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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2022-0337

DIRECT TESTIMONY

OF

KARL R. MOOR

ON

BEHALF OF

UNION ELECTRIC COMPANY
D/B/A AMEREN MISSOURI

St. Louis, Missouri
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DIRECT TESTIMONY

OF

KARL R. MOOR

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I. INTRODUCTION

Q. Can you state your name and where you live?

A. Karl R. Moor. I live in Washington, DC.

Q. What do you do for work?

A. I am retired. Occasionally I consult for clients on matters that allow me to draw upon my background and experience on matters involving energy and the environment.

Q. Can you summarize your educational background?

A. I graduated from the University of Montevallo in Alabama in 1979 with a B.A. in History (and a minor in Economics). After that, I attended The George Washington University in Washington, D.C., where in 1982 I earned an M.A. in Public & International Affairs; Science, Technology and Public Policy. I then attended the Georgetown University Law Center, where I earned my law degree in 1986. A copy of my *curriculum vitae* is attached as Schedule KRM-D1.

Q. Can you summarize your professional background, as relevant to the issues in this proceeding?

A. Professionally, I have been dealing with Clean Air Act issues since 1986. Prior to that time, I served on two Congressional committees, in a U.S. Senate office and briefly within the Reagan Administration. My work in connection to the Clean Air Act began when I was asked by my client Alabama Power Company to move to Washington, D.C. to assist with the development of policy and legislation as Congress and the Executive Branch considered possible amendment of the federal Clean Air Act to address, among other things, emissions from coal-fired power plants. Between 1987 and 1989, I also served as loaned counsel to the Clean Air Working Group, the primary industry group interacting with members of Congress and the Executive Branch—including the U.S. Environmental Protection Agency ("EPA") and the Office of Management and Budget—on key portions of the Clean Air Act Amendments that affected electric utilities and every other industrial sector. In this role, I was conversant and active on all matters related to New Source Review ("NSR"). Whether and how NSR would apply to projects performed on existing coal-fired power plants was a key topic of discussion with Congress and the Executive Branch.

After passage of the 1990 Clean Air Act Amendments, I worked extensively on the regulatory implementation of these amendments for my utility clients (including Southern Company Services and the operating companies of Southern Company) as a lawyer in private practice.

In 1998, I joined Southern Company Services as Vice President and Associate General Counsel for Litigation and Public Policy. Accordingly, I was the Southern Company Services system executive primarily responsible for all interactions, discussions, litigation and decision-making associated with EPA's electric utility enforcement initiative from 1999 to 2015. Later, I also served simultaneously as General Counsel and Compliance Officer for Southern Transmission. Subsequently, I was promoted to Senior Vice President and Chief Environmental Counsel for Southern Company Services, Inc. I retired from the company in that position in 2015. In my various company roles, from 1998 to 2015, I served as the executive responsible at Southern Company Services for determining whether and recommending when the Southern Company's various operating companies should seek NSR permits for activities at more than 30 fossil steam stations with a combined nameplate capacity of greater than 21,000 MW.

After my retirement from Southern Company Services, and subsequent service as counsel for the law firm Balch & Bingham LLP, I accepted an appointment at the EPA. From 2019 to 2021, I served as Deputy Assistant Administrator for Policy in the EPA Office of Air and Radiation, the office that has responsibility for the federal NSR program. I retired from federal government service in January, 2021.

As a result of this combined experience, I have a deep understanding of and professional engagement with the legislative, regulatory, litigation and policy issues that existed when Ameren Missouri made its decisions with respect to the Rush Island plant. This larger context is key to understanding what Ameren Missouri and the utility industry as a whole were facing in the period between 2005 and 2010, the timeframe when Ameren Missouri made the relevant decisions.

The opinions offered in my testimony are, except as specifically noted, based upon information that is publicly available or provided to me by Ameren Missouri.

Q. During your tenure at EPA, did you have anything to do with EPA's NSR enforcement case against Ameren Missouri?

A. No. EPA's enforcement actions were handled by a separate office, the Office of Enforcement and Compliance Assurance ("OECA").

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my direct testimony is to offer opinions on the reasonableness of Ameren Missouri's decisions that NSR did not apply to certain projects Ameren Missouri performed at its Rush Island plant in 2007 and 2010, and the decisions to proceed with those projects without seeking any NSR permits.

Q. Can you provide a summary of your testimony and opinions?

A. I would summarize my testimony and opinions as follows.

1. To determine the reasonableness of Ameren Missouri's decisions, a reviewer should understand the statutory, regulatory and legal context that existed at the time they were made: 2005-2007 for the Unit 1 projects and 2005-2010 for the Unit 2 projects. Post-hoc second-guessing of those decisions is not appropriate. To evaluate Ameren Missouri's decisions requires understanding what Ameren Missouri knew, or reasonably should have known, about the applicable legal requirements and how they would apply to the specific projects at Rush Island.

2. The NSR program requires source owners or operators to make preconstruction determinations of whether their activities will trigger permitting requirements. The program does not require source owners or operators to obtain regulatory approval of those determinations. In its pre-construction evaluation of the projects at Rush Island for potential permitting requirements, Ameren Missouri evaluated three criteria:

- Would the project be expected to cause an increase in the unit's potential annual emissions?
- Would the project be expected to cause an increase in the unit's actual annual emissions?
- Would the project involve a change to the unit that was not "routine maintenance, repair or replacement"?

Ameren Missouri understood that only if the answer to each of these three questions was "yes" would an NSR permit be required.

3. Given the state of the law that existed at the time Ameren Missouri conducted its preconstruction evaluations, it was entirely reasonable for Ameren Missouri to use these three criteria to identify projects requiring NSR permits. Ameren Missouri's view of the applicable regulations, which had been promulgated by Missouri and approved by EPA as part of the Missouri state implementation plan ("SIP"), was consistent with that of the Missouri Department of Natural Resources ("MDNR"). Ameren Missouri's view of the federal NSR regulations incorporated into the Missouri SIP was also consistent with the official statements and policy of EPA's program office in charge of implementing the NSR program.

4. When one applies Ameren Missouri's reasonable understanding of the applicable legal requirements to the facts of the Rush Island projects, the only reasonable conclusion is that no NSR permit was required. No project increased a unit's potential to emit, and no one to my knowledge has ever claimed otherwise. No project would have been expected to cause an increase in a unit's actual annual emissions, because each unit had ample unused capacity to generate in the years before the projects occurred—capacity unused due to lack of demand—and the component replacements at issue were merely like-kind replacements that would not be expected to affect the overall capacity or utilization of the unit. Finally, the components at issue were routinely replaced by Ameren Missouri and by others across the electric utility industry, and fit comfortably within the exclusion of routine maintenance, repair or replacement ("RMRR") from NSR permitting requirements. This is supported by a number of statements by EPA and the determinations

made by Missouri and other states with respect to similar projects, leading up to and contemporaneous with the 2007 and 2010 projects at Rush Island.

5. EPA attempted to abandon its established interpretation of NSR with an industry-wide "enforcement initiative" launched in 1999 against electric utilities. The litigation positions advanced in EPA's enforcement initiative over the decade that followed—in addition to departing from past EPA statements and practice—conflicted with the official policy and guidance developed by the relevant EPA program office during that time. At the time that Ameren Missouri made its pre-project decisions on NSR applicability, most courts had rejected EPA's attempts to re-write the NSR program through litigation.

6. The projects Ameren Missouri performed at Rush Island are like those performed countless times every year in the electric utility industry, because they are necessary for the continued safe and reliable operation of generating assets critical to the supply of electricity. After the launch of EPA's enforcement initiative, Ameren Missouri—like other utilities—continued to follow the guidance of its state permitting authority and the official interpretations of the NSR regulations issued by EPA's program office. Despite the prevalence of similar component replacements across the industry, I know of no utility in that period that sought an NSR permit prior to undertaking such projects.

7. I conclude that Ameren Missouri acted reasonably in determining that none of the Rush Island projects required preconstruction permitting. I also conclude that Ameren Missouri acted reasonably in proceeding with the projects without seeking any NSR permits.

III. THE CLEAN AIR ACT AND NEW SOURCE REVIEW

Q. Can you summarize the nature of the Clean Air Act's New Source Review program, and how it fits with the 1990 Clean Air Act Amendments?

A. As the name denotes, "New Source Review" focuses on new emissions sources, not existing sources. NSR requires preconstruction review and permitting of new sources of air emissions. NSR does not apply to existing sources of emissions unless they undergo "modification." 42 U.S.C. §§ 7475, 7411(a)(4). The Clean Air Act defines "modification" as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source . . . ." Id. § 7411(a)(4). The Clean Air Act does not assume that every existing source will eventually undergo "modification" and require controls. United States v. DTE Energy Co., 711 F.3d 643, 650-51 (6th Cir. 2013). In fact, the 1990 Clean Air Act Amendments, with which I was intimately familiar, were premised on the assumption that coal-fired electric generating units would be refurbished and continue to operate (and generate sulfur dioxide ("SO_2") emissions as a result), without triggering NSR and its control requirements. Congress considered and specifically rejected proposals to require unit-by-unit retrofits of scrubbers and similar controls on existing coal-fired units, and instead chose the innovative strategy of "cap-and-trade" to address emissions from these sources. Lower emissions rates, not control technologies, were the end point of the 1990 Clean Air Act Amendments. This "grand compromise" was considered to be the seminal environmental success of those amendments. At every step in the legislative and regulatory process leading to and after the 1990 Clean Air Act Amendments, the industry was assured by EPA, consistent with the plain text of the regulations, that the NSR regulations cannot be interpreted to undermine the industry's ability to operate, repair, and maintain existing units.

There are two different parts of the federal NSR program: (1) the Prevention of Significant Deterioration ("PSD") program, which applies to sources located in areas that have been found to meet EPA's national ambient air quality standards; and (2) the Nonattainment New Source Review ("NNSR") program, which applies to sources located in areas that fail to meet those air quality standards.[1] The applicability provisions in the federal PSD and federal NNSR rules are the same in all relevant respects. For this reason, and because most practitioners in my experience refer to both PSD and NNSR collectively as the "NSR program," I will do the same and refer in my testimony generally to the "NSR program" and the "NSR regulations," even though Rush Island was not subject to the subset of these consisting of the NNSR regulations.

IV. AMEREN MISSOURI'S APPLICABILITY DETERMINATIONS

Q. How did you gain an understanding of what Ameren Missouri did to evaluate the applicability of NSR for the Rush Island projects?

A. I reviewed the decisions in the Ameren Missouri litigation in the U.S. District Court for the Eastern District of Missouri, as well as the testimony and declarations of Steven Whitworth and David Boll in that case. United States v. Ameren Missouri, No. 4:11-cv-00077-RWS (E.D. Mo.).[2] Mr. Whitworth has been the head of Ameren's Environmental Services Department since 2007. Schedule KRM-D2 (Whitworth Decl.) ¶ 2. The Environmental Services Department has a lead role in determining whether permits are required for projects at Ameren Missouri's units. Id. ¶ 3. The Environmental Services

[1] I understand that Rush Island was located is an area that met EPA's national ambient air quality standards at all relevant times.

[2] Unless otherwise noted, all references to depositions, exhibits and declarations herein refer to materials produced in the Ameren Missouri litigation in the U.S. District Court for the Eastern District of Missouri. United States v. Ameren Missouri, No. 4:11-cv-00077-RWS (E.D. Mo.).

Department would fulfill this responsibility by working with engineers who had responsibility for the projects. Id. ¶¶ 4-6. One such engineer was David Boll, a licensed professional engineer in Ameren's Environmental Project Engineering Department whose responsibilities included supervising the work for the component replacement projects at issue at Rush Island, and assessing the impact component replacements were expected to have on unit operations. Schedule KRM-D3 (Boll Decl.) ¶¶ 2-3. In addition to reviewing their testimony and declarations, I interviewed Steven Whitworth and David Boll by Zoom. Finally, I also reviewed certain documents produced by Ameren Missouri in the underlying litigation in the U.S. District Court for the Eastern District of Missouri.

Q. What is your understanding of how Ameren Missouri evaluated the applicability of NSR for the Rush Island projects?

A. Ameren Missouri first evaluated the projects in 2005. The NSR program requires companies to address program applicability before a project is commenced. The projects for Unit 1 were commenced in an outage that began in February of 2007. The projects for Unit 2 were commenced in an outage that began on January 1, 2010. Considering (1) the plain language of the Missouri SIP and its application by the MDNR, (2) the plain regulatory meaning of the 2002 NSR rules and their application by EPA outside the enforcement initiative, and (3) how courts had ruled on the various NSR issues that were being litigated around the country, Ameren Missouri asked the right questions in its evaluation.

The first question Ameren Missouri evaluated was whether the projects would be expected to increase the units' maximum annual rated design capacity, given continuous year-round operations (i.e., the annual potential to emit). Whitworth Decl. ¶¶ 9, 13. The answer was no. None of the projects increased a unit's potential to emit.

The second question Ameren Missouri evaluated was whether actual annual emissions would be expected to increase as a result of the projects. The two coal-fired units operated below their annual capacity. The units had a large amount of unused capacity to generate. Ameren Missouri's engineering and environmental personnel, based upon their experience, knowledge and judgment, concluded that these projects would not be expected to cause actual annual emissions to increase. Id. ¶¶ 11, 15; Boll Decl. ¶¶ 13-18.

The third question Ameren Missouri evaluated was whether the projects constituted routine maintenance, repair and replacement activities excluded from NSR permitting. Ameren Missouri concluded that the activities at issue were routine replacement of components and thus would not require NSR permits. Whitworth Decl. ¶¶ 10, 14; Boll Decl. ¶ 15.

If I had been asked to make a decision on whether to move forward with these projects, these are the three questions that I would have asked my company's engineering and environmental personnel. These inquiries are consistent with my own experience and judgment-making as a responsible corporate executive. Based upon my understanding of the law and the facts as they had developed at that time (2005-2010), these inquiries and the answers given would have been sufficient for me to approve moving forward with the projects without seeking NSR permits.

V. AMEREN MISSOURI'S APPLICABILITY DETERMINATIONS WERE REASONABLE

Q. Did you make a determination whether Ameren Missouri's applicability determinations were reasonable?

A. Yes. Ameren Missouri's approach to compliance and its conclusions were prudent and consistent with the obligations of a public utility.

Q. What is the appropriate frame of reference for evaluating whether Ameren Missouri's applicability determinations for the Rush Island projects were reasonable?

A. The appropriate frame of reference for this question is not one of hindsight. NSR is a preconstruction program, requiring a utility to address program applicability before any construction or modification commences, with no requirement for seeking regulatory pre-approval. Thus, the relevant question is what Ameren Missouri knew or should have known at the time it made its preconstruction applicability decisions: 2005-2010.

Q. What would you have expected Ameren Missouri to do in order to make a reasonable decision on these projects?

A. The proper thing for any utility examining and deciding whether to move forward with such projects would be to examine (a) the state SIP and (b) the application of the state SIP to its specific facts. The state SIP is the source law that governs compliance.

Q. Has Missouri generally required NSR permits for such projects?

A. No. The state prepared guidance on its Construction Permit Rule demonstrating that the question of NSR applicability arises only for projects first defined as "modifications" under the Missouri SIP. Schedule KRM-D4 (excerpts from MDNR

2011 Permit Manual). "Modifications" under the state SIP occur only where a project causes the potential annual emissions to increase. Mo. Code Regs. Ann. tit. 10, § 10-6.020(2)(M)(10) (2006). This is confirmed by the testimony of Kyra Moore on behalf of the MDNR in the Ameren Missouri litigation in the U.S. District Court for the Eastern District of Missouri, Tr. of 30(b)(6) Dep. of Kyra Moore (Sept. 18, 2013) ("Moore Dep.") and by MDNR's consistent application of that standard to boiler component replacements in Missouri before these projects began. Examples of this consistent application can be found in the exhibits to the Kyra Moore deposition.

In addition, the Missouri regulations themselves, when dealing with minor sources, defined boiler tube replacements as routine. Mo. Code Regs. Ann. tit. 10, § 10-6.061(3)(B)(1)(D) (2006). This is consistent with the industry understanding.

MDNR's statements and actions represent crucial context for the evaluation of Ameren Missouri's actions to comply with the SIP's permitting requirements at Rush Island.

1. <u>Evaluation of Potential Annual Emissions</u>

Q. The first reason Ameren Missouri had for concluding that the Rush Island projects would not trigger NSR was that they would not be expected to cause an increase in potential annual emissions. What basis did Ameren Missouri have to use this test?

A. Focusing on whether a project would increase potential annual emissions was firmly grounded in the language of the Missouri SIP and its application by the MDNR. The relevant text is found in the "Applicability" provision of Mo. Code Regs. Ann. tit. 10, § 10-6.060 (2006). This section first defines when a permit is required, and then, if permitting is applicable, what form of permit should be obtained. The permitting obligation is spelled out as follows:

> **10 CSR 10-6.060. Construction Permits Required**
>
> **(1) Applicability.**
>
> […]
>
> (C) **Construction/Operation Prohibited.** No owner or operator shall commence construction or modification of any installation subject to this rule [or] begin operation after that construction or modification . . . without first obtaining a permit from the permitting authority under this rule. . . .

