# Iowa
# State Implementation Plan

# Redesignation Request and Maintenance Plan for the 2010 1-Hour Sulfur Dioxide Standard Muscatine, Iowa

**Iowa Department of Natural Resources**
**Environmental Services Division**
**Air Quality Bureau**
**502 E 9th St**
**Des Moines, IA 50319**

**Final**
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# Executive Summary

The Iowa Department of Natural Resources (DNR) is proposing to revise the State Implementation Plan (SIP) to support redesignation of the Muscatine area from nonattainment to attainment for the 2010 1-hour sulfur dioxide ($SO_2$) primary National Ambient Air Quality Standard (NAAQS). With the submittal of this plan to the U.S. Environmental Protection Agency (EPA), the state will concurrently request an attainment redesignation. The removal of provisions from Iowa's SIP no longer needed due to the revocation of the 24-hour and annual $SO_2$ NAAQS will also be requested.

On August 5, 2013 (78 FR 47191), EPA designated a portion of Muscatine County as nonattainment for the 2010 1-hour $SO_2$ NAAQS, based in part on ambient air quality monitoring data from 2009-2011. Beginning with the 2015-2017 three-year period, the 1-hour $SO_2$ design values for all three ambient air quality monitoring sites in the area have attained the NAAQS. Dispersion modeling results also demonstrate attainment.

The improvement in air quality is due to the implementation of permanent and enforceable control measures at Grain Processing Corporation (GPC), Muscatine Power & Water (MPW), and Monsanto Company - Muscatine (Monsanto). The emission limits for the control measures were contained in source-specific air quality construction permits included in the area's attainment plan. The DNR submitted the attainment plan on May 17, 2016, and it was approved by EPA on November 17, 2020 (85 FR 73218).

This SIP revision includes updated air quality construction permits, new dispersion modeling, and a maintenance plan. The maintenance plan meets the requirements of Clean Air Act (CAA) section 175A. Maintenance of the 2010 1-hour $SO_2$ NAAQS is demonstrated for the 10-year period ending in 2033, and also through 2040 for additional assurance. In the unlikely event that elevated 1-hour $SO_2$ concentrations are measured in the area in the future, a newly established contingency plan is included with triggering events and additional potential control measures.

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# 1. Background

Sulfur dioxide ($SO_2$) is one of a group of reactive gases known collectively as "oxides of sulfur" that are linked with adverse effects on the respiratory system. Scientific evidence links short-term $SO_2$ exposures, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (*e.g.*, while exercising or playing). Studies also show a connection between short-term exposure and increased visits to emergency rooms and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics.

## 1.1 National Ambient Air Quality Standards for $SO_2$

To protect "sensitive" populations (such as children, the elderly, and asthmatics) from the harmful effects of air pollutants like $SO_2$, the U.S. Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) to regulate the maximum amount of pollution allowed in the air. Under the authority of sections 108 and 109 of the federal Clean Air Act (CAA), EPA sets two types of NAAQS, primary NAAQS and secondary NAAQS. Primary NAAQS are health-based standards that establish limits necessary to protect public health with an adequate margin of safety. Secondary NAAQS are commonly referred to as welfare-based standards and protect against damage to crops, animals, buildings, and ecosystems; visibility degradation may also be considered.

Pursuant to the requirements of the CAA, EPA first promulgated NAAQS for $SO_2$ on April 30, 1971 (36 FR 8186).[1] At that time EPA promulgated a 24-hour average primary $SO_2$ standard of 0.14 parts per million (ppm), not to be exceeded more than once per year, and an annual average primary $SO_2$ standard of 0.030 ppm. To protect public welfare, EPA promulgated a 3-hour average secondary $SO_2$ standard of 0.5 ppm, not to be exceeded more than once per year (a secondary annual $SO_2$ standard was also established in 1971 but was revoked in 1973).

The CAA requires EPA to periodically review each NAAQS to determine if it still provides the requisite level of protection. The most recent revision to the $SO_2$ NAAQS occurred in 2010 when EPA established a new short-term 1-hour primary standard set at a level of 75 parts per billion (ppb) to provide increased health protections for sensitive individuals (75 FR 35519, June 22, 2010). The form of the 1-hour standard is the 3-year average of the 99$^{th}$ percentile of the annual distribution of daily maximum 1-hour average concentrations. Because the new 1-hour primary standard is generally more stringent than the 24-hour and annual primary $SO_2$ NAAQS, EPA included provisions to revoke those standards. EPA retained the 3-hour secondary $SO_2$ standard without revision. The $SO_2$ NAAQS are summarized in Table 1-1.

**Table 1-1. Summary of the current $SO_2$ NAAQS. Standards revoked by the 2010 revision are also listed.**

| Type | Date | Averaging Time | Level | Form |
|---|---|---|---|---|
| **Primary** | 2010 | 1-hour | 75 ppb | 99$^{th}$ percentile of 1-hour daily maximums, averaged over 3 years |
| **Secondary** | 1971 | 3-hour | 0.5 ppm | Not to be exceeded more than once per year |
| | | | | |
| Revoked[2] (primary) | 1971 | 24-hour | 0.14 ppm | Not to be exceeded more than once per year |
| | | Annual | 0.030 ppm | Annual arithmetic average |

## 1.2 Designations

Once EPA establishes a new NAAQS or revises an existing NAAQS, section 107(d) of the CAA requires that states and EPA complete a designations process. Only EPA has the authority to issue designations and must generally do so within two years of a NAAQS revision, although the CAA offers EPA a 1-year extension if sufficient information is not available. Areas that meet the $SO_2$ NAAQS are designated attainment. Areas that do not meet the NAAQS or areas that contribute to violations of the NAAQS are designated nonattainment. Areas that cannot be classified on the basis of the available information as meeting or not meeting the NAAQS are designated unclassifiable.

[1] Although $SO_2$ is the component of greatest concern and it is used as the indicator for the larger group of "oxides of sulfur," the $SO_2$ NAAQS is designed to protect against exposure to the entire group of sulfur oxides ($SO_x$). Typically, other gaseous sulfur oxides (*e.g.,* $SO_3$) are found in the atmosphere at concentrations much lower than $SO_2$.

[2] In most cases, these standards cease to apply 1 year after the effective date of an area's designation for the 1-hour $SO_2$ standard.

## 1.3 Muscatine 2010 1-Hour $SO_2$ Nonattainment Area

In the first round of $SO_2$ designations, EPA designated a portion of Muscatine County (not the entire county) as nonattainment for the 2010 1-hour $SO_2$ NAAQS.[3] The nonattainment designation was based on air quality monitoring data from 2009-2011 and the extent of the nonattainment area was informed by a meteorological analysis and dispersion modeling results provided by the state. The nonattainment designation was published in the Federal Register on August 5, 2013 (78 FR 47191), and became effective October 4, 2013.

Muscatine County is located in eastern Iowa and borders the Mississippi River. The nonattainment area is depicted in Figure 1-1. It encompasses approximately 126 of the 449 square miles in Muscatine County and includes the incorporated cities of Muscatine and Fruitland. The legal description of the nonattainment area is found in the Code of Federal Regulations (CFR) at 40 CFR 81.316 and is defined using the following sections and townships in Muscatine County:

- Sections 1-3, 10-15, 22-27, 34-36 of T77N, R3W (Lake Township)
- Sections 1-3, 10-15, 22-27, 34-36 of T76N, R3W (Seventy-six Township)
- T77N, R2W (Bloomington Township)
- T76N, R2W (Fruitland Township)
- All sections except 1, 12, 13, 24, 25, 36 of T77N, R1W (Sweetland Township)

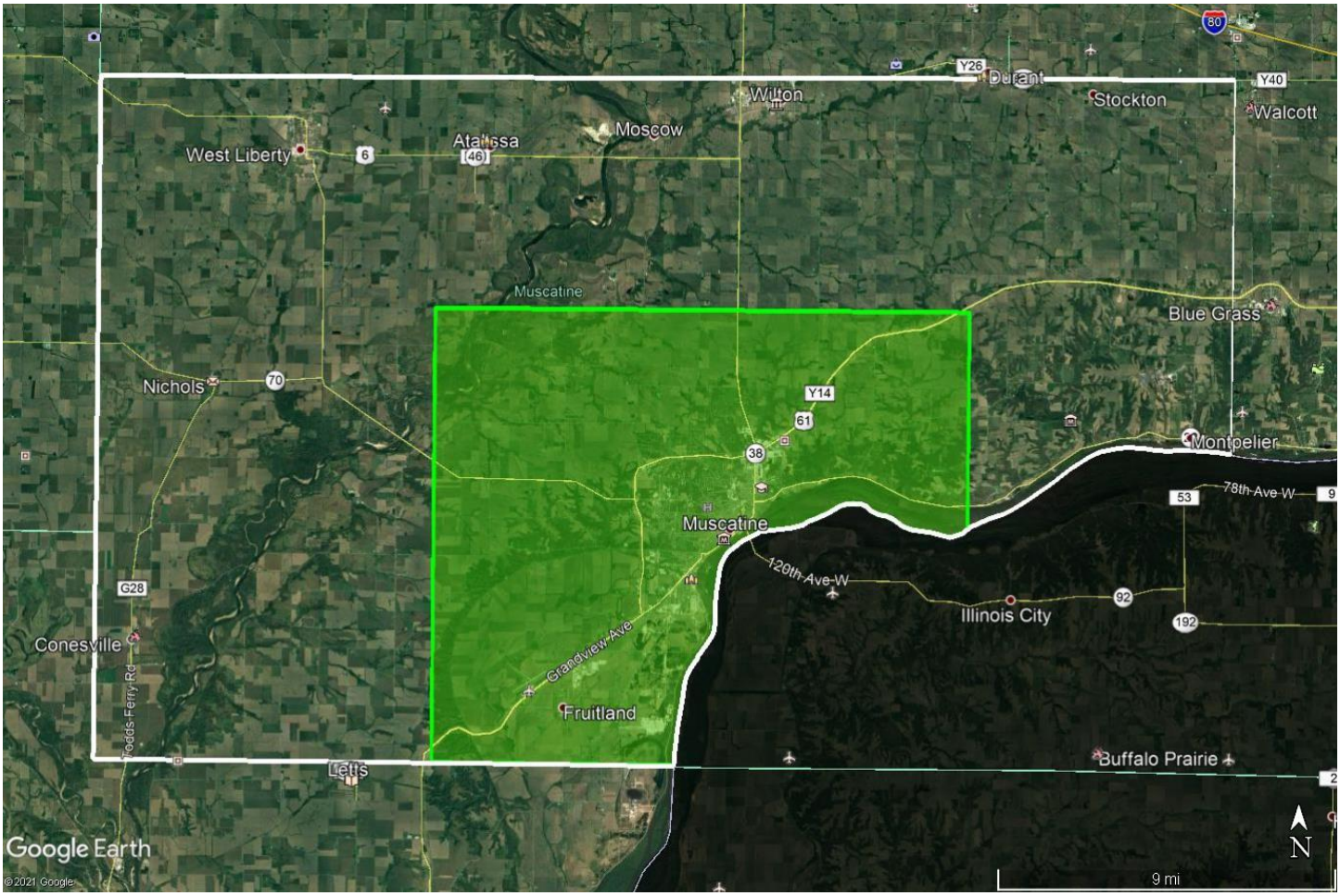



**Figure 1-1. Depiction of the 2010 1-hour $SO_2$ nonattainment area (tinted green) within Muscatine County (white border). Areas in Illinois are shaded.**

[3] EPA conducted the initial designations process for the 2010 1-hour $SO_2$ NAAQS in four separate rounds. The first round focused on areas with monitored NAAQS violations. See https://www.epa.gov/sulfur-dioxide-designations for additional information.

## 1.4 Attainment Plan and Affected Sources

Any state containing a nonattainment area must revise its State Implementation Plan (SIP) by submitting an attainment plan to EPA. All attainment plans must address the requirements of CAA section 172. Sulfur dioxide nonattainment areas are additionally subject to the requirements of CAA sections 191 and 192 (Subpart 5).

The DNR submitted the state's attainment plan for the Muscatine nonattainment area to EPA on May 17, 2016.[4] The attainment plan included, among other required elements, control measures and implementation schedules necessary to attain the 2010 1-hour $SO_2$ NAAQS as expeditiously as practicable and no later than the area's October 4, 2018, attainment deadline. EPA fully approved the attainment plan on November 17, 2020 (85 FR 73218), and the approval became effective on December 17, 2020.

The attainment plan's control measures and implementation timeframes were developed in cooperation with the three significant $SO_2$ sources within the nonattainment area: Grain Processing Corporation (GPC), Muscatine Power & Water (MPW), and Monsanto Company – Muscatine (Monsanto[5]). Figure 1-2 depicts the approximate locations of these facilities and the locations of the three $SO_2$ monitoring sites in the area. Figure 1-3 provides greater spatial detail.

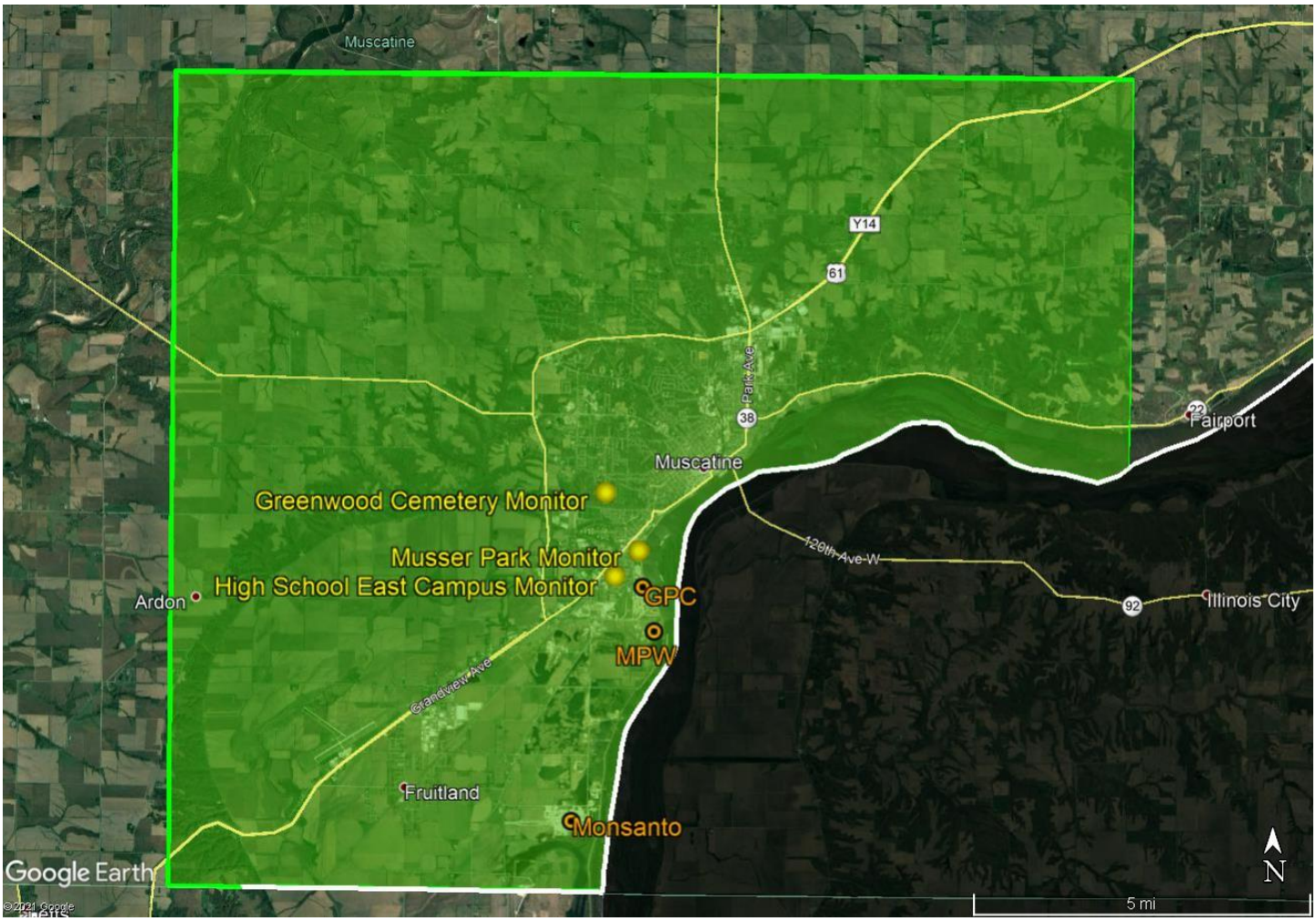



**Figure 1-2. Depiction of the nonattainment area, facility locations, and ambient $SO_2$ monitoring sites.**

[4] A copy of the attainment plan (*Iowa, State Implementation Plan, 1-Hour $SO_2$ Nonattainment, Muscatine, Iowa*, dated May 17, 2016) and its attachments are available on the DNR's Implementation Plans website.

[5] The Monsanto facility in Muscatine is now named Bayer CropScience LP. This document retains use of the Monsanto name for consistency with the attainment plan.


**Figure 1-3. Higher resolution image of the facility and ambient $SO_2$ monitoring site locations. The shading around each facility roughly depicts where public access is restricted and does not necessarily portray property boundaries.**

### 1.4.1 Grain Processing Corporation

GPC (facility ID 70-01-004) is a corn wet milling facility that processes grain into industrial, beverage, and fuel-grade ethanol, as well as a variety of grain-based food products, industrial products, and animal feeds. The northern edge of the facility is located approximately 250 meters south of the Musser Park monitor and is situated between the western bank of the Mississippi River and Oregon Street. The facility extends southward approximately 1350 meters following the contours of the Mississippi River.

The comprehensive $SO_2$ emissions inventory for GPC includes diverse sources situated within a relatively large facility. This is not uncommon in the corn wet-milling industry. Early in the corn wet milling process the grain is soaked (steeped) in large tanks where sulfur-containing compounds are added to the steep water to reduce bacterial growth and to help break down the kernels. The sulfur content in the steep water is generally low but does lead to $SO_2$ emissions from a variety of downstream processes.

GPC's coal-fired boilers were historically its largest $SO_2$ sources. In the 2011 base year, GPC's annual $SO_2$ emissions were 10,809.9 tons. The coal-fired boilers accounted for 96% of that total. In 2011 GPC was the largest $SO_2$ source in the nonattainment area.

