

Technical Demonstration for the Removal of the

Gateway Vehicle Inspection Program in the

Boles Township Ozone Nonattainment Area

**Purpose and Background**

The purpose of this document is to provide additional information demonstrating that removal of the Gateway Vehicle Inspection Program (GVIP) requirements in Boles Township complies with Section 110(l) of the Clean Air Act (CAA). This document supports the removal of Boles Township from GVIP requirements by demonstrating that contemporaneous emission reductions have occurred in the 2015 ozone St. Louis nonattainment area that are equivalent to the forgone emissions benefit in Boles Township. Although the Boles Township is part of the 2015 ozone St. Louis nonattainment area, it is located inside Franklin County and outside the urbanized area of the bi-state St. Louis metropolitan area. Removal of GVIP from Boles Township will not impact attainment or maintenance of any National Ambient Air Quality Standard (NAAQS), including the 2015 ozone standard.

In addition, removal of GVIP in Franklin and Jefferson counties will comply with the CAA requirements related to the protection of visibility in Federal Class I Areas. The two Federal Class I areas within Missouri are Hercules Glades and Mingo. Missouri’s plan to address visibility focuses on the reduction of sulfur dioxide (SO2) emissions and oxides of nitrogen (NOx) emissions, which are the largest contributors to visibility impairment at both Hercules Glades and Mingo. Major anthropogenic sources of these emissions are electric generating units (EGU) and large industrial boilers with the majority of these sources having installed controls because of a number of requirements, including the Clean Air Interstate Rule (CAIR), the Cross-State Air Pollution Rule (CSAPR), state programs, and state and federal consent agreements, which have reduced SO2 and NOx emissions. Although the mobile sector is considered an anthropogenic source of emissions, modeled emissions from the onroad mobile sector in the St. Louis area are projected to decline in the future even without GVIP in place, which will contribute to the downward trend in visibility impairment at Missouri’s Class I areas. The removal of GVIP in Franklin and Jefferson counties does not impede reasonable progress toward meeting the goal of a return to natural visibility conditions by 2064.

The U.S. Environmental Protection Agency (EPA) designated the City of St. Louis, St. Louis and St. Charles counties and Boles Township in Franklin County as a marginal nonattainment area for the 2015 8-hour Ozone NAAQS effective August 3, 2018. The Missouri Department of Natural Resources’ Air Pollution Control Program (air program) submitted a State Implementation Plan (SIP) revision to EPA in November of 2019 (2019 I/M Plan Revision) requesting the removal of GVIP requirements from Franklin and Jefferson counties. As a follow-up, the air program is removing Jefferson and Franklin counties, including Boles Township, from the applicability section of *10 CSR 10-5.381 Onboard Diagnostics Motor Vehicle Emissions Inspection*, which is the state rule that specifies the enforceable requirements of GVIP.

**Equivalent Emission Reduction Demonstration for Removal of the GVIP Requirements in Boles Township**

This document demonstrates that the emissions reduction from GVIP in Boles Township can be replaced with equivalent, current and permanent emission reductions in the 2015 ozone nonattainment area. The equivalent reductions are actual emissions reductions that have been achieved in the time frame contemporaneous to the removal of GVIP in Boles Township and will counterbalance emissions due to the removal of GVIP in Boles Township. These equivalent emissions reductions are also permanent, enforceable, quantifiable, and surplus.

## GVIP in Boles Township

The 2019 I/M Plan Revision included a demonstration that showed that the removal of GVIP does not interfere with attainment or maintenance of any NAAQS, including the 2015 ozone standard. The plan removed GVIP requirements from the SIP for Franklin and Jefferson counties and quantified the emissions attributed to GVIP in both counties in their entireties. The demonstration showed that fleet turnover ensures that emissions in these counties will continue declining even without GVIP. Fleet turnover is the process in which newer vehicles that meet the latest EPA emission standards replace older and higher-polluting vehicles that have reached the end of their useful lives. The demonstration clearly showed the continued expected decline of regional motor vehicle emissions in these two counties absent the GVIP requirements, and a separate evaluation was included specifically for Boles Township because it is included in the 2015 ozone St. Louis nonattainment area. The full demonstration for the removal of Franklin and Jefferson counties is available in the 2019 I/M Plan Revision. For this document, the air program is focusing on supporting the removal of Boles Township from GVIP requirements by demonstrating that contemporaneous emission reductions have occurred in the 2015 ozone St. Louis nonattainment area.

