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JUL 28 2006
STATE OF ILLINOIS
Pollution Control Board

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED NEW 35 ILL. ADM. CODE 225	)	R06-25
CONTROL OF EMISSIONS FROM	)	(Rulemaking – Air)
LARGE COMBUSTION SOURCES	)	
35 Ill. Adm. Code 225.100, 200	)	
	)	
	)	

NOTICE OF FILING

TO: Those Individuals as Listed on attached Certificate of Service

Please take notice that on July 28, 2006, the undersigned caused to be filed with the Clerk of the Illinois Pollution Control Board the attached Testimony of Anne Smith and the Testimony of Michael Menne, a copy of which is herewith served upon you.

Dated this 28th day of July, 2006.

Respectfully submitted,

AMEREN ENERGY GENERATING COMPANY
AMERENENERGY RESOURCES GENERATING COMPANY
ELECTRIC ENERGY, INC.

By: _____
One of its Attorneys

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CERTIFICATE OF SERVICE

The undersigned, one of the attorneys for Petitioners, hereby certifies that I served a copy of the attached Testimony of Anne Smith and Testimony of Michael Menne upon those listed below on July 28, 2006 via First Class United States Mail, postage prepaid.

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TESTIMONY OF ANNE E. SMITH, Ph.D.

I, Anne E. Smith, am testifying on behalf of Ameren Corporation ("Ameren") as an expert on the costs and benefits of policies to control emissions of air pollutants from the electric generating sector

The Illinois Environmental Protection Agency ("IEPA") has proposed a rule to effectively reduce mercury emissions from Illinois coal-fired generating units by 90% by 2009. Ameren supports a multi-pollutant control strategy as an alternative option for meeting the requirements of IEPA's proposed mercury rule. My testimony addresses the financial, operational, and environmental advantages of such a multi-pollutant control strategy ("MCS") provision. In presenting this testimony, I am speaking solely on behalf of Ameren and not on behalf of the IEPA.

I. BACKGROUND AND QUALIFICATIONS

I am an economist and decision analyst who has specialized for the past thirty years in environmental risk assessment, cost and economic impact assessment, and integrated assessment to support environmental policy decisions. In my career, I have worked for government and private sector clients on a global basis. From 1977 to 1979, I served as an economist in the Office of Policy Planning and Evaluation of the U.S. Environmental Protection Agency ("U.S. EPA"). From 1979 through 1985, I consulted on risk assessment and risk management for environmental policy to the U.S. EPA, to governments in Europe, and on United Nations expert committees convened in Geneva, Rome, and Thailand. From 1985 through 1998, I was employed by Decision Focus International (later named Talus Solutions, Incorporated), which was a risk analysis consulting firm that had substantial practices supporting electric utility operating and business decisions, and supporting policy assessment for the U.S. EPA. From 1988 to 1990, I advised the Director of the National Acid Precipitation Assessment Program ("NAPAP") on integrated assessment of the costs and benefits of policies to control SO_2 and NO_X. Since 1998, I have been a Vice President of CRA International, a global

economics consulting firm with a substantial practice on issues related to energy and the environment.

I have also served as a member of several committees of the National Academy of Sciences focusing on risk assessment and risk-based decision making. I have testified several times before committees of the U.S. Senate on risks from fine particulate matter, on costs and benefits associated with regional haze policies, and on costs of climate change policies.

I have been analyzing multi-pollutant policies for the U.S. utility sector, including mercury, SO_2, NO_X, and other emissions limitations, for the past six years. Under funding from the Edison Electric Institute, and with technical support on data from the Electric Power Institute ("EPRI"), I led a team that developed the leading alternative model to the IPM model that U.S. EPA uses for all of its electric-sector multi-pollutant policy modeling. I supported the utility industry in assessing impacts of alternative mercury MACT controls under Section 112 of the Clean Air Act, and I also prepared an expert report on the costs and effectiveness of the proposed Clean Air Mercury Rule ("CAMR") that was used in comments submitted by EPRI on the proposed CAMR rule, and later also on the Notice of Data Availability ("NODA") regarding the proposed CAMR. My projections of speciated mercury emissions were used as a key input to the mercury deposition modeling that EPRI has also documented in comments on the proposed CAMR rule, in response to the mercury NODA, and in comments on the reconsideration of the CAMR rule. I also developed a cost-effectiveness framework for evaluating mercury control policies that was published as an EPRI report in 2003. The latter study demonstrated how to integrate projections of cost, deposition, exposure, and health risks for alterative mercury control approaches.

I received my Ph.D. (1984) in economics with a Ph.D. minor in engineering-economic systems from Stanford University. My M.A. (1981) in economics was also from Stanford University. I received my B.A. (1977) in economics from Duke

University, *summa cum laude*. I am attaching my CV to this testimony, which lists my major publications.

II. DESCRIPTION OF ANALYSIS PERFORMED

In this testimony, I report on my projections of the costs and emissions of SO_2, NO_X and mercury for IEPA's proposed mercury rule, with and without an MCS provision. These projections were developed using CRA International's National Electricity and Environment Model ("NEEM"), which is described in greater detail in Section III.

As a starting point for purposes of comparison, I used NEEM to prepare a least-cost simulation of attainment of the CAMR rule when implemented in combination with the SO_2 and NO_X caps of the Clean Air Interstate Rule ("CAIR") rule ("CAIR/CAMR").[1] I next used NEEM to simulate the effects of Illinois imposing IEPA's proposed mercury rule while the rest of the nation would continue to implement CAIR/CAMR ("IL Rule").[2] Third, I prepared a simulation of the IL Rule that includes an MCS provision. My testimony focuses on how my projections of the costs, emissions, and business impacts of the proposed IL Rule compare to those of the proposed IL Rule amended to include an MCS provision. My conclusion is that the MCS provision would increase the benefits that would otherwise be obtained under the IL Rule by providing a broader set of emissions reductions. I also conclude that the MCS provision would provide greater financial and operational stability to at least one of Illinois's electricity generation and services providers.

To simulate the IL Rule with the MCS, I assumed that only Ameren would make use of the MCS provision. I did not attempt to evaluate whether other companies would also find the MCS provision to be a preferred alternative. I started with the NEEM model run for the IL Rule, with no change to any of its input assumptions. However, for the MCS simulation, I modeled a multi-pollutant set of controls that could be expected of

[1] This scenario also accounts for the provisions of the Clean Air Visibility Rule ("CAVR"), which affect mainly electricity generating units in the West.

[2] Note that the scenario that I call "IL Rule" in my testimony *also* accounts for the provisions of CAIR nationally (including in Illinois), as well as the provisions of CAMR in all states other than Illinois.

Ameren if it were to meet the MCS provision's requirements. All other Illinois generators in the simulation then took the control actions that are least-cost to meet the proposed IL Rule provisions, just as in the original IL Rule model run.

III. DESCRIPTION OF NEEM MODEL

My simulations have been conducted using CRA's North American Electricity and Environment Model ("NEEM"). NEEM is a linear programming model that simulates a competitive electricity market for the continental United States by minimizing the present value of incremental costs to the electric sector while meeting electricity demand and complying with relevant environmental limits. NEEM was designed specifically to be able to simultaneously model least-cost compliance with all state, regional and national, seasonal and annual emissions caps for SO_2, NO_X and Hg. The least-cost outcome is the expected result in a competitive wholesale electricity market.

NEEM is a process-based model of U.S. electricity markets and portions of the Canadian system. U.S. electricity markets are divided into 24 individual demand regions (based on NERC sub-regions) and interconnected by limited transmission capabilities (also based on NERC data). Coal units in particular are represented in detail as these are most affected by environmental regulation. All coal units greater than 200 MW in size are individually represented in the simulation.[3] All non-coal generating units in the United States are also represented in the model with some level of unit aggregation. Units are dispatched to load duration curves within each region. There are 20 load segments spread over three different seasons.

NEEM produces forecasts of short-term and long-term decisions such as coal choices, investments in pollution control equipment, new capacity additions, unit utilization, unit retirements, and unit emissions. NEEM also produces associated projections of wholesale electricity prices and capacity values by region, and allowance prices for all emissions categories that are subject to a cap.

[3] For this analysis, even the smallest coal units in Illinois were individually represented in NEEM to provide greater accuracy.

CRA International has used NEEM extensively to assess electric sector responses to many different types of national, regional and state environmental policies in analyses for EPRI, the Edison Electric Institute, the National Rural Electric Cooperatives Association, and for a number of individual utilities and other companies. NEEM has also been licensed to clients for their in-house modeling purposes.

NEEM is a similar model to the IPM model that is used extensively by the U.S. EPA, and also has been used by the IEPA in this proceeding. Both models are dynamic, linear programming models of the U.S. electricity sector. Both models minimize the present value of incremental costs subject to a set of operational constraints. The primary difference between NEEM and IPM is in the exogenous assumptions used in the respective models, such as cost and effectiveness of control technologies, fuel prices, and future electricity demand levels.

This type of model is particularly well suited to evaluate environmental policies that affect the electric sector, as it has a long-term focus necessary to assess major capital investments like retrofit decisions and a national scope necessary to simulate emissions markets that affect compliance planning. This type of model is usually used to compare between alternative scenarios, thus providing a "controlled experiment" regarding the relative impacts of two possible future policy paths. This comparative format is useful because it mitigates much of the uncertainty that is associated with any single projection. The appropriateness of this type of model is reflected in the fact that it has been used to evaluate every major electricity sector emissions policy in the last twenty years. The extensive use of these models has also made them well understood in the modeling community, and implies that their internal computations have withstood repeated scrutiny and critique. The primary concern when evaluating new simulations from NEEM or IPM should be focused on the quality of their input assumptions.