### 1.4.2 Muscatine Power & Water

MPW (facility ID 70-01-011) is a municipal electric generating station (power plant) located along the Mississippi River just south of GPC. Its northern most $SO_2$ sources are situated approximately 1.8 kilometers south/southeast of the Musser Park monitor. MPW produces electricity by burning fossil fuels, mostly coal, to heat water into high-pressure steam that spins turbines connected to generators. The largest $SO_2$ sources at MPW are three coal-fired boilers, Unit 7,

Unit 8, and Unit 9, serving generators with nameplate capacities of 25.0, 93.0[6], and 175.5 megawatts (MW), respectively. MPW's auxiliary boiler is not capable of burning coal but has the potential to emit $SO_2$ when firing on distillate fuel oil. In 2011, MPW emitted 2,374.4 tons of $SO_2$, making it the second largest source of $SO_2$ emissions in the nonattainment area at that time.

### 1.4.3 Monsanto Company – Muscatine

Monsanto (facility ID 70-01-008) is a manufacturer and formulator of herbicides for agricultural use and also produces intermediates for herbicide manufacturing and formulation. The facility is located near the western bank of the Mississippi River approximately 6.5 kilometers south/southwest of the Musser Park monitor. In 2011, Monsanto emitted 537.3 tons of $SO_2$, making it the third largest source of $SO_2$ emissions in the nonattainment area. At that time, over 99.9% of Monsanto's total $SO_2$ emissions were associated with Boiler #8, which was fueled primarily by coal and used for the production of on-site heat and power.

### 1.4.4 Other Sources

All other point sources in the nonattainment area emit no or very little $SO_2$ (typically much less than 1 ton per year). Emissions of $SO_2$ from the nonpoint, onroad, nonroad, and event data categories are also relatively small and adequately characterized by the background concentration included in the modeling analyses. Additional emissions information for these sources is discussed in Chapter 7 and Appendix A.

### 1.4.5 Nearby Source

MidAmerican Energy Company's Louisa Generating Station (LGS, facility ID 58-07-001) is a coal-fired electric generating station (power plant) located outside the nonattainment area in northern Louisa County. While LGS is not within the nonattainment area, the maximum permitted allowable $SO_2$ emission rates for the sources at LGS were included in the modeled attainment demonstration for the attainment plan. This approach ensured that the control strategy would be successful without imposing unnecessary restrictions on a source outside the nonattainment area. LGS's maximum permitted allowable $SO_2$ emission rates will continue to be included in all $SO_2$ maintenance modeling demonstrations for the Muscatine area.

[6] Unit 8 serves two generators, of 18.0 and 75.0 MW, for a combined capacity of 93 MW. All nameplate capacity figures are from the U.S. Energy Information Administration (EIA) Form EIA-860 final data for 2019, released September 15, 2020.

## 2. Requirements for Redesignation Requests

The $SO_2$ concentrations in the Muscatine area have declined significantly as a result of the implementation of the control measures required by the attainment plan. Beginning with the three-year period from 2015-2017, all 1-hour $SO_2$ design values in the area have attained the NAAQS. This is a vital step to protect public health but is just one of many prerequisites for a redesignation to attainment. All of the following conditions from section 107(d)(3)(E) of the CAA must be met if EPA is to redesignate the area from nonattainment to attainment:

1. EPA determines that the area has attained the NAAQS;
2. EPA has fully approved the applicable implementation plan for the area under §110(k) of the CAA;
3. EPA determines that the improvement in air quality is due to permanent and enforceable emissions reductions;
4. EPA has fully approved a maintenance plan for the area as meeting the requirements of CAA §175A; and
5. The state has met all requirements applicable to the area under §110 and Part D of the CAA.

EPA currently references two guidance documents that help clarify its expectations regarding redesignation requests and maintenance plans. The most recent document is the April 23, 2014, "*Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions,"* memorandum from Stephen Page, Director, Office of Air Quality Planning and Standards (the "2014 Page" memo or "2014 guidance"). The other document is the September 4, 1992, EPA memorandum "*Procedures for Requests to Redesignate Areas to Attainment*," from John Calcagni, Director, Air Quality Management Division (the "1992 Calcagni" memo).

This proposed SIP revision provides the evidence, updated air quality construction permits, new dispersion modeling, and the required maintenance plan to support EPA action on a request from the governor to redesignate the Muscatine County (partial) nonattainment area to attainment. The maintenance plan (see Chapter 7) meets the requirements of CAA §175A and provides for attainment of the 2010 1-hour $SO_2$ NAAQS beyond the required minimum planning horizon of 10 years after redesignation. A contingency plan is included to help prevent, and if necessary, to promptly correct, any violation of the $SO_2$ NAAQS that occurs after the area is redesignated to attainment. Submittal of this SIP revision will occur concurrent with the governor's formal redesignation request.

# 3. Attainment of the 2010 1-Hour SO2 NAAQS

Section 107(d)(3)(E)(i) of the CAA conditions eligibility for redesignation from nonattainment to attainment upon a determination by EPA that the area has attained the NAAQS. According to the 1992 Calcagni and the 2014 Page memos, there are two components to demonstrating that the $SO_2$ NAAQS have been attained. The first component relies upon ambient air quality monitoring data. For $SO_2$ the available monitoring data would need to indicate that all monitors in the affected area are meeting the standard as stated in 40 CFR 50.17 using data analysis procedures specified in 40 CFR part 50, Appendix T. The second component relies upon air quality modeling.

## 3.1 Ambient Air Quality Monitoring Data

The DNR measures $SO_2$ concentrations in ambient air at three sites within the Muscatine nonattainment area. These sites are listed in Table 3-1 and their locations are shown in Figure 3-1. All three monitoring sites are located within the city limits of Muscatine.

**Table 3-1. $SO_2$ monitoring locations within the Muscatine nonattainment area.**

| Site Name | Air Quality System (AQS) Site ID | $SO_2$ Monitor Start Date |
|---|---|---|
| **Greenwood Cemetery** | 19-139-0016 | January 1, 2012* |
| **High School East Campus** | 19-139-0019 | August 1, 2012 |
| **Musser Park** | 19-139-0020 | December 11, 1989 |

*Ambient $SO_2$ monitoring at Greenwood Cemetery began in the early 1980s but was suspended at the end of 2007. At that time, measured $SO_2$ concentrations were low in comparison to the NAAQS. Monitoring resumed in January 2012.


**Figure 3-1. Locations of the three $SO_2$ monitoring sites in the Muscatine nonattainment area.**

Attainment of the 2010 1-hour $SO_2$ NAAQS is evaluated using a design value metric. The 1-hour $SO_2$ design value is calculated as the 3-year average of annual 99$^{th}$ percentile daily maximum 1-hour values for a monitoring site. According to 40 CFR 50 Appendix T, the 2010 1-hour primary $SO_2$ NAAQS is met at an ambient air quality monitoring site when the valid 1-hour primary standard design value is less than or equal to 75 ppb.

Ambient concentrations measured in 2020 are the most recent certified data available. The 2011 data was the most recent evaluated by EPA during the first round of 1-hour $SO_2$ designations. All available design values across that timeframe are shown in Table 3-2 and plotted in Figure 3-2. The number of available design values varies between sites due to the different monitor start dates.

The largest of the three 2015-2017 1-hour $SO_2$ design values is 65 ppb. This supports the conclusion that the Muscatine area attained the 2010 1-hour $SO_2$ NAAQS before its October 4, 2018, attainment deadline. The 2016-2018 design values show even greater air quality improvement and are the first to reflect the use of only natural gas in GPC's boilers (coal combustion ceased mid-2015). The most recent design values for the Greenwood Cemetery, High School East Campus, and Musser Park sites are 15, 18, and 20 ppb, respectively. These design values are no greater than 27% of the NAAQS.

**Table 3-2. Design values (ppb) for the 2010 1-hour $SO_2$ NAAQS for the Muscatine monitoring sites. All design values beginning with the three-year period from 2015-2017 attain the 75 ppb standard.**

| Site Name (AQS ID) | 2011-2013 | 2012-2014 | 2013-2015 | 2014-2016 | 2015-2017 | 2016-2018 | 2017-2019 | 2018-2020 |
|---|---|---|---|---|---|---|---|---|
| **Greenwood Cemetery** (19-139-0016) | | 101 | 97 | 77 | 45 | 20 | 17 | 15 |
| **High School E. Campus** (19-139-0019) | | | 128 | 84 | 42 | 22 | 21 | 18 |
| **Musser Park** (19-139-0020) | 217 | 194 | 158 | 113 | 65 | 34 | 25 | 20 |

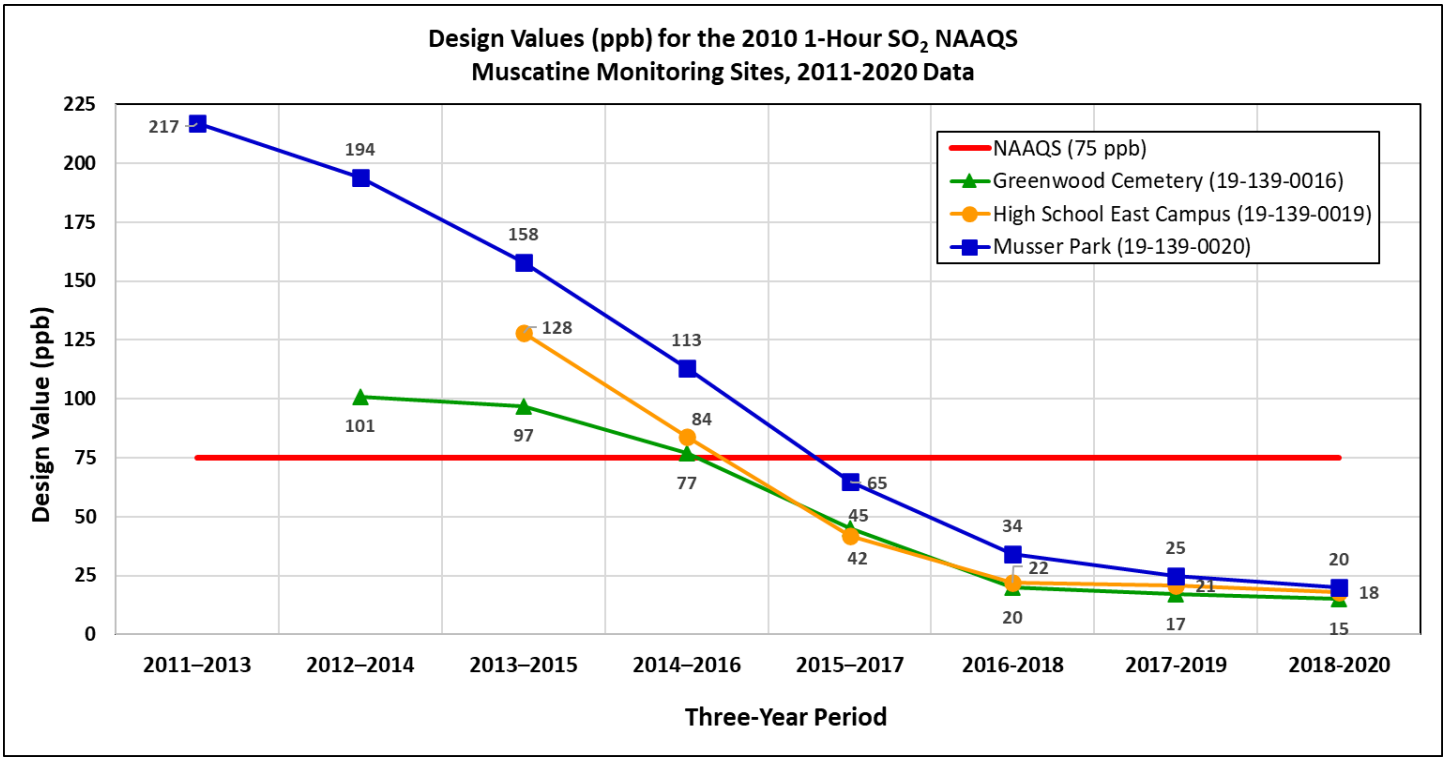



**Figure 3-2. Design values (ppb) for the 2010 1-hour $SO_2$ NAAQS for the three Muscatine monitoring sites.**

## 3.2 Dispersion Modeling Data

According to the 1992 Calcagni memo, for pollutants such as $SO_2$ a small number of monitors is not typically representative of area-wide air quality or areas of highest concentration, and dispersion modeling is generally necessary

to evaluate comprehensively sources' impacts. In the 2014 Page memo EPA discusses two possible modeling options for demonstrating attainment, either by modeling actual emissions and meteorological data from the most recent three years, or by relying on the modeled attainment demonstration developed as part of the attainment plan.

The DNR is relying on the modeled attainment demonstration included with the attainment plan to support the determination of attainment. The attainment plan modeled maximum permitted allowable emission rates over a 5-year meteorological period. This is more robust than the alternative option of modeling actual emission rates across a 3-year meteorological dataset. To support this approach, EPA advises that it is necessary to show that the control strategy in the SIP has been fully implemented (compliance records demonstrating that the control measures have been implemented as required by the approved SIP would be relevant for making this determination).

## 3.3 Control Measure Implementation and Compliance

This compliance analysis focuses on the 2018 and prior reporting periods to demonstrate that the 2010 1-hour $SO_2$ NAAQS was attained throughout the area by the October 4, 2018, attainment deadline. The control measures in the attainment plan included reasonably available control technology (RACT)[7] $SO_2$ emissions limits for 52 emission points at GPC, 4 emission points at MPW, and 2 emission points at Monsanto. The RACT limits establish the maximum permitted allowable emission rate for each emission point (stack) and are specified in air construction permits issued by the DNR and approved into the SIP. Compliance records, including Title V (operating permit) annual compliance certification reports,[8] stack test data, and continuous emission monitoring system (CEMS) data, provide evidence that GPC, MPW, and Monsanto have complied with the limits and conditions that provide for attainment throughout the area.[9]

**Grain Processing Corporation**

All but three[10] of GPC's RACT limits became effective in or before 2017 and all were effective no later than March 31, 2018. In its Title V annual compliance certification for the 2017 reporting period (due March 31, 2018), GPC certified that it was in compliance with its applicable $SO_2$ RACT emission limits and indicated that the scrubber installations required in 2017 (or before) had been completed. GPC's Title V annual compliance certification for the 2018 reporting period indicated that the remaining measures had been implemented and that sources were in compliance with their applicable RACT limits. Full implementation preceded the October 4, 2018, attainment deadline.

**Muscatine Power & Water**

The control measures for MPW include a RACT limit for the auxiliary boiler when it is firing fuel oil (it is not capable of burning coal) and a RACT limit that works in conjunction with a compliance formula for all three coal-fired boilers (Unit 7, Unit 8, and Unit 9). The air construction permits for these sources established an implementation deadline of January 1, 2017. MPW confirmed compliance with these requirements in both its 2017 and 2018 Title V annual compliance certifications.

**Monsanto Company – Muscatine**

The control measures for Monsanto include RACT limits for the CAC Process Flare Burner (EP-234) and the coal-fired boiler (Boiler #8, EP-195). Monsanto has fully implemented its requirements for the CAC Process Flare Burner and confirmed compliance for this unit in its Title V annual compliance certifications for 2016, 2017, and 2018. On September 2, 2015, Monsanto completed a stack test on Boiler #8 that confirmed compliance with this unit's RACT limit.

[7] The RACT limits also generally serve to satisfy reasonably available control measure (RACM) requirements.

[8] A Title V facility must certify to the DNR that it is in compliance with all its general, plant-wide, and emission point specific conditions, or it must report and describe any deviations and briefly explain the suspected cause of the deviation and any corrective actions taken. The report for the prior calendar year is due annually by March 31st. The Title V permit incorporates all requirements established in facility's air construction permits. Title V compliance certifications are available online via DocDNA.

[9] The DNR also confirmed that Louisa Generating Station was in compliance with its existing $SO_2$ emission limit.

[10] Those for EP200S, EP279.0 and EP315.0.

## 4. Permanent and Enforceable Emission Reductions

To be eligible for redesignation, areas that attain the NAAQS must demonstrate that the improvement in air quality is due to permanent and enforceable emissions reductions. This is required by CAA §107(d)(3)(E)(iii).

The conversion[11] of GPC's coal-fired boilers to natural gas on July 14, 2015, produced an immediate improvement in ambient $SO_2$ concentrations. This is evident in the 2011-2020 time series plots of daily maximum 1-hour $SO_2$ concentrations for the three ambient $SO_2$ monitors in the area, shown in Figure 4-1. Since the fuel conversion, no exceedances have been measured and the maximum daily 1-hour $SO_2$ concentrations are less than 63% of the NAAQS on all days. The daily 1-hour maximums are less than half the 75 ppb NAAQS on 99% of days following the fuel conversion.

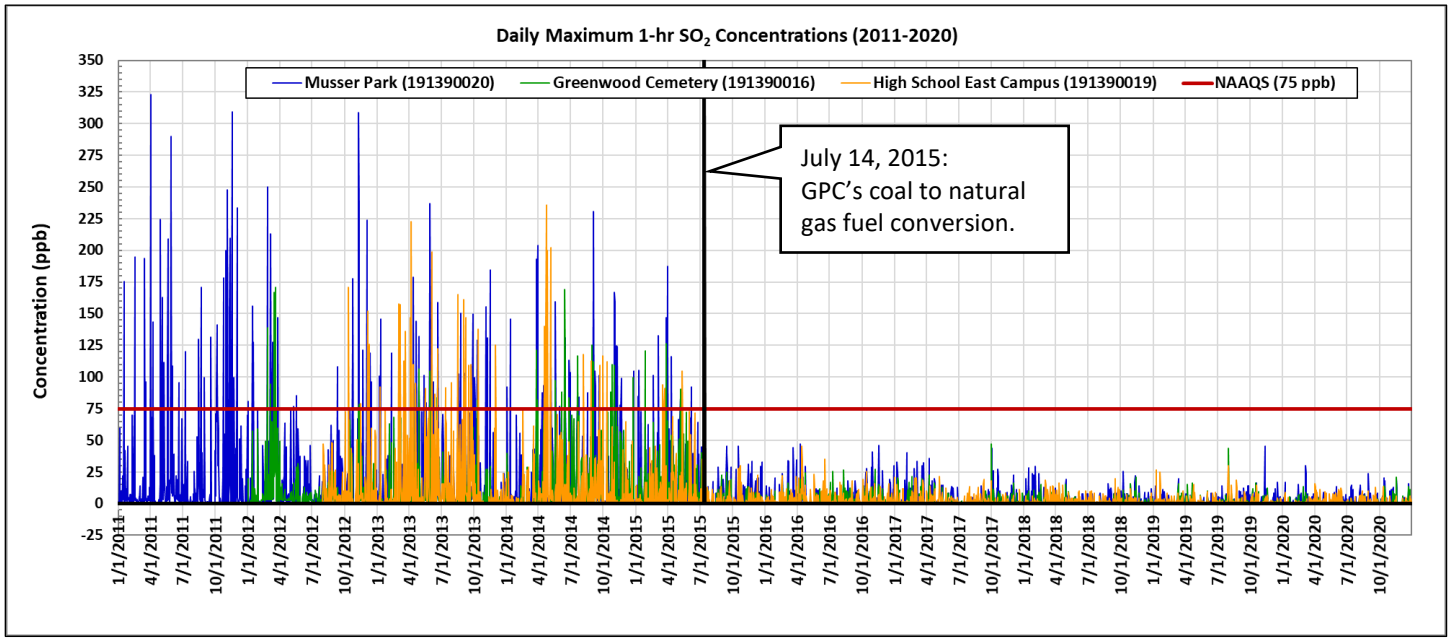



**Figure 4-1. Daily maximum 1-hour $SO_2$ concentrations measured in Muscatine from 2011-2020.**

Table 4-1 provides the annual 99th percentile daily maximum 1-hour $SO_2$ concentrations from 2011 through 2020 for the Muscatine monitoring sites. Concentrations from 2016 and thereafter reflect the use of only natural gas in GPC's boilers and are substantially lower than values from previous years.

