RULES AND REGULATIONS

Title 25—ENVIRONMENTAL PROTECTION

ENVIRONMENTAL QUALITY BOARD

[25 PA. CODE CH. 123]
Standards for Contaminants; Mercury

The Environmental Quality Board (Board) amends Chapter 123 (relating to standards for contaminants) to read as set forth in Annex A. The purpose of this final-form rulemaking is to establish "State-specific" requirements to reduce mercury emissions from coal-fired electric generating units (EGUs) with a nameplate rated capacity of 25 megawatts or more that produce electricity for sale. The final-form rulemaking establishes mercury emission standards, annual emission limitations as part of a Statewide annual nontradable mercury allowance program and monitoring, recordkeeping and reporting requirements to reduce mercury emissions from coal-fired EGUs or cogeneration units. This final-form rulemaking will be submitted to the United States Environmental Protection Agency (EPA) as an element of the State Plan required under section 111(d) of the Clean Air Act (CAA) (42 U.S.C.A. § 7411(d)).

This order was adopted by the Board at its meeting of October 17, 2006.

A. *Effective Date*

The final-form rulemaking will be effective upon publication in the *Pennsylvania Bulletin*.

B. *Contact Persons*

For further information, contact Krishnan Ramamurthy, Chief, Division of Compliance and Enforcement, Bureau of Air Quality, 12th Floor, Rachel Carson State Office Building, P. O. Box 8468, Harrisburg, PA 17105-8468, (717) 783-9476; or Robert "Bo" Reiley, Assistant Counsel, Bureau of Regulatory Counsel, 9th Floor, Rachel Carson State Office Building, P. O. Box 8464, Harrisburg, PA 17105-8464, (717) 787-7060.

C. *Statutory Authority*

This final-form rulemaking is adopted under the authority of section 5(a)(1) of the Air Pollution Control Act (APCA) (35 P. S. § 4005(a)(1)), which grants the Board the authority to adopt regulations for the prevention, control, reduction and abatement of air pollution.

D. *Background and Summary*

1. *Legal and Regulatory History Regarding the Control of Mercury Emissions*

Mercury is a highly toxic pollutant—one specifically targeted by Congress when, in 1990, it amended section 112 of the CAA (42 U.S.C.A. § 7412). The environmental impacts of mercury are significant, widespread and adverse.

Under the 1990 amendments to the CAA, Congress altered the principle focus of the hazardous air pollutants (HAPs) program under section 112 of the CAA from a health-based to a technology-based regulatory program. As part of this new regulatory focus, under section 112(b) of the CAA, Congress listed 189 HAPs. Those chemicals chosen to be regulated as HAPs under the CAA by Congress are especially harmful to public health and the environment. These chemicals are known to cause cancer, birth defects, lung disease, nervous system disorders, liver damage and other health problems. Many of these chemicals are also known to bioaccumulate in living organisms and become more concentrated at higher levels in the food chain.

Congress chose to regulate and reduce HAP emissions through a technology-based standard rather than a health-based standard because the former is more effective in reducing emissions. The control of HAPs through health-based standards by the EPA under the pre-1990 CAA amendments resulted in serial litigation with industry and regulatory paralysis at the agency. Moreover, the EPA had a difficult time conducting the necessary risk analysis and ambient air quality analysis to list pollutants and establish emission standards. As a result, Congress concluded that a technology-based approach was appropriate because routine and episodic releases of HAPs posed a significant threat to public health; the risk of adverse health effects related to these emissions were significant; and HAPs may cause significant environmental damage. *See* S. COMM. REP. NO. 101-228 at 132 (Report on S. 1630, Clear Air Amendments of 1989.)

Under section 112(c) of the CAA, the EPA was required to establish a list of all categories and subcategories of major and area sources of air pollution for those pollutants listed under subsection (b). For each listed category of sources, the EPA is required, under section 112(d) of the CAA, to promulgate standards requiring the installation of maximum achievable control technology (MACT) in light of economic, energy and environmental considerations.

The EPA is required to base the standard on the best technology currently available for the source category in question. These standards must be at least as stringent as the level achieved in practice by the best-controlled source in the source category for new sources or for the best performing group of sources for existing source MACT standards. For existing source MACT standards, the EPA defines the "MACT floor" (the minimum stringency level for existing source MACT) in terms of the central tendency (arithmetic mean or median) of the best 12% of sources in the source category (where there are 30 or more sources in the category) or the best performing 5 sources (where there are fewer than 30 sources in the category).

As part of this MACT process, the EPA has already finalized mercury emission limits for municipal waste combustors and medical waste incinerators, which resulted in a 90% reduction in mercury emissions within 5 years. However, Congress set forth additional regulatory steps before mercury emissions from EGUs could be controlled.

Under section 112(n)(1)(A) of the CAA, Congress directed the EPA to perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions of HAPs by EGUs. Under this same subparagraph, the EPA is further directed to regulate these units if the agency finds regulation is appropriate and necessary after considering the results of the study.

In addition to this section of the CAA, section 112(n)(1)(B) of the CAA further directs the EPA to conduct a study of mercury emissions from EGUs, municipal waste combustion units and other sources to consider the rate and mass of these emissions, the health and environ-

mental effects of these emissions, control technologies and the costs of these technologies.

In December of 1997, the EPA fulfilled the statutory directive of section 112(n)(1)(B) of the CAA when it issued its "Mercury Study Report to Congress," EPA-452/R-97-003. This 1,800-page, 8-volume report discusses the National inventory of anthropogenic mercury emissions in the United States, the fate and transport of mercury in the environment, an assessment of exposure to mercury in the United States, health effects of mercury and mercury compounds, an ecological assessment for anthropogenic mercury emissions in the United States, characterization of human health and wildlife risks from mercury in the United States and an evaluation of mercury control technologies and costs.

On February 28, 1998, the EPA fulfilled its statutory obligation, under section 112(n)(1)(A) of the CAA, when it released its "Study of Hazardous Air Pollutant Emissions from Electric Steam Generating Units—Final Report to Congress." This Utility Air Toxics Study issued in February 1998 evaluated EGUs that burn coal, oil or gas to generate electricity and are greater than 25 megawatts in size. This study includes the description of the utility industry; an analysis of air toxics emissions data from fossil-fuel (coal, oil and gas) fired utilities; an assessment of risks to public health from exposure to toxics emissions through inhalation; assessment of potential risks to the public health from exposure to four specific air toxics (radio nuclides, mercury, arsenic and dioxins) through other indirect means of exposure (for example, food ingestion, dermal absorption); a general assessment of the fate and transport of mercury through environmental media; and a discussion of alternative control strategies.

December 20, 2000, the EPA concluded, based upon the findings of its 1998 report and on information subsequently obtained, that in accordance with section 112(n)(1)(A) of the CAA, the regulation of mercury emissions from electric utilities was "appropriate and necessary" 65 FR 79825. As a result of these findings, the EPA added these units to the list of source categories to be regulated under section 112(c) of the CAA. The EPA was then required to establish emission standards for this source category under section 112(d) of the CAA.

The EPA published a final rule at 70 FR 15993 (March 29, 2005) entitled "Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units From the Section 112(c) List." The EPA now believes that it is neither appropriate nor necessary to regulate mercury from these units under section 112 of the CAA.

As a result of this conclusion, the EPA removed coal- and oil-fired EGUs from the Section 112(c) list. This final action means that the EPA does not have to promulgate MACT standards for the control of mercury emissions from utility units. This action also cleared the way for the EPA to regulate these emissions under a Section 111 cap-and-trade approach.

On March 15, 2005, the EPA finalized the Clean Air Mercury Rule (CAMR). The final rulemaking published at 70 FR 28606 (May 18, 2005) established standards of performance for mercury for new and existing coal-fired EGUs as defined in section 111 of the CAA. New EGUs are subject to different standards of performance based on five subcategories—subbituminous, bituminous, lignite, waste coal or integrated gasification combined cycle (IGCC). The CAMR establishes a "cap-and-trade" program by which mercury emissions from new and existing coal-fired EGUs are capped at specified, Nationwide levels. The Phase 1 cap of 38 tons per year (tpy) becomes effective in 2010 and the Phase 2 cap of 15 tpy becomes effective in 2018. Facility owners and operators must demonstrate compliance with the standard by holding one "allowance" for each ounce of mercury emitted in any given year. Allowances will be readily transferable among all regulated facilities under the Section 111 trading scheme.

In response to the EPA's March 29, 2005, revision and the CAMR, petitions for review challenging these final agency actions were filed with the United States Court of Appeals for the D.C. Circuit. In addition to the Commonwealth, state challengers include California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New Jersey, New York, Rhode Island, Vermont and Wisconsin.

On May 31, 2005, the Commonwealth, together with the States of California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Jersey, New Mexico, New York, Minnesota, Rhode Island, Vermont and Wisconsin, filed a petition for reconsideration under section 307(d)(7)(B) of the CAA (42 U.S.C.A. § 7607(d)(7)(B)) related to the EPA's March 29, 2005, final action revising its December 2000 regulatory finding. Issues related to this petition included, but were not limited to, whether the EPA's action is contrary to the CAA and supported by the record and whether the procedural requirements under the Administrative Procedures Act and the CAA were followed.

On July 18, 2005, the Commonwealth, together with these same states, filed a petition for reconsideration under section 307(d)(7)(B) of the CAA related to the CAMR. Issues related to this petition included, but were not limited to, the setting of new source performance standards (NSPS) standards based on subcategories of coal, the cost-benefit analysis, air quality modeling and provisions concerning the 2010 cap on mercury emissions.

On October 28, 2005, the EPA granted reconsideration on both petitions and reopened the public comment period related to certain issues under both final actions. *See* 70 FR 62200 and 62213 (October 28, 2005).

On December 19, 2005, the Commonwealth and the other states filed comments on these reconsideration actions. Issues related to these reconsideration notices included, but were not limited to, the EPA's legal interpretations, the EPA's methodology and conclusions concerning reasonably anticipated hazards to public health resulting from EGU mercury emissions, modeling of mercury deposition, costs, NSPS standards and statistical analysis used for the NSPS standards.

On June 9, 2006, after considering the petitions for reconsideration and the comments received, the EPA decided not to further revise the CAMR other than to explain in more detail what the agency meant by the effectiveness element in the term "necessary" 70 FR 33388. The only two substantive changes the EPA made to the CAMR in response to comments involve revisions to the state mercury allocations and to the NSPS. The EPA also finalized the regulatory text that clarifies the applicability of the CAMR to municipal waste combustors and certain industrial boilers. Finally, the EPA denied the requests for reconsideration with respect to all other issues raised in the petitions for reconsideration submitted for both rules.

Section 111(c) and (d) of the CAA requires each state to develop and submit to the EPA Administrator a procedure for implementing and enforcing the NSPS for new sources and emission guidelines for existing sources. Specifically, the EPA authorizes states, under the CAMR, to adopt the mercury cap-and-trade program whether by incorporating by reference the CAMR cap-and-trade rule that will be codified in 40 CFR Part 60, Subparts Da and HHHH (relating to standards of performance for electric utility steam generating units for which construction is commenced after September 18, 1978; and emission guidelines and compliance times for coal-fired electric steam generating units), or by codifying the provisions of the CAMR cap-and-trade rule, to participate in the EPA-administered mercury cap-and-trade program. The final CAMR establishes the Commonwealth's 2010-2017 mercury emissions budget as 1.77 tons and the 2018 budget as 0.702 ton.

Each state participating in the EPA-administered cap-and-trade program must develop a method for allocating an amount of allowances authorizing the emissions tonnage of the state's CAMR budget. Each state has the flexibility to allocate its allowances however it chooses, so long as certain timing requirements are met. States may elect to participate in the EPA-managed cap-and-trade program for coal-fired EGUs. However, state participation in this program is voluntary. For states that elect not to participate in the EPA-administered mercury cap-and-trade program, a methodology must be established by the states to meet the CAMR mercury emission budgets by reducing mercury emissions.

By November 17, 2006, states must submit a plan to the EPA to implement the requirements of the CAMR or a more protective program. If a state fails to submit a state plan, as required in the final rule, the EPA will prescribe a Federal plan for that state under section 111(d)(2)(A) of the CAA. The EPA would propose the model rule under the CAMR as that Federal plan. However, the EPA has indicated in the preamble to the final rule that states are free to develop a more stringent mercury control program than the one in the final rule.

The Department of Environmental Protection (Department) held three public hearings on the proposed State Plan for designated EGU facilities. *See* 36 Pa.B. 4269 (August 5, 2006). On September 6, 2006, public hearings were held at two Department regional offices in Norristown and Pittsburgh and at the Rachel Carson State Office Building in Harrisburg. This final-form rulemaking will be submitted to the EPA as the State Plan to fulfill the Commonwealth's requirements under the CAMR for new and existing EGUs.

