

## 5. Environmental Compliance

### **Highlights**

- *Since the 2020 Integrated Resource Plan (IRP) filing, the U.S. Environmental Protection Agency (EPA) has issued a number of new or updated regulations for power plant air, water, and solid waste emissions.*
- *Such environmental regulations affect the operations of Ameren Missouri's Energy Centers; in particular, its coal-fired units.*
- *Ameren Missouri has identified mitigation steps and costs for complying with current and probable future environmental regulations to be used in its evaluation of alternative resource plans.*

Ameren Missouri has made significant investments to comply with existing environmental regulations and maintain a sufficient compliance margin. Rules proposed or promulgated since the IRP filing in September of 2020 include the Illinois Climate and Equitable Jobs Act (CEJA), the Good Neighbor Plan for the 2015 Ozone National Ambient Air Quality Standards (NAAQS), the 2023 update to the Mercury and Air Toxics Standards (MATS), the 2023 Steam Electric Power Generating Effluent Limitations Guidelines (ELG) Proposed Update, and proposed regulations of greenhouse gas emissions under section 111 of the Clean Air Act.

Environmental regulations are an important factor to consider in resource planning. The future regulatory horizon is uncertain with respect to certain regulatory programs such as those addressing greenhouse gas emissions from coal-fired and natural gas-fired generating units. In this IRP, we have not included new coal-fired generation as a candidate resource option, but we will continue monitoring advancements, especially in carbon capture and sequestration (CCS) technology. Ameren Missouri has incorporated assumptions regarding proposed and potential environmental regulations in its "most likely" case, and a corresponding compliance path characterized by environmental retrofits to its existing fleet. The cost and timing of those retrofits are reflected in the risk analysis presented in Chapter 9. Furthermore, the planning scenarios (described in Chapter 2) act as signposts for decision making and therefore are an important aspect of the strategy selection in Chapter 10.

## 5.1 Overview

**Table 5.1 Current & Pending Environmental Regulations**

Regulatory Driver	Summary Requirements	Regulation Status	Compliance Timing
Current CSAPR Regulation	Created Group 3 Ozone Season Allowance Program for 12 states including IL reducing NOx ozone season banked allowances and allowance allocations for IL sources	Revised CSAPR Update was published on 4/30/2021 and went into effect on 6/29/2021. The rule reduces seasonal NOx allocations for IL EGUs for the 2021 ozone season and again in 2022 and 2023.	2021 ozone season and beyond
Proposed CSAPR Update	Requires 23 eastern states (including MO) to reduce emissions that contribute to pollution in other states through SIPs or newly promulgated FIP's.	The final pre-publication rule was published in March, 2023. The final rule was published in the FR during summer, 2023. The SIP Disapproval was stayed in the 8 <sup>th</sup> circuit court for Missouri; therefore the FIP is on hold.	2023 ozone season and beyond
Revisions to National Ambient Air Quality Standards (NAAQS)	Lower PM, NOx and SO2 limits; Expansion of non-attainment areas	SO2 final rule June, 2010; EPA proposed redesignation from "unclassifiable" to attainment for area around Labadie based on 2017-2019 data; Redesignation of Jefferson County to attainment pending final action.	SO2: 2017 - 2020
		Fine particulate (PM2.5) lowered 1/15/2013; Attainment designations 03/2015; Missouri in attainment. EPA retained the current 12 mg/M3 standard in 2020. EPA announced new standards in January, 2023, proposing to lower the standard to a level between 9 and 10 micrograms per cubic meter.	PM2.5: 2025 - 2028
		Ozone standard lowered, final rule 12/2015; Attainment designations complete April 2018; St. Louis/Metro East area marginal nonattainment and size of area reduced.	EPA proposed to retain standard in 2020
Mercury and Air Toxics Standards (MATS)	Reduction in emissions of Mercury, HCl (proxy for acid gases) and particulate emissions (proxy for non-mercury metals)	New Rule Update proposed in April, 2023.	Estimated to be 2025.

Regulatory Driver	Summary Requirements	Regulation Status	Compliance Timing
Clean Air Visibility Rule (CAVR)/Regional Haze Rule	Application of Best Available Retrofit Technology (BART); Targets reduction in transported SO <sub>2</sub> and NO <sub>x</sub> ; status of CSAPR may require state to change approach.	EPA issued revisions in Jan 2017 and guidance in 2018; MO working with affected sources and federal land managers to develop an approvable state plans.	MDNR consulted with Federal Land Managers on a draft state plan. Missouri state plan submitted in 2022.
Clean Water Act Section 316(a) Thermal Standards	Implementation through NPDES permit conditions	Evaluation covered by NPDES permits	New thermal requirements implemented at Labadie; other plants contain similar requirements in existing NPDES permits.
Clean Water Act Section 316(b) Protection of Aquatic Life	Case-by-case determination of controls required to meet entrainment standards; national standard for impingement	Studies 2015 - 2017; Compliance 2022 - 2024	Labadie NPDES Permit required intake modifications are in-progress. Other Plants NPDES permit requirements to be determined.
Waters of The United States (WOTUS) <sup>1</sup>	Protection of additional streams and tributaries	The EPA and Corps of Engineers finalized revisions and issued the Navigable Waters Protection Rule: Definition of "Waters of the United States".	Final rule recently modified to reflect Supreme Court Sackett Decision.
Revisions to Steam Electric Effluent Limitations Guidelines (ELG)	Dry ash handling and Installation of wastewater treatment facilities; Implemented through NPDES permit conditions	EPA linked ELG rule to CCR rule; EPA has stayed certain compliance deadlines during rulemaking to revise the final rule.	All ELG required modifications now complete.
Coal Combustion Residuals (CCR)	Conversion to dry bottom ash and fly ash; Closure of existing ash basins; Dry disposal in landfill	Final determination that CCRs are nonhazardous by EPA in December 2014; final rule April 2015, effective October 19, 2015. Federal legislation (WINN Act) to revise rule signed December 16, 2016. Additional USEPA rulemakings in progress.	Basin closures and corrective measures in process. Completion in advance of regulatory deadline.
Clean Air Act Regulation of Greenhouse Gases (GHG)/Affordable Clean Energy Rule (ACE)	New Source Performance Standard (NSPS) for new, modified, reconstructed units; state emission limits (CO <sub>2</sub> ) for existing sources	Clean Power Plan final rule was stayed by Supreme Court 2/9/2016; DC Circuit Court dismissed CPP case in September 2019.	CPP was stayed; on 6/30/22, the SCOTUS issued a ruling in West Virginia v. EPA that noted the CPP is unlawful. EPA recently proposed a new rule regulating GHGs under Section 111 (b) & (d).

<sup>1</sup> In the recent Sackett vs EPA decision, the US Supreme Court held that *"the CWA extends to only those 'wetlands with a continuous surface connection to bodies that are 'waters of the United States' in their own right," so that they are "indistinguishable" from those waters.*" Ameren Missouri will continue to review how this new ruling may affect the current WOTUS regulations.

Ameren Missouri is subject to various environmental laws and regulations enforced by federal, state (Missouri and Illinois) and local authorities. Table 5.1 summarizes the current environmental regulations for which Ameren Missouri must implement mitigation measures, along with expectations for compliance requirements for certain potential regulations. The following sections describe the status of the major current and future regulations that may govern the operations of Ameren Missouri facilities. Given the lack of certainty regarding future regulatory programs, Ameren Missouri has necessarily made good faith assumptions based upon available information regarding potential future compliance measures. Such assumptions are subject to revision.