Using the annual emission figures in the 2019 I/M Plan Revision, the air program projected county level emissions. For this document, the air program focuses only on Boles Township. The annual modeled emission attributed to GVIP in 2020 for Franklin County is 60.68 tons/year of NOx and 48.52 tons/year of Volatile Organic Compounds (VOC). The annual emissions attributed to GVIP in Boles Township is calculated by taking the annual modeled emissions in Franklin County and multiplying it by 20 percent. According to 2010 Census data, Boles Township comprises 18 percent of Franklin County’s population. Multiplying Franklin County’s value by the 20% represents Boles Township’s portion of the county’s emissions. The annual emissions attributable to GVIP in Boles Township is 12.14 tons/year of NOx and 9.70 tons/year of VOC.

For this demonstration, the air program is substituting NOx emission reductions for VOC emission reductions at a 1:1 ratio. Adding the annual emission attributable to GVIP in Boles Township for NOx and VOC equals 21.84 total tons/year.

This substitution ratio of one ton of reduction of NOx emissions for each ton of VOC emissions is protective of air quality in the St. Louis area and consistent with EPA guidance. The St. Louis 8-Hour Ozone Technical Support Document prepared for the 1997 ozone standard (May 31, 2007) includes a discussion on an ozone source apportionment analysis using photochemical modeling in the St. Louis area. The analysis concluded that St. Louis ozone is formed primarily (~80%) under NOx-limited conditions. The photochemical modeling effort showed that NOx emission reductions are more effective than VOC emission reductions at reducing ozone in the St. Louis area. This provides the technical basis for supporting the approach of substituting NOx emission reductions for VOC emission reductions in this demonstration.

Additionally, EPA’s recent photochemical modeling analyses for generating Modeled Emission Rates for Precursors (MERPs) supports substituting NOx reductions for VOC reductions in the St. Louis area. From EPA’s MERPS View Qlik site ([https://www.epa.gov/scram/merps-view-qlik](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.epa.gov_scram_merps-2Dview-2Dqlik&d=DwMFAg&c=GSntNbUav5AC0JJIyPOufmfQT3u3zI7UKdoVzPd-7og&r=z3ugRQprcnTpAgN8N7vQPqcTxt0VMHLFsLvkcssK8uM&m=1Zswaj35y1_EJcmk8Eyo4XSwUjAQ1vU0Ig68k-XcjfE&s=220SzN99yz-9jW7KnHQy1rC9SuOHyDYNDIdnoklzIaU&e=)), a hypothetical stationary source with 1,000 tons/year NOx emissions and 500 tons/year VOC emissions from a 10 meter stack (low-level releases) was modeled in St. Charles County. The MERP values established based on this evaluation were 446 tons/year NOx and 2,037 tons/year VOC. MERPs are the emission rates (in tons per year) of precursor pollutants that would result in a modeled impact equal to a critical air quality threshold (1 ppb for ozone).[[1]](#footnote-1)Therefore, the lower NOx MERP (compared to the VOC MERP) is indicative of NOx-limited conditions with NOx emissions being the more prominent pollutant for the formation of ozone in the St. Louis area, and demonstrates the conservative nature of substituting NOx reductions for VOCs at a 1:1 ratio in this demonstration.

Therefore, the amount of current and permanent emission reductions needed within the St. Louis nonattainment area to match the emissions attributed to GVIP in Boles Township is **21.84 total tons/year**.

## 2017 Metropolitan Energy Center National DERA Grant (United Parcel Service Heavy-Duty Diesel Truck Replacements)

The Metropolitan Energy Center received funding from the 2017 National Diesel Emission Reduction Act (DERA) Grant to replace five Class 8 trucks operated by United Parcel Service (UPS) in the St. Louis area. Under DERA requirements, when a vehicle replacement project is completed, the vehicle and engine are permanently disabled. The disabling process is the enforceable mechanism ensuring the emission reductions are permanent. The purchase of the new trucks and the disabling of the older 2005 model year trucks will occur in the fall of 2020, which ensures these emission reductions meet the contemporaneous requirement. These reductions are surplus, as the state has not taken any credit for the emission reductions associated with these truck replacements in any submitted or approved SIP elements.

The air program quantified emission reductions from these five DERA truck replacement projects using emission factors derived from the Motor Vehicle Emission Simulator (MOVES). The five UPS trucks are all 2005 engine model year Class 8 heavy-duty diesel trucks. According to Table A-22 from the Argonne National Laboratory document, the lifetime mileage-weighted average air pollutant emission factors (g/mile) for diesel combination long-haul trucks for model year 2005 and 2019 are 13.9775 g/mile and 4.8525 g/mile, respectively. These five trucks average 92,380 miles per year. The following equation provides the quantified emissions benefit of replacing these five 2005 engine model year trucks with new 2019 engine model year trucks.

$$\frac{5 trucks\*92,380 miles per year\*\left(13.9775 grams per mile-4.8525 grams per mile\right)}{\begin{array}{c}907,185 grams per ton\\\end{array}}=4.65 tons NOx per year $$

The quantified NOx emissions reduction achieved by these DERA truck replacement projects used to demonstrate equivalent emission reductions for the removal of the GVIP requirements in Boles Township is 4.65 tons/year. These emission reductions meet the requirements for equivalent emission reductions and are contemporaneous, permanent, enforceable, and surplus.