IV. RESULTS OF ANALYSES REGARDING EFFECTIVENESS AND FINANCIAL IMPACTS

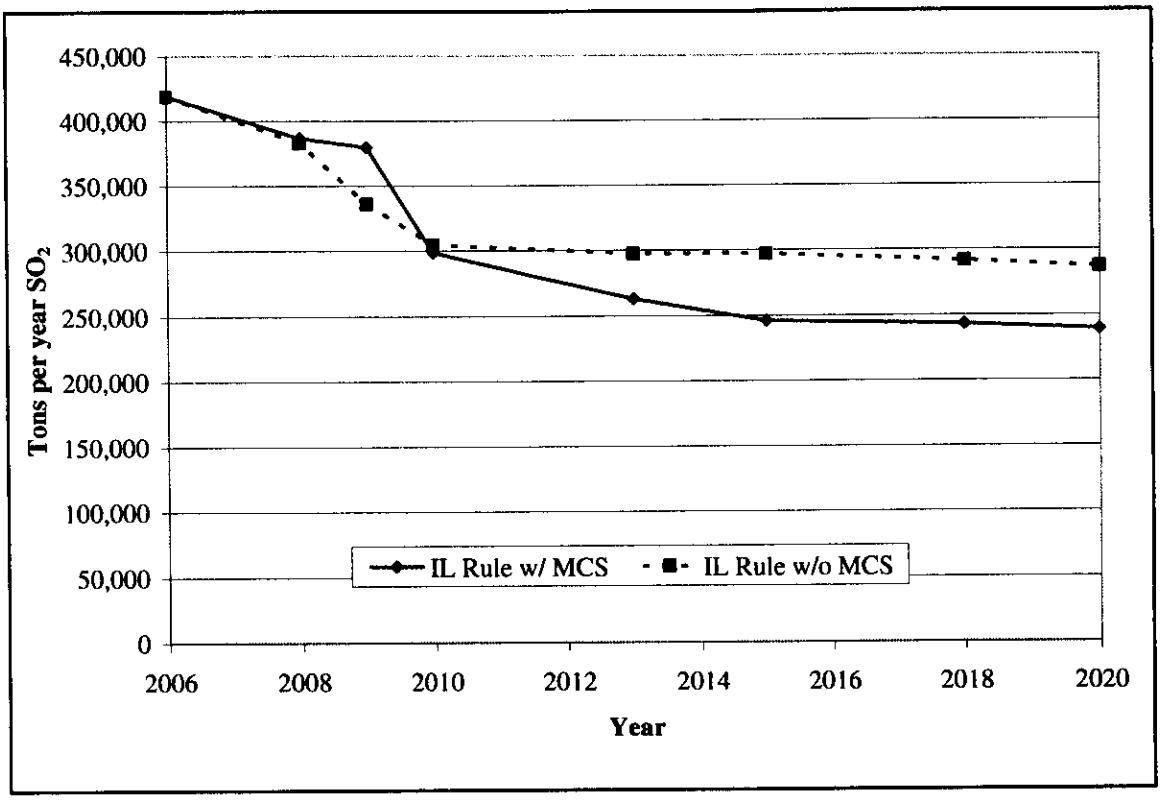
A. SO_2, NO_X, and Mercury Emissions Projections

The MCS provision is projected to produce much lower SO_2 emissions in Illinois, moderately lower NO_X emissions, and very similar mercury emissions. Almost all of the differences are due to changes in control measures at Ameren's units.

Ameren's use of the proposed MCS provision would cause SO_2 emissions to fall gradually to substantially lower levels than under CAIR combined with the IL Rule without the MCS (Figure 1). By 2015, Illinois SO_2 emissions are projected to be about 50,000 tons, or 17 percent, lower with the MCS provision than without it. SO_2 emissions are a major contributor (or "precursor") to ambient concentrations of fine particulate matter ("$PM_{2.5}$"), and the additional reductions of Illinois SO_2 emissions would be helpful to Illinois in achieving attainment with the $PM_{2.5}$ National Ambient Air Quality Standards ("NAAQS"). The sulfate particles that form from SO_2 emissions also block light, and decrease visual ranges over long distances. Thus, the extra SO_2 reductions due to the MCS will also help improve regional haze in the state, and meeting the requirements of the Regional Haze Program under the Illinois state implementation plan ("SIP") for visibility.

Some of these SO_2 reductions would be very unlikely to occur under CAIR/CAMR alone, or under CAIR/CAMR in conjunction with the IL Rule. I estimate that five of the FGD projects assumed under the MCS scenario would cost between $3,600/ton and $4,800/ton SO_2 removed, which is four to five times higher than the range of SO_2 allowance prices that is projected by EPA and others.

Figure 1: Comparison of SO_2 Emissions by Existing Coal Plants in Illinois

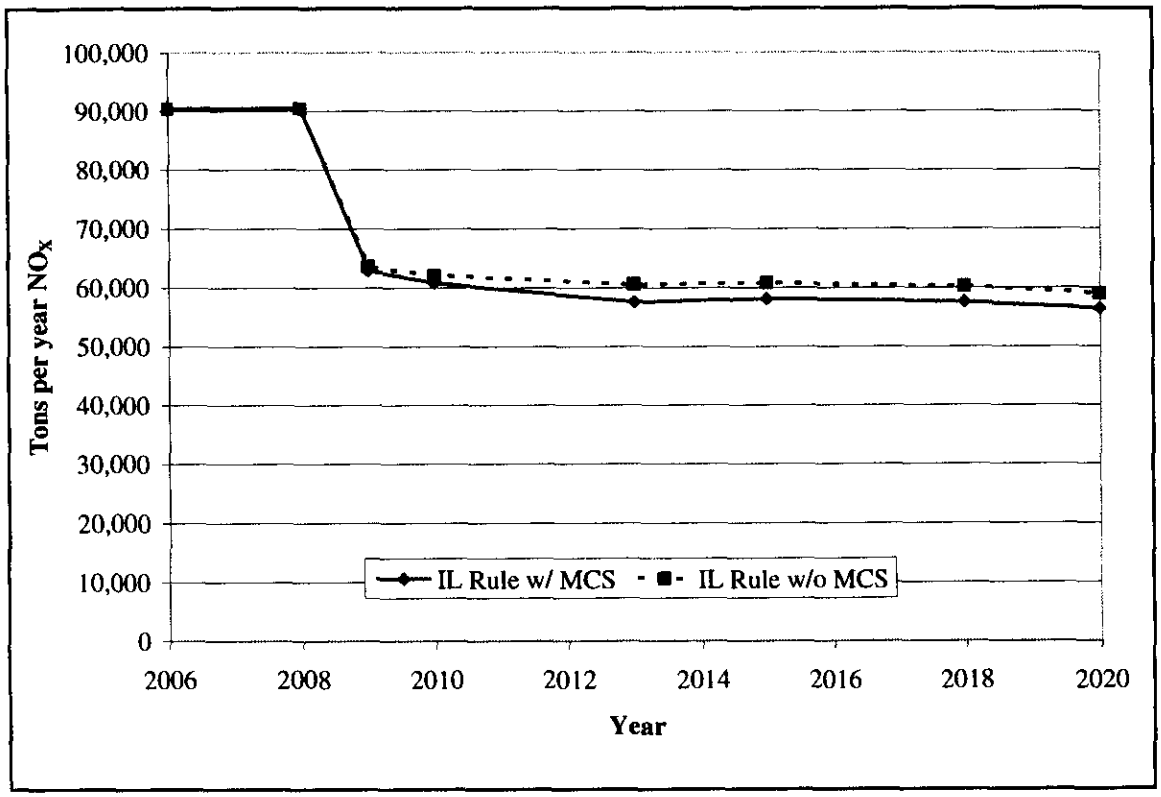


Ameren's use of the proposed MCS provision would also cause NO_X emissions to be lower than under the IL Rule without the MCS. NO_X emissions are progressively lower over time, until 2015 when they are about 3,000 tons, or 5 percent, lower than projected for the IL Rule without the MCS provision (Figure 2). NOx emissions can be a major contributor to the formation of ambient ozone in the troposphere, and these reductions would be helpful to Illinois in its efforts to attain the ozone NAAQS. NO_X emissions also can form into nitrate particles in the air, which impair regional haze. Thus, the extra NO_X emissions reductions may also contribute to reduced regional haze in the state, and help meet the requirements of the Regional Haze Program under the Illinois visibility SIP.

Some of these NO_X reductions would be very unlikely to occur under CAIR/CAMR alone, or under CAIR/CAMR in conjunction with the IL Rule. I estimate that the two SCR projects at Newton assumed under the MCS scenario would cost