Id. § 10-6.060(1)(C). Thus, according to the Missouri SIP, construction permits are required only for construction (i.e., installation of a new source of emissions) or "modification" of an existing source of emissions. The SIP specifically defines "[m]odification" as "[a]ny physical change, or change in method of operation of, a source operation . . . which would cause an increase in potential emissions of any air pollutant emitted . . . ." Id. § 10-6.020(2)(M)(10). An existing source's "potential emissions" are "[t]he emission rates . . . at maximum design capacity," and annual potential emissions "shall be based on the maximum annual-rated capacity of the installation assuming continuous year-round operation." Id. § 10-6.020(2)(P)(19). Under the plain language of the Missouri SIP, which has been approved by EPA for implementing the requirements of the Clean Air Act, only a change to a source that causes an increase in the potential annual emissions will be considered a modification. This is also consistent with how the word "modification" has historically been interpreted and applied by EPA under the Clean Air Act.

After establishing the applicability of construction permitting under 10 CSR 10-6.060(1) (requiring permitting only for "construction" or "modification"), the rule goes on to specify what sort of construction permit may be required. For example, subsection (5) says that "*de minimis*" permits may be required for "[a]ny construction or modification at an installation" that results in emissions below "*de minimis* levels." Mo. Code Regs. Ann. tit. 10, § 10-6.060(5) (2006). Subsection 8 of the same rule applies to permitting for major sources in attainment areas (i.e., PSD permitting), and incorporates by reference the requirements of 40 C.F.R. § 52.21 (the federal PSD regulations). Id. § 10-6.060(8)(A). Subsection 7 of the same rule applies to permitting for major sources in nonattainment areas (i.e., NNSR permitting). Id. § 10-6.060(7).

The text and structure of the Missouri SIP indicates that no construction permit of any type will be required for activities other than construction or modification. If modification as defined by the SIP would occur, then further analysis is required to determine what type of permit to seek, such as a minor source permit for small annual emissions increases or PSD permits for emissions increases that would be "major." As discussed below, this was also MDNR's interpretation of the SIP at the time Ameren Missouri made its permitting decisions.

MDNR's interpretation of its SIP is plainly set forth in a flow chart published in its permitting manual that shows the potential to emit ("PTE") is the reference point for determining whether a project triggers construction permitting. Schedule KRM-D4 (excerpts from MDNR 2011 Permit Manual). First, one determines whether either "construction" or "modification" occurred. If so, then a permit is required. To determine what sort of permit is required, one then proceeds to examining annual emissions. If the annual emissions increase is significant, then an NSR permit is required. Id. If, on the other hand, neither "construction" nor "modification" has occurred, then no permit is required, and the inquiry ends. Id. In my experience, permit manuals like this are used and relied upon by both the agency and the regulated community to guide compliance decisions. They therefore tend to undergo substantial review by the agency before they are published.

Ameren Missouri acted consistent with state law and the interpretation of the responsible state regulatory authorities in evaluating the Rush Island projects. The deposition of Kyra Moore, Director of MDNR's air program who testified on behalf of MDNR in United States v. Ameren Missouri, is absolute proof of the truth of this statement. See Moore Dep. at 68-69, 73-74, 75, 99-100, and 115-17.

At the time that these projects were undertaken, there was nothing to indicate that MDNR had abandoned the language of the SIP or its consistent prior interpretations. EPA had not called upon Missouri to change its state SIP or the way it had been applied. Ameren Missouri had no basis to believe that its state regulator—acting under an EPA-approved SIP as contemplated by the Clean Air Act—had behaved unlawfully or that MDNR's interpretations of its own regulations as applied to projects like those at issue in this case were in error. If Ameren Missouri had sought NSR permits for these projects, it would have been contrary to the state SIP and its consistent application by the state regulator. In other words, it would have undermined established state law and impliedly cast the rest of Missouri industry as being in non-compliance.

At the time that these projects were undertaken, Ameren Missouri had no way of knowing that the state's interpretation of its regulations, as explained by MDNR and Ms. Moore, would be vitiated by a federal court years later in 2016. It is the SIP that sets forth the rule of decision, as explained by the U.S. Court of Appeals for the Seventh Circuit in

United States v. Cinergy, 623 F.3d 455, 458 (7th Cir. 2010) ("The Clean Air Act does not authorize the imposition of sanctions for conduct that complies with a State Implementation Plan that the EPA has approved."). Thus, it was entirely reasonable for Ameren Missouri to credit and rely upon the interpretation of the SIP given by MDNR.

Q. What other things lead you to conclude that it was reasonable in 2007 and 2010 for Ameren Missouri to use this potential-to-potential test to evaluate NSR applicability?

A. The potential-to-potential test used in Missouri was consistent with the Clean Air Act. In fact, EPA proposed adoption of a similar test for NSR in 2005 and again in 2007. The 2007 proposal made by EPA specifically incorporated a two-step approach, similar to that set forth in the Missouri SIP.

> [W]e are proposing that major NSR applicability would include an hourly emissions increase test, followed by the current regulatory requirements for the actual-to-projected-actual emissions increase test to determine significance, and the significant net emissions increase test. We call this approach Option 1 and we are proposing it as our preferred option.
>
> …
>
> [C]hanges that will not increase the hourly emissions rate—such as those to make repairs to reduce the number of forced outages—do not require further review under Option 1. That is, if there would be no hourly emissions increase following a physical change or change in the method of operation, the proposed rule does not require a determination of whether a significant increase or a significant net emissions increase would occur.
>
> …
>
> However, if there would be an hourly emissions increase following a physical change or change in the method of operation, the proposed rule requires a determination of

> whether a significant increase or a significant net emissions increase would occur.

"Supplemental Notice of Proposed Rulemaking for Prevention of Significant Deterioration and Nonattainment New Source Review: Emission Increases for Electric Generating Units; Proposed Rule," 72 Fed. Reg. 26,202 26,205, 26,213 (May 8, 2007). Although EPA never finalized these proposals, it also issued a memorandum in 2005 stating that it did not intend to bring enforcement actions for alleged violations of NSR unless the conduct at issue would also have violated the proposed rule, requiring an increase in the hourly emissions (i.e., potential annual emissions) for NSR applicability. See Mem. from Marcus Peacock, Deputy Adm'r, EPA, to Reg'l Adm'rs & State Envtl. Comm'rs, "Fiscal Years (FY) 2005-2007 National Program Managers Guidance—Supplement" (Oct. 13, 2005).

The potential-to-potential test was also used by states beyond Missouri to evaluate projects for NSR. For example, in a jurisdiction with which I am very familiar and had responsibility for understanding, the Alabama Department of Environmental Management ("ADEM") took the same two-step approach. ADEM first examined whether "there was in increase in the maximum hourly rate of emissions" caused by a project. Decl. of Richard Grusnick ¶ 11, United States v. Ala. Power Co., CV-01-HS-0152-S (N.D. Ala.) (Oct. 7, 2004). If so, ADEM would then evaluate whether the projects would trigger NSR by causing an increase in annual emissions. Id. ¶¶ 9, 11 ("Only if the maximum hourly rate of emissions increased as the result of a project or activity could the activity potentially trigger [NSR] requirements."). Tennessee had a similar approach. Decl. of Barry R. Stephens ¶¶ 21-22, Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth., No. 3:01-cv-00071-TAV-HBG (E.D. Tenn. Apr. 11, 2008), ECF No. 129-2 ("Stephens Decl.").

Q. Was Ameren Missouri's conclusion, when it applied this potential-to-potential test to the Rush Island projects, reasonable?

A. Yes. No project increased a unit's design rate of emissions. No project increased the maximum achievable hourly rate of emissions at the units. Boll Decl. ¶¶ 7-8. There was no dispute of this in the underlying litigation: the projects did not cause an increase in the potential rate of annual emissions for either unit.

2. Evaluation of Actual Annual Emissions

Q. The second reason Ameren Missouri had for concluding that the Rush Island projects would not trigger NSR was that they would not be expected to cause an increase in actual annual emissions. Can you summarize Ameren Missouri's approach in making this evaluation?

A. Prior to the projects, Ameren Missouri performed a qualitative analysis of whether any of the projects would cause annual generation and emissions to increase. That analysis focused on the availability and dispatch of the units prior to the outages. Ameren Missouri's engineers understood that because the units had high annual availability pre-project and the component replacements were like-kind (i.e., not impacting maximum continuous rating or steam flow), that any difference in annual utilization between the pre-project period and the post-project period would be driven by changes in demand, rather than caused by the component replacements. Id. ¶¶ 13-18; Whitworth Decl. ¶¶ 11, 15.

Q. What bases did Ameren Missouri have in 2007 and 2010 for using this approach for evaluating whether projects would cause an increase in expected annual emissions?

A. Based upon my knowledge and experience, this qualitative analysis was common in the industry. Detailed calculations were not required. See United States v. Cinergy, 458 F.3d 705, 709 (7th Cir. 2006) ("[W]hat is required . . . is . . . merely a reasonable estimate of the amount of additional emissions that the change will cause."). The exhibits to the Kyra Moore deposition contain numerous examples of similar evaluations presented to and accepted by the regulator. See, e.g., Moore Dep. Ex. 2 at 70, AM-00025865-MDNR (Letter from Randy Raymond, Permit Section Chief, MDNR, to Charles Means, Manager, Envtl. Servs., Associated Elec. Coop., Inc. (undated, received May 19, 2003). These letters evidence a settled understanding between regulators and regulated parties about the types of evaluations required by the rules, and what the results would be. Ameren Missouri's qualitative evaluation was also consistent with the text of the 2002 NSR regulations.

Q. What do the NSR rules say about doing emission projections?

A. The rules are flexible. Under the 2002 NSR rules incorporated into the Missouri SIP in 2006, "projected actual emissions" are determined by calculating "the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project." 40 C.F.R. § 52.21(b)(41)(i) (2003). The rules instruct operators to "consider all relevant information" when estimating the post-project emissions, and require them to exclude the post-project emissions that are not caused by the projects. Id. § 52.21(b)(41)(ii)(*a*), (*c*).

Q. What do these rules say concerning causation?

A. Under both the Clean Air Act and the NSR regulations, causation is a core element of the definition of "modification" and "major modification." In other words, a project must cause the projected emissions increase for either a modification or a major modification to occur.

> The NSR regulatory provisions require that the physical or operational change "result in" an increase in actual emissions in order to consider that change to be a modification. . . . In other words, NSR will not apply unless EPA finds that there is a causal link between the proposed change and any post-change increase in emissions.

57 Fed. Reg. 32,314, 32,326 (July 21, 1992) (preamble to final rule commonly referred to as "the WEPCO Rule").

Nothing in either the statute or the regulations specifies how causation is to be determined. The only language in the regulations dealing with causation for projected emission increases is found in 40 C.F.R. § 52.21(b)(41)(ii)(*a*) and (*c*) (2003). These regulations required a source to exclude from any calculated increase "that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline . . . and that are also unrelated to the particular project, including any increased utilization due to product demand growth." Id. § 52.21(b)(41)(ii)(*c*). The regulations did not specify how sources were to determine the "relatedness" of any projected emissions. EPA has admitted that "there is no specific test available for determining whether an emissions increase indeed results from an independent factor such as demand growth, versus factors relating to the change at the unit." 63 Fed. Reg. 39,857, 39,861 (July 24, 1998). Thus, what emissions may be excluded as "unrelated" to a project or activity "'is a fact-dependent determination that must be resolved on a case-by-case basis.'" DTE Energy, 711 F.3d at 646 (quoting 57 Fed. Reg. at 32,327).

This was the language of the 2002 NSR regulations incorporated into the Missouri SIP in 2006, and it has not changed since that time.

Q. In promulgating the NSR rules, did EPA provide any guidance on evaluating causation?

A. Yes. When EPA first promulgated such language for use by electric utilities in 1992, it explained that under a "projected actual" rule, the causation test "focus[es] on the effect of any nonroutine changes on operating characteristics of the unit during the representative baseline period." 57 Fed. Reg. as 32,327. In other words, the "capable of accommodating" test is a "but-for" test. If increased operations "could not [have] be[en] accommodated . . . but for the proposed . . . change," the increase is "considered to result from the change." Id. at 32,326. If the projected increase in operations could have been accommodated even without the change, then the question is whether the nonroutine change is "the predominant cause of the [increased annual operations] . . . and demand growth is not." Id. at 32,327. Under this "predominant cause" test, the source looks to whether "independent factors such as demand growth . . . could have occurred and affected the unit's operations during the representative baseline period even in the absence of the physical or operational change." Id. If that is the case, the projected increased operations "cannot be said to result from the change" (i.e., they are unrelated to the change) and the source "need not include in their projection of post-change utilization that portion of the increased rate of utilization, if any." Id. at 32,326, 32,327.

Q. Did Ameren Missouri's approach to evaluating whether a project would cause an expected annual emission increase track EPA's regulations and guidance?

A. Yes. Ameren Missouri applied this approach in its pre-project evaluation of the Rush Island projects, just as it had in countless other projects. Based upon this experience with utility operations and maintenance, Ameren Missouri understood that none of the Rush Island projects would cause actual annual emissions to increase. Whitworth Decl. ¶¶ 11, 15. This was so for two reasons. First, the Rush Island units were capable of increased generation (and emissions) in the baseline period, absent any of the projects. Second, the projects consisted of like-kind replacement of components, without altering the design capacity of either unit. Thus, none of the projects would increase the hourly emissions rate or the potential annual emissions. In such circumstances, EPA has stated that the work should not be expected to cause an increase in actual annual emissions. See, e.g., 70 Fed. Reg. 61,081, 61,100 (Oct. 20, 2005) (the new source performance standards ("NSPS") hourly rate test "does not result in a substantially different outcome from the actual-to-projected-actual test . . . [because] a source can subtract from its post-project emissions those emissions that the unit could have accommodated during the baseline period and that are unrelated to the change").

Q. Was Ameren Missouri's conclusion, that the Rush Island projects would not cause an increase in expected annual emissions, reasonable?

A. Yes. Utility maintenance programs are based upon maintaining the availability of generating units. Maintaining availability is a requirement for system reliability. The Rush Island units had the availability to operate at higher annual levels of generation pre-projects. Whitworth Decl. ¶¶ 11, 15. In other words, they were capable of accommodating the post-project generation even without the component replacements. Moreover, it was reasonable to conclude that any post-project increases in emissions would be unrelated to the projects because the replacements were simply like-kind, and did not change the design or operation of the unit. As noted previously, MDNR agreed with similar conclusions concerning boiler component replacement, without requiring submission of emission calculations. Ameren Missouri knew this, and it was reasonable for Ameren Missouri to conclude as it did.

Q. In addition to Missouri, did other states follow a similar approach in evaluating whether a project would result in an increase in expected annual emissions?

A. Yes. For example, the State of Minnesota evaluated a potential air heater replacement for an existing Minnesota Power facility in 1992. Although the evaluation acknowledged a potential improvement in unit availability, the state concluded that the air heater replacement was not the cause of a projected emissions increase, but rather demand growth was. Minnesota therefore determined that the replacement would not trigger NSR. Schedule KRM-D5 (Facsimile from Ed Hoefs, Minnesota Pollution Control Agency, Air Quality Div., to Dennis Niemi, Minnesota Power, "Pre & Post Modification Emission Analysis" (Aug. 21, 1992)). This was one of the applicability determinations that Ameren Missouri and the utility industry studied. Hunton & Williams LLP, Presentation, "UARG PREP Committee, Project Evaluations for NSR Applicability," Washington, D.C., (Apr. 28, 2009).

3. <u>Evaluation of Routine Maintenance, Repair and Replacement</u>

Q. The third reason Ameren Missouri had for concluding that the Rush Island projects would not trigger NSR was that the projects were excluded from permitting requirements as "routine maintenance, repair or replacement" (hereinafter, "RMRR"). Was Ameren Missouri's approach to RMRR reasonable?

A. Yes. Ameren Missouri's approach to RMRR was to evaluate each individual component replacement and to determine whether replacement of that component was routine for the utility industry. This was a reasonable approach and consistent with what other electric utilities were doing.

Q. Please explain.

A. First, evaluating each component replacement separately for RMRR purposes was a reasonable approach. EPA's explanation of the RMRR exclusion in the WEPCO Rule preamble states that the inquiry "must be based on the evaluation of whether <u>that type of equipment</u> has been repaired or replaced by sources within the relevant industrial category." 57 Fed. Reg. at 32,326 (emphasis added). This describes a component-by-component approach to RMRR. EPA later recognized that just because projects may occur simultaneously does not mean that they must be aggregated as one. Rather, "inquiry into the nature of the activities and their relationship to each other is needed before deciding whether the activities must be aggregated under NSR." 68 Fed. Reg. 61,248, 61,258 (Oct. 27, 2003). Ameren Missouri was not required to aggregate all component replacements together into a single "project" for purposes of the RMRR review. In denying EPA's motion for summary judgment, seeking to establish that the individual component replacement projects constituted a single "project" at each unit, the District

Court found that there was authority on both sides of the aggregation question. United States v. Ameren Missouri, No. 4:11 CV 77 RWS, 2016 WL 728234, at *6-8 (E.D. Mo. Feb. 24, 2016). Because there were genuine issues of fact, the District Court denied EPA's motion for summary judgment. Id. at *8. This illustrates that reasonable minds could differ on the question of aggregation and the application of the RMRR exclusion. In my opinion, the aggregation test that the District Court ultimately used and applied at trial was unknown to the utility industry before the opinion was issued. Because Ameren Missouri's decisions have to be judged based on what it knew or should have known at the time, what the District Court later decided is not relevant to the question of whether Ameren Missouri acted reasonably in 2007 and 2010. For the reasons I have stated above, it was reasonable for Ameren Missouri to assess RMRR on a component-by-component basis.