2. *Anthropogenic Sources of Mercury Emissions*

Since the beginning of the industrial age, human activities have increased the amount of mercury releases to the environment. Today in the United States, the combustion of coal at coal-fired power plants represents the largest source category of mercury emissions at approximately 43%. The second largest category after coal-fired power plants is electric arc furnaces at 10%.

This Commonwealth has 36 coal-fired power plants with 78 EGUs that represent approximately 20,000 megawatts of capacity. These units accounted for approximately 78% of the more than 5 tons of mercury emitted into the air from all contamination sources in this Commonwealth, ranking this Commonwealth second only to Texas in terms of total mercury emissions and third behind Texas and Ohio, respectively, for EGU-specific mercury emissions in 2003. The Commonwealth's next largest source of mercury emissions is the stone/clay/glass category, which accounts for almost 9% of the total.

The primary reason that coal-fired power plants represent such a large percentage of mercury emissions in the United States and this Commonwealth is because this source category is unregulated for this type of emissions. While both the National and Pennsylvania figures show that coal-fired power plants emit a disproportionate amount of mercury, mercury emissions from coal-fired power plants in this Commonwealth are disproportionate to the National figure. Therefore, the Board believes that it is important to ensure that uncontrolled mercury emissions from the EGU source category are regulated as intended by Congress under the CAA.

3. The Mercury Cycle in the Environment

Mercury cycles throughout the environment are a consequence of both natural and human activities. The annual global cycling of mercury in the earth's atmosphere amounts to about 5,000 tons. It is estimated that 4,000 tons are the consequence of anthropogenic activities. The United States is responsible for 3% of global anthropogenic emissions. Mercury in the air eventually settles into water or onto land where it can be washed into water. Once deposited, certain microorganisms can change it into methylmercury, a highly toxic form that builds up in fish, shellfish and animals that eat fish. Methylmercury builds up more in some types of fish and shellfish than others. The levels of methylmercury in fish and shellfish depend on what they eat, how long they live and how high they are in the food chain. Fish and shellfish are the main sources of methylmercury exposure to humans. Because the developing fetus may be the most sensitive to the effects from methylmercury, women of childbearing age are regarded as the population of greatest interest.

4. Mercury Deposition in this Commonwealth's Environment

The mercury in the flue gas of EGUs can be characterized as being in two forms: ionic (oxidized) or elemental. The ability of an air pollution control system to capture the mercury is dependent, in part, on the species of the mercury in the flue gas. When the coal is burned in an electric utility boiler, the resulting high combustion temperatures vaporize the mercury in the coal to form gaseous elemental mercury (Hg^0). Subsequent cooling of the combustion gases and interaction of the gaseous Hg^0 with other combustion products results in a portion of the Hg being converted to gaseous ionic or oxidized forms of mercury (Hg^{+2}) and particle bound mercury (Hg_p). The lifetime of elemental mercury (Hg^0) in the atmosphere is estimated to be up to 1 year, while ionic forms have a lifetime of only a few days because of particulate settling and solubility. Hg^0 can be transported over transcontinental distances, whereas Hg^{+2} and Hg_p forms are deposited near their source. Coal-fired power plants that burn bituminous coal emit oxidized forms of mercury. In this Commonwealth, 85% of the coal burned by coal-fired power plants is bituminous, with the remainder waste coal. In this Commonwealth, on a Statewide average, the exhaust gas split of the three forms of mercury is as follows: 5.93% Hg_p; 59.99% Hg^{+2}; and 34.08% Hg^0. The percentage of Hg^{+2} emitted in this Commonwealth is higher than the National average. Consequently, coal-fired power plants in this Commonwealth are more likely to cause local deposition.

On April 27, 2005, preliminary results from the EPA-funded "Steubenville Mercury Deposition Source Appor-

tionment Study" were released. This study found that nearly 70% of the mercury in rain collected at an Ohio River Valley monitoring site originated from nearby coal-burning industrial plants. *See* "Sources of Mercury Wet Deposition in Eastern Ohio, USA," *Keeler, et al. Environ. SciTechol 40(19)5874-5881 (2006).* Also, according to the Goddard Earth Observing System-Chem modeling and Community Multi-scale Air Quality modeling results for 2001, the mercury deposition attributable to United States EGUs in the eastern portion of the country is generally 1—5 µg m^{-2} range. However, in the eastern United States, there is a large area in the Ohio River Valley with EGU attributable mercury depositions in the 5-10 µg m^{-2} range and a much smaller area in the 10-15 µg m^{-2} range. United States EGUs attributable mercury depositions over 20 µgm^{-2} are found in parts of this Commonwealth. It is in this Commonwealth where the maximum percentage of utility attributable deposition of 71% compared to total deposition from all sources occurs. *See* "Mercury Deposition Modeling with the Community Multi-scale Air Quality (CMAQ) Model for the Clean Air Mercury Rule (CAMR)," Thomas N. Braverman, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Mail Code C439-01, Research Triangle Park, NC 27711, Poster Session, 8th International Conference on Mercury as a Global Pollutant, June 2006. These and other studies confirm the Board's conclusion that the mercury speciation trends for this Commonwealth tend to favor the likelihood of higher local mercury deposition than that for the National average.

5. *Mercury in this Commonwealth's Environment*

Accumulation of mercury in aquatic ecosystems has resulted in 45 states, including this Commonwealth, issuing fish consumption advisories. The Commonwealth has fish consumption advisories for mercury in approximately 80 waterways across this Commonwealth, which include the Delaware, Ohio, Potomac and Susquehanna River Basins and the Lake Erie Basin. Mercury fish advisories account for 60% of the fish consumption advisories throughout this Commonwealth.

The Department has reviewed the mercury tissue concentration of fish in water bodies in this Commonwealth from 1999 to 2004. The highest fish concentration of mercury was 1.564 ppm in walleye found at Lake Wallenpaupack. The lowest fish concentration of mercury was 0.036 ppm found in brown trout in the Delaware River near State Route 191. Of the approximately 187 sampling sites, 100 sites found fish tissue concentrations of 0.32 ppm or more which has an EPA risk-based consumption limit of no more than 2 meals per month.

The Department has mapped the location of the active, and in some cases, inactive power plants in this Commonwealth together with the mercury concentration found in fish. For example, the Department has identified 4 sampling sites with fish tissue concentrations in the 0.30 to 0.89 ppm range within a 50-mile radius of the Shawville power plant in Clearfield County. This data suggests a correlation between higher mercury fish concentrations and power plants within a 50-mile radius from the sampling sites. Also, this data lends strong support to the Department's concern that coal-fired power plants that burn bituminous coal emit ionic forms of mercury, which are deposited near their source. As a result, the Board has concluded that mercury contamination is ubiquitous across this Commonwealth and should be reduced.

6. *Health Effects of Mercury*

Mercury is a dangerous reproductive and neurological toxicant. It can affect the brain, spinal cord, kidneys and liver. High exposure levels to mercury can affect the ability to feel, see and taste and has the potential to limit mobility. A study by the National Academy of Sciences (NAS) concluded that human exposure to methylmercury from eating contaminated fish and seafood is associated with adverse neurological and developmental health effects. Women of childbearing age and pregnant women are of special concern in terms of methylmercury exposure. Methylmercury exposure prior to pregnancy can actually place the developing fetus at risk because methylmercury persists in body tissue and is only slowly excreted from the body. Furthermore, according to the NAS, chronic low-dose prenatal methylmercury exposure has been associated with poor performance on neurobehavioral tests in children, including tests that measure attention, visual spatial ability, verbal memory, language ability, fine motor skills and intelligence. Adults can be affected by high mercury exposures as well, with effects on the nervous system and impaired vision and hearing.

In the EPA's Mercury Study Report to Congress (1997), the EPA estimated that 7% of women of childbearing age would have blood mercury concentrations greater than those equivalent to the Reference Dose (RfD). The estimate of 7% of women of childbearing age above the RfD was based on patterns of fish and shellfish consumption and methylmercury concentrations present in fish and shellfish. Blood mercury analyses in the 1999-2000 National Health and Nutrition Examination Survey (NHANES) for 16- to 49-year old women showed that approximately 8% of women in the survey had blood mercury concentrations greater than 5.8 µg/L (which is a blood mercury level equivalent to the current RfD). Based on this prevalence for the overall population of women of reproductive age in the United States and the number of births each year in the United States, it is estimated that more than 300,000 newborns each year may have increased risk of learning disabilities associated with in utero exposure to methylmercury.

To determine levels of total blood Hg in childbearing-aged women and in children 1 to 5 years of age in the United States, the CDC's NHANES began measuring blood Hg levels in these populations in 1999. The NHANES is a continuous survey of the health and nutritional status of the civilian, noninstitutionalized U.S. population; data are released and reported in 2-year cycles. NHANES results for 1999—2002 confirmed that blood mercury levels in young children and women of childbearing age usually are below levels of concern. However, approximately 6% of childbearing-aged women had levels at or above an RfD.

One area in which the toxicokinetic data have been consistent is the finding that methylmercury is actively transferred to the fetus across the placenta by means of neutral amino acid carriers during gestation. Although maternal and cord blood mercury concentration is highly correlated, cord-blood mercury is consistently higher than the corresponding maternal concentration with an average ratio of about 1.7. Consequently, for biomonitoring of adult women's blood methylmercury commonly used as a surrogate for potential fetal exposure, the corresponding fetal level will be, on average, 70% higher than maternal blood and up to three times higher at the 95th percentile. The maternal body burden of methylmercury tends to

decrease during gestation, consistent with hemodilution and a transfer of a portion of the maternal body burden to the fetus.

Recent separate studies by *Stern, et al.*, (2006), *Trasande et al.*, (2005) and *Mahaffey, et al.*, (2004) suggest that even the EPA-established RfD is too high. According to Trasande, there is no evidence to date validating the existence of a threshold blood mercury concentration below which adverse effects on cognition are not seen. See Leonardo Trasande, *et al.*, "Public Health and Economic Consequences of Methylmercury Toxicity to the Developing Brain," *Environmental Health Perspectives*, 113:590-596 (2005). Stern in his 2006 presentation at the 8th International Conference on Mercury as a Global Pollutant entitled "An Estimate of the Population Variability in the Relationship Between Cord Blood Mercury and Maternal Methylmercury Intake" found that the EPA RfD should be reduced by 33%. *See also Stern, et al.*, "An Assessment of the Cord Blood Maternal Blood Methylmercury Ratio: Implications for Risk Assessment," *Environmental Health Perspectives* 111:1465—1470 (2003). In January 2004, an EPA researcher estimated that at least 7.8% (and possibly as many as 15.7%) of women of childbearing age had blood mercury levels high enough that approximately 630,000 newborns may be at risk from the adverse effects of mercury. Kathryn R. Mahaffey, Ph.D., "Methylmercury: Epidemiology Update" (January 26, 2004).

Additionally, Congress declared that the HAPs listed under section 112(b) of the CAA pose a significant threat to public health; the risk of adverse health effects related to these emissions were significant; and HAPs may cause significant environmental damage.

Because of these and other studies, the Board has determined that methylmercury is a public health concern for the developing fetus, women of childbearing age, young children and adults. Moreover, the Board has determined that a reduction in the amount of mercury and methylmercury in the environment would improve local ecosystems and public health, especially the health of developing fetuses, young children and women of childbearing age.

7. *Cost Benefit Studies Related to Mercury Emissions*

The Northeast States for Coordinated Air Use Management (NESCAUM) sponsored a report analyzing the cost savings and public health benefits of controlling mercury emissions from power plants. NESCAUM, Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-fired Power Plants (February 2005) (Harvard Study). The Harvard Study reveals that the EPA miscalculated the "nature of the risk involved" by underestimating the public health benefits of reducing mercury. Specifically, the Harvard Study indicates that the public benefit of reducing power plant mercury emissions to 15 tpy ranges from $119 million annually (if only persistent IQ deficits from fetal exposures to methylmercury are counted) to as much as $5.2 billion annually (if IQ deficits, cardiovascular effects and premature mortality are all counted).

The May 2005 edition of *Environmental Health Perspectives* indicates that the EPA underestimated the health benefits to be gained from reducing mercury. In one study, scientists from the Mount Sinai School of Medicine examined National blood mercury prevalence data from the CDC and found that between 316,588 and 637,233 children each year have cord blood mercury levels greater than 5.8 micrograms per liter—the level associated with loss of IQ. *See* Leonardo Trasande, *et al.*, "Public Health and Economic Consequences of Methylmercury Toxicity to the Developing Brain," 113 *Environmental Health Perspectives*, No. 5 (May 2005). They estimated that the resulting loss of intelligence and diminished economic activity amounted to $8.7 billion annually, with $1.3 billion each year being directly attributable to mercury emissions from power plants. The scientists further caution that these costs will recur each year with each new birth cohort as long as mercury emissions are not controlled.