## 5.2 Air Regulation and Compliance Assumptions

### *Clean Air Act Regulation of Greenhouse Gases/Affordable Clean Energy Rule*

In 2015, the EPA issued the Clean Power Plan (CPP), which would have established CO<sub>2</sub> emissions standards applicable to existing power plants. The CPP was challenged in the DC Circuit Court of Appeals. However, the United States Supreme Court stayed the rule in February 2016, before the case was heard. As a result, the CPP was never implemented. The EPA promulgated the Affordable Clean Energy (ACE) rule as a replacement for the CPP in September 2019, repealing the CPP in the process. The ACE rule established emission guidelines for states to follow in developing plans to limit CO<sub>2</sub> emissions from coal-fired electric generating units. The ACE rule defined certain efficiency measures that could be applied directly to coal fired boilers as the Best System of Emission Reduction (BSER). The DC Circuit Court vacated the ACE rule on January 19, 2021. On June 30, 2022, the US Supreme Court reversed and remanded the DC Circuit Court decision deciding that EPA did not have the authority to "devise emissions caps based on the generation shifting approach the Agency took in the Clean Power Plan." The US EPA then announced that it was developing a replacement to the ACE Rule and further challenges to the ACE rule have been held in abeyance pending issuance of the new rule. In May 2023, EPA announced new rules focused on reducing greenhouse gas (GHG) emissions from power plants. These new rules are included under the Clean Air Act Sections 111 (b) & (d), affecting new and existing fossil generation. Ameren submitted comments to the EPA in August 2023. If enacted as proposed, the GHG Rule would affect existing coal-fired generation as well as new fossil-fueled generation. Specifically, the Rule could require Carbon Capture and Sequestration (CCS) and/or cofiring with natural gas at existing coal units as early as 2030, depending upon their planned retirement date. For new combustion gas turbines (combined cycle or simple cycle generators), the Rule could require CCS or hydrogen cofiring as early as 2032, depending on capacity factor.

### ***Attainment Designations for the National Ambient Air Quality Standard for Ozone***

The air quality in the St. Louis area continues to improve. The EPA re-designated the St. Louis and Metro-East Illinois area to be in attainment with the 2008 eight-hour ozone standard. The EPA further lowered the ambient standard for ozone from 75 parts per billion (ppb) to 70 ppb in December 2015 (2015 ozone standard). EPA made final designations for about 85 percent of the country in November 2017, however those designations did not include the St. Louis/Metro-East Illinois area. The EPA released final designations for the St. Louis/Metro-East Illinois area as well as the other remaining areas of the country on April 30, 2018. The final designation for the St. Louis area reduced the size of the nonattainment area by removing Jefferson County in Missouri and Monroe County in Illinois, as well as all but a small portion (Boles Township) of Franklin County in Missouri. However, on July 10, 2020, the DC Circuit Court of Appeals remanded to EPA the final designations for Jefferson County, Missouri and Monroe County, Illinois in *Clean Wisconsin vs. EPA*. On May 24, 2021, EPA promulgated a final rule in response to the remand designating Jefferson County and Monroe County as nonattainment for the 2015 ozone standard.

The St. Louis area was designated as marginal with a marginal area attainment date of August 2021. Based on the 2018-2020 design value the St. Louis area failed to attain the 2015 standard and a bump up to moderate non-attainment was expected. However, because the St. Louis area 2019-2021 design value met the 2015 standard, Missouri DNR submitted a redesignation request in January 2022. Illinois EPA was working on a similar request for the Illinois portion of the St Louis non-attainment area. Unfortunately, prior to Illinois EPA's submission, 2022 ozone data indicated that the St. Louis Area ozone design value for 2020-2022 would show non-attainment. As a result, EPA bumped up the St. Louis Ozone non-attainment area to moderate nonattainment in 2022.

### ***National Ambient Air Quality Standard for SO<sub>2</sub>***

The EPA lowered the SO<sub>2</sub> ambient standard to 75 ppb on June 2, 2010. Initial attainment designations were finalized on August 5, 2013, and included the designation of two areas in Missouri as nonattainment. The two nonattainment areas included an area in the vicinity of Kansas City (portions of Jackson County) and an area around Herculaneum (portions of Jefferson County). In 2015, the Missouri Department of Natural Resources (MDNR) finalized attainment plans for both areas. The areas are required to demonstrate compliance with the new SO<sub>2</sub> standard no later than October 4, 2018. For the Herculaneum area, the MDNR has over three years of air quality monitoring data that indicates the area is in attainment with the standard. At MDNR's request, on June 23, 2017, the EPA proposed a determination that the area has attained the SO<sub>2</sub> ambient standard. On September 13, 2017, the EPA published a final determination that the Jefferson County area is in attainment with the SO<sub>2</sub> ambient standard. In December 2017,

the MDNR submitted a formal request to the EPA to re-designate the Jefferson County SO<sub>2</sub> nonattainment area to attainment.

As a part of MDNR's state implementation plan for the Herculaneum area, Ameren Missouri entered into an agreement in 2015 to install an ambient SO<sub>2</sub> monitoring network in the vicinity of the Rush Island Energy Center. The agreement also includes lower SO<sub>2</sub> emissions limits for the Rush Island, Labadie and Meramec Energy Centers that took effect on January 1, 2017. The ambient SO<sub>2</sub> monitors near the Rush Island Energy Center began gathering data in December 2015 and, to date, measured values are significantly below the ambient air quality standard for SO<sub>2</sub>. In each calendar year since commencement of the monitoring network through December 31, 2019, quality-assured data has recorded fourth-highest hourly ambient SO<sub>2</sub> levels between 14 ppb and 30 ppb; 60 to 80 percent below the air quality level allowed (75 ppb) under the SO<sub>2</sub> NAAQS.

In addition to the initial attainment designations, the EPA is taking steps to complete the designation process for the SO<sub>2</sub> ambient standard. The EPA entered into a consent order with the Sierra Club and the Natural Resources Defense Council on March 2, 2015, and also finalized the "Data Requirements Rule" on August 21, 2015. The Data Requirements Rule requires states to evaluate emissions from "large sources" of SO<sub>2</sub> (generally greater than 2000 tons SO<sub>2</sub>/year) by either the use of air dispersion modeling or ambient air quality monitoring. For areas where states choose to use modeling to determine attainment status states including Missouri, respondents submitted their designations (and supporting information) to the EPA by January 13, 2017. Subsequently, the EPA designated those areas by December 31, 2017. For sources in Missouri for which the modeling option of the Data Requirements Rule was utilized, the MDNR completed the modeling analysis in the fall of 2016. In December 2016, the Missouri Air Conservation Commission approved the MDNR recommendation of attainment for eight sources in Missouri that included the Meramec Energy Center. The attainment recommendations were submitted to the EPA. On September 5, 2017, the EPA issued the preliminary designations for the modeling option, and the final designations were made on December 21, 2017.

For areas where states choose monitoring, states had to submit monitoring plans to the EPA by July 2016, and sources are required to have monitors installed by January 1, 2017. After 3 years of monitoring data is collected (2017-19), the states must certify the data collected by May 2020. The EPA will designate these areas either attainment or nonattainment by December 2020. Non-attaining areas must be in compliance by December 2025.

The Consent Order addresses areas that contain any stationary source not announced for retirement that according to the EPA's Air Markets Database emitted in 2012 either (a) more than 16,000 tons of SO<sub>2</sub>, or (b) more than 2,600 tons of SO<sub>2</sub> and had an average emission rate of at least 0.45 lbs. SO<sub>2</sub>/MMBtu. The EPA finalized designations for these

areas in July 2016. These areas have up to 5 years to achieve attainment. In September 2015, the MDNR recommended that the area around the Labadie Energy Center be designated as unclassifiable. In April 2015, Ameren Missouri began operating SO<sub>2</sub> ambient monitors to determine whether the area is in compliance with the SO<sub>2</sub> air quality standard. On June 30, 2016, the EPA issued a final determination of “unclassifiable” for the area around the Labadie Energy Center. Data collected from the ambient SO<sub>2</sub> monitors indicates that air quality in the vicinity of the Labadie Energy Center complies with the EPA standards. In accordance with the EPA’s Data Requirement Rule, the ambient SO<sub>2</sub> monitoring network for the Labadie Energy Center has been enhanced and two additional monitors are in service as of January 2017. In each calendar year since commencement of the monitoring network in 2015, air quality data has recorded ambient SO<sub>2</sub> design concentration between 18 ppb and 38 ppb; approximately 50 to 76 percent below the SO<sub>2</sub> NAAQS. No exceedances of the SO<sub>2</sub> NAAQS have occurred between 2015 and present. There is now three full years of data from the expanded monitoring system available to EPA that demonstrates ambient conditions that are well-below the SO<sub>2</sub> NAAQS. Under the DRR, the EPA and the MDNR are reassessing the attainment classification using certified monitoring data from the 2017 through 2019 time period. In August, both the MDNR and the EPA proposed to re-designate the area around Labadie from unclassifiable to attainment. The EPA is expected to finalize the re-designation by the end of the year. Ameren Missouri continues to operate the monitoring systems and submit the data to both the MDNR and the EPA. Based on monitoring data gathered to date and the EPA proposal to designate the area as attainment, we have assumed the area around Labadie will ultimately be designated as "attainment." Ameren Missouri's assumptions for compliance regarding SO<sub>2</sub> emissions reflect this expectation as well as expected steps necessary to comply with The Cross State Air Pollution Rule (CSAPR).