**Table 4-1. The 99th percentile daily maximum 1-hour $SO_2$ concentrations from 2011-2020.**

| Site Name | AQS Site ID | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Greenwood Cemetery | 19-139-0016 | | 104.2 | 83.7 | 116.5 | 90.5 | 24.4 | 20.1 | 15.1 | 15.7 | 13.5 |
| High School East Campus | 19-139-0019 | | | 160.9 | 147.9 | 75.3 | 29.6 | 20.2 | 16.3 | 25.0 | 12.7 |
| Musser Park | 19-139-0020 | 247.9 | 224 | 178.5 | 179.7 | 116 | 44.5 | 34.5 | 24.0 | 16.4 | 20.1 |

GPC's fuel switch reduced its actual $SO_2$ emissions by over 10,000 tons per year, a 96% reduction in the facility's total $SO_2$ emissions versus the 2011 base year. The impact of GPC's fuel switch and the implementation of all other control measures is evident in the emissions data provided in Table 4-2. Between 2011 and 2017, the year by which most measures had been fully implemented, total $SO_2$ emissions from GPC, MPW, and Monsanto decreased by 12,172.1 tons, or 89%. While total emissions were higher in 2019 and 2020 versus 2017, due to increases at MPW, the overall large-scale reductions are permanent and total emissions remain around 12,000 tons less than in the 2011 base year.

[11] The fuel conversion was necessary to comply with a requirement in the consent order, judgment, and decree between the State of Iowa and Grain Processing Corporation [Law No. CVCV020979, Iowa District Court for Muscatine County (March 27, 2014)]. This fuel conversion resulted in a RACT emission limit for those boilers that is based on combusting only natural gas.

**Table 4-2. Facility total $SO_2$ emissions (tons) from the 2011 nonattainment base year and 2015 onward.**

| Facility Name | Facility ID | 2011 (Base Year) | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| GPC | 70-01-004 | 10,809.9 | 6,191.3 | 187.2 | 174.3 | 84.2 | 89.4 | 83.2 |
| MPW | 70-01-011 | 2,374.4 | 1,714.4 | 1,769.3 | 1,167.1 | 1,457.9 | 1,714.9 | 1,625.2 |
| Monsanto | 70-01-008 | 537.3 | 402.2 | 349.4 | 208.1 | 0.4 | 0.4 | 0.4 |
| **Total (tons)** | | **13,721.6** | **8,307.9** | **2,305.8** | **1,549.5** | **1,542.5** | **1,804.7** | **1,708.8** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Difference versus 2011** | **(tons)** | | -5,413.7 | -11,415.8 | -12,172.1 | -12,179.1 | -11,916.9 | -12,012.8 |
| | **(%)** | | -39% | -83% | -89% | -89% | -87% | -88% |

It is clear that GPC's fuel conversion, in combination with all permanent and enforceable control measures implemented at GPC, MPW, and Monsanto, have substantially reduced ambient $SO_2$ concentrations in the area. The requirements of CAA §107(d)(3)(E)(iii) are satisfied because the improvement in air quality is attributable to permanent (not temporary) and enforceable emission reductions.

## 5. Permit Updates

As part of the maintenance SIP, the state is requesting to update the air construction permits approved into the SIP for GPC, MPW, and Monsanto. Inclusion in the SIP ensures the emission reductions necessary to maintain the NAAQS remain permanent. The requested revisions are identified and summarized in the tables in Section 5.1. The new or modified air construction permits contain RACT emission limits and compliance provisions that maintain the requisite $SO_2$ NAAQS protections. This is demonstrated by the comprehensive dispersion modeling analysis described in Chapter 6.

**Grain Processing Corporation**

GPC's permit updates incorporate a variety of design revisions, engineering adjustments, and test results. The requested revisions are summarized in Table 5-1 and include the following:

- Removal of 12 permits for emission points (stacks) that are no longer in service,
- Inclusion of 5 new permits (4 new stacks and 1 newly identified $SO_2$ emission source), and
- Replacement of 20 modified[12] permits.

Attachment 1 contains GPC's 25 new or modified air construction permits. Iowa's SIP will contain 45 air construction permits for GPC for 2010 1-hour $SO_2$ attainment and maintenance purposes if EPA approves the requested revisions.[13]

**Muscatine Power & Water**

MPW's $SO_2$ control measures are unchanged. However, the DNR is requesting the replacement of two permits superseded due to modifications unrelated to $SO_2$, as indicated in Table 5-2. Attachment 2 contains MPW's modified air construction permits for the affected sources, Unit 8 and Unit 9. For 1-hour $SO_2$ purposes, the total number of MPW's SIP-approved permits will remain at four.

**Monsanto Company – Muscatine**

The DNR approved a refueling project requested by Monsanto that converted Boiler #8 from combusting primarily coal to burning only natural gas. The fuel switch, which occurred in November of 2017, was not necessary for attainment or maintenance purposes but did reduce Boiler #8's RACT limit and eliminated nearly all its actual $SO_2$ emissions. The requested revision is summarized in Table 5-3 and includes the following:

- Replacement of 1 modified permit.

Attachment 3 contains Monsanto's modified air construction permit for Boiler #8. The SIP-approved permit for the CAC Process Flare Burner has not been modified. For 1-hour $SO_2$ purposes, the total number of Monsanto's SIP-approved permits will remain at two.

[12] The modifications to three permits (for EP190A, EP190B, and EP545.0) did not impact any $SO_2$ related requirements and only addressed other pollutants, such as fine particulate matter ($PM_{2.5}$) or volatile organic compounds (VOC).

[13] The SIP-approved attainment plan included 52 permits for GPC, and of those, 20 have not been modified.

## 5.1 Source Summary Tables

**Table 5-1. GPC's permit updates and $SO_2$ control strategy summary.**

| **Source Name** (Emission Unit ID) | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| Power House-Boilers No. 1, No. 2, No. 3, No. 4, No. 6, No. 7 (EU5201.0, EU5202.0, EU5203.0, EU5204.0, EU5206.0, EU5207.0) | EP001.0 | No | | | 95-A-374-S4 | 0.55 | December 10, 2015 |
| #1 Wet Germ Cyclone to the #1 North Top Rotary Germ Drier (EU2801.0) | ~~EP014.0~~ | Removal | Stack removed from service, unit vented to new EP296.0 (North) | 15-A-078 | | | |
| #1 North Top Rotary Germ Drier (EU 2802.0), #2 North Bottom Rotary Germ Drier (EU2802.1) | ~~EP015.0~~ | Removal | Stack removed from service, units vented to new EP296.0 (North) | 79-A-194-S2 | | | |
| ~~Gluten Day Bin (EU1213.0)~~ | ~~EP038.0~~ | Removal | Source decommissioned | 71-A-067-S4 | | | |
| #1 Gluten Flash Dryer (EU 1217.0), #1 Gluten Flash Dryer Direct Fired Burner (DFB) (EU1217.1), #2Gluten Flash Dryer (EU 1217.2), #2 Gluten Flash Dryer DFB (EU1217.3) | ~~EP043.1~~ | Removal | Stack removed from service, units vented to new EP318.0 | 75-A-087-S1 | | | |
| Maltrin #1 Spray Dryer (EU3101.0), Maltrin #1 Spray Dryer DFB (EU3101.1) | EP066.0 | No | | | 72-A-199-S2 | 0.006 | December 10, 2015 |
| #2 Wet Germ Cyclone to #3 South Top Rotary Germ Drier (EU2803.0) | ~~EP096.0~~ | Removal | Stack removed from service, unit vented to new EP297.0 (South) | 74-A-014-S1 | | | |
| #3 South Top Rotary Germ Drier (EU 2804.0) | ~~EP097.0~~ | Removal | Stack removed from service, unit vented to new EP297.0 (South) | 74-A-015-S2 | | | |
| Dryer House Warehouse #1 Crown Feed Cooler (EU 1234.0) | EP119.0 | No | | | 75-A-353-S2 | 0.20 | July 6, 2015 |
| #4 South Bottom Rotary Germ Drier (EU2807.0) | ~~EP126.0~~ | Removal | Stack removed from service, unit vented to new EP297.0 (South) | 79-A-195-S2 | | | |
| Maltrin #3 Spray Dryer with Product Recovery Cyclones (PRC) (EU3111.0), Maltrin #3 Spray Dryer DFB (EU3111.1) | EP132.1 (East Stack) | Yes | All requirements moved into a CAP;[14] [$SO_2$ RACT limit unchanged] | 80-A-149-S5 | CAP: 80-A-149-S6 | 0.011 (combined) | February 21, 2017 |
| | EP132.2 (West Stack) | Yes | | 80-A-150-S5 | CAP: 80-A-150-S6 | | |
| Maltrin #4 Spray Dryer with PRC (EU3110.0), Maltrin #4 Spray Dryer Direct-Fired Low-NOx Line Burner (EU3110.1) | EP135.0 (East Stack) | Yes | All requirements moved into a CAP, dispersion parameters updated, RACT limit changed from 0.014 to 0.017 lb/hr | 85-A-031-S2 | CAP: 85-A-031-S5 | 0.017 (combined) | May 19, 2020 |
| | EP136.0 (West Stack) | Yes | | 85-A-032-S2 | CAP: 85-A-032-S5 | | |

[14] A CAP (Collection of Air Permits) is a type of air construction permit issued by the DNR that combines the requirements and conditions for multiple emission points (and thus multiple permit numbers) into one document.

| **Source Name** (Emission Unit ID) | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| Boiler #10: Combustion Engineering Natural Gas Fired Boiler (EU5210.0) | EP142.0 | No | | | 85-A-038-P1 | 0.10 | December 10, 2015 |
| Boiler #11: Combustion Engineering Natural Gas Fired Boiler (EU5211.0) | EP153.0 | No | | | 85-A-135-P1 | 0.10 | December 10, 2015 |
| Dryer House Warehouse #2 Crown Feed Cooler (EU 1242.0) | EP167.0 | No | | | 90-A-111-S1 | 0.20 | July 6, 2015 |
| GP2 - #4 Gluten Pre-Mill Cooling System (EU1245.0) and Gluten Mill (EU1246.0) | EP174.0 | Yes | Increase in operating capacity; [$SO_2$ RACT limit unchanged] | 91-A-068-S2 | 91-A-068-S3 | 0.37 | November 4, 2019 |
| Power House- Boiler No.12 (EU5212.0) | EP177.0 | No | | | 93-A-110-P1 | 0.22 | December 10, 2015 |
| Gluten Surge Bin, Feed Loading Surge Bin, GP2 #1 Feed Truck Loadout (EU 1258.0) | EP179.0 | Yes | Dispersion parameters updated; [$SO_2$ RACT limit unchanged] | 92-A-383-S2 | 92-A-383-S3 | 0.25 | October 11, 2016 |
| Gluten Surge Bin, Feed Loading Surge Bin, GP2 #2 Feed Truck Loadout (EU 1259.0) | EP180.0 | Yes | Dispersion parameters updated; [$SO_2$ RACT limit unchanged] | 92-A-385-S1 | 92-A-385-S2 | 0.25 | October 11, 2016 |
| Maltrin #6 Spray Dryer with PRC (EU3116.0), Maltrin #6 Spray Dryer DFB (EU3116.1) | EP186.0 (East Stack) | Yes | All requirements moved into a CAP, dispersion parameters updated, (new low emissions burner for other pollutants); [$SO_2$ RACT limit unchanged] | 94-A-055-S1 | CAP: 94-A-055-S3 | 0.027 (combined) | May 13, 2021 |
| | EP187.0 (West Stack) | Yes | | 94-A-061-S1 | CAP: 94-A-061-S3 | | |
| GP2 Gluten Loadout Pneumatic Transport System (EU 1256.0) | EP190A | Yes | Permit update unrelated to $SO_2$ | 02-A-781-S2 | 02-A-781-S3 | 0.125 | February 8, 2018 |
| GP2 Gluten Truck Loadout Bin (EU 1257.0) | EP190B | Yes | Permit update unrelated to $SO_2$ | 02-A-782-S2 | 02-A-782-S3 | 0.005 | February 8, 2018 |
| Dryer House 4, Spent Germ Receiving (EU1262.0) | EP195.0 | No | | | 09-A-482-S2 | 0.012 | December 10, 2015 |
| DH4 and DH5 Rotary Dryers Product Receiver Cyclone (EU1263.0) | EP196.0 | Yes | Dispersion parameters updated; [$SO_2$ RACT limit unchanged] | 10-A-563-S1 | 10-A-563-S2 | 0.42 | July 25, 2017 |
| North Steep House (see the current permit for the full list of emission units) | EP200N | Yes | EP264.0 and EP279.0 units vented here; [Scrubber (CE2810-1) installed as previously required, sodium bisulfite requirements retained, $SO_2$ RACT limit unchanged] | 15-A-200 | 15-A-200-S1 | 2.80 | April 12, 2018 |
| South Steep House (see the current permit for the full list of emission units) | EP200S | Yes | Additional equipment (*e.g.*, tanks, grinding & separation equipment) identified as $SO_2$ sources and vented here; [Scrubber (CE2810-2) installed as previously required, sodium bisulfite requirements retained, $SO_2$ RACT limit unchanged] | 15-A-201 | 15-A-201-S1 | 3.17 | April 12, 2018 |
| Corn Wet Mill Steep Water Tank (EU2896.0) | ~~EP264.0~~ | Removal | Stack removed from service, unit vented to EP200N | 15-A-202 | | | |

| **Source Name** (Emission Unit ID) | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| GP1: Gluten Filter No. 1 (EU1250.0) | EP268.0 | No | | | 15-A-203 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 2 (EU1251.0) | EP269.0 | No | | | 15-A-204 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 3 (EU1252.0) | EP270.0 | No | | | 15-A-205 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 4 (EU1253.0) | EP271.0 | No | | | 15-A-206 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 5 (EU1254.0) | EP272.0 | No | | | 15-A-207 | 0.067 | February 15, 2016 |
| Starch Building (EU2433.0) | EP278.0 | No | | | 15-A-208 | 0.10 | December 10, 2015 |
| Wet Mill Bins Nos. 1-6 (EU2895.1 – EU2895.6) | ~~EP279.0~~ | Removal | Stack removed from service, units vented to EP200N | 15-A-209 | | | |
| GP1: Gluten Filter No. 6 (EU1255.6) | EP283.0 | No | | | 15-A-480 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 7 (EU1255.7) | EP284.0 | No | | | 15-A-481 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 8 (EU1255.8) | EP285.0 | No | | | 15-A-482 | 0.067 | February 15, 2016 |
| GP1: Gluten Filter No. 9 (EU1255.9) | EP286.0 | No | | | 15-A-483 | 0.067 | February 15, 2016 |
| #1 Wet Germ Transfer System with PRC (EU2801.0), #1 Germ Dryer (North Top) with PRC (EU2802.0), #2 Germ Dryer (North Bottom) with PRC (EU2802.1) | EP296.0 (North) | New Stack | EP014.0 and EP015.0 units vented to scrubbers (CE2802-2 and CE2802-3) and this new stack | | 17-A-298 | 3.8 | April 12, 2018 |
| #2 Wet Germ Transfer System with PRC (EU2803.0), #3 Germ Dryer (South Top) with PRC (EU2804.0), #4 Germ Dryer (South Bottom) with PRC (EU2807.0) | EP297.0 (South) | New Stack | EP096.0, EP097.0, and EP126.0 units vented to scrubbers (CE2804-2 and CE2804-3) and this new stack | | 17-A-299 | 2.05 | April 12, 2018 |
| Dryer House 4, Rotary Dryer #5 (EU1236.0), Dryer House 4, Rotary Dryer #6 (EU1238.0), Dryer House 4, Rotary Dryer #7 (EU1241.0), Dryer House 4 Building Aspiration System (see the current permit for the full list of emission units) | EP311.0 | Yes | EP546.0 and EP551.0 units vented here, dispersion parameters updated; [$SO_2$ RACT limit unchanged] | 15-A-213 | 15-A-213-S2 | 2.10 | December 22, 2020 |
| GP2: Gluten Filter No. 1 (EU1281.1), Gluten Filter No. 4 (EU1281.4) | EP312.0 | No | | | 15-A-484 | 0.134 | February 15, 2016 |
| GP2: Gluten Filter No. 2 (EU1281.2), Gluten Filter No. 3 (EU1281.3) | EP313.0 | No | | | 15-A-485 | 0.134 | February 15, 2016 |
| GP2: No 5 Gluten Filter (EU1281.5), GP2: No 6 Gluten Filter (EU1281.6), GP2: No.7 Gluten Filter (EU1281.7), GP2: No.8 Gluten Filter (EU1281.8) | EP314.0 | Yes | Additional Gluten Filter permitted (adds capacity), $SO_2$ RACT limit changed from 0.201 to 0.27 lb/hr | 15-A-486 | 15-A-486-S1 | 0.27 | November 4, 2019 |
| #5 Wet Mill Germ Dryer with PRC (EU2874.0), #3 Germ Transfer and Receiver with PRC (EU2894.0) | EP315.0 | Yes | Capacity restrictions added; [$SO_2$ RACT limit unchanged] | 15-A-326 | 15-A-326-S1 | 0.70 | March 4, 2020 |