Trasande and his colleagues have further concluded that their calculations on economic cost may, in fact, be an underestimate. *See* "Mental retardation and prenatal methylmercury toxicity." *Am. J. Ind. Med.* 2006 Mar; 49(3):153-8. Downward shifts in IQ resulting from prenatal exposure to methylmercury of anthropogenic origin are associated with 1,566 excess cases of mental retardation annually (range: 376—14,293). This represents 3.2% of mental retardation cases in the United States (range: 0.8%—29.2%). The mental retardation costs associated with decreases in IQ in these children amount to $2.0 billion/year (range: $0.5—$17.9 billion). Mercury from American power plants accounts for 231 of the excess mental retardation cases/year (range: 28—2,109), or 0.5% (range: 0.06%—4.3%) of all mental retardation. These cases cost $289 million (range: $35 million—$2.6 billion). Therefore, Trasande concludes that toxic injury to the fetal brain caused by mercury from coal-fired power plants exacts a significant human and economic toll on American children. These conclusions have been peer-reviewed.

It should also be noted, as previously discussed, under the 1990 amendments to the CAA, Congress ended the debate regarding the development of risk analyses for HAPs. Congress concluded that a technology-based approach was appropriate because routine and episodic releases of HAPs posed a significant threat to public health; the risk of adverse health effects related to these emissions were significant; and HAPs may cause significant environmental damage. As a result, HAP emissions must be regulated to the maximum extent possible. Therefore, the Board concludes that the benefits of regulating mercury emissions from coal-fired power plants in this Commonwealth outweigh the costs associated with that regulation.

8. *Federal Analysis Related to the CAMR*

On February 3, 2005, the EPA's Office of Inspector General (OIG) published an Evaluation Report: "Additional Analyses of Mercury Emissions Needed before EPA Finalizes Rules for Coal-Fired Electric Utilities." The EPA's OIG found that the EPA's cap-and-trade proposal failed to adequately address the potential for hotspots of mercury pollution. The OIG also found evidence that, instead of basing its proposed MACT standard on an unbiased determination under section 112(d) of the CAA of what mercury emission rates the top performing units were achieving, EPA staff followed orders from EPA senior management and simply set the MACT standard at a rate that would result in National emissions of 34 tons annually. Finally, the OIG found that the EPA's rule development process did not comply with certain Agency and Executive Order requirements, including fully analyzing the costs/benefits of regulatory alternatives and fully assessing the rule's impact on children's health. The OIG recommended that the EPA conduct additional analyses of mercury emissions data, strengthen its cap-and-

trade proposal, assess the costs/benefits of regulatory alternatives to its proposal and fully explore potential impacts to children's health.

In February 2005, the United States Government Accountability Office (GAO) issued a report to Congressional requesters entitled "Clean Air Act: Observations on EPA's Cost-Benefit Analysis of Its Mercury Control Options." The GAO concluded that the EPA's economic analysis of its proposed mercury control options had four major shortcomings: it failed to document some of its analysis; it failed to follow Office of Management and Budget guidance; it did not estimate the value of health benefits that would result from decreased mercury emissions; and it failed to analyze some of the key uncertainties underlying its cost/benefit estimates. The GAO concluded that, as a result of these shortcomings, the EPA's cost/benefit estimates are not comparable and are of limited use for assessing the economic trade-offs of the different options for controlling mercury.

On April 15, 2005, the Congressional Research Service developed a report entitled "Mercury Emissions from Electric Power Plants: An Analysis of EPA's Cap-and-Trade Regulations." Among other things, this report found that the CAMR would allow utilities to delay full compliance with the 70% reduction until well beyond 2018, as they use up banked allowances rather than install further controls. The EPA's analysis projects actual emissions to be 24.3 tons as late as 2020 (less than a 50% reduction compared to baseline 1999 emissions). The report further found that it appears that full compliance with the 70% reduction might be delayed until 2030.

In a May 15, 2006, report entitled "Monitoring Needed to Assess Impact of EPA's Clean Air Mercury Rule on Potential Hotspots," the EPA OIG found several uncertainties associated with key variables in the analysis could affect the accuracy of the EPA's conclusion that the CAMR will not result in "utility-attributable" hotspots. They noted gaps in available data and science for mercury emissions estimates, limitations with the model used for predicting mercury deposition, uncertainty over how mercury reacts in the atmosphere and uncertainty over how mercury changes to a more toxic form in water bodies.

The Board finds that there were serious procedural and analytical flaws related to the promulgation of the EPA's CAMR.

9. *Legal Analysis Related to the Control of HAPs under the CAA and the APCA*

The Department has determined that the EPA does not have the legal authority to develop a regulatory scheme for a HAP, like mercury, under section 111 of the CAA. The Congressional intent regarding the regulation of mercury is clear and unambiguous—it must be regulated under section 112 of the CAA. Mercury is explicitly identified as an HAP under section 112(b) of the CAA. For sources other than coal-fired units, the EPA must list source categories under section 112(c) of the CAA and then set emission standards for those categories under section 112(d) of the CAA. While the statutory scheme for regulating mercury from coal-fired units is under section 112(n) of the CAA, the Congressional intent is the same—mercury emissions from these units must be regulated under the Section 112 MACT approach. See *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984) (where if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.)

The EPA's proposed "cap-and-trade" program is an unreasonable interpretation of its statutory authority under sections 111 and 112 of the CAA. The fact that Congress chose to list specific HAPs under section 112 of the CAA indicated that Congress believed that these pollutants required more stringent measures than those permitted under section 111 of the CAA. Moreover, regulation under section 112 of the CAA has been historically and consistently interpreted as requiring HAPs to be controlled through installation and operation of MACT. A cap-and-trade approach under this section was never contemplated as a control technology. As a result, the EPA is now acting contrary to Congressional intent by attempting to regulate mercury HAP sources under a less stringent standard than the framers of the CAA desired.

The APCA also contains specific provisions applicable to the regulation of HAPs under section 112 of the CAA. Section 6.6(a) of the APCA (35 P. S. § 4006.6(a)) provides that "the regulations establishing performance or emission standards promulgated under section 112 of the [CAA] are incorporated by reference into the Department's permitting program." Section 6.6(a) of the APCA further provides that the "Environmental Quality Board may not establish a more stringent performance or emission standard for hazardous air pollutant emissions from existing sources, except as provided in subsection (d) [regarding health risk-based emission standards]." This "no more stringent than" provision applies to performance standards (MACT) or requirements adopted under section 112 of the CAA.

As previously noted, the EPA revised its December 2000 "appropriate and necessary" regulatory finding for the regulation of mercury emissions from coal- and oil-fired EGUs as HAPs and delisted EGUs, which were included on a list of source categories under section 112(c) of the CAA. Section 6.6(a) of the APCA provides that the Board may establish emission standards for source categories which are not included on the list of source categories established under section 112(c) of the CAA. Because of the EPA's "delisting" action in December 2000, the limitations in section 6.6(a) of the APCA are not applicable to performance standards and other measures that would be adopted to implement the Section 111 standards for new and existing sources.

The Board had determined that it has the legal authority to promulgate a regulation under the APCA to control mercury emissions from coal-fired EGUs within this Commonwealth.

10. *Petition for Rulemaking Process*

On August 9, 2004, Citizens for Pennsylvania's Future, PennEnvironment, Pennsylvania Federation of Sportsmen's Clubs, Pennsylvania NOW, Pennsylvania State Building and Construction Trades Council, Pennsylvania Trout, Planned Parenthood Pennsylvania Advocates, Sierra Club Pennsylvania Chapter, Women's Law Project and WomenVote PA (petitioners) filed a petition for rulemaking under Chapter 23 (relating to Environmental Quality Board policy for processing petitions—statement of policy) requesting that the Board adopt regulations to reduce mercury emissions from electric utilities in this Commonwealth. Since the original filing of the petition, an additional 39 organizations declared their intent to be copetitioners. The petitioners seek to protect human health and the environment through the regulation of mercury emissions from coal-fired power plants in this Commonwealth. They requested that the Department exercise its statutory authority under the APCA and develop a regulatory program to reduce the mercury

emissions from electric utilities for consideration by the Board. The petitioners submitted suggested regulatory language adapted from a January 5, 2004, New Jersey Department of Environmental Protection (NJDEP) proposal to reduce mercury emissions from coal-fired boilers.

On May 18, 2005, the Department finalized its response to the petitioners' petition for rulemaking and set forth its rationale as to why neither the NJDEP regulation nor the EPA's CAMR was in the best interest of this Commonwealth. The New Jersey regulatory language has one emission standard for both new and existing sources. The Department believes there should be separate emission standards for new and existing coal-fired boilers. Moreover, New Jersey has a limited number of coal-fired utility units which are not representative of the significantly varied boiler types in this Commonwealth.

The Department also does not believe that the EPA's Section 111 approach to mercury control for the electric generating sector is best for this Commonwealth. The Department strongly opposes a cap-and-trade approach under the CAMR for the regulation of mercury emissions from the utility sector for a number of reasons. First, the Department believes that the EPA does not have the legal authority to regulate an HAP like mercury under the less stringent provisions of section 111 of the CAA, as opposed to the more stringent provisions under section 112 of the CAA. Second, the Department believes this approach will significantly delay the control of mercury emissions from the utility sector and will create "hot spots" of mercury exposure that could be very detrimental to humans and wildlife. Third, the Department believes that the CAMR, since it is not a fuel-neutral regulation, requires greater reductions from coal-fired units that burn bituminous coal from states like this Commonwealth. Consequently, the Department recommended that a comprehensive approach to mercury control should be considered and recommended the development of a fuel-neutral regulatory approach to mercury emissions control.

On August 16, 2005, the Board accepted the Department's recommendation to move forward with a Pennsylvania-specific mercury rulemaking with an expanded public involvement process. The list of stakeholders to be included in the public involvement process was expanded to include the Pennsylvania Chamber of Business and Industry, Pennsylvania Chemical Industry Council, Associated Petroleum Industries of Pennsylvania, Pennsylvania Manufacturers Association, Industrial Energy Users of Pennsylvania, Electric Power Generation Association, Pennsylvania Coal Association, United Mine Workers of America, Air Quality Technical Advisory Committee (AQTAC), Citizens Advisory Council, the petitioners and other representatives of the potentially regulated community.

The Department established a Mercury Rule Workgroup (Workgroup) as part of the expanded public involvement process for a Pennsylvania-specific mercury rule. The intent of the Workgroup was not to reach consensus regarding the regulation of mercury emissions in this Commonwealth, but to develop information to assist the Department in the development of a mercury rule and enhance the public participation regarding the drafting of this final-form rulemaking. The first Workgroup meeting was held on October 14, 2005. During the first meeting, presentations included Workgroup objectives, an overview of mercury, its fate and transport and other State regulations. The second meeting of the Workgroup was held on October 28, 2005. The second meeting focused on the health impacts of mercury. The third meeting of the Workgroup was held on November 18, 2005. Speakers at this meeting discussed the health impacts of mercury and methods of controlling mercury emissions from coal-fired power plants. The last Workgroup meeting was held on November 30, 2005. The last meeting focused on additional health impacts regarding mercury and Workgroup members and others discussed their organizations' proposals for the control of mercury.

On February 22, 2006, the Department presented concepts of its proposed rulemaking at a joint meeting of the Workgroup, the AQTAC and the Citizens Advisory Council. Additionally, on March 30, 2006, the AQTAC recommended that the Board consider the proposed rulemaking at its May 17, 2006, meeting.

On May 17, 2006, the Board heard a Department presentation concerning the proposed mercury rulemaking. During discussions on the proposed rulemaking, Board members from the Citizen's Advisory Council requested that the Department prepare a Decision Document. Following discussion, the Board approved the proposed rulemaking for public comment. The Board also requested a Decision Document to complement other documentation prepared for the final-form mercury rulemaking. The Board noted that this document should set forth the Department's justification, rationale and supporting information for any final-form rulemaking. The Decision Document is available for public inspection at the Department's website: www.depweb.state.pa.us. The Decision Document includes a compilation and summary of the data, models, studies and evidence considered and used to support the decision making; the legal and regulatory history and rationale for the rulemaking; and an evaluation of arguments and information presented by those in favor and opposed to the rulemaking and an explanation of the decision trail and intent of the final-form rulemaking.

The proposed rulemaking was published at 36 Pa.B. 3185 (June 24, 2006) for a 60-day comment period.

