)

<sup>1</sup>The range in model years affected can reflect phasing of requirements based on engine size or initial years for replacing earlier tier requirements.

<sup>2</sup>Compression ignition applies to diesel non-road compression engines including engines operated in construction, agricultural, and mining equipment.

<sup>3</sup>Recreational vehicles include snowmobiles, off-road motorcycles, and ATVs

<sup>4</sup>Small spark ignition engines include engines operated in lawn and hand-held equipment.



## **APPENDIX 10**

### **Classification and Regression Tree (CART) Analysis for the Sheboygan Kohler Andrae Monitor**

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A classification and regression tree (CART) analysis is a statistical tool to classify data. A CART analysis for the Sheboygan Kohler Andrae monitor is attached in this submittal to provide additional evidence that improvements in air quality observed in the Manitowoc County 2015 ozone NAAQS nonattainment area are due to changes in emissions, rather than favorable meteorology. Sheboygan County is located directly south of the Manitowoc County 2015 ozone nonattainment area and the Sheboygan Kohler Andrae and Manitowoc monitors are located just 33 miles apart. Given that the lakeshores of both Sheboygan and Manitowoc counties experience very similar meteorology, it is reasonable to consider this CART analysis as additional evidence that the reductions in ozone concentrations in the Manitowoc County 2015 ozone NAAQS nonattainment area have been driven by non-meteorological factors.

Below are the results of the CART analysis statistical tool applied to 8-hour ozone and meteorological data to determine the meteorological conditions most commonly associated with high ozone days at the Sheboygan Kohler Andrae monitor. Once days are classified by their unique, shared meteorological characteristics, ozone concentration trends among days with similar meteorological conditions can be examined. This process minimizes the influence of year-to-year meteorological variability on ozone concentrations, and any remaining trend is assumed to be the result of reductions in emissions of ozone precursors and other non-meteorological factors.

This CART analysis was conducted by the Lake Michigan Air Directors Consortium (LADCO) using 8-hour ozone monitoring data from the Kohler Andrae monitor located in Sheboygan County. The analysis included data from the years 2005-2019 and therefore explores long-term trends in ambient ozone concentrations after adjustment for meteorology. This analysis does not include data for 2020 because the meteorological data for this year was not yet complete.<sup>1</sup> The goal of the analysis was to determine the meteorological conditions associated with high ozone episodes at the Sheboygan Kohler Andrae monitor and to construct trends for the days identified as sharing similar meteorological characteristics.

The CART analysis processed multiple meteorological variables for each day to determine which are the most effective at predicting ozone concentrations. Meteorological data collected for the analysis was taken at the Manitowoc airport. Upper air observations were downloaded from the National Climatic Data Center (NCDC) Integrated Global Radiosonde Archive. Meteorological variables included:

- Daily precipitation
- Cloud cover
- 850 and 700 millibar (mb) temperatures at 6 a.m.
- Maximum daily temperature, dew point, relative humidity, and pressure
- Average daily wind speed
- Average wind direction during the day, morning and afternoon as North/South, East/West wind vectors

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<sup>1</sup> The meteorological data used in the CART analysis requires significant processing by the National Oceanic and Atmospheric Administration (NOAA), the National Weather Service and LADCO. This processing is time-consuming and results in a lag between the end of the year and when the data is available for use.

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- The distance air masses traveled in 24 hours
- Morning, afternoon, and evening dew point and pressure
- Day of the week
- Previous day's average temperature, pressure, wind speed, and wind direction
- Change in temperature and pressure from previous day
- 2- and 3-day average wind speed and temperature
- Other meteorological parameters.

Regression trees, where each branch describes the meteorological conditions associated with different ozone concentrations, were developed to classify each summer day (May – September). Meteorologically similar days were assigned to day type groups (known as “nodes”), which are equivalent to branches of the regression tree. By grouping days with similar meteorology, the influence of meteorological variability on the underlying trend in ozone concentrations is largely removed; the remaining trend can be presumed to be due to trends in precursor emissions or other non-meteorological influences. Ozone trends of these day types were then plotted.

The CART analysis determined that there were five CART nodes at the Kohler Andrae monitor that had average ozone concentrations of 50 parts per billion (ppb) or higher. CART node “E” had average ozone concentrations of 71 ppb; this was the only type of day that had average ozone concentrations over 61 ppb.<sup>2</sup> Node E days were characterized by southerly transport, southerly winds in the morning and above-average temperatures.<sup>3</sup>

Figure A11-1 shows the trends in ozone concentrations from 2005 to 2019 for the five CART nodes with highest average ozone concentrations. This figure shows that ozone concentrations for all five CART nodes have decreased over the last 15 years, and the largest ozone reductions occurred on days with the highest ozone (CART node E). This analysis demonstrates that, on days with similar meteorology, ozone concentrations at the Kohler Andrae monitor have decreased substantially since 2005.

By using a CART analysis to analyze 8-hour ozone data at the Sheboygan Kohler Andrae monitor, the influence of variations in meteorology was removed to allow determination of whether ozone values have decreased over time due to anthropogenic emission reductions. This analysis demonstrates that the observed reductions in ozone concentrations were not driven by suboptimal meteorological conditions for ozone production. Instead, the observed reductions must have derived from non-meteorological factors, such as decreasing emissions. These results further suggest that progress in reducing ozone precursor emissions is likely an important driver of the observed reductions in 8-hour ozone concentrations along the eastern shoreline of Lake Michigan, including the Manitowoc County 2015 ozone NAAQS nonattainment area.

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<sup>2</sup> Average concentrations were 51 ppb for Node H, 56 ppb for type I, 52 ppb for type J, and 61 ppb for type K.

<sup>3</sup> Node E days had transport from the south over the last 24 hours, temperatures at 850 mb >4 degrees above 10-year mean values, and morning winds from the south.

**Figure A10-1. Trends by the meteorological day type for the Kohler Andrae monitor. This figure only shows the CART Nodes with average ozone concentrations of 50 ppb or higher.**