| **Source Name** (Emission Unit ID) | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| GP1 #1 Gluten Flash Dryer with PRC (EU1217.0), GP1 #1 Gluten Flash Dryer DFB (EU1217.1), GP1 #2 Gluten Flash Dryer with PRC (EU1217.2), GP1 #2 Gluten Flash Dryer DFB (EU1217.3), GP2 #4 Gluten Flash Dryer (EU1244.0), GP2 Low-NOx Burner (EU1244.1) | EP318.0 | New Stack | EP043.1 units vented to this new stack | | 19-A-515-S1 | 5.45 | December 22, 2020 |
| Railcar Loading: Gluten (EU1275.0) | EP319.0 | New to $SO_2$ SIP | $SO_2$ RACT limit established for this previously unidentified $SO_2$ source | | 18-A-136 | 0.10 | May 30, 2018 |
| Gluten Plant 1 Pneumatic Transport System (EU1260.0) | EP531.0 | Yes | Dispersion parameters updated; [$SO_2$ RACT limit unchanged] | 03-A-471-S1 | 03-A-471-S3 | 0.10 | May 30, 2018 |
| ~~Mash Fermenters Nos. 1-23 (EU6301.0 – EU6323.0),~~ Mash Fermenters Nos. 24-29 (EU6324.0 – EU6329.0) | ~~EP544.0~~ | Removal | Stack removed from service, Mash Fermenters Nos. 24-29 vented to new EP556.0, Mash Fermenters Nos. 1-23 decommissioned | 05-A-926-S4 | | | |
| Seventeen Expellers for Spent Germ Hulls (EU2876.0 – EU2893.0) | EP545.0 | Yes | Permit update unrelated to $SO_2$ | 06-A-1261-S1 | 06-A-1261-S2 | 0.50 | December 22, 2020 |
| #1 Alpha Laval Centrifuge in Dryer House 4 (DH4) (EU1264.0) | ~~EP546.0~~ | Removal | Stack removed from service, unit vented to EP311.0 | 11-A-338-S1 | | | |
| East Tank and C-400 Thrus Tank (EU1264.0, EU1264.2) | ~~EP551.0~~ | Removal | Stack removed from service, units vented to EP311.0 | 15-A-354 | | | |
| Mash Fermenters Nos. 24-33 (EU6324.0 – EU6329.0) | EP556.0 | New Stack | EP544.0 units (Mash Fermenters Nos. 24-29) vented to this new stack, 30-33 added; [$SO_2$ RACT limit unchanged from EP544.0] | | 17-A-112 | 0.258 | May 2, 2017 |
| Wet Feed Pad and Loadout to Truck (EU1276.0) | EP WETFEED | Yes | Annual throughput revised; [$SO_2$ RACT limit unchanged] | 15-A-199 | 15-A-199-S1 | 0.15 | January 11, 2021 |

**Table 5-2. MPW's permit updates and $SO_2$ control strategy summary.**

| **Source Name** | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| Auxiliary Boiler | EP60 | No | | | 13-A-152-S1 | 0.045 | March 2, 2016 |
| Unit 7 | EP70 | No | | | 74-A-175-S4 | 1153 (cumulative)* | March 2, 2016 |
| Unit 8 | EP80 | Yes | Permit update unrelated to $SO_2$ | 95-A-373-P3 | 95-A-373-P4 | | June 1, 2016 |
| Unit 9 | EP90 | Yes | Permit update unrelated to $SO_2$ | 80-A-191-P3 | 80-A-191-P4 | | June 1, 2016 |

* This cumulative $SO_2$ emission limit is only summarized here. Refer to the construction permits for the compliance formula and other associated details.

**Table 5-3. Monsanto's permit updates and $SO_2$ control strategy summary.**

| **Source Name** | **Emission Point ID** | **Has the Permit Been Updated?** | **Description of Modification** (if applicable) | **Outdated Permit** (remove from the SIP) | **Current Permit** (retain or add to the SIP) | **$SO_2$ RACT Limit (lb/hr)** | **Current Permit Issuance Date** |
|---|---|---|---|---|---|---|---|
| Boiler #8 | EP-195 | Yes | Converted from coal to natural gas, dispersion parameters updated, $SO_2$ RACT limit reduced | 82-A-092-P11 | 82-A-092-P12 | 75.0 | November 1, 2016 |
| CAC Process Flare Burner | EP-234 | No | | | 88-A-001-S3 | 0.02 | May 13, 2015 |

# 6. Updated Dispersion Modeling Analysis

The DNR conducted a new comprehensive dispersion modeling analysis to demonstrate that the permit updates provide for maintenance of the 2010 1-hour $SO_2$ NAAQS throughout the Muscatine area. The modeled maintenance demonstration was built from the attainment demonstration (described in the attainment plan) and incorporates the following updates:

- Permit updates (discussed in the previous chapter).
- Newer version of the AERMOD modeling system.
- More recent five-year meteorological dataset.
- Updated background concentration of 5 µg/$m^3$.
- Updated horizontal emissions points to use the POINTHOR option in AERMOD.
- Receptors included along the levee near GPC since the public now has access to this area.
- Updated LGS's main boiler stack temperature and flowrate (per permit 05-A-031-P4 issued April 2, 2020).

## 6.1 Air Quality Model Selection

The DNR performed the ambient air quality modeling analysis using the EPA preferred American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) dispersion model. AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (<50 kilometers [km]) dispersion from the source.

Consistent with 40 CFR 51 Appendix W, the most current version (19191) of AERMOD available at the time of the analysis was used with EPA's regulatory default options and with the latest guidance available for evaluating 1-hour $SO_2$ impacts. This guidance includes the applicable portions of: the August 23, 2010, 1-hour $SO_2$ clarification memo;[15] the March 1, 2011, 1-hour $NO_2$ clarification memo;[16] and the August 2016 $SO_2$ Technical Assistance Document[17] (TAD).

The analysis utilized several supporting pre-processing programs for AERMOD. Terrain elevations were obtained from the AERMAP preprocessor, meteorological data was prepared using AERMET, and direction-specific building downwash effects were incorporated using the Building Profile Input Program (BPIP) with plume rise model enhancements (PRIME). Version numbers were as follows:

- AERMAP version 18081
- AERMET version 19191
- BPIP-Prime version 04274

## 6.2 Receptor Grid/Spacing/Terrain Elevations

The receptor grid was centered on the Musser Park monitor and extended to the edges of the nonattainment area.[18] The grid utilized the following resolutions:

- 50-meter spacing along facility property boundaries;
- 50-meter spacing out to 0.5 kilometers from the Musser Park monitor;
- 100-meter spacing out to 1.5 kilometers;
- 250-meter spacing out to 3 kilometers;
- 500-meter spacing out to 5 kilometers; and
- 1000-meter spacing beyond 5 km.

Finer grid spacing of 50 meters was also used to resolve modeled impacts around other nearby individual facilities included in the analyses, but finer grid spacing was applied only around sources within the nonattainment area. Portions of fence lines falling outside of the nonattainment area were omitted from the analysis. Receptors were excluded within

[15] *Applicability of Appendix W Modeling Guidance for the 1-hour $SO_2$ National Ambient Air Quality Standard*, August 23, 2010.
[16] *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard*, March 1, 2011.
[17] *$SO_2$ NAAQS Designations Modeling Technical Assistance Document*, August 2016.
[18] A depiction of the receptor grid is shown in Section 6.8, in Figure 6-1.

the property boundaries of each facility, except in those analyses in which the impacts upon the property of one facility by the others was being evaluated. Those analyses required the creation of additional grids which used 50-meter spacing across facility property. All receptors for all grids were assigned a terrain height and hill height using the terrain preprocessor AERMAP and the United States Geological Survey (USGS) National Elevation Dataset (NED) in North American Datum 1983 (NAD83).

## 6.3 Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the Iowa DNR. The surface and upper air data were collected from the Davenport (KDVN) National Weather Service (NWS) station for calendar years 2015 through 2019. This timeframe represents the most recent, readily available 5-year period at the time of the initial analysis. For this time period the Davenport meteorological data are considered representative of conditions near Muscatine.[19]

## 6.4 Building Downwash

Building downwash effects were determined using BPIP-Prime with the heights and locations of buildings, structures, and sources. Based upon the facility configuration, BPIP determines if wake effects from surrounding structures will affect the emissions from a source. If structure wake effects are evident, flags are set to indicate the stacks affected by building wake zones. The program then calculates the modeling inputs for building heights and widths necessary for the dispersion model to simulate the building downwash effects in the wake area.

## 6.5 Source Inventory

From within the nonattainment area, $SO_2$ emissions were modeled from GPC, MPW, and Monsanto. Facilities outside the nonattainment area that were also explicitly modeled include MidAmerican Energy's Louisa Generating Station (LGS). These are the same four facilities included in the attainment demonstration modeling for the attainment plan and they account for all the nearby $SO_2$ sources not adequately characterized by the background concentration. Each $SO_2$ source at each facility was modeled at its current maximum permitted allowable emission rate.

Consistent with EPA's March 1, 2011, clarification memo, emissions were excluded from units that operate intermittently, such as emergency engines and fire pumps. Additionally, emission units limited to burning a specific fuel intermittently were modeled at emission rates that represent the fuel that is burned during normal operation. The two auxiliary boilers (EP2 and EP3) at LGS are limited to burning fuel oil for no more than 48 hours per year. These two sources were modeled at emission rates associated with burning natural gas.

## 6.6 Good Engineering Practice Stack Height

As shown in Table 6-1, there are stacks at GPC, MPW, and LGS whose heights exceed the 65-meter de-minimis good engineering practice (GEP) stack height. However, no actual stack heights exceed formula GEP height due to nearby tall buildings. All sources were thus modeled using their actual stack characteristics

**Table 6-1. Tall stack GEP height determination.**

| Facility (ID) | Emission Point | Actual Height (meters) | GEP Formula Height (meters) |
|---|---|---|---|
| GPC (70-01-004) | EP1.0 | 66.75 | 83.00 |
| MPW (70-01-011) | EP70 | 67.06 | 81.52 |
| | EP80 | 68.58 | 81.32 |
| | EP90 | 91.44 | 131.33 |
| LGS (58-07-001) | EP1 | 185.93 | 194.66 |

[19] Please refer to the section "Determination of the Areas Represented by Each Meteorological Site" in the meteorological data TSD: https://www.iowadnr.gov/portals/idnr/uploads/air/dispmodel/tsd_2015_2019_aermod_met_data.pdf

## 6.7 Background Value

The DNR used a 5 µg/m$^3$ $SO_2$ background concentration to account for $SO_2$ contributions from sources not explicitly modeled. This background value corresponds to the 2017-2019 design value of the Lake Sugema $SO_2$ monitor (ID 19-177-0006). The Lake Sugema site is not located near any industrial $SO_2$ emissions and it provides a suitable choice to determine a representative $SO_2$ background concentration for Iowa. Over 97% of Iowa's $SO_2$ emissions are associated with industrial activities.[20] There are a relatively small number of industrialized areas in Iowa contributing to this majority of statewide $SO_2$ emissions. All existing $SO_2$ monitoring sites in Iowa are located near these areas, except the Lake Sugema monitor. Using data from any other monitoring location in the calculation of the background would result in an overly conservative background value. Additional discussion is provided in the DNR's *Background Concentration Data* Technical Support Document (TSD).[21]

## 6.8 Results

The DNR modeled seven scenarios to ensure that each demonstrates continued modeled attainment (maintenance) with the 2010 1-hour $SO_2$ NAAQS. The scenarios vary depending upon which combination of MPW's three coal-fired boilers (Units 7, 8, and 9, abbreviated as U7, U8, and U9, respectively) are running. The scenarios include: simultaneous operation of all three boilers, referred to as the "All" scenario in Table 6-2; operation of U7 and U8 simultaneously ("U9 Off"); operation of U7 and U9 simultaneously ("U8 Off"); operation of U8 and U9 simultaneously ("U7 Off"); and operating U7 only; U8 only; or U9 only. The cumulative model results shown in Table 6-2 indicate that each operational scenario at MPW, combined with the impacts from GPC, Monsanto, LGS, and the background concentration, provides for continued maintenance of the 2010 1-hour $SO_2$ NAAQS. The contours of maximum predicted 1-hour concentrations (in ug/m$^3$) are depicted in Figure 6-1. This figure also depicts the receptor grid. Additionally, the impacts upon the property of one facility by the emissions from the other facilities were evaluated. In all cases, the maximum 4$^{th}$-high on-property concentrations were less than the maximum cumulative concentrations listed in Table 6-2.

**Table 6-2. Cumulative modeled ambient air impacts demonstrating all scenarios attain and maintain the $SO_2$ NAAQS.**

| MPW Scenario | Cumulative Model Result (µg/m$^3$) | 1-hour $SO_2$ NAAQS (µg/m$^3$) |
|---|---|---|
| **All** | 163.09 | 196 |
| **U9 Off** | 168.37 | |
| **U8 Off** | 167.26 | |
| **U7 Off** | 162.97 | |
| **U7 Only** | 166.92 | |
| **U8 Only** | 162.72 | |
| **U9 Only** | 177.53 | |

[20] According to data from the January 2021 version of the 2017 NEI. Use of data from the 2011 NEI yields the same result.
[21] Iowa DNR, *Background Concentration Data*, Technical Support Document, September 8, 2020. Available on: https://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Background-Data

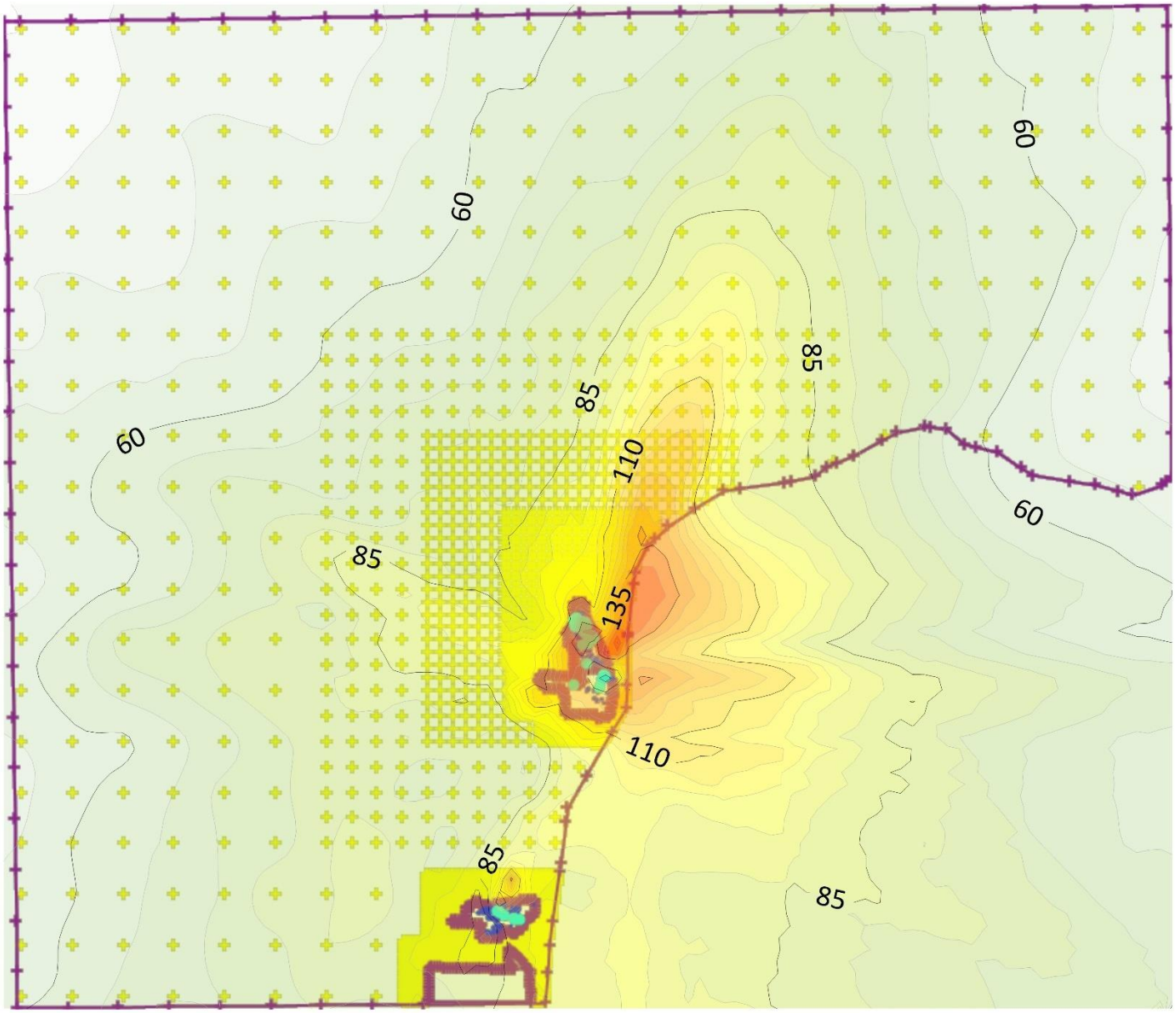



**Figure 6-1. Depiction of the predicted maximum 1-hour $SO_2$ concentration contours (in ug/$m^3$) and the receptor grid (excluding the additional receptors added to one facility's property when assessing the impacts from the other facilities' sources). Areas that appear solid yellow utilize a receptor spacing of 50 meters.**

# 7. Maintenance Plan

According to CAA §107(d)(3)(E)(iv), EPA must approve a maintenance plan for a nonattainment area before it can be redesignated to attainment. This 1-hour $SO_2$ maintenance plan conforms to CAA §175A requirements and addresses the following elements expected[22] by EPA.

- Attainment Inventory
- Maintenance Demonstration
- Monitoring Network
- Verification of Continued Attainment
- Contingency Plan

## 7.1 Attainment Inventory

EPA guidance recommends developing an inventory of actual emissions to identify the level of emissions sufficient to attain the NAAQS. However, using this approach in the Muscatine area would not achieve the desired result. It would underestimate the emissions level that provides for attainment because actual emissions from GPC, MPW, and Monsanto are less than their maximum permitted allowable $SO_2$ emission rates (RACT limits) and dispersion modeling demonstrates that the permitted rates provide for attainment.