The Board held public meetings on the proposed regulation on July 25, 2006, at the Department's Southwest Regional Office in Pittsburgh; on July 26, 2006, at the Rachel Carson State Office Building in Harrisburg; and on July 27, 2006, at the Department's Southeast Regional Office in Norristown.

On September 27, 2006, the Department requested that the AQTAC take action on this final-form rulemaking. The AQTAC approved this final-form rulemaking for consideration by the Board at its October 17, 2006, meeting.

11. *Public Health and Environmental Improvements Regarding a Pennsylvania-Specific Mercury Emissions Reduction Rule*

The Department has reviewed several studies and reports of fish consumption by the general population and by sport anglers to answer the question of how these anglers and their families might be at risk of consuming mercury contaminants at levels greater than health-based limits in the fish they caught. Because Statewide data is limited, the Department reviewed National surveys to evaluate fish consumption. These studies are extraordinarily useful to summarize data on human behaviors and characteristics, which affect exposure to environmental contaminants, like mercury. For example, the EPA's "Exposure Factors Handbook" was consulted to obtain data on standard factors needed to calculate human exposure to mercury from fish intake. For all fish the recommended

values are 6.0 grams per day (g/d) for freshwater/estuarine fish, 14.1 g/d for marine fish, and 20.1 g/d for all fish. The recommended mean and 95th percentile values for recreational freshwater anglers are 8 g/d and 25 g/d, respectively.

The Fish and Boat Commission determined that in 2005 approximately 800,000 anglers fished in waters in this Commonwealth. Studies of sport fish consumption by angler cohorts in Michigan provide a thorough evaluation of consumers of sport fish. The studies of Michigan anglers provide data for total amounts of fish and self-caught fish consumed by various subgroups of the cohort. *See*, for example, West, "1991-1992. Michigan sport anglers fish consumption study," University of Michigan School of Natural Resources for the Michigan Department of Natural Resources, Technical Report No. 6, 1993. This group also consumes much more fish than the general population, with mean and 95th percentile rates as high as 61.3 and 123.9 g/d (99 and 199 meals/year), respectively. Particularly relevant for describing at-risk populations is the information regarding females (ages not specified), with mean and 95th percentile of total fish consumption reported to be 42.3 and 85.7 g/d (68 and 138 meals/year), respectively.

Hudson River Sloop Clearwater, Inc. conducted a survey of adherence to fish consumption health advisories among Hudson River anglers. *See* "Hudson River Angler Survey," Hudson River Sloop Clearwater, Inc. (1993). Approximately 94% of Hispanic Americans were likely to eat their catch, while 77% of African Americans and 47% of Caucasian Americans intended to eat their catch. Of those who eat their catch, 87% were likely to share their meal with others (including women of childbearing age and children under 15 years of age).

In 2000, a study was published on behalf of the Fish and Boat Commission to determine levels of stocked trout consumption among anglers as well as their awareness and attitudes towards consumption advisories. *See* "Levels of Trout Consumption and Attitudes Toward Consumption Advisories Among Pennsylvania Trout Anglers," Responsive Management, 2000, conducted for the Pennsylvania Fish and Boat Commission. Of those who were aware of trout consumption advisories, 78% stated that they followed them but only 48% said that the advisory impacted their consumption decisions regarding stocked trout.

The Department's review of fish consumption literature provides strong support that sport anglers in this Commonwealth may consume amounts of sport-caught fish that could allow them and their families to exceed health-based limits for mercury contaminants in their fish. The literature regarding anglers' consumption of their catch strongly suggests that a subset of these anglers have meal frequencies that put them well above the recommended rates for even fairly low levels of contamination. Furthermore, a review of the relevant studies suggests that there is a strong environmental justice component regarding this public health issue. Consumption rates were higher among minorities, people with low income and people residing in smaller communities. As a result, the Department can say with a high level of confidence that it is possible for anglers and their families to consume enough sport fish to put themselves and their families at risk from mercury contamination from their fish.

A multiagency State of Florida study launched in 1994 compared mercury levels in the Everglades before and after pollution controls were installed at municipal and medical waste incinerators in South Florida. *See* "Everglades Consolidated Report," The South Florida Water Management District and the Florida Department of Environmental Protection. Since the 1980s, mercury emissions from waste incinerators close to the Everglades have dropped nearly 99%. Over the last 10 years, scientists documented a 70% decline in mercury in bird feathers and a 60% decrease in fish tissue. While this study focused on waste incinerators and not bituminous coal-fired power plants, it is important to note that both source categories emit comparable amounts of ionic mercury, which deposits locally. As a result, the conclusions in the multiagency Florida study are applicable to this Commonwealth.

The mercury concentration in fish was investigated in a region of Massachusetts predicted to have regionally high atmospheric deposition of mercury during 1999 to 2004. *See* "Massachusetts Fish Tissue Mercury Studies: Long Term Monitoring Results 1999-2004," Massachusetts Department of Environmental Protection, 2006. In eight of the nine water bodies in northeastern Massachusetts, significant decreases in mercury in yellow perch were observed with a range of 26.0% to 61.9%. The mean decrease over all lakes was 32.4%. Five of the remaining eight lakes around the rest of the state also had statistically significant, but not as large, decreases in yellow perch mercury levels ranging from 20.1% to 28.0% with an overall mean decrease of 15.4%.

Large mouth bass mercury concentrations followed a similar pattern with 11 of 17 lakes throughout the state decreasing in tissue mercury concentrations. Eleven of the lakes sampled were in northeastern Massachusetts and mercury levels in large mouth bass from seven of those decreased significantly, ranging from 16.0% to 55.2% with a mean decrease of 24.8%. Four of the remaining six lakes located around the rest of the state also had statistically significant but smaller decreases in large mouth bass mercury concentrations. The range of these decreases was 15.9% to 36.4% with a mean decrease of 19.0%. These reductions were achieved primarily through the imposition of stringent mercury emissions controls on municipal solid waste incinerators and medical waste incinerators, as well as reductions from other regional sources. In both studies, the emission reductions, which are predominantly in the form of ionic mercury from local incinerators, resulted in significant reductions in mercury levels in fish. As with the Florida study, while this study focused on waste incinerators, and not bituminous coal-fired power plants, it is important to note that both of source categories emit comparable amounts of ionic mercury, which deposits locally. As a result, the conclusions in this Massachusetts study are applicable to this Commonwealth.

Other studies confirm the results of the Florida and Massachusetts studies where the response of mercury deposition rates to emission reductions close to anthropogenic sources is expected to be much more rapid than that at remote locations, largely because near-field mercury deposition is probably dominated by local Hg^{+2} emissions. These studies find good historical evidence from lake-sediment records for rapid and large (30%—50%) declines in mercury deposition from urban areas in the United States and Europe. Moreover, these declines occurred over the last 1 to 3 decades and correspond with known reductions in local and regional mercury emissions for the same areas. *See* Munthe, J., *et al.*, "Input-output of Hg in forested catchments in Europe and North America." *RMZ-Materials and Geoenvironment*, 51:1243—1246, (2004). *See* also Engstrom, D.R., and Swain, E.B.

1997. "Recent declines in atmospheric mercury deposition in the upper Midwest." *Environ. Sci. Technol.* 312: 60—967. *See* Kamman, N.C., and Engstrom, D.R. 2002. "Historical and present fluxes of mercury to Vermont and New Hampshire lakes inferred from 210Pb dated sediment cores." *Atmos. Environ.* 36: 599—1609.

The literature review conducted by the Department confirms that mercury reduction approaches translate into a significant drop in mercury concentrations found in fish and other fauna. These illustrate the point that despite the fact that there are global mercury transportation issues, local emission reduction efforts are very significant to the local air quality, human exposure and environmental impacts. Continued improvements to the ecosystem are expected in the long-term as these reductions work their way through the food chain. Consequently, the Board has found reductions in mercury emissions do translate into real, measurable improvements in public health and the environment in this Commonwealth.

12. *Improvements Regarding the Tourism Industry in this Commonwealth*

As previously noted, the Fish and Boat Commission determined that in 2005 approximately 800,000 anglers fished in waters in this Commonwealth. Fish licensing sales in this Commonwealth amounted to $18.5 million in 2005. According to the Erie Regional and Growth Partnership, residents of this Commonwealth 16 years of age and older spent $400 million on fishing in this Commonwealth in 2001. The average angler spent $458 in 2001 on fishing. These direct expenditures created $1.2 billion in Pennsylvania economic output. Also as noted previously, this Commonwealth has fish consumption advisories for mercury in approximately 80 waterways across this Commonwealth, 60% of which are related to mercury fish consumption advisories.

Resources for the Future conducted a study on mercury contamination of the Chesapeake Bay entitled "The Benefits and Costs of Fish Consumption Advisories for Mercury," October 2002. Applying an estimate of the percentage of consumer surplus lost due to an advisory from the literature to consumer surplus estimates for a fishing day in the Chesapeake Bay, they estimate an annual consumer surplus loss over all Maryland saltwater fishing days of $8.83 million (in $2,000). For the commercial striped bass fishery, they estimate a very simple model of supply and demand that predicts equilibrium price and quantity with reasonable accuracy. Using parameter estimates from this model, they estimate annual consumer and producer surplus losses of $215,800 and $304,500, respectively, under commercial consumption advice, for a total annual surplus loss of $520,300.

Furthermore, based on their mortality estimate, the Resources for the Future report estimates annual health benefits from an advisory to be approximately $14 million. They conclude the value of further information for this mercury mortality relationship is quite high, as it suggests that significant health benefits may accrue at lower mercury levels than has been suggested by the research focusing on neurological development effects from fetal exposure, the health endpoint that has been the focus of policy discussion to date.

As a result, the Commonwealth has a significant economic interest in fresh water fishing as an economic driver. Therefore, the Board finds that any improvement, or prevention of loss, to fish activities in this Commonwealth through implementation of this final-form mercury rulemaking could have a positive impact to this important industry.

13. *Mercury Reduction Technologies*

Coal-fired power plants that burn subbituminous coal emit elemental mercury, which is very difficult to capture with conventional air pollution control devices like wet flue gas desulfurization (WFGD) for sulfur dioxide (SO_2) control and selective catalytic reduction (SCR) for nitrogen oxides (NO_x) control. Moreover, coal-fired power plants that burn subbituminous coal emit Hgo, which can be transported over transcontinental distances. Coal-fired power plants that burn bituminous coal emit oxidized forms of mercury, which are easier to capture using WFGD and SCR. Coal-fired power plants that burn bituminous coal emit oxidized forms of mercury, which are deposited near their source. For example, EGUs that burn 100% subbituminous coal and control emissions with a WFGD and SCR can expect to capture approximately 16% of mercury emissions. In contrast, EGUs that burn 100% bituminous coal and control emissions with WFGD and SCR can expect to capture approximately 90% of mercury emissions. In this Commonwealth, 85% of coal the burned by coal-fired power plants is bituminous, with the remainder waste coal.

This final-form rulemaking is designed, in part, to take advantage of the cobenefit reductions that will occur under the Clean Air Interstate Rule (CAIR), published at 70 FR 72268 (December 2, 2005), designed to reduce SO_2 and NO_x emissions from EGUs.

Owners and operators of facilities in this Commonwealth provided mercury emissions data and mercury coal content data to the Department in December 2005 in response to an information request. Using this data, the mercury removal efficiencies from the facilities that provided mercury emissions data were determined. The analysis of this data show that EGUs controlled with cold side-electrostatic precipitator (ESP) and WFGD reduce mercury by 80% and EGUs controlled with cold side—ESP, WFGD and SCR reduce mercury by over 90%. While these control devices were not specifically designed to remove mercury, it is possible to modify their operation to increase mercury collection without degrading other emission control or operational aspects. Testing has shown that increasing the rate of slurry recirculation in scrubbers will increase mercury removal. New additives, injected into the scrubber slurry, may also increase mercury removal.

Powdered activated carbon injection (ACI) controls mercury emissions by adsorption onto its surface. Carbon is injected into flue gas and controlled downstream by a particulate collector along with adsorbed mercury. Properties of the activated carbon are selected to maximize mercury control. It is much more effective adsorbing ionized mercury than elemental mercury vapor. Activated carbon treated with a halide, usually bromine, can also be used. It generally provides additional mercury control over other activated carbon for the same injection rate into the flue gas. The Compact Hybrid Particulate Collector (COHPAC) system requires installation of a final fabric filter in addition to existing control equipment. Tested mercury removal rates for various ACI rates from the EPA paper "Control of Mercury Emissions from Coal Fired Electric Utility Boilers: An Update" issued February 18, 2005, shows removal rates of 90% for ACI with cold side—ESP, ACI-COHPAC and brominated-ACI (B-ACI) with cold side-ESP.

