BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R06-25
PROPOSED NEW 35 ILL. ADM. CODE 225	)	(Rulemaking – Air)
CONTROL OF EMISSIONS FROM	)	
LARGE COMBUSTION SOURCES(MERCURY)	)	

NOTICE

TO: Dorothy Gunn
Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph St., Suite 11-500
Chicago, IL 60601-3218

SEE ATTACHED SERVICE LIST

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Illinois Pollution Control Board the POST-HEARING COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY, a copy of which is herewith served upon you.

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

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DATED: September 20, 2006

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THIS FILING IS SUBMITTED ON RECYCLED PAPER

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POST-HEARING COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

NOW COMES the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (Illinois EPA), by its attorneys, and hereby submits post-hearing comments in the above rulemaking proceeding. The Illinois EPA appreciates the efforts of the Illinois Pollution Control Board (Board) in this rulemaking regarding the request to add 35 Ill. Adm. Code Part 225 to control mercury emissions from coal-fired electric generating units.

On March 14, 2006, the Illinois Environmental Protection Agency ("Illinois EPA") filed a regulatory proposal entitled *In the Matter Of: Proposed New 35 Ill. Adm. Code 225, Control of Emissions from Large Combustion Sources*, with the Board to control mercury emissions from coal-fired electric generating units ("EGUs") beginning in July 2009. The Illinois EPA engaged in extensive outreach on this proposal and held regular meetings with representatives of the affected sources and public interest groups during the months of January and February. The proposed rulemaking is intended to satisfy Illinois' obligation to submit a State plan to the United States Environmental Protection Agency ("USEPA") to address the requirements of the Federal Clean Air Mercury Rule ("CAMR"). 70 *Fed. Reg.* 28606 (May 18, 2005). Furthermore, this rulemaking proposal addresses the significant deficiencies present in the CAMR--the unnecessary delay in achieving mercury emissions reductions, the inherent concerns

associated with a cap and trade program to control a persistent, bioaccumulative toxin, and the inadequate mercury reductions contained in the CAMR.

Today, approximately 40% of Illinois' electricity comes from coal-fired power plants, and these coal-fired power plants comprise the largest source of uncontrolled mercury emissions in the State. Accordingly, the rulemaking proposal is designed to achieve a high level of mercury reductions, based upon the Illinois EPA's finding that there exists mercury control technology that is both technologically feasible and economically reasonable. The proposal requires mercury reductions from Illinois' coal-fired power plants in two phases. During phase I, which begins on July 1, 2009, coal-fired power plants must comply with either an output-based emission standard of 0.0080 lbs mercury/GWh, or a minimum 90-percent capture of input mercury, both on a rolling 12-month basis. However, plants with the same owner/operator may elect to comply with the limit on a system-wide basis by averaging across their entire fleet of plants in Illinois, provided that each plant meets a minimum output-based emission standard of 0.020 lbs mercury/GWh or a minimum 75-percent capture of input mercury. In Phase II, beginning January 1, 2013, plants must comply with either an output-based emission standard of 0.0080 lbs mercury/GWh or a minimum 90-percent capture of input mercury, both on a rolling 12-month basis.

Furthermore, to provide additional regulatory flexibility for compliance with the proposed rule, the Illinois EPA filed a motion to amend the rulemaking to include a Temporary Technology-Based Standard ("TTBS") that was granted by the Board. Under the TTBS, which is voluntary, EGUs that satisfy relevant eligibility criteria may

demonstrate compliance with control requirements for mercury emissions for a specified and limited time frame.

Illinois EPA witnesses testified and provided evidence in support of the proposed rulemaking at the first hearing that was held in Springfield on June 12, 2006 through June 23, 2006. In addition, prior to the second hearing, the Illinois EPA and Ameren Energy Generating Company, AmerenEnergy Resource Generating Company, and Electric Energy (collectively "Ameren") jointly proposed Multi-Pollutant Standards ("MPS"), along with Ameren testimony, that allow a slight relaxation of the mercury emissions reduction requirements in exchange for significant reductions in NO_x and SO_2 emissions. Ameren Joint Statement, Hearing Exhibits ("Exhibit") 75-78. The MPS, like the TTBS, are voluntary provisions that allow for additional compliance flexibility. At the second hearing that was held in Chicago on August 14, 2006 through August 23, 2006, the Illinois EPA and Dynegy Midwest Generation, Inc. ("Dynegy") jointly submitted a slightly revised version of the Ameren MPS, with a corrected version resubmitted to the Board. Public Comment #6284, Exhibit 125. Given the minor distinctions between the Ameren MPS and Dynegy MPS, and the fact that the Dynegy MPS effectively supersedes the Ameren MPS, the Dynegy MPS will henceforth be referred to in these comments as the MPS.

In addition, Kincaid Generation, LLC ("Kincaid") introduced provisions at the second hearing relating to "Alternative Emissions Standards for EGUs Electing Optional Control Plan." Exhibit 138. Such provisions allow for EGUs meeting certain eligibility criteria to comply with alternative control options; however, compliance with such options results in significantly less stringent mercury control requirements.

The Illinois EPA urges the adoption of the initial proposed rulemaking and proposed amendatory TTBS and MPS provisions. The Board may revise proposed regulations before adoption upon its own motion or in response to suggestions made at hearing and in written comments made prior to second notice. 35 Ill. Adm. Code 102.600. No additional hearing on the revisions need be held. *Id*. Accordingly, the Illinois EPA urges the Board to adopt the initial rulemaking proposal and proposed amendatory TTBS and MPS provisions.

The Illinois EPA testified and introduced evidence in support of this proposition and reiterates such in these post-hearing comments. A very thorough record has been compiled in this rulemaking proceeding encompassing 18 days of hearings, approximately 4457 pages of hearing transcript, and 138 exhibits. Also, as was set forth in the Illinois EPA's Response to Midwest Generation's Motion for Additional Hearings, all parties had more than sufficient time and opportunity to either question proponents of the MPS provisions or present testimony challenging those provisions. Thus, there is no impediment to the Board including the MPS provisions in the second notice of this rulemaking. Indeed, inclusion of the MPS and TTBS provisions in the second notice will allow the proposed rule to be adopted in the manner and scope intended.

These post-hearing comments of the Illinois EPA are two-fold; the comments summarize the hearing testimony and address issues raised by the Board and Midwest Generation, LLC ("Midwest Generation") in pleadings. The areas of coverage are as follows: Technical feasibility and economic reasonableness of controlling mercury emissions from coal-fired power plants in Illinois; deposition of mercury; mercury impacts on human health; fish advisories; monitoring of mercury emissions; impact on

utilization of fly-ash; interaction of the proposed Illinois mercury rule and the Clean Air Interstate Rule ("CAIR"); MPS issues; Kincaid's proposal; suggested clarification of certain MPS provisions; and compliance with the CAMR annual EGU mercury budget or caps.

Technical Feasibility

The Illinois EPA's Technical Support Document ("TSD") classifies existing coal fired units in Illinois broadly into the following five categories:

1. Those that can comply with the emission requirements of the proposed Illinois rule through "co-benefit" removal. These include bituminous units equipped with flue gas desulfurization (scrubbers) and selective catalytic reduction (SCR) and the circulating fluidized bed boiler at Marion. With regard to this category of units, the testimony of Mr. Cichanowicz on behalf of Midwest Generation assumes that these units will be able to comply with the rule through co-benefit removal of mercury as indicated by its table entitled CAIR-IL Rule Tech. Exhibit 120.

2. A small number of small-capacity bituminous coal units that currently are unscrubbed and may or may not be able to meet the 90% removal or the output-based standard, but are addressed by the multipollutant control alternative and the TTBS.

3. Some units (Baldwin, Havana, Vermilion) with electrostatic precipitator ("ESPs") that currently plan to install a fabric filter downstream of the ESP. Both Illinois EPA and the industry acknowledge that these units are expected to achieve 90% or more capture of mercury.

4. Two units burning Powder River Basin ("PRB") coal and using hot-side ESPs. Illinois EPA and industry agree that these units would have to install fabric filters to comply with the proposed Illinois rule.

5. Units firing PRB coal and using cold side ESPs – the largest group of units in Illinois.

TSD § 8.6, pgs. 147-152.

The principle area of disagreement between Illinois EPA and Midwest Generation relates to this last group of units. Illinois EPA and Midwest Generation disagree on the

method that will be necessary to meet the requirements of the Illinois mercury rule on PRB coal-fired units. This disagreement accounts for nearly all the difference in the estimates of cost of the regulation between Illinois and its expert, Dr. Staudt, on the one hand, and Mr. DePriest and Mr. Cichanowicz, the Midwest Generation experts, on the other. However, the evidence before the Board demonstrates that PRB coal-fired units will be able to use sorbent injection to achieve 90% or greater reduction of mercury emissions on the timetable of the proposed rule. Cross-examination of Mr. Cichanowicz, technology expert for Midwest Generation, showed that his opinions to the contrary were based on speculation contradicted by the evidence in the record.

Based on the evidence presented in the TSD, the Illinois EPA concluded that mercury emissions reductions of 90% or greater are achievable on PRB coal-fired units with cold-side precipitators using sorbent injection of halogenated Powdered Activated Carbon ("PAC") at a treatment range of about 3 lb/MMacf. TSD § 8.6.2, p. 149.

In testimony to the Board, Dr. Staudt, witness for Illinois EPA, stated that in his opinion, "All of the coal-fired units in the state of Illinois are capable of meeting the requirements of the proposed mercury control rule." Exhibit 50, p. 6. With respect to units burning low sulfur PRB coal, Dr. Staudt stated that sorbent injection of "halogenated PAC has been shown to be very effective at several full-scale coal-fired boiler installations providing 90% or more removal." Exhibit 50, p. 6. Based on these conclusions, and using cost figures for halogenated PAC that are not in serious contention here, Dr. Staudt estimated the total cost of compliance with the proposed mercury regulation at about $32-37 million per year in the period 2010-2018. Since the EPA's CAMR, which limits mercury emissions to similar levels, takes effect in 2018, Dr. Staudt

properly concluded that the incremental cost of the Illinois program would be negligible thereafter.

By contrast, Mr. Cichanowicz assumed that many PRB coal-fired units would need to install fabric filters because of his opinion that sorbent injection has not currently been demonstrated to achieve emissions reductions of 90% or more. Mr. DePriest testified that he used Mr. Cichanowicz' assumptions regarding the technology that will be needed to comply with the Illinois rule when he developed his estimate of the cost of the rule. Thus Mr. DePriest's extraordinarily high cost estimate stands or falls on the control technology testimony offered by Mr. Cichanowicz.

Mr. Cichanowicz' opinion rests solely on the premise that sorbent injection upstream of a cold-side ESP is incapable of providing high levels of mercury reduction. He asserts that "there is insufficient data to demonstrate that Hg control technology is available today to assure compliance with the Agency's proposed Hg rule"; and, "suggests" that there is a relationship between ESP size and the removal rate achieved by sorbent injection, based on a figure developed by Mr. Cichanowicz (figure 5.2 of his pre-filed testimony). Exhibit 84, p. 4. If it existed, such a relationship would be relevant in this proceeding because many Illinois PRB coal-fired units have ESPs with relatively small plate area (expressed as Specific Collection Area or "SCA").

With regard to the first point, Mr. Cichanowicz posed the wrong test. The issue before the Board is not whether 90% reduction of mercury emissions is demonstrated to be "available today," but rather whether the technology is sufficiently demonstrated for the Board to conclude that it will be available to meet the requirements of the regulation

when they become effective. The Illinois EPA has presented ample evidence for the Board to reach that conclusion.

First, the TSD provides a list of 28 field demonstrations completed, and 11 more in progress or planned. TSD, Table 8.1, p. 125-6. In contrast to the arguments industry has presented, Illinois EPA's position is supported by actual test results under sponsorship of the U.S. Department of Energy and others.

On PRB units with a cold-side ESP, 90% or better removal has been demonstrated at multiple sites using halogenated PAC at treatment rates of about 3 lb/MMacf. The consistency of these results at multiple sites provides high confidence that this performance will be achieved by Illinois units that burn PRB coal. Only when carbons were used that have lower activity than normal halogenated PAC – such as untreated carbon or specialty treated carbons like Sorbent Technologies' C-PAC – was less than 90% removal achieved.

With regard to the second point, whether mercury capture will be adversely affected by small ESP plate size, Mr. Cichanowicz admitted in his pre-filed testimony that the relationship "suggested" in his pre-filed testimony was "anecdotal" and "not intended to reflect any fundamental theorem of carbon Hg absorption." Exhibit 84, p. 4. Under cross-examination, Mr. Cichanowicz acknowledged that the "suggested" relationship of Figure 5.2 between ESP size and sorbent injection effectiveness is not supported by the underlying data. Mr. Cichanowicz acknowledged that the variations in the effectiveness of sorbent injection in field demonstrations identified in Figure 5.2 are explained by other factors – choice of sorbent (halogenated or not), sorbent injection, coal type, sulfur content of coal, or, in the case of Yates unit 1, poor reagent distribution.

Poor reagent distribution at Yates 1 has been confirmed by the computer modeling results performed for the U.S. Department of Energy that are included in Exhibit 71. Thus the "suggested" relationship between ESP size and Hg removal in Figure 5.2 was shown to be spurious, with the variations in performance acknowledged to be explained by other factors that Mr. Cichanowicz agreed affect mercury capture performance by sorbent injection. Tr. 8/17/06, pgs. 831-834, 999.