Evaluating maximum permitted allowable $SO_2$ emissions, rather than actual emissions, is the appropriate and conservative alternative for the sources in the control strategy and is consistent with the emission rates modeled in the attainment and maintenance demonstrations. Current total maximum permitted allowable $SO_2$ emissions, in tons per year (tpy), are listed in Table 7-1 for the modeled facilities. The values were derived by summing the current maximum permitted $SO_2$ emissions from all sources at each facility, assuming each source operated 8760 hours per year unless otherwise restricted by an enforceable condition. The same calculation was performed for Louisa Generating Station because this source is always explicitly modeled in the area's $SO_2$ attainment and maintenance demonstrations.

**Table 7-1. Attainment inventory (rounded) of maximum permitted allowable $SO_2$ emissions for modeled sources.**

| Location | Facility Name | Facility ID | Maximum Permitted Allowable $SO_2$ Emissions (tpy) |
|---|---|---|---|
| Inside the Nonattainment Area (NAA) | Grain Processing Corporation | 70-01-004 | 175 |
| | Muscatine Power & Water | 70-01-011 | 5,051 |
| | Monsanto Company – Muscatine | 70-01-008 | 329 |
| | **Total** | | **5,555** |
| Outside the NAA | Louisa Generating Station | 58-07-001 | 15,188 |

While nearly all $SO_2$ emissions in the nonattainment area are attributable to GPC, MPW, and Monsanto, the area's comprehensive inventory includes emissions from other point, nonpoint, onroad, nonroad, and event (prescribed fire) sources. Recent $SO_2$ emission estimates for these sectors are shown in Table 7-2 and detailed in 0. The data are from the January 2021 version of the 2017 National Emissions Inventory (NEI). This is the most recent information available for these sectors and is suitable for use as the attainment year. In 2017, these sector emissions totaled 12.36 tons. This is 0.2% of the current total potential emissions from GPC, MPW, and Monsanto of 5,555 tons and 0.8% of their 2017 total actual emissions of 1,549.5 tons (see Table 4-2).

The "point-other" category includes emissions from industrial point source facilities within the nonattainment area (excluding GPC, MPW, and Monsanto), airport operations, and support activities from rail transportation. The emission estimates for the nonpoint, onroad, nonroad, and event sources represent county-wide totals. The DNR did not attempt to parse the nonpoint, onroad, nonroad, or event emissions to the partial Muscatine County nonattainment area because their emissions are relatively small and the parsing process is complex.

[22] Discussed in the "*Procedures for Requests to Redesignate Areas to Attainment,*" memo from John Calcagni, September 4, 1992, and the "*Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions,"* memo from Stephen Page, April 23, 2014.

**Table 7-2. Attainment inventory of actual $SO_2$ emissions for sources not explicitly modeled.**

| Data Category | Geographic Scope | Attainment Inventory 2017 NEI (tpy) |
|---|---|---|
| Point-Other[23] | Nonattainment area only | 0.33 |
| Nonpoint | Muscatine County | 6.96† |
| Onroad | Muscatine County | 3.17 |
| Nonroad | Muscatine County | 0.51 |
| Event (Prescribed Fires) | Muscatine County | 1.38 |
| **TOTAL** (may not sum as shown due to rounding) | | **12.36** |

† The 2017 NEI contains a known error in Iowa's nonpoint inventory that incorrectly yields emissions from coal-fired industrial combustion sources. All emissions from industrial coal combustion in Iowa are accounted for in the point source category. The erroneous nonpoint emissions were excluded from this value.

## 7.2 Maintenance Demonstration

Maintenance of the NAAQS is demonstrated by either modeling that shows the future mix of sources and emission rates will not cause a NAAQS violation, or by showing that future $SO_2$ emissions will not exceed the level of the attainment inventory. Regardless of the approach, maintenance of the NAAQS must be demonstrated for a period of 10 years following the redesignation. Because the 10-year maintenance horizon starts with the date of redesignation, and not the submittal date of the redesignation request, time must be added to allow EPA to process the maintenance plan and the redesignation request. It is reasonable to provide EPA with at least 2 years[24] to accomplish those tasks, therefore this maintenance demonstration identifies 2033 as the (minimum) maintenance horizon. However, additional data is included that demonstrates maintenance through 2040 and this extends the maintenance horizon for added assurance.

Maintenance for the Muscatine area can be demonstrated using both dispersion modeling and the attainment inventory above. For GPC, MPW, and Monsanto (and LGS), both approaches incorporate maximum permitted allowable emission rates. The dispersion modeling analysis, discussed in Chapter 6, is the more sophisticated approach. It incorporates meteorology, topography, source characteristics, and the background concentration and shows that the $SO_2$ NAAQS will be met even if GPC, MPW, Monsanto, and LGS were to constantly emit at their maximum permitted allowable emission rates. If any of those four sources were to request an increase in any permitted $SO_2$ emission rate, the modification would only be considered if new dispersion modeling shows that the modification maintains the $SO_2$ NAAQS. The DNR would submit such revisions to EPA for approval and inclusion in the SIP.

The attainment inventory provides for maintenance through 2033 (and beyond, through 2040) for two reasons: 1) it is based on the maximum permitted allowable emissions from GPC, MPW, and Monsanto (and LGS) shown in Table 7-1, and 2) because impacts and growth from other $SO_2$ sources in the area will likely remain negligible, as discussed below. Additionally, actual emissions from GPC, MPW, and Monsanto are expected to stay well below their maximums. This provides a compliance margin and is suggested by the 2017-2020 data in Table 4-2.

The DNR also expects LGS's actual emissions will be considerably less than its annualized permitted rate of 15,188 tons. This is supported by LGS's operating history from the last 10 years. Table 7-3 provides the annual $SO_2$ emissions from LGS from 2011 to 2020, as reported to EPA's Clean Air Markets Division (CAMD).

**Table 7-3. Louisa Generating Station 2011–2020 annual $SO_2$ emissions, as reported to CAMD.**

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| **LGS $SO_2$ (tons)** | 7,306 | 8,743 | 8,206 | 9,365 | 6,098 | 5,156 | 5,237 | 7,332 | 5,286 | 2,870 |

[23] The "Point-Other" category excludes emissions from GPC, MPW, and Monsanto (they are addressed separately) but is otherwise identical to the Point source sector from the January 2021 version of the 2017 NEI. It includes emissions from all other industrial facilities, airports, and rail yard operations located within the bounds of the nonattainment area.

[24] Clean Air Act section 107(d)(3)(D) grants the EPA up to 18 months from receipt of a complete submittal to process a redesignation request. This time frame was rounded up to a minimum of 2 years.

The DNR investigated potential growth in actual emissions from all $SO_2$ sources not explicitly modeled (those represented by the background concentration) and has determined that reasonable projections do not jeopardize maintenance of the $SO_2$ NAAQS in Muscatine. Emissions forecasts for the point-other, nonpoint, onroad, nonroad, and event (prescribed fire) sectors were estimated by multiplying the 2017 NEI data by population growth factors. The growth factors were generated by calculating the ratio of a future year population estimate to that of 2017. All population estimates were sourced from *Woods & Poole Economics, Inc. Washington, D.C., Copyright 2020*.

Growth factors were produced for 2033 and two additional future years, 2035 and 2040, as shown in Table 7-4. The resulting emissions forecasts are provided in Table 7-5. By 2040, total $SO_2$ emissions from these sectors is estimated to grow by only ~0.38 tons (3.09%). The NAAQS will be maintained because such a small increase will not significantly impact ambient $SO_2$ concentrations in the area. Even if growth were twice the expected amount, the increase would still be less than one ton. Use of more sophisticated forecasting methods or alternative techniques are not reasonably anticipated to alter the conclusion that the 2010 1-hour $SO_2$ NAAQS will be maintained through 2033, and through 2040, because emissions from these sectors have remained low in recent years. Additionally, forecasting any $SO_2$ emissions growth for these sectors is thought to be conservative as reductions are more likely to occur.

**Table 7-4. Population estimates (*Woods & Poole Economics, Inc, 2020*) and calculated growth factors.**

| Year | 2017 | 2033 | 2035 | 2040 |
|---|---|---|---|---|
| **Population Estimate (Muscatine County)** | 42,892 | 44,101 | 44,166 | 44,216 |
| **Growth Factor** | -- | 1.0282 | 1.0297 | 1.0309 |

**Table 7-5. Recent and future year $SO_2$ emissions estimates (tons) for the Muscatine area.**

| Sector | 2017 NEI (Attainment Inventory) | 2033 Forecast | 2035 Forecast | 2040 Forecast |
|---|---|---|---|---|
| **Point-Other** | 0.33 | 0.34 | 0.34 | 0.34 |
| **Nonpoint** | 6.96 | 7.16 | 7.17 | 7.18 |
| **Onroad** | 3.17 | 3.25 | 3.26 | 3.26 |
| **Nonroad** | 0.51 | 0.53 | 0.53 | 0.53 |
| **Event (Prescribed Fires)** | 1.38 | 1.42 | 1.42 | 1.42 |
| **TOTAL** (may not sum as shown due to rounding) | **12.36** | **12.71** | **12.72** | **12.74** |
| **Forecast Growth from 2017 (tons)** | -- | 0.35 | 0.37 | 0.38 |

## 7.3 Monitoring Network

The DNR commits to keep in operation an $SO_2$ monitoring network as necessary to verify the attainment status of the area and will continue to work with the EPA through the air monitoring network review process, as required by 40 CFR Part 58, to determine the adequacy of the $SO_2$ monitoring network and when $SO_2$ monitoring can be reduced or discontinued.

## 7.4 Verification of Continued Attainment

According to EPA's 1992 and 2014 guidance documents, a state's submittal should indicate how progress of the maintenance plan will be tracked, regardless of whether the maintenance demonstration is based on modeling or a showing that future emissions of $SO_2$ will not exceed the attainment inventory.

The DNR will track progress of the plan by continuing to implement its SIP-approved preconstruction permitting program and by ensuring that GPC, MPW, and Monsanto comply with their emissions limits, stack testing, monitoring, and recordkeeping requirements associated with their control measures.[25] The DNR has a comprehensive program to identify sources of violations and to undertake aggressive follow-up for compliance and enforcement. DNR field

[25] The DNR will also ensure that Louisa Generating Station complies with its $SO_2$ emission limit.

inspectors have authority to conduct onsite inspections to review the compliance status of each facility (Iowa Code 455B.103(4)). Recordkeeping, reporting, and monitoring requirements established in the control measures for each facility provide the DNR with a mechanism to ensure continued compliance on a source-specific basis.

Persons responsible for equipment are required to provide to the DNR information necessary to characterize emissions at the facility (567 IAC 21.1(3)). Facilities in the Title V operating permit program are required to identify instances of deviations from permit requirements in semi-annual reports to the DNR, including the cause of the deviations and any corrective actions or preventive measures taken (567 IAC 22.108(5)). In addition, facilities are required to report (567 IAC 24.1(2) and 24.1(3)) and take corrective action (567 IAC 24.1(4)) and 24.2(1)"b") in response to incidences of excess emissions.

On a case-by-case basis, the DNR will evaluate and model the $SO_2$ emissions from $SO_2$ sources that propose to construct or alter regulated equipment in or near the area. The construction of new or modified sources that may impact the maintenance of attainment is regulated by 567 Iowa Administrative Code (IAC) 22.3(1)"b." This requires that the expected emissions from a proposed source or modification, in conjunction with all other emissions, will not prevent the attainment or maintenance of the NAAQS. Paragraph 567 IAC 22.3(3)"f" allows the DNR to establish a more stringent emission standard and to require the installation of additional control equipment for portable equipment that may locate into an area under a maintenance plan to ensure maintenance of the NAAQS.

## 7.5 Contingency Plan

Section 175A(d) of the CAA requires that maintenance plans include contingency provisions to promptly correct any violation of the NAAQS that occurs after redesignation of the area to attainment. Pursuant to EPA's 2014 guidance (Page memo), if attainment is based on compliance of a single source or a small set of sources with emission limits shown to provide for attainment, EPA interprets "contingency measures" to mean that the state agency has a comprehensive program to identify sources of violations of the 2010 1-hour $SO_2$ standard and to undertake aggressive follow-up for compliance and enforcement. The control measures that provide for attainment and maintenance in the Muscatine $SO_2$ nonattainment area include emissions limits for three facilities (GPC, MPW, and Monsanto) and the DNR verified (in the section above) that it has a comprehensive enforcement program to undertake aggressive follow-up for any violations. This satisfies the requirements of CAA §175A(d) relating to contingency measures. However, for added assurance the DNR developed additional contingency provisions to apply after the maintenance plan is approved by EPA.

### 7.5.1 Caution Level Response

The DNR will evaluate the need for additional control measures if a certified annual 99$^{th}$ percentile daily maximum 1-hour $SO_2$ concentration measured at a monitoring site in the maintenance area equals or exceeds 76 ppb. A study will be conducted to determine if a trend toward higher $SO_2$ concentrations exists in the Muscatine maintenance area. The study will evaluate whether the trend, if any, is likely to continue.

The DNR will plan to complete the study within six months of the determination that a caution level response has been triggered. Any necessary control measures developed in response to a caution level trigger will be implemented as expeditiously as practicable. DNR's commitment to initiate a caution level response is intended to prevent future violations of the NAAQS from occurring. It should be noted that the EPA does not require a state to implement contingency measures if occasional exceedances are recorded.

### 7.5.2 Action Level Response

An action level response will be prompted if a new violation of the 2010 1-hour $SO_2$ NAAQS occurs within the maintenance area. A violation occurs if a consecutive three-year average of the annual 99$^{th}$ percentile daily maximum 1-hour $SO_2$ concentrations is valid and is 76 ppb or greater. In the event that the action level response is triggered, and a culpability investigation finds it is not due to an exceptional event, the DNR, in conjunction with the entity(ies) believed to be responsible for the violation, will evaluate additional control measures needed to assure future attainment of the 2010 1-hour $SO_2$ NAAQS.

The DNR will establish orders, issue new air construction permits, or modify existing permits within approximately nine months of completion of a culpability investigation that identifies such actions as being necessary to mitigate the NAAQS

violation. The DNR will plan to complete the culpability investigation no later than three months after a valid design value, as determined in accordance with Appendix T to 40 CFR 50, indicates that the action level response has been triggered.

### 7.5.3 Potential Contingency Measures

Control measures for either the caution level response or the action level response could include, for example, fuel switches, improvements to existing control devices, additional control devices, production curtailments, reductions to operating loads, housekeeping and maintenance improvements, or other appropriate measures necessary to mitigate the elevated $SO_2$ concentrations. It is not possible to fully develop an appropriate list of contingency measures until a culpability analysis is conducted to determine both the suspected cause of the elevated $SO_2$ concentrations and the appropriate response. Such an analysis may require data collection activities and a reexamination of previous assumptions or conclusions.

The DNR may request or conduct new or supplemental reviews of $SO_2$ emissions from sources and activities affecting the area. Once determined, the DNR will submit an analysis to EPA demonstrating that the proposed measures are adequate to meet the 2010 1-hour $SO_2$ NAAQS. Any contingency measures implemented will require a compliance plan and an expeditious compliance timeline. If a new measure is already promulgated and scheduled to be implemented at the federal or state level, and that measure is determined to be sufficient to address the upward trend in ambient $SO_2$ concentrations within the maintenance area, additional local measures may be unnecessary. At a minimum, the DNR will require the implementation of all contingency measures contained in the attainment plan that were in place prior to redesignation.

## 8. Clean Air Act Section 110(k), Section 110, and Part D Applicable Requirements

EPA may not promulgate a redesignation of a nonattainment area to attainment unless it has fully approved the applicable implementation plan for the area under §110(k) and the state has met all applicable requirements for the area under §110 and Part D of the CAA. This is required by CAA §107(d)(3)(E)(ii) and (v).

### 8.1 CAA Section 110(k)

Section 110(k) of the CAA addresses EPA actions on SIP submissions and covers the following: SIP completeness; deadlines for EPA actions on SIPs; full, partial, and conditional SIP approval; SIP disapproval; and SIP corrections. An area cannot be redesignated to attainment if a required element of its plan is the subject of: a disapproval; a finding of failure to submit or to implement the SIP; or a partial, conditional, or limited approval. This does not mean that earlier issues with regard to the SIP will be reopened, as the SIP must be fully approved only with respect to applicable requirements that pertain to a nonattainment designation.

EPA published its full approval of the attainment plan on November 17, 2020 (85 FR 73218). The approval became effective December 17, 2020. The area is not subject to any SIP disapprovals, any failures to submit or implement the SIP, or any partial, conditional, or limited approvals related to elements applicable to the nonattainment designation.

### 8.2 CAA Section 110

Under sections 110(a)(1) and (2) of the CAA, states are required to submit plans to provide for the implementation, maintenance, and enforcement of any new or revised NAAQS. Section 110(a) directs each state to submit these plans to EPA within 3 years of promulgation of a new or revised NAAQS. The plans are typically called Infrastructure SIPs because they address basic air quality management functions and requirements (air quality infrastructure). CAA section 110(a)(2) identifies the specific infrastructure elements to be addressed, for example, ambient monitoring, enforcement, permitting, air quality modeling, adequate personnel, resources, and legal authority.

The DNR submitted the state's Infrastructure SIP for the 2010 1-hour $SO_2$ NAAQS to EPA on July 23, 2013. On September 29, 2017 (82 FR 45550), EPA proposed to approve this SIP. EPA's final approval was published on March 22, 2018 (83 FR 12486). EPA concluded that Iowa met the requirements of sections 110(a)(1) and (2) evaluated by EPA. Although EPA has not taken action on the interstate transport (good neighbor) provisions of section 110(a)(2)(D)(i)(I), that does not jeopardize the redesignation request. These elements continue to apply to a state regardless of the designation of any one particular area in the state and EPA has stated that the requirements linked with a particular nonattainment area's designation are the relevant measures to evaluate in reviewing a redesignation request.[26]

### 8.3 CAA Part D

Subpart 1 of Part D of the CAA contains general requirements applicable to all nonattainment areas.[27] It includes section 172(c), which identifies several key provisions that states must address in an attainment plan submittal, for example:

- Provisions for attainment and the timely implementation of all reasonably available control technology (RACT) and reasonably available control measure (RACM); CAA §172(c)(1)
- Reasonable Further Progress (RFP); CAA §172(c)(2)
- An emissions inventory for the nonattainment area; CAA §172(c)(3)
- Nonattainment new source review; CAA §172(c)(5)
- A control strategy with enforceable emission limits and schedules and timetables for compliance as necessary to provide for attainment; CAA §172(c)(6)
- Contingency measures; CAA §172(c)(9)

The fully approved attainment plan and DNR's nonattainment new source review program fulfill these applicable CAA Part D requirements. The attainment plan addressed the RACT/RACM provisions of CAA §172(c)(1), the RFP provisions of §172(c)(2), and the control strategy provisions of §172(c)(6). The air construction permits included with that plan contained emission limits, operating restrictions, and other enforceable conditions with methods, schedules, and

[26] See, for example, the pertinent discussion in 79 FR 20139, published April 11, 2014.