### ***Revisions to the National Ambient Air Quality Standard for Fine Particulate Matter***

On December 14, 2012, the EPA revised the National Ambient Air Quality Standard for fine particulate matter (PM<sub>2.5</sub>). The previous standards for PM<sub>2.5</sub> were promulgated in 1997 and 2006 and included an annual standard and a 24-hour standard. The annual standard, which was set in 1997, was 15 micrograms per cubic meter (µg/m<sup>3</sup>), and the 24-hour standard, which was set in 2006, is 35 µg/m<sup>3</sup>. The revised NAAQS finalized in December 2012 retained the 24-hour standard but lowered the annual standard from 15 µg/m<sup>3</sup> to 12 µg/m<sup>3</sup>. In December 2013, the MDNR recommended that the entire state of Missouri, including the St. Louis area that includes Franklin, Jefferson, St. Charles, and St. Louis Counties and St. Louis City, be designated as “attainment/unclassifiable.” Based on 2010 through 2012 ambient air monitoring data, all monitors in Missouri were in compliance with the standard. In January 2015, the EPA designated the St. Louis area and the metro-East area in Illinois as unclassifiable due to insufficient quality assured monitoring data for the state of Illinois to assess compliance with the 2012 annual fine

particle standard. In December 2018, the MDNR submitted a request to the EPA to re-designate the Missouri portion of the unclassifiable area to attainment. Illinois has corrected the problems the EPA identified with their air quality monitoring data, and both Missouri and Illinois now have complete, quality assured, and certified ambient PM<sub>2.5</sub> monitoring data for three years (2015-2017) demonstrating that the area is in attainment with the PM<sub>2.5</sub> standard. Based on the current data, the area is in attainment. Ameren Missouri expects the area to remain in attainment and thus no further mitigation would be required at Ameren Missouri's facilities.

The Clean Air Act requires the EPA to review all of the ambient standards on a periodic basis. In December 2020, the EPA finalized a rule to retain the current standard for fine particulate matter. On January 6, 2023, US EPA proposed to lower the standard for fine particulate matter to a range of 9-10 µg/m.<sup>3</sup>

### **CSAPR and the CSAPR Update Rule**

CSAPR was finalized on July 6, 2011 replacing the Clean Air Interstate Rule (CAIR). CSAPR established new allowances for the annual nitrogen oxides (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) trading programs and the seasonal NO<sub>x</sub> trading program. CSAPR uses newly created allowances and thus there is no initial bank to rely on from the Acid Rain or CAIR programs to use for any potential shortfall. CSAPR was slated to become effective January 1, 2012, but the rule was stayed by a federal court decision on December 30, 2011, in response to several legal challenges. On June 26, 2014, the EPA filed a motion with the United States (U.S.) Court of Appeals for the District of Columbia (D.C.) Circuit to: (1) remove the stay of CSAPR and, (2) delay for three years all of the compliance deadlines that had not already passed when the stay was enacted. On October 23, 2014, the D.C. Circuit court lifted the stay. On December 3, 2014, the EPA implemented a three-year toll that moved the starting date for Phase 1 of CSAPR to January 1, 2015, and January 1, 2017 for Phase 2. Ameren Missouri units are currently in-compliance with the CSAPR limits for both SO<sub>2</sub> and NO<sub>x</sub>.

On March 15, 2023, EPA released the "Good Neighbor Plan" to require upwind states to reduce emissions of the ozone precursor nitrogen oxide (NO<sub>x</sub>) from electric generating units (EGUs) and certain stationary industrial sources, in accordance with EPA's 2015 ozone National Ambient Air Quality Standards (NAAQS). The rule will apply to 23 states. The rule took effect 60 days after publication in the Federal Register. The changes to the rule could apply to Ameren Missouri EGUs in both Illinois and Missouri and impact Ameren Missouri's CSAPR allowances and compliance strategy going forward. In January 2023, EPA disapproved Missouri's State Implementation Plan (SIP), however, the State of Missouri, Ameren Missouri, and others challenged this decision in the 8<sup>th</sup> Circuit Court of Appeals. The disapproval, and subsequent CSAPR FIP, was stayed, pending the outcome of the ongoing litigation. Ameren Missouri will continue to follow the



judicial process in this case. If the FIP is eventually implemented in Missouri, additional control technologies and/or reduced dispatch could be necessary. The potential additional controls are discussed in more detail in Chapter 9.

In September 2021, the Illinois General Assembly passed the Climate and Equitable Jobs Act (CEJA), which affects gas-fired peaking generation units owned by Ameren Missouri and located within Illinois. The law includes requirements for emissions reductions from fossil-fueled generators, among other provisions. CEJA includes emission limits on fossil-fueled units based on actual emissions for the period 2018-2020 and enforced on a rolling 12-month basis, with exceptions for emergency operation to support grid reliability. It also includes requirements for eliminating CO<sub>2</sub> emissions from fossil-fueled units. Based on the Company's review of the statutory requirements, this effectively requires the retirement of simple cycle gas-fired combustion turbine generators (CTGs) by January 1, 2040. Accelerated emission reduction requirements are imposed on units near statutorily defined Environmental Justice Communities. This provision affects Ameren Missouri's Venice Energy Center, which effectively requires retirement of its units by January 1, 2030. The Company's 2022 Notice of Change in Preferred Resource Plan reflects retirement of Venice by the end of 2029 and all other Ameren Missouri CTGs in Illinois by the end of 2039.

Ameren Missouri established a plan to comply with the revised Cross States Air Pollution Rule ozone season allowance allocation that was finalized by the EPA in May 2017 for the 2018 ozone season. Ameren Missouri's strategy for NO<sub>x</sub> compliance was to continue operation of low NO<sub>x</sub> burner (LNB) and over-fire air (OFA) systems at the coal-fired energy centers as well as neural net optimization systems to enhance NO<sub>x</sub> emission reduction. In addition, the installed selective non-catalytic reduction (SNCR) systems at the Sioux Energy Center were tuned and available for use if needed for additional NO<sub>x</sub> reduction. The cost of operation of the SNCR systems was compared to the cost of purchasing additional NO<sub>x</sub> allowances to determine the most cost-effective compliance approach.

Figure 5.1 Ameren Missouri Coal Fleet SO<sub>2</sub> Emissions vs EPA Regulations