The Institute of Clean Air Companies found that air pollution control vendors are reporting booking new contracts for mercury control equipment for more than a dozen power plant boilers. The contracts for commercial systems are attributed to Federal and state regulations, including new source permit requirements and consent decrees, which specify high levels of mercury capture.

A Congressional Research Service Report, April 15, 2005, found that the EPA's own Office of Research and Development (ORD) in a white paper posted on the EPA's website on March 2, 2004, appears to conclude that technology is more available and more effective than is maintained in the EPA's CAMR rulemaking. The ORD found that fabric filters, a relatively simple technology that is currently installed on more than 12% of power plants, achieve a 90% reduction in mercury emissions at bituminous coal plants and a 72% reduction at subbituminous plants. The addition of a scrubber increased the emission reduction to 98% at bituminous plants, according to the ORD. The white paper further stated that, by 2010, ACI with a fabric filter "has the potential to achieve 90% Hg reduction" on any rank of coal, and could be installed within 1 to 2 years of signing a contract to do so. Since the white paper was written, there have been reports that a European firm, Donau Carbon, has begun offering commercial guarantees for mercury removal from coal-fired power plants using ACI technology.

Accordingly, the Board finds that mercury reduction technologies and other technologies are commercially available and cost effective to the owners and operators of EGUs to assist them in reducing mercury emissions from EGUs.

14. *Issues Regarding Cost and Electricity Availability*

The Department conducted an analysis to determine the cost of this final-form rulemaking above and beyond the CAIR. The CAIR involves the installation air pollution control equipment for SO_2 and NO_x. Under the EPA's CAIR analysis, this Commonwealth' average retail electric prices without the CAIR would be as follows: in 2010—$0.0593 kWh; and in 2015—$0.0695 kWh. Under this same analysis, this Commonwealth's average retail electric prices with the CAIR would be as follows: in 2010—$0.061 kWh; and in 2015—$0.072 kWh. Consequently, the average retail electric price in this Commonwealth would rise approximately 3% because of CAIR compliance costs.

For each unit, the capital cost, annualized capital costs and operating costs were determined. This was offset against how much it would cost to purchase an equivalent amount of emissions allowances based on the EPA's projections of mercury allowance costs from 2010—2030. These projections come from a United States Department of Energy (DOE) document entitled "Annual Energy Outlook 2006 With Projections to 2030." The costs of control were based on cost estimates for installing and operating ACI systems. The capital costs were determined by estimating the cost ranging from $2/kW to $4/kW of plant electrical generating capacity. This capital cost was then annualized over 20 years assuming a 10% interest rate. The operating costs were calculated for Phase 1 based on a B-ACI injection rate of 6 lbs. per million actual cubic feet of exhaust gas. For Phase 2, an injection rate of 4.84 or 9.68 pounds per million actual cubic feet of exhaust gas was used depending on how much was needed to meet the emission limit. The injection rate was multiplied by the average of the 3 highest years of heat input between 1998 and 2002 and then multiplied by $ 0.0175 lb of sorbent/Million "Btu". This calculation was performed for each effected emission unit.

For each applicable EGU in this Commonwealth, the Department determined the amount of mercury, if any, that would need to be controlled beyond CAIR control levels for Phase 1 and Phase 2. For Phase 1, the Department estimated that 16 units at 7 facilities might opt for mercury-specific control beyond the CAIR control installations. The total capital costs needed for B-ACI were estimated to be approximately $4.9 to $9.8 million. The annual operating costs were estimated to be approximately $14.7 million. The total annualized costs for Phase 1 were estimated to be approximately $15.4 to $15.8 million.

For Phase 2, the Department estimated that 18 units at 7 facilities might opt for mercury specific control beyond the CAIR control installations. Some EGU owners and operators may choose to install compact hybrid powdered activated carbon (COHPAC) filter systems to comply with the Commonwealth's mercury final-form rulemaking. The Electric Power Research Institute has patented the "TOXECON" process which employs COHPAC in the control configuration. TOXECON/COHPAC has been demonstrated to achieve around 90% reduction of mercury emissions. The capital costs for were determined by estimating the cost ranging from $56.53/kW to $125/kW of plant electrical generating capacity.

The difference between the lower-bound and upper-bound costs estimates for Phase 2 reflects the difference between carbon injection and the installation of COHPAC filter systems. The total capital costs are estimated to range from $141.6 to $313.3 million. The total annualized cost (capital and operating) of mercury-specific control technology that EGU owners and operators might opt to install beyond CAIR to comply with the final-form rulemaking would range from $16.7 to $53 million per year. The estimated total cost of purchasing mercury allowances (using $2,619 per ounce, according to a DOE estimate) would be approximately $28.3 million per year if EGU owners and operators did not implement additional measures beyond the CAIR to comply with the CAMR.

As previously noted, this final-form rulemaking is designed, in part, to take advantage of the cobenefit reductions that will occur under the CAIR, designed to reduce SO_2 and NO_x emissions from EGUs. The Phase 1 and Phase 2 timeframes under this final-form rulemaking coincide with the time frames under the CAIR. It is anticipated that the majority of EGUs in this Commonwealth will opt to comply with both phases of the rule using existing WFGD and SCR technology, which will be necessary to comply with the CAIR. While some EGUs may opt to install mercury specific control technology, the Department believes that there are a number of currently available control technologies that coal-fired power plants can use to reduce their emissions of mercury to the atmosphere, which will result in a minor cost increase on a cents per kW-hr. basis.

As previously described for Phase 1, the total annualized cost (capital and operating) of mercury-specific control technology that EGU owners and operators may opt to install beyond the CAIR to comply with the Pennsylvania-specific mercury rulemaking would be $15.4 million per year. The total cost of purchasing mercury allowances if EGUs did not do anything beyond the CAIR to comply with the CAMR would be $15.7 million per year. As a result, the total cost of complying with the

Pennsylvania-specific mercury rulemaking for Phase 1 would be no more than the cost of complying with the CAMR.

As previously described for Phase 2, the total annualized cost (capital and operating) of mercury-specific control technology that EGU owners and operators might opt to install beyond the CAIR to comply with the Pennsylvania mercury final-form rulemaking would range from $16.7 to $53 million per year. The resulting cost per kilowatt-hour would be no greater than $0.0038/kWh for EGU owners and operators utilizing the TOXECON/COHPAC control technology to comply with the Phase 2 limits. The cost of $0.0038/kWh represents the upper bound cost estimate for the owners and operators of EGUs to comply with the Phase 2 limits.

The cost differential between allowance costs and technology costs were $25.1 million on the high end and an incremental cost reduction of $11.6 million on the low end. The total kilowatt-hours calculated for the 18 units that will not be installing CAIR controls to meet the Phase 2 requirements are 13,748,393,901. The resulting cost per kilowatt-hour ranges from $0.0018/kWh for the use of the TOXECON/COHPAC control technology to $0.00084/kWh for using B-ACI to comply with the Phase 2 limits.

Because of these analyses, the Board concludes that the costs regarding the control of mercury emissions from coal-fired EGUs is reasonable and that any increased cost in electricity is insignificant on a dollar per kilowatt hour basis.

15. *Impacts on Pennsylvania Coal*

When coal burns, mercury vapor can be released to the atmosphere. Therefore, any regulatory approach aimed at reducing these emissions is of concern to the coal mining industry. This is especially the case in this Commonwealth, which is the fourth largest coal producing state in the Nation with approximately 66 million short tons mined annually. Wyoming is first with 396 million short tons. West Virginia is second with 148 million short tons. Kentucky is third with 114 million short tons. Texas is fifth with 45 million short tons.

According to the Department's Pennsylvania Coal Report for 2004, 6,825 miners are employed in this Commonwealth with about 55% of the miners employed in Greene and Washington Counties. In addition, these two counties account for over 66% of the coal mined in this Commonwealth. Moreover, the Department determined that the median mercury content of the coals mined in these two counties is approximately 8.8 lb of mercury per Trillion "Btu" (lb. Hg/TBtu). The median content of mercury from all coals mined in this Commonwealth is 18.1 lb. Hg/TBtu.

Data acquired by the Department shows that coal washing is a viable pretreatment option. For example, the data from our analysis shows an average "as received" mercury content of 26.73 lb. Hg/TBtu. The average "as washed" mercury content is 12.93 lb. Hg/TBtu. This translates into an average removal of 49.5%. As a result of this study and comments received during the proposed rulemaking, a pretreatment credit has been added to this final-form rulemaking.

The EPA CAMR finalized New Source Performance Standards Mercury limits for new units are: bituminous coal at 20×10^6 lb/MWh; subbituminous coal (wet units) at 66×10^6 lb/MWh; subbituminous coal (dry units) at 97×10^6 lb/MWh; lignite coal at 175×10^6 lb/MWh; coal refuse at 16×10^6 lb/MWh; and IGCC at 20×10^6 lb/MWh. This clearly shows that the most stringent standards have been reserved for bituminous and coal refuse units. All units in this Commonwealth burn either bituminous or coal refuse. As a result, all new EGUs in this Commonwealth would be subject to the most stringent mercury emission standards in the Nation.

On the other hand, this mercury final-form rulemaking is fuel-neutral. All new and existing units, regardless of fuel-type, are subject to the same mercury emission standards. New pulverized coal-fired (PCF) units must meet an emission standard of 0.011 pound of mercury per gigawatt hour (lb. Hg/GWh) or a minimum 90% of total mercury removal. New circulating fluidized bed (CFB) units burning 100% coal refuse must meet a mercury emission standard of 0.0096 lb. Hg/GWh or a minimum 95% control of total mercury as measured from the mercury content in the coal, as fired. New CFBs burning 100% coal must meet an emission of 0.011 lb. Hg/GWh or a minimum 90% of total mercury removal. New IGCC must meet a mercury emission standard of 0.0048 lb. Hg/GWh or a minimum 95% of total mercury removal.

Existing PCF units must meet an emission of 0.024 lb. Hg/GWh or a minimum 80% of total mercury removal in Phase 1, and an emission of 0.012 lb. Hg/GWh or a minimum 90% of total mercury removal in Phase 2. Existing CFB units burning 100% coal refuse must meet a mercury emission standard of 0.0096 lb. Hg/GWh or a minimum 95% control of total mercury as measured from the mercury content in the coal in Phases 1 and 2.

In addition to these fuel neutral emission standards, the Department anticipates the vast majority of the mercury reductions in this Commonwealth will be achieved through the installation of CAIR controls for NO_x and SO_x. Therefore, the same incentive does not exist to utilize fuel switching to lower mercury content coal as there is under the CAMR. Based on emissions data submitted to the Department's data request, fuel switching is not necessary to comply with the emission standards.

One of the more significant changes to the final-form rulemaking involves the demonstration of compliance under subsection (o) for those EGUs subject to § 123.207 (relating to annual emission limitations for coal-fired EGUs). In addition to compliance on a unit-by-unit and facility-wide basis, owners and operators of affected EGUs may now demonstrate compliance through system-wide demonstration. For example, so long as the actual emissions of mercury from the EGUs at the facility and other EGUs at other facilities covered in the system-wide demonstration are less than the allowable emissions of mercury from all EGUs covered by the demonstration on an annual basis compliance has been demonstrated. This additional compliance option will make it even less likely that owners and operators will opt to switch fuels as a compliance option.

As a result of the Department's analysis and changes made between proposed and final-form rulemaking, the Board does not anticipate adverse impact on the local coal industry because of the Pennsylvania-specific mercury rulemaking.

16. *Reductions Beyond the CAMR*

The Department reviewed the list of Integrated Planning Model (IPM) runs that the EPA conducted in support of the CAMR. Base case model runs for this Commonwealth in 2010 and 2020 include the National Title IV SO_2 cap-and-trade program and the NO_x SIP Call regional ozone season cap-and-trade program without the

CAIR or the CAMR. These show mercury emissions from coal-fired power plants in this Commonwealth in 2010 and 2020 as 5.862 tons (11,724 lbs.) and 5.625 tons, (11,250 lbs.), respectively. A second round of model runs was conducted for 2010 which included CAIR and CAMR control strategies and for 2020, which included CAIR and CAMR control strategies. These show mercury emissions from coal-fired power plants in this Commonwealth in 2010 and 2020 as 1.491 tons (2,982 lbs.) and 1.153 tons, (2,306 lbs.), respectively. While these model runs show that coal-fired power plants in this Commonwealth will emit 16% less mercury or 0.279 ton (558 lbs.) than the established cap in 2010 of 1.77 tons of mercury (3,540 lbs.), these same model runs show that coal-fired power plants in this Commonwealth will emit 39% more mercury 0.451 ton (902 lbs.) than the established cap of 0.702 ton (1,404 lbs.) in 2020. As a result, the owners and operators of these EGUs would be required to purchase allowances to come into compliance with the CAMR. The purchase of additional allowances needed to comply with the CAMR is particularly troublesome given the Commonwealth's experience under Title IV of the CAA. In this Commonwealth, the total current SO_2 acid rain allowances equal 540,000. EGUs in this Commonwealth emit about 1 million tpy of SO_2. Therefore, this Commonwealth currently "imports" about 460,000 SO_2 allowances per year from reductions in other states. The trading of mercury allowances under the CAMR may mimic the Acid Rain Program.