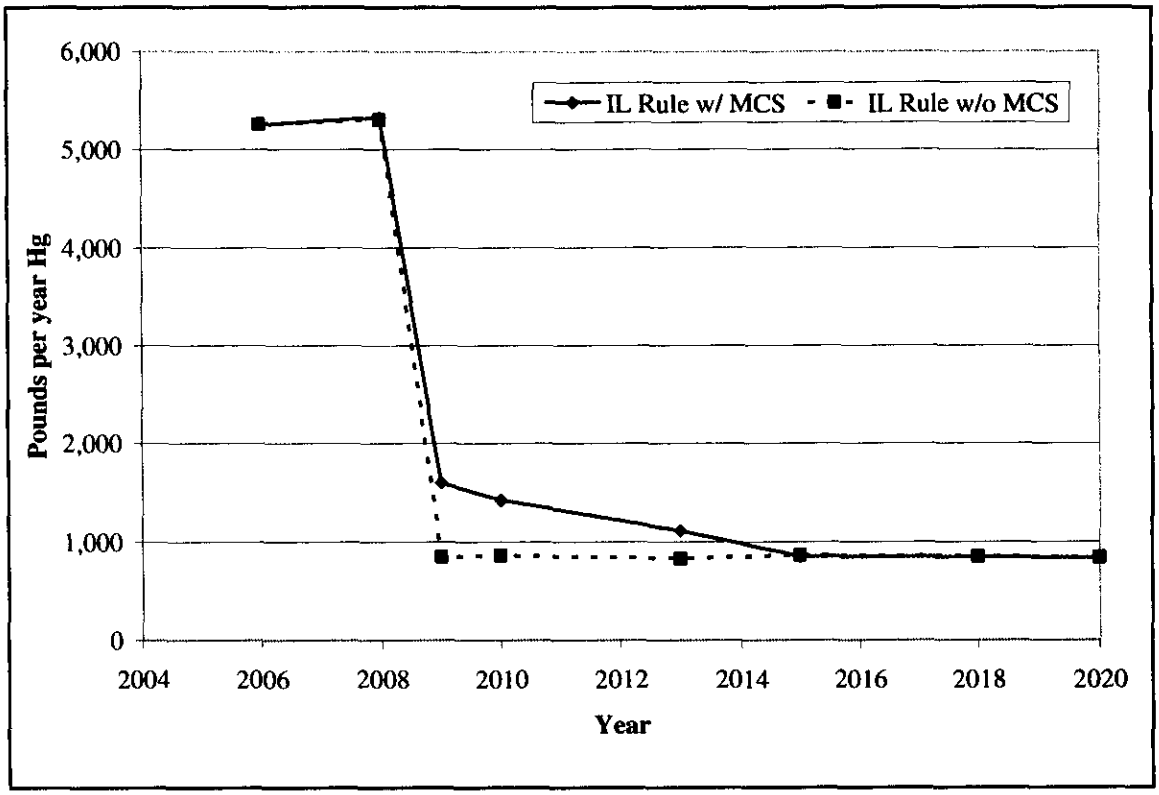
between $20,000/ton and $26,000/ton NO_X removed, which is about ten times higher than the range of NO_X allowance prices that is projected by EPA and others.

Figure 2: Comparison of NO_X Emissions by Existing Coal Plants in Illinois



Ameren's use of the MCS results in slightly less mercury reduction in the years 2009-2014, after which the Illinois mercury emissions of the two scenarios become essentially identical (Figure 3). Projected Illinois mercury emissions with the MCS provision still achieve 83 percent of the reduction that would occur under the IL Rule without the MCS in 2009, rising to 87 percent of the IL Rule's reduction in 2010, and 94 percent by 2013. Then, from 2015 onwards, Illinois mercury emissions are at the same level as under the IL Rule alone. Thus, large reductions in mercury emissions occur even by 2009 under the MCS provision, and the small difference in emissions of mercury lasts only a few years. The mercury deposition for the years 2009 through 2014 with the MCS provision would therefore be only slightly different than the expected deposition change described in Dr. Vijayaraghavan's testimony.

Figure 3: Comparison of Mercury Emissions by Existing Coal Plants in Illinois



In summary, there are widely accepted linkages between SO_2 and NO_X reductions and lowered levels of criteria pollutants and regional haze, all of which pose attainment challenges to Illinois in the coming decade. It is therefore reasonable to view the MCS provision's incremental reductions in these emissions as having a meaningful chance of producing real benefits to Illinois. I find that the small differences in the amount by which mercury emissions fall during 2009 through 2014 are, in comparison, non-meaningful.

B. Costs and Financial Burdens

There are several ways to measure the financial impacts of a policy. The measure of cost alone, such as the NEEM and IPM models provide, has some relevance for determining the economic efficiency of a policy, but it can be very misleading as a measure of the financial burden or economic impact to a particular region, such as the state of Illinois. This problem is especially true when a policy is imposed in a single

state, while surrounding states take a less onerous policy that gives their generators a potential competitive edge. The problem is that these models' estimates of "cost" include costs of generation as well as costs of controlling emissions. According to these models, cost *falls* if the state's generators lose market share to generators in surrounding states when their variable costs rise due to their greater requirements for emissions controls. In other words, measures of costs from a least-cost model would suggest that Illinois is *better off* (has "lower costs") when its generators are harmed competitively by the regulation. Thus a single state could seriously mislead itself about the impacts to its state if it were to rely on the standard cost output of models such as IPM and NEEM. Additional calculations after the model run are necessary to obtain measures of state-specific cost and financial burden that are appropriate for decision making.

One step to obtaining a more meaningful measure is to use the model's projected choices of additional control equipment to estimate actual expenditures on control equipment, including both the capital cost and the costs of running the control equipment when generating. To the extent that control actions include changing to a cleaner fuel, then the cost estimate should include the higher cost of the fuel as well as the cost of control equipment. This step provides a measure of the true control costs caused by the IL Rule, after removing the offsetting "cost reductions" that actually reflect lost ability to compete.

The MCS provision is more costly, and those added costs are borne by Ameren. However, there would be other important financial and operational benefits to Ameren in making use of the MCS provision. The IL Rule, with or without the MCS, will require Ameren (and the other Illinois generators) to make major new capital investments in control equipment. The investment requirements of the CAIR/CAMR rule alone present financing challenges to electricity generating companies nationwide, and the IL Rule adds yet a larger burden, and in a foreshortened period of time. There are substantial benefits to companies if they can spread the capital investment costs over a longer period of time. (There are perhaps equally important benefits if companies can spread out the associated demands on construction project management. Overburdening of construction

management resources can lead to inefficiencies and bottlenecks that can create cost escalation beyond the levels estimated in this testimony.)

Figures 4 and 5 show the amount of capital that my analysis has estimated Ameren needs raise in each year from now until 2020 under the CAIR/CAMR, the IL Rule without the MCS, and the IL Rule with Ameren using the MCS. Both figures show the present value (in 2006) of capital expenditures in each future year. They are stated as annualized capital charges in the case of Figure 4 and stated as "overnight investment" in the case of Figure 5. Figure 5 shows that the IL Rule not only implies a much greater amount of capital expenditure overall than CAIR/CAMR, but also that most of the increased expenditure is condensed into the near-term -- by 2009. I estimate that the total capital that Ameren must raise by 2010 under CAIR/CAMR is almost $200 million (in 2006 present value). In contrast, I estimate that Ameren must raise over three times that amount by 2009 under the IL Rule -- nearly $650 million in 2006 present value. The MCS substantially mitigates Ameren's surge of demand for capital in 2009 by taking on more total investment but spreading it more gradually over time.

Although the total capital expenditures are larger under the MCS than under the IL Rule without the MCS, they are greatly smoothed out, in a manner that should be far more feasible to finance, and with a far more manageable rate of increase in demands on cash flow. Additionally, the control requirements under the MCS give the company the opportunity to take advantage of technological improvements that are likely to occur in the later years. This suggests that my estimates of higher costs in the later years may be overstated, while the savings estimated for the MCS provision in the first few years are not so likely to be overstated. Hence, the estimated increment to Ameren's costs if it were to make use of the MCS provision may not be as large as these figures indicate. The smoothing out of the capital expenditures also indicates a more operationally manageable rate of development of large construction projects over the Ameren system.

Figure 4. Annualized Capital Expense for Ameren Projected Using NEEM under CAIR/CAMR Alone, the IL Rule, and the IL Rule with Ameren Using the MCS (2006 Present Value)