[27] Subpart 5 of Part D contains attainment plan submission deadlines and attainment dates specifically applicable to areas designated nonattainment for $SO_2$ (and nitrogen dioxide and lead).

timetables for compliance necessary to attain the 2010 1-hour $SO_2$ NAAQS as expeditiously as practicable. The attainment plan also included a current, comprehensive, and accurate $SO_2$ emissions inventory as required by §172(c)(3) and contingency measures as required by CAA §172(c)(9). The source revisions and associated air construction permits included with this SIP revision (see Chapter 5) continue to provide for attainment, ensure maintenance of the 2010 1-hour $SO_2$ NAAQS, and satisfy all applicable CAA requirements.

In accordance with CAA §172(c)(5) and §173, the DNR implements a nonattainment new source review program that regulates the construction of any new major source or major modification subject to nonattainment review. On May 15, 2014 (79 FR 27763), EPA approved updates to Iowa's nonattainment new source review regulations in 567 IAC 31. Implementation of the DNR's SIP-approved prevention of significant deterioration (PSD) program (567 IAC 33) will regulate the construction of any new major source or major modification in the area after the area is redesignated to attainment.

## 9. Removal of Provisions for the Revoked SO2 Standards

In 1991 and 1992 the DNR measured violations of the 24-hour $SO_2$ NAAQS in Muscatine. In 1994, EPA designated a portion of Muscatine County as nonattainment (see Figure 9-1).[28] The DNR subsequently developed an attainment plan that contained control measures for GPC, MPW, and Monsanto.[29] EPA redesignated the area to attainment in 1998 (63 FR 13343, March 19, 1998) and approved the DNR's second 10-year maintenance plan on August 1, 2007 (72 FR 41900).

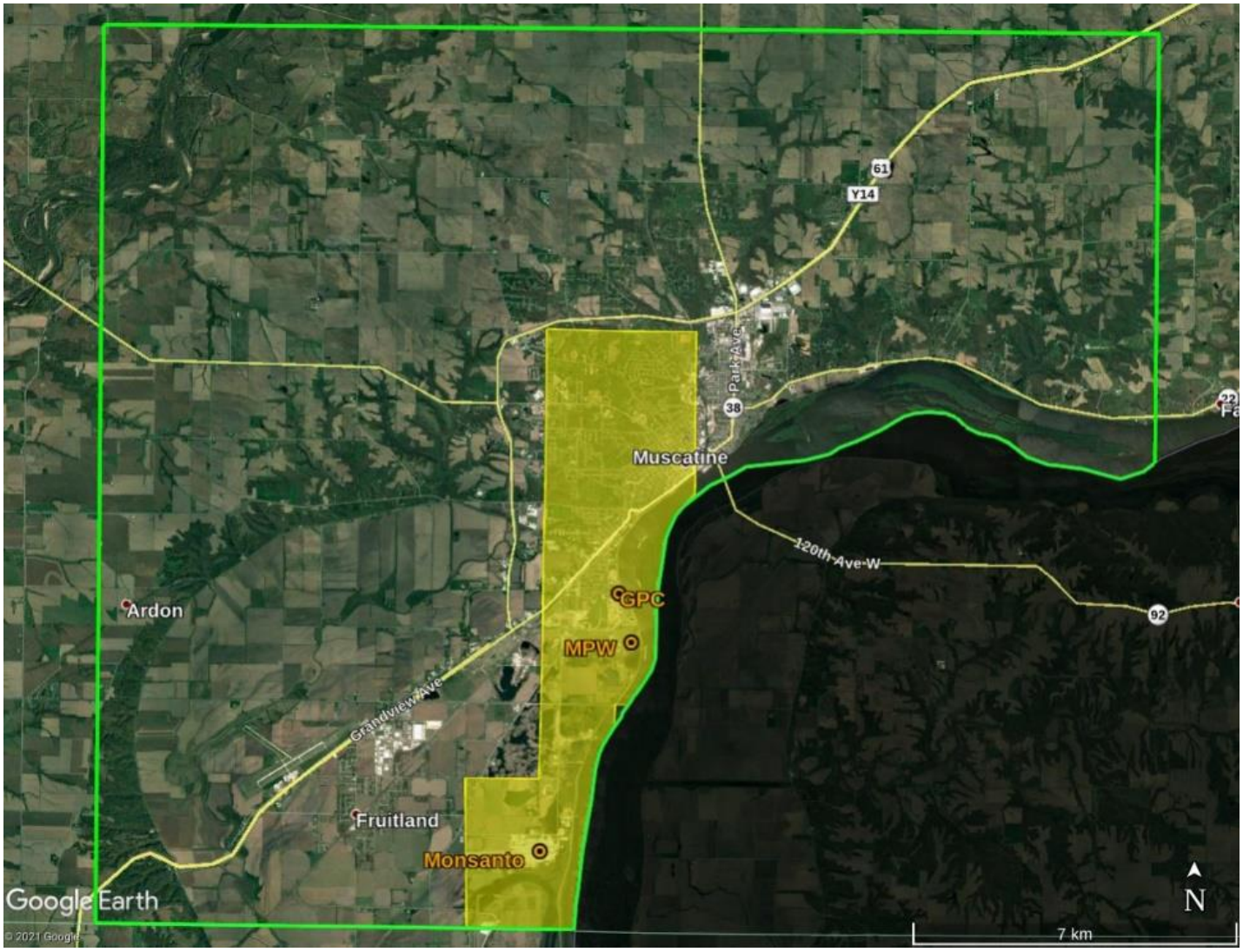



**Figure 9-1. Nonattainment areas for the revoked 24-hour (shaded yellow) and current 1-hour (green line) $SO_2$ NAAQS.**

The attainment and maintenance provisions associated with those actions are no longer needed due to the revocation of the 24-hour and annual $SO_2$ NAAQS.[30] The DNR is requesting their removal from the SIP, including the permits listed in Table 9-1 that contained the original contol measures. The anti-backsliding provisions of CAA §110(l) are satisfied by replacement with the attainment plan, maintenance plan, and associated permits for the more stringent 1-hour $SO_2$ standard. Accordingly, the emission limits approved into the SIP for the 1-hour $SO_2$ NAAQS are more stringent than the prior emission limits for the revoked 24-hour $SO_2$ NAAQS that are being replaced.

[28] EPA proposed the nonattainment designation on August 24, 1993 (58 FR 44639). A correction was published on September 23, 1993, (58 FR 49467). The final designation was published on March 10, 1994, (59 FR 11193), and effective April 11, 1994.

[29] The attainment plan and permits were submitted in 1996 (revised in 1997) and approved by EPA on December 1, 1997 (62 FR 63454).

[30] The 2010 $SO_2$ NAAQS revision (75 FR 35519, June 22, 2010) included provisions to revoke both the 24-hour and annual average primary $SO_2$ standards. In Muscatine, those standards ceased to apply on October 4, 2014, one year after its 1-hour $SO_2$ designation.

**Table 9-1. Construction permits to remove from the SIP pursuant to the revocation of the 24-hour $SO_2$ NAAQS.**

| Facility (ID) | Permit to Remove | Emission Point ID | Justification for Removal |
|---|---|---|---|
| **GPC** (70-01-004) | 74-A-015-S | EP097.0 | This emission point no longer exists |
| | 79-A-194-S | EP015.0 | This emission point no longer exists |
| | 79-A-195-S | EP126.0 | This emission point no longer exists |
| | 95-A-374 | EP001.0 | Replaced by SIP-approved permit 95-A-374-S4[†] |
| **MPW** (70-01-011) | 74-A-175-S | Boiler #7 | Replaced by SIP-approved permit 74-A-175-S4[†] |
| | 95-A-373 | Boiler #8 | Replaced by SIP-approved permit 95-A-373-P3[†]; updating to 95-A-373-P4 |
| **Monsanto** (70-01-008) | 76-A-161S3 | Boiler #7 | In 2012, Boilers #6 and #7 were both restricted to combusting only natural gas and their $SO_2$ limits were removed from the modified permits |
| | 76-A-265S3 | Boiler #6 | |

[†] Approved by EPA on November 17, 2020 (85 FR 73218), as part of the DNR's attainment plan for the 1-hour $SO_2$ NAAQS.

# 10. Administrative Materials

The submittal of this SIP revision complies with the procedural elements of Subpart F of 40 CFR 51 and the applicable criteria in Appendix V of 40 CFR 51, as discussed below and in Chapter 11.

A formal letter of submittal from the Governor of the State of Iowa, or their designee, requesting EPA approval of the proposed revision to the SIP for the State of Iowa will be included with the SIP submittal. All the included air construction permits are in their final form, and the DNR will follow all applicable procedural requirements of the state's laws and constitution in the adoption of this plan.

## 10.1 Evidence of State Adoption

The date of adoption will be addressed in the transmittal letter after the plan is approved by the Environmental Protection Commission (EPC). The EPC is the governing commission for the environmental services portion of the DNR (Iowa Code 455A.6).

## 10.2 Legal Authority

The DNR is the regulatory agency with primary responsibility for outdoor air quality permitting and compliance activities in the State of Iowa. The DNR's authority is set forth in chapter 455B of the Iowa Code and implemented through 567 IAC Chapters 10 and 20-35, and 561 IAC Chapters 2 and 7. The DNR's permitting and compliance programs and associated rules have previously been approved by EPA as part of Iowa's SIP.

The DNR has the necessary legal authority under state statute to adopt and implement this plan. Iowa Code section 455B.133(3) provides that the Iowa Environmental Protection Commission shall "[a]dopt, amend, or repeal ambient air quality standards for the atmosphere of this state on the basis of providing air quality necessary to protect the public health and welfare." The federal $SO_2$ NAAQS are adopted by reference at 567 IAC 28. Iowa Code section 455B.133(4) provides that the commission shall "[a]dopt, amend, or repeal emission limitations or standards relating to the maximum quantities of air contaminants that may be emitted from any air contaminant source." Iowa Code section 455B.134(9) states that the duties of the director include issuing "orders consistent with rules to cause the abatement or control of air pollution, or to secure compliance with permit conditions."

In combination with the DNR's existing legal authority and associated administrative regulations, this SIP revision is adequate to maintain the 2010 1-hour $SO_2$ NAAQS in Muscatine.

# 11. Public Participation

The public comment period for this proposed SIP revision began on August 20, 2021, and ended September 20, 2021. A public hearing was held virtually on September 20, 2021. The DNR's public participation process followed procedures meeting the requirements in 40 CFR 51.102 and Appendix V to 40 CFR 51.

## 11.1. Response to Public Comments

The DNR received two written comment letters during the public comment period. One comment letter was submitted by a citizen of Muscatine and the second was a joint comment letter from Sierra Club and Clean Air Muscatine (CLAM). Copies of these letters are available from the DNR upon request. No comments were provided during the public hearing. A summary of the written comments and the DNR's responses are provided in the following responsiveness summary.

Comment

The commenter is concerned that air quality will degrade in Muscatine if the area is redesignated to attainment.

*DNR Response*

The federal CAA contains provisions to prevent air quality degradation in areas that have been redesignated from nonattainment to attainment. Such areas are commonly referred to as maintenance areas and they are subject to additional oversight for a minimum timeframe of 20 years after redesignation. The DNR's maintenance SIP includes a demonstration that the area will maintain the 2010 1-hour $SO_2$ NAAQS throughout the 10-year period ending in 2033 (extended through 2040 for additional assurance). Eight years after EPA redesignates the area to attainment, the DNR must submit a second maintenance plan that ensures continued attainment for the remainder of the 20-year timeframe.

Additionally, the DNR's maintenance SIP includes both a commitment to keep in operation an $SO_2$ monitoring network as necessary to verify the attainment status of the area and a contingency plan with triggers and responses to help prevent a NAAQS violation if elevated concentrations are measured in the future.

Comment

The commenter is concerned that future emissions increases will degrade air quality in Muscatine. In support of their concern, the commenter references a recent draft permit allowing GPC to increase emissions from the Wet Feed Pad.

*DNR Response*

Requirements in Iowa administrative code, the DNR's SIP-approved pre-construction permitting program, and DNR dispersion modeling procedures work in combination to prevent air quality degradation in Muscatine. The construction of new or modified sources that may impact the maintenance of attainment is regulated by 567 IAC 22.3(1)"b," which requires that the expected emissions from the proposed source, in conjunction with all other emissions, will not prevent the attainment or maintenance of the ambient air quality standards.

The DNR will continue to conduct dispersion modeling to demonstrate that any new or modified $SO_2$ sources permitted in Muscatine will not jeopardize maintenance of the 1-hour $SO_2$ NAAQS. While the recent request from GPC to increase $SO_2$ emissions from the Wet Feed Pad is currently under DNR review and beyond the scope of this initial Maintenance SIP, the DNR would like to assure the commenter that the requested permit modification has only a small impact on $SO_2$. The requested modification would increase $SO_2$ emissions by less than 0.22 tons per year (from 0.15 to 0.20 lb/hr) and dispersion modeling results show no increase in the predicted maximum 1-hour $SO_2$ concentration.

Comment

Iowa previously asked for an allowable increase of pollutants during startup, shut down, and malfunction (SSM). This creates the potential that industry will be allowed to increase emissions during SSM periods, negatively affecting air quality in Muscatine.

*DNR Response*

To clarify, the state did not ask EPA for an increase in emissions during SSM events and no such increases are anticipated. Iowa's excess emissions regulations in 567 IAC 24 have remained unchanged since before EPA issued its national SSM SIP-Call (80 FR 33839, June 12, 2015). A change in federal policy led EPA to conclude that Iowa's excess

emissions regulations were not deficient. EPA published Iowa's removal from the 2015 SSM SIP-Call with the approval of the Muscatine attainment plan (85 FR 73218, November 17, 2020).

Comment
Muscatine Power and Water's (MPW) 21-day rolling average $SO_2$ emission limit is inadequate to protect the 2010 1-hour $SO_2$ NAAQS. Supporting information includes the form of the standard, in which air quality could be rendered unsafe by only a few hours of elevated concentrations in a given year, and variations in MPW's hourly emission rates.

*DNR Response*
The DNR designed MPW's 21-day averaging limit to be protective of the 2010 1-hour $SO_2$ NAAQS. EPA's April 2014 "*Guidance for 1-hour SO2 Nonattainment Area SIP Submissions*" provides the option of setting longer term limits, up to 30 days, if adjusted to a level that reflects a stringency comparable to the 1-hour average limit at the critical emission value (CEV). The DNR utilized this approach when setting MPW's 21-day average limit. EPA fully approved the 21-day averaged emission limit into Iowa's SIP on November 17, 2020 (85 FR 73218). EPA's approval was based on the conclusion that all the SIP's emission limits, including MPW's 21-day average limit, provide for attainment. The ambient monitoring data support that decision. The current (2018-2020) maximum 1-hour $SO_2$ design value measured in the Muscatine area is 20 ppb, ~27% of the NAAQS.

Comment
The modeling analysis does not support redesignation because cumulative maximum impacts are close to the NAAQS, the DNR selected an extremely low background concentration that is not representative of the actual $SO_2$ background concentrations in Muscatine, and several $SO_2$ sources in and around Muscatine County were not included in the analysis.

*DNR Response*
The background concentration represents ambient $SO_2$ concentrations not attributable to any source which is explicitly included in the modeling analysis. The monitor locations mentioned by the commenter (those in Clinton and Linn Counties) are inappropriate for use as background because each is located in communities with large sources of $SO_2$. The Chancy Park and Tait Cummins monitors are immediately adjacent to those sources. The Lake Sugema monitor, being in a rural location, is best fit to provide a true background concentration that is not influenced by nearby industry.

The additional industrial $SO_2$ sources mentioned by the commenter – Gerdau Ameristeel, SSAB, Linwood, and Continental Cement (fka LaFarge) – were screened out of the analysis due to a combination of factors including emission levels, distance, source characteristics, and predominant wind directions. The emissions from these facilities will have dispersed before reaching the area being evaluated and would therefore be represented as part of the background.

The remaining $SO_2$ emissions in Muscatine County, which includes those from the nonpoint, onroad, nonroad, and event (fire) categories, are inconsequential with respect to the background concentration. Based on the 2017 NEI, such sources yielded an additional 7.25 tons per year of $SO_2$ in Muscatine County versus those in Van Buren County. The ambient impact of that difference is trivial. For example, the 2017 $SO_2$ emissions in Polk County from such sources were nearly 107 tons per year higher than those in Van Buren County, yet, the 2016-2018 1-hour $SO_2$ design value from the Health Department monitor (ID 19-153-0030)[31] in Des Moines, was 1 ppb, while the design value from the Lake Sugema monitor (ID 19-177-0006, located in Van Buren County) for that same three-year period was higher, at 2 ppb.

Comment
DNR's selection of meteorological data from the Davenport airport station, and not the Muscatine airport station, likely leads to under assessing ambient air pollution impacts in the dispersion modeling analysis.

*DNR Response*
The DNR initially considered using the meteorological data from the Muscatine airport. Unfortunately, data quality is an issue at this site. The example provided by the commenter illustrates this point. The Muscatine airport station is missing 19% of the available hourly measurements, while the Davenport site is missing only 2.5%. In addition, there tends to be

[31] Starting January 1, 2019, $SO_2$ monitoring was terminated at this site. Its 2016-2018 design value is thus the most recent available.

an excessive number of calm hours at the Muscatine airport site (20%, compared to 5% at Davenport). The model cannot calculate concentrations during hours with calm winds. Combined, 39% of the data from the Muscatine airport is either missing or unusable (calms), as opposed to 7.5% for Davenport.