In comparison, the Pennsylvania mercury final-form rulemaking would require an 80% reduction of mercury present in the coal fired in EGUs on a 12-month rolling average by 2010, and 90% reduction of mercury present in the coal fired in EGUs on a 12-month rolling average by 2015. After Phase 1 of the program, it is anticipated that the Pennsylvania mercury final-form rulemaking would achieve a 29% greater reduction than required under the CAMR or a 16% greater reduction that the EPA projects from its IPM model runs. This would amount to 1.2567 tons (2,513.4 lbs.) of mercury emissions as opposed to 1.77 tons (3,558 lbs.) mercury emissions under the required CAMR cap or 1.491 tons (2,983 lbs.) as projected under the EPA's IPM model runs. After Phase 2, it is anticipated that the Pennsylvania mercury final-form rulemaking would achieve a 39% greater reduction than what would be achieved by the CAMR under Phase 2. This would mean that the Commonwealth would achieve its cap of 0.702 ton (1,404 lbs.) by 2015 rather than exceeding it by 0.451 ton (902 lbs.)

However, it should be noted that the EPA concedes that due to the banking and trading provisions of the CAMR, projected reductions may not be achieved until 2026 or later. Moreover, as the previous analysis shows, the EPA's IPM models expect coal-fired power plants in this Commonwealth will emit 64% more mercury 0.451 ton (902 lbs.) than the established cap of 0.702 ton (1,404 lbs.) in 2020. As a result, under a Pennsylvania-specific rulemaking no mercury allowances would be imported which would result in greater mercury emissions and greater local mercury deposition.

Due to this analysis, the Board finds that a Pennsylvania-specific mercury rulemaking would result in faster and steeper cuts in mercury emissions than under the CAMR.

17. *Benefits to Residents of this Commonwealth*

Prior to the CAIR and the CAMR, in the base year of 2001, the EPA estimates fish-tissue methylmercury concentrations at the 90th percentile, 99th percentile, and maximum levels attributable to coal-fired power plants are 0.11, 0.27 and 0.85 milligram per kilogram (mg/kg), respectively. The EPA estimates that after CAIR and CAMR implementation, these concentrations at the 90th percentile, 99th percentile, and maximum levels attributable to coal-fired power plants would be reduced by 0.06, 0.19 and 0.44 mg/kg, respectively.

However, the Department estimates that after implementation of the Pennsylvania-specific mercury final-form rulemaking in Phase 2, these concentrations at the 90th percentile, 99th percentile and maximum levels attributable to coal-fired power plants would be reduced to 0.0985, 0.31 and 0.72 mg/kg, respectively. This means that these concentrations at the 90th percentile, 99th percentile and maximum levels would be reduced by an additional 0.0385, 0.12 and 0.28 mg/kg, respectively. As a result, the Pennsylvania-specific mercury final-form rulemaking would amount to an additional 36% reduction in fish-tissue methylmercury concentrations.

The EPA estimates that when the CAMR is fully implemented it will reduce mercury emissions from coal-fired power plants to 15 tpy by 2018. If this goal is reached, NESCAUM estimates that the predicted annual benefit associated with IQ increases in the annual birth cohort ranges are $119 million to $288 million. This benefit is from reduced fetal methylmercury exposure. If cardiovascular effects are only experienced by male populations that consume nonfatty freshwater fish, the monetized annual benefits are $86 million. If these cardiovascular effects are experienced by the whole population of the United States, then the monetized annual benefits are predicted to be $4.9 billion.

If, as the EPA predicts in Phase 2, EGUs in this Commonwealth emit 1.153 tons (2,306 lbs.), then the annual benefit associated with IQ increases in the annual birth cohort ranges are $2.66 million to $6.45 million. This benefit is from reduced fetal methylmercury exposure. If cardiovascular effects are only experienced by the male population that consumes nonfatty freshwater fish, then the monetized annual benefits are $1.15 million. If these cardiovascular effects are experienced by all residents of this Commonwealth, then the monetized annual benefits are predicted to be $128.6 million.

However, under a Pennsylvania-specific mercury rulemaking, EGUs in this Commonwealth will emit no more than 0.702 ton (1,404 lbs.) by 2015. As a result, annual benefit associated with IQ increases in the annual birth cohort ranges are $4.165 million to $10.08 million. This benefit is from reduced fetal methylmercury exposure. This means that the Pennsylvania rulemaking will provide an additional benefit of $1.49 million to $3.63 million per year over the CAMR. If cardiovascular effects are only experienced by the male population that consumes nonfatty freshwater fish, then the monetized annual benefits are $1.8 million. This means that the Pennsylvania rulemaking will provide an additional benefit of $0.65 million per year over the CAMR. If these positive cardiovascular effects are experienced by all residents of this Commonwealth, then the monetized annual benefits are predicted to be $200.9 million. This means that the fully implemented Pennsylvania final-form rulemaking will provide an additional benefit of $72.3 million per year over the CAMR. Moreover, residents of this Commonwealth will see these results being achieved by 2015.

In comparison, the total cost of complying with Phase 1 of the Pennsylvania-specific rulemaking would be no more than the cost of complying with the CAMR. For Phase 2 at the low end of the cost estimate, the annualized cost of

mercury specific technology may not be any more than the costs of purchasing the allowances. However, at the high end of the cost estimate, the additional cost above purchasing allowance would be around $24.7 million. Nevertheless, the benefits of a Pennsylvania rulemaking outweigh the costs. Therefore, the Board finds that this difference will result in significant environmental improvement with reduced fish-tissue methylmercury concentrations and increased monetized benefits for all residents of this Commonwealth as well as future residents of this Commonwealth.

18. *Conclusion*

A large body of scientific evidence, some of which was developed as a result of the EPA's obligations under the CAA, has clearly demonstrated that mercury is a persistent, toxic, bioaccumulative pollutant which can have adverse effects on human health and the environment. The Board has determined that effective mercury control technology does exist to significantly reduce mercury emissions from EGUs. Furthermore, mercury control technology is presently being implemented at a number of air pollution emitting sources and recent testing of mercury control technologies on coal-fired utilities has been shown to be effective in reducing mercury emissions. The Board has determined that the provisions in the EPA's final mercury rule for the utility sector that was promulgated under section 111 of the CAA are not adequate to ensure that the citizens of this Commonwealth and the environment will be adequately protected from the harmful effects of mercury emissions.

The CAMR does not require specific reductions in mercury emissions from any specific EGU facility. Due to the CAMR cap-and-trade provisions, the owners and operators of a facility that emits mercury beyond its CAMR allowance level can purchase allowances from credits generated at a facility that emits below its CAMR allowance level anywhere in the United States. A large portion of the mercury emission reductions that will occur will be as a result of cobenefit reductions occurring when a CAIR compliance plan for a facility to reduce both its NO_x and SOx emissions involves the installation of SCR and wet WFGD control technologies. The NO_x emission control equipment of SCR oxidizes elemental mercury of the mercury emissions, which makes the removal of mercury emissions even more efficient by the wet WFGD controls. However, where a facility only reduces its NO_x emissions with a SCR control to meet the CAIR requirements, but does not also utilize a wet WFGD for SO_x control, this will result in much higher quantities of the ionic form of mercury to be emitted and deposited nearby, and this will result in a much greater negative mercury impact on the nearby environment.

Additionally, under CAMR mercury emissions trading, it is even possible that mercury emissions in this Commonwealth could actually increase because there would not be a regulatory ability to restrict actual emission increases due to the importation of out-of-State allowances. Another important problem with the EPA's National mercury emissions trading provisions under the CAMR is that it allows significantly less control of mercury in one area compared to another; and it allows emissions to be further increased through the use of banked allowances from previous years. Allowing mercury emission reductions to be used in different control periods further delays the real mercury emission reductions that are seen by the environment. The GAO evaluation of the CAMR states that the mercury emission levels that are required by 2018, during the second Phase of the required CAMR reductions, will not actually occur until 2030, or later. This will result in a larger burden of mercury into the ecosystem resulting over time and a significant lengthening of the time exposure to these emissions.

The Pennsylvania State-specific mercury rulemaking assures a specific maximum level of actual mercury emissions from utilities in this Commonwealth, and assures that these levels are achieved in a much shorter time than the CAMR. The Phase 2 mercury emissions caps will be achieved in this Commonwealth by 2015, not 2018, which translates into 2026 or 2030 because of emissions trading under the CAMR. Furthermore, each and every owner or operator of an electric generating facility in this Commonwealth will make significant reductions in their mercury emissions at each and every one of their facilities. This is not the case under the CAMR.

Data generated by the EPA has shown that this Commonwealth has the highest wet deposition of mercury in the Nation with a direct correlation to the location and quantity of mercury emissions from coal-fired electric generating facilities. Research has also shown that higher percentages of more recently deposited ionic mercury are more quickly methylated in the ecosystem. The methylation of mercury eventually leads to a concentration of methylmercury in the tissue of fish and other wildlife. These higher concentrations of mercury in the wildlife are not only directly affecting the wildlife in ways such as reduced reproductivity, but also affecting humans when they eat this wildlife.

Recent studies in the Florida Everglades and in Massachusetts indicate that mercury concentrations found in fish and wading birds in the Everglades have dropped significantly. These illustrate the point that despite the fact that there are global mercury transportation issues, local emission reduction efforts are very significant to the local air quality and environmental impacts and reductions in mercury emissions do translate into real, measurable improvements in the environment. Continued improvements to the ecosystem are expected in the long-term as these reductions work their way through the food chain and residents of this Commonwealth will receive the greatest portion of these benefits.

After consideration of mercury control technology, the Department has determined that a State-specific mercury reduction rulemaking is necessary to protect the public health and environment. Moreover, the required control levels of 80% in Phase 1 and 90% in Phase 2 are achievable and will allow the Pennsylvania emission limits under the CAMR to be achieved as well.

E. *Summary of Final-Form Rulemaking*

The final-form rulemaking amends Chapter 123 by adding § 123.201 (relating to purpose) to provide that §§ 123.202—123.215 establish mercury emission standards, annual emission limitations as part of a Statewide mercury allowance program with annual nontradable mercury allowances and other requirements for the purpose of reducing mercury emissions from coal-fired EGUs or cogeneration units.

Section 123.202 (relating to definitions) defines terms used in §§ 123.203—123.215. The definitions include: "Act," "Administrator," "Btu—British thermal unit," "Bottoming-cycle cogeneration unit," "CFB—circulating fluidized bed unit," "CO_2," "CS-ESP—cold side electrostatic precipitator," "Clean Air Act," "coal," "coal refuse," "cogeneration unit," "commence operation," "control period," "EGU—electric generating unit," "existing EGU,"

"FF—fabric filter," "facility," "GWh—gigawatt-hour," "heat input," "IGCC—integrated gasification combined cycle unit," "MMBtu," "MW—megawatt," "MWe—megawatt electric," "MWh—megawatt-hour," "nameplate capacity," "new EGU," "O_2," "operator," "owner," "PCF—pulverized coal-fired unit," "Phase 1," "Phase 2," "rolling 12-month basis," "SCR—selective catalytic reduction," "SO_2," "space velocity," "standby unit," "system," "system-wide compliance demonstration," "topping-cycle cogeneration unit," "WFGD—wet flue gas desulfurization unit" and "watt-hour." The proposed definition of "bituminous coal" has been deleted. While the definition of "EGU—electric generating unit" remains, it has been amended to reflect a change made by the EPA during its reconsideration process. Minor changes between the proposed and final-form rulemaking were made to the terms "CFB—Circulating fluidized bed unit," "existing EGU" and "new EGU." The following terms were added between the proposed and final-form rulemaking: "Act," "administrator," "bottoming-cycle cogeneration unit," "Clean Air Act," "coal," "commence operation," "control period," "heat input," "operator," "owner," "system," "system-wide compliance demonstration" and "topping-cycle cogeneration unit."