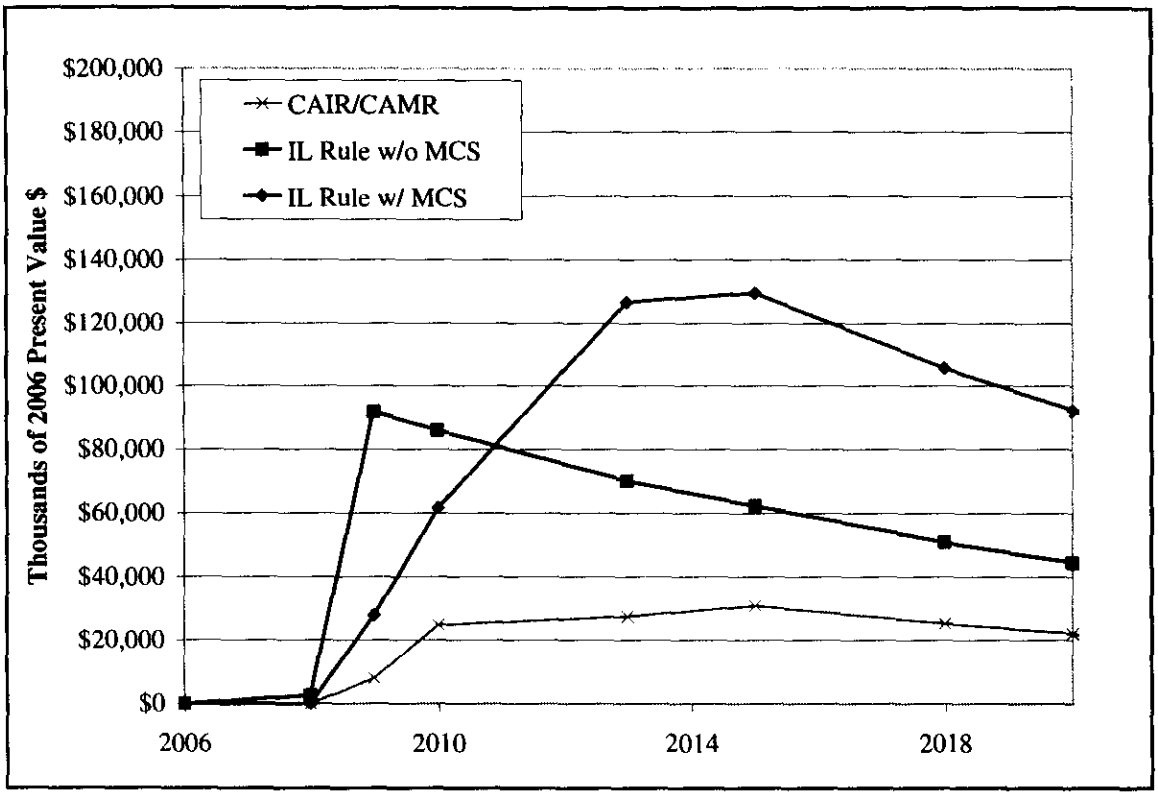
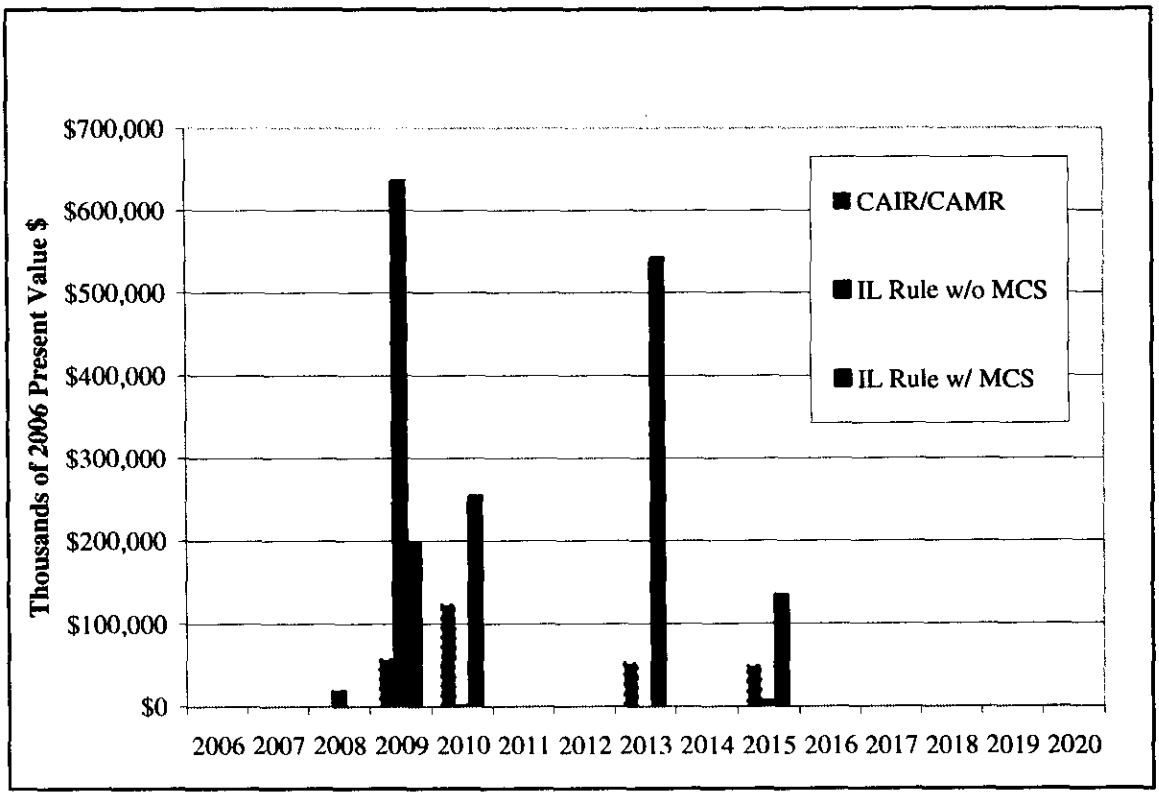


Figure 5. Overnight Capital Expense for Ameren Projected Using NEEM under CAIR/CAMR Alone, the IL Rule, and the IL Rule with Ameren Using the MCS (2006 Present Value)



V. CONCLUSION

As explained in Section IV.A, the higher total investment in controls, and the way that they are spread over multiple pollutants under the MCS provision is a good environmental deal for the state of Illinois. As explained in Section IV.B, the MCS provision also represents a prudent trade-off for Ameren to make from the perspective of corporate financial stability, corporate management of construction projects (with associated operational stability), and the creation of opportunities to achieve these environmental benefits at lower ultimate total cost.

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Dr. Smith is a nationally recognized expert in risk assessment, uncertainty analysis, and environmental economics, applying economics, decision sciences and systems modeling to help manage complex environmental and energy issues. Dr. Smith has been engaged by clients to analyze risks, benefits, and costs of the most prominent environmental policy issues of the past decade, including air quality, climate change, contaminated sites, nuclear waste cleanup, and food safety. She has testified before the U.S. Senate on costs of climate policy, risks of particulate matter and on technical assessments of regional haze benefits and costs. In the area of solid waste risk management, Dr. Smith has submitted expert comments on EPA's Hazard Ranking System and on its underground tank rules. She has served on several committees of the National Academy of Sciences, and on a subcommittee of EPA/ORD's Board of Scientific Counselors. Her clients have included research institutions, trade associations, private corporations, multi-stakeholder organizations, and governments.

Before joining CRA, Dr. Smith was a vice president at Decision Focus Incorporated and leader of the company's environmental policy analysis practice. She has also served as an economist in the Office of Policy Planning and Evaluation of the US Environmental Protection Agency.

PROFESSIONAL EXPERIENCE

Below are listed examples of relevant projects by Dr. Smith during her thirty-year career.

Risk Assessment and Uncertainty Analysis

- *Utility Air Regulatory Group* — Technical review of PM risk analyses and demonstration of methods for incorporating uncertainty into the analysis. Technical reviews of health effects literature for ambient particulate matter (PM), with focus on potential errors in the statistical inferences being used as the basis for risk and benefits estimates associated with the proposed PM NAAQS.

- *US Department of Energy* — Assessed risks to public and workers at and surrounding sites within DOE's nuclear weapons complex, for input into a DOE Report to Congress. Compared

occupational safety and health impacts associated with alternative site remediation plans and review of OS&H programs.

- *US Department of Agriculture, Food Safety and Inspection Service.* Worked closely with USDA staff to develop a risk ranking system to support a risk-based procedure for allocating Department resources for sampling for contaminants across the entire US food supply.

- *Electric Power Research Institute* — Developed the Constituent-Level PM Standards Assessment Framework and associated control options data for assessing costs and risks of different regulatory standards for PM at the regional level, and of different implementation options. Also performed uncertainty analysis on health damage functions and benefits valuation.

- *Electric Power Research Institute.* Designed, developed and applied screening-level risk estimation methods for prioritizing risks and other concerns associated with contaminated sites. Applications to coal tar sites and PCB spill sites.

- *Utility Solid Waste Activities Group.* Prepared expert comments on correlation of Superfund Hazard Ranking System results with actual environmental risks of sites, as part of rulemaking process.

- *EPRI and individual utilities* — Developed probabilistic model for assessing risks and uncertainties associated with underground tank leaks, and associated tank management decision support tools.

- *Stanford University* — Developed air toxics risk analysis for Stanford University research laboratories. Prepared statistical design for ambient monitoring program.

- *US Environmental Protection Agency* — Performed risk assessment of the health effects of ambient carbon monoxide, using physiological modeling and decision analysis, in support of the National Ambient Air Quality Standards-setting process.

- *Various companies and government.* Conducted training courses in risk assessment and risk management for environmental and legal staff of large companies, and for government agencies.

Environmental Economics

- *EPRI*—Managed the design and implementation of a full-scale contingent valuation survey to estimate willingness to pay for improvement in regional haze conditions in scenic vistas in the Eastern U.S. The survey explored the sensitivity of stated willingness to pay to different questionnaire formats. Results were found to be sensitive to alternative ways of reminding respondents of their personal budgets.

- *Southern Appalachian Mountains Initiative* — Led a team of expert economists and sociologists to advise SAMI's multi-stakeholder group on the state of the art in valuing changes in air quality-

related values, and provided guidance for SAMI to plan a comprehensive socioeconomic impact assessment of alternative emission management options for the southeastern region of the United States. Valuation techniques covered included ecosystem-related changes, visibility, recreation, health, materials, agro-forestry, lifestyle changes, and reliability. Also provided guidance on options and techniques for assessing economic impacts and other distributional impacts.

- *Stoel Rives* — Provided expert testimony in legal proceedings on valuation of visibility benefits associated with a power plant's emissions in legal proceedings.

- *US Environmental Protection Agency* — Interdisciplinary review and critique of considerations for valuing ecosystem-related damages associated with global climate change.

- *Electric Power Research Institute* — Member of group of experts advancing the state of knowledge regarding appropriate ways for estimating societal value associated with ecosystem impacts of global climate change.

- *CONCAWE* — Prepared policy-focused white paper on the state of the art in valuing mortality risks associated with air pollution, and summarized needs for further methodological development.

- *Nuclear Electric, plc, UK* — Reviewed and critiqued existing and on-going efforts to value the environmental externalities of electricity fuel cycles. Prepared a research plan in this area for the client to address data gaps in evaluating environmental externalities of power.

- *National Acid Precipitation Assessment Program* — Prepared materials damages portion of Integrated Assessment report and contributed to State-of-Science paper No. 27 on valuation of materials damages.

- *US Department of Energy* — Developed and demonstrated model for assessing interaction between physical deterioration and economic behavior in assessing the losses due to painted surface damages from acid deposition.

Integrated Environmental Policy Assessment

- *Electric Power Research Institute*—Prepared a framework integrating scientific and economic models and data to assess the cost-effectiveness of alternative mercury emissions control policies. Prepared paper demonstrating the framework for two alternative utility sector emissions policies, including cap-and-trade versus a MACT standard.

- *Grand Canyon Visibility Transport Commission* — Led the development of the GCVTC's Integrated Assessment System, its associated database of emissions control measures, and *projected baseline of* visibility conditions in the southwestern region of the United States. Also applied a 15-region REMI model of the western United States to assess the macroeconomic

impacts of alternative visibility management strategies generated through use of the Integrated Assessment System.