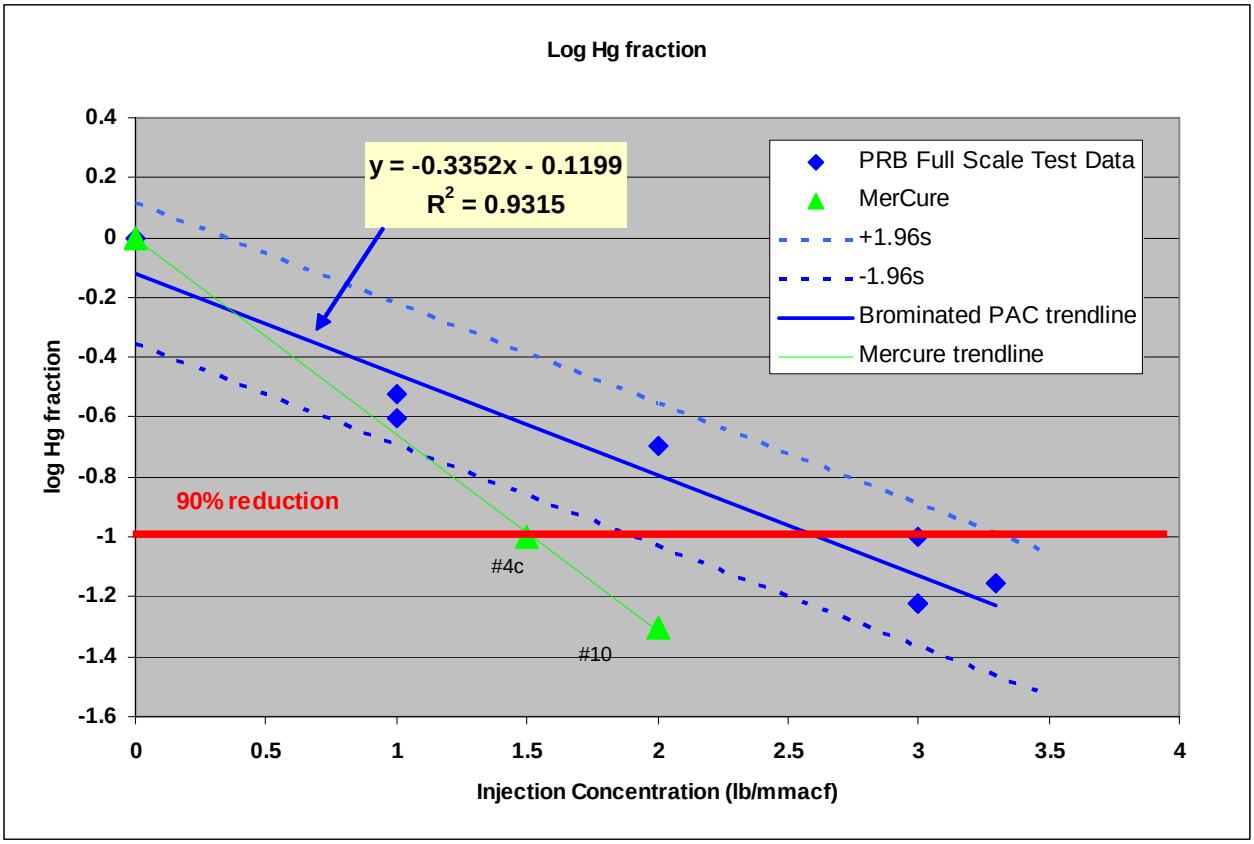
In his pre-filed testimony Mr. Cichanowicz also claimed that theoretical analysis by Professor Clack of the Illinois Institute of Technology supported his theory that ESP size is an important factor in mercury capture. However, cross examination of Mr. Cichanowicz demonstrated that these theoretical studies performed by Professor Clack do not support the suggestion that ESP size determines the effectiveness of sorbent injection technology. Exhibits 102, 103; Tr. 8/16/06, pgs. 747-748. As demonstrated on cross examination of Mr. Cichanowicz, the effect of mercury capture that Clack found to be potentially significant is fully realized in even the smallest ESP in Illinois and there is little or no further benefit to mercury capture beyond that size.

The figure below, submitted with Dr. Staudt's oral testimony, [*identify transcript reference and exhibit number*] shows the strong relationship between the amount of halogenated sorbent and the removal of mercury. As noted in Dr. Staudt's oral testimony, each of these points represents full-scale test data using either Darco Hg LH or Sorbent Technologies B-PAC sorbent on a PRB coal unit with a cold-side ESP. The dashed blue lines added to this figure (+1.96s and -1.96s) indicate the 95% confidence interval for the brominated carbon data that is calculated in a straightforward manner using the best fit curve and data submitted with Dr. Staudt's oral testimony.

Data taken from Mr. Cichanowicz's Figure 5-2 (Exhibit 85) that was submitted with Mr. Cichanowicz's oral testimony in response to Illinois EPA's questions to his written testimony has also been added to Figure 1. As shown, the MerCure technology (Nos. 10 and 4c from his table) is capable of even greater mercury removal at lower treatment rates on western coals (PRB for #10 and Lignite for #4c). The MerCure results provided by Mr. Cichanowicz also appear to have the same linear behavior when plotted in a semi-log fashion as shown. Notably, the data on this figure is taken from units with ESPs sized with SCAs ranging from 300 ft^2/1000 acfm to over 700 ft^2/1000acfm.

In short, this table shows the relationship between the amount of sorbent injected and the degree of mercury removal, without respect to ESP size, holding constant coal type (PRB coal) and sorbent type (halogenated sorbent). This relationship was not visible in Mr. Cichanowicz' Figure 5.2, because neither coal type nor sorbent type were held constant. By holding constant coal type and sorbent type, it becomes apparent that removal of mercury from PRB coals is determined by the sorbent injection rate, not by ESP size. Had ESP size played a significant role, the relationship between injection rate and mercury removal would not plot in such a linear fashion. In addition, it is apparent that over 90% mercury capture can be expected at 3 lb/MMacf with halogenated sorbents and is virtually assured at 3.5 lb/MMacf with PRB coal – without respect to the size of the ESP.

Figure 1. Mercury Capture Performance with Brominated PAC on Western Coals



The data shown in Figure 1 does not reflect the effects of SO_3 injection, which is deliberately injected at some units to improve fly ash resistivity for the ESP, and which is known to adversely affect mercury capture performance of sorbent. But, as discussed at the hearings by Dr. Staudt, SO_3 can be injected downstream of the mercury sorbent injection point, avoiding that effect. Tr. 6/22 & 23/06, p. 122. Or, if that is not possible, alternative methods can be used to address ash resistivity, such as treating the coal with other materials as Midwest Generation does. In fact, the testing by Sorbent Technologies at Midwest Generation's Crawford Station shows that this method of addressing fly ash resistivity does not adversely affect the ability of the sorbent to capture mercury. Mr. Nelson's testimony, in particular Exhibit 88, shows that around 75% to 80% mercury capture is achieved with his C-PAC product. Even better mercury capture, similar to

what is shown on Figure 1, can be expected from Mr. Nelson's B-PAC product (but a negative impact to fly ash use for concrete). Finally, the Illinois units that use SO_3 are owned by Ameren, Dynegy and Electric Energy, Inc. (Joppa plant), not the companies that continue to oppose the Illinois mercury rule. Thus SO_3 is not a major concern for those companies that continue to oppose the rule.

Midwest Generation has also argued that sorbent injection will adversely affect ESP performance. This concern is not supported by the facts. Despite dozens of sorbent test programs having sorbent injected upstream of a cold-side ESP, there are no test programs of this configuration that have shown sorbent injection to produce adverse effects. Yates unit 1 is the only such site where the issue has even been raised. Cross-examination of Mr. Cichanowicz demonstrated, however, that the injection of PAC is not the cause of ESP problems at Yates unit 1. Examination of the test report issued by the US DOE during Mr. Cichanowicz's cross examination showed that the Yates unit 1 ESP behaved erratically regardless of activated carbon injection. Exhibit 71; Tr. 8/17/06, pgs. 873-876. As shown in the Dombrowski paper referenced in the TSD, there were no ESP problems in sorbent injection tests at Yates unit 2 which has a smaller ESP than Yates unit 1. TSD ex. 9.

Moreover, Mr. Nelson's testimony regarding results of tests at Crawford, which has a much smaller ESP than either Yates unit 1 or unit 2, showed no adverse impact to the ESP from activated carbon injection. The only other ESP that is alleged to have had problems from sorbent injection was with an experimental configuration called TOXECON II where the sorbent was injected into the middle of the ESP (not upstream) – a configuration that could be expected to cause problems for the ESP because the very

carefully controlled flow within the ESP is disrupted by the injection of sorbent. Mr. Cichanowicz did testify to the importance of controlling flow within an ESP. Exhibit 84, p. 25. Simply put, the evidence from dozens of sites does not support the argument of the remaining opponents of the Illinois rule that sorbent injection upstream causes problems for the ESP.

Opponents of the rule also raised the possibility of carbon ignition. However, coal fly ash often has high levels of carbon in it that is left over from coal that did not completely burn. This carbon often exists in much greater quantities than would ever be injected for sorbent injection. In fact, despite the dozens of tests where carbon sorbent has been captured by an ESP, none resulted in fires or any ignition – perhaps because these ESPs were designed to capture unburned carbon from the coal. Carbon ignition has occurred in fabric filters, but in each case the fires were associated with operating practices related to hopper heaters and hopper cleaning, and in each case changes to these operating practices corrected the problem.

Economic Reasonableness

Illinois EPA provided a detailed, unit-by-unit estimate of the cost of complying with the proposed rule. See TSD Table 8.8, pp.161-166. Illinois EPA spelled out all of its assumptions that, with Dr. Staudt's testimony, consider detailed studies of the facilities in Illinois and to include fuel characteristics, duct sizes, ESP sizes, use of flue gas conditioning, and other plant-specific matters that may affect the sorbent injection system design. Illinois EPA had personnel visit every plant to assure that the information on the units was correct. Tr. 6/21/06 pm, pgs. 15-17. Illinois EPA's economic analysis considered site-specific factors when evaluating the suitability, cost and performance of

mercury control technology. Mr. Marchetti erroneously suggested in his pre-filed testimony that industry's cost estimate considered site-specific factors while Illinois EPA's did not. Exhibit 84, p. 25. That simply is not the case. Illinois EPA's cost estimate considered site-specific information and also considered selection of the appropriate mercury control technology for that site, based on a recently performed and thorough review of the state-of-the-art of mercury control technology and the conditions at the plant. TSD § 8.

In sum, the evidence from actual test programs supports the conclusion of Illinois EPA that sorbent injection will allow PRB coal-fired units to meet the requirements of the proposed Illinois rule, supporting Illinois EPA's cost estimate. This conclusion was supported by numerous demonstrations cited in the TSD and discussed by Dr. Staudt in his testimony.

As confirmed by Mr. Cichanowicz, Mr. Marchetti, and Mr. DePriest, the difference between Illinois EPA's estimate of the cost of the proposed rule and industry's exceedingly large estimate is almost entirely a function of Mr. Cichanowicz opinion that sorbent injection upstream of cold side ESPs would not be sufficient to achieve 90% reduction in PRB coal-fired units. As a consequence, Mr. Cichanowicz postulated that fabric filters would be needed to control mercury emissions from these units . Under cross-examination, Mr. Cichanwicz opinions regarding the effectiveness of sorbent injection in such units were shown to be based upon (1) speculation about a relationship between ESP size and mercury removal efficiency that does not withstand analysis, (2) misinterpretation of the work of Dr. Clack and (3) misunderstanding of the experience at Georgia Power's Plant Yates Unit 1 .

Moreover, actual compliance costs are likely to be less than the Illinois EPA's best current estimate. For example, because some sorbents can adversely affect beneficial reuse of fly ash, Illinois EPA's economic analysis assumed that the elimination of the market for fly ash for beneficial uses would be a significant part of the ongoing cost of the rule. However, the TSD describes techniques for treating fly ash – carbon sorbents such as Sorbent Technologies' C-PAC(being tested at Midwest Generation's Crawford Station), mineral-based sorbents – that are being tested to reduce or eliminate this problem.

Sorbent costs are also expected to drop from the estimate in the TSD. As Mr. Cichanowicz testified, the widespread use of Selective Catalytic Reduction by the utility industry attracted many companies to supply the catalyst for this market. The resulting competition drove down prices substantially. Exhibit 84, p. 22. In the same manner, a market for mercury sorbent will attract competitors that will likely drive down prices.

Deposition of Mercury

The TSD concluded that by reducing mercury emissions from coal-fired generating units in Illinois, the proposed Illinois EPA rule would significantly reduce deposition of mercury in Illinois, TSD §5.1, p 81. The EPA also cited studies in Florida and Massachusetts that showed rapid and steep declines in measured concentrations of mercury in fish tissue when mercury emissions from nearby sources such as incinerators and fossil fuel combustion were curtailed by regulations. TSD §5.2.

These conclusions were supported in the testimony and cross-examination of Dr. Gerald Keeler, the Illinois EPA expert witness. Dr. Keeler is an internationally recognized expert in atmospheric chemistry, transport, and deposition based on 16 years

of research in the field. He has authored, or co-authored, over 100 peer-reviewed, scientific papers on this and related topics. Dr. Keeler testified regarding a multi-year source-receptor study of mercury deposition conducted by the University of Michigan Air Quality Laboratory and the U.S. EPA Office of Research and Development in Steubenville. In this study, daily precipitation event samples were collected during 2003-4, then analyzed using Ion Chromatography technology to determine a suite of trace elements in the samples. Multivariate statistical receptor models were used to identify source type "fingerprints" for different types of industrial sources. To determine the direction and distance from which samples arrived, the researchers used back trajectory analysis of available weather systems.

Dr. Keeler testified that coal combustion sources were the dominant source of mercury deposition recorded at the Steubenville research site, accounting for about 70 per cent of the mercury in wet deposition. Other large industrial sources located in the area of Steubenville were not significant contributors to mercury deposition. Exhibit 10, p. 4.

Dr. Keeler also testified that meteorological analysis corroborated other evidence that "a substantial amount of the mercury deposition found at the Steubenville site was due to local and regional sources." *Id*. at 3. In response to a question from counsel, Dr. Keeler reiterated the statement quoted in the TSD, §5.1, p. 78, that "the lifetime of elemental mercury in the atmosphere is likely much shorter than previously believed. Thus mercury may be deposited much closer to its source, even if emitted in elemental form, if oxidizing compounds are present in the atmosphere."

In his prepared testimony, Dr. Keeler noted the empirical foundation for his conclusions. He stated that the method used in this research "is based on observation

made at sampling or receptor sites." *Id*. Dr. Keeler contrasted the empirical nature of the source receptor method with source-oriented Eulerian models such as that used as the basis of the testimony of Dr. Vijayaraghavan, the Midwest Generation witness. Eulerian models, "while extremely useful,"

> "are limited by the large uncertainties in emission inventories including the lack of speciated mercury emission profiles, atmospheric mercury chemistry, and accurate wet and dry deposition parameterizations. Receptor models differ from source-oriented models in that they use statistical methods for which implementation only relies upon observations of deposition at a location or receptor."

Id. at 4. In his written response to questions, Dr. Keeler stated that CMAQ, a widely-used Eulerian model endorsed by U.S. EPA, underestimated mercury wet deposition by varying amounts up to a factor of two.

Finally, Dr. Keeler testified that "reductions in emissions from coal combustion sources in the region would have a significant impact on the amount of mercury deposited via both wet and dry deposition." *Id*. at 5. Reducing emissions from Illinois' 21 coal-fired power plants, which emit close to four tons of mercury per year, would be especially beneficial to the many lakes in the state that have been identified as impaired due to the levels of mercury found in fish. *Id*. at 5. Under cross-examination, he unequivocally stated that he endorsed the conclusion of the TSD at 81 (quoted above) that reductions in emissions of mercury in Illinois will yield significant reductions in mercury deposition in Illinois. Tr. 6/13/06, p. 98.

Dr. Keeler stated that the conclusions of the Steubenville study were expected to be published imminently in a peer-reviewed journal, *Environmental Science and Technology*. The article has now been published as stated. It states that, based on wet deposition data from 2003-4, and source apportionment modeling,

> "The dominant contributor to the mercury wet deposition was found by both models to be coal combustion (≈70%). Meteorological analysis also indicated tha a majority of the mercury deposition found at the Steubenville site was due to local and regional sources."

G. Keeler, M. Landis, G. Norris, E. Christianson, T. Dvonch, "Sources of Mercury Wet Deposition in Eastern Ohio, USA," The University of Michigan Air Quality Laboratory and the U.S. EPA Office of Research and Development, *Environ. Sci. and Technol*. Public Comment #6292.

On behalf of Midwest Generation, Dr. Vijayaraghavan presented deposition estimates based on a Eulerian modeling exercise with a proprietary model ("TEAM"), which Dr. Vijayaraghavan admitted has never been subjected to external benchmarking or accepted by any regulatory agency for the purpose of regulation. Tr. 8/21/06, pgs. 1355-1356.

Dr. Vijayaraghavan agreed that the source-receptor method used by Dr. Keeler was a valid method of investigation of mercury deposition. He stated that the results of his modeling analysis were consistent with Dr. Keeler's conclusion that 70% of wet deposition at Steubenville was contributed by coal-fired power plants within 1,000 Km of Steubenville. *Id*. at 1512.