Second, the "routine in the industry" standard applied by Ameren Missouri was correct. This was expressly stated by EPA in its 1992 WEPCO Rule preamble, and the standard adopted by the majority of courts in the NSR enforcement initiative. See Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth., No. 3:01-CV-71, 2010 WL 1291335, at *24-25, 29-31 (E.D. Tenn. Mar. 31, 2010); United States v. Duke Energy Corp., No. 1:00CV1262, 2010 WL 3023517, at *6-7 (M.D.N.C. July 28, 2010); Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth., 618 F. Supp. 2d 815, 825 (E.D. Tenn. 2009); Pennsylvania, Dep't of Envtl. Prot. v. Allegheny Energy, Inc., No. 05-885, 2008 WL 4960100, at *7 (W.D. Pa. Sept. 2, 2008); United States v. Ala. Power Co., 681 F. Supp. 2d 1292, 1309-10 (N.D. Ala. 2008); United States v. E. Ky. Power Coop., 498 F. Supp. 2d 976, 993 (E.D. Ky. 2007); Mem. Op. in Supp. of Order to Stay & Referral to Mediation at 8-9 & n.6, Sierra Club v. Tenn. Valley Auth., No. 3:02-cv-2279-VEH (N.D. Ala. May 23, 2006), ECF No. 110; United States v. Ala. Power Co., 372 F. Supp. 2d 1283, 1293, 1307 (N.D. Ala. 2005), order vacated in part, No. 2:01-cv-00152-VEH, 2008 WL 11383702 (N.D. Ala. Feb. 25, 2008); Order at 4, United States v. Duke Energy Corp., No. 1:00-cv-01262-WO-JEP (M.D.N.C. Feb. 23, 2004), ECF No. 294; United States v. Duke Energy Corp., 278 F. Supp. 2d 619, 635-37 (M.D.N.C. 2003), aff'd on other grounds, 411 F.3d 539 (4th Cir. 2005), vacated sub nom. Env'tl Def. v. Duke Energy Corp., 549 U.S. 561 (2007).

Q. Was Ameren Missouri required to limit application of RMRR to "de minimis" activities?

A. No. EPA had early and often stated that RMRR was not a "de minimis" exception to NSR review. In 1978, EPA's Director of Stationary Source Enforcement provided the following guidance on the scope of RMRR: "Routine replacement means the routine replacement of parts, within the limitations of reconstruction . . ." (i.e., at a cost of less than 50% of replacing the entire facility). Schedule KRM-D6 (Mem. from Edward E. Reich, Dir., Div. of Stationary Source Enforcement, EPA, to Howard G. Bergman, Dir., Enforcement Div. (6AE), Region VI, "PSD-Routine Maintenance, Repair and Replacement" (Oct. 3, 1978)). This is the only "bright line" that EPA has ever drawn with respect to the RMRR exclusion. In 1988, EPA issued its first and only determination before the start of the NSR enforcement initiative concerning the application of the RMRR exclusion to maintenance, repair and replacement activities at coal-fired electric utility units. In this determination, issued concerning the replacement of steam drums and refurbishment of boilers and turbines in a multi-year "life extension" project for the five units at the WEPCO Port Washington Plant, EPA concluded that the work would not be

RMRR. Letter from Lee M. Thomas, Adm'r, U.S. EPA, to John W. Boston, Vice President, Wis. Elec. Power Co., at 2, 3 (Oct. 14, 1988); Golden Rep. n. 122, 125-28.

After the 1988 WEPCO applicability determination, EPA conducted a survey of utility "life extension" activities and concluded that they can be routine and are not likely to trigger NSR. See id. at 4 (referring to survey of utility life extension projects).

Q. What is life extension and how does it demonstrate that RMRR projects need not be "de minimis"?

A. Utility life extension projects were studied by both EPA and Congress in the 1988 to 1991 timeframe, around the passage of the 1990 Clean Air Act Amendments. The results of this analysis were described in a 1990 GAO Report:

> Fossil fuel power plants traditionally were expected to have an operating service life of about 30 to 40 years, after which they would be replaced with new plants. However, in part to avoid the financial risks of constructing new plants, utilities increasingly [were] looking to extend the service life of older plants well past their assumed retirement age. Utilities' life extension projects encompass a variety of activities, including maintenance, repair and replacement of equipment.

U.S. GEN. ACCOUNTING OFFICE, GAO/RCED-90-200, ELECTRICITY SUPPLY; OLDER PLANTS' IMPACT ON RELIABILITY AND AIR QUALITY 2 (Sept. 1990) ("GAO Report").

The GAO Report provided several examples of utility life extension activities. Id. at 14-15. For example, at the Cincinnati Gas and Electric Company's Beckjord plant Unit 3, refurbishment of the unit "included replacing worn-out turbine-generator components" and other life extension work during a single planned outage of 13 weeks. Id. at 14. "After the renovation, the utility estimated that the 32-year old plant . . . could operate at an acceptable level of availability for another 25 years." Id.

EPA Administrator William Reilly wrote a letter to Congressman John Dingell in 1989 discussing EPA's survey of utility life extension projects, and noted that "[t]he survey did not result in the detection of any violations." Letter from William K. Reilly, Adm'r, U.S. EPA, to the Hon. John D. Dingell, Chairman, Subcomm. on Oversight & Investigations, Comm. on Energy & Commerce, U.S. House of Representatives, at 2 (Apr. 19, 1989); Golden Rep. n. 129. EPA thereafter assured the public, utilities, and Congress that such actions are not expected to trigger NSR. For example, in the 1990 GAO Report, EPA officials are cited for the proposition that "WEPCO's life extension project is not typical of the majority of utilities' life extension projects, and concerns that the agency will broadly apply the ruling it applied to WEPCO's project are unfounded." GAO Report at 30-31. The EPA officials also noted that life extension projects may not increase emissions, and that such life extension projections can be routine in nature. Thus, EPA's official "1989 emission[s] forecast assumed that the WEPCO decision would not result in a significant number of additional power plants' having to comply with the NSPS and the [NSR] program requirements." Id. at 31.

As noted above, the assumption that utilities were expected to refurbish their coal-fired units (often by aggregating major component replacements under the heading of "life extension") without triggering NSR controls was a fundamental assumption of the Clean Air Act Amendments of 1990. Even after passage of these amendments, EPA continued to assure Congress and the regulated public that life extension and boiler refurbishment would not trigger NSR. For example, EPA Assistant Administrator for Air William Rosenberg wrote in a letter to Congressman Dingell in 1991 that utility life extension projects can be routine. Letter from William G. Rosenberg, Assistant Adm'r for Air &

Radiation, U.S. EPA, to the Hon. John D. Dingell, Chairman, Subcomm. on Oversight & Investigations, Comm. on Energy & Commerce, U.S. House of Representatives, at 5 (June 19, 1991); Golden Rep. n. 141-142. Furthermore, EPA official Mary Nichols stated in 1995 that the RMRR provision in the rules encompasses restoration activities at a unit. See Letter from Mary D. Nichols, Assistant Adm'r for Air & Radiation, U.S. EPA, to William H. Lewis, Morgan Lewis & Bockius, at 19 (May 31, 1995) (response to Issue 6).

Shortly before Ameren Missouri undertook the projects at issue, EPA again declared that the RMRR exclusion was broader than a mere "de minimis" exception. In issuing a proposed rule for RMRR in 2002, EPA stated:

> We recognize that there are numerous occasions when, to maintain, facilitate, restore, or improve efficiency, reliability, availability, or safety within normal facility operations, facilities replace existing equipment with either identical equipment or equipment that serves the same function. Such replacements may be conducted immediately after component failure or they may be conducted preventively to assure a source's continued safe, reliable and efficient operation. We believe that many such replacements typically should be considered RMRR activities.

67 Fed. Reg. 80,290, 80,300 (Dec. 31, 2002). In finalizing that proposed rule in 2003, EPA stated: "We believe industrial facilities are constructed with the understanding that certain equipment failures are common and ongoing maintenance programs that include replacing components in order to maintain, restore, or enhance the reliability, safety, and efficiency of a plant are routine." 68 Fed. Reg at 61,253. Similarly, "[w]hen equipment is wearing out or breaks down, it often is replaced with equipment that serves the same purpose or function but is different in some respect or improved in some ways in comparison with the equipment that is removed." Id. If the replacement equipment is "functionally equivalent" and does not "change the basic design parameters of the affected process unit (*e.g.*, for

electric utility steam generating units . . . heat input and fuel consumption specifications)”, id., then according to EPA this should be “within the scope of ‘routine maintenance, repair and replacement.’” Id. For a summary of EPA’s statements in this rulemaking on the scope of the RMRR exclusion, and how those statements conflicted with EPA’s enforcement interpretation, see Mem. from Hunton & Williams to UARG PREP Committee, “August 27, 2003 Routine Maintenance, Repair, and Replacement (RMRR) Rule: Summary and Implications for Future Projects and NSR Enforcement Actions” (Sept. 9, 2003).

In 2006, EPA stated to the D.C. Circuit that it has historically interpreted the RMRR exclusion as “exclud[ing] at least some non-*de minimis* activities from NSR and NSPS.” EPA’s Pet. for Reh’g or Reh’g *En Banc* at 11, New York v. EPA, No. 03-1380 (D.C. Cir. May 1, 2006); 68 Fed. Reg. at 61,272 (EPA “did not consider the terms ‘modification’ or ‘change’ to cover everything other than *de minimis* activities”).

The District Court’s application of the “de minimis” standard for RMRR departed from the consistent statements from EPA’s program office over decades. It is not reasonable to expect Ameren Missouri to have foreseen that years later a court would depart from the industry’s clear understanding of how EPA itself viewed the rules in 2007 and 2010.

Q. Did Ameren Missouri reasonably conclude in 2007 and 2010 that the Rush Island projects were RMRR?

A. Yes, Ameren Missouri reasonably concluded that the Rush Island projects were excluded from permitting as RMRR. In order to understand how it reached that conclusion, it is important to know what Ameren Missouri was doing as it considered, approved, and implemented these projects. Number one, Ameren Missouri changed fuels at Rush Island in order to meet the requirements of the 1990 Clean Air Act Amendments. In switching to low-sulfur coal sourced in the Powder River Basin ("PRB") of Wyoming, Ameren Missouri was taking a compliance approach consistent with what the industry as a whole was doing in response to the 1990 Clean Air Act Amendments. The 1990 Clean Air Act Amendments' cap-and-trade program was designed to permit utilities like Ameren Missouri to select fuel switching to meet new SO_2 reduction requirements. Lower-sulfur fuel could in some cases necessitate repairs through like-kind replacement of boiler components in order to ensure unit reliability. In order to gain operational and economic efficiencies, Ameren Missouri moved to a six-year maintenance cycle that would have directly benefitted Missouri consumers by ensuring that routine repairs and replacements would be done at the same time, to minimize planned outage hours and keep repair costs low. Simultaneously performing these routine projects would have resulted in efficiencies of direct benefit to Missouri electric customers and maximized system availability. It has been common industry practice to take advantage of planned outages to perform multiple repairs and replacements as needed. It was reasonable and prudent for Ameren Missouri to undertake RMRR activities in this way and under this schedule. At the time they did so, there was ample authority to view these projects as RMRR, even though they were done at the same time.

Q. What were those authorities?

A. First, the replacements were common for Ameren Missouri. Ameren's employee David Boll testified about several similar component replacements at other Ameren Missouri plants. Tr. of Dep. of David Boll at 62 (Sept. 5, 2014); Boll Decl. ¶ 14.

See also Whitworth Decl. ¶¶ 10, 14. As an Ameren Missouri witness explained in direct testimony before this Commission in 2009: "Capital expenditures and continuing maintenance are integral to the continued operation of a power plant and are routine in the industry. Without ongoing capital expenditures, a plant will become increasingly less reliable and ultimately cannot operate." Direct Testimony of Larry W. Loos, P.E. on behalf of Union Electric Co. d/b/a AmerenUE, Mo. Pub. Serv. Comm'n, Case No. ER-2010-0036 at 11 (July 2009). The integrated resource plans filed by Ameren Missouri and its predecessors plainly describe its longstanding maintenance practices.

> AmerenUE continually reviews its existing units to determine the economic value of improving plant efficiency. Periodically, projects are evaluated for maintaining and improving availability and/or efficiency. Boiler components, heat exchangers, controls, etc. are evaluated and replaced or improved, if justified.

Ameren UE, "Integrated Resource Plan, Integrated Resource Analysis," at 113 (Dec. 2005) (AM-00073835). See also Union Electric, "Integrated Resource Plan," at 2-6 to 2-7 (Dec. 1993) (AM-00175804-05) (same).

Second, based upon my own experience, these types of projects were routinely undertaken within the utility industry. A report prepared by the federal government's own utility—the Tennessee Valley Authority ("TVA")—makes this clear. TVA provided public notice of this report in the Federal Register in 2000. 65 Fed. Reg. 35,154 (June 1, 2000). The large number of similar component replacements targeted by EPA across the electric utility industry underscored how common and routine these activities were. See Mem. from Hunton & Williams LLP to UARG PREP Committee, "Summary of Allegations in New Source Review Enforcement Initiative" (May 16, 2007) (tallying the component replacement projects targeted in the enforcement initiative).

Third, MDNR considered similar projects RMRR. In addition to defining boiler tube replacements as an example of routine maintenance in its regulations, MDNR issued specific applicability determinations on the application of the RMRR exclusion. For example:

- In 2003, MDNR found replacement of boiler tubes at the cost of $1.2 million to be RMRR. Moore Dep. Ex. 2 at 67, Letter from Kyra L. Moore, Interim NSR Unit Chief, MDNR, to Tad Johnsen, Power Production Superintendent, Columbia Municipal Power Plant (Dec. 23, 2003), AM-00025849-MDNR. The expected cost was approximately 2.5% of the cost to replace the unit. Id.[3]

- In 2009, MDNR found that replacement of boiler tubes, including all of the superheater pendant tubes, at Independence Power & Light's Missouri City Unit 2 was a routine repair. Moore Dep. Ex. 2 at 169, Letter from Kyra L. Moore, Permits Section Chief, MDNR, to Dayla Bishop Schwartz, Deputy City Counselor, City of Independence, MO, (July 17, 2009), AM-00024473-MDNR.

Fourth, other states determined similar projects to be RMRR. For example:

- Pennsylvania considered replacement of reheaters on boilers RMRR. Tr. of Nonjury Trial Proceedings, Testimony of Joseph Pezze at 46, *Pennsylvania, Dep't of Envtl. Prot. v. Allegheny Energy, Inc.*, No. 05-885 (W.D. Pa. Sept. 27, 2010).

- Tennessee considered "[p]rojects that maintain or restore the safety, reliability, availability or efficiency of a unit, plant, or process are typical of the kind of projects that are common at plants and fall within this [RMRR] exclusion" under the Tennessee regulations. Stephens Decl. ¶ 19.

- In 1998, North Dakota found a turbine upgrade at the Coal Creek Plant to be routine. Letter from Dana K. Mount, P.E., Dir., Div. of Envtl. Eng'g, N.D. Dep't of Health, Envtl. Health Section., to Mary Jo Roth, Mgr., Envtl. Servs., Cooperative Power at 1 (Dec. 17, 1998), AM-00896287-NDH.

- In 2000, North Carolina found the replacement of a heat exchanger in a sulfuric acid plant to be routine. Letter from Donald R. van der Vaart, Supervisor, Permitting Branch, N.C. Dep't of Env't & Nat. Res., to Pete Wind, Envtl. Eng'r, PCS Phosphate Co., Inc. at 3 (Dec. 5, 2000). The project was expected to cost more than 3% of what it would cost to build a new plant. Id. at 3.

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[3] The relative cost of component replacement, in comparison to the cost of replacing the unit, is relevant for two reasons. First, spending more than 50% of the unit replacement cost triggers NSPS reconstruction review. Second, this 50% threshold is the only bright line for identifying a non-routine project under the NSR rules. Schedule KRM-D6.

- In 2000, the State of Washington found the replacement of generating bank tubes and economizer tubes on a boiler to be routine. Letter from Alan Newman, State of Washington, Dep't of Ecology, to Dan Meyer, EPA Region X (Dec. 13, 2000). The project was expected to cost about 8% of the cost of replacing the entire boiler. Id. at 2.

- In 2002, North Carolina found that a boiler repair, intended to restore its reliability, would be routine. Letter from Donald R. van der Vaart, P.E., Supervisor, Permitting Branch, N.C. Dep't of Env't & Nat. Res., Div. of Air Quality, to Derric Brown, Mgr, Envtl. Affairs, Blue Ridge Paper Products, Inc. at 4 (Jan. 16, 2002), AM-00896803-SCDHEC. The project was expected to cost less than 4% of the replacement cost of the boiler. Id.