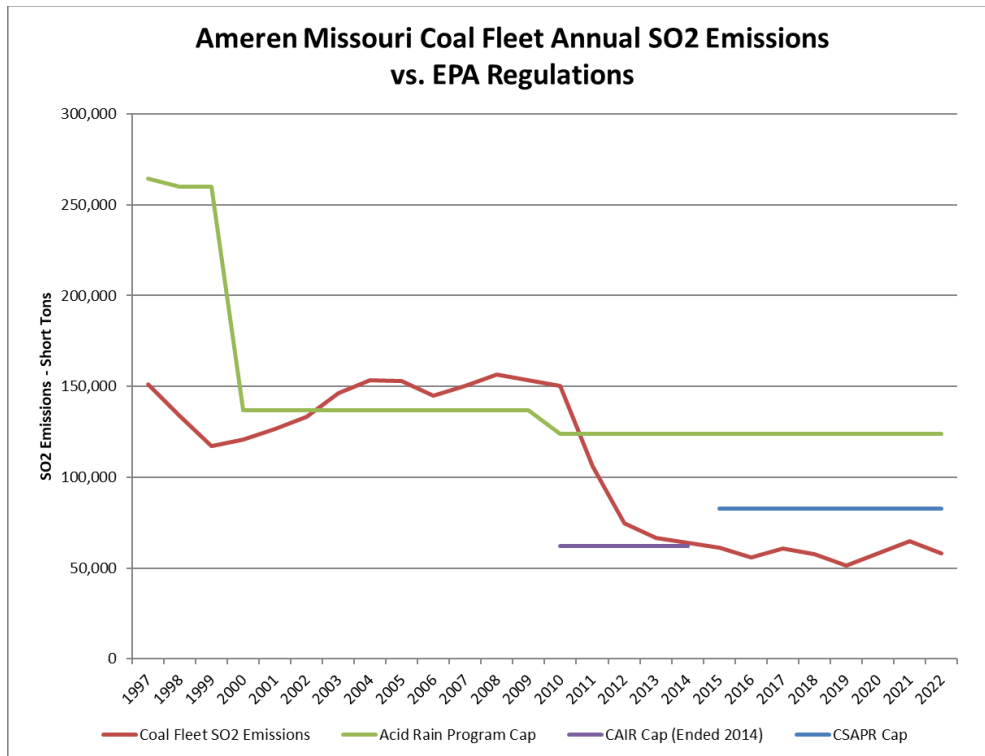
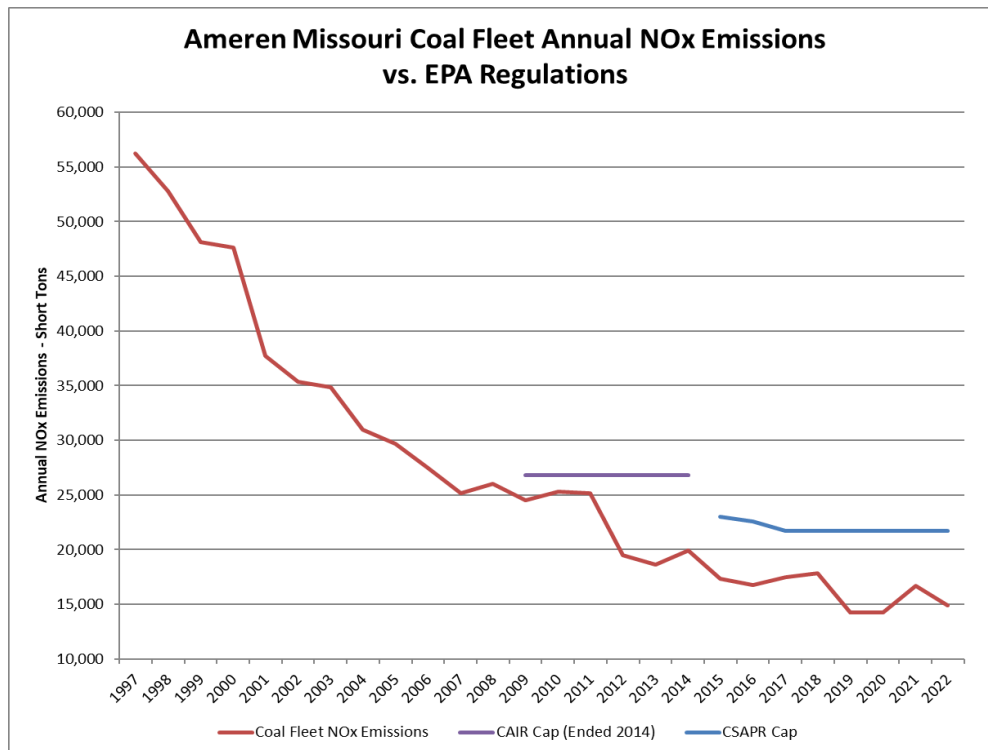
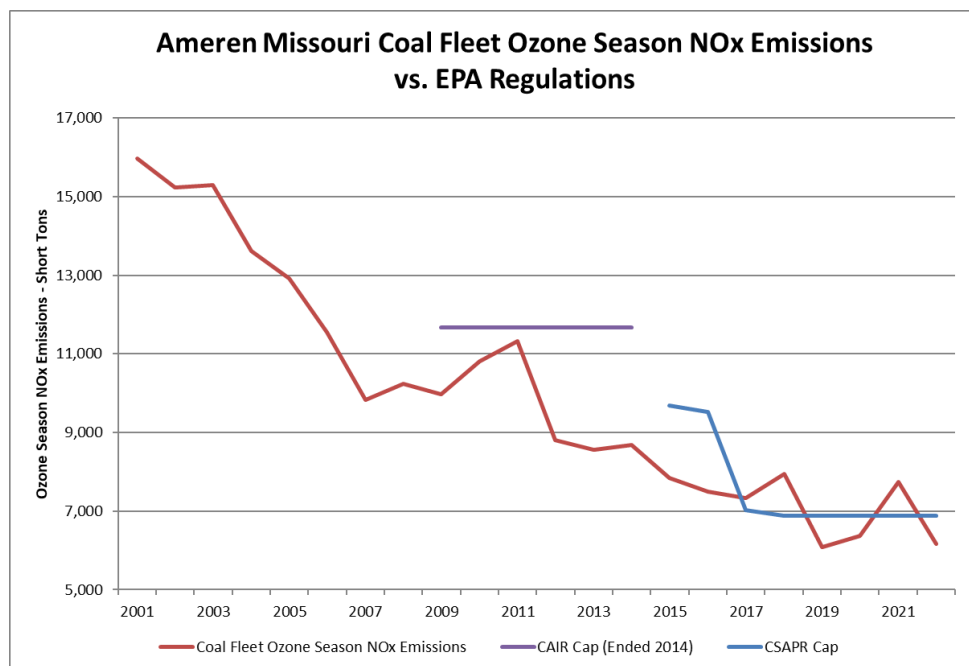


Figure 5.2 Ameren Missouri Coal Fleet Annual NO<sub>x</sub> Emissions vs EPA Regulations



**Figure 5.3 Ameren Missouri Coal Fleet Ozone Season NO<sub>x</sub> Emissions vs EPA Regulations**



### **Maximum Achievable Control Technology (MACT) Standards to Control Mercury and Other Hazardous Air Pollutants for Electric Generating Units (EGU)**

The MACT rule for EGU's was effective on April 16, 2012. This final rule is known as the Mercury and Air Toxics Standards (MATS). The MATS includes standards for mercury, particulate matter as a surrogate for non-mercury metals hydrogen chloride (HCl) as a surrogate for acid gases, work practices for organic emissions and monitoring requirements. The MATS standard also includes more stringent emission limits for new sources.

Ameren Missouri's Rush Island and Sioux Energy Centers were compliant with the MATS on April 16, 2015. The Labadie and Meramec (units 3 & 4) Energy Centers received a one-year extension and achieved compliance with the MATS on April 16, 2016. Units 1 & 2 at the Meramec Energy Center began burning natural gas only on April 16, 2016, and thus were not subject to MATS. Ameren Missouri installed Activated Carbon Injection technologies at all four of its coal-fueled energy centers and made modifications to the existing PM controls at its Labadie Energy Center. In addition, Ameren Missouri will utilize work practices and fuel choices to meet the other MATS regulated hazardous air pollutants. The figures below show Ameren Missouri's coal fleet compliance with the MATS requirements. Ameren Missouri is currently achieving compliance with some margin. On April 5, 2023, EPA released a proposal to tighten certain aspects of the MATS (Proposed Rule). Specifically, EPA is generally proposing to lower the emission limit for filterable particulate matter (fPM), remove the emission limits for total and individual non-

mercury (Hg) hazardous air pollutant (HAP) metals, require the use of continuous emissions monitoring systems (CEMS) to demonstrate compliance with the PM standard, lower the Hg emission limit for lignite coal fired electric generating units (EGUs), and eliminate one of the two definitions of “startup” in MATS. Ameren Missouri is currently reviewing the details of this proposed update to the MATS rule and will be determining if additional compliance measures will be necessary. Ameren Missouri did submit comments to EPA during the comment period.

The following data is based on a 30-day rolling average comprised of hourly data when the emission unit is operating. If the unit is not operating, there will be gaps in the 30-day rolling average.