Dr. Vijayaraghavan also testified that the Illinois rule would significantly reduce mercury deposition in Illinois. Under cross examination, he stated that the Illinois rule would approximately double the reduction in mercury deposition provided by the federal CAMR rule in 2010, and that the Illinois rule would reduce deposition of mercury in 2010 in "most of Illinois" and in "every grid square of Illinois" by comparison to CAMR. *Id*. at 1422, 1436, 1462. He admitted that most of the benefits of the Illinois rule would occur in Illinois. *Id*. at 1425. In response to a questions Dr. Vijayaraghavan conceded

that the proposed Illinois rule would reduce deposition in Illinois by approximately the same amount as the 2020 CAMR rule, but ten years earlier. *Id*. at 1428, 1434.

Under cross-examination, Dr. Vijayaraghavan also confirmed the accuracy of Dr. Keeler's critique of the use of Eulerian models to predict deposition of mercury. Dr. Vijayaraghavan admitted that many of the inputs to his model were based on assumptions rather than measured data.

- He admitted that there were few actual measurements of the mercury species emitted by coal-fired power plants [transcript 1383, 1386, 1387], even though the deposition and biological activity of different mercury species are very different.

- He agreed that mercury emissions from coal-fired generating plants are affected by the mercury content of the coal burned, the use of pollution control equipment, and the chlorine content of coal, but that these variables have not been measured and thus "there is some level of uncertainty in emissions [inventories]." *Id*. at 1383-1384.

- With considerable understatement, he agreed that the chemical transformation of mercury species in the atmosphere is "not understood with 100% certainty", and that as a consequence, the TEAM model necessarily makes assumptions about the atmospheric chemistry. *Id*. at 1388.

Dr. Vijayaraghavan also admitted that the TEAM model does not take into account the effects of thunder storms on deposition of mercury. *Id*. at 1394-1395. In his research, Dr. Keeler observed that "The deposition of mercury is heavily influenced by a few large precipitation events. . . ." Exhibit 10, p. 5.[1] Dr. Vijayaraghavan admitted a storm would bring most of the reactive gaseous mercury to the ground, regardless of the stack height at which the emissions were released. *Id*. at 1467, 1470, 1472. As a consequence, Dr. Vijararaghathan agreed that the failure to take thunderstorms into account would be a limitation on the ability of the TEAM model to predict deposition,

[1] The recently published peer-reviewed report of the work of Dr. Keeler's group's work notes that "Individual precipitation events can contribute significantly to the annual Hg deposition total at individual sites." *Environ. Sci. and Technol.*article at p. F.

and that, as a result of not taking thunderstorms into account, the TEAM model would not predict well the local or regional contributions to deposition. *Id*. at 1397-1399.

While admitting that the results of the TEAM model were a function of the many assumptions built into it, Dr. Vijayaraghavan maintained that it was the only tool for predicting the deposition effects of changes in emissions. But the Board should regard these predictions with considerable skepticism, even though Dr. Vijayaraghavan presented the predicted deposition reductions to three significant figures in the slide show. Although Dr. Vijayaraghavan was asked to provide 90% statistical confidence intervals for the predicted deposition effects, and agreed that doing so would be "informative", Midwest Generation now takes the position that providing such a common statistical expression of uncertainty " is not applicable" to the deposition effects predicted by the TEAM model. *Id*. at 1444; Post-Hearing Comments: Additional Information of Midwest Generation, point 6.

As Dr. Vijayaraghavan admitted in his testimony, nationwide, the TEAM model accounted for only 50% of the variance in measured mercury deposition, or, in statistical terms, had an r^2 of only 0.5. *Id*. at 1441-1442. For purposes of comparison, a rule of betting "heads" on a coin flip would, over enough flips, explain 50% of the variance.

Mercury Impact on Human Health

The goal of public health policymaking is the reduction of risk to the public. Reducing the risk of methyl-mercury exposure from consumption of Illinois fish to as many Illinoisans as possible is an appropriate human health objective and one that has considerable support. The human health effects testimony of Dr. Deborah Rice, provided in support of the Agency's proposal, is scientifically sound and compelling. Dr. Gail Charnley's testimony was offered in opposition to the proposed Illinois mercury rule, yet, even within her responses can be found support for a policy of reduced methyl-mercury risk. Her comments note the value of controlling mercury emissions, including those mercury emissions from coal-fired power plants, as well as the desirability of reducing the mercury content of fish, and the expectation of health benefits from emission reductions. Tr. 8/22/06, pgs. 62-63, 96. It is therefore altogether appropriate for the State of Illinois to seek a reduction in methyl-mercury exposure risk by regulating mercury emissions from power plants.

Dr. Charnley's stated preference for an emissions "trading program" in contrast with a "command-and-control program" as the basis for her public policy position on mercury control must be viewed as a bias which impugns any potential value of her testimony to the proceedings. Tr. 8/22/06, p. 1678. Dr. Charnley has no record of independent research evaluating these types of control programs and, thus, her assessment of CAMR and the proposed Illinois mercury rule with regard to their level of health benefits to which she has said ". . . it will be very difficult, if not impossible, to distinguish between the benefits of one compared to the other" is highly suspect. Tr. 8/22/06, pgs. 1679, 1682. If one accepts the premise that mercury reductions achieved through CAMR or the proposed Illinois mercury rule will translate into health benefits (no matter the size), Dr. Charnley's opinion asserting an inability to distinguish between the

benefits of CAMR and the Illinois proposed rule is simply counterintuitive, given that the Illinois proposal results in deeper reductions, that are implemented more quickly.

There is scientific uncertainty in attempting to assess the extent to which mercury emission reductions from power plants translate to reduced atmospheric deposition, reduced methyl-mercury generation, reduced methyl-mercury accumulation in fish, and ultimately reduced adverse human health effects. A one-to-one reduction in fish tissue mercury concentrations relative to power plant mercury emissions is not expected, nor was this intended by Illinois EPA's TSD. What is clear, however, is that near-term improvement (or possible elimination) of fish consumption advisories for the waters of Illinois will not likely occur without deep and accelerated reductions in mercury emissions. Relative to the CAMR, timelines set for compliance with the initial Illinois mercury rule provisions and the more recent multipollutant standard amendments---2009 and 2015, respectively---represent deeper and quicker emission reductions that are expected to translate to reduced human health risks. While these risks are expected to be less, scientific uncertainty precludes a precise statement of the spatial-temporal distribution of lower risk that will result for Illinois.

The National Research Council ("NRC") was asked to review USEPA's reference dose for methylmercury. TSD, Appendix A, p.10. Based upon its review and analysis, the NRC determined that the existing reference dose (0.1 micrograms per kilogram body weight per day) was scientifically justifiable. *Id*. A reference dose is defined by USEPA as "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime" (www.epa.gov/iris/subst/0073.htm). The USEPA reference dose is not a "bright line"

and does not represent a true threshold in a toxicological sense. Tr. 06/13/06, p. 88. It does, however, have great utility from a risk management perspective in helping to define an acceptable level of exposure. The *Oken et.al* (2005) investigators found that approximately 10% of the women in their study had hair mercury levels that would exceed the reference dose level, and an equivalent or slightly greater percentage of women would exceed the reference dose based upon recent National Health and Nutrition Examination Survey (NHANES) data. Tr. 6/13/06, p. 58. The average maternal hair methyl-mercury concentrations within the Faroes Islands, Seychelles Islands, and New Zealand longitudinal study cohorts were above the equivalent USEPA reference dose concentration, but, more importantly, the range of maternal hair concentration values has significant overlap with that of United States women. Perhaps surprisingly, the *Oken et.al* (2005) study according to Dr. Deborah Rice, suggests effects from methyl-mercury exposures that are below the USEPA reference dose. Tr. 6/13/06, p. 55. As to the question of whether there is a threshold for developmental neurotoxic effects from methyl-mercury exposure, Dr. Rice has testified that the body of scientific data do not indicate such a threshold. The appropriate critical analysis of methyl-mercury health effects data, (touted as the question "that matters the most"), is not on revisiting the assumptions that could result in any upward adjustment of the reference dose, as suggested by Dr. Charnley, but rather on identifying that research needed to better ascertain the dose-response relationships for this seemingly non-threshold pollutant. Tr. 8/22/06, pgs. 1684 -1685. As Dr. Rice has noted, "We don't really know that there's no effect below the reference dose." Tr. 6/13/06, p. 112.

The Faroes Islands study represented the "critical study" from which the National Academy of Sciences ("NAS") provided their recommendation for the methyl-mercury reference dose, even though individual and integrative analyses that included the Seychelles Child Development Study and the New Zealand study were part of the evaluation. Tr. 6/13/06, p. 81. The Faroes Island cohort was the largest (over 900 children), and biological markers for assessing exposure included umbilical cord blood, as well as maternal hair. The investigators found "that cord blood was a better predictor of the performance of the child than was maternal hair." Tr. 6/13/06, p. 44. Only maternal hair mercury concentrations were measured in the Seychelles Islands study and the New Zealand study. As noted by Dr. Rice, "If you're using hair as a marker, you're likely to be mischaracterizing, misclassifying exposure to the fetus on the basis of hair, which would bias the results of the study towards the null." Tr. 6/13/06, pgs. 67-68. The Faroes Islands study was truly prospective in that maternal participants were recruited before the children were born. The Seychelles Island study cohort, on the other hand, was recruited approximately 6 months after the children were born, at which time hair samples were collected by the study investigators. As noted by Dr. Rice, "It can be argued that the measure of exposure might not have been quite as precise in the Seychelles as it was in the other two studies." Tr. 6/13/06, p. 11. The Seychelles Islands investigators assumed that the mothers were eating fish purchased at local markets, and they analyzed these fish for methyl-mercury concentrations. It is actually unknown as to what exactly these women were eating (no food diary or food questionnaire information was obtained).

Points of disagreement between testifying experts regarding the adequacy, outcomes, and/or applicability of the Faroes Islands, Seychelles Islands, and New Zealand longitudinal studies appear to be the interpretations of experts on matters to which seemingly reasonable people can disagree. For example, the dose-response modeling performed by the NAS on the Faroes Islands study data has been interpreted as showing "no evidence of a threshold within the range of exposures . . . down to about one microgram per liter in cord blood" whereas Dr. Charnley contends that the "modeling does not rule out a threshold." Tr. 8/22/06, p. 112. The NAS considered that only a linear or sublinear relationship between exposure and effect was biologically plausible, and Dr. Charnley has indicated that this is the appropriate fitting of the 7-year and, more recent, 14-year results for the Faroes Islands study. Dr. Rice, however, has contended that the relationship is log-linear and that this relationship has also been indicated for the New Zealand study results. The Seychelles Islands study investigators, though concluding that their data "do not support the hypothesis that there is a neurodevelopmental risk from prenatal exposure resulting solely on ocean fish consumption" have conducted benchmark dose analyses on more recent data from the cohort, presumably, as stated by Dr. Rice, to determine "a defined effect level." Tr. 6/13/06, p. 28.

Aside from the three longitudinal studies previously identified, there is considerable relevant information in published reports and in the peer-reviewed literature on mercury body-burdens and the human health effects of methyl-mercury exposure. Dr. Rice's written testimony describes three prospective studies---Massachusetts (Oken et.al., 2005), Poland, and the Phillippines---which have evaluated these effects. TSD App. A, p. 5. Cross-sectional studies evaluating mercury exposure and neuropsychological deficits have indicated adverse effects, even with limited fish consumption by the study subjects. Neurological function deficits were

noted in a Portuguese study involving children whose mothers ate on average 2.5 fish meals weekly. Tr. 8/22/06, p. 97. Many other cross-sectional studies---developmental studies involving children and studies involving adults---were described in Dr. Rice's written testimony. TSD App. A, pgs. 7-9. The cardiovascular benefits of fish consumption are well known; however, there is compelling evidence that these benefits (which may have thresholds) can be more than offset by the negative impacts resulting from methyl-mercury exposure. Although Dr. Charnley contends that "the evidence that mercury is associated with coronary heart disease risk is contradictory" she acknowledges that there are "suggestive positive findings." Tr. 8/22/06, p. 1656.

Studies showing a relationship between increased prenatal fish consumption and better performance by children on neurodevelopmental tests, have generally not controlled for covariants known to be the strongest performance determinants---maternal IQ and environment of the child. Tr. 06/13/06, p. 35. Interpreting the results of these studies may be complicated by the choice of markers being measured (e.g. cord tissue), an inadequate or inappropriate statistical assessment, or other aspects of the work. In the Daniels et.al. (2004) study, the investigators noted a "benefit from eating fish at least once every two weeks but no incremental increase in benefit with more frequent fish consumption." Tr. 8/22/06, p. 89. Thus, indicating a threshold between fish consumption and cognitive development.

The potential contributory role of polychlorinated biphenyls (PCBs) to neurotoxic responses ascribed to methyl-mercury in the Faroes Islands study group is uncertain, but not supported by initial and follow-up study results---low correlation values for PCB and mercury levels; test scores and PCB exposure associations reduced to a non-significant level after

adjusting for mercury exposure. As stated by the Faroes' investigators (and provided in Dr. Charnley's testimony), "The possible neurotoxic influence of PCB exposure did not explain the methyl-mercury associated neurobehavioral deficits." Tr. 8/22/06, p. 103. Additionally, Dr. Charnley has acknowledged that there is not "any reason to believe that postnatal PCB exposure (through breast milk) would be highly correlated with *in utero* mercury exposure." Tr. 8/22/06, p. 101. PCBs and methyl-mercury may have common endpoints (test measures of cognitive functioning), but there is not a clear weight of evidence for accepting a combined methyl-mercury and PCB neurotoxic effect in explaining the Faroes Islands study results.

Dr. Charnley's contention that reducing methyl-mercury in Illinois waters will not lead to the elimination of the fish consumption advisories because PCB's will still be present, is meaningless. If the Board adopted this point of view no pollution control regulation would be justified because there are always going to be other pollutants contaminating the air. No rule must solve every facet of a problem to be valid. The various rules work in tandem to improve public health.

A further point is that the CAMR looks at the United States as a single unit and seeks reductions within that unit. From this perspective, allowance trading may not seem to have a significant impact because there will always be a reduction occurring somewhere. For Illinois, however, this does not hold true. As a single state, Illinois' outlook is very different. Reductions in another state do not improve the health of Illinois citizens and therefore Illinois cannot depend upon CAMR from a public health perspective. This is evident by looking at USEPA's own projections for mercury reduction. Dr. Charnley's testimony clearly shows that CAMR will have a modest impact on existing mercury deposition in Illinois. Exhibit 130, ex. 2. This map,

generated by USEPA, shows mercury deposition in the United States from domestic coal-fired EGUs in 2001 and then shows remaining deposition in 2020, after CAMR takes effect. As can be seen, there are only a few border areas of Illinois which show significant declines in deposition. Most of the state remains in the same quintile after CAMR that it was in before CAMR existed. Indeed, the entire region surrounding Lake Michigan shows at best a modest reduction from CAMR. Such an outcome may be acceptable if the entire country is viewed as one unit. But as a state, Illinois clearly needs something more.