- In 2002, Florida found that replacing 60% of the steam generating bank tubes and replacing all of the roof tubes would be routine. Letter from C.H. Fancy, Chief, Bureau of Air Regulation, Fla. Dep't of Envtl. Prot., to William A. Raiola, Vice President, United States Sugar Corp. at 1-2 (Mar. 22, 2002), EPA4_AME056858–59.

- In 2003, the Lincoln-Lancaster County Health Department, at the request of the Nebraska Department of Environmental Quality, found the replacement of tube bundles on a fluidized bed combustion unit boiler to be routine. Letter from Gary Walsh, Envtl. Eng'r, Lincoln-Lancaster Cty. Health Dep't, to Michelle L. Bublitz, Envtl. Mgr., ADM Processing Div., Archer-Daniels-Midland Co. at 1-2 (June 25, 2003), EPA7_AME155697.

- In 2004, North Carolina found that replacement of approximately 12% of a boiler's steam tubes was routine. Letter from Donald R. van der Vaart, P.E., Supervisor, Permitting Branch, N.C. Dep't of Env't & Nat. Res., Div. of Air Quality, to Jaysen Schock, Facility Superintendent, Cargill, Inc. at 2 (Sept. 22, 2004), AM-00972098-NCDENR. The project was expect to cost less than 6% of the replacement cost of the facility. Id.

- In 2004, Wisconsin found that replacement of all superheater tubes on a boiler would be routine. Letter from Steven Dunn, NSR Team Leader, Bureau of Air Mgmt., Wis. Dep't of Nat. Res., to Susan Siepkowski, U.S. EPA – Region V at 1-2 (Aug. 13, 2004), EPAHQ_AME027548–49.

- In 2006, Oklahoma found that replacement of reheater outlet tube bank, the secondary superheater inlet tube bank, the primary air heater baskets, and the low-nitrogen oxide ("NOx") burners on a boiler would be routine, despite the fact that they were all done in one outage that was longer than the typical outage for the unit. Mem. from Grover R. Campbell, P.E., Existing Permit Section, Okla. Dep't of Envtl. Quality, Air Quality Div., to Dawson Lasseter, P.E., Chief Eng'r, Okla. Dep't of Envtl. Quality, "Evaluation of Permit Application No. 97-058-AD (M-3) Proposed Repair/Maintenance Activities, Western Farmers Electric Cooperative, Hugo Unit 1, Hugo, Choctaw County" (May 5, 2006), EPA6_AME088164–75. The tube replacements involved approximately 12% of the total boiler tubes. Id. at 8, EPA6-AME088171.

- In 2008, North Carolina found replacement of all waterwall tubes on a boiler, expected to cost over 10% of what it would cost to replace the boiler, to be RMRR. Letter from Donald R. van der Vaart, Ph.D., P.E., Chief, N.C. Dep't of Env't & Nat. Res., Div. of Air Quality, to Karen B. Wrigley, Plant Mgr., E.I. du Pont de Nemours & Co., LLC at 3 (May 8, 2008), AM-00972066_NCDENR.

- In 2010, North Carolina found that replacement of waterwall tubes (at the cost of $30 million) and the primary superheater tubes (at the cost of $5 million) on a coal-fired electric utility boiler was routine. Letter from Donald R. van der Vaart, Ph.D., J.D., P.E., Chief, N.C. Dep't of Env't & Nat. Res., Div. of Air Quality, to Harry Sideris, Plant Mgr., Roxboro Steam Elec. Plant, Progress Energy Carolinas, Inc. at 2 (May 27, 2010), AM-00972044-NCDENR. Respectively, the two projects were expected to cost 2% and 0.33% of the cost to replace the facility. Id.

Finally, as noted above, EPA acknowledged utility life extension projects can be RMRR. Because life extension often involved an aggregation of component replacements performed in a single outage, EPA has recognized that a collection of routine replacements performed simultaneously can remain routine, even as an aggregated life extension "project." Even if one aggregates the component replacement projects together for Unit 1 and for Unit 2 at Rush Island, they were less costly and less extensive than the "massive" and "unprecedented" WEPCO Port Washington project. Wis. Elec. Power Co. v. Reilly, 893 F.2d 901, 911 (7th Cir. 1990). They were also less costly and less extensive than other life extension projects that EPA surveyed in 1988-1990 and found not to pose any NSR concerns. This comparison was performed by one of Ameren Missouri's experts in the litigation in the Eastern District of Missouri. Expressing all costs in 2010 dollars and using the $/kilowatt metric to control for the different size of units, the expert calculated that the aggregated costs of the projects on Unit 1 at Rush Island were less than a fifth of the WEPCO project and less than a third of the Beckjord Unit 3 life extension project, which

EPA examined and found not to violate NSR. Report of Jerry L. Golden (redacted) at 136 (May 16, 2014).[4] Similarly, the aggregated cost of the projects on Unit 2 at Rush Island were less than a quarter of the cost of the WEPCO project and roughly a third of the cost of the Beckjord Unit 3 life extension project. Id. at 161.

Q. Do subsequent court decisions mean that Ameren Missouri's application of the RMRR exclusion was unreasonable?

A. No. On the contrary, they support Ameren Missouri. District courts in Tennessee (National Parks Conservation Association v. TVA) and Pennsylvania (Pennsylvania, Department of Environmental Protection v. Allegheny Energy Inc.) found similar projects were excluded as RMRR. And even though the District Court ultimately reached a different conclusion here, it is important to note that this required a trial, indicating that reasonable minds could differ on the RMRR question. On EPA's motion for summary judgment, the District Court denied EPA's attempt to establish that the projects were not RMRR as a matter of law. Ameren Missouri, 2016 WL 728234, at *6-8. The District Court held that there were genuine issues of fact that could support a finding that the Rush Island projects were RMRR, even if aggregated. The District Court's summary judgment decision is consistent with the fact that there are few bright lines with respect to the RMRR exclusion. Thus, as an original member of EPA's enforcement initiative team testified, "reasonable people can come to different conclusions" regarding the applicability of the RMRR exclusion. Tr. of Dep. of John Hewson, United States v. Ala. Power Co., No. CV-01-HS-0152-S at 44 (N.D. Ala. June 8, 2009) ("Hewson Dep.").

[4] I understand that the Report of Jerry L. Golden contains information claimed as confidential by third parties. That information was redacted from the version of Mr. Golden's report that was provided to me, and the only confidential information in the redacted report given to me belongs to Ameren Missouri.

VI. INDUSTRY PRACTICE CONFIRMS THE REASONABLENESS OF AMEREN MISSOURI'S DECISIONS

Q. You testified above that Ameren Missouri's Rush Island projects were common in the utility industry. Did the electric utility industry generally seek NSR permits for such projects?

A. No, based upon my experience from 1986 to 2015, utilities were not routinely seeking NSR permits for such activities, despite the litigation positions developed by EPA after 1999. NSR is a self-implementing program, in which pre-approval of applicability decisions is neither required nor practical (given the large number of such decisions that have to be made annually). EPA guidance on application of the RMRR exclusion called for utilities to consider all the relevant facts, and make a "common-sense" decision. Similarly, the NSR regulations allowed utilities the flexibility to apply their own engineering judgment and operational experience in evaluating "all relevant information" to project emissions increases and identify any projected increases that would be caused by a non-routine physical change. At all relevant times, it was widely understood across the utility industry that performing like-kind component replacements on existing units, in order to maintain the availability, reliability and safety of these assets, would not trigger NSR.

Q. Before the industry-wide enforcement initiative launched by EPA in 1999, did EPA take the position that NSR permits were required for such projects?

A. At no point prior to 1999 were projects like these alleged to trigger NSR. As an original member of EPA's enforcement initiative described it, this initiative "certainly it was designed to force the companies to fundamentally change the way that they do maintenance activities, because they would be forced to get a permit for a vast majority of the maintenance activities which they hadn't been forced to do in the past." Hewson Dep. at 21.

Q. How did the utility industry react to the enforcement initiative?

A. EPA's litigation positions concerning the meaning and application of the NSR rules conflicted with the official statements coming from EPA's program office with responsibility for the NSR program. EPA's litigation position also conflicted in many instances with the state NSR programs, and those state NSR programs were the law—regardless of litigation positions that one part of EPA may choose to take. The projects targeted in the enforcement initiative are critical to the continued operation of vital infrastructure and required by prudent utility practice. Utilities therefore continued to perform projects like those at Rush Island, consistent with the guidance provided by EPA's program office, the agency's senior leaders, and the relevant state authorities.

Q. What have the results of EPA's enforcement initiative been?

A. As the U.S. Court of Appeals for the Third Circuit recognized, the NSR enforcement initiative against electric utilities has been "'the largest, most contentious industry-wide enforcement initiative in EPA history.'" United States v. EME Homer City Generation, L.P., 727 F.3d 274, 281 (3rd Cir. 2013) (citation omitted). In the course of this enforcement initiative, many courts have rejected EPA's unpromulgated enforcement interpretations of the NSR rules, and held that projects like those Ameren Missouri performed do not trigger NSR. For example:

- EPA launched its enforcement initiative with a proceeding in its Environmental Appeals Board ("EAB") against the federal government's own electric utility, the Tennessee Valley Authority ("TVA"). The EAB issued an order that attempted to change the settled meaning of the NSR rules. TVA challenged the EAB order in the U.S. Court of Appeals for the Eleventh Circuit, which rejected EPA's attempt as a "patent violation of the

Due Process Clause" that "lacked the virtues of most agency adjudications." Tenn. Valley Auth. v. Whitman, 336 F.3d 1236, 1245-46, 1258-59 (11th Cir. 2003). The Eleventh Circuit therefore declared EPA's order to be "legally inconsequential" and held that "TVA is free to ignore [it]." Id. at 1239-40.

- On cross-motions for summary judgment, the U.S. District Court for the Middle District of North Carolina rejected EPA's litigation positions on RMRR and emissions increase. United States v. Duke Energy Corp., 278 F. Supp. 2d 619 (M.D.N.C. 2003), aff'd on other grounds, 411 F.3d 539 (4th Cir. 2005), vacated sub nom. Envt'l Def. v. Duke Energy Corp., 549 U.S. 561 (2007). The District Court found EPA's new interpretation of the NSR program contrary to "EPA's statements in the Federal Register, its statements to the regulated community and Congress, and its conduct for at least two decades . . . ." Id. at 637. In ruling against EPA's unsuccessful attempt to relitigate this decision, the U.S. District Court for the Middle District of North Carolina noted EPA's propensity to "sp[eak] out of both sides of its mouth" on the issue of NSR applicability. Order at 3, United States v. Duke Energy Corp., No. 1:00-cv-01262-WO-JEP (M.D.N.C. Feb. 23, 2004), ECF No. 294. Although the U.S. Supreme Court ultimately reversed the decision concerning the proper emissions increase test under the NSR rules, it also held that whether EPA could apply its emissions increase test remained an issue to be decided under the doctrine of fair notice. Envtl. Def. v. Duke Energy Corp., 549 U.S. at 581-82. After remand, EPA was again unable to get the court to adopt its litigation position on RMRR. United States v. Duke Energy Corp., No. 1:00CV1262, 2010 WL 3023517, at *6-7 (M.D.N.C. July 28, 2010). EPA then dropped most of its claims, Stipulation of Dismissal of Certain Claims and Defenses, United States v. Duke Energy Corp., No. 1:00-cv-01262-WO-JEP (M.D.N.C. Aug. 5, 2011), ECF No. 418, and after additional litigation settled the remainder.

- In ruling against EPA on the meaning and application of the NSR rules, the U.S. District Court for the Northern District of Alabama criticized EPA for the "zigs and zags represented by its contradictory . . . statements and rules" and its failure to speak "with one voice, or a consistent voice, or even a clear voice" on the application of the NSR program. United States v. Ala. Power Co., 372 F. Supp. 2d 1283, 1306 (N.D. Ala. 2005), order vacated in part, No. 2:01-cv-00152-VEH, 2008 WL 11383702 (N.D. Ala. Feb. 25, 2008). The same court characterized EPA's enforcement initiative as a "sport, which is not exactly what one would expect to find in a national regulatory enforcement program." Id. at 1306 n.44. The court conducted an extensive review of EPA's prior statements about the RMRR exclusion and compared them to EPA's litigating position. Applying the factors set out by the United States Supreme Court in United States v. Mead Corp., 533 U.S. 218 (2001), the court found that EPA's litigation position on RMRR failed four of the five Mead factors and was not, therefore, entitled to deference. Id. at 1306.

The court therefore rejected EPA's litigation position on the scope and application of the RMRR exclusion. Id. at 1290, 1307.

- In the Memorandum Opinion on Sierra Club Motion to Reconsider Stay and Referral to Mediation, Sierra Club v. TVA, No. 3:02-cv-2279-VEH, slip op. at 9 (N.D. Ala. July 5, 2006), ECF No. 117, the District Court stated "I do not see how anyone can say with a straight face that EPA's" litigation position on NSR was the same as the published regulations.

- In denying summary judgment to EPA, the U.S. District Court for the Eastern District of Kentucky held that EPA's enforcement interpretations deserve no deference because the agency "takes an inconsistent view of the regulations, makes inconsistent statements with respect to the regulation, and also enforces the regulation with no discernable consistency."). United States v. E. Ky. Power Coop., 498 F. Supp. 2d 976, 993 (E.D. Ky. 2007).

- In reaffirming its rejection of EPA's litigation position in 2008, the United States District Court for the Northern District of Alabama stated "[i]t would take a strained reading" of the relevant history to support EPA's litigation position.

> This court believes it is superficial and insufficient to quote the Clay Memorandum [on WEPCO] and say it forecloses all further discussion. The EPA continued to publish statements about enforcement and RMRR after the Clay Memorandum [in 1988]. Those statements did not occur in a vacuum; the court believes the EPA meant what it said when it called the modifications in *WEPCO* extraordinary and that the EPA did not anticipate bringing additional enforcement actions because of *WEPCO*. The fact that years passed before it did so speaks for itself. The electric utility industry was reading what the EPA was publishing, *e.g.*, EPA's response to Congressman Dingell's "inquiry."
>
> …
>
> [EPA] could not tell Congress it envisioned very few *future WEPCO*-type enforcement actions on the one hand, and then argue in subsequent enforcement actions that the utility industry was unreasonable in relying on those, or similar, EPA statements.

United States v. Ala. Power Co., 681 F. Supp. 2d 1292, 1309, 1310 (N.D. Ala. 2008).

- In a 2008 trial in the Southern District of Indiana, the jury largely rejected the emissions increase methodology that EPA later used at trial against Ameren Missouri. Verdict Form, United States v. PSI Energy, Inc., No. 1:99-cv-01693-LJM-JMS (S.D. Ind. May 22, 2008), ECF No. 1339 (finding for defendants on 10 of 14 projects).

- In denying summary judgment to Plaintiffs, the U.S. District Court for the Western District of Pennsylvania held that the emissions increase opinions offered by EPA's experts were insufficient as a matter of law to establish liability. Pennsylvania, Dep't of Envtl. Prot. v. Allegheny Energy, Inc., No. 02-05cv885, 2008 WL 4960090, at *6-7 (W.D. Pa. Nov. 18, 2008). That same court also rejected the narrow enforcement initiative interpretation of RMRR advanced by EPA. Pennsylvania, Dep't of Envtl. Prot. v. Allegheny Energy Inc., No. 05-885, 2008 WL 4960100, at *7 (W.D. Pa. Sept. 2, 2008).

- When given a second bite at the apple, on retrial of six of the projects for which the jury in 2008 found for Defendants, EPA again lost on four of the six projects. Verdict Form, United States v. PSI Energy, Inc., No. 1:99-cv-01693-LJM-JMS (S.D. Ind. May 19, 2009), ECF No. 1742 (finding for defendants on four of the six re-tried projects). The special verdict form makes it clear that the jury rejected EPA's emissions increase methodology on these projects. Special Verdict Form, United States v. PSI Energy, Inc., No. 1:99-cv-01693-LJM-JMS (S.D. Ind. May 19, 2009), ECF No. 1744.

- In ruling on summary judgment, the United States District Court for the Eastern District of Tennessee also rejected the narrow interpretation of RMRR advanced in the enforcement initiative. Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth., 618 F. Supp. 2d 815, 825 (E.D. Tenn. 2009). After trial, that same court held that projects like those Ameren Missouri performed at Rush Island were RMRR and therefore excluded from NSR review. Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth., No. 3:01-CV-71, 2010 WL 1291335, at *24-31 (E.D. Tenn. Mar. 31, 2010).

- In reversing a jury verdict for EPA, the Seventh Circuit held that the emissions increase opinions offered by EPA's experts at trial were unreliable and inadmissible. United States v. Cinergy Corp., 623 F.3d 455, 458-61 (7th Cir. 2010).

At the time that construction of the last projects at Rush Island commenced in 2010, courts had largely rejected the litigation position that EPA had advanced in the enforcement initiative. Although a few courts had deferred to EPA's litigation position early in the enforcement initiative, by 2007 the U.S. Supreme Court had started drawing lines illustrating that such deference was inappropriate. Compare Long Island Care at Home, Ltd. v. Coke, 551 U.S. 158, 170-71 (2007) (deferring to new interpretation that "create[d] no unfair surprise" because agency had adopted it through notice-and-comment rulemaking) with Christopher v. SmithKline Beecham Corp., 567 U.S. 142, 156 (2012) (citing Long Island Care, 551 U.S. at 170-71, and refusing to defer to agency interpretation announced for the first time in an enforcement proceeding); see also Duke Energy, 549 U.S. at 581-82 (remanding with instructions to address the issue of whether EPA had provided "fair notice" of its regulatory interpretations).[5] The landscape of court cases arising from the enforcement initiative provided additional context at the time Ameren Missouri made its decisions about Rush Island and those court decisions reinforce the reasonableness of Ameren's actions.