**Figure 5.4 Labadie MATS Compliance – Mercury**

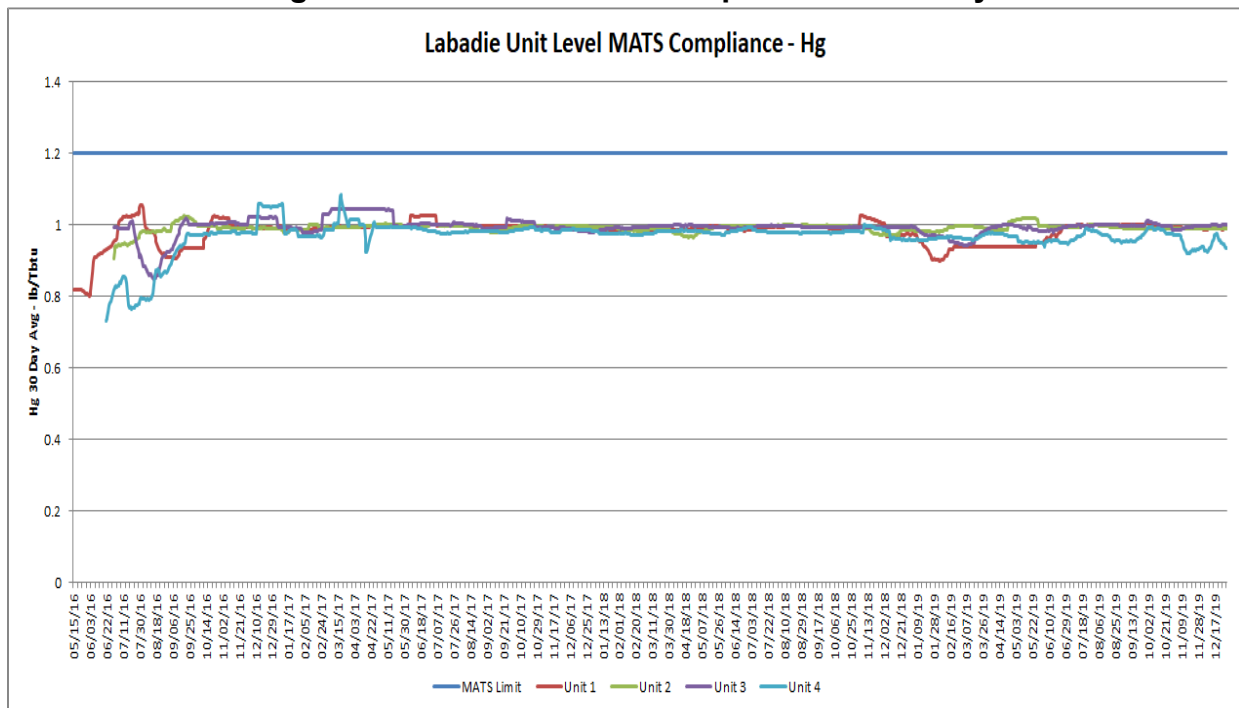


Figure 5.5 Rush Island MATS Compliance – Mercury

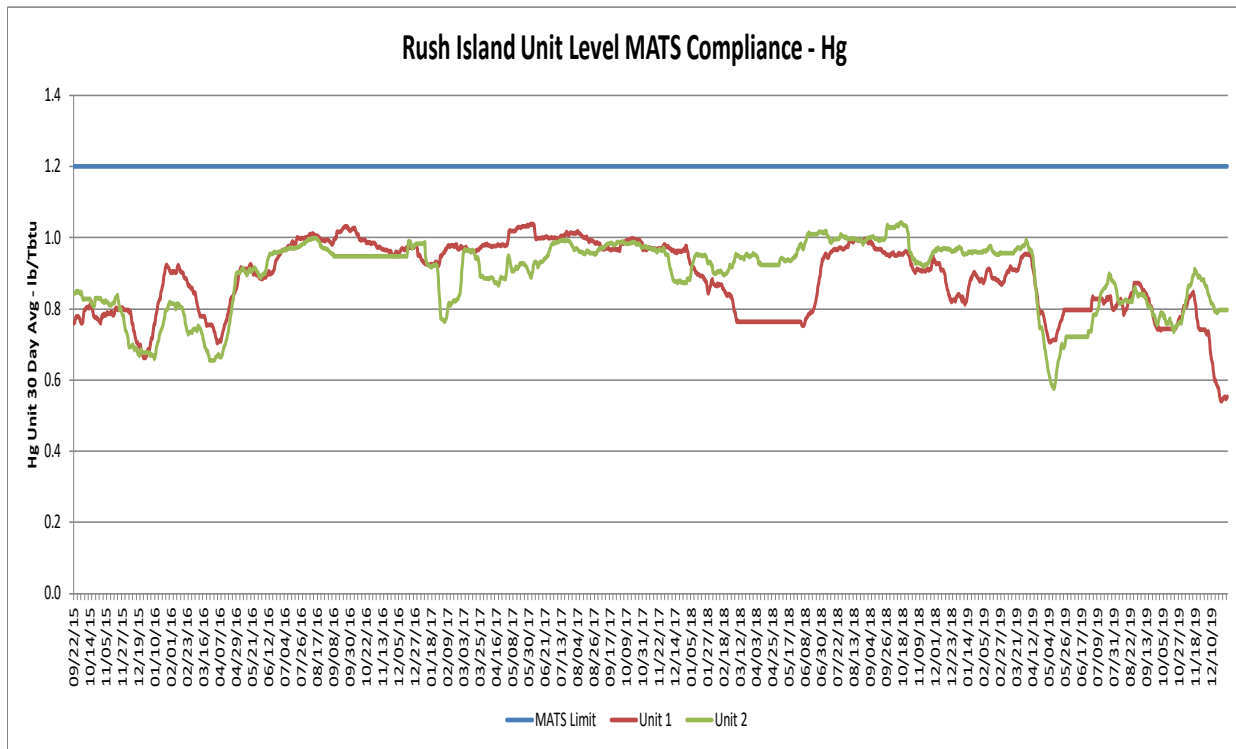


Figure 5.6 Sioux MATS Compliance – Mercury

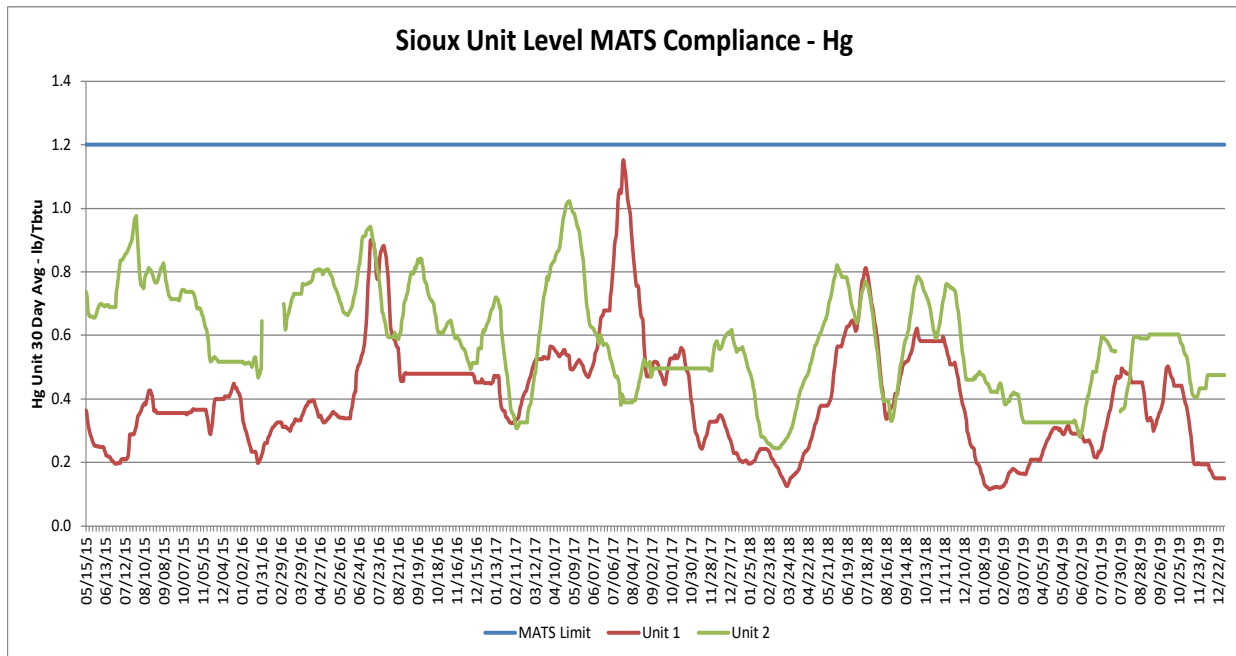


Figure 5.7 Labadie MATS Compliance – PM

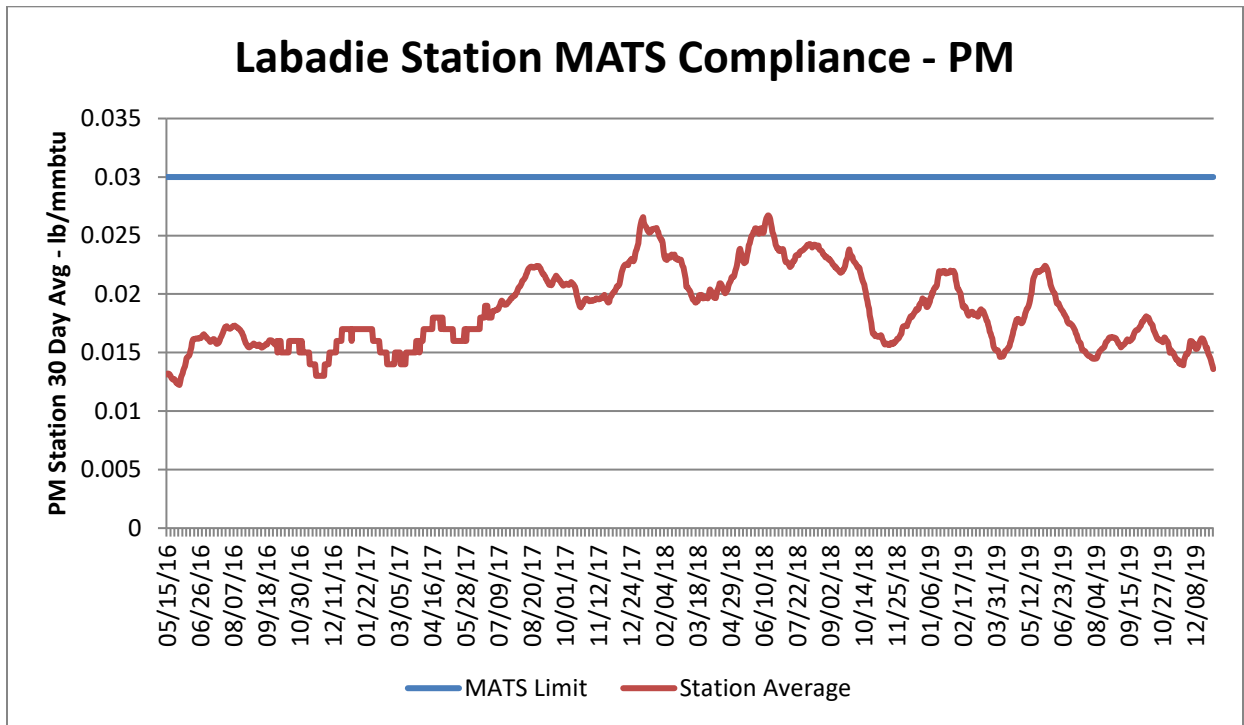


Figure 5.8 Rush Island MATS Compliance – PM

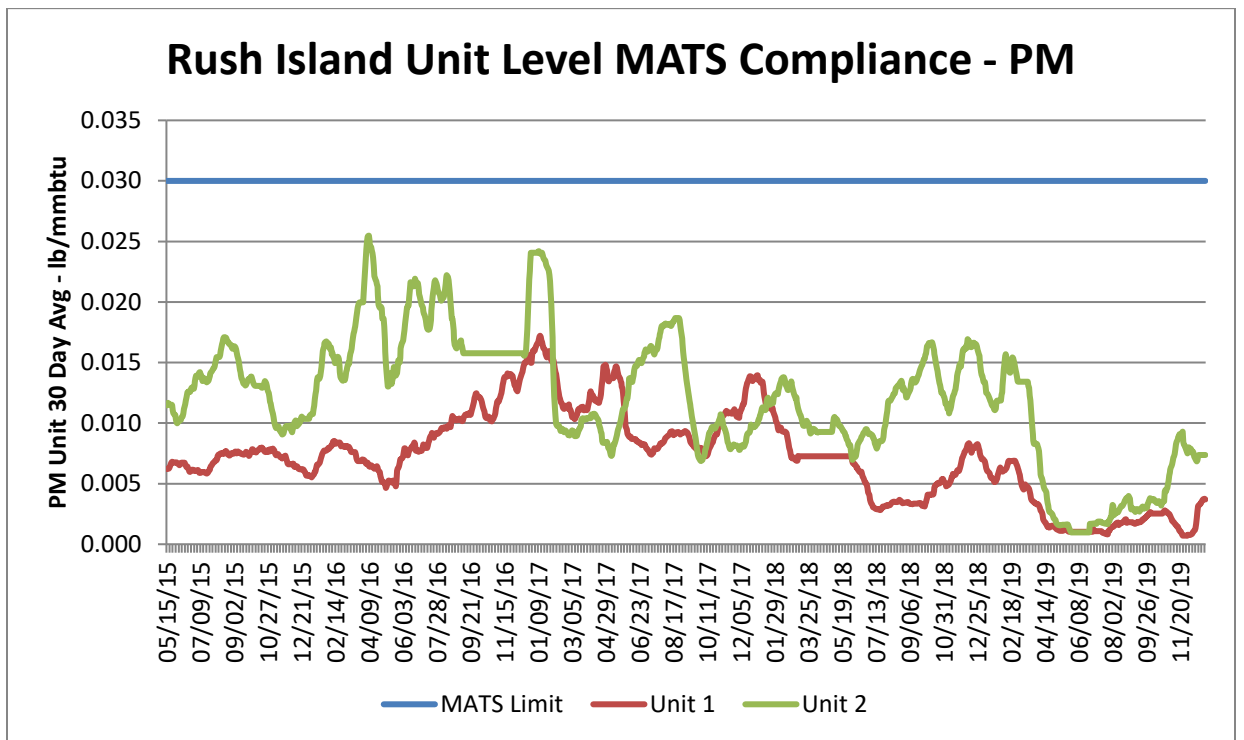


Figure 5.9 Sioux MATS Compliance – PM

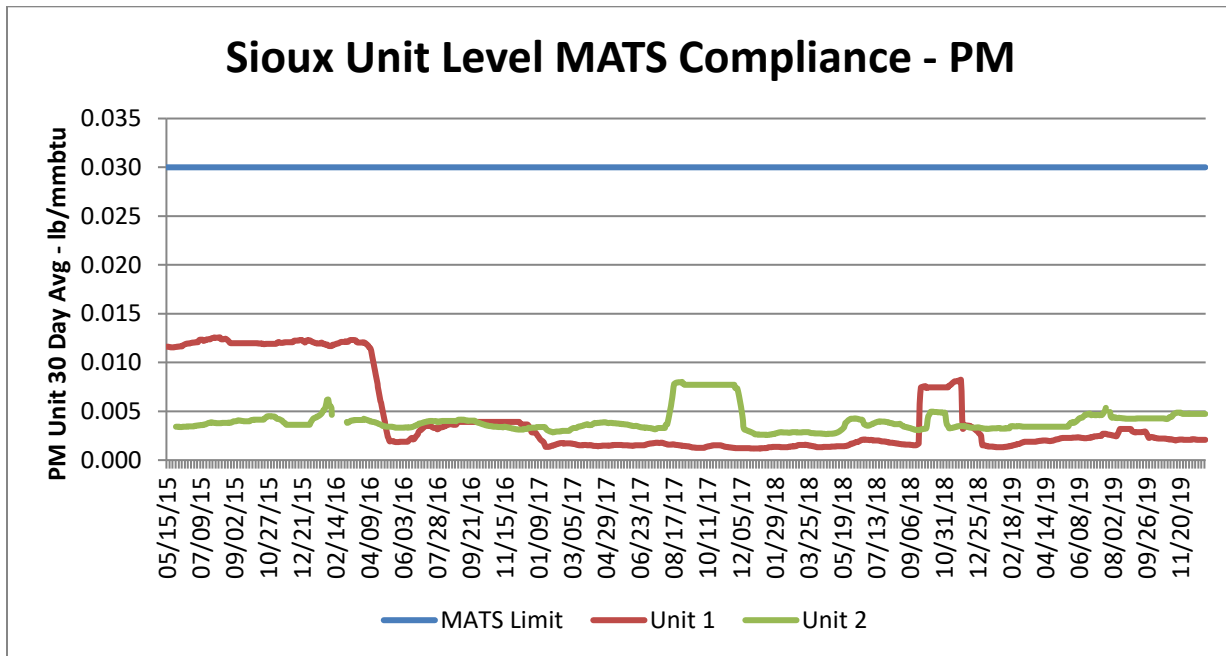
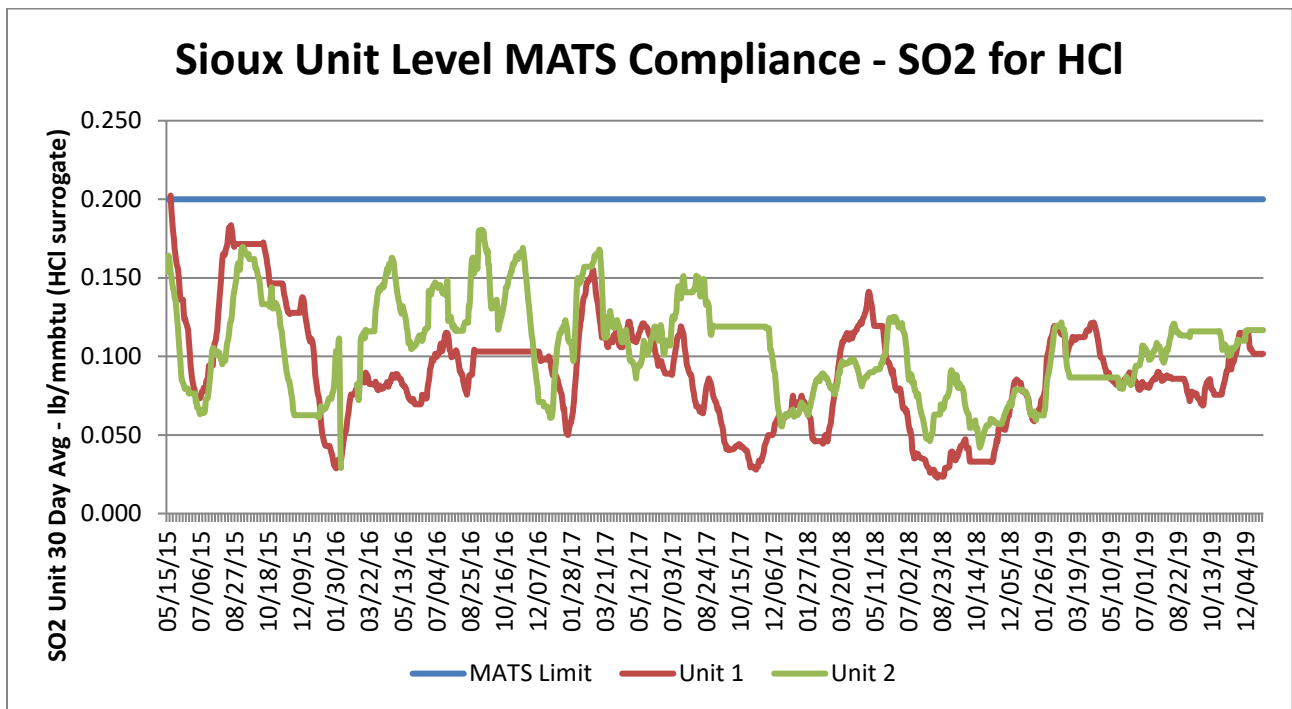


Figure 5.10 Sioux MATS Compliance – HCl (Sioux uses SO<sub>2</sub> as a surrogate)



### **Clean Air Act Regional Haze Requirements**

The goal of the Regional Haze Rule is to set visibility equivalent to natural background levels by 2064 in Class I areas. Class I areas are defined as national parks exceeding 6,000 acres, wilderness and national memorial parks exceeding 5,000 acres and all international parks in existence on August 7, 1977. There are currently 156 Class I areas, two of which are in the State of Missouri (Hercules Glade and Mingo). As part of the first planning period (2008-2018), states have developed implementation plans necessary to meet the glide path for the first 10-year planning period. In addition, the Regional Haze Rule requires compliance with Best Available Retrofit Technology (BART) for SO<sub>2</sub> & NO<sub>x</sub> for the first planning period. The EPA has determined that compliance with CSAPR meets the BART requirements. Ameren Missouri is fully compliant with CSAPR, and thus, is compliant with the BART requirements. On August 26, 2022, the Missouri Department of Natural Resources (MDNR) submitted its State Implementation Plan (SIP) to EPA for approval. The SIP was approved by the Missouri Air Conservation Commission as the Missouri Regional Haze Plan for the Second Planning Period. As part of this SIP, Ameren Missouri entered into agreements with MDNR to assure continued use of existing control technology.