Illinois must experience reductions within Illinois if the state's public health is to improve. Dr. Charnley attempts to create a long chain of uncertainty which she apparently hopes the Board will accept and thus favor no action. Tr. 8/22/06, pgs. 1659-60. The chain is that for there to be a public health problem the regulating authority must first be certain of the following factors. First, it must be determined where an emission of mercury occurred. Then the mercury must deposit in Illinois waters. Then there must be site-specific factors present to convert that mercury to methyl-mercury. Then people must catch those fish and eat them in sufficient quantities to result in an adverse result. And after all of this, the regulating authority must be sure that reducing the pollutant will produce a demonstrable health benefit. Only after being certain of all those factors should a regulator seek to manage a problem. If all regulatory authorities adopted this attitude, the scope of environmental regulation would narrow greatly and it's pace turn glacial.

More importantly, the Illinois EPA has testified that there is a state-wide fish consumption advisory due to methyl-mercury contamination in Illinois waters. Coupled with USEPA projections that there will still be considerable mercury deposition after CAMR takes

affect, there is sufficient reason to adopt regulations in this case. After all, USEPA has already determined that there is a nationwide problem with mercury emissions from coal-fired EGUs. They have also determined that methyl-mercury results in harm to US citizens. The question is thus what needs to be done that Illinois can do? In all of Dr. Charnley's chain of activities, the only part that Illinois regulators can control is in-state mercury emissions. This is the point where Illinois can make a difference. Thus, considering that methyl-mercury is contaminating Illinois water bodies and USEPA's projection continuing mercury deposition in Illinois after CAMR takes effect, even Dr. Charnley's high standard for regulations seems appropriate.

Dr. Charnley further states that the USEPA did not include the Seychelles Islands study when calculating its reference dose. Exhibit 130, p. 16. This, she believes, produces a more stringent reference dose than other countries have calculated. *Id*. This is irrelevant. It is reasonable and logical for Illinois to follow the federal government's lead. Since the USEPA has determined that a health risk exists, it is not necessary for the Board to review USEPA's decision. The Illinois EPA is not disputing whether a health risk exists, it is accepting USEPA's judgment. Rather, the Illinois EPA takes issue with the level of mercury emissions reductions required by coal-fired EGUs for the reasons stated above.

Hence, what will CAMR actually achieve for Illinois? What is needed is a state rule that will actually ensure that there are reductions within Illinois. The Illinois mercury rule takes that extra step to achieve deep reductions where CAMR predicts they will be needed. That is proper public health policy. As Dr. Rice stated when questioned by Ms. Geertsma of the Environmental Law and Policy Center:

> Q. Dr. Rice, you just used the phrase "reaching genetic potential." Would you say that the roll [sic] of a person practicing public health is not just to prevent severe defects or mental retardation, but also in maximizing the population's full genetic potential?

A. Absolutely. That is the role of public health.

Tr. 6/13/06, p. 66-67. When viewed from Illinois' perspective, the proposed Illinois mercury rule is a reasonable and justifiable exercise of regulatory authority to further public health goals in Illinois.

Fish Advisories

The Illinois Fish Contaminant Monitoring Program ("FCMP") is a cooperative effort of five Illinois agencies, the Departments of Agriculture, Emergency Management, Natural Resources, and Public Health, and the Illinois EPA. As the Illinois EPA explained in the hearings, the FCMP operates under a Memorandum of Agreement that spells out the responsibilities of each agency, and certain other procedures have been adopted from the "Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory" and from policy determinations agreed upon by the members of the FCMP. Tr. 6/16/06, p. 48. These procedures provide guidance for the activities needed to generate consistent and reliable data about contaminants in Illinois sport fish. The primary goal of the FCMP is to identify for Illinois anglers through sport fish consumption advisories those species of fish and bodies of water that may pose the greatest potential risks to the anglers and their families, and allow them to avoid these risks by making informed judgments about the types and amounts of fish they eat. TSD, p. 54-55; Exhibit 9, p. 2.

Data gathered by the FCMP has resulted in the state-wide mercury advisory that was discussed so thoroughly during the hearings, and in fifteen bodies of water being placed on the Special Mercury Advisory. As can be seen from the other sport fish consumption advisories included in the Department of Natural Resources' "2006 Illinois

Fishing Information" booklet introduced in the first hearing, there are also numerous advisories based on polychloriniated biphenyls ("PCB"), three based on chlordane, and one based on both PCBs and chlordane. Exhibit 11. By following these advisories, anglers in Illinois can eat the fish they catch and not be concerned that they and their families will suffer health effects from these fish.

On the topic of PCB advisories, it should be noted that Dr. Peter Chapman's testimony included a claim that 74% of the waters listed as impaired due to mercury would still be impaired due to PCBs even if the proposed rule resulted in all fish in the listed waters achieving compliance with the mercury criteria. This claim is extremely misleading since there are numerous waters that could have been listed as impaired due to mercury but have not because of FCMP policy decisions. One of these policies is that initial samples found to have a contaminant that exceeds its criterion require follow-up samples. Another FCMP policy requires that two or more recent samples exceeding a criterion are necessary for issuing or changing an advisory, and the Illinois EPA's Bureau of Water has the same policy for listing a water body as impaired.

However, the FCMP has also decided that initial samples of predator species having mercury levels in the one meal/week range (0.06-0.22 mg/kg) will not be followed up, since the state-wide advisory already covers these samples (allowing the limited funding to be spent more appropriately elsewhere). Thus, many more waters could have been listed as impaired for mercury if initial samples in the range of 0.06-0.22 mg/kg had been followed up – this is amply demonstrated by the tables submitted by Dr. Hornshaw showing that two-thirds to three-quarters of all waters sampled between 1988-2001 had predator species that would require advisories for mercury. TSD, p. 53.

Of the many points made and issues discussed in the three and one-half weeks of hearings, one key subject was sport fish advisories. For nearly everyone, eating fish is the only way they are exposed to methyl mercury, and for some Illinois anglers and their families a significant portion of their exposure is through the fish they catch. The Illinois EPA presented evidence and testimony that some anglers and their families eat a lot of sport fish, enough in some cases to put their children and their future children at risk for the problems known to be caused by methyl mercury. It has been shown that most of the predator fish in most water bodies in Illinois contain enough methyl mercury that a state-wide advisory is needed, cautioning women of child-bearing age and children under 15 years of age to eat no more than one meal per week of any predator species.

Unfortunately, as more data on levels of methyl mercury in fish have been generated by the FCMP in recent years, more waters have been found that require listing in the Special Mercury Advisory. The original list of four water bodies in the 2002 Special Mercury Advisory has been expanded in the 2006 Special Mercury Advisory to fifteen waters, including for the first time an entire river system (the Little Wabash River and its tributaries).

The Illinois EPA has presented testimony in support of the proposition that reductions in mercury emissions ultimately result in reductions in mercury in fish tissue, but the question facing the State is how much reduction is appropriate from coal-fired power plants. In proposing a regulation that calls for a 90% reduction of mercury emissions by 2009, with no related "hotspots," the Illinois EPA's position is that larger and faster reductions in mercury emissions are the most appropriate way to address sport fish advisories for methyl mercury. It is a realistic goal of the proposed Illinois rule that

there will be a slowing in the growth of the Special Mercury Advisory, including possible delistings from this advisory, and a reduced number of waters being listed as impaired due to mercury.

Monitoring of Mercury Emissions

While the proposed Illinois mercury rule has many differences from the Federal CAMR program, emissions monitoring of mercury emissions is identical in substance to the emissions monitoring required under the CAMR. Mr. Richard McRanie, who presented testimony challenging the monitoring provisions of proposed rule, tried to claim technical difficulties with mercury emissions monitoring. However, Mr. McRanie also admitted several times that the monitors required under the proposed Illinois regulations are the same as those required under the CAMR, that any issues he believes exist would exist under the CAMR as well, and that if the proposed Illinois rule is not adopted, sources would have to monitor using the same provisions under the CAMR. Tr. 8/22/06, pgs. 1738, 1743, 1751, 1758. These admissions significantly undercut Mr. McRanie's testimony, since Illinois sources would be subject to the same mercury emissions monitoring whether or not the Board promulgates the proposed rule, thus making his comments on this point essentially a non-issue.

It should be noted that this is not the first time Mr. McRanie has offered his opinions on mercury emissions monitoring. He provided similar comments to USEPA during the CAMR rulemaking process (*Id*. at 1736, 1759) and USEPA nonetheless finalized its regulation containing the monitoring requirements that are identical to the emissions monitoring requirements for the proposed Illinois rule. As Mr. Keith Harley noted in questioning Mr. McRanie, it seemed Mr. McRanie's testimony was "in fact,

much more about CAMR than it is about anything in the monitoring requirements that are contained in the Illinois rule." *Id*. at 1759.

Other portions of Mr. McRanie's testimony indicate that he has a clearly expressed bias against regulatory agencies and those who write and promulgate regulations. This bias should be taken into account when considering the weight of his testimony. Mr. McRanie made a number of unwarranted inflammatory statements in his prefiled testimony, where he cast aspersions on the Illinois EPA and the rulemaking process as a whole without providing any evidence to support his claims. Under questioning at hearing, Mr. McRanie admitted he had not talked to anyone from Illinois EPA involved in the rulemaking and further admitted that such unsupported claims were only his opinions. *Id*. at 1739-41, 1750-52, 1761. His objectivity in this matter must certainly be questioned.

More of this bias was evident when Mr. McRanie asserted that the Illinois EPA's TSD should have contained more information about mercury monitoring. On questioning, he admitted that he did not actually know what it should have contained that isn't found in the Federal CAMR documents on the subject. *Id*. at 1804. This raises the question of why he would make such a claim when he cannot articulate what he was supposedly seeking.

Beyond his acknowledged bias, Mr. McRanie further admitted unfamiliarity with certain parts of the proposed rule, including the 12-month average and averaging across multiple units that would work to lessen the effects of any monitor problems, admitting it was "a little confusing to me." *Id*. at 1747-48, 1754.

But even if Mr. McRanie's statements were taken at face value, and for the sake of argument his bias were set aside, the main points of his testimony remain unconvincing. In addition to his concession that sources will be subject to the same monitoring requirements whether through the proposed Illinois rule or CAMR, Mr. McRanie also admitted that mercury monitors have already improved and will continue to do so. *Id*. at 1695. He further admitted that detection has gotten better, that monitors "will make further advances" before the proposed Illinois regulation requires their installation, and that they are "definitely seeing better reliability" in monitors and "we can get the reliability up some more." *Id*. at 1730, 1797, 1798.

Other evidence supports the Illinois EPA's position that accurate and reliable mercury emissions monitoring will be readily available for Illinois sources. After the second round of hearings for this rulemaking, USEPA's Clean Air Markets Division posted a document on its website entitled, "Mercury Emissions Monitoring Program for Coal-Fired Boilers under the Clean Air Mercury Rule, Status Report, August 2006." A copy of this document is attached to these written comments as Attachment 1 and can be found at http://www.epa.gov/airmarkets/whatsnew.html.

This document provides new information that supports the Illinois EPA. For example, USEPA states in the document, "As a result of [field demonstration and validation] tests, system design changes have been made to improve the performance and reliability of the monitoring systems." The document also provides, "Additionally, the precision between different CEM [Continuous Emissions Monitoring] systems has improved dramatically." Written Comments Attachment 1, p. 1. Indeed, USEPA says, "Mercury monitoring technologies continue to advance at a rapid pace and are on-track to

meet the QA/QC requirements required under CAMR." Written Comments Attachment 1, p. 2.

Furthermore, USEPA seems certain that there will be enough mercury emissions monitors to supply the demand created by CAMR and related rules. USEPA notes in this document that "Approximately, twelve Hg CEMS and sorbent trap vendors are currently developing new and improved monitoring systems." Written Comments Attachment 1, p. 2. USEPA further states, "The manufacturers of Hg CEMS have indicated that beginning in 2007 they will, collectively, be able to produce well over 1000 CEMS per year," and "[B]ased on these projections, there will be more than enough Hg CEMS and sorbent trap systems available to meet the requirements of CAMR, and there should be sufficient time for facilities to install and certify the monitoring systems before the January 1, 2009 compliance deadline." The document succinctly says, "Thus, EPA is confident that the CAMR monitor certification deadline will be met." Written Comments Attachment 1, p. 5.

But USEPA is not the only source of information that challenges Mr. McRanie's opinions. The Thermo Electron mercury monitor brochure (Exhibit 134) is one example that contradicts Mr. McRanie's claims that such monitors are difficult to use and prone to breakdown. As the brochure says, the monitor is "Easy to use" with "Fast, intuitive navigation. Simple, menu-driven programming. Common interface with all new Thermo iSeries analyzers." Furthermore, the brochure says the monitor is "Easy to maintain" and continues, "Key components are readily accessible for quick maintenance or change-out."

In addition, Mr. McRanie is contradicted by EPRI, an organization for which he works. An EPRI document introduced at the hearing discussing mercury CEMS states,

"In 2007, this project is expected to complete the work conducted over the past several years to ensure that commercially offered continuous emissions monitoring systems (CEMS) for mercury are accurate and field-ready." Exhibit 135, p. 2.

While Mr. McRanie attempted to dismiss this out of hand with his opinion that this is merely an objective or being too aggressive, the fact remains that this is provided in writing by EPRI as an "expected" deliverable, and should be given much more significant consideration than Mr. McRanie's unsubstantiated dismissal. The same is true for EPRI's expectation, provided in the same document, that in 2007 it will "complete the development of QA/QC procedures for Hg CEMS" and "obtain EPA approval of these procedures." And, again, for EPRI's expectation that it will, in 2007, "work on QA/QC procedures [that] includes National Institute of Standards and Technology (NIST)-traceable cylinders and/or use of on-site gas generators as calibration gases, as well as an instrumental reference method for immediate readout of RATA test results."

In the August update document referenced above, USEPA relied upon a variety of tests to reach its conclusions. Contrast that with the fact that a great deal of Mr. McRanie's evidence stems from tests at only one facility, the Trimble County station. Tr. 8/22/06, p. 1707. This site has a wet stack; however, when asked how many stacks in Illinois are wet stacks, he admitted, "I don't have a clue." *Id*. at 1787. This is important because Mr. McRanie also admitted that mercury monitoring on a dry stack is "much easier than on a wet stack with low mercury emissions." *Id*. at 1792. Without Mr. McRanie's ability to somehow link his testimony and suppositions to existing configurations or conditions at Illinois power plants, his testimony on this point is questionable at best.

When Mr. McRanie did not even have one particular site to rely upon, he presented a "made-up curve" (the "Log Normal Distribution") that supposedly supported his position but which was not backed by any actual presented evidence. *Id*. at 1764. Furthermore, Mr. McRanie admitted that he is "not an expert on mercury control technology" and thus could not readily comment on how that curve would actually be affected by the ability for mercury controls to achieve greater than 90 percent reduction. *Id*. at 1766. Thus, Mr. McRanie's entire testimony on this point should be discarded as unsupported and meaningless.

Use of Sorbent Traps

It was pointed out in the Chicago hearing that the emissions monitoring requirements of the proposed Illinois regulation include the allowed use of sorbent trap technology, just as in the CAMR. Mr. McRanie was aware of this alternative and admitted that affected sources could make use of it under the proposed Illinois rule. *Id*. at 1774, 1781-82. Significantly, none of the potentially affected sources provided any prefiled testimony suggesting any problems with this methodology, and Mr. McRanie even admitted that he was only asked by his client to discuss CEMS. *Id*. at 1780.