- *US Environmental Protection Agency* — Designed and developed a multi-criteria decision-aiding framework, TEAM (Tool for Environmental Assessment and Management), for building consensus on complex public policy decisions marked by long-term uncertainties. Applications to coastal zone management, water resources, and agricultural strategies in the United States and abroad.

- *US Environmental Protection Agency* — Prepared an integrated assessment model for climate change costs and benefits (PEF), and used it to explore the trade-offs between costs and benefits for alternative time paths to achieve atmospheric stabilization of greenhouse gases.

- *National Acid Precipitation Assessment Program* — Advised the Director of NAPAP in managing its Integrated Assessment of findings from its diverse research fields, with particular emphasis on uncertainties assessment and communication.

- *Utility Solid Waste Activities Group.* Analysis of cost and environmental benefits of Federal policy options for management of underground storage tanks. Prepared expert report for USWAG comments on Federal proposed regulations to manage tanks.

- *Secretary of Energy, Mexico*—Analyzed the role of natural gas in an environmentally sound energy policy for Mexico, focusing on the air quality impacts of such policy decisions. Assessed the return on investments for alternative refinery investment options that could support a government natural gas strategy. Liaison with U.S. energy and environmental programs.

Environmental Markets Modeling and Policy Impact Assessment

- *Edison Electric Institute, EPRI, other industry organizations, and private corporations*— Developed an integrated modeling framework for assessing costs and economic impacts of multi-pollutant emissions trading policies in the U.S. Framework incorporates a bottom-up, unit-level model of U.S. electricity sector with a top-down macroeconomic model of the U.S. economy at large. Led the implementation of data for assessing mercury emissions and controls for input to the model. Submitted formal comments on cost and impact analyses for rulemaking process leading to the Clean Air Mercury Rule (CAMR), and also on the Clean Air Interstate Rule (CAIR), both of which were finalized in 2005.

- *[Confidential International Power Company]*—In a country with no previous emissions trading experience, provided expertise on program design considerations, analysis needs, and cost-reduction opportunities in developing a regional emissions trading program.

- *Americans for Equitable Climate Solutions*—Quantified the economic impacts and cost-effectiveness of incorporating a "safety valve" into a greenhouse gas cap-and-trade program.

- *Several clients*—Analyzed the costs and economic impacts of the McCain-Lieberman Bill to cap U.S. greenhouse gas emissions. An important insight from this effort was that long-run policy and cost expectations can strongly affect even the near-term economic impacts of such a policy. This demonstrated the importance of using dynamic or forward-looking models in estimating policy costs.

- *Center for Clean Air Policy* — Developed state impact models to assess the distributional impacts to sectors of carbon trading policies that employ alternative ways of distributing the carbon permits. Focus of work was on efficiency-equity trade-offs.

- *EPRI* — Developed a general equilibrium model for analysis of alternative ways of achieving greenhouse gas targets, including emissions trading and hybrids of trading with technology standards. Added distortions of existing taxes to allow evaluation of efficiency-distributional trade-offs associated with alternative permit allocation schemes.

- *Edison Electric Institute* — Prepared two papers on emissions trading. First paper analyzed errors being made in the interpretation of Title IV SO_2 allowance prices and their relationship to actual costs of achieving the SO_2 emissions reductions under Title IV. Second paper analyzed the differences in markets for SO_2, NO_x and greenhouse gases, and the challenges in creating effective emissions trading programs for each one.

- *Reason Public Policy Institute* — Assessed costs and regional economic impacts of proposed national air quality standards for particulate matter and ozone. Used multi-region REMI national model to assess economic impacts, including regional competitiveness effects, job loss/creation by sector, income impacts, and equity/distributional impacts.

- *US Environmental Protection Agency* — Developed engineering-based model (GEMINI) integrating environmental and energy-economy feedbacks, for use in evaluating a range of regulatory options to control greenhouse gases; this effort involved a detailed analysis of energy subsidy impacts.

- *Nuclear Electric, plc, UK* — Developed engineering-based economic model of UK energy markets for use in evaluating the national value of nuclear power in helping the UK meet its environmental objectives.

- *US Environmental Protection Agency* — Investigated practical implementation issues for using emissions trading to address global climate change goals, and compared emissions trading to other incentive mechanisms.

Business Decisions and Environmental Risk Management

- *Southern Company*—Supported senior executives of the company in the planning and development of its May 2005 report to shareholders on environmental assessment. Activities included the modeling of climate policy scenarios, integration of results into internal corporate analyses, and participation in presentations to the board of directors.

- *[Confidential Diversified Energy Company]*—Assessed the sensitivity of profitability to potential climate policy of the individual business operations across the varied operations of a large diversified energy company. This effort enabled an integrated and internally-consistent view of overall corporate risks and opportunities.

- *Cooperative Research Network of National Rural Electric Cooperative Association*—Prepared report explaining business opportunities and strategies for cooperative utilities as participants in upcoming NO_x emissions trading programs.

- *[Confidential Power Companies]*—Developed real options analysis for developing corporate NO_x compliance strategies, accounting for regulatory and market uncertainties. One of these analyses identified ways to reduce compliance costs by over $60 million.

- *Petro-Canada*—Prepared a company-wide assessment of the firm's business strategy and recommended adjustments in light of potential new developments in air quality and climate change policy. Developed real-options analyses for specific asset development projects that were presented to the firm's CEO and executive team.

- *Skadden, Arps, Slate, Meagher, and Flom, LLP*—In support of major litigation, managed analysis and delivery of an expert report regarding probabilistically sound estimates of environmental remediation liabilities reportable under SEC rules.

- *Comision Federal de Electricidad, Mexico*—Developed utility-company emissions control strategies in the context of integrated energy planning for Mexico.

TESTIMONY

- "Science and Risk Assessment Behind the EPA's Proposed Revisions to the Particulate Matter Air Quality Standards" *U.S. Senate Environment and Public Works Committee*, July 2006.

- "Economic Impacts of Various Proposals to Reduce Domestic Greenhouse Gas Emissions" *U.S. Senate Committee on Energy and Natural Resources,* September 2005.

- Expert witness on estimating economic benefits of visibility improvements, *State of Washington Pollution Control Hearings Board*, December 1998.

- "The Proposed Regional Haze Regulation and its Relationship to the Work of the Grand Canyon Visibility Transport Commission," *U.S. Senate Committee on Energy and Natural Resources, Subcommittee on Forests and Public Land Management*, October 1997.

- "Scientific Foundations for U.S. EPA's Proposed New National Ambient Air Quality Standard for $PM_{2.5}$," *U.S. Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Wetlands, Private Property, and Nuclear Safety,* February 1997.

- On costs and benefits of $PM_{2.5}$ NAAQS, *EPA Public Hearings on $PM_{2.5}$ Proposed Rule*, Boston, MA, January 1977.

- On $PM_{2.5}$ and ozone risk analysis and risk management, before *EPA's Clean Air Scientific Advisory Committee*, (multiple occasions), Durham, NC, 1996–2006.

ADVISORY COMMITTEES

- Congressionally Mandated Committee on Management of Certain Radioactive Waste Streams Stored in Tanks at Three Department of Energy Sites, National Academy of Sciences, 2005-2006.

- Committee on Risk-Based Approaches for Transuranic and High-Level Radioactive Waste, National Academy of Sciences, 2003–2005.

- Committee on the Characterization of Remote-Handled Transuranic Waste for the Waste Isolation Pilot Plant, National Academy of Sciences, 2001–2002.

- Programmatic Review of EPA's $PM_{2.5}$ Research Program, Subcommittee on Risk Management, Board of Scientific Counselors, U.S. Environmental Protection Agency, 1999.

- Technical Expert to Committee on Idaho National Engineering and Environmental Laboratory High-Level Waste Alternative Treatments, Board on Radioactive Waste Management, National Academy of Sciences, 1998.

- Committee to Evaluate Science, Engineering, and Health Basis of DOE's Environmental Management Program, Subcommittee on Priority Setting, Timing and Staging, National Academy of Sciences, 1995–2002.

- Panel on DOE's Environmental Restoration Priority-setting System, National Academy of Sciences, 1992–1993.

- Dialogue on Global Climate Change and National Energy Policy, Keystone Foundation, Keystone, CO, 1989–1990.

- Working Group on Assessment of the Impact of Pollutants on the Marine Environment, Group of Experts on Scientific Aspects of Marine Pollution (GESAMP), United Nations, Bangkok, Thailand, 1984.

- Working Group on Biological Aspects of Thermal Pollution of the Marine Environment, GESAMP, United Nations, Rome, Italy, 1983.

- Ad-hoc Committee on Cost-Benefit Analysis, United Nations Economic Commission for Europe, Geneva, Switzerland, 1982.

SELECTED PAPERS

- "Price, Quantity, and Technology Strategies for Climate Change Policy," (with W. D. Montgomery), chapter in *Human Induced Climate Change: An Interdisciplinary Assessment,* Cambridge University Press, 2006.

- "Methods and Results from a New Survey Of Values For Eastern Regional Haze Improvements," with M. Kemp, T. Savage and C. Taylor, *Journal of the Air and Waste Management Association*, November 2005.

- "Implications of Trading Implementation Design for Equity-Efficiency Trade-offs in Carbon Permit Allocations", with M. Ross and D. Montgomery (in revision for *Energy Journal).*

- "Improving Estimates of Uncertainty in $PM_{2.5}$ Health Risk Analyses", with P. Labys (in revision for *Risk Analysis*).

- "Not All Problems Have Been Solved in Emissions Trading", *Natural Gas*, John Wiley & Sons, Inc., December 2001, pp. 15–20.

- "An Empirical Mechanistic Framework for Heat Related Illness," with N. Y. Chan, M. T. Stacey, and others, *Climate Research* Vol. 16 (January 2001), pp. 133–143.

- "Global Climate Change and the Precautionary Principle," with W. D. Montgomery, *Human and Ecological Risk Assessment*, Vol. 6, No. 3, (2000), pp. 399–412.