Q. Does this conclude your direct testimony?

A. Yes, it does.

[5] The U.S. Supreme Court cited both Long Island Care and Christopher in severely limiting the applicability of the doctrine of deference to agency interpretation of regulations. Kisor v. Wilkie, 139 S. Ct. 2400, 2417-18 (2019).

DIRECT TESTIMONY OF KARL R. MOOR
CASE NO. ER-2022-0337
<u>SCHEDULES</u>

Index

Schedule	Description
KRM-D1	Curriculum Vitae of Karl R. Moor
KRM-D2	U.S. v. Ameren Missouri, ECF 568-1, Declaration of Steven Whitworth (without exhibits)*
KRM-D3	U.S. v. Ameren Missouri, ECF 568-4, Declaration David Boll (without exhibits)*
KRM-D4	MDNR General Guidance for Air Construction Permits – Permit Applicability Determination for Criteria Air Pollutants (5/31/2011) (excerpts)
KRM-D5	Minnesota Pollution Control Agency: Pre and Post Modification Emission Analysis (Aug. 21, 1992)
KRM-D6	Memo from E. Reich, Director of Stationary Source Enforcement to H.G. Bergman, Director of Enforcement Div. 6AE, Region VI re: PSD-Routine Maintenance Repair and Replacement (Oct. 3, 1978)

*As noted on the face of Schedule KRM-D2 and Schedule KRM-D3, these declarations were redacted pursuant to the protective order, governing the use of confidential business information, entered by the U.S. District Court for the Eastern District of Missouri. The versions of these declarations provided here are the redacted versions, without exhibits, filed in the District Court.

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Professional Experience

Deputy Assistant Administrator for Policy - OFFICE OF AIR & RADIATION AT THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Washington D.C. (2019-2021)

Counsel - BALCH & BINGHAM LLP, Birmingham, Alabama (2016-2018)

Sr. Vice President & Chief Environmental Counsel - SOUTHERN COMPANY SERVICES INC., Birmingham, Alabama (2012-2015)

General Counsel & Compliance Officer - SOUTHERN TRANSMISSION, (SOUTHERN COMPANY) Atlanta, Georgia (2005-2011) - Additional role while performing other duties.

Vice President & Associate General Counsel for Litigation & Public Policy - SOUTHERN COMPANY, Washington, D.C. (1998-2012)

Partner, BALCH & BINGHAM LLP, UTILITY, LEGISLATIVE & REGULATORY SECTION, Washington D.C. (1986-1998)

Special Assistant for Legislative Affairs, *Political Appointee* (Reagan Administration) UNITED STATES DEPARTMENT OF EDUCATION (1985-1986)

Senior Legislative Assistant, UNITED STATES SENATE - Advising Senator J.A. Denton (R-AL). (1985-1985)

Staff Director, UNITED STATES SENATE, LABOR AND HUMAN RESOURCES COMMITTEE, SUBCOMMITTEE ON FAMILY AND HUMAN SERVICES. (1984-1985)

Professional Staff Member, UNITED STATES SENATE, LABOR AND HUMAN RESOURCES COMMITTEE, SUBCOMMITTEE ON AGING, FAMILY AND HUMAN RESOURCES. (1982-1984)

Professional Staff Member, UNITED STATES SENATE, COMMITTEE ON THE JUDICIARY, SUBCOMMITTEE ON SECURITY AND TERRORISM. (1981-1982)

Professional Staff Member, UNITED STATES SENATE, LABOR AND HUMAN RESOURCES COMMITTEE, SUBCOMMITTEE ON AGING, FAMILY AND HUMAN SERVICES (1981-1981)

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Bar Memberships

Member, Alabama State Bar Association, United States District Court for the Northern District of Alabama, The United States Court of Appeals for the Eleventh Circuit, the United States Court of Appeals for the District of Columbia Circuit and the United States Supreme Court.

Education

1986 J.D., Georgetown University Law Center, Washington, D.C.

1982 M.A., The George Washington University, Washington, D.C.
Public & International Affairs; Science, Technology and Public Policy, Scottish Rite Fellow

1979 B.A., University of Montevallo, Montevallo, Alabama
Phi Kappa Phi

1974 University of Haifa, Haifa, Israel
Middle East Studies

Married, father of five adult daughters.

Biography

Mr. Moor has represented utilities and other businesses, and managed industry coalitions both as outside counsel and as a senior executive. On environmental matters, he has provided decision-making on major legislation, led industry efforts to influence the development of regulations, and helped lead joint defense efforts at the district court, circuit court, and at the U.S. Supreme Court levels. He has had executive legal management authority in defending clients in federal enforcement matters involving the control, use, and development of CO_2 and other emissions as both a policy and business matter.

Early in his career, Mr. Moor played a lead role in the development of the Clean Air Act Amendments of 1990 as a loaned executive to the Clean Air Working Group (CAWG) and also as counsel to Southern Company Services, Inc. Additionally, as a utility regulatory lawyer, he has extensive experience with the Federal Power Act and the Tennessee Valley Authority Act.

During his time at Southern Company, Mr. Moor led industry efforts to fight EPA's New Source Review enforcement initiative and to defend against global climate change mass tort suits. He has extensive experience advising on climate and carbon dioxide (CO_2) policy. At Balch & Bingham LLP, he advised clients on CO_2 policies and international economic and regulatory developments related to CO_2 policy and carbon capture utilization and storage.

Mr. Moor played a principal role in Southern Company's international activities, with a particular focus on environmental and technology issues. On behalf of the Company he attended in numerous UN Conference of the Parties meetings, designed to help implement the 1997 Kyoto Protocol and the development of the various successor accords. He helped lead efforts to interest governments, state owned enterprises and private companies in new clean coal generation technologies (with support from the Department of Energy). That effort necessitated extensive travel and work in China, Japan, Norway and the European Union. For example, he was part of a U.S. Trade Delegation to China (joint between the Departments of Commerce and Energy) for the same purpose of promoting the clean coal technology known as TRIG and for the construction of TRIG facilities in southern China and Eastern Europe. During this period, he served as a member of the board of directors for the Atlantic Council.

Mr. Moor served as Co-Convener (co-chief executive) of the Carbon Sequestration Council, an association of companies primarily in the petroleum, electric power utility and coal mining industries designed to build cross-industry and multi-stakeholder consensus on the key CCUS-related issues, including policy, funding, and messaging. The Council facilitated information sharing and coordination to promote policies, legislation and regulatory frameworks that foster the use of CO_2 for enhanced oil recovery as well as the early use and commercial deployment of CCUS as an accepted and creditable means of addressing greenhouse gas mitigation. In addition, he served as chair of the Edison Electric Institute Task Force on Carbon Capture and Sequestration.

At the EPA, Mr. Moor had the policy lead for the development of final rules with respect to 1) establishing a pollutant-specific contribution threshold for evaluating when stationary sources of GHGs trigger New Source Performance Standards (NSPS) under the Clean Air Act; 2) the SAFE Rule regulating GHG emissions from automobiles under CAFE, and, 3) the OOOOa NSPS regulatory and policy packages governing the regulation of methane emissions from oil and gas sources. In addition, Mr. Moor worked on the implementation of the Affordable Clean Energy Rule (ACE).

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	**Case No. 4:11-CV-00077-RWS**
v.	)	**Judge Rodney W. Sippel**
	)	
AMEREN MISSOURI,	)	
	)	
Defendant.	)	
	)	

AMEREN MISSOURI'S SUMMARY JUDGMENT MOTIONS

EXHIBIT A1

PORTIONS REDACTED PURSUANT TO ECF # 90

PART 1 OF 3

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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	**Case No. 4:11-CV-00077-RWS**
v.	)	
	)	**Judge Rodney W. Sippel**
AMEREN MISSOURI,	)	
	)	
Defendant.	)	
	)	

DECLARATION OF STEVEN WHITWORTH

I, Steven Whitworth, am over 18 years of age and make the following declaration pursuant to 18 U.S.C. § 1746:

1. I make this declaration on behalf of Ameren Missouri ("Ameren") based on my personal knowledge, and the records of Ameren or information available through employees of Ameren. I am prepared to testify to the following facts if called as a witness.

2. I am employed by Ameren Services Company, which provides services to Ameren Corporation's operating companies, including Ameren Missouri (which I will generally refer to below as "Ameren"). I have worked in Ameren's Environmental Services Department for over 16 years, and since 2007 I have managed and directed that Department. My title is Senior Director, Environmental Policy and Analysis. I am familiar with Ameren's emissions assessments for the 2007 and 2010 Projects at issue in this case.

Assessment of Projects for Construction Permitting Applicability

3. Ameren's Environmental Services Department ("Environmental Services") plays a lead role in evaluating whether environmental permits are required for activities Ameren

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undertakes, including whether major New Source Review ("NSR") or other construction permits are required under the Missouri State Implementation Plan ("SIP") Construction Permitting Rule, 10 C.S.R. 10-6.060. Typically, we reach a consensus decision within Environmental Services on permit applicability through collaborative discussion.

4. To assess the nature of a project and to determine whether it should be considered for air construction permitting, Environmental Services typically works in conjunction with Ameren engineering personnel in the Project Engineering and Performance Engineering departments. We will also consult other Ameren departments (for example, Corporate Planning) as needed.

5. Environmental Services staff have considerable knowledge and experience with assessing permit applicability regarding all manner of projects at Ameren, including component replacements at Ameren's power plants, like Rush Island. We used that prior experience with similar activities in assessing any emission impact of the 2007 and 2010 Projects.

6. Environmental Services also relies on the subject matter expertise of our engineering colleagues to identify projects that have the potential, from an engineering point of view, to result in emissions increases, due to their nature and scope. Ameren had conducted dozens of similar boiler component replacement projects at its other plants prior to performing the 2007 and 2010 Projects. Our experience with and knowledge gained from those similar projects informed our decision-making and analysis with respect to the 2007 and 2010 Projects.

7. Ameren assesses the impact that a project is expected to have on unit operations well before beginning construction, as part of its project planning and justification processes. Consistent with normal practice, Ameren assessed the expected impact of the 2007 and 2010 Projects before beginning construction of those projects.

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<u>Ameren's Emissions Assessment for the 2007 Projects at Rush Island Unit 1</u>

8. Ameren conducted a planned unit outage at Rush Island Unit 1 from approximately February to May 2007. During this outage, I understand that Ameren performed nearly 100 discrete projects. I understand that just four of those projects are at issue in this case: the replacements of the reheater, economizer, lower slope and air preheater components (the "2007 Projects"). While Ameren made emissions assessments with respect to all of the activities taking place during the 2007 Outage as a whole, to simplify the following discussion, I will refer to the 2007 Projects.

9. I understand from David Boll, currently Ameren's Consulting Engineer in Ameren's Environmental Project Engineering Department, that before the 2007 Outage, Ameren engineering personnel assessed the nature and scope of the 2007 Projects and the other projects planned to be undertaken during the 2007 Outage, and concluded that none of those projects would increase the unit's maximum annual rated design capacity given continuous year-round operations. Based on our considerable experience with NSR permitting under the Missouri SIP, and the language of the SIP, we understand that such projects would not increase the unit's annual rate of potential emissions, and therefore did not constitute "modifications" under the Missouri SIP. Accordingly, we determined that such Projects would not trigger the application of the Missouri Construction Permit Rule, meaning no construction permit was required.

10. As explained in Mr. Boll's declaration, Ameren engineering personnel had also determined that the 2007 Projects were routine in nature because, among other reasons, they were like-kind replacements of existing components with new components that were functionally equivalent. Ameren was aware that such replacements were commonly performed throughout the industry. I and my colleagues in Environmental Services knew that Ameren had conducted

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dozens of similar component replacements at its other generating units in prior years. Accordingly, I and my colleagues in Environmental Services determined, prior to the 2007 Projects, that Ameren's routine boiler component replacements such as the 2007 Projects constituted routine maintenance repair and replacement activities that are excluded from NSR permitting under the Missouri SIP.

11. In addition to assessing the applicability of the Missouri SIP and whether the 2007 Projects constituted routine maintenance repair and replacement, Ameren also assessed any impact of the Projects on projected actual future emissions. We had experience with and knowledge of the similar projects described above, and were familiar with the Rush Island units' operational characteristics. This included our knowledge that Ameren's coal-fired generating units operate below their available capacity and thus have a large amount of unused capacity to generate. Based on these and other considerations derived from our experience, knowledge and judgment, and based on the judgment of Ameren's engineering personnel, we in Environmental Services concluded that the 2007 Projects would not cause actual emissions to increase.

Ameren's Emissions Assessment for the 2010 Projects at Rush Island Unit 2

12. Ameren conducted a planned unit outage at Rush Island Unit 2 from approximately January to April 2010. During this outage, I understand that Ameren performed over 100 discrete projects. I understand that only 3 of these projects are at issue: the replacements of the reheater, economizer, and air preheater components of Rush Island Unit 2 (the "2010 Projects"). While Ameren made emissions assessments with respect to all of the activities taking place during the 2010 Outage as a whole, to simplify the following discussion, I will refer only to the 2010 Projects.

13. I understand from Mr. Boll that before the 2010 Outage, Ameren engineering personnel assessed the nature and scope of the 2010 Projects and the other projects planned to be

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undertaken during the 2010 Outage, and concluded that none of those projects would increase the unit's maximum annual rated design capacity given continuous year-round operations. Based on our considerable experience with NSR permitting under the Missouri SIP, and the language of the SIP, we in Environmental Services understand that such projects would not increase the unit's annual rate of potential emissions, and therefore did not constitute "modifications" under the Missouri SIP. Accordingly, we determined that such Projects would not trigger the application of the Missouri Construction Permit Rule, meaning no construction permit was required.

14. As explained in Mr. Boll's declaration, Ameren engineering personnel had also determined that the 2010 Projects were routine in nature because, among other reasons, they were like-kind replacements of existing components with new components that were functionally equivalent. Ameren was aware that such replacements were commonly performed throughout the industry. I and my colleagues in Environmental Services knew that Ameren had conducted dozens of similar component replacements at its other generating units in prior years. Accordingly, I and my colleagues in Environmental Services determined, prior to the 2010 Projects, that Ameren's routine boiler component replacements such as the 2010 Projects constituted routine maintenance repair and replacement activities that are excluded from NSR permitting under the Missouri SIP.

15. In addition to assessing the applicability of the Missouri SIP and whether the 2010 Projects constituted routine maintenance repair and replacement, Ameren also assessed any impact of the Projects on projected actual future emissions. We had experience with and knowledge of the similar projects described above, and were familiar with the Rush Island units' operational characteristics. This included our knowledge that Ameren's coal-fired generating

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units operate below their available capacity and thus have a large amount of unused capacity to generate. Based on these and other considerations derived from our experience, knowledge and judgment, and based on the judgment of Ameren's engineering personnel, we in Environmental Services concluded that the 2010 Projects would not cause actual emissions to increase.

16. In addition to the foregoing assessment of actual emissions, Ameren also documented an assessment of whether there was a reasonable possibility, within the meaning of the relevant rules, that the 2010 Projects would increase emissions from the unit. The Missouri state permitting rules had changed in late 2009, requiring Missouri operators to perform in certain instances a numerical calculation of emissions, a requirement that had not applied under either the applicable state or federal regulations prior to that. While we believed (see above) that no construction permit of any kind was required under the Missouri Construction Permitting Rule, and that the 2010 Projects were excluded from New Source Review permitting because they constituted routine maintenance repair and replacement, we nonetheless prepared a numerical calculation out of an abundance of caution.

17. To determine whether there was a reasonable possibility of an emissions increase from the 2010 Outage, Environmental Services prepared a numerical emissions projection. A true and correct copy of the results of that projection, titled "Rush Island Unit 2 – Spring 2010 Outage – Reasonable Possibility Analysis Summary" is attached hereto as Attachment 1. (The document attached as Attachment 1 is the summary or conclusion page of a much larger document containing all the details of Ameren's analysis. Ameren produced the entire analysis during discovery in this case, but given its volume has not attached it here. Ameren stands ready to provide it to the Court upon request.)

18. Pursuant to 40 C.F.R. 52.21(b)(48) (as incorporated by reference in the Missouri SIP at 10 C.S.R. 10-6.060(8)), Ameren first calculated Unit 2's "baseline actual emissions" rate by taking the average annual rate from the 24-month period of April 2005 through March 2007. That rate was 14,288 tons per year.

19. Pursuant to 40 C.F.R. 52.21(b)(41)(i) (incorporated by reference in the Missouri SIP at 10 C.S.R. 10-6.060(8)), Ameren then determined Unit 2's "maximum annual rate" of future actual emissions in the five years following the date Unit 2 would resume regular operation after the 2010 Outage. That maximum annual rate was 16,818.88 tons per year. In Attachment 1, this is shown under the column labeled "Projected Actual Emissions (tons/year)." This calculation of emissions following the Projects did not yet account for causation, which the NSR regulations require be accounted for through application of the "capable of accommodating" provision.