The fact remains that the sorbent trap methodology is an accepted alternative to CEMS for those sources that might agree with Mr. McRanie's opinions about monitor issues. Mr. McRanie even noted that EPRI is a supporter of sorbent traps and that it is working with vendors on a 2007 deliverable that includes "Commercially available, reliable, robust sorbent trap mercury measuring system that satisfies Appendix K criteria,

with training services to allow operation by plant instrument technicians." *Id*. at 1779; Exhibit 135. Furthermore, the information provided in that EPRI document discussed how sources can save up to $80,000 per installation and reduce capital costs for mercury monitoring by using sorbent traps rather than CEMS.

In support of the EPRI statements, the USEPA August update document referenced above notes, "Mercury sorbent trap monitoring systems continue to perform well at the EPA and EPRI field test sites." Written Comments Attachment 1, p. 2. The document goes into further detail, stating, "Field demonstration tests currently in progress include a continuation of EPA's work at a coal-fired power plant in North Carolina and EPRI's work at a field test site in Kentucky. Substantial improvements in Hg CEMS and sorbent trap operation and performance have been achieved at these two test sites." *Id*. at 3.

Data Substitution

In his testimony, Mr. McRanie objected to the use of data substitution for mercury monitors, claiming that substitution should only be used in a trading rule and the proposed Illinois rule does not fall into that category. However, aspects of the proposed Illinois mercury rule are, in fact, similar to those of a trading rule when it comes to allowing freedom from a specific hard cap on emissions at all times. A trading program allows averaging of emissions over multiple locations and across a longer time period than an instantaneous compliance determination would, as does the proposed Illinois mercury rule.

Further, Mr. McRanie admitted that these averaging provisions within the proposed Illinois rule are "in conceptual thought" essentially the same as a trading rule.

Tr. 8/22/06, p. 1749. And, as mentioned previously, he admitted to being unfamiliar with certain parts of the proposed rule, including the 12-month average and averaging across multiple units, so his statements on this topic should be given little weight or consideration. *Id*. at 1747-48, 1754. In addition, Mr. McRanie admitted that without the use of missing data substitution, companies faced with possible noncompliance could avoid accounting for excess emissions and thus avoid the intent of the regulation. *Id*. at 1772.

Also on the topic of data substitution, the Illinois EPA respectfully disagrees with Acting Chairman Girard's suggestion that the proposed regulation might be modified by discarding "a certain number of outliers" such that data points would be thrown out. *Id*. at 1768. Under such a system, a source's noncompliance could be covered up by throwing out data points that would otherwise lead to a finding of such noncompliance. Similarly, the Illinois EPA disagrees with the suggestion that the 90 percent requirement might be reduced because sources would supposedly need to achieve greater than 90 percent reduction to comply with a 90 percent limit. *Id*. at 1769.

The same could be said about virtually all Illinois air pollution regulations with specific reduction requirements, and almost all of those require instantaneous compliance rather than allowing averaging over a full year and multiple locations. The only way to guarantee a 90 percent reduction is to require it specifically.

NIST-Traceable Reference Standard

Another point that was raised by Mr. McRanie in his testimony was his observation that there was no National Institute of Science and Technology ("NIST")-traceable reference standard for calibrating mercury monitors. *Id*. at 1697. He went on to

testify that "we do not have" a protocol for calibration yet. *Id*. at 1710. However, in the August 2006 status report cited above, USEPA noted that NIST was continuing to provide assistance in developing mercury reference standards for elemental and oxidized mercury. Through USEPA and NIST collaboration, USEPA stated that it expects that NIST-traceable gas standards and protocols will be available in fiscal year 2007 for use in certifying CEMS and sorbent trap monitoring systems. Written Comments Exhibit 1, p. 6.

Impact on Utilization of Fly-Ash

Dr. Ishwar Prasad Murarka's pre-filed and oral testimony set forth information regarding the effects of activated carbon injection on the utilization of coal fly ash. However, Dr. Murarka's testimony was general in nature and did not specifically address how the proposed rule would impact Illinois' power plants, much less on a unit by unit basis. In fact, he testified at hearing that his working knowledge of Illinois power plants' generation of fly ash was limited to his review of partial contracts of Dynegy and Electric Energy, Inc. Tr. 8/17/06, p. 1023, 1025.

In reality, Dr. Murarka only presented information that the Illinois EPA already considered when performing the economic analysis of the proposed mercury rule. The Illinois EPA stated in the TSD that the cost analysis that was performed included an assumption that all fly ash revenues were lost for those plants that reported fly ash revenues in their 2004 EIA Form 767 and were projected to use activated carbon injection. TSD p. 154.

In presenting his testimony, Dr. Murarka set forth three points pertaining to the impact the use of activated carbon injection ("ACI") would have on the fly ash.

Specifically, Dr. Murarka stated that the use of ACI will increase the loss-on-ignition ("LOI") content in fly ash; the use of ACI will darken the color of the fly ash; and the use of ACI will result in an unacceptable Foam Index. Exhibit 114, p. 1; Tr. 8/17/06, p. 1017. Dr. Murarka's testimony made clear he considered the first of the aforementioned three points to formulate his fourth point. The fourth point raised by Dr. Murarka through testimony is that the reduction of utilization of fly ash in concrete will result in increased costs to the affected entities. *Id.* Again, the Illinois EPA acknowledges that the use of ACI could potentially impact the utilization of fly ash in concrete, but already stated in the TSD that the cost impact to the affected entities will vary depending upon several factors. The factors are: the amount of fly ash that is being generated at the power plant (which depends on coal ash content, heating value and unit heat rate, etc.), the marketable value of the ash as a cement material, the marketable value of the ash for lower quality applications, and the cost to dispose of the ash, if necessary. TSD p. 136. The Illinois EPA included a worst case scenario when performing the economic analysis of the proposed rule by establishing a $25 per ton of generated fly ash that will not be able to be utilized by the power plants for concrete purposes. TSD p. 155. Dr. Murarka did not dispute the Illinois EPA's economic analysis or the $25 per ton cost estimate the Illinois EPA used when evaluating the economic impact the proposed rule will have on the affected entities. Furthermore, Dr. Murarka agreed with the Illinois EPA's economic results during his oral testimony. Tr. 8/17/06, p. 1045.

Thus, Dr. Murarka's testimony at best served to confirm the underlying assumptions the Illinois EPA previously discussed and set forth in the TSD. His testimony added no new information or arguments for the Board's consideration,

especially given his admitted lack of knowledge of all fly ash-related contracts entered into in Illinois. His testimony was too general and failed to contain specifics applicable to Illinois facilities that will be subject to the proposed mercury rule.

Issues Raised by the Board and Midwest Generation

The Illinois EPA strongly advocates the adoption of the initial proposed rulemaking and proposed amendatory TTBS and MPS provisions. As stated above, the Board may revise proposed regulations before adoption upon its own motion or in response to suggestions made at hearing and in written comments made prior to second notice. 35 Ill. Adm. Code 102.600. No additional hearing on the revisions need be held. *Id*. Therefore, the Illinois EPA urges the Board, at second notice, to propose the adoption of the initial rulemaking proposal including the proposed amendatory TTBS and MPS provisions. The Board has heard testimony from the Illinois EPA and affected utilities that the TTBS and MPS provisions should be included in the rule to ensure the needed level of flexibility to ensure compliance with the rule itself.

Interaction of the Proposed Illinois Mercury Rule and CAIR

Introduction

This discussion encompasses the interaction between two pending rulemakings before the Board, namely the proposed Illinois mercury rule and the proposed Illinois CAIR rule. Although the proposed mercury rule focuses on the control of mercury emissions, it contains optional MPS provisions that companies can comply with as an alternative to the otherwise applicable requirements of the rule. Under the MPS, companies can commit to voluntarily meet numerical emission standards for both NOx and SO_2 emissions and in return are provided additional flexibility in complying with the

mercury emission standards. The MPS also contains a provision restricting the trading of NOx and SO_2 allowances. By regulating the emissions of NOx and SO_2 and restricting the trading of allowances, the MPS has implications for the proposed Illinois CAIR NOx and SO_2 cap and trade program.

At the present time, two of Illinois' three largest coal-fired electric power generating companies have indicated that they would utilize the MPS, specifically Ameren and Dynegy. These companies comprise roughly half of the coal-fired electric generating capacity in Illinois. The Illinois EPA has discussed the MPS with representatives from other eligible companies and in particular, has had several discussions with Midwest Generation concerning the MPS.

Background

The Illinois EPA believes that a multi-pollutant approach for controlling the emissions of mercury, SO_2, and NO_x from EGUs can have numerous advantages over the traditional, single pollutant schemes. For example, a well crafted MPS can increase the protection of public health and the environment, reduce pollution more cost-effectively, and offer greater certainty to both industry and regulators. Since mercury emission reductions can be obtained as a "co-benefit" from the control devices used to reduce SO_2 and NO_x, it makes sense to allow companies the option to synchronize the control of these pollutants, provided that public health and the environment are likewise positively impacted. The MPS contained in the proposed Illinois mercury rule accomplishes these goals.

Both the proposed Illinois mercury rule with the MPS and the proposed Illinois CAIR target the emissions of SO_2 and NOx from power plants. In this respect, their

goals are the same in that they seek to significantly reduce the emissions of these harmful pollutants from EGUs. In Illinois, EGUs are the largest source of SO_2 emissions, and one of the largest sources of NOx. Both SO_2 and NOx are precursors to the formation of fine particles or $PM_{2.5}$, and NOx is also a precursor to ozone formation. Control of these air pollutants is necessary for Illinois to comply with the Federal CAIR promulgated on May 12, 2005. 70 *Fed. Reg.* 25162. As part of the Federal CAIR development process, USEPA found that air pollution originating from Illinois contributes significantly to air quality problems in downwind states through the phenomenon of interstate air pollution transport. Specifically, pollution from Illinois was determined to have a significant contribution to nonattainment with the National Ambient Air Quality Standards ("NAAQS") for 8-hour ozone and $PM_{2.5}$ in downwind states. In addition, USEPA concluded that transported pollution from Illinois sources interfered with the maintenance of air quality in areas that are in attainment with the NAAQS. Moreover, modeling on both a regional scale and at the State level indicates that substantial reductions of NOx and SO_2 emissions are necessary to attain the 8-hour ozone and $PM_{2.5}$ NAAQS in Illinois.

CAIR is a cap and trade program that regulates the emissions of NOx and SO_2. States were given an emissions budget by USEPA that is not to be exceeded. This budget is comprised of allowances which are allocated to sources in advance of the year in which they are to be used. Each allowance is an authorization to emit one "unit" of a pollutant. Allowances essentially permit a source to emit up to the level of allowances it holds (e.g., for NOx, 1 ton = 1 allowance) during a given period in time. On an annual basis, sources must demonstrate to the program authority that they hold sufficient allowances to cover their emissions and surrender the appropriate number of allowances for each unit of

actual emissions. Because each source must hold sufficient allowances to cover its emissions each year, the limited number of allowances available ensures required reductions are achieved. Sources are technically not restricted in the amount of emissions they actually emit; they are only required to hold sufficient allowances to cover their emissions during the reconciliation period. Since allowances can be traded (i.e., exchanged, gifted, banked, purchased or sold) sources are not required to actually reduce emissions each year in order to meet a numeric emission standard. Instead, they can choose to emit greater than their allocated allowances, and make up for the difference by purchasing allowances, relying on banked allowances, or otherwise obtaining allowances sufficient to cover the level of emissions by which they exceed their cap. These additional allowances can come from out-of-state sources and used by Illinois sources, and in this manner, Illinois would not be the direct beneficiary of the emissions reductions contemplated in the determination of Illinois' budget. Accordingly, CAIR does not ensure a specific amount of emissions reductions occur in Illinois. Therefore, a regional cap and trade program such as CAIR may or may not provide the necessary level of emission reductions and air quality benefits to a specific state, like Illinois. Forecasts of emission reductions and air quality benefits expected from cap and trade programs are typically made using complex predictive models such as the Integrated Planning Model ("IPM") owned by ICF Resources.

A numeric emission standard or limit is a set emission rate that cannot be exceeded. This type of regulation is commonly referred to as command and control. Under the MPS, the sources within Illinois owned by one power company will be required to meet either specific NOx and SO_2 numeric emission limits in pounds per

million Btu or a percent reduction that can be converted to, and is essentially the equivalent of, a specified numeric emission limit. In addition, a source is not allowed to sell, trade, or bank outside of the confines of its Illinois companies any allocated allowances equal to the level of emissions reductions needed for compliance with the MPS. The restrictions on trading are designed to ensure that the emissions reductions required by the MPS are carried forward into CAIR and that they occur in Illinois. In this regard, an amount of allowances equal to the extra emissions reductions beyond CAIR that occur as a result of the MPS are removed from the trading program each year and prevented from being reintroduced and used in Illinois and other states. This ensures that these reductions provide benefits both in Illinois and region wide. The combination of numeric emission limits and trading restrictions guarantees that emissions reductions will occur in Illinois and therefore provide substantial benefit to public health and the environment in Illinois.

Companies that opt-in to the MPS are not restricted from trading or selling any additional allowances that occur as a result of companies controlling emissions beyond the levels required by the MPS. This provides an incentive for companies to reduce emissions to the greatest extent possible instead of seeking only to control emissions to the exact level of the MPS numeric emission limits. Illinois is guaranteed to receive the benefit of the emissions reductions down to the level of the MPS numeric emission limits.

Once a company opts-in to the MPS, it is required to comply with the MPS for the lifetime of the affected units, i.e., the MPS is a “once-in, always-in” provision. This provision is necessary to ensure that Illinois and its citizens continue to receive the

benefits of the MPS if a company elects to use this alternative to the otherwise applicable standards of the Illinois mercury rule. Otherwise a company might elect to opt-in to the MPS, receive the benefits of mercury control flexibility, and then opt-out of the MPS and comply with the otherwise applicable requirements of the proposed mercury rule absent the additional emissions reduction requirements for NOx and SO_2.

The co-existence of numeric emission limits and trading programs is not unusual and such rules do not typically conflict or present unmanageable contradictions. Other occurrences where such rules co-exist in a manner where sources are required to comply with both a numeric emissions standard and trading program requirements are found in Illinois and other states. For example, Illinois currently has a Volatile Organic Material ("VOM") cap and trade program for the Chicago non-attainment area known as the Emissions Reduction Market System ("ERMS"), 35 Ill. Adm. Part 205. Sources subject to ERMS must comply with both the cap and trade requirements of ERMS as well as other applicable Board rules such as 35 Ill. Adm. Code Part 218, which contains numeric emissions standards for VOM emissions. There have been no significant issues with the implementation of these two rules in the context of contradictions of requirements. Similar circumstances exist for sources subject to the NOx SIP Call and Acid Rain trading programs which both utilize a combination of cap and trade and numeric emission standards. Affected sources must comply with both the NOx and SO_2 trading requirements and any applicable numeric emission standards. In addition, affected sources would need to comply with any applicable Board rules, such as 35 Ill. Adm. Code 217, Subpart V.

Interaction of the Two Rules

The most straightforward way to look at the interaction between the requirements of the MPS in the proposed mercury rule and the proposed CAIR is that companies that elect to utilize the MPS would need to comply with both rules. Such companies will be required to comply with both the CAIR cap and trade requirements and the numeric emission limits of the MPS. Specifically, these companies will need to both hold sufficient allowances each year under CAIR and emit NOx and SO_2 at a rate equal to or less than the numeric emission limits of the MPS. Compliance with CAIR is mandatory whereas companies have the option of utilizing the MPS. Compliance with both rules was contemplated and is accounted for in the proposed MPS rule language. In particular, the MPS provisions do not prohibit companies from purchasing, using banked, or otherwise obtaining allowances for purposes of complying with other federal or state requirements such as the proposed CAIR. In essence, a company utilizing the MPS can purchase or obtain allowances from the general interstate market in order to meet the proposed CAIR requirements. Companies under the MPS can also utilize banked allowances to comply with CAIR. The need to obtain additional allowances will be necessary if and when actual emissions rates meet the requirements of the MPS, yet the company still needs to obtain allowances for compliance with the proposed CAIR.