- "Analysis of the Reduction of Carbon Emissions Through Tradable Permits or Technology Standards in a CGE Framework," with E. J. Balistreri, P. M. Bernstein, and others, *AERE/Harvard Workshop on Market-Based Instruments for Environmental Protection*, Cambridge, MA, July 18–20, 1999.

- "An Integrated Assessment Framework for Climate Change and Infectious Diseases," with N. Y. Chan, K. L. Ebi, and others, *Environmental Health Perspectives*, Vol. 107, No. 5, May 1999.

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- "Making Appropriate Comparisons of Estimated and Actual Costs of SO_2 Emissions Reductions under Title IV," Paper 98-TP49.01, *Air and Waste Management Association Conference*, San Diego, CA (June 14–18, 1998).

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Pollution Control Board

TESTIMONY OF AMEREN CORPORATION
BY MICHAEL L. MENNE, VICE PRESIDENT

My name is Michael L. Menne and I am the Vice President of the Environmental, Safety and Health Department for Ameren Services Company, a subsidiary of Ameren Corporation. I am responsible for developing policies and procedures relating to environmental compliance for Ameren Corporation and its subsidiaries. In addition, I am responsible for ensuring that Ameren's operating subsidiaries comply with state and federal permitting conditions and regulatory requirements. In presenting this testimony, I am speaking solely on behalf of Ameren and not on behalf of the IEPA.

Through its operating subsidiaries, Ameren operates regulated utilities and power plants in Illinois and Missouri. Ameren Corporation owns the following utility companies: Illinois Power Company (AmerenIP), Central Illinois Public Service Company (AmerenCIPS), Central Illinois Light Company (AmerenCILCO), and Union Electric Company (AmerenUE), the last of which operates primarily in the State of Missouri. The utility companies procure power from the following Ameren generating companies also located in Illinois: Ameren Energy Resources Generating Company (AERG), Ameren Energy Generating Company (AEG), and Electric Energy Inc. (EEI). In total, Ameren's coal-fired facilities in Illinois comprise 19 steam generating units located at seven plants throughout the state. These are primarily base load facilities which provide electricity for central and southern Illinois homes and businesses. They employ 1,018 people in seven communities. The proposed mercury rule you are debating today certainly does impact Ameren company operations and our customers.

Ameren companies - particularly Ameren's predecessor company Union Electric

- which I have been affiliated with for over 30 years, has a long history of being proactive in reducing emissions from our power plants. This includes installing one of the first commercial SO_2 scrubbers in the late 1960's, developing Quality Control and Quality Assurance programs for Continuous Emissions Monitoring systems with the Federal EPA in the 1980's, developing the only utility-owned federally permitted PCB destruction method - for which we received a Resource Steward Award from the State of Missouri in 1983, and developing industry leading combustion control NO_x reduction methods on coal-fired power plants, beginning in 1989, for which we received the Governor's Pollution Prevention Award in Missouri in 1998. Indeed, our NO_x emission reduction program resulted in AmerenUE having the lowest NO_x emitting large coal-fired generating unit in the nation for 5 years running, and AmerenUE continues to have the lowest NO_x emitting cyclone-fired boiler in the nation operating without Selective Catalytic Reduction technology.

Thus, when it became apparent a few years ago that coal-fired boilers were to be controlled for mercury emissions, Ameren embarked on a program to research and conduct tests to determine the feasibility of both reducing and monitoring mercury emissions from our boilers. Ameren commenced extensive characterization studies across its generating system to analyze mercury in coal, ash and flue gas. Ameren has been funding Washington University in St. Louis to develop non carbon-based injection sorbents since 2003. Ameren provided a host site for testing various carbon and non-carbon based gas stream injection technologies in conjunction with the Department of Energy at our AmerenUE Meramec facility in 2004. Ameren has retained ADA-ES, a leading expert in the field of mercury control technologies, to conduct tests as part of the

Meramec program, as well as testing the effect of SO3 injection on mercury removal at our AmerenUE Labadie facility. Ameren has an agreement with the Energy and Environment Research Center in North Dakota to study the formation and speciation of mercury in power plant boilers. This year, Ameren will complete mercury testing at our Joppa, Edwards, Hutsonville, Meredosia, and Newton plants in Illinois. In addition, Ameren will be working with the Electric Power Research Institute to evaluate ways for continuously measuring mercury emissions. Ameren recently announced a pollution control technology exchange contract with Hitachi, Ltd. headquartered in Tokyo, Japan. And finally, Ameren will be conducting a pilot test, with Washington University and Powerspan, Inc. out of New Hampshire, of a photo-chemical oxidation mercury control technology under a congressionally funded grant to the Federal EPA at our AmerenUE Rush Island facility in 2007.

The point of raising all this is to illustrate to you that Ameren is taking the control of mercury emissions from our power plants seriously. We want to understand just how to attain and maximize mercury reductions, as well as measure mercury emissions, in the most reliable and economically viable way for future compliance obligations on our generating units. This Board has heard much testimony as to the effectiveness of mercury control technologies. And while some testimony may seem contradictory of others, the simple fact is that there are many variables that can affect the efficacy of mercury control technology, particularly a technology such as activated carbon injection. Ameren is determined to find out how effective this type of technology will be on our generating units.

Over the past 15 years, Ameren has reduced SO_2 and NO_x emissions 60 to 70%

across our generating fleet. As I mentioned, our combustion control technology development program has been industry leading - many units across the country employ combustion controls to reduce NO_x emissions that were piloted and perfected on our generating units. We have learned a great deal from this experience, but two points in particular should be kept in mind that we believe are pertinent to the mercury control program. First, it takes time to engineer, install, and "fine tune" new technologies to achieve maximum performance. Second, because of the many variables involved, what you can achieve at one facility may not be reflective of what you can achieve somewhere else.

Ameren fully supports the goal of reducing mercury emissions in ways that are technically feasible and economically reasonable. In an attempt to develop a mercury emissions reduction program, Ameren conducted an evaluation of its system and its emission control capabilities. In developing its compliance strategy, Ameren considered a number of control technologies, including: activated carbon, developing sorbents, Hg oxidation catalyst, and wet scrubber additives.

This Board has heard testimony that halogenated carbon injection (HCl) can achieve 90% mercury reductions. However, we do not believe Ameren's system can make the IEPA 90% reduction requirement with HCl alone. This is primarily due to predominate use of subbituminous coal and SO3 conditioning (used for opacity control, typically with subbituminous coals) on its system. 90% of Ameren's MWs have SO3 conditioning systems installed. Ameren has determined that SO3 conditioning severely impacts the performance of halogenated sorbents to reduce mercury emissions. Ameren concluded that halogenated activated carbon preferentially absorbed the SO3,

interfering both with mercury removal and opacity compliance. Mr. Stoudt has testified that SO3 flue gas conditioning systems may limit sorbent effectiveness such that HCl alone may not suffice to reach 90% removal. Ameren's experience with its system confirms Mr. Stoudt's position.

Further evaluation by the company, in conjunction with ADA, revealed that mercury emission reductions that would approach 90% removal using current technologies would require either a wet FGD/SCR system for those units still burning bituminous coal, or a fabric filter plus sorbent injection for units burning subbituminous coal. The addition of a fabric filter to a subbituminous unit would also allow the unit to reduce or cease SO3 conditioning, and would further generally, and independently, improve the performance of the sorbent over an ESP configuration. The installation of fabric filters in these two applications, however, is substantially more expensive than an ACI-halogenated sorbent system and would take much longer to design, procure and install. In addition, Ameren concluded that fabric filter installations on subbituminous units, and SCR/FGD or fabric filters on bituminous units, would need to be coordinated with the company's overall NO_x and SO_2 emissions reduction strategy.

An Alternative, Multi-Pollutant Approach

For many years, the power industry and other stakeholders have been struggling with the complexity of new and overlapping emission reduction mandates. The end goal of emission reduction is clear and a coordinated and synchronized approach to those reductions allow the power industry the best means of reaching that goal. The proposal we put before you today sets out a regulatory scheme that addresses three pollutants-SO_2, NO_x and mercury-in a way that synchronizes and coordinates regulatory

reduction mandates that are clearly on the way. This multi-pollutant mechanism balances the environmental goal of effective controls across pollutants and, at the same time, supports the goal for industry of a more stable and certain regulatory framework. Indeed, with these two goals as the focus, the results are more certain and accelerated reductions, more effective planning and smarter technology choices. The alternative that we have developed in conjunction with Illinois EPA called "Multi-Pollutant Standards," or "MPS", will reduce mercury emissions by 90% on most units, as well as make significant reductions in nitrogen oxide and sulfur dioxide, above those required by the Federal Clean Air Interstate Rule (CAIR).

Under the proposal, Ameren intends to install either HCI or FGD/SCR or equivalent technology on all of its Illinois units greater than 90 MW in 2009, and then meet a 90% mercury reduction requirement on these units by 2015. To qualify for this mercury control plan, a generating system must install additional NOx and SO_2 control technologies that achieve stringent multi-pollutant NOx and SO_2 emission rates set forth in the proposal. The multipollutant alternative allows Ameren to take advantage of the "co-benefits" that established NOx and SO_2 pollution control equipment provide for mercury control This approach both assures that 90% mercury removal can be met, and provides substantial beyond-CAIR NOx and SO_2 controls.

Federal CAIR was issued in March, 2005, and will reduce power plant emissions of NO_x and SO_2 from sources in the eastern half of the country by about 60% (NO_x) and 70% (SO_2) from 2003 levels when fully implemented. CAIR relies on an emissions cap and trade program that has a two-phase step down, with the first phase NO_x reduction occurring beginning January 1, 2009 and the first phase SO_2 reduction occurring

beginning January 1, 2010. The second and final reduction phase for each pollutant begins January 1, 2015.