20. We did not believe that any relevant fugitive emissions were quantifiable, and so did not project them according to 40 C.F.R. 52.21(b)(41)(ii)(b) (incorporated by reference in the Missouri SIP at 10 C.S.R. 10-6.060(8)). Emissions associated with startups, shutdowns and malfunctions were included in the projection of the maximum annual rate of projected future emissions following the 2010 Outage.

21. Finally, as required pursuant to the "capable of accommodating" provision (sometimes called the demand growth provision), 40 C.F.R. 52.21(b)(41)(ii)(c) (as incorporated by reference in the Missouri SIP at 10 C.S.R. 10-6.060(8)), Ameren determined the amount of emissions following the 2010 Projects that was unrelated to the 2010 Projects. We initially determined the amount of emissions that Unit 2 could have accommodated during the baseline period above and beyond those it actually emitted during the baseline period. That amount was

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3,275.11 tons per year. In Attachment 1, this is shown under the column labeled "Capable of Accommodating Emissions (tons/year)."

22. Ameren determined that additional amount of SO_2 emissions (3,275 tons per year) was unrelated to the Projects because it could have been emitted during the baseline period and was related to: (a) increased utilization due to increased market demand, up to a level not exceeding the unused capacity that actually was available during the baseline period; and/or (b) normal variations in hourly emissions rates due to a combination of factors unrelated to the 2010 Projects, none of which were expected to affect hourly emissions rates.

23. To determine the amount of emissions (if any) following the Projects that were related to the Projects, Ameren then excluded (*i.e.*, subtracted) a portion (2,531.15 tons per year, "Excluded Emissions" on Attachment 1) of the unrelated SO_2 emissions from the difference between baseline emissions (14,287.73 tons per year) and the emissions following the Projects (16.818.88 tons per year).

24. The result of this calculation was zero, and is shown as the "Net Change" on Attachment 1. Stated mathematically: 16,818.88 *minus* 14,287.73 *minus* 2,531.15 *equals* 0.00, the emissions related to the Project. (We did not subtract all 3,275.11 tons per year of unrelated emissions because that would have resulted in a negative number.)

25. Because, after following the requirements of the regulation, any amount of projected SO_2 emission increase related to the 2010 Projects was less than the 40-ton significance threshold for SO_2, Ameren determined that the 2010 Projects (and the 2010 Outage as a whole) would not cause a significant increase in emissions of SO_2.

26. Pursuant to 40 C.F.R. 52.21(b)(41)(ii)(a) (incorporated by reference in the Missouri SIP at 10 C.S.R. 10-6.060(8)), when determining the annual rate of "projected actual

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emissions," (as defined under 40 C.F.R. 52.21(b)(41)(i), Ameren considered all relevant information. In addition to the considered judgment and expertise of Environmental Services, we relied (as described above) on the judgment and expertise of Ameren's engineering personnel, performance engineering personnel, and Corporate Planning department, among others. Ameren considered all relevant information regarding Unit 2's historical operational data, Unit 2's expected business activity and Ameren's highest projections of business activity. Ameren also considered the amount of unused, but available generating capacity that was available to it during the baseline period, and which Unit 2 could have utilized had the market called upon it to do so. Ameren also considered the normal variations in hourly emission rates that occur during the normal operations of Unit 2.

27. Ameren retained records of this calculation. Since well before the Projects took place, Ameren reports the SO_2 emissions from both Rush Island units to EPA as part of its submission of CEMS data (see below).

<u>Rush Island Emissions and Generation Over Time</u>

28. Ameren's Environmental Services Department plays a role in monitoring the emissions of each of Ameren's plants, including Rush Island.

29. Rush Island's Continuous Emissions Monitor Systems (CEMS) measure and record emissions data on a continuous basis during Rush Island's operations. Ameren gathers that data and reports it to EPA. EPA keeps this data in databases and publishes it on the internet, where it can be accessed by the general public. The CEMS data contains multiple data points in addition to emissions, including gross generation. I am familiar with CEMS Data and use it routinely in carrying out my job responsibilities.

30. I reviewed the CEMS data for SO_2 emissions, NOx emissions, and gross generation over time. As the below table demonstrates, compared to 1990 levels, Rush Island's

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annual emissions of SO_2 in 2014 were just 39% of their 1990 levels, a decrease of over 27,500 tons per year. That decrease came about even though Rush Island's annual generation of electricity has increased and is now 152% of their 1990 levels, an increase of over 3 gigawatt-hours per year. Likewise, Rush Island's emissions of NOx are at just 28% of their 1995 levels, a decrease of nearly 9,000 tons per year.

<u>Rush Island Generation and Emissions 1990-2014</u>

Year	Unit 1 Generation	Unit 1 SO_2	Unit 1 NOx	Unit 2 Generation	Unit 2 SO_2	Unit 2 NOx
	(MWH)	(TPY)	(TPY)	(MWH)	(TPY)	(TPY)
1990	2,786	21,343	-	3,101	23,609	-
1995	3,614	21,412	4,593	2,821	22,209	7,734
1996	3,401	13,225	4,077	3,917	14,044	3,922
1997	3,735	13,484	3,826	3,222	11,659	3,032
1998	3,936	13,485	3,396	4,281	13,924	3,710
1999	3,721	12,653	2,711	4,276	14,543	2,981
2000	4,228	13,643	2,801	4,107	13,257	2,589
2001	3,169	8,963	1,824	3,794	10,912	2,295
2002	4,426	12,744	2,092	3,506	10,511	1,900
2003	4,565	13,127	1,928	3,797	11,866	1,856
2004	3,916	11,725	1,602	3,995	11,193	1,665
2005	4,467	14,070	1,971	4,952	14,315	2,098
2006	4,613	14,584	1,991	4,638	14,090	1,976
2007	2,936	9,126	1,268	4,484	13,336	2,019
2008	4,794	15,492	2,086	4,456	14,102	2,106
2009	4,484	14,754	1,927	4,000	13,573	1,934
2010	4,506	14,964	1,935	3,360	11,103	1,449
2011	3,802	12,272	1,587	4,853	15,764	1,853
2012	4,455	10,642	1,549	4,097	9,780	1,405
2013	4,359	9,595	1,525	4,581	9,992	1,542
2014	4,161	8,846	1,456	4,171	8,598	1,394

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Rush Island Emissions Variations Over Time

31. The amount of SO_2 emitted at Rush Island varies significantly from year to year. In my experience, such fluctuations are normal at coal-fired power plants and are caused by a variety of factors including variations in market demand. I have reviewed the emissions data for Rush Island for the decade from 1996 to 2006. I then determined the changes in emissions from year-to-year. Below is an accurate summary of the amount of SO_2 emitted at Rush Island from 1996 to 2006.

Rush Island SO_2 Emissions Variations Over Time

	Unit 1		Unit 2	
Year	SO_2 Emissions	Change from previous year	SO_2 Emissions	Change from previous year
1996	13,225	--	14,044	--
1997	13,484	259	11,659	-2,385
1998	13,485	1	13,924	2,265
1999	12,653	-832	14,543	619
2000	13,643	990	13,257	-1,286
2001	8,963	-4,680	10,912	-2,345
2002	12,744	3,781	10,511	-401
2003	13,127	383	11,866	1,355
2004	11,725	-1,402	11,193	-673
2005	14,070	2,345	14,315	3,122
2006	14,584	514	14,090	-225

32. I reviewed the SO_2 emissions data for Rush Island Unit 1 for 2007 to 2014. I have provided a chart of the SO_2 emissions by year for the unit, below. The data for 2007 only includes a partial year of service because the plant was not operating during the Spring 2007 outage. Annual emissions are now about 5,000 tons per year below their averages before the 2007 Projects.

Unit 1 SO_2 Emissions After the 2007 Projects

Year	SO_2 (TPY)
2007	9,126
2008	15,492
2009	14,754
2010	14,964
2011	12,272
2012	10,642
2013	9,595
2014	8,846

33. I reviewed the SO_2 emissions data for Rush Island Unit 2 for 2010 to 2014. I have provided a chart of the SO_2 emissions by year for the unit, below. The data for 2010 only includes a partial year of service because the plant was not operating during the Spring 2010 outage. As with Unit 1, annual emissions are now about 5,000 tons per year below their averages before the 2010 Projects.

Unit 2 SO_2 Emissions After the 2010 Projects

Year	SO_2 (TPY)
2010	11,103
2011	15,764
2012	9,780
2013	9,992
2014	8,598

Title V

34. Environmental Services is responsible for obtaining and securing the renewal of Title V Permits for the Rush Island plant. The applicable permit for the Rush Island units at the

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time of the 2007 and 2010 outages, Operating Permit No. OP2000061, was issued on May 18, 2000. A true and correct copy of the Title V permit is attached hereto as Attachment 2 (AM-02511339).

35. It is my understanding that before issuing a Title V Permit, the Missouri Department of Natural Resources provides the draft permit to EPA for comment or objection. EPA did not make any objection to Ameren's Title V operating permit before it was issued on May 18, 2000.

36. Generally, Title V permits have a 5-year term length. Although Title V permits must be renewed before they expire, because of permitting delays, permit renewals often take years to complete.

37. On or about November 18, 2004, Ameren filed an application to renew the May 18, 2000 Title V permit (Permit No. OP2000061).

38. On or about May 29, 2010, the Missouri Department of Natural Resources provided EPA a copy of the draft Rush Island Title V Permit. EPA did not object to the permit renewal.

39. On August 30, 2010, MDNR renewed Ameren's Title V Permit for the Rush Island Units, Operating Permit No. OP2010-047. A true and correct copy of the Title V permit is attached hereto as Attachment 3 (AM-00424093).

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 23, 2015

Steven Whitworth

KRM-D2

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	**Case No. 4:11-CV-00077-RWS**
v.	)	**Judge Rodney W. Sippel**
	)	
AMEREN MISSOURI,	)	
	)	
Defendant.	)	
	)	

AMEREN MISSOURI'S SUMMARY JUDGMENT MOTIONS

EXHIBIT A2

PORTIONS REDACTED PURSUANT TO ECF # 90

KRM-D3

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	**Case No. 4:11-CV-00077-RWS**
v.	)	
	)	**Judge Rodney W. Sippel**
AMEREN MISSOURI,	)	
	)	
Defendant.	)	
	)	

DECLARATION OF DAVID BOLL

I, David Boll, am over 18 years of age and make the following declaration pursuant to 18 U.S.C. § 1746:

1. I make this declaration on behalf of Ameren Missouri ("Ameren") based on my personal knowledge, and the records of Ameren or information available through employees of Ameren. I am prepared to testify to the following facts if called as a witness.

2. I have been employed by Ameren since 1981 and I currently hold the position of Consulting Engineer in Ameren's Environmental Project Engineering Department. I received a B.S. in Mechanical Engineering from Washington University in St. Louis in 1981. I am a licensed Professional Engineer in the States of Missouri and Illinois.

3. My responsibilities during the time relevant to this case included justifying capital projects; preparing documents associated with such justifications such as project justification and work order documents; assessing the impact of component replacements on the performance and operations of the unit; preparing requests for proposal to be let out for bids; and supervising the construction of capital projects, including the component replacements at issue in this case.

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The Projects

4. Ameren replaced portions of the reheater, economizer, lower slope and air preheater components of Rush Island Unit 1 (the "2007 Projects") during the outage that took place from approximately February to May, 2007.

5. Ameren replaced portions of the reheater, economizer, and air preheater components of Rush Island Unit 2 (the "2010 Projects") during the outage that took place from approximately January to April, 2010.

The Effect of the Projects on the Units' Maximum Design Capacity

6. I am familiar with the projects to replace the reheater, economizer, lower slope and air heater components that occurred during Ameren's planned unit outage at Rush Island Unit 1 from approximately February to May 2007 (the "2007 Projects"). I am also familiar with the projects to replace the reheater, economizer and air heater components that occurred during Ameren's planned unit outage at Rush Island Unit 2 from approximately January to April 2010 (the "2010 Projects").

7. The nature of these component replacement projects is such that they would not reasonably be expected to, and Ameren did not expect them to, increase the Unit's maximum design capacity or maximum annual-rated capacity assuming continuous year-round operation (or, as the concept is expressed in the electric power industry, the Unit's "maximum continuous rating.") Nor would they be expected to increase the Unit's designed steam flow rating or designed heat input capacity.

8. I have reviewed the actual effects of the Projects, and they did not actually increase the Units' maximum design capacity, maximum annual-rated capacity assuming

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continuous year-round operation, or maximum continuous rating. They did not increase the Unit's designed steam flow rating or designed heat input capacity.

The Scope of the 2007 and 2010 Outages

9. Ameren conducted a planned unit outage at Rush Island Unit 1 from approximately February to May 2007 (the "2007 Outage"). During such outages, Ameren attempts to schedule as many activities as possible to be completed, in order to minimize overall unit downtime, and because such outages are generally planned to occur only once every six years. During the 2007 Outage, Ameren conducted 93 discrete maintenance, repair and replacement projects at Unit 1. Some of these other projects are of the same size and scope as the Projects at issue. Ameren generally prepares a Post Outage Report detailing the work that is performed during an outage. A true and correct copy of the 2007 Unit 1 Post Outage Report is attached hereto as Attachment 1.

10. Of the 93 projects conducted during the 2007 Outage, I understand that only 4 are at issue in this case: the replacement of the reheater, economizer, lower slope and air heater components. Moreover, in addition to these 93 projects, during the same 2007 Outage, Ameren performed innumerable tasks as part of the boiler overhaul, all designed to improve the long-term reliability, availability, and efficiency of the boiler. These tasks are not captured in detail in the Post Outage Report.

11. Ameren conducted a planned unit outage at Rush Island Unit 2 from approximately January to April 2010 (the "2010 Outage"). During such outages, Ameren attempts to schedule as many activities as possible to be completed, in order to minimize overall unit downtime, and because such outages are generally planned to occur only once every six years. During the 2010 Outage, Ameren conducted 108 discrete maintenance, repair and

KRM-D3

replacement projects at Unit 2. Some of these other projects are of the same size and scope as the Projects at issue. Ameren generally prepares a Post Outage Report detailing the work that is performed during an outage. A true and correct copy of the 2010 Unit 1 Post Outage Report is attached hereto as Attachment 2.

12. Of the 108 projects conducted during the 2010 Outage, I understand that only 3 are at issue in this case: the replacement of the reheater, economizer, and air heater components. Moreover, in addition to these 108 projects, during the same 2010 Outage, Ameren performed innumerable tasks as part of the boiler overhaul, all designed to improve the long-term reliability, availability, and efficiency of the boiler. These tasks are not captured in detail in the Post Outage Report.

The Expected Effect of the Projects on the Units' Actual Post-Project Generation of Electricity

13. In my experience, Ameren assesses the impact that a project is expected to have on unit operations well before beginning construction, as part of its project planning and justification processes. Consistent with its normal practice, Ameren assessed the impact of the 2007 and 2010 Projects before beginning construction of those projects. As one of the engineers who had responsibility for preparing the project justification documents for these Projects, I was one of several Ameren personnel who assessed these issues. Typically, we assessed such issues together as a group, and reached a group consensus.

14. Prior to the Projects, I had been involved with dozens of projects at Ameren's other plants that were similar in nature and scope to the Projects. In particular, I had experience with reheater replacements at Labadie; economizer replacements at Labadie, Sioux and

Meramec; lower slope replacements at Labadie and air preheater replacements at Labadie and Meramec.

15. In my experience, replacement activities such as the Projects do not cause the unit's generation to increase. These are all like-kind replacements, substituting one component for another, sometimes with minor changes in design that made the units more efficient. I understood that my colleagues at Ameren shared the same views.

16. I expected that these replacement projects would improve the efficiency of the units. The economizer replacements were specified to be more efficient than the designs they replaced. Moreover, by replacing the economizer and air preheater with new components with slightly changed designs that could better handle the low-sulfur coal that Rush Island was burning, the auxiliary power demands on the units would be reduced, making the units more efficient overall.

17. I did not expect the Projects to increase the equivalent availability of the unit as compared to the pre-project periods. (Equivalent availability is a measure of the unit's availability to operate and produce electricity. It is a common metric for availability that is used throughout Ameren, and to my knowledge the electric utility industry.) I understood that my colleagues at Ameren shared the same views.

18. This is true for at least two reasons. First, the equivalent availability of the Rush Island units before these Projects was already exceptional – above 90% and at times reaching annual rates of 95% to 96%. In my experience, it is unlikely for any coal-fired unit to achieve sustained equivalent availability above those levels. Second, generating units are complex machines that consist of thousands of components, most of which can and do fail at some point. It is the combined operation of all of these component parts that determines the level of unit

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availability. Based on decades of experience, I knew that these other components would continue to fail, limiting the overall availability of the unit. I understood that my colleagues at Ameren shared the same views.

19. I did not expect the Projects to increase the stated generating capability of the unit as compared to the pre-project periods, other than by increasing the units' efficiency. When ordering the components (reheater, lower slope, economizer, and air preheater) Ameren specified that the new components have the same thermal performance as the old components, meaning that the new components would not increase capability.