Implications of MPS Trading Restrictions on CAIR

The MPS does not allow the trading of allowances that are generated as a result of measures taken to comply with the NOx and SO_2 emission standards. Specifically, companies cannot sell or trade outside of Illinois or with other companies in Illinois the allowances needed to meet the MPS numeric emissions limits for NOx and SO_2. The allowances needed to meet the numeric emissions limits are determined by converting

into allowances the allowable emissions from a company based on compliance with the numeric emissions limits. The allowances needed to meet the MPS limits are required to be retired or surrendered on an annual basis beginning on the date the MPS emission standards become effective (i.e., 2012 for NOx and 2013 for SO_2). Any allowances remaining with the company as a result of over-compliance with the MPS can be freely traded or banked. Allowances from over-compliance occur when a company's actual emission rates are below the required emission rates of the MPS. The availability of allowances for trading or banking would be determined from the actual emissions rate, in pounds per million Btu, achieved for NOx and SO_2 in the particular year. The difference between the required rate and a lower actual rate would be converted into allowances that could be traded or banked.

Since the requirements of the MPS for SO_2 and NOx do not become applicable until 2012 for NOx and 2013 for SO_2, and CAIR requirements for NOx begin in 2009 and 2010 for SO_2, a company using the MPS would need to comply with only CAIR until the corresponding MPS limits become applicable. Once the MPS and CAIR limits both apply, it is believed that initially compliance with the MPS will result in inherent compliance with the emission reduction requirements of the proposed CAIR in regards to SO_2. This is due to emission reduction requirements for SO_2 in the MPS being more stringent than the reductions required under CAIR. As a result, companies that comply with the MPS should reduce actual emissions to a level below their emissions allowed by their allocated SO_2 allowances under CAIR. However, this may change over time due to various factors, including the potential for increases in electrical generation from existing units (e.g., increase in operating hours or generation efficiency). If it becomes necessary

in the future, affected companies could purchase, trade, utilize banked, or otherwise obtain additional SO_2 allowances to comply with CAIR as needed without interference from the MPS.

For NOx, the situation is slightly more complex. A company opting into and complying with the MPS is more likely to need additional allowances beyond what is initially allocated to them under CAIR as proposed to be implemented in Illinois. Before further discussion, it is of critical importance to again recognize that companies utilizing the MPS retain their ability to purchase, trade, utilize banked allowances, or otherwise obtain (e.g., accept as gift or exchange) NOx allowances in order to meet the proposed CAIR NOx requirements in the event that actual emissions rates meet the requirements of the MPS, yet the company still needs to obtain allowances for compliance with the proposed CAIR.

One option for companies using the MPS to obtain any needed additional allowances is to obtain them through the Clean Air Set-Asides ("CASA"). Seven percent of the CASA is intended for (1) air pollution control equipment upgrades, and (2) early adopters. For companies utilizing the MPS and installing additional pollution control equipment that is not otherwise required pursuant to a consent decree, additional NOx allowances sufficient for compliance purposes should be readily obtainable. For those companies required to install controls under a consent decree, the Illinois EPA is revising the current proposed CAIR CASA provision to allow for NOx allowances to be obtained for the amount of over-compliance achieved. Over-compliance would be the amount of NOx reduced beyond that required by the consent decree.

Of course a company could also choose to reduce emissions through additional control measures such that additional allowances were not needed. Regardless of the mechanism for CAIR compliance, the MPS does not prohibit a company from purchasing, using banked, or otherwise obtaining additional allowances needed to comply with the proposed CAIR.

CAIR allows the use of banked allowances for compliance with the emissions caps. The MPS addresses the use of banking by allowing companies to utilize the banked allowances obtained prior to the effective dates of the associated MPS standards for CAIR compliance purposes. However, even though companies can continue to carry forward and utilize such banked allowances and are not required to surrender them, after the effective date of the associated MPS standard a company under the MPS can only bank allowances obtained from over-compliance. Essentially, the MPS allows for use of both banked allowances acquired before 2012 for NOx and before 2013 for SO2 and any additional banked allowances that are generated from over-compliance after those dates. For example, if a company has NOx allowances in a given year in excess of those needed for compliance after 2012 (i.e., allowances from over-compliance), the source can bank such allowances or may instead choose to sell or trade them within the interstate market.

Possible Retirement of Additional Allowances as a Result of the MPS and Potential Impact on CAIR

Another issue that was raised is the potential impact to the region-wide trading program and to other companies that may occur as a result of the retirement of any allowances that would otherwise not be removed from the CAIR trading program absent the MPS. A primary area of concern appears to be the additional cost of allowances in

the regional market that could occur from any corresponding shrinkage of the allowance pool.

The MPS requires that allowances needed to cover the allowable emissions pursuant to the numeric emissions limits for NOx and SO_2 be retired each year. CAIR requires that the appropriate number of allowances for each unit of actual emissions be retired each year. Therefore, only the incremental amount of any additional allowances retired as necessary for compliance with the MPS could potentially have an impact on the trading program.

Since the allocated allowances to companies for NOx under CAIR are expected to be fewer than the allowances needed to cover the allowable emissions pursuant to the MPS NOx emission rate, there should be no additional NOx allowance retirements due to the MPS. Therefore, there would be a negligible impact to the region-wide CAIR program in regards to NOx due to the requirement to retire NOx allowances under the MPS. Even if the MPS resulted in a large amount of additional allowances being retired or surrendered, the impact to the CAIR should be negligible. Evidence of this is found in the economic modeling performed by the Illinois EPA during the development of the proposed CAIR rule. In particular, it was assumed that 30% of the total NOx allowances were retired, although a 30% retirement is not the case. Even this large amount of retired NOx allowances was shown to have an insignificant impact on CAIR in terms of cost to industry and the Illinois consumer. A similar minimal impact would be expected to the SO_2 trading program from a large retirement. This is due to the region-wide scope of the trading program and Illinois constituting only one of up to 28 states participating. Any impact from an incremental amount of additional allowances retired in Illinois would be

spread over the region and total allowance pool, and hence minimized. Additionally, cap and trade programs by design are cost effective and spread costs over the program participants. For perspective on this issue, the Federal CAIR establishes region-wide annual NOx caps of 1.5 million tons in 2009 (53,361 allowances in Illinois) and 1.3 million tons in 2015 (44,468 allowances in Illinois).

Companies opting-in to the MPS will likely need to acquire and retire or surrender additional SO_2 allowances under CAIR. However, the MPS is structured similar to CAIR in that it required SO_2 reductions in two phases. This should help minimize any impact to the trading program from additional allowance retirements since the timing of the effective date of the more stringent SO_2 standard of the MPS corresponds to the tightening of emissions in CAIR. For both phase 1 and phase 2 of CAIR it is estimated that the any additional allowances needed to be retired or surrendered would have a negligible impact to the trading program for the reasons discussed and provided for the NOx trading program. Any additional retirement of SO_2 allowances would be relatively small in comparison to the annual SO_2 region-wide budget. For perspective on this issue, the Federal CAIR establishes region-wide annual SO2 caps of 3.6 million tons in 2010 (385,341 allowances or 192,671 tons in Illinois) and 2.5 million in 2015 (134,869 tons in Illinois). The additional SO2 allowances estimated to be retired or surrendered as a result of the MPS is less than 10% of the Illinois budget and less than 1% of the region-wide budget.

MPS, CAIR and the CASA

As stated above, a portion of the CASA is for (1) air pollution control equipment upgrades, and (2) early adopters. Air pollution control upgrades are eligible for 5% of

the total allowance pool, which is 3,812 allowances in phase I and 3,176 in phase II of CAIR, and such projects can continue to receive allowances for 15 years. Early adopters are eligible for 2% of the CASA, which is 1,525 allowances in phase I and 1,271 allowances in phase II, and such projects can continue to receive allowances for 10 years. These set-asides provide for the allocation of allowances to sources that install controls and such additional allowances would serve to offset the costs of the controls.

Companies using the MPS are eligible for additional NOx allowances through any category of the CASA, but due to the installation of controls needed for compliance with the MPS they are particularly suited for the air pollution control equipment upgrades or early adopter categories. Should Ameren or Dynegy (or any other company that chooses to use the MPS) need additional allowances for CAIR compliance purposes, it is believed they could obtain all or a portion of the allowances needed through the CASA from these categories. For Ameren in particular this is the case since it plans to install up to seven scrubbers and two SCRs to meet the MPS limits.

Since unused allowances in a CASA category accrue until the category contains double its initial allocation amount, if the pollution control upgrade or early adopter categories go unused or are undersubscribed for a period, more allowances will be available from these categories once companies start installing controls. Moreover, in the event that other CASA categories have excess allowances more than double their initial allocation amount, these excess allowances will be available for distribution to other categories, including pollution control upgrades and early adopters. It is possible that available allowances could even exceed double the amount of the initial allowances available in these two CASA categories. All allowances are allocated on a pro rated, or

assessed proportionately, basis. The proposed CASA is aimed at making installation of pollution control equipment more cost effective in Illinois.

For Dynegy, it would be able to utilize these categories of the CASA only for new control equipment beyond that already required by the consent decree and to the extent it achieves emission reductions beyond what is required in the consent decree. Dynegy has theorized that it may need to install a new scrubber and baghouse in order to meet the 2015 SO_2 emission rate of the MPS. Such controls would be eligible for full allowance allocations from the CASA.

Conclusion

The MPS of the proposed Illinois mercury rule and the proposed Illinois CAIR will work together to ensure significant reductions of SO_2 and NOx. Companies that elect to utilize the MPS provisions will need to comply with both the cap and trade requirements of CAIR and the emission rate and restricted trading requirements of the MPS. The provisions of the MPS allow for companies to purchase, trade, utilize banked, or otherwise obtain allowances needed to comply with the proposed CAIR. The requirements of the MPS do not interfere with companies obtaining additional allowances if needed for compliance with the proposed CAIR. The combination of the two rules ensures public health and environmental benefits in Illinois and region wide.

Multi-Pollutant Standard Issues

The following discussion addresses issues and concerns raised regarding the impact of the proposed MPS provisions.

Potential Impact of the MPS on companies that do not opt-in to the MPS. Specifically, the potential impact of the MPS on Midwest Generation and Kincaid in controlling mercury emissions.

As a general matter, the MPS will have no impact in regard to mercury control on companies that do not opt-in to the MPS. Such companies will need to comply with the non-MPS provisions of the proposed mercury rule and these provisions have not been revised. Therefore, the mercury control requirements for companies that do not choose to utilize the MPS are the same before and after the MPS provisions were added. The MPS is simply an alternative means to comply with the proposed rule.

Of course the MPS is an option available to all of the coal-fired systems. A company can either choose to comply with the proposed Illinois mercury rule or it may elect to opt-in to the proposed MPS provisions and thereby comply with the proposed rule.

For Midwest Generation in particular, the Illinois EPA determined the emission standards that would apply to it if it elected to use the MPS. Interestingly enough, for both annual and seasonal NOx emissions, Midwest Generation would need to comply with the numerical standard, i.e., 0.11 lbs/mmbtu. For SO_2, it would need to comply with the percent reductions requirement, i.e., 56% beginning 2013, and then 65% from 2015 on.

Therefore, under the MPS, Midwest Generation would be required to meet the same NOx emissions rate as Ameren and the same SO_2 percent reduction as Dynegy. Of note is that Dynegy has to meet a lower NOx emission rate than Midwest Generation, i.e., 0.10 lbs/mmbtu for Dynegy versus 0.11 lbs/mmbtu for Midwest Generation. For SO_2, Ameren has to meet a greater percent reduction of 70% by 2015, whereas Midwest Generation would only need to reduce SO_2 by 65%.

Potential Impact of the MPS on future SO_2 and NOx rulemakings

The proposed Illinois CAIR is the only rulemaking besides the proposed Illinois mercury rule that is currently underway to regulate coal-fired power plants and therefore have any impact on Midwest Generation or Kincaid, or any other coal-fired power plant.

Potential future rulemakings by the Illinois EPA that may address coal-fired power plants are Reasonably Available Control Technology ("RACT") and Best Available Retrofit Technology ("BART"). The Illinois EPA is in the process of determining the applicability of RACT and BART requirements for coal-fired generating units in Illinois. The Illinois EPA must develop revisions to Illinois' State Implementation Plan ("SIP") in the next two years to address these requirements. These requirements are based on four related federal rulemakings: On July 1, 1999, USEPA issued final regional haze regulations for the protection of visibility in national parks and wilderness areas (Regional Haze Rule). One of the key components of the Regional Haze Rule is BART, which is required on certain older combustion units. On June 15, 2004, nonattainment designations became effective for portions of Illinois for 8-hour ozone. Similarly, on April 5, 2005, nonattainment designations became effective for portions of Illinois for fine particulate matter (PM2.5). Finally, on November 29, 2005, USEPA published the final rule to implement the 8-hour ozone NAAQS.

USEPA's 1999 Regional Haze Rule was established to improve visibility at designated Class I areas in the United States. As mentioned, BART is a key element of this program, and it has been the subject of litigation since the initial promulgation. Currently, BART applies to coal-fired electric generating units that began operation after August 7, 1962, were in existence as of August 7, 1977, are located at facilities with a generating capacity greater than 750 MW, and that cause significant visibility impairment

at a designated Class I area. Visibility impairing pollutants, as determined by modeling performed by the Midwest Regional Planning Organization (Midwest RPO, aka LADCO), are NO_x and SO_2.

The BART rule requires states to identify whether emissions from units subject to BART contribute to visibility impairment, and if so, whether retrofit controls are available to reduce emissions below current levels. Preliminary modeling by the Illinois EPA has determined that there may be significant impairment to at least one Class I area as the result of emissions from units at the following facilities: Baldwin, Kincaid, Coffeen, Wood River, Edwards, Powerton, Joliet, CWLP, Duck Creek, and Will County. As part of the determination of BART, states must consider a number of factors, including: the cost of the controls; the impact of controls on energy availability or any non-air quality environmental impacts; the remaining useful life of the equipment to be controlled; any existing pollution controls already in place; and the visibility improvement that would result from controlling the emissions. These factors may lead states to require no additional control or the use of the best technology available, a less-effective technology than BART.

The BART rule allows for states to establish that compliance with the CAIR by affected EGUs would satisfy BART requirements. USEPA has noted that it believes that CAIR is clearly better than BART, and that CAIR would therefore satisfy the BART requirements for affected EGUs. The BART rule also provides presumptive emission limits for coal-fired EGUs for both SO_2 and NOx. Depending on the coal type and boiler configuration, the presumptive emission limitations generally require the use of flue gas desulfurization (FGD) and selective catalytic reduction (SCR) to control SO_2 and NOx

emissions, respectively. It is important to note that the Illinois EPA is still evaluating the best approach for satisfying the BART requirements pertaining to coal-fired EGUs and will consult interested stakeholders in the decision-making process.