In addition to CAIR, many states, including Illinois, have begun additional emissions reduction planning to address their ozone and PM 2.5 nonattainment areas. Consequently, emission reductions of NO_x and SO_2 that are beyond CAIR will further reduce ambient levels of ozone and PM 2.5, and provide substantial environmental benefits to the residents of Illinois.

LADCO's Midwest Regional Planning Organization lists CAIR Phase 2 2015 emission rates as 0.125 lbs/mmBtu for NOx and 0.47 lbs/mmbtu for SO_2. Under Ameren's proposal, power companies electing the multi-pollutant option, at a minimum, will have to meet a system-wide NO_x emissions rate of 0.11 lbs/mmBtu by 2012 (more and earlier than CAIR) and a system-wide SO_2 emissions rate of 0.33 lbs/mmBtu by 2013, dropping to 0.25 lbs/mmBtu by 2015 (again, more and earlier than CAIR).

To structure the Multi-Pollutant Standards or MPS, Ameren's built upon IEPA's recent Temporary Technology Based Standard (TTBS). The TTBS approach recognizes that "one size does not fit all," and provides a temporary extension from the 90% removal requirement until 2015, when 90% reduction is required, provided units subject to exemption install ACI and inject halogenated PAC by 2010. The TTBS recognizes that ACI and halogenated PAC will get whatever removals it will get upon installation, and that level of removal is adequate until the technology can be developed and installed to ensure 90% removal. Ameren believes that although the TTBS may provide an alternative for some, it does not allow for multi-pollutant coordination and reductions, and it does not address Ameren's technical conclusions on the effectiveness

of ACI or HCl at its plants. Building upon the TTBS concepts, Ameren and other companies that elect to be covered by the proposal, will be required to install HCl (or FGD/SCR) on all units, except certain very small units (i.e., units under 90 MW), by 2010, and operate those systems, as generally provided in the TTBS. In addition, all units installing ACI by 2010 will have to meet 90% removal or the alternative output based limit by 2015, consistent with the TTBS, and any small units that did not install ACI in 2010 will have to install it by 2012. Under Ameren's proposal, to provide an additional significant public health benefit, power companies electing to use the multi-pollutant approach will also have to install NO_x and SO_2 pollution control equipment not otherwise required by the Federal CAIR program.

Ameren's only condition is that it be provided the same timeframe contemplated by the TTBS to meet the 90% mercury reduction requirement, so that it can sensibly manage the massive amount of equipment procurement and construction, and raise the capital required to meet this commitment and so that it can coordinate the scrubber and FGD/SCR controls with its beyond-CAIR multipollutant plan

Like the TTBS, Ameren's proposal includes injection of halogenated sorbent at specified rates, and incorporates the alternatives provided by the TTBS, including the ability to inject at a lower rate if Ameren demonstrates the higher rate will interfere with meeting opacity and particulate compliance. This will ensure that the ACI systems are operated for effective mercury removal.

Ameren's amendment reflects our commitments to meet specific regulatory limits for mercury by 2010 and 2015, representing 90% reduction in mercury on all but its smallest units, and substantial and real reductions in NO_x and SO_2 which go beyond the

CAIR requirements. The proposal also incorporates other requirements regarding NO_x and SO_2 reductions requested by the Agency.

The proposal we are submitting does not come before you lightly. The commitment in pollution control technology could cost as much as $2 billion in investments on a very aggressive schedule. Ameren brings forth this proposal as an attempt to satisfy the spirit of the proposed Illinois rule and we believe it provides significant air quality benefits not otherwise contemplated through this rule.

I have attached to my Testimony as Attachment 1 the Multi-Pollutant Standards (MPS) proposal. We believe this proposal in conjunction with the underlying rule represents the maximum reductions in mercury, NO_x and SO_2 that are technically feasibly and economically reasonable for Ameren's facilities in the timeframes provided. We urge the Pollution Control Board to include the multi-pollutant standards language along with, and as a part of, the Illinois EPA's proposed regulation.

Base Emission Rate means, for a group of EGUs subject to emission standards for NOx and SO_2 pursuant to Section 225.233, the average emission rate of NOx or SO_2 from the EGUs, in pounds per million Btu heat input, for calendar years 2003 through 2005 (or for seasonal NOx, the 2004 and 2005 ozone seasons), as determined from the data collected and quality assured by the USEPA pursuant to the federal Acid Rain and NOx Budget Trading Programs for emissions and heat input of the group of EGUs.

Section 225.233 Multi-Pollutant Standards (MPS)

a) General

(1) As an alternative to compliance with the emissions standards of Section 225.230(a) of this Subpart, the owner of eligible EGUs may elect for such EGUs to comply with this Section, which establishes control requirements and standards for emissions of NOx and SO_2, as well as emissions of mercury.

(2) For the purpose of this Section:

(A) An eligible EGU is an EGU located in Illinois that commenced commercial operation on or before December 31, 2000.

(B) For the purposes of this Section, ownership of an eligible EGU is determined based on direct ownership, or by holding a majority interest in a company that owns an EGU or EGUs or by common ownership of the company that owns the EGU, whether through a parent /subsidiary relationship, as a sister corporation, or as an affiliated corporation with the same parent corporation, provided that the owner has the right or authority to submit a CAAPP application on behalf of the EGU.

(3) The owner of one or more EGUs electing to comply with this Subpart by means of this Section must submit an application for a CAAPP permit modification to the Agency, as provided in Section 225.220 of this Subpart, that includes the information specified in subsection (b) of this Section and that clearly states the owner's election to comply with the provisions of this Section 225.233.

(A) If the owner of one or more EGUs elects to comply with this Subpart by means of this Section, then all EGUs it owns in Illinois as of July 1, 2006, as defined in subsection (a)(2)(B) of this Section, shall be thereafter subject to the standards and control requirements of this Section, except as provided in subsection (a)(3)(B) below. Such EGUs shall be referred to as an MPS Group.

(B) Notwithstanding the foregoing, the owner may exclude from the MPS Group any EGU scheduled for permanent shutdown that the owner so designates in its CAAPP application required to be submitted pursuant to

subsection (a)(3), with compliance for such unit(s) to be achieved by means of Section 225.235 of this Subpart.

(4) When an EGU is subject to this Section, the requirements of this Section shall apply to all owners and operators of the EGU, and to the designated representative for the EGU.

b) Notice of Intent

The owner of one or more EGUs that intends to comply with this Subpart by means of this Section shall notify the Agency of its intention by December 31, 2007, which notification shall be accompanied by the following:

(1) Identification of each of the EGUs that will be complying with this Subpart by means of the multi-pollutant standards contained in this Section, with evidence that the owner has identified all EGUs that its owns in Illinois as of July 1, 2006, and that commenced commercial operation on or before December 31, 2000.

(2) If an EGU identified above is also owned or operated by an entity different than the owner submitting the notice of intent, a demonstration that the submitter has the right to commit the EGU or authorization from the responsible official for the EGU accepting the application.

(3) The Base Emission Rates for the EGUs, with copies of supporting data and calculations.

(4) A summary of the current control devices on the EGUs and identification of the additional control devices that will likely be needed for the EGUs to comply with emission control requirements of this section.

(5) Identification of any EGU or EGUs that are scheduled for permanent shut down, as provided by Section 225.235, which will not be part of the MPS Group and will not be complying with this Subpart by means of this Section.

c) Control Technology Requirements for Emissions of Mercury:

(1) (A) For each EGU in an MPS Group with a capacity of 90 MW or more, for the period beginning July 1, 2009 (or December 31, 2009 for an EGU for which an SO_2 scrubber is being installed to be in operation by December 31, 2009), and ending on December 31, 2014 (or such earlier date that the EGU is subject to the mercury emission standard in subsection (d)(1) of this Section), the owner or operator of the EGU shall install, to the extent not already installed, and properly operate and maintain one of the following:

(i) A Halogenated Activated Carbon Injection System, complying with the sorbent injection requirements of subsection (c)(2) of this Section, except as may be otherwise provided by subsection (c)(4) of this Sec ion, and followed by a Cold-Side Electrostatic Precipitator or Fabric Filter ; or

(ii) If the boiler fires bituminous coal, a Selective Catalytic Reduction (SCR) System and an SO_2 Scrubber.

(B) For each EGU in an MPS Group with a capacity that is less than 90 MW, unless the EGU is subject to the emission standards in subsection (d)(2) of this Section, beginning on January 1, 2013, and continuing until such date that the owner or operator of the EGU commits to comply with the mercury emission standard in subsection (d)(2) of this Section, the owner or operator of the EGU shall install and properly operate and maintain a Halogenated Activated Carbon Injection System, complying with the sorbent injection requirements of subsection (c)(2), except as may be otherwise provided by subsection (c)(4) of this Section, and followed by either a Cold-Side Electrostatic Precipitator or Fabric Filter. The use of a properly installed, operated and maintained Halogenated Activated Carbon Injection System that meets the sorbent injection requirements of subsection (c)(2) of this Section is referred to as the "principal control technique."

(2) For each EGU for which injection of halogenated activated carbon is required by subsection (c)(1) of this Section, the owner or operator of the EGU shall inject halogenated activated carbon in an optimum manner, which, except as provided in subsection (c)(4) of this Section, shall be deemed to be the following:

(A) Use of an injection system designed for effective absorption of mercury, considering the configuration of the EGU and its ductwork;

(B) The injection of halogenated activated carbon manufactured by Alstom, Norit, or Sorbent Technologies, or the injection of other halogenated activated carbon or sorbent that the owner or operator of the EGU shows to have similar or better effectiveness for control of mercury emissions;

(C) The injection of sorbent at the following minimum rates, as applicable:

(i) For an EGU firing subbituminous coal, 5.0 pounds per million actual cubic feet.

(ii) For an EGU firing bituminous coal, 10.0 pounds per million actual cubic feet.