20. I am informed and believe that the documents set forth on Attachment 3 hereto, and attached as exhibits to Ameren's various motions being filed contemporaneously, are copies of Ameren's business records, made at or near the time of the occurrence of the matters set forth by, or from information transmitted by, a person with knowledge of those matters, kept in the course of regularly conducted activity, and made by the regularly conducted activity as a regular practice.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 23, 2015

David E Boll

David Boll

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ATTACHMENT 1

ATTACHMENT REDACTED

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ATTACHMENT 2

ATTACHMENT REDACTED

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ATTACHMENT 3

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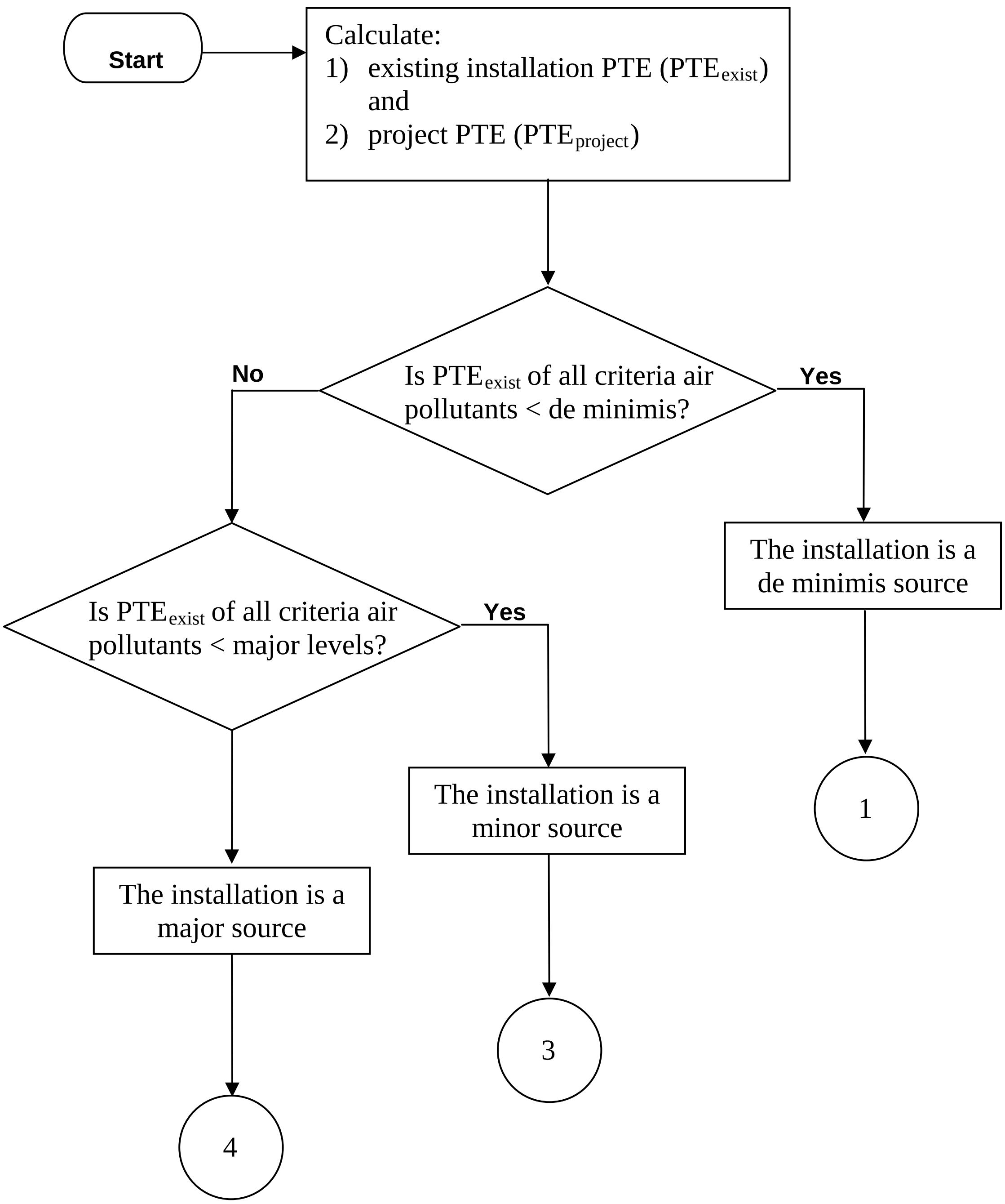
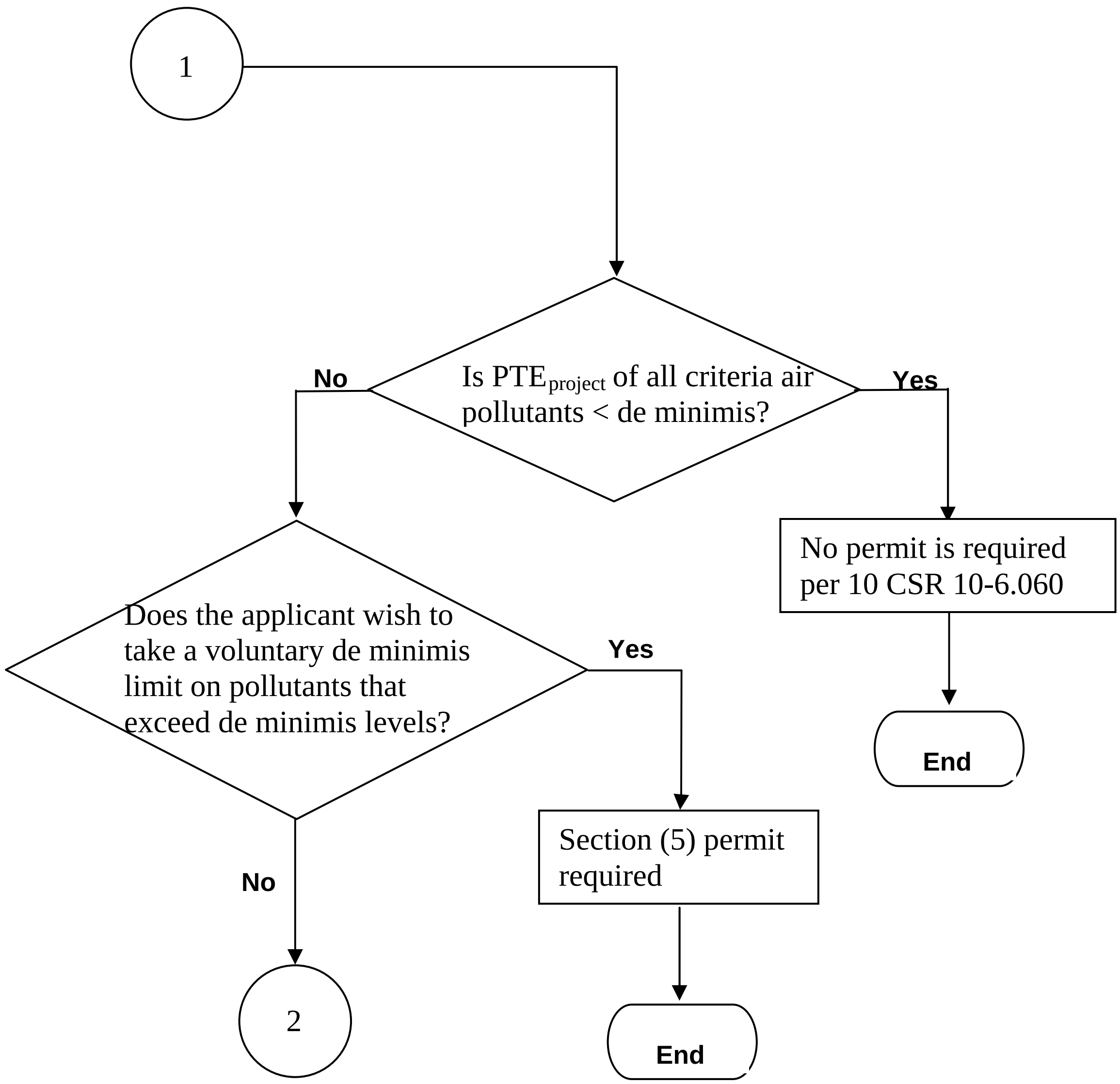
Attachment 3 to the Declaration of David Boll

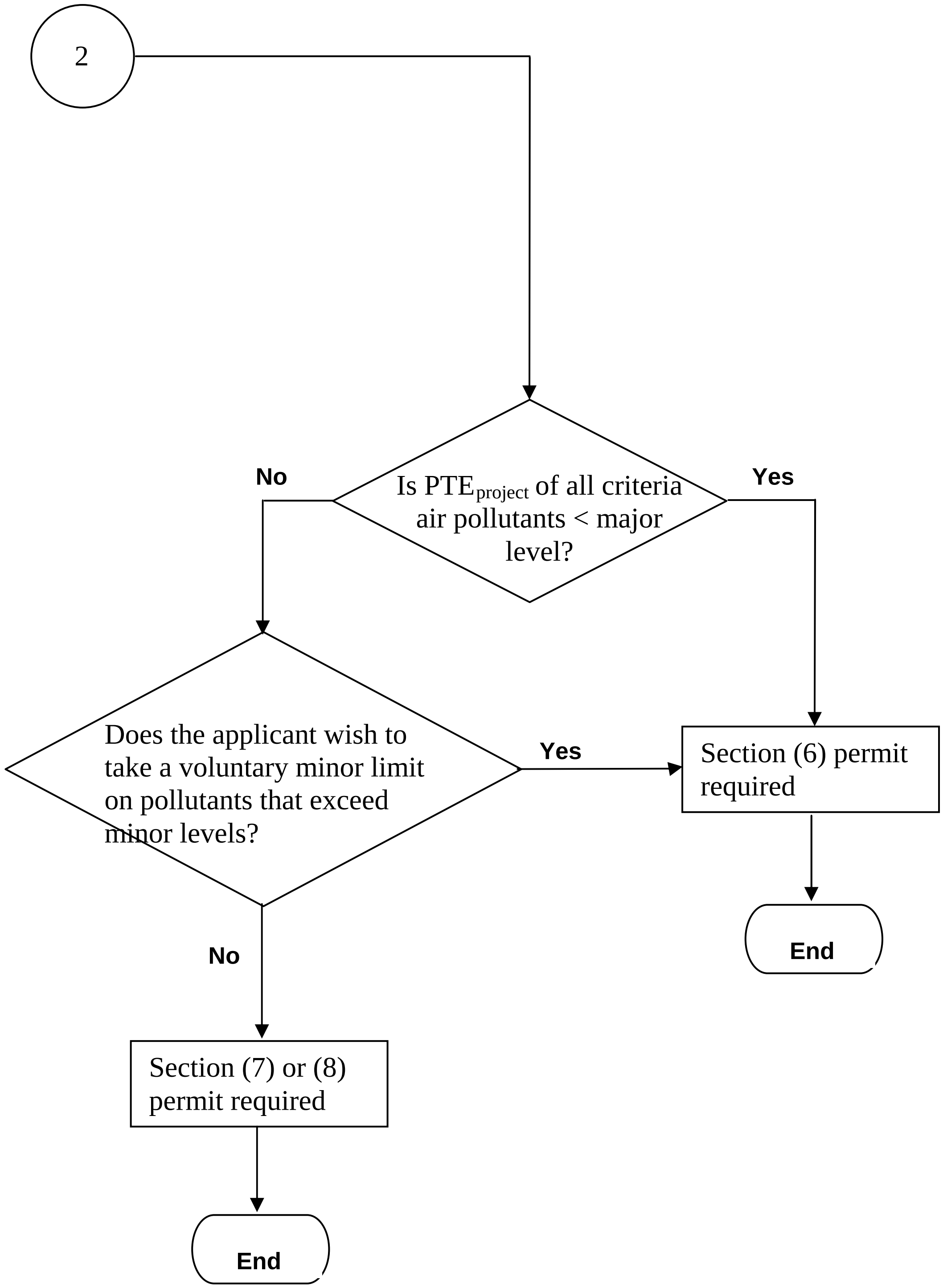
Exhibits	
C1	Unit 1 RELS Project Justification Package, AM-00072570
C2	Unit 1 Air Preheater Project Justification Package, AM-00072850
C3	Unit 2 RELS Project Justification Package, AM-00072829
C4	Unit 2 Air Preheater Project Justification Package, AM-00072906
C5	Ameren 2005 Unit Capabilities Tables, AM-00943285
C6	Ameren 2006 Unit Capabilities Tables, AM-00175922
C7	Ameren 2009 Unit Capabilities Tables, AM-00067238

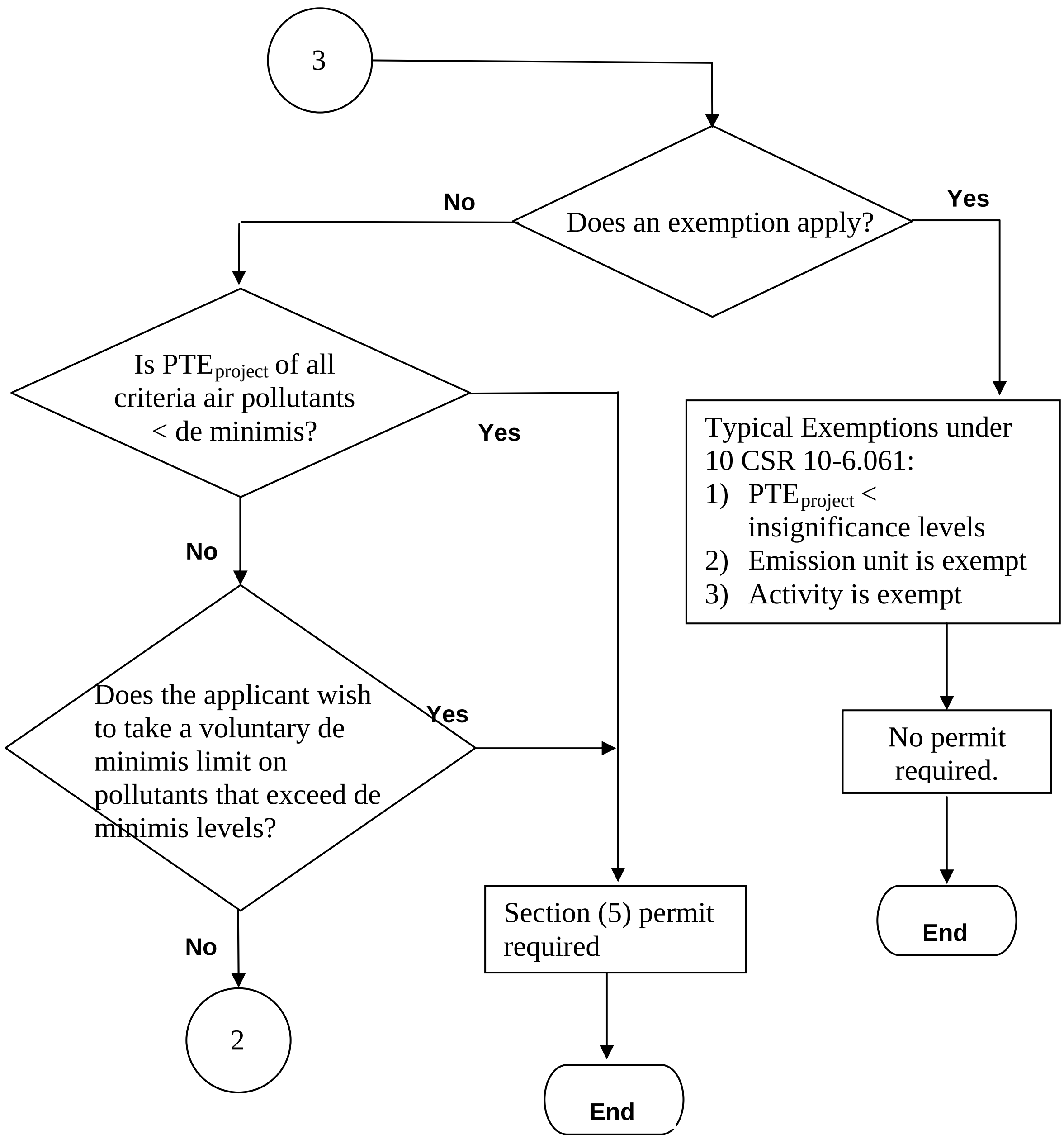
KRM-D3

Permit Applicability Determination for Criteria Air Pollutants (1 of 6)