As mentioned previously, portions of Illinois have been designated as nonattainment for both 8-hour ozone and PM2.5. Under Sections 110 and 182 of the Clean Air Act, states must include in their SIPs requirements for RACT for ozone and PM2.5 precursors for affected sources located in the nonattainment areas. 42 U.S.C. §§ 7410 and 7511a. The 2005 Implementation Rule for 8-hour ozone establishes guidance for states in developing RACT requirements for volatile organic compounds (VOCs) and NOx during the ozone season. Since Illinois has already implemented VOC RACT under the previous 1-hour ozone NAAQS, the Illinois EPA is focusing its efforts on addressing the requirements for NOx RACT. USEPA has not yet finalized the companion implementation guidance for PM2.5, so it is yet unclear what states must do to satisfy RACT requirements for SO_2 and NOx, the primary PM2.5 precursors, on an annual basis.

It is the Illinois EPA's intention to require RACT on all emission sources in the nonattainment areas with a potential to emit NOx of 100 tons per year or more. Depending on the requirements of the final PM2.5 Implementation Rule, the Illinois EPA expects to follow the same approach for SO_2 as well. The Illinois EPA is still evaluating the best approach for satisfying RACT requirements for coal-fired EGUs. Coal-fired EGUs that are located in either the Chicago or Metro-East nonattainment areas include the Baldwin, Wood River, Joliet, Will County, Crawford, Fisk, and Waukegan power plants. Similar to BART, the 8-hour ozone Implementation Rule provides for states to establish that compliance with the CAIR by affected EGUs would satisfy RACT

requirements. Presumably the PM2.5 Implementation Rule will contain a similar option for meeting RACT.

As mentioned above, the Illinois EPA is considering the best approach for addressing the requirements of BART and RACT. The Illinois EPA is committed to an open process and will consult stakeholders as it refines and finalizes its approaches. The Illinois EPA's recently proposed rule to address mercury emissions from coal-fired EGUs does not preclude the Illinois EPA from examining these requirements and taking action to address these requirements as appropriate or necessary. To the extent that the MPS affects any future rule, those potential affects would be addressed as part of the rulemaking process for that rule.

Potential Impact created by exchanging mercury emissions for particulate and ozone precursors.

The MPS does not result in the exchange of reductions in mercury for reductions in particulate and ozone precursors, i.e., SO_2 and NOx. Instead, it provides additional flexibility in regard to the installation and timing of controls and the mercury control strategy utilized. In exchange for this flexibility, companies must commit to meet numeric emission limits on NOx and SO_2. Although companies that use the MPS may not immediately achieve the 90% or equivalent mercury reductions for a short period, ultimately, the system-wide reduction in mercury emissions should be greater than what would be achieved using the mercury control strategy that would likely be employed absent the MPS. This is because under the MPS companies must install controls not only for mercury, but also for SO_2 and NOx. These SO_2 and NOx controls (e.g., scrubbers and SCRs) achieve and/or enhance mercury control as a co-benefit.

As a result of the MPS, it is believed that air quality will benefit from both significant reductions in mercury and significant reductions in NOx and SO_2. It is expected that mercury will be reduced to an even greater extent than it would absent the MPS. Hence, there will be an overall net gain in benefits to the public and environment, not an exchange in the reductions of one pollutant for others, as has been suggested. The benefits of mercury control have been well documented in the TSD to the proposed mercury rule and the testimony and exhibits of the hearings.

Although the Illinois EPA has not attempted to quantify the additional air quality benefit associated with the MPS, it is expected that the main benefits will come from the reduction in fine PM and ozone. Both SO_2 and NOx contribute to the formation of PM, and NOx contributes to the formation of ground-level ozone. PM and ozone are associated with premature deaths and illnesses. Additionally, these pollutants reduce visibility and damage sensitive ecosystems.

PM-related benefits include fewer premature fatalities, fewer cases of chronic bronchitis, fewer non-fatal heart attacks, fewer hospitalization admissions (for respiratory and cardiovascular disease combined) and result in significant reductions in days of restricted activity due to respiratory illness and fewer work loss days. We also estimate health improvements for children from reduced upper and lower respiratory illness, acute bronchitis, and asthma attacks.

Ozone health-related benefits are expected to occur during the summer ozone season (usually ranging from May to September). Ozone-related health benefits are expected to include fewer hospital admissions for respiratory illnesses, fewer emergency

room admissions for asthma, fewer days with restricted activity levels, and fewer days where children are absent from school due to illnesses.

In addition to these significant health benefits, the proposal will result in ecological and welfare benefits. These benefits include reductions in acidification in lakes, streams, and forests, benefits from reduced ozone levels for forests and agricultural production, and visibility improvements.

Kincaid's Proposal

It is the Illinois EPA's position that the proposed amendment to the rule submitted by Kincaid is unacceptable and should not be adopted by the Board. The proposal would significantly relax the mercury control requirements as proposed in the rule. This would occur with no additional requirements for SO_2 and NOx reductions, which will also serve to facilitate control of mercury. Kincaid has not identified any benefits for air quality and the environment.

In addition, since the proposal would significantly relax the proposed mercury reduction requirements, it results in additional mercury emissions beyond that contemplated by the Illinois EPA in the rule development process and recent amendments. As a result, the additional mercury emissions allowed by the proposal would have a detrimental impact on Illinois' ability to demonstrate compliance with the Federal CAMR caps.

The Illinois EPA believes that Kincaid can comply with the applicable emission standards as they currently exist, i.e., through the injection of halogenated ACI. This is the approach that other sources in Illinois are expected to rely upon and the approach that Dominion, the owner of Kincaid, is planning to use at plants located outside of Illinois.

In the event that compliance cannot be achieved, Kincaid can seek source-specific regulatory relief from the Board as provided by the Environmental Protection Act, in which context the consequences of such relief for Illinois' budget could be considered. The Illinois EPA is not at this time commenting on the appropriateness of relief for Kincaid.

Suggested Clarification of MPS Provisions

There are several minor changes that the Illinois EPA is bringing to the Board's attention concerning the existing language of the MPS. First, given testimony at hearing by Ameren that the Joppa power plant is part of its system, the Illinois EPA recommends the deletion of the reference to this source, "Electric Energy, Inc., ID 127855AAC," in Sections 225.232(d)(2)(A) and 225.234(b)(3)(B). There is no negative impact on the remaining sources listed in those sections if such source is removed.

Second, in Section 225.233(f)(3) of the MPS, the inclusion of the word "banking" in the first line of the subsection (so that the subsection reads, "The provisions of this subsection do not restrict or inhibit the banking, sale or trading * * *") will more clearly describe the flexibility concerning handling of allowances.

Finally, the Illinois EPA recommends replacing Section 225.233(f)(5) with different language to insure that affected sources have an appropriate amount of time to account for USEPA's actions regarding surrender of allowances. To that end, more reasonable language for that subsection would read:

> By March 1, 2010, and continuing each year thereafter, the owner or operator of EGUs in an MPS Group shall submit an initial report to the Agency detailing the means by which compliance with the requirements of this subsection for the previous year will be accomplished, which shall include identification of any allowances that are expected to be surrendered to the USEPA or to the Agency, and identification of any

allowances that were or will be sold, gifted, used, exchanged or traded because they became available due to overcompliance. All allowances that are required to be surrendered must be surrendered by August 31, unless USEPA has not yet deducted the allowances from the previous year. A final report shall be submitted to the Agency by August 31 of each year, verifying that the actions described in the initial report have taken place or, if such actions have not taken place, an explanation of all changes that have occurred and the reasons for such changes. If USEPA has not deducted the allowances from the previous year by August 31, the final report shall be due, and all allowances required to be surrendered must be surrendered, within 30 days after such deduction occurs.

Compliance with CAMR Annual EGU Mercury Budget or Caps

The Federal CAMR requires that Illinois reduce and maintain mercury emission levels from coal-fired EGUs at or below 3,188 pounds per year beginning in 2010, or phase 1 of CAMR. Under Phase 2 of CAMR, beginning in 2018, mercury emissions from all coal-fired EGUs statewide are budgeted at 1,258 pounds annually. These budgeted emissions for Illinois equate to a reduction in mercury emissions of approximately 47 percent by 2010 and 78 percent by 2018. Since the Illinois mercury rule targets a 90% reduction beginning July 2009, compliance with the Illinois rule should result in inherent compliance with the CAMR budget in both phase 1 and 2 of the Federal CAMR.

Even though Illinois' proposed mercury rule requires greater mercury emissions reductions, and requires that the reductions be achieved sooner than CAMR, the proposed rule does not directly impose the "emissions budget" established by the Federal rule. Several factors could affect Illinois mercury emissions and cause them to approach the level of the CAMR emissions budget. Such factors include future growth of electric generation from existing coal-fired EGUs, additional mercury emissions as a result of the TTBS, additional mercury emissions as a result of the MPS, and mercury emissions from

new EGUs. Although CAMR does not require a state to adopt a cap and trade program, the rule does require that a state not using the cap and trade provisions demonstrate that it will not exceed the budget. The Illinois EPA must submit a State plan to USEPA by November 17, 2006 that demonstrates how it will ensure that the State's CAMR emissions budget will never be exceeded, or if exceeded, that the appropriate corrective action is taken (e.g., purchase and retirement of an appropriate amount of mercury allowances by Illinois).

Increases in mercury emissions from the future growth of electric generation at existing coal-fired EGUs and from new EGUs was estimated and it is believed that the Illinois mercury rule is sufficiently stringent so as to not jeopardize any exceedances of the CAMR caps. The introduction of additional flexibility provided in the mercury rule via various provisions, including the TTBS and MPS, does not significantly increase the emissions of mercury so as to jeopardize the ability of Illinois to meet the CAMR caps.

In regard to the MPS, by the end of 2009, companies opting-in to the MPS are required to install mercury controls that the Illinois EPA believes will achieve 90% control on all units, except for the smallest units. The EGUs that are required to install mercury controls in 2009 are also required to demonstrate a minimum of 90% mercury reduction by January 1, 2015. The small units can only delay the installation of mercury controls until the end of 2012. Reasons for allowing a delay in controlling mercury for the smallest units include the fact that such units are also the smallest emitters of mercury. The additional mercury emissions that could occur from these small units during the period of 2009 to 2012 would be minimal compared to the overall reduction that will be occurring. After 2012 and the required installation of mercury controls on

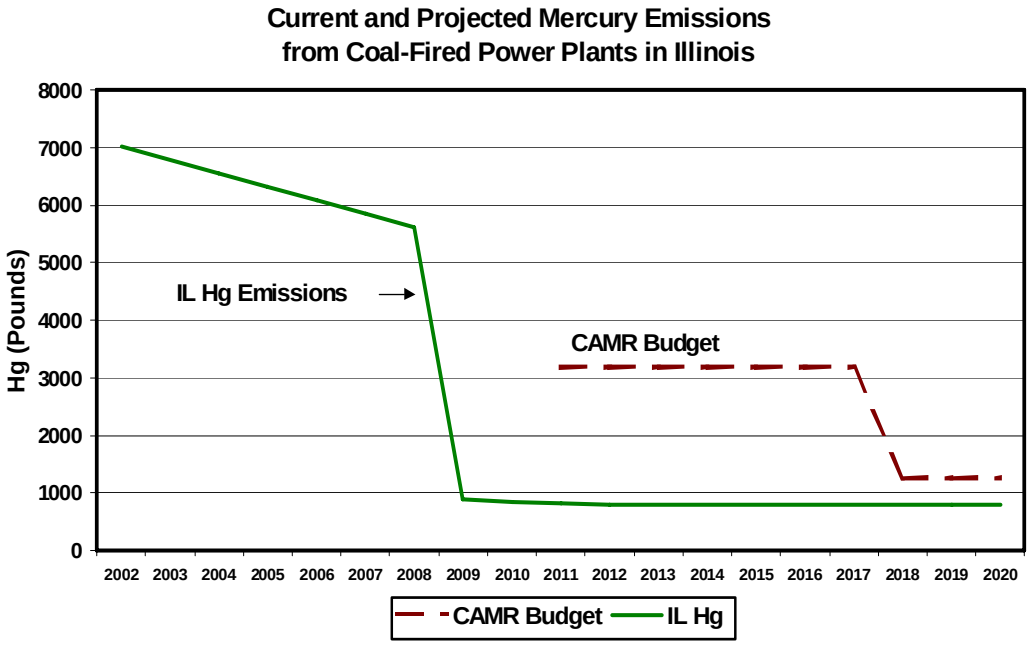
these small units, the additional mercury emissions as a result of the MPS amounts to only the small incremental difference between 90% control and the average level of control actually achieved, which may well be greater than 90%. Also under the MPS, these small units are never required to achieve a 90% emission reduction. Instead, they are required to operate the ACI systems appropriately and inject sorbent at specified default rates. The default rates are based on injection rates that assure that ACI is being injected for the maximum practicable reduction in mercury emissions. These units should achieve a high level of mercury emission reductions and the level of any additional emissions will not meaningfully affect the overall reduction that is achieved. In actuality, the Illinois EPA, Ameren and Dynegy all estimate that Ameren and Dynegy will each achieve greater than 90% mercury reduction system-wide after all controls are installed.

Under the TTBS, 25% of a system's capacity can elect to inject sorbent at default rates and thereby temporarily avoid the requirement to demonstrate 90% mercury emission reduction. The Illinois EPA testified that in development of the TTBS, it sought to minimize the additional amount of mercury emissions that could occur from units that comply via the TTBS. This was accomplished by limiting the use of the TTBS to 25% of a systems capacity and by requiring specified default sorbent injection rates. As with the MPS, the additional mercury emissions that could occur under the TTBS is the incremental amount between 90% control and whatever lesser level of control is actually achieved. These additional mercury emissions should be small. For example, the additional level of mercury emissions from a unit that emits 100 pounds of uncontrolled mercury emissions per year that achieves only 80% control instead of 90% is only 10

pounds of mercury per year. The duration of this effect is time-limited as the TTBS ceases to be available as of July 1, 2015. Since both Ameren and Dynegy have indicated they will opt-in to the MPS, Midwest Generation is the primary candidate to utilize the TTBS. It is important to note that EGUs equipped with hot-side ESPs are not eligible for the extension under the TTBS.

The Illinois EPA has prepared a projection of expected mercury emissions in Illinois from coal-fired EGUs for the first 10 years of the CAMR program (2010-2020) that projects Illinois mercury emissions will remain below budget levels during this period (see Figure 2). This is based on projected growth in coal consumption by EGUs during this timeframe and the control requirements contained in Illinois' proposed rule. The Illinois EPA is actively preparing a revised projection, however, and it is believed that the message will be essentially the same, i.e., that the proposed Illinois mercury rule will provide reductions beyond the CAMR budget.

Figure 2



Furthermore, the Illinois EPA will commit to provide to USEPA on an annual basis beginning in 2011, subsequent to the first year of the CAMR program, a report that tabulates mercury emissions reported by the subject sources for the preceding year to demonstrate that actual emissions have not exceeded the State's CAMR emissions budget. The annual report to be submitted by Illinois EPA will also include a projection of mercury emissions from coal-fired EGUs in Illinois for the next 10-year period. In the event that annual emissions exceed the applicable CAMR mercury budget, based on either the previous year's reported emissions or on the 10-year projection, the Illinois EPA will take corrective actions to limit mercury emissions as needed to comply. The corrective actions may include the submission to the Board of an amendment to the proposed Illinois mercury rule that contains an emissions cap on Illinois mercury emissions from coal-fired power plants. The Illinois EPA's commitment to prepare the

annual report, including the 10-year projection, and to take corrective actions in the event that the CAMR budget is exceeded is an integral part of Illinois' state Plan to be submitted to the USEPA.