(iii) For an EGU firing a blend of subbituminous and bituminous coal, a rate that is the weighted average of the above rates, based on the blend of coal being fire.

(iv) A rate or rates lower than the rate specified above may be set on a unit-specific basis to the extent that the owner or operator of the EGU demonstrates that such rate or rates are needed so that carbon injection will not increase particulate matter emissions or opacity so as to threaten compliance with applicable requirements for particulate matter or opacity.

For this purpose, flue gas flow rate shall be determined for the point of sorbent injection, provided, however, that this flow rate may be assumed to be identical to the stack flow rate if the gas temperatures at the point of injection and the stack are normally within 100^{o} F, or may otherwise be calculated from the stack flow rate, corrected for the difference in gas temperatures.

(3) The owner or operator of an EGU that seeks to operate an EGU with an activated carbon injection rate or rates that are set on a unit-specific basis pursuant to subsection (c)(2)(C)(iv) of this Section shall submit an application to the Agency proposing such rate or rates, and shall meet the following requirements:

(A) The application shall be submitted as an application for a new or revised federally enforceable operating permit for the EGU and include a summary of relevant mercury emission data for the EGU, the unit-specific injection rate or rates that are proposed and detailed information to support the proposed injection rate or rates.

(B) This application shall be submitted no later than the date that activated carbon must first be injected. For example, the owner or operator of an EGU that must inject activated carbon injection pursuant to subsection (c)(1)(A) of this subsection shall apply for unit-specific injection rate or rates by July 1, 2009. Thereafter, the owner or operator of the EGU may supplement its application.

(C) The decision of the Agency denying a permit or granting a permit with conditions that set a lower injection rate or rates may be appealed to the Board pursuant to Section 39 of the Act.

(D) The owner or operator of an EGU may operate at the injection rate or rates proposed in its application until a final decision is made on the application, including a final decision on any appeal to the Board.

(4) During an evaluation of the effectiveness of a listed sorbent, an alternative sorbent, or other technique to control mercury emissions, the owner or operator of an EGU need not comply with the requirements of subsection (c)(2) of this Section for such system as needed to carry out an evaluation of the practicality and effectiveness of such technique, as further provided below:

(A) The owner or operator of the EGU shall conduct the evaluation in accordance with a formal evaluation program submitted to the Illinois EPA at least 30 days in advance.

(B) The duration and scope of the evaluation shall not exceed the duration and scope reasonably needed to complete the desired evaluation of the alternative control technique, as initially addressed by the owner or owner in a support document submitted with the evaluation program.

(C) The owner or operator of the EGU shall submit a report to the Illinois EPA no later than 30 days after the conclusion of the evaluation describing the evaluation that was conducted and providing the results of the evaluation.

(D) If the evaluation of the alternative control technique shows less effective control of mercury emissions from the EGU than achieved with the principal control technique, the owner or operator of the EGU shall resume use of the principal control technique. If the evaluation of the alternative control technique shows comparable effectiveness to the principal control technique, the owner or operator of the EGU may either continue to use the alternative control technique in a manner that is at least as effective as the principal control technique or resume use of the principal control technique. If the evaluation of the alternative control technique shows more effective control of mercury emissions, the owner or operator of the EGU shall continue to use the alternative control technique in a manner that is more effective than the principal control technique, if it continues to be subject to this subsection (c) of this Section.

(5) In addition to complying with the applicable recordkeeping and monitoring requirements in Sections 225.240 through 225.290 of this Subpart, the owner or operator of an EGU electing to comply with this Subpart by means of this Section shall also:

(A) For the first 36 months that injection of sorbent is required, maintain records of the usage of sorbent, the exhaust gas flow rate from the EGU, and the sorbent feed rate, in pounds per million actual cubic feet of exhaust gas at the injection point, on a weekly average.

(B) After the first 36 months that injection of sorbent is required, monitor activated sorbent feed rate to the EGU, flue gas temperature at the point of

sorbent injection, and exhaust gas flow rate from the EGU, automatically recording this data and the sorbent carbon feed rate, in pounds per million actual cubic feet of exhaust gas at the injection point, on an hourly average.

(C) If a blend of bituminous and sub-bituminous coal is fired in the EGU, keep records of the amount of each type or coal burned and the required injection rate for injection of activated carbon, on a weekly basis.

(6) In addition to complying with the applicable reporting requirements in Sections 225.240 through 225.290 of this Subpart , the owner or operator of an EGU electing to comply with this Subpart by means of this Section shall also submit quarterly reports for the recordkeeping and monitoring conducted pursuant to subsection (c)(5) of this Section.

d) Emission Standards for Mercury

(1) For each EGU in an MPS Group with a capacity that is 90 MW or more, beginning January 1, 2015 (or such earlier date that the owner or operator of the EGU notifies the Agency that it will comply with these standards) and thereafter, the owner or operator of the EGU shall comply with one of the following standards on a rolling 12-month basis:

(A) An emission standard of 0.0080 lb mercury/GWh gross electrical output; or

(B) A minimum 90-percent reduction of input mercury.

(2) For each EGU in an MPS Group with a capacity that is less than 90 MW, beginning on the date that the owner or operator of the EGU notifies the Agency that it will comply with these standards and thereafter, the owner or operator of the EGU shall comply with one of the following standards on a rolling 12-month basis:

(A) An emission standard of 0.0080 lb mercury/GWh gross electrical output; or

(B) A minimum 90-percent reduction of input mercury.

(3) Compliance with the mercury emission standard or reduction requirement shall be calculated in accordance with Section 225.230(a) or (d) of this Subpart.

e) Emission Standards for NOx and SO_2

(1) NOx Emission Standards:

(A) Beginning in calendar year 2012, and each calendar thereafter, for the EGUs in each MPS Group, the owners and operators of the EGUs shall comply with an overall NOx annual emission rate of no more than 0.11 lbs/million Btu or a rate equivalent to 50 percent of the Base Annual Rate of NOx emissions, whichever is more stringent.

(B) Beginning in the 2012 ozone season and each ozone season thereafter, for the EGUs in each MPS Group, the owners and operators of the EGUs shall comply with an overall NOx seasonal emission rate of no more than 0.11 lbs/million Btu or a rate equivalent to 80 percent of the Base Seasonal Rate of NOx emissions, whichever is more stringent.

(2) SO_2 Emissions Standards:

(A) Beginning in calendar year 2013 and continuing in calendar year 2014, for the EGUs in each MPS Group, the owners or operators of EGUs shall comply with an overall SO_2 annual emission rate of 0.33 lbs/million Btu or a rate equivalent to 35 percent of the Base Rate of SO_2 emissions, whichever is more stringent.

(B) Beginning in calendar year 2015, and continuing in each calendar year thereafter, for the EGUs in each MPS Grouping, the owners or operators of EGUs shall comply with an overall annual emission rate for SO_2 of 0.25 lbs/million Btu or a rate equivalent to 30 percent of the Base Rate of SO_2 emissions, whichever is more stringent.

(3) Compliance with the NOx and SO_2 emission standards shall be determined in accordance with Sections 225.310, 225.410, and 225.510 of this Part. The owners or operators of EGUs must complete the determination of compliance by March 1 of the following year for annual standards and by November 1 for seasonal standards, by which date a compliance report shall be submitted to the Agency.

f) Requirements for NOx and SO2 Allowances

(1) The owners or operators of EGUs in an MPS Group shall not sell or trade to any person or otherwise exchange with or give to any person NOx allowances allocated to the EGUs in the MPS Group for vintage years 2012 and beyond that would otherwise be available for sale, trade or exchange as a result of actions taken to comply with the standards in subsection (e) of this Section. Such allowances that are not retired for compliance shall be surrendered to the Agency on an annual basis, beginning in calendar year 2013. This provision does not apply to the use, sale, exchange, gift or trade of allowances among the EGUs in an MPS Group.

(2) The owners or operators of EGUs in an MPS Group shall not sell or trade to any person or otherwise exchange with or give to any person SO2 allowances

allocated to the EGUs in the MPS Group for vintage years 2013 and beyond that would otherwise be available for sale or trade as a result of actions taken to comply with the standards in subsection (e) of this Section. Such allowances that are not retired for compliance shall be surrendered to the Agency on an annual basis, beginning in calendar year 2014. This provision does not apply to the use, sale, exchange, gift or trade of allowances among the EGUs in an MPS Group.

(3) The provisions of this subsection do not restrict or inhibit the sale or trading of allowances that become available from one or more EGUs in a MPS Group as a result of holding allowances that represent over-compliance with the NOx or SO_2 standard in subsection (e) of this Section, once such a standard becomes effective, whether such over-compliance results from control equipment, fuel changes, changes in the method of operation or unit shut downs, or for other reasons.

(4) For purposes of this subsection, NOx and SO_2 allowances shall mean allowances necessary for compliance with Sections 225.310, 225.410, 225.510 of this Part, 40 CFR Part 72, or 40 CFR 96.101, *et seq.*, and 40 CFR 96.301, *et seq.* The provisions of this Section do not prohibit the owners or operators of EGUs in an MPS Group from purchasing or otherwise obtaining allowances from other sources as allowed by law for purposes of complying with federal or state requirements, excluding specifically the requirements of this Section.

(5) By March 1, 2010, and continuing each year thereafter, the owner or operator of EGUs in an MPS Group shall submit a report to the Agency demonstrating compliance with the requirements of this subsection for the previous year, which shall include identification of any allowances that have been surrendered to the USEPA or to the Agency, and identification of any allowances that were sold, gifted, used, exchanged or traded because they became available due to over-compliance.

g) Notwithstanding 35 Ill. Adm. Code 201.146(hhh), until an EGU has complied with the applicable emission standards of subsections (d) and (e) of this Section for 12 months, the owner or operator of the EGU shall obtain a construction permit for any new or modified air pollution control equipment proposed to be constructed for emissions of mercury, NOx or SO_2.