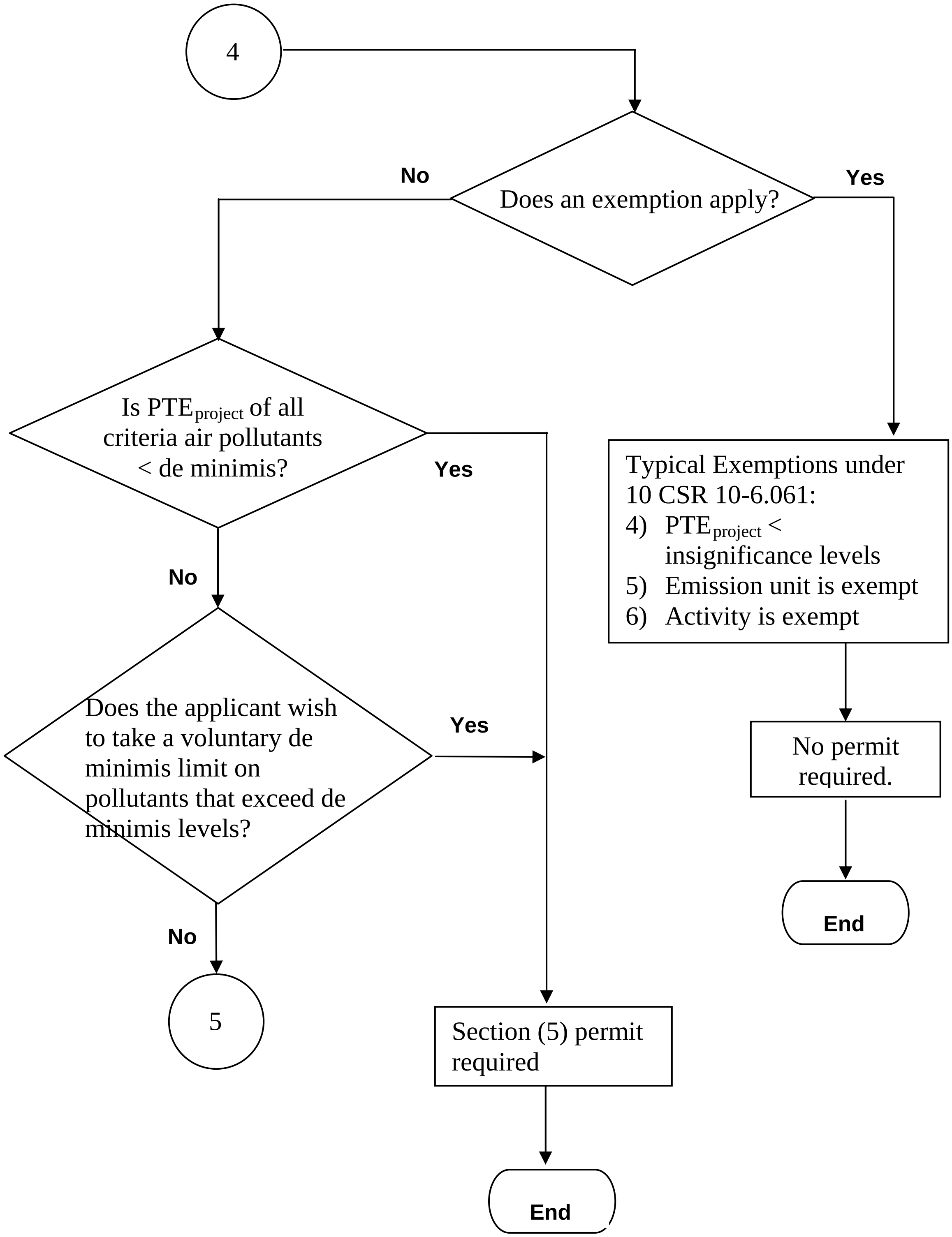



1
Is $PTE_{project}$ of all criteria air pollutants < de minimis?
No
Yes
No permit is required per 10 CSR 10-6.060
End
Does the applicant wish to take a voluntary de minimis limit on pollutants that exceed de minimis levels?
Yes
Section (5) permit required
End
No
2

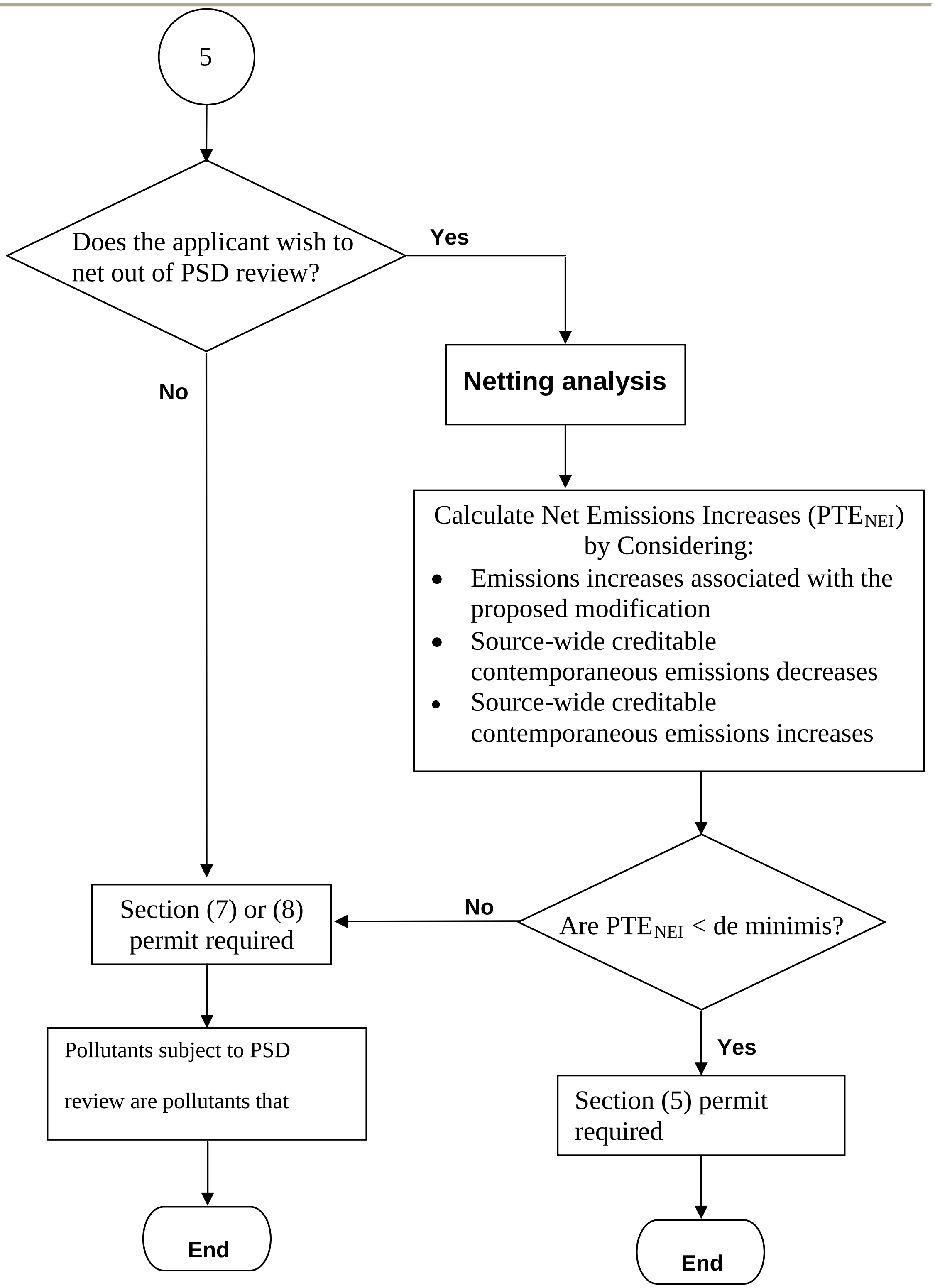

2
No
Is $PTE_{project}$ of all criteria air pollutants < major level?
Yes
Does the applicant wish to take a voluntary minor limit on pollutants that exceed minor levels?
Yes
Section (6) permit required
End
No
Section (7) or (8) permit required
End


3
Does an exemption apply?
No
Yes
Is $PTE_{project}$ of all criteria air pollutants < de minimis?
Yes
No
Typical Exemptions under 10 CSR 10-6.061:
1) $PTE_{project}$ < insignificance levels
2) Emission unit is exempt
3) Activity is exempt
Does the applicant wish to take a voluntary de minimis limit on pollutants that exceed de minimis levels?
Yes
No
No permit required.
Section (5) permit required
End
End
2
End

Permit Applicability Determination for Criteria Air Pollutants (5 of 6)



Permit Applicability Determination for Criteria Air Pollutants (6 of 6)



Minnesota Pollution Control Agency

Air Quality Division
520 Lafayette Road
Saint Paul, MN 55155-3898

FACSIMILE TRANSMITTAL SHEET

To: Dennis Niemi

Company or Agency: Minnesota Power

Facsimile Number: (218) 723-3916

Subject: Pre & Post Modification Emission Analysis

From: ED HOEFS

Company or Agency: MPCA/AIR QUALITY DIVISION

Telephone Number: (612) 296-8632

Facsimile Number: 297-7709

Date: 8/21/92

Pages to Follow: 4

(Please Number ALL Pages)

If you have questions regarding this transmittal, please call: (612) 296-8632

Dennis - Please review and provide comments as soon as possible.
Thanks, Ed.

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Minnesota Pollution Control Agency	Project: Minnesota Power		Page 1
	Location: Clay Boswell No. 2 - Air Heater		File No. 73B
	Calculations for: Determine	Prepared by: EAH	Date: 8/20/92
	Pre. & Post. Mod. Emissions	Reviewed by:	Date:

REFERENCE: March 27, 1991 Letter from Minnesota Power to Lisa Thorvig of MPCA, with several attachments. (cc:'d to Ron VanMersbergen, EPA V)

(1) Determine Pre-Modification Baseline Emissions

NOTE: Per 40 CFR 52.21 (b)(21)(ii), actual emissions can be taken as the average emission rate for any representative two year period within the five year period preceding a physical change.

Per Attachment 4 of the above mentioned reference, the years 1989-1990 can be taken to be a representative baseline period. Emissions in this period were:

	HEAT INPUT (MM BTU/YR)	ACTUAL EMISSIONS, TPY PM	SOx	NOx	CO
1989	3,277,116	27	2439	1978	57
1990	3,350,140	27	2306	2006	57
AVG.	3,313,628	27	2372	1992	57

∴, These values can be taken as a representative pre-modification Baseline

NOTE: 1991 was not chosen as a representative year due to a 3000 Hour Shutdown for a turbine overhaul (See MP's 8/18/92 letter to MPCA)

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PQ00627-01 (4/91)

Minnesota Pollution Control Agency	Project: Minnesota Power		Page 2
	Location: Clay Boswell No. 2 - Air Heater		File No. 73B
	Calculations for: Determine	Prepared by: EAH	Date: 8/20/92
	Pre & Post-Mod. Emissions	Reviewed by:	Date:

2 Determine Post-Modification Emissions

Per Attachment 2 of the previously listed Reference, projected emissions for the two-year period after the modification can be shown to be:

Expected Coal Burn:

1993: 230,900 TONS
1994: 221,300 TONS

1993-94 AVG: 226,100 TONS (3,934,140 MM BTU/YR @ 8700 BTU/LB)

Using Emission Factors shown in Attachment 2 of Reference:

PM) $\frac{0.016 \text{ LB PM}}{\text{MM BTU}} \times \frac{3{,}934{,}140 \text{ MM BTU}}{\text{YR}} \times \frac{\text{TON PM}}{2000 \text{ LB}} = 31 \text{ TPY}$

SOx) $\frac{1.44 \text{ LB}}{\text{MM BTU}} \times \frac{3934{,}140 \text{ MM BTU}}{\text{YR}} \times \frac{\text{TON } SO_x}{2000 \text{ LB}} = 2833 \text{ TPY}$

NOx) $\frac{1.21 \text{ LB}}{\text{MM BTU}} \times \frac{3934{,}140 \text{ MM BTU}}{\text{YR}} \times \frac{\text{TON } NO_x}{2000 \text{ LB}} = 2380 \text{ TPY}$

CO) $\frac{0.035 \text{ LB}}{\text{MM BTU}} \times \frac{3{,}934{,}140 \text{ MM BTU}}{\text{YR}} \times \frac{\text{TON CO}}{2000 \text{ LB}} = 69 \text{ TPY}$

∴, AVERAGE POST-MODIFICATION EMISSIONS ARE:

	PM	SOx	NOx	CO
for 3,934,140 MM BTU/YR:	31	2833	2380	69

(ALL VALUES IN TPY)

NOTE: Per 40 CFR 52.21 (b)(21)(v), post modification emissions from electric utility steam generating units can be taken as the representative actual annual emissions.

KRM-D5

Minnesota Pollution Control Agency	Project: Minnesota Power		Page 3
	Location: Clay Boswell No. 2 - Air Heater		File No. 73 B
	Calculations for: Determine	Prepared by: BAH	Date: 8/20/92
	Pre & Post-Mod. Emissions	Reviewed by:	Date:

3 Determine Emission Increases from Baseline Period to Post-Modification Period

From 1 & 2 above, emissions can be seen to increase from the 1989-90 baseline period to the 1993-94 post-modification period by the following amounts:

	HEAT INPUT (MM BTU/YR)	REPRESENTATIVE ACTUAL EMISSIONS (TPY) PM	SOx	NOx	CO
1993-94	3,934,140	31	2833	2380	69
− 1989-90	3,313,628	27	2372	1992	57
INCREASE:	$\boxed{620,512}$	$\boxed{4}$	$\boxed{461}$	$\boxed{388}$	$\boxed{12}$

4 Determine Emission Increases RESULTING FROM proposed Physical Change

Per 40 CFR 52.21 (b)(33)(ii), the Administrator shall exclude, in calculating any increase in emissions that results from the particular physical change or change in the method of operation at an electric utility steam generating unit, that portion of the units emissions following the change that could have been accommodated during the representative baseline period and is attributable to an increase in projected capacity utilization at the unit that is unrelated to the particular change, including any increased utilization due to the rate of electricity demand growth for the utility system as a whole.

(CONTINUED)

KRM-D5

PO00627-01 (4/91)

Minnesota Pollution Control Agency	Project: Minnesota Power	Page (4)
	Location: Clay Boswell No. 2 - Air Heater	File No. 73B
	Calculations for: Determine / Prepared by: EAH	Date: 8/21/92
	Pre-Post. Mod. Emissions / Reviewed by:	Date:

(4) CONTINUED.

It can be shown that none of the increased emissions shown in (3) can be attributed to the physical change now proposed, for the following reasons:

1. MP has shown that the deteriorated condition of some parts of the existing Air Heater in no way prevented Unit No. 2 from producing power at the projected post-modification rates. (see December 13, 1991 Letter from MP to Lisa Thorvig, MPCA)

2. MP has shown that the replacement air heater is thermally equivalent to the existing air heater. Therefore no change in emissions per unit of power produced is expected.

3. Minnesota Power has shown that the priority dispatch ranking of CB No. 2 will not change as a result of this modification. In other words, the reliability of this unit will not increase over that of another unit and hence, no emissions will be displaced from another plant.

4. ALL of the emission increases from 1989-90 levels to 1993-94 levels can be attributed to a projected increased coal use of approximately 620,500 ~~tons~~ per year, (see (3) above). This is due solely to increased electric demand.

For these reasons, it can be seen that the proposed physical change will RESULT IN NO increase in emissions. Therefore, the project should be considered EXEMPT from New Source Review.

PQ00627-01 (4/91)

KRM-D5

ENVIRONMENTAL

A-90-05

II-B-10

OCT 3 1978

MEMORANDUM

SUBJECT: PSD-Routine Maintenance Repair and Replacement

FROM: Director
Division of Stationary Source Enforcement

TO: Howard G. Bergman, Director
Enforcement Division (6AE)
Region VI

This is in response to your memo of September 15, 1978, requesting an interpretation of the term "routine maintenance, repair and replacement" as it is used in §52.21(b)(2)(i). In particular you request guidance on what should be considered routine replacement. Routine replacement means the routine replacement of parts, within the limitations of reconstruction, and would not include the replacement of an entire facility (i.e., an old heater at a petrochemical plant which has ended its normal useful life).

If you have any further questions, please contact Libby Scopino at FTS 755-2564.

/S/
H. F. Johnson
for Edward E. Reich

cc: Mike Trutna
Peter Wyckoff

bcc: D. Rochlin,
L. Scopino DSSE:EN-341:LScoipino:ncb:10/2/78

KRM-D6 FILE

DATE: ... 5 1979

SUBJECT: Interpretation of 40 CFR 52.21(b)(2)(i), Exemption From Being a Major Modification

FROM: Howard G. Bergman
Director
Enforcement Division (6AE)

TO: Edward E. Reich
Director, Stationary Source
Enforcement Division (EN-341)

Section 52.21(b)(2)(i) states "a physical change shall not include routine maintenance repair and replacement." We have received a question from Coastal States Petrochemical Company, Corpus Christi, Texas, if replacement in this section would include the replacement of a facility after it has ended its normal useful life. In other words would replacing an old heater with a new heater be considered a routine replacement and, therefore, exempt from PSD review.

We have received conflicting verbal interpretations from your staff. We support the latest interpretation we received that this section only exempts routine replacement of parts. We request the interpretation be provided us in writing.

EPA FORM 1320-6 (REV 3-76)

KRM-D6

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Adjust Its Revenues for Electric Service.	)))	Case No. ER-2022-0337

AFFIDAVIT OF KARL R. MOOR

WASHINGTON, D.C.) ss

Karl R. Moor, being first duly sworn states:

My name is Karl R. Moor, and on my oath declare that I am of sound mind and lawful age; that I have prepared the foregoing *Direct Testimony*; and further, under the penalty of perjury, that the same is true and correct to the best of my knowledge and belief.

Karl R. Moor

Karl R. Moor

Sworn to me this 28 day of July, 2022.

Rhonda M McDonald

RHONDA M. MCDONALD
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires July 31, 2022

RHONDA MCDONALD NOTARY PUBLIC DISTRICT OF COLUMBIA EXP. 7-31-22