In the event USEPA does not approve Illinois' demonstration that the proposed rule will meet the CAMR budget for Illinois, or if the State plan is submitted to USEPA after the November 17, 2006 deadline, then CAMR will be imposed upon Illinois. If this occurs, it is Illinois' intention that it will still proceed forward with the proposed mercury rule, and if promulgated, Illinois EGUs will need to comply with both CAMR and the Illinois mercury rule. It is believed that compliance with CAMR will be inherent upon compliance with the Illinois mercury rule since the Illinois mercury rule standards will result in emissions below the CAMR caps. There should be relatively little additional burden placed on Illinois EGUs if both rules are implemented. In fact, sources would be able to sell allowances that are not needed for CAMR compliance. Such allowances would likely occur as a result of sources meeting the more stringent reduction requirements of Illinois' proposed mercury rule.

The Illinois EPA has discussed CAMR compliance with USEPA Region V personnel. The Illinois EPA is aware of areas that USEPA has identified as needing resolution in order to demonstrate CAMR compliance. The Illinois EPA is actively working to address these issues and is optimistic that a resolution can be reached.

WHEREFORE, as provided herein, and as supported and set forth in the Illinois EPA's testimony, exhibits, and other documents submitted to the Board in this proceeding to date, the Illinois EPA respectfully requests that the Board adopt the initial rulemaking proposal, as well as the TTBS and MPS provisions.

Respectfully submitted,

By:_____
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Dated: September 20, 2006

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ATTACHMENT 1

Mercury Emissions Monitoring Program for Coal-Fired Boilers under the Clean Air Mercury Rule Status Report

August 2006

Introduction

The Clean Air Mercury Rule (CAMR) requires affected electric utility units to continuously monitor mercury (Hg) mass emissions, using technically-feasible, compliance-capable technologies. To ensure that the Hg emission reduction goals of CAMR are met, these monitoring technologies will be subject to rigorous certification and quality assurance/quality control (QA/QC) requirements under 40 CFR Part 75. The U.S. Environmental Protection Agency (EPA) continues to work with the regulated community, the monitoring equipment and software vendors, academia, and other organizations to ensure timely implementation of a technically sound, effective CAMR mercury monitoring program.

This paper updates the February 2006 status report on the mercury emissions monitoring program under the CAMR. The paper discusses the results of the mercury emission monitoring demonstration and method validation tests to date and the remaining challenges to be overcome. The paper also discusses capacity issues associated with the availability and installation of the required monitoring systems within the required CAMR deadlines.

Background

Over the past two years, EPA, the Electric Power Research Institute (EPRI), industry and monitoring equipment vendors have conducted field demonstration and validation tests of continuous mercury emission monitoring systems (CEMS) and sorbent trap monitoring systems at a number of coal-fired utility boilers. EPA and the National Institute of Standards and Technology (NIST) have also been working together to develop NIST-traceable mercury calibration gas standards and protocols necessary to ensure the accuracy of the mercury monitoring systems. As a result of these tests, system design changes have been made to improve the performance and reliability of the monitoring systems. Most notably, design changes have been made to reduce probe plugging and calibration drift, particularly under wet stack environments. Additionally, the precision between different CEM systems has improved dramatically.

Working with EPRI, NIST, and industry, most of the major issues have been successfully addressed, and now the focus of future field tests and laboratory analyses is on resolving the remaining issues. These include: (1) developing a viable instrumental reference method (IRM) for mercury; (2) finalizing NIST traceability protocols for Hg calibration gas cylinders and gas generators; and (3) improving CEMS performance in daily calibration error tests and system integrity checks (especially in low temperature, low concentration, high moisture stack environments).

EPA is also working with industry and other groups to develop an alternative reference method using sorbent trap technology. However, the Agency still considers a workable instrumental reference method for mercury to be the best alternative to the currently-required Ontario Hydro wet-chemistry reference method.

Hg CEMS and Sorbent Trap Hardware

Mercury monitoring technologies continue to advance at a rapid pace and are on-track to meet the QA/QC requirements required under CAMR. However, continued commitment from all parties is essential to maintain this pace and ensure that CAMR requirements are met.

Approximately, twelve Hg CEMS and sorbent trap vendors are currently developing new and improved monitoring systems. EPA, EPRI and monitoring system vendors will continue to conduct tests demonstrating these improvements at various coal-fired power plants in the United States. Hg CEMS manufactured by Tekran, Horiba, Durag, Opsis, Thermo, Ohio Lumex, Forney/Genesis, and GE/PS Analytical are currently being field tested. Most manufacturers have made significant improvements to or refinements of their monitors as a direct result of EPA and EPRI's field demonstration tests. For example, several new CEMS probe designs have been developed, some of which reduce plugging and may reduce system calibration drift in low concentration, high moisture stack environments. Other more streamlined probe designs are being developed by equipment vendors to facilitate sample traversing[1] during IRM testing. Vendors are also working to integrate Hg calibration gas generating systems into their CEMS.

Mercury sorbent trap monitoring systems continue to perform well at the EPA and EPRI field test sites. Remaining developmental efforts for these systems will include: (1) testing of a variety of sorbent materials and sample conditioning systems; and (2) development of alternatives to the lengthy process of sending Hg samples to a laboratory for analysis. Promising alternatives that allow for rapid, on-site sample analysis include thermal desorption and direct combustion methods, both of which are based on sample heating/combustion to release mercury. Industry is also working to improve the Hg detection capabilities of sorbent trap systems in low-concentration stack environments.

[1] In order to make measurements of its concentration in the stack, sampling at multiple points is generally required. "Traversing" is the act of moving the probe to reach the individual sampling points.

Instrumental Reference Method Evaluation and Validation

EPA has drafted a conceptual mercury IRM to provide an alternative to the lengthy and complex Ontario Hydro reference method currently required by CAMR. EPRI and industry will continue to provide IRM development assistance to EPA through the assessment of its feasibility and challenges. Issues associated with the implementation and validation of the conceptual IRM are currently being addressed at the EPA North Carolina and the EPRI Kentucky test sites. Also, IRM development was one of the primary areas of focus at the recent Pennsylvania/Lehigh University field test, and is currently a primary area of focus at a Texas lignite field test site. The principal objective of these field tests is to demonstrate the practicality and effectiveness of the draft IRM procedures in a variety of stack environments. EPA and EPRI are examining the length of time required to perform the procedures and the efficacy of pre- and post-test dynamic spiking, as well as the possibility of using SO_2 stratification test results as an indicator of Hg stratification in the stack. Equipment manufacturers are also exploring equipment design modifications to improve sample conditioning, reference method probe mobility, and the integrity of the instruments during transport.

Field Demonstrations

Field demonstration tests currently in progress include a continuation of EPA's work at a coal-fired power plant in North Carolina and EPRI's work at a field test site in Kentucky. Substantial improvements in Hg CEMS and sorbent trap operation and performance have been achieved at these two test sites. Testing was recently completed at a coal-fired power plant in Pennsylvania in collaboration with Lehigh University, and additional testing has commenced at a lignite coal-fired facility in Texas. The following paragraphs describe these tests in more detail.

North Carolina Site Testing: At this dry stack location, EPA ORD has installed and operated a Tekran CEMS since December 2004. In addition to the Tekran system, the test team has evaluated Hg CEMS manufactured by Thermo, Horiba, GE/PS Analytical, Forney/Genesis, Durag and Ohio Lumex. These evaluations include multiple certification and relative accuracy tests as well as long-term daily calibration error tests and weekly system integrity checks. Results of the testing effort include improvements in instrument reliability as evidenced through increased data availability. More recently, the North Carolina site has been used to demonstrate and optimize tools and approaches for implementing the conceptual IRM, including the refinement of approaches for dynamic spiking. The North Carolina test site is also being used to evaluate new and innovative probes that can be used to meet the traversing requirements of the IRM.

Kentucky Site Testing: As mentioned in the February 2006 status report, the Kentucky test site is now serving as an equipment and software development location for Hg CEMS vendors and is considered to be representative of the most challenging measurement

environment found among well-controlled boilers (i.e., it represents low temperature, low Hg concentration, and high moisture flue gas conditions). EPRI has evaluated the performance and reliability of CEMS manufactured by GE, Thermo, and Tekran at this site, as well as sorbent trap systems made by Frontier Geosciences. Remaining CEMS and sorbent trap performance issues continue to be addressed.

Participating equipment vendors are also developing and testing suitable probes for the wet stack conditions encountered at the Kentucky site. One manufacturer is testing two probe types simultaneously. Each of these new probes has shown promise, and has significantly reduced the occurrence of plugging. On-going efforts are being made to continue to improve probe reliability and reduce the amount of required maintenance and repair. The Agency expects that industry and vendors will have reliable probes within the next few months.

Other outstanding CEMS issues that have been identified at the Kentucky test site include: (1) the need to reduce calibration drift; (2) the need for front-end humidification to allow for dynamic spiking and daily calibration at the probe; and (3) the need to optimize the position of the Hg converter in the sampling system (i.e., nearer to or farther away from the probe). EPRI and industry experts are addressing these issues, however, the same high level of commitment and support provided up to this point needs to be maintained by all parties to ensure that these issues are satisfactorily resolved.

Lehigh Field Study: With support from EPA, EPRI, the Italian government, several utility companies and others, the Lehigh University Energy Research Center (ERC) organized a field test where reference methods for mercury, heavy metals and particulate, which have been developed in the U.S. and the European Union (EU), were compared. The field testing was begun in late June 2006 and was completed in July 2006. Testing was conducted by a joint U.S. and European Union team at a power plant in Pennsylvania. Western Kentucky University (WKU) provided a mobile mercury test laboratory for the project.

As part of the Lehigh field study, EPA was able to satisfactorily perform many of the procedures in EPA's draft conceptual IRM, including dynamic spiking, calibration error, and system integrity tests. The test team performed IRM test procedures on Hg CEMS manufactured by Thermo Electron, Tekran, GE/PS Analytical and Ohio Lumex. In addition, Frontier Geosciences and CONSOL/Clean Air performed Appendix K sorbent trap monitoring. The Lehigh study provided a valuable opportunity to assess the amount of time required to perform the IRM pretest activities and sample runs, and to develop and optimize the dynamic spiking procedures. Due to time and resource constraints, only limited traverse and stratification tests (using SO_2 as a surrogate) were undertaken. These issues will be addressed more fully in future field tests. The results of the conceptual IRM testing from the Lehigh study will be compared to those obtained with paired Ontario Hydro trains.

We Energies Michigan Field Study:

We Energies has been working with the Department of Energy on a mercury control technology demonstration project at a Michigan test site, involving a ®TOXECON baghouse and activated carbon injection to control mercury emissions from three electric generating units. Hg CEMS manufactured by Thermo have been installed on the inlet and outlet of the baghouse and have been operating without any significant problems for several months. Baseline stack tests were conducted in February using the Ontario Hydro reference method and the Appendix K sorbent trap method. In addition, CEMS relative accuracy and IRM evaluation testing are scheduled to be performed later this summer or in the fall.

Texas Lignite Field Study:

WKU, in conjunction with EPRI, is conducting three field tests on Tekran and Thermo CEMS at a lignite-fired utility plant in Texas. The tests are scheduled to be completed later this summer. Both relative accuracy and IRM evaluation testing will be conducted. Stratification tests, using SO_2 as a surrogate for Hg, will also be performed during one of the field tests.

Additional Field Tests:

EPRI and the U.S. Department of Energy performed relative accuracy tests of a Hg CEMS and a sorbent trap monitoring system at another field site in Pennsylvania. IRM evaluation tests were also performed. The IRM tests were conducted using batch-type dynamic spiking.

Field tests of Thermo and Tekran CEMS and two sorbent trap monitoring systems have also been performed at an Indiana power plant. These tests are part of EPA's Environmental Technology Verification (ETV) program. The verification testing included two relative accuracy tests, the first of which was conducted in mid-June 2006 and the second in mid-July 2006. IRM evaluation testing was not done at this site.

Availability of Mercury Monitoring Systems

Approximately 1100 electric generating units (EGUs) are affected by CAMR. EPA estimates that between 800 and 1000 mercury monitoring systems (i.e., Hg CEMS and sorbent trap systems) must become commercially available between now and 2008, to ensure that the affected EGUs will be able to meet the continuous emission monitoring requirements of CAMR. The exact number of Hg monitoring systems that will be needed to implement CAMR is somewhat uncertain, because: (1) some of the affected units are in common stack configurations; and (2) at least 100 to 200 of the affected units are expected to qualify as low mass emission (LME) units under Part 75 (§75.81(b)), and the owners of these units may elect to perform periodic Hg emission testing rather than installing mercury monitoring systems.

The manufacturers of Hg CEMS have indicated that beginning in 2007 they will, collectively, be able to produce well over 1000 CEMS per year. One vendor plans to produce 600 Hg CEMS per year, and a second vendor plans to produce 60 CEMS per month. A number of other monitoring equipment manufacturers also plan to increase their production capabilities to meet the monitoring demands of CAMR. Based on these projections, there will be more than enough Hg CEMS and sorbent trap systems available to meet the requirements of CAMR, and there should be sufficient time for facilities to install and certify the monitoring systems before the January 1, 2009 compliance deadline.

Thus, EPA is confident that the CAMR monitor certification deadline will be met. The Agency will continue to work with industry and with the equipment vendors to ensure that the CAMR emissions monitoring program is implemented on schedule.

NIST- Traceable Hg Calibration Standards

NIST continues to provide assistance in developing Hg reference standards for elemental and oxidized mercury. The existence of such reference standards is the first step in developing the NIST-traceable Hg standards for use under Part 75. EPA ORD and NIST are collaborating to develop calibration procedures for mercury gas generators and cylinders. Gas generators calibrated by these procedures are expected to be available for field tests during the fall of this year. These calibration procedures will serve as the basis for drafting traceability protocols for elemental and oxidized mercury. The Agency also expects that NIST-traceable gas standards and protocols will be available in fiscal year 2007 for use in certifying CEMS and sorbent trap monitoring systems.

Rulemaking Changes to Hg Monitoring Provisions in Part 75

EPA has proposed minor technical and procedural changes to the Hg monitoring provisions of Part 75. The proposed changes were published in the Federal Register on 22 August 2006 and are expected to be finalized by early summer 2007. These changes include adding EPA Method 29 (with additional QA provisions consistent with the Ontario Hydro method) as an alternative reference method. Method 29 is similar to Ontario Hydro, but is more familiar to stack testers. The method would be an option for relative accuracy and LME tests.

The rule change proposal also addresses the testing and reporting requirements of mercury LME units and provides changes to the common stack provisions. EPA will also solicit comment on how to equitably apply the LME provision to units which, in addition to coal, burn fuels that have very low Hg content. The rule currently assumes that only coal is burned in these units.

STATE OF ILLINOIS)
) **SS**
COUNTY OF SANGAMON)
)

CERTIFICATE OF SERVICE

I, the undersigned, an attorney, state that I have served electronically the attached POST-HEARING COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY upon the following persons:

Dorothy Gunn
Clerk
Illinois Pollution Control Board
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SEE ATTACHED SERVICE LIST

ILLINOIS ENVIRONMENTAL
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Gina Roccaforte
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Dated: September 20, 2006

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