While there are subtle differences in the wind pattern between Muscatine and Davenport, the two locations are still very similar. Predominant winds are from the northwest and south at both sites. Calculating the correlation between the available wind data at each site results in a correlation coefficient of 0.91, which is quite good.

The amount of missing and unusable data at the Muscatine airport precludes that site from being used in the dispersion modeling analysis. The Davenport data is representative of the conditions at Muscatine based on the similarities in the data.

Comment
DNR appears to have not placed increased concentrations of receptors at known areas of heightened concentration. Instead, DNR has prioritized placing receptors around the Musser Park monitor.

*DNR Response*
The receptor grid covers the entire nonattainment area, which encompasses approximately 126 square miles in Muscatine County, including the incorporated cities of Muscatine and Fruitland. Modeling outside the nonattainment boundary is unnecessary. EPA has designated all adjacent areas as attainment/unclassifiable for the 2010 1-hour $SO_2$ NAAQS and implementation of the control strategy and provisions in the maintenance plan will not impact the attainment status of areas outside the nonattainment area.

The receptor grid was originally designed to capture high concentrations around the Musser Park monitor and the facility property lines. Based on the commenter's concern about capturing the maximum concentration, the DNR added Figure 6-1, which depicts both the maximum predicted 1-hour $SO_2$ concentration at each receptor and the receptor grid. To ensure that areas of elevated $SO_2$ concentrations are adequately captured by the receptor grid, the areas extending 500 meters from each facility's property line are saturated with receptors spaced at 50 meter intervals. Figure 6-1 indicates that the maximum concentration occurs along the Mississippi River to the northeast of GPC and MPW. This area is within the portion of the receptor grid that contains the greatest density of receptors. Concentrations are decreasing at the edges of the evaluation area, which indicates that higher peaks do not exist within the nonattainment area and are unlikely within the remainder of Muscatine County. The existing receptor grid is therefore adequate to capture the maximum predicted concentration.

Comment
Based on the previous four comments, the commenter opposes this SIP revision and the redesignation to attainment.

*DNR Response*
The DNR considered the commenter's concerns and has determined that this SIP revision and the redesignation request remain warranted, as evaluated and discussed above.

## 11.2. Evidence of Public Notice

Notice of the DNR's intention to revise the State Implementation Plan and notice of the public comment period and public hearing was published in the Muscatine Journal on August 20, 2021. A copy of the notice is provided in the Proof of Publication below. Electronic notice of the draft SIP, the public comment period, and the public hearing was provided to over 22,000 subscribers of the DNR's Air Quality Technical Updates email distribution service. Notice of the public hearing was also posted on the DNR Event Calendar and the DNR's website. The DNR certifies that the public hearing was held on September 20, 2021, at 11:00 a.m., in accordance with the information in the public notice and the state's laws and constitution.

An electronic copy of the maintenance SIP, its attachments, and participation instructions for the public hearing were posted on the DNR's Public Input Webpage at https://www.iowadnr.gov/airpublicinput (screenshot below). Copies of the materials were also made available to the public at the Musser Public Library, 304 Iowa Ave, Muscatine, IA 52761.

**Proof of Publication**

# *** Proof of Publication ***

The undersigned, being first duly sworn, on oath does say that he/she is an authorized employee of THE MUSCATINE JOURNAL, morning edition, a daily newspaper printed and published by Lee Enterprises, Incorporated, in the City of Davenport, Scott County, Iowa, and that a notice, a printed copy of which is made a part of this affidavit, was published in said THE MUSCATINE JOURNAL, on the dates listed below.

IOWA DEPT OF NATURAL RESOURCES
AIR QUALITY BUREAU - NORMA GENTRY
502 E. 9th Street
Des Moines, IA 50319

ORDER NUMBER 103407

The affiant further deposes and says that all of the facts set forth in the foregoing affidavit are true as he/she verily believes.

Section: Notices & Legals
Category: 2627 Miscellaneous Notices
PUBLISHED ON: 08/20/2021

TOTAL AD COST: 47.44
FILED ON: 8/20/2021

Subscribed and sworn to before me by said affiant this 20 day of August 2021.

Danine Glascock

Notary Public in and for Scott County, Iowa

**Notice**

Iowa Department of Natural Resources

The Iowa Department of Natural Resources is requesting public comments on a draft plan to help redesignate the Muscatine area from nonattainment to attainment with the 1-hour sulfur dioxide (SO2) national ambient air quality standard. The DNR intends to submit the plan to the U.S. Environmental Protection Agency (EPA) as a revision to Iowa's state implementation plan (SIP).

On August 5, 2013, EPA designated a portion of Muscatine County as a nonattainment area because SO2 concentrations in the air did not meet the 2010 federal 1-hour SO2 health standard of 75 parts per billion (ppb). Beginning with the 2015-2017 three-year period, SO2 concentrations measured in Muscatine show the area meets the standard. The improved air quality is the result of permanent reductions in local emissions.

The proposed SIP revision includes a maintenance plan to demonstrate the Muscatine area will continue to meet the 1-hour SO2 standard. The DNR is also requesting the removal of outdated permits and less stringent SO2 requirements for the revoked 24-hour SO2 federal air quality standard. When DNR submits the plan, the Governor will formally ask EPA to redesignate the area to attainment. Only EPA can redesignate the area to attainment.

Find an electronic copy of the plan on DNR's Public Participation webpage at https://www.iowadnr.gov/airpublicinput Look in the Public Input section under Muscatine SO2 Redesignation Request and Maintenance Plan Available for Public Comment. Or, view a copy of the plan and its attachments at the Musser Public Library, 304 Iowa Ave., Muscatine. Anyone may make written comments on this proposed SIP revision. Direct written comments to Matthew Johnson, Department of Natural Resources, Wallace State Office Building, 502 East 9th St., Des Moines, IA 50319-0034; by fax at 515-725-9501; or by email to matthew.johnson@dnr.iowa.gov. All comments must be received no later than 4:30 p.m. on September 20, 2021.

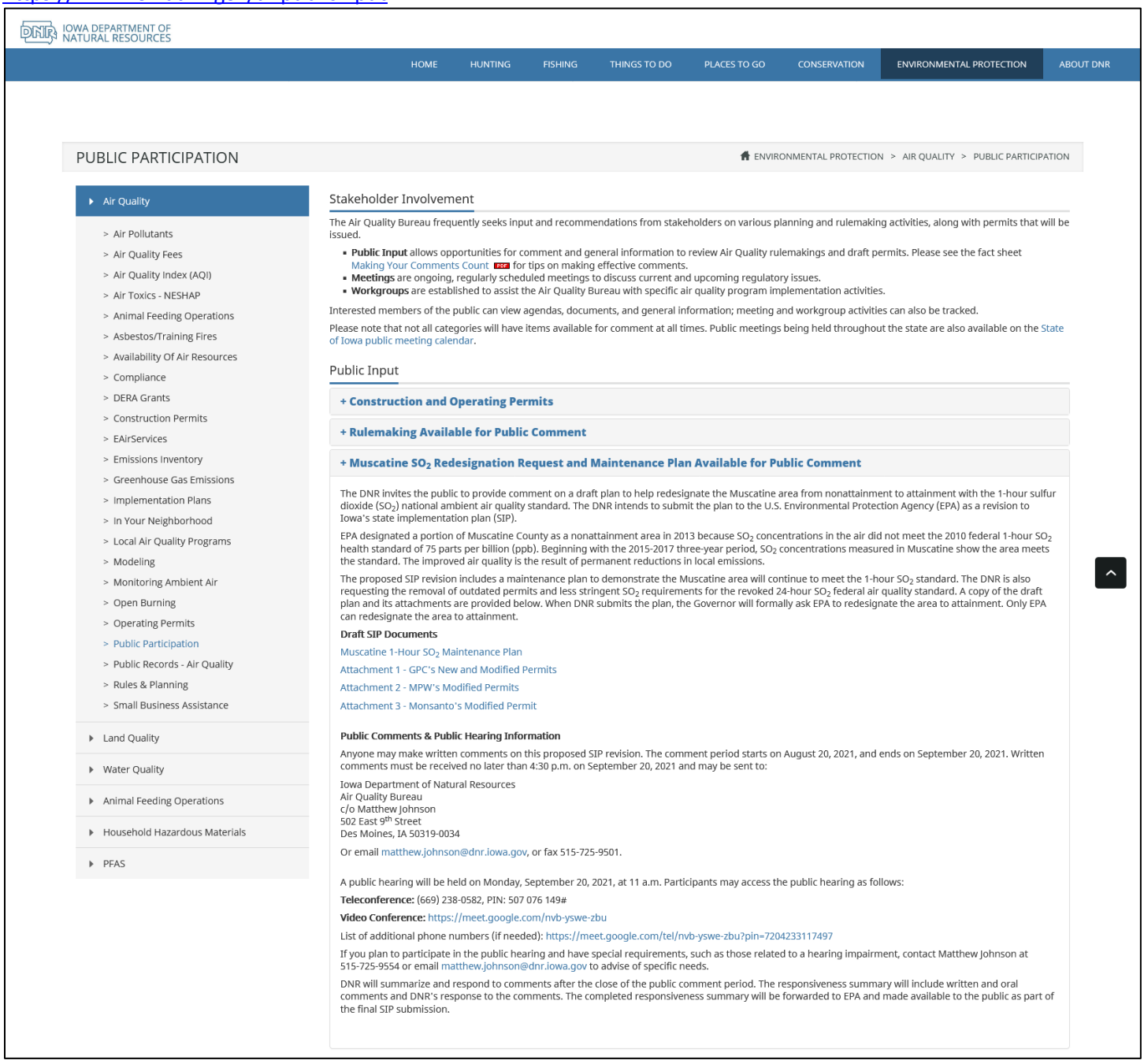
DNR will hold a public hearing for oral comments on Monday, September 20, 2021, at 11:00 a.m. The public hearing will be held virtually and accessible by video conference or by telephone. To learn how to participate in the public hearing, please go to the website identified in the previous paragraph. If you plan to participate in the public hearing and have special requirements, such as those related to a hearing impairment, contact Matthew Johnson at 515-725-9554 or email matthew.johnson@dnr.iowa.gov to advise of specific needs.

DNR will summarize and respond to comments after the close of the public comment period. The responsiveness summary will include written and oral comments and DNR's response to the comments. The completed responsiveness summary will be forwarded to EPA and made available to the public as part of the final SIP submission.



NOTARIAL SEAL IOWA
DANINE GLASCOCK
Commission Number 810108
My Commission Expires 4-17-22

**Notification Posted to the DNR's Public Participation Website (screenshot)**
https://www.iowadnr.gov/airpublicinput



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  - Animal Feeding Operations
  - Asbestos/Training Fires
  - Availability Of Air Resources
  - Compliance
  - DERA Grants
  - Construction Permits
  - EAirServices
  - Emissions Inventory
  - Greenhouse Gas Emissions
  - Implementation Plans
  - In Your Neighborhood
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  - Modeling
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  - Open Burning
  - Operating Permits
  - Public Participation
  - Public Records - Air Quality
  - Rules & Planning
  - Small Business Assistance
- Land Quality
- Water Quality
- Animal Feeding Operations
- Household Hazardous Materials
- PFAS

## Stakeholder Involvement

The Air Quality Bureau frequently seeks input and recommendations from stakeholders on various planning and rulemaking activities, along with permits that will be issued.

- **Public Input** allows opportunities for comment and general information to review Air Quality rulemakings and draft permits. Please see the fact sheet Making Your Comments Count PDF for tips on making effective comments.
- **Meetings** are ongoing, regularly scheduled meetings to discuss current and upcoming regulatory issues.
- **Workgroups** are established to assist the Air Quality Bureau with specific air quality program implementation activities.

Interested members of the public can view agendas, documents, and general information; meeting and workgroup activities can also be tracked.

Please note that not all categories will have items available for comment at all times. Public meetings being held throughout the state are also available on the State of Iowa public meeting calendar.

## Public Input

**+ Construction and Operating Permits**

**+ Rulemaking Available for Public Comment**

**+ Muscatine $SO_2$ Redesignation Request and Maintenance Plan Available for Public Comment**

The DNR invites the public to provide comment on a draft plan to help redesignate the Muscatine area from nonattainment to attainment with the 1-hour sulfur dioxide ($SO_2$) national ambient air quality standard. The DNR intends to submit the plan to the U.S. Environmental Protection Agency (EPA) as a revision to Iowa's state implementation plan (SIP).

EPA designated a portion of Muscatine County as a nonattainment area in 2013 because $SO_2$ concentrations in the air did not meet the 2010 federal 1-hour $SO_2$ health standard of 75 parts per billion (ppb). Beginning with the 2015-2017 three-year period, $SO_2$ concentrations measured in Muscatine show the area meets the standard. The improved air quality is the result of permanent reductions in local emissions.

The proposed SIP revision includes a maintenance plan to demonstrate the Muscatine area will continue to meet the 1-hour $SO_2$ standard. The DNR is also requesting the removal of outdated permits and less stringent $SO_2$ requirements for the revoked 24-hour $SO_2$ federal air quality standard. A copy of the draft plan and its attachments are provided below. When DNR submits the plan, the Governor will formally ask EPA to redesignate the area to attainment. Only EPA can redesignate the area to attainment.

**Draft SIP Documents**

Muscatine 1-Hour $SO_2$ Maintenance Plan

Attachment 1 - GPC's New and Modified Permits

Attachment 2 - MPW's Modified Permits

Attachment 3 - Monsanto's Modified Permit

**Public Comments & Public Hearing Information**

Anyone may make written comments on this proposed SIP revision. The comment period starts on August 20, 2021, and ends on September 20, 2021. Written comments must be received no later than 4:30 p.m. on September 20, 2021 and may be sent to:

Iowa Department of Natural Resources
Air Quality Bureau
c/o Matthew Johnson
502 East 9th Street
Des Moines, IA 50319-0034

Or email matthew.johnson@dnr.iowa.gov, or fax 515-725-9501.

A public hearing will be held on Monday, September 20, 2021, at 11 a.m. Participants may access the public hearing as follows:

**Teleconference:** (669) 238-0582, PIN: 507 076 149#

**Video Conference:** https://meet.google.com/nvb-yswe-zbu

List of additional phone numbers (if needed): https://meet.google.com/tel/nvb-yswe-zbu?pin=7204233117497

If you plan to participate in the public hearing and have special requirements, such as those related to a hearing impairment, contact Matthew Johnson at 515-725-9554 or email matthew.johnson@dnr.iowa.gov to advise of specific needs.

DNR will summarize and respond to comments after the close of the public comment period. The responsiveness summary will include written and oral comments and DNR's response to the comments. The completed responsiveness summary will be forwarded to EPA and made available to the public as part of the final SIP submission.

## Appendix A. 2017 Emissions Data by Source and SCC

Actual emission estimates for sources not explicitly modeled in the attainment and maintenance demonstrations are provided in this appendix using data from the January 2021 version of the 2017 NEI. These $SO_2$ emissions are relatively small and adequately characterized by the $SO_2$ background concentration but are provided here for completeness purposes. The emissions are organized according to the following EPA data categories: point, nonpoint, onroad, nonroad, and event.

- Point sources include, for example, larger manufacturing plants, industrial facilities, and electric generating stations (power plants). EPA's point source category also includes emissions from the landing and take-off portions of aircraft operations, the ground support equipment at airports, and locomotive emissions within railyards.
- Nonpoint sources include, for example, emissions from smaller manufacturing operations, commercial businesses, and residential activities.
- Mobile sources are characterized as either onroad (cars, trucks, buses, etc.) or nonroad (construction and agricultural equipment, lawn and turf maintenance, off-road recreational vehicles, marine vessels, etc.).
- The event category includes emissions from wildfires and prescribed burns (agricultural field burning, which is not common in Iowa, is included in the nonpoint category).[32]

Table A-1 provides the attainment inventory for the point sources specifically located within the Muscatine nonattainment area.[33] The emissions from GPC, MPW, and Monsanto are excluded because the attainment inventory uses their maximum permitted allowable emission rates and each facility is explicitly modeled in all maintenance demonstrations. The sources listed in Table A-1 represent all those referred to as "Point-Other" in Chapter 7.

Emission estimates by source classification code (SCC) for the nonpoint, onroad, nonroad, and event sectors are provided in Tables A-2 through A-5. The data represent emissions for all of Muscatine County. Parsing the relatively small values to the nonattainment area would require a complex spatial analysis that is unwarranted.

Note, the data in the tables below may not sum as shown due to rounding.

[32] The NEI reasonably produced no wildfire (or agricultural field burning) emissions in Muscatine County in 2017. All event emissions in Muscatine County were associated with prescribed fires.

[33] The location of each point source is precisely known and only point sources within the nonattainment area are included.