### **Clean Air Act – New Source Review (NSR)**

Ameren Missouri is required to review projects that it intends to perform under 40 CFR 52.21(r)(6) to determine if NSR permitting is applicable for existing major sources. For new facilities not located at Ameren Missouri's existing facilities, evaluations are performed based on the level of expected emissions and whether these projects fall under regulations defined under the New Source Performance Standards (NSPS) (Clean Air Act Section 111), National Emission Standards for Hazardous Air Pollutants (NESHAP) (Clean Air Act Section 112) or other state construction permitting requirements.

- Ameren Missouri continues to review major projects at its existing facilities related to maintenance activities and compliance initiatives (e.g., electrostatic precipitator (ESP) upgrades, ACI systems for MATS compliance...) for the EPA's and the state's regulations.
- Ameren Missouri currently is not involved in construction of new major air pollutant emitting facilities requiring compliance with NSPS, NESHAP or other state air regulations.

## **5.3 Water Regulation and Compliance Assumptions**

### **Clean Water Act (Amended 1972)**

The Clean Water Act (CWA), in conjunction with State regulations, establishes pollutant-specific water quality standards for discharges to surface waterbodies. The National



Pollutant Discharge Elimination System (NPDES) permit process provides for protection of water resources for industrial facilities. Technology and water quality based effluent limitations are in place to ensure water quality meets the applicable standards. In order to comply with effluent standards, it may be necessary to modify operations and/or install additional water pollution control equipment to meet a water quality standard.

### **CWA, Section 316(a) Thermal Discharges**

Section 316(a) of the CWA requires limitations on thermal discharges from industrial sources, including power plants.

The EPA and MDNR regulate cooling water systems at the Ameren Missouri energy centers through the NPDES permit program. The Missouri Department of Natural Resources administers the NPDES permit program for sources in Missouri including the Ameren Missouri energy centers.