Additionally, a subsection was added to § 123.202 between proposed and final-form rulemaking to provide that the definitions under the Standards of Performance for New Stationary Sources and Emission guidelines for Existing Sources Promulgated in 40 CFR Part 60, Subparts Da and HHHH are adopted in their entirety and incorporated by reference. The provisions will be used in the interpretation of applicable requirements in §§ 123.202—123.215.

Section 123.203 (relating to applicability) provides that the requirements of §§ 123.201, 123.202 and 123.204—123.215 and this section apply to owners and operators of EGUs in this Commonwealth and except, as otherwise noted, supercedes those requirements adopted in their entirety and incorporated by reference under § 122.3 (relating to adoption of standards).

Section 123.204 (relating to exceptions) provides that the owner or operator of an EGU that enters into an enforceable agreement with the Department for the shutdown and replacement of the unit with IGCC technology shall be exempted from compliance with the Phase 1 requirements of § 123.205 (relating to emission standards for coal-fired EGUs). This section was revised between proposed and final-form rulemaking so that owners or operators that shutdown and replacement a unit with IGCC technology are not exempt from compliance with the Phase 2 emission limitation requirements under § 123.207.

Section 123.205 establishes emission standards for coal-fired EGUs. New PCF EGUs and IGCC EGUs are required to meet either a certain mercury emission standard or minimum mercury control percentage upon construction and new CFB EGUs are required to meet a certain mercury emission standard upon construction. In addition, existing PCF EGUs are required to meet either an increasingly stringent mercury emission standard or minimum mercury control percentage from Phase 1 (effective from January 1, 2010, to December 31, 2014) to Phase 2 (effective beginning January 1, 2015). Existing CFB EGUs are required to meet a certain mercury emission standard or minimum mercury control percentage, which does not change from Phase 1 to Phase 2. IGCC units are regard to meet a 95% mercury reduction.

This section was revised between proposed and final-form rulemaking to provide that CFB EGUs must meet either a certain mercury emission standard or minimum control efficiency of mercury emissions. The owners and operators of CFB EGUs must comply with either: (1) a mercury emission standard of 0.0096 pound of mercury per GWh; or (2) a minimum 95% control of total mercury as measured from the mercury content in the coal refuse, either as fired or as approved in writing by the Department. Changes were also made to ensure that owners and operators of new EGUs comply with the standards promulgated under 40 CFR Part 60, Subparts Da and HHHH. Modifications were further rendered to allow owners and operators to receive mercury reduction credit for the pretreatment of fuel. Additionally, modifications were made to delete the terms "bituminous" and "rolling 12-month basis" under specific subsections.

Section 123.206 (relating to compliance requirements for the emission standards for coal-fired EGUs) establishes compliance requirements for the emission standards for coal-fired EGUs. Compliance can be demonstrated on a unit-by-unit basis or by facility-wide emissions averaging. The Department may approve in a plan approval or operating permit an alternative mercury emission standard or schedule, or both, if the owner or operator of an EGU subject to the emission standards of § 123.205 demonstrates in writing to the Department's satisfaction that the mercury reduction requirements are economically or technologically infeasible. Lastly, the Department has established certain calculation requirements to ensure that a facility does not exceed the applicable emission standard or control percentage requirement.

The Board has made some significant modifications to this section. The compliance presumptions for owners and operators of an existing EGU combusting 100% bituminous coal controlled by certain air pollution control device configurations has been deleted because of constitutionality concerns raised by commentators. The Board has also added language that the Department's approval of an alternate emission standard or a compliance schedule will not relieve the owner or operator of the EGU from complying with the other requirements of §§ 123.207—123.215. Additional language has been added to provide that the Department's approval of an alternative emission standard or compliance schedule shall be based on the information provided in the application submitted by the owner or operator of the EGU. Another addition includes certain provisions related to facility wide averaging. Subsection (f) allows an EGU owner or operator to demonstrate compliance with the requirements of § 123.205 by means of facility-wide averaging that demonstrates that the actual mercury emissions from EGUs covered under the emissions averaging demonstration are less than the allowable mercury emissions from all EGUs covered by the demonstration on a 12-month rolling basis.

Section 123.207 (relating to annual emmission limitations for coal fired EGU) establishes an annual emission limitation for coal-fired EGUs. In addition to the mercury emission standard requirements in § 123.205, the owner or operator of a new or existing affected EGU subject to § 123.203 shall comply with the annual emission limitations established through a Statewide mercury nontradable allowance program under this section. The total ounces of mercury emissions available for emission limitation set-asides as annual nontradable mercury allowances in the Statewide mercury allowance program are 56,928 ounces (3,558 pounds) of mercury emissions for Phase 1, effective from January 1, 2010, through December 31,

2014, and 22,464 ounces (1,404 pounds) of mercury emissions for Phase 2, effective beginning January 1, 2015, and each subsequent year. Of this overall total, 5% of the Phase 1 annual allowances will be set aside for new units and 3% of the Phase 2 annual allowances will be set aside for new units for the calendar year beginning January 1, 2015, and subsequent years. However, annual allowances will not be set aside for the owner or operator of an existing affected EGU, which is already shut down, scheduled for shutdown or is on standby as of the effective date of each set-aside phase.

The maximum number of annual nontradable mercury allowances set aside for the owner or operator of each existing affected CFB or PCF will be determined by multiplying the affected unit's baseline heat input fraction of the State's total baseline annual heat input for all EGUs. The Department will publish in the *Pennsylvania Bulletin* the maximum number of annual allowances set aside for the owner or operator of each existing affected CFB and PCF. If the actual emissions of mercury reported to the Department are less than the maximum number of annual allowances set aside in the allowance program for the owner or operator of an EGU, the Department will place the unused portion of annual allowances in the annual emission limit supplement pool established under § 123.208 (relating to annual emission limitation supplement pool).

A number of modifications have been made to § 123.207 between proposed and final-form rulemaking. First, subsection (a) additionally provides that the Department will issue to the owner or operator of an affected EGU a plan approval or operating permit that contains the applicable requirements of this section and §§ 123.202—123.206 and 123.210—123.215 before the later of January 1, 2010, or the date on which the affected EGU begins operation. Second, because of changes made by the EPA during the reconsideration process, the Commonwealth was allotted 2 lbs. less than under the original CAMR. As a result, this change is reflected in the final-form rulemaking. Third, the Board has established a more detailed process for the allocation of allowances for new EGUs under subsection (c). For instance, after a new EGU has begun operation and completed three control periods, the EGU will become an existing EGU. The new EGU will continue to receive nontradable allowances from the new unit set-aside until the new EGU is eligible for nontradable allowances allocated from the existing EGU set-aside. Fourth, the Board has promulgated additional procedures for the allocation of allowances for permanently shutdown units under subsection (k). For example, annual nontradable mercury allowances will not be set aside for the owner or operator of an existing affected EGU that is already shut down or scheduled for shutdown, unless the owner or operator of the EGU obtains a plan approval for the construction of a new EGU.

One of the more significant changes to this section involves the demonstration of compliance under subsection (o) for EGUs subject to § 123.207. In addition to compliance on a unit-by-unit and facility-wide basis, owners and operators of affected EGUs may now demonstrate compliance through a system-wide compliance demonstration. For example, so long as the actual emissions of mercury from the EGUs at the facility and other EGUs at other facilities covered in the system-wide demonstration are less than the allowable emissions of mercury from all EGUs covered by the demonstration on an annual basis compliance has been demonstrated. However, an owner or operator may not include an EGU in more than one system-wide averaging demonstration submitted for the purposes of complying with the requirements of §§ 123.202—123.215. Additionally, the Board has made a number of minor changes to subsections of this section to ensure consistency with the more significant changes that were made.

Section 123.208 establishes the annual emission limitation supplement pool. Annual allowances that have either been created as part of the new EGU set-aside or are unused annual allowances as part of the annual emission limitation for coal-fired EGUs will be set aside in the supplement pool for future use. Minor clarifications were made to this section between proposed and final rulemaking.

Section 123.209 (relating to petition process) establishes a petition process for the owner or operator of an EGU to request additional annual allowances from the annual emission limit supplement pool. Each calendar year beginning January 1, 2010, the Department may, at its discretion, allocate allowances from the supplemental pool to the owners or operators of new or existing affected EGUs that successfully petition the Department in accordance with the requirements of this section. If the petition for supplemental annual nontradable mercury allowances is approved by the Department, the supplemental annual nontradable mercury allowances set aside for the owner or operator of the new or existing affected EGU will be added to the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the EGU under § 123.207 only for the calendar year of the request.

The major change to § 123.209 that occurred between proposed and final-form rulemaking is the deletion of the order of preference for the allocation of supplemental allowances generally, and the order of preference for the allocation of supplemental allowances as it specifically relates to those owners and operators that burn 100% bituminous coal and employ certain air pollution control technologies. The Board has added a provision that the Department's approval of supplemental annual nontradable mercury allowance allocations shall be based on the information provide in the petition submitted by the owner or operator of the EGU.

Section 123.210 (relating to monitoring and recordkeeping requirements) creates general monitoring and reporting requirements for the owner or operator of a new or existing EGU subject to §§ 123.201—123.215. The owner or operator of a new EGU shall demonstrate compliance with §§ 123.205 and 123.207 by installing and operating a continuous emissions monitoring system to measure, record and report the concentration of mercury in the exhaust gases from each stack. The owner or operator of a new or existing affected EGU shall comply with the monitoring, recordkeeping and reporting requirements in this section, §§ 123.211—123.215 and § 139.101 (relating to general requirements), the applicable provisions of the *Continuous Source Monitoring Manual* (DEP 274-0300-001) and 40 CFR Part 75, Subpart I (relating to Hg mass emission provisions). Additionally, for purposes of complying with this section, the definitions in § 123.202 and 40 CFR 72.2 (relating to definitions) are applicable requirements. However, the owner or operator of an existing affected EGU that emits 464 ounces (29 pounds) or less of mercury per year shall either demonstrate compliance with the requirements of §§ 123.205 and 123.207 and 40 CFR Part 75, Subpart I or implement the excepted sorbent trap monitoring methodology for an EGU meeting the requirements in 40 CFR 75.81(b)—(e).

The Board has made a number of modifications to § 123.210 between proposed and final-form rulemaking. For example, the owner or operator of a new or existing affected EGU shall comply with the monitoring, recordkeeping and reporting requirements in this section, §§ 123.211—123.215 and 139.101, the applicable provisions of the *Continuous Source Monitoring Manual* (DEP 274-0300-001) and 40 CFR Part 75, Subpart I. Also, 40 CFR 60.4110—60.4114 are adopted in their entirety and incorporated by reference in this subsection in response to the EPA comments concerning mercury designated representative provisions. Additionally, for purposes of complying with the requirements of this section, the definitions in § 123.202 and 40 CFR 72.2 apply. Also, the owner or operator of an existing affected EGU that emits 464 ounces (29 pounds) or less of mercury per year shall either demonstrate compliance with the requirements of §§ 123.205 and 123.207 and 40 CFR Part 75, Subpart I or implement the excepted sorbent trap monitoring methodology for an EGU meeting the requirements in 40 CFR 75.81(b)—(e). Additional minor changes were also made to § 123.210 to ensure consistency with the more significant changes that were made.

Subsection (h) was added in the final-form rulemaking to provide that the owner or operator of an EGU for which construction of a new stack or flue, installation of add-on mercury emission controls, a flue gas desulfurization system, an SCR system or a compact hybrid particulate collector system is completed after the applicable deadline must comply with the monitoring system certification and other requirements in § 123.210.

Additionally, subsection (k) now provides that owner or operator of an EGU shall not use an alternative monitoring system, alternative reference method or other alternative to any requirement in 40 CFR Part 75 unless the alternative system, method or requirement is approved, in writing, by the Administrator in accordance with 40 CFR Part 75, Subpart E.

Subsection (n)(3) now provides that the owner or operator of an EGU that is using a continuous emission monitoring system or a sorbent trap system to continuously monitor mercury emissions under § 123.210(c)(1) and 40 CFR 75.81(a) may elect to comply with the methodology in § 123.210(c)(2) and 40 CFR 75.81(b)—(f).

Section 123.211 (relating to initial certification and recertification procedures for emissions monitoring) creates initial certification and recertification procedures for emissions monitoring. By the applicable deadline in § 123.210, the owner or operator of an affected EGU shall comply with certain initial certification and recertification procedures for a continuous monitoring system or continuous emission monitoring system and an excepted monitoring system (sorbent trap monitoring system) as required under 40 CFR 75.15 (relating to special provisions for measuring Hg mass emissions using the excepted sorbent trap monitoring methodology) and Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources). Only minor changes were made to this section between proposed and final rulemaking to reflect that § 123.210 also applies in certain circumstances.