## 10 CSR 10-6.410 Emissions Banking and Trading Rule

State rule *10 CSR 10-6.410 Emissions Banking and Trading* allows facilities to implement voluntary emission reduction projects to acquire emission reduction credits (ERCs). The rule also requires the annual reduction of banked ERCs by three percent (3%), which is then rounded down to the next full ton.

In 2017, which is within the contemporaneous time frame under the 2015 ozone standard, Anheuser Busch implemented an emission reduction project in the St. Louis area in which the facility banked 252.06 tons/year of NOx ERCs (Permit Number: 2016-04-056 March 30, 2017). In December 2017, these credits, reduced by three percent per the state rule, resulted in a January 2018 balance of 244 credits. In 2018, Anheuser Busch transferred 165 of these ERCs to another facility in the area (Metal Container Corporation) leaving Anheuser Busch with 79 NOx ERCs. These ERCs have then since reduced by three percent each December. Since 2017, the three percent annual reductions in ERCs for Anheuser Busch has resulted in a permanent emission reduction in the area of 21.06 tons/year of NOx as of the beginning of 2021.

Metal Container Corporation (the facility that Anheuser Busch transferred 165 ERCs to in 2018), initially used 158 ERCs to satisfy a requirement in their permit. This left them with 7 ERCs banked. In December 2018, the three percent reduction dropped their banked ERC total to 6 tons/year, and in December 2019 the annual reduction dropped their banked ERC total to 5 tons/year. Therefore, the three percent annual reductions at Metal Container Corporation have resulted in a permanent emission reduction in the area of 3 tons/year of NOx as of the beginning of 2021. Adding these two tons/year with the emission reductions associated with the annual three percent reductions pursuant to the state rule at Anheuser Busch gives a total of 24.06 tons/year of permanent NOx reductions in the area.

Table 1 summarizes the banked ERCs pursuant to the state rule, along with their three percent reductions.

Table 1 –Emission Reduction Credit Summary for NOx Since 2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ERC Owner | Beginning balance of banked ERCs (tons/year) | Date | New balance of banked ERCs (tons/year) | ERCs lost due to three percent reduction (tons/year) |
| AB | 252.06 | Dec. 31, 2017 | 244 | 12.06 |
| AB | 79\* | Dec. 31, 2018 | 76 | 3 |
| Metal | 7 | Dec. 31, 2018 | 6 | 1 |
| AB | 76 | Dec. 31, 2019 | 73 | 3 |
| Metal | 6 | Dec. 31, 2019 | 5 | 1 |
| AB | 73 | Dec. 31, 2020 | 70 | 3 |
| Metal | 5 | Dec. 31, 2020 | 4 | 1 |
| **Total emission credits lost due to three percent reductions:** | **24.06** |

\*165 credits transferred from AB to Metal Containers. 158 ERCs used in construction permits.

**Conclusion**

The reductions associated with the DERA grant and the state’s emissions banking and trading rule are adequate to demonstrate that current and permanent emission reductions in the area are greater than the emissions attributable to GVIP in Boles township.

|  |  |
| --- | --- |
| Action Description  | Emissions (Tons) |
| DERA emission reduction | 4.65 |  |
| ERCs emission reduction  | 24.06 |  |
| Emission Reduction Equivalent Total | 28.71 |  |
| GVIP emissions in Boles Township |  | 21.84 |
|  Difference in emissions | 6.87 surplus |

This document has provided an analysis demonstrating equivalent emission reductions supporting the removal of GVIP in Boles Township, which is part of the 2015 ozone St. Louis nonattainment area, and that the removal of GVIP requirements in Boles Township complies with Section 110(l) of the CAA. Removal of GVIP from Boles Township will not impact attainment for any NAAQS, including the 2015 ozone standard, and will not negatively affect overall emission reductions in the 2015 ozone St. Louis nonattainment area.

This demonstration combined with the 2019 I/M Plan Revision ensures that the removal of GVIP requirements for Franklin (including Boles Township) and Jefferson counties from the Missouri SIP complies with Clean Air Act Section 110(l). This demonstration and the accompanying amendment to 10 CSR 10-5.381 to remove Franklin and Jefferson counties from the applicability section of the rule satisfies EPA’s conditions for approval of the previously submitted 2019 I/M Plan Revision.

1. *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program* (December 2, 2016) [↑](#footnote-ref-1)