The Labadie Energy Center cooling water discharge and the associated thermal plume have been studied extensively since the facility's initial NPDES permit application. Energy center operations have not changed significantly since the original studies were performed. Further biological studies were voluntarily and periodically performed over the years. In 2017, the MDNR approved a biological study plan in accordance with the current NPDES permit for the Labadie energy center. In 2016, Ameren Missouri requested a modification to the Labadie Energy Center NPDES permit to allow use of a site-specific model to determine compliance with Missouri Water Quality Standards (MWQS). The model established that an effluent limitation expressed as a Thermal Discharge Parameter (TDP) would ensure compliance with the water quality standard. In May 2017, the MDNR issued a revised NPDES permit establishing a thermal effluent limitation of 0.95 TDP for both the interim and final thermal effluent limitations.

The TDP limit incorporates a 5 percent margin of safety to ensure compliance with the MWQS. Nevertheless, there is the potential for occasional, infrequent exceedances (less than one percent of the time on average based on existing data) of the MWQS. This could occur during conditions of extraordinarily high ambient river temperature and/or extraordinarily low river flow leading Ameren Missouri to seek alternative thermal effluent limitations. In April 2020, Ameren Missouri submitted CWA 316(a) Final Demonstration proposing an alternative temperature effluent limit to ensure continued operation of the Labadie Energy Center, at the same time, assuring the protection and propagation of a balanced indigenous aquatic community in the lower Missouri River. In December 2021, MDNR issued a final NPDES permit for the Labadie Energy Center.

Ameren Missouri has identified operating procedures it would implement to address any thermal issues. This will allow it to avoid requirements to install cooling towers at the Labadie Energy Center. In addition, Ameren Missouri does not believe there are any thermal issues at its other fossil energy centers that would require cooling towers.