**Table A-1. Point source $SO_2$ emissions within the Muscatine nonattainment area (not countywide) from the January 2021 version of the 2017 NEI. Referred to in Chapter 7 as "Point-Other" data. Excludes GPC, MPW, and Monsanto. Only facilities that report their emissions annually to the DNR have a DNR Facility ID.**

| Source Type | FIPS Code | DNR Facility ID | Site Name | NAICS Code | NAICS Description | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|---|
| Point | 19139 | | Fruitland | 488210 | Support Activities for Rail Transportation | 0.001873868 |
| Point | 19139 | 70-01-006 | HNI Corporation - Central Campus | 33721 | Office Furniture (including Fixtures) Manufacturing | 0.076299784 |
| Point | 19139 | 70-01-050 | HNI Corporation - North Campus | 33721 | Office Furniture (including Fixtures) Manufacturing | 0.054137376 |
| Point | 19139 | 70-01-005 | Kraft Heinz - Muscatine | 311421 | Fruit and Vegetable Canning | 0.058600744 |
| Point | 19139 | | Muscatine | 488210 | Support Activities for Rail Transportation | 0.001873868 |
| Point | 19139 | | Muscatine Muni | 48811 | Airport Operations | 0.12090226 |
| Point | 19139 | 70-01-048 | Union Tank Car Co - Muscatine | 488210 | Support Activities for Rail Transportation | 0.017211 |
| Point | 19139 | | Unity Healthcare | 48811 | Airport Operations | 0.00130402 |
| **TOTAL** | | | | | | **0.33220292** |

**Table A-2. Nonpoint $SO_2$ emissions in Muscatine County by SCC from the January 2021 version of the 2017 NEI (with corrections[34]).**

| Source Type | FIPS Code | SCC | Sector | SCC Description (Level 4) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|
| Nonpoint | 19139 | 2103008000 | Fuel Comb - Comm/Institutional - Biomass | Total: All Boiler Types | 0.1338676 |
| Nonpoint | 19139 | 2103006000 | Fuel Comb - Comm/Institutional - Natural Gas | Total: Boilers and IC Engines | 0.1420456 |
| Nonpoint | 19139 | 2103005000 | Fuel Comb - Comm/Institutional - Oil | Total: All Boiler Types | 0.05706247 |
| Nonpoint | 19139 | 2103004002 | Fuel Comb - Comm/Institutional - Oil | IC Engines | 0.03891003 |
| Nonpoint | 19139 | 2103004001 | Fuel Comb - Comm/Institutional - Oil | Boilers | 0.01114508 |
| Nonpoint | 19139 | 2103007000 | Fuel Comb - Comm/Institutional - Other | Total: All Combustor Types | 0.006859369 |
| Nonpoint | 19139 | 2102008000 | Fuel Comb - Industrial Boilers, ICEs - Biomass | Total: All Boiler Types | 0.3561974 |
| Nonpoint | 19139 | 2102006000 | Fuel Comb - Industrial Boilers, ICEs - Natural Gas | Total: Boilers and IC Engines | 0.8687768 |
| Nonpoint | 19139 | 2102004002 | Fuel Comb - Industrial Boilers, ICEs - Oil | All IC Engine Types | 2.421417 |
| Nonpoint | 19139 | 2102004001 | Fuel Comb - Industrial Boilers, ICEs - Oil | All Boiler Types | 0.05475566 |
| Nonpoint | 19139 | 2102011000 | Fuel Comb - Industrial Boilers, ICEs - Oil | Total: All Boiler Types | 0.01311334 |
| Nonpoint | 19139 | 2102007000 | Fuel Comb - Industrial Boilers, ICEs - Other | Total: All Boiler Types | 0.09806128 |
| Nonpoint | 19139 | 2104006000 | Fuel Comb - Residential - Natural Gas | Total: All Combustor Types | 0.2700985 |
| Nonpoint | 19139 | 2104004000 | Fuel Comb - Residential - Oil | Total: All Combustor Types | 0.02607165 |
| Nonpoint | 19139 | 2104011000 | Fuel Comb - Residential - Oil | Total: All Heater Types | 0.000033255 |

[34] The 2017 NEI contains a known error for Iowa that yields non-zero emissions from nonpoint coal-fired industrial combustion sources (SCC numbers 2102002000 and 2102001000). To avoid double counting, the erroneous data is excluded. All industrial coal combustion emissions in Iowa are correctly accounted for in the point source data.

| Source Type | FIPS Code | SCC | Sector | SCC Description (Level 4) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|
| Nonpoint | 19139 | 2104007000 | Fuel Comb - Residential - Other | Total: All Combustor Types | 0.05425267 |
| Nonpoint | 19139 | 2104008510 | Fuel Comb - Residential - Wood | Furnace: Indoor, cordwood-fired, non-EPA certified | 0.2298395 |
| Nonpoint | 19139 | 2104008610 | Fuel Comb - Residential - Wood | Hydronic heater: outdoor | 0.2236276 |
| Nonpoint | 19139 | 2104008620 | Fuel Comb - Residential - Wood | Hydronic heater: indoor | 0.1428732 |
| Nonpoint | 19139 | 2104008320 | Fuel Comb - Residential - Wood | Woodstove: freestanding, EPA certified, NC[35] | 0.1200695 |
| Nonpoint | 19139 | 2104008700 | Fuel Comb - Residential - Wood | Outdoor wood burning device, NEC[36] | 0.1020219 |
| Nonpoint | 19139 | 2104008100 | Fuel Comb - Residential - Wood | Fireplace: general | 0.09090105 |
| Nonpoint | 19139 | 2104008330 | Fuel Comb - Residential - Wood | Woodstove: freestanding, EPA certified, catalytic | 0.07985953 |
| Nonpoint | 19139 | 2104008310 | Fuel Comb - Residential - Wood | Woodstove: freestanding, non-EPA certified | 0.03674742 |
| Nonpoint | 19139 | 2104008530 | Fuel Comb - Residential - Wood | Furnace: Indoor, pellet-fired, general | 0.03623085 |
| Nonpoint | 19139 | 2104008400 | Fuel Comb - Residential - Wood | Woodstove: pellet-fired, general[37] | 0.02367634 |
| Nonpoint | 19139 | 2104008220 | Fuel Comb - Residential - Wood | Woodstove: fireplace inserts; EPA certified; NC[35] | 0.01719201 |
| Nonpoint | 19139 | 2104008230 | Fuel Comb - Residential - Wood | Woodstove: fireplace inserts; EPA certified; catalytic | 0.01143459 |
| Nonpoint | 19139 | 2104008210 | Fuel Comb - Residential - Wood | Woodstove: fireplace inserts; non-EPA certified | 0.005261633 |
| Nonpoint | 19139 | 2104008630 | Fuel Comb - Residential - Wood | Hydronic heater: pellet-fired | 0.000979212 |
| Nonpoint | 19139 | 2810060100 | Miscellaneous Non-Industrial NEC | Humans | 0.01832405 |
| Nonpoint | 19139 | 2810060200 | Miscellaneous Non-Industrial NEC | Animals | 4.66233E-06 |
| Nonpoint | 19139 | 2280002202 | Mobile - Commercial Marine Vessels | C1C2 Underway emissions: Auxiliary Engine | 0.03814153 |
| Nonpoint | 19139 | 2280002201 | Mobile - Commercial Marine Vessels | C1C2 Underway emissions: Main Engine | 0.0100453 |
| Nonpoint | 19139 | 2285002006 | Mobile - Locomotives | Line Haul Locomotives: Class I Operations | 0.027446 |
| Nonpoint | 19139 | 2285002007 | Mobile - Locomotives | Line Haul Locomotives: Class II / III Operations | 0.007092017 |
| Nonpoint | 19139 | 2610000500 | Waste Disposal | Land Clearing Debris[38] | 0.6246904 |
| Nonpoint | 19139 | 2610030000 | Waste Disposal | Household Waste[39] | 0.5497604 |
| Nonpoint | 19139 | 2610000400 | Waste Disposal | Yard Waste - Brush Species Unspecified | 0.007963329 |
| Nonpoint | 19139 | 2610000100 | Waste Disposal | Yard Waste - Leaf Species Unspecified | 0.007963329 |
| **TOTAL** | | | | | **6.964813057** |

[35] NC = non-catalytic
[36] (fire-pits, chimeas, etc.)
[37] (freestanding or FP insert)
[38] (use 28-10-005-000 for Logging Debris Burning)
[39] (use 26-10-000-xxx for Yard Wastes)

**Table A-3. Onroad $SO_2$ emissions in Muscatine County by SCC from the January 2021 version of the 2017 NEI.**

| Source Type | FIPS Code | SCC | Sector | SCC Description (Level 3) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|
| Onroad | 19139 | 2202610080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Combination Short-haul Truck | 0.1892196 |
| Onroad | 19139 | 2202620080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Combination Long-haul Truck | 0.1526843 |
| Onroad | 19139 | 2202520080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Single Unit Short-haul Truck | 0.05605427 |
| Onroad | 19139 | 2202530080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Single Unit Long-haul Truck | 0.01471702 |
| Onroad | 19139 | 2202430080 | Mobile - On-Road Diesel Heavy Duty Vehicles | School Bus | 0.005623379 |
| Onroad | 19139 | 2202510080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Refuse Truck | 0.005527754 |
| Onroad | 19139 | 2202410080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Intercity Bus | 0.002213194 |
| Onroad | 19139 | 2202540080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Motor Home | 0.001873192 |
| Onroad | 19139 | 2202420080 | Mobile - On-Road Diesel Heavy Duty Vehicles | Transit Bus | 0.000359363 |
| Onroad | 19139 | 2202310080 | Mobile - On-Road Diesel Light Duty Vehicles | Passenger Truck | 0.03899713 |
| Onroad | 19139 | 2202320080 | Mobile - On-Road Diesel Light Duty Vehicles | Light Commercial Truck | 0.007326074 |
| Onroad | 19139 | 2202210080 | Mobile - On-Road Diesel Light Duty Vehicles | Passenger Car | 0.002314713 |
| Onroad | 19139 | 2201520080 | Mobile - On-Road non-Diesel Heavy Duty Vehicles | Single Unit Short-haul Truck | 0.02404318 |
| Onroad | 19139 | 2201540080 | Mobile - On-Road non-Diesel Heavy Duty Vehicles | Motor Home | 0.009519533 |
| Onroad | 19139 | 2201530080 | Mobile - On-Road non-Diesel Heavy Duty Vehicles | Single Unit Long-haul Truck | 0.007365859 |
| Onroad | 19139 | 2201430080 | Mobile - On-Road non-Diesel Heavy Duty Vehicles | School Bus | 0.002872807 |
| Onroad | 19139 | 2201420080 | Mobile - On-Road non-Diesel Heavy Duty Vehicles | Transit Bus | 0.00022079 |
| Onroad | 19139 | 2201310080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Passenger Truck | 1.604507 |
| Onroad | 19139 | 2201210080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Passenger Car | 0.8819935 |
| Onroad | 19139 | 2201320080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Light Commercial Truck | 0.1252163 |
| Onroad | 19139 | 2205310080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Passenger Truck | 0.02030008 |
| Onroad | 19139 | 2201110080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Motorcycle | 0.006999922 |
| Onroad | 19139 | 2205210080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Passenger Car | 0.003868502 |
| Onroad | 19139 | 2205320080 | Mobile - On-Road non-Diesel Light Duty Vehicles | Light Commercial Truck | 0.001646896 |
| **TOTAL** | | | | | **3.165464358** |

**Table A-4**. Nonroad $SO_2$ emissions in all of Muscatine County by SCC from the January 2021 version of the 2017 NEI.

| Source Type | FIPS Code | SCC | Sector[40] | SCC Description (Level 3) | SCC Description (Level 4) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|---|
| Nonroad | 19139 | 2270005022 | M-NRE - Diesel | Agricultural Equipment | Diesel Agriculture Equipment | 0.1993005 |
| Nonroad | 19139 | 2270002022 | M-NRE - Diesel | Construction Equipment | Diesel Construction Equipment | 0.05451549 |
| Nonroad | 19139 | 2270003022 | M-NRE - Diesel | Industrial Equipment | Diesel Industrial Equipment | 0.0351726 |
| Nonroad | 19139 | 2270006022 | M-NRE - Diesel | Commercial Equipment | Diesel Commercial Equipment | 0.01059474 |
| Nonroad | 19139 | 2282020022 | M-NRE - Diesel | Diesel | Diesel Pleasure Craft | 0.006958273 |
| Nonroad | 19139 | 2270003060 | M-NRE - Diesel | Industrial Equipment | AC\Refrigeration | 0.00594283 |
| Nonroad | 19139 | 2270004044 | M-NRE - Diesel | Lawn & Garden Equipment | Diesel Lawn & Garden Eqpt. (Commercial) | 0.002093108 |
| Nonroad | 19139 | 2270007022 | M-NRE - Diesel | Logging Equipment | Diesel Logging Equipment | 0.000478828 |
| Nonroad | 19139 | 2270004022 | M-NRE - Diesel | Lawn & Garden Equipment | Diesel Mowers, Tractors, Turf Eqpt. (Commercial) | 0.000320941 |
| Nonroad | 19139 | 2270004036 | M-NRE - Diesel | Lawn & Garden Equipment | Snowblowers (Commercial) | 3.34199E-05 |
| Nonroad | 19139 | 2282005022 | M-NRE - Gasoline | Gasoline | 2-Stroke Pleasure Craft | 0.03328647 |
| Nonroad | 19139 | 2265006022 | M-NRE - Gasoline | Commercial Equipment | 4-Stroke Commercial Equipment | 0.02551923 |
| Nonroad | 19139 | 2265003022 | M-NRE - Gasoline | Industrial Equipment | 4-Stroke Industrial Equipment | 0.02014628 |
| Nonroad | 19139 | 2282010005 | M-NRE - Gasoline | Gasoline 4-Stroke | Inboard/Sterndrive | 0.01706517 |
| Nonroad | 19139 | 2265004033 | M-NRE - Gasoline | Lawn & Garden Equipment | 4-Stroke Lawn & Garden Eqpt. (Residential) | 0.01586201 |
| Nonroad | 19139 | 2265004022 | M-NRE - Gasoline | Lawn & Garden Equipment | 4-Stroke Mowers, Tractors, Turf Eqpt. (Commercial) | 0.01571485 |
| Nonroad | 19139 | 2265004044 | M-NRE - Gasoline | Lawn & Garden Equipment | 4-Stroke Lawn & Garden Eqpt. (Commercial) | 0.007578235 |
| Nonroad | 19139 | 2265005022 | M-NRE - Gasoline | Agricultural Equipment | 4-Stroke Agriculture Equipment | 0.006215024 |
| Nonroad | 19139 | 2265001050 | M-NRE - Gasoline | Recreational Equipment | 4-Stroke Golf Carts | 0.004224439 |
| Nonroad | 19139 | 2265002022 | M-NRE - Gasoline | Construction Equipment | 4-Stroke Construction Equipment | 0.00175744 |
| Nonroad | 19139 | 2260004044 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Lawn & Garden Eqpt. (Commercial) | 0.001722015 |
| Nonroad | 19139 | 2260004021 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Chain Saws < 6 HP (Commercial) | 0.000965054 |
| Nonroad | 19139 | 2265004036 | M-NRE - Gasoline | Lawn & Garden Equipment | 4-Stroke Snowblowers (Commercial) | 0.000793944 |
| Nonroad | 19139 | 2260004033 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Lawn & Garden Eqpt. (Residential) | 0.000710274 |
| Nonroad | 19139 | 2260006022 | M-NRE - Gasoline | Commercial Equipment | 2-Stroke Commercial Equipment | 0.000445816 |
| Nonroad | 19139 | 2265004035 | M-NRE - Gasoline | Lawn & Garden Equipment | 4-Stroke Snowblowers (Residential) | 0.000435475 |
| Nonroad | 19139 | 2260004020 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Chain Saws < 6 HP (Residential) | 0.000301047 |
| Nonroad | 19139 | 2260002022 | M-NRE - Gasoline | Construction Equipment | 2-Stroke Construction Equipment | 0.000246921 |
| Nonroad | 19139 | 2260004036 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Snowblowers (Commercial) | 0.000241578 |

[40] M-NRE = Mobile - Non-Road Equipment

| Source Type | FIPS Code | SCC | Sector[40] | SCC Description (Level 3) | SCC Description (Level 4) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|---|
| Nonroad | 19139 | 2260004035 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Snowblowers (Residential) | 0.000132561 |
| Nonroad | 19139 | 2260005022 | M-NRE - Gasoline | Agricultural Equipment | 2-Stroke Agriculture Equipment | 4.80239E-05 |
| Nonroad | 19139 | 2265003060 | M-NRE - Gasoline | Industrial Equipment | 4-Stroke AC\Refrigeration | 0.000026867 |
| Nonroad | 19139 | 2260003022 | M-NRE - Gasoline | Industrial Equipment | 2-Stroke Industrial Equipment | 2.61568E-05 |
| Nonroad | 19139 | 2265007022 | M-NRE - Gasoline | Logging Equipment | 4-Stroke Logging Equipment | 1.90655E-05 |
| Nonroad | 19139 | 2260007022 | M-NRE - Gasoline | Logging Equipment | 2-Stroke Logging Equipment | 4.6958E-06 |
| Nonroad | 19139 | 2260004022 | M-NRE - Gasoline | Lawn & Garden Equipment | 2-Stroke Mowers, Tractors, Turf Eqpt. (Commercial) | 3.83272E-07 |
| Nonroad | 19139 | 2267003022 | M-NRE - Other | Industrial Equipment | LPG Industrial Equipment | 0.04009937 |
| Nonroad | 19139 | 2268003022 | M-NRE - Other | Industrial Equipment | CNG Industrial Equipment | 0.00300509 |
| Nonroad | 19139 | 2267006022 | M-NRE - Other | Commercial Equipment | LPG Commercial Equipment | 0.000609287 |
| Nonroad | 19139 | 2268006022 | M-NRE - Other | Commercial Equipment | CNG Commercial Equipment | 0.000421169 |
| Nonroad | 19139 | 2268005022 | M-NRE - Other | Agricultural Equipment | CNG Agriculture Equipment | 0.000314987 |
| Nonroad | 19139 | 2267002022 | M-NRE - Other | Construction Equipment | LPG Construction Equipment | 6.29576E-05 |
| Nonroad | 19139 | 2267004044 | M-NRE - Other | Lawn & Garden Equipment | LPG Lawn & Garden Eqpt. (Commercial) | 6.01533E-05 |
| Nonroad | 19139 | 2267005022 | M-NRE - Other | Agricultural Equipment | LPG Agriculture Equipment | 2.9913E-06 |
| Nonroad | 19139 | 2268003060 | M-NRE - Other | Industrial Equipment | CNG AC\Refrigeration | 1.88262E-06 |
| Nonroad | 19139 | 2268002022 | M-NRE - Other | Construction Equipment | CNG Construction Equipment | 1.45618E-07 |
| **TOTAL** | | | | | | **0.513477788** |

**Table A-5. Event (prescribed fire) $SO_2$ emissions in all of Muscatine County by SCC from the January 2021 version of the 2017 NEI.**

| Source Type | FIPS Code | SCC | Sector | SCC Description (Level 4) | 2017 $SO_2$ Emissions (tons) |
|---|---|---|---|---|---|
| Event | 19139 | 2811015002 | Fires - Prescribed Fires | Flaming | 1.179623 |
| Event | 19139 | 2811015001 | Fires - Prescribed Fires | Smoldering | 0.201351 |
| **TOTAL** | | | | | **1.380974** |

## Attachment 1. GPC's New and Modified Air Construction Permits

See separate document for GPC's 25 new or modified air construction permits included with this SIP revision. Note, each of GPC's three CAPs (Collection of Air Permits) contains two permits.

## Attachment 2. MPW's Modified Air Construction Permits

See separate document for MPW's two modified air construction permits included with this SIP revision.

## Attachment 3. Monsanto's Modified Air Construction Permit

See separate document for Monsanto's modified air construction permit included with this SIP revision.