### *CWA, Section 316(b) Entrainment and Impingement of Aquatic Organisms*

Section 316(b) of the CWA was established to protect fish and aquatic habitat from detrimental impacts associated with water intake structures. At energy centers, aquatic organisms can be impinged (e.g., trapped or pinned against the intake screens) and entrained (e.g., pass through the screens, enter the heat exchanger and then be discharged) within cooling water intake structures/piping and condenser systems. The EPA and MDNR establish regulations to limit adverse impacts associated with cooling water intake structure operation through the NPDES permit process. Compliance with CWA §316(b) standards may incorporate performance and/or design criteria, or the utilization of specific control technologies. The presence of threatened or endangered species at a cooling water intake structure could potentially result in the need for additional operational and physical changes.

The EPA issued revised CWA §316(b) regulations on August 15, 2014. While the rules do not expressly require the installation of cooling towers at all facilities, they are expected to result in capital expenditures for modifications to existing cooling water intake structures to achieve compliance. All facilities with a cooling water intake structure are required to perform studies for review by the MDNR and other agencies. Facilities withdrawing in excess of 125 million gallons of water per day are required to perform additional studies to determine what control technologies are required. Intake structure owners are provided the option of selecting one of seven different impingement compliance options. These options include: (1) closed cycle cooling; (2) 0.5 foot per second (ft./sec) through-screen velocity (by design); (3) 0.5 ft./sec through-screen velocity (as measured); (4) existing off-shore velocity cap; (5) modified traveling water screens; (6) a “suite of technologies” determined by the permit writer to represent the best available technology; or (7) any technology that results in an annual impingement mortality rate of less than 24%. For those facilities that withdraw over 125 million gallons of water per day, or at the discretion of the permitting authority, the regulation also requires the reduction of entrainment similar to closed cycle cooling or a site-specific standard. New generating units are required to install closed cycle cooling.

The compliance options that have been considered to meet the CWA §316(b) include the following.

To meet the impingement and entrainment standards:

- Modified traveling water screens
- Installation of Fine Mesh Screens
- Installation of closed cycle cooling using Cooling Towers

In 2015, Ameren Missouri began two-year entrainment characterization studies as the next step in complying with Section 316(b). Due to the retirement of the Meramec Energy

Center at the end of 2022, no additional mitigation is necessary. Fish studies performed at the Callaway Energy Center have resulted in the determination that no additional modifications of its intake structure are required to achieve compliance with CWA §316(b) requirements.

In January 2020, Ameren Missouri submitted the NPDES permit renewal application for the Labadie Energy Center. The application included the Section 316(b) report. This report details the results of the biomonitoring studies and the selected path forward for implementing impingement and entrainment modifications at the intake structure.

Coarse-mesh modified traveling water screens have been found to be the more appropriate impingement mortality reduction technology at the Labadie Energy Center. In the 2021 final NPDES permit for Labadie Energy Center, the MDNR agreed with the studies and required new traveling water screens to be installed; that work is now on-going with completion expected before the 5-year permit renewal.

Since the Rush Island Energy Center is expected to be retired within the next several years, no additional modifications are expected. The Sioux Energy Center permit renewal application is currently being reviewed by MDNR. 316(b) study reports were submitted with the permit application and recommended modifications to the existing traveling water screens and fish pump system.

### ***CWA, Steam Electric Effluent Limitation Guidelines Revisions***

Sector specific effluent limitation guidelines are periodically updated by the EPA to ensure best available technology is utilized in the treatment of wastewater discharges, including those from steam electric power plants. On November 3, 2015, the EPA issued a revised rulemaking for steam electric power plant discharges. Although most of the impact of this rule is associated with discharges from flue gas desulfurization (FGD) wastewater, the rule prohibits discharges of ash transport water. As a consequence, Ameren Missouri completed projects at the Labadie, Rush Island and Sioux energy centers to construct new or augmented fly ash handling systems and new bottom ash handling systems. Ameren Missouri has also completed projects to construct and operate new wastewater treatment systems to manage discharges from various power plant systems such as demineralizer regenerations, storm water, and other process wastewater.

In 2020, the EPA finalized a rule revising the regulations for the Steam Electric Power Generating category. That rule revised requirements for two specific waste streams produced by steam electric power plants: flue gas desulfurization (FGD) and bottom ash transport water. This new rule did not affect Ameren Missouri's generating fleet.

## 5.4 Solid Waste Regulation and Compliance Assumptions

### *Coal Combustion Residuals*

The federal Coal Combustion Residuals (CCR) rule was published April 17, 2015 and became effective October 19, 2015. It establishes national standards for the management of CCRs. The CCR rule is self-implementing, and the Company continues to fully comply with the Rule requirements. The EPA has recently initiated a series of rulemakings to revise the federal CCR rule in accordance with the WIIN Act as well as recent court decisions.

Ameren Missouri is executing its compliance strategy in advance of the regulatory deadlines. The Company continues to monitor the potential for further changes in regulations that may impact resource planning decisions, such as the recently introduced changes for Legacy Coal Combustion Residuals Surface Impoundments and CCR Management Units. Table 5.3 below shows the capex and O&M assumptions for environmental mitigation.

### *Groundwater Remediation*

In late 2020 Ameren Missouri paired with an outside consulting firm on a groundwater remediation project at the Rush Island Energy Center. This pilot project was set up to ultimately improve groundwater quality around the site by using a pump and treat method. Groundwater removed through extraction wells is treated in an above ground structure, then discharged through injection wells back into the ground. Removing groundwater impurities mechanically in conjunction with natural attenuation will speed up reductions of groundwater constituents. Building upon the success of that pilot project, Ameren Missouri completed the full-scale implementation at Rush Island. A similar full-scale project was substantially complete at Sioux in 2022 as well. Design of a similar system at the Labadie Energy center is on-going.

### *Ash Pond Closure Initiatives*

Ash basin impoundments at the Rush Island, Labadie, and Sioux Energy Centers are now complete. Remaining Meramec Energy Center ash basins will be closed in 2023 and 2024. The closure of these ash ponds will reduce our consumption of approximately 11 billion gallon of water per year. With regard to groundwater and drinking water concerns, extensive analyses and tests have been undertaken by an independent third-party expert (many of which are beyond regulatory requirements).

Those tests have concluded:

- There is no significant adverse impact on human health or the environment from our CCR management practices

- There is no evidence of CCR impacts in rivers or streams close to our facilities or in groundwater used for drinking water

Additionally, the Sioux Energy Center completed a new Interim gypsum basin in 2022 with the full gypsum cell planned for completion in late 2023. Design and closure of the previous gypsum basin is planned to begin in 2023. While mitigation has been included in our analysis for current and certain potential future regulations, further changes in regulations are possible. The Company continues to monitor the potential for further changes in regulation that may impact resource planning decisions. Table 5.2 below shows the capex and O&M assumptions for environmental mitigation.<sup>2</sup>

**Table 5.2 Environmental Mitigation Costs**

Facility	Environmental Mitigation	Regulation	In-Service Year	Cost ( incl. AFUDC) \$ Million	O&M \$ Million
Labadie	Landfill Cell	CCR	2033	11	-
	Traveling Screens	CWA 316	2025	24	0.5 *
	Groundwater Improvement	CWA	2025	26	1.4 <sup>α</sup>
	NOx Control	CSAPR	2025	0.3	
	SCR	CSAPR	2027	697	2.0 <sup>α</sup>
<b>Labadie</b>	<b>Total Environmental</b>			<b>758</b>	<b>4</b>
Rush Island	NPDES Permitting	CWA 316 (b)	2023	0.4	-
	Groundwater Improvement	CWA	2023	0.4	1.0
<b>Rush Island</b>	<b>Total Environmental</b>			<b>0.4</b>	<b>1</b>
Sioux	Landfill Cell Closure	CCR	2022	9	-
	Landfill Cell	CCR	2022	8	-
	Aquatic Life	CWA 316 (b)	2026	8	-
	Groundwater Improvement	CWA	2024	3	0.7 <sup>α</sup>
	NOx Control	CSAPR	2024	1	
<b>Sioux</b>	<b>Total Environmental</b>			<b>18</b>	<b>0.7</b>
<b>TOTAL</b>	<b>Total Environmental</b>			<b>776</b>	<b>5.6</b>

\* One time expense in 2024

<sup>α</sup> Average annual over lifetime

<sup>2</sup> 20 CSR 4240-22.040(1)

## 5.5 Compliance References

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