Section 123.212 (relating to out-of-control periods for emissions monitors) creates out-of-control periods for emissions monitors if an emissions monitoring system fails to meet the quality-assurance and quality-control requirements or data validation requirements. One change to this section has been made between proposed and final-form rulemaking. If a mass emissions monitoring system fails to meet a quality-assurance or quality-control requirement, mass emissions data shall be substituted using the missing data procedures in 40 CFR Part 75, Subpart I.

Section 123.213 (relating to monitoring of gross electrical output) creates monitoring requirements regarding gross electrical output of an affected EGU. One minor change to this section has been made between proposed and final-form rulemaking. The owner or operator of an EGU complying with the requirements of only § 123.206(d) and not § 123.206(e) must monitor gross electrical output of the associated generators and report in watt-hours per hour.

Section 123.214 (relating to coal sampling and analysis for input mercury levels) creates sampling and coal analysis for input mercury levels of affected EGUs. The Department may revise the frequency of the sampling of the coal combusted in the EGU for the mercury content based on historical data provided by the owner or operator of the EGU. One change to this section has been made between proposed and final-form rulemaking. The Department now has the authority to approve, in writing, an alternate coal sampling and analysis program submitted by the owner or operator of an EGU to demonstrate compliance with §§ 123.201—123.215.

Section 123.215 (relating to recordkeeping and reporting) creates recordkeeping and reporting requirements. Among other things, the owner or operator of an affected EGU must comply with the recordkeeping and reporting requirements in this section and the applicable recordkeeping and reporting requirements in Chapter 139, Subchapter C and 40 CFR Part 75. Minor clarifications were made to this section between proposed and final rulemaking.

F. *Comments and Responses*

The Board received nearly 11,000 comments on the proposed rulemaking. The Board determined that over 99% of the commentators are in favor of the proposed rulemaking. The commentators were extraordinarily diverse ranging from the public, sportsmen, industry, trade associations and the EPA. Additionally, comments were received from the Senate Environmental Resources and Energy Committee and the Independent Regulatory Review Commission (IRRC). The complete set of comments and responses is in the Comment and Response document for the final-form rulemaking. A summary of the comments and responses follows.

While other commentators echoed many of the comments of the Senate Environmental Resources and Energy Committee, the Committee recommended that the advanced notice of final rulemaking process be used to solicit comment and input on its revisions. The Board disagrees. Since the close of the public comment period, the Department has held additional meetings with the Workgroup, the Citizens Advisory Council and the AQTAC on the draft final-form rulemaking. Notices of these meetings were published in the *Pennsylvania Bulletin* and the meetings were open to the public to comment on the revisions. As a result, the Board believes that sufficient comment has been received on the revisions.

IRRC also had many of the same comments posed by other commentators, but believes that a "health-based" analysis is necessary as provided under section 6.6 of the APCA. The Board disagrees. The statutory requirements in section 6.6 of the APCA do not apply to this final-form rulemaking because the EPA revised the "appropriate and necessary" finding to establish a cap-and-trade scheme

under section 111 of the CAA for the trading of mercury allowances. As part of its decision making process, the Department has completed an analysis of the health impacts of this final-form rulemaking. A detailed summary of the health benefits resulting from the implementation of this final rulemaking is provided in Section G of this Order.

An overwhelming number of commentators strongly supported the proposed rulemaking on mercury reductions from coal-fired power plants in this Commonwealth. The Board appreciates this strong support for this final-form rulemaking.

One commentator noted lakes, rivers and streams in this Commonwealth are contaminated with mercury pollution. The Board agrees. There is a Statewide fish consumption advisory in effect in this Commonwealth. The 2006 advisory covers water bodies in the Delaware River Basin, Susquehanna River Basin, Lake Erie Basin, Ohio River Basin and the Potomac River Basin. Over 60% of those advisories are for mercury.

Another commentator said mercury pollution builds up in areas close to the source, creating dangerous "hot spots" of high mercury concentrations. The Board agrees. The preliminary results of the study title "*Sources of Mercury Wet Deposition in Eastern Ohio, USA*" (Steubenville Study) conducted by Dr. Gerald J. Keeler, *et al.*, found that local and regional wet deposition of mercury from coal-fired powered plants is much higher than anticipated. This study was published on the American Chemical Society's website on September 8, 2006, and was subsequently published in *Environmental Science and Technology*.

Approximately 70% of the wet mercury deposition has been attributed to coal-fired units. Moreover, in May 2006, the EPA's Acting Inspector General, Bill Roderick, stated that the EPA's analysis of the methylation of mercury " . . . did not fully account for the highly variable ways that mercury bioaccumulates in fish." *See* also "Monitoring Needed to Assess Impact of EPA's Clean Air Mercury Rule on Potential Hotspots, Report No. 2006-P-00025."

A commentator found that this Commonwealth is number two in the Nation for mercury pollution to air from coal-fired power plants and that the most recent Toxic Release Inventory from the EPA ranks this Commonwealth as second worst in the Nation for mercury pollution to the air, behind Texas. The Board agrees with this comment. According to the 2004 Toxic Release Inventory, mercury emissions from coal-fired EGUs in this Commonwealth accounted for approximately 79% of the mercury emitted to the atmosphere.

One commentator said the CAMR does too little too late. CAMR proponents claim that this Commonwealth will see an 86% drop in mercury pollution as a result of the Federal rule. The Congressional Research Service detailed that the CAMR won't deliver the reductions it promises due to mercury pollution trading, when dirty plants are allowed to buy credits from cleaner, more modern ones. The Board agrees. The claims that implementation of the CAMR in this Commonwealth would result in an 86% reduction in mercury emissions in this Commonwealth by 2018 overestimates the actual reduction under the cap-and-trade program. According to the independent Congressional Research Service, the EPA projected mercury emission reductions may not be met until 2030. The final-form "state-specific" regulation establishes emission standards requiring at least an 80% mercury emissions reduction by January 1, 2010, and at least a 90% reduction by January 1, 2015, from existing EGUs or in the alternative a numerical emission standard.

One commentator contended that mercury pollution controls are available and affordable, and coal-fired power plants in this Commonwealth are very profitable. The Board agrees. The Board has determined that a control technology combination of cold side-ESP and WFGD would result in at least 80% control efficiency of mercury emissions from coal-fired power plants in this Commonwealth. Moreover, a control technology combination of cold side-ESP, WFGD and SCR would result in at least 90% control efficiency of mercury emissions from coal-fired power plants in this Commonwealth. Because of this determination, the Board has selected the 80 and 90% control efficiencies as requirements for the Pennsylvania-specific mercury final-form rulemaking. In addition, the Board has selected the Phase 1 and Phase 2 compliance dates of 2010 and 2015 because they coincide with the deadlines under the CAIR. As this analysis relates to mercury-specific control technology, the Board believes there is sufficient evidence to show that for owners and operators that choose to this type of technology it is cost-effective and commercially available.

Another commentator noted that the Federal mercury rule is bad for this Commonwealth's economy. Mercury contamination is threatening this Commonwealth's sporting, angling and recreation industry, a significant source of revenue and jobs throughout this Commonwealth. Because of the trading system in the CAMR, plants in this Commonwealth are more likely to pay for pollution credits than to clean up and modernize old plants. Most importantly, there are significant costs associated with the devastating health impacts, rates of learning disabilities and associated health effects of mercury in children are increasing.

The Board agrees. The Fish and Boat Commission determined that in 2005 approximately 800,000 anglers fished in waters in this Commonwealth. Fish licensing sales in this Commonwealth amounted to $18.5 million in 2005. According to the Erie Regional and Growth Partnership, residents of this Commonwealth 16 years of age and older spent $400 million on fishing in this Commonwealth in 2001. The average angler spent $458 in 2001 on fishing. These direct expenditures created $1.2 billion in economic output in this Commonwealth. As a result, this Commonwealth has a significant economic interest in fresh water fishing as an economic driver. The purchase and sale of mercury allowances will not be allowed under the Pennsylvania-specific final-form rulemaking. The Board shares this concern regarding the adverse health impacts of exposure to mercury emissions. According to Dr. Leonardo Trasande, Assistant Director for The Mount Sinai Center for Children's Health and the Environment, it is found that each year between 316,588 and 637,233 children " . . . have cord blood mercury levels >5.8 µg/L, a level associated with loss of IQ." The resulting loss of intelligence causes diminished economic productivity that persists over the entire lifetime of these children. This lost productivity is the major cost of methylmercury toxicity, and it amounts to $8.7 billion annually (range, $2.2—$43.8 billion; costs are in 2000 dollars). Of this total, $1.3 billion (range, $0.1—$6.5 billion) each year is attributable to mercury emissions from American power plants.

One commentator said that each unit should make mercury reductions. The Board agrees. In February 2005,

the EPA OIG issued a report to the EPA stating " . . . the EPA did not fully analyze the potential for hot spots (i.e., areas of elevated pollutant concentrations) to occur under its proposed cap-and-trade option." The potential for hot spot formation under the proposed cap-and-trade rule has generated a great deal of concern and debate among various stakeholders. In the Decision Document, the Department has a summary of the hot spot analysis it conducted and determined that a reduction in the local contribution of mercury emissions from coal-fired utilities in this Commonwealth through a Pennsylvania-specific mercury final-form rulemaking would result in direct benefits to the citizens of this Commonwealth. The Commonwealth will receive the majority of a reduction that is required to come from a coal-fired utility in this Commonwealth. The CAMR not only ignores the issue of potential local mercury hotspots, but also does not guarantee that any reductions in mercury emissions will occur at coal-fired utilities in this Commonwealth. As a result, a Pennsylvania-specific mercury final-form rulemaking would improve local ecosystems and concomitantly improve public health by reducing mercury deposition.

One commentator supported the fastest and furthest reduction of mercury emissions to protect citizens in this Commonwealth from even low levels of exposure. The Board agrees that the CAMR will not adequately protect public health and the environment within the borders of this Commonwealth. The final-form rulemaking does not establish a cap-and-trade program and will ensure that greater reductions in mercury emissions are achieved prior to the 2018 compliance deadline established under Phase 2 of the CAMR. The final-form rulemaking will achieve a 90% reduction in total mercury removal from coal-fired power EGUs by January 1, 2015. Alternatively, the owners and operators of PCF units may comply with an output-based standard of 0.012 pound of mercury per gigawatt-hour (lb/GWh) starting January 1, 2015 (Phase 2) and each year thereafter. The owners and operators of CFB EGUs will have the option of complying with an emission standard of 0.0096 lb/GWh or a minimum 95% control of total mercury, as measured from the mercury content in the coal as fired.

A commentator stated that no evidence was presented by any party showing the proposed rulemaking will provide additional environmental or health benefit to this Commonwealth beyond the EPA CAMR and that no credible evidence of mercury "hot spots" was presented by any party. The commentator stated that evidence was presented that there were no local mercury "hot spots." The Board strongly disagrees. The Department's analysis has determined that a reduction in the local contribution of mercury emissions from coal-fired utilities in this Commonwealth through a Pennsylvania-specific mercury final-form rulemaking would result in direct benefits to the citizens of this Commonwealth. For instance, it is well known that some forms of atmospheric mercury are rapidly deposited by both wet and dry processes, and emissions of these forms of mercury, especially near ground level, are responsible for a large portion of the observed mercury deposition in a surrounding area. These more reactive forms of mercury, which are emitted by EGUs burning bituminous coal, are usually deposited from the atmosphere before they can travel long distances. Therefore, the Department can say with confidence that elemental mercury is more inert and can be transported globally, and that oxidized mercury compounds are more reactive and travel much shorter distances before depositing. As a result, the Commonwealth will receive the majority of any reduction that is required to come from a coal-fired utility in this Commonwealth. The CAMR not only ignores the issue of potential local mercury hotspots, but also does not guarantee that any reductions in mercury emissions will occur at coal-fired utilities in this Commonwealth.

One commentator said that mercury pollution credit trading cannot be allowed. The Board agrees. The Board believes the EPA is without the legal authority to regulate HAPs such as mercury under section 111 of the CAA. The Board also believes that the EPA is not legally authorized under section 111 or section 112 of the CAA to implement a cap-and-trade program. The Congressional intent regarding the regulation of mercury is clear and unambiguous—it must be regulated under section 112 of the CAA. Mercury is explicitly identified as an HAP under section 112(b) of the CAA. For sources other than coal-fired units, the EPA must list source categories under section 112(c) of the CAA and the set emission standards for those categories under section 112(d) of the CAA. While the statutory scheme for regulating mercury from coal-fired units is under section 112(n) of the CAA, the Congressional intent is the same—mercury emissions from these units must be regulated under the Section 112 MACT approach. See *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984) (where if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.) The EPA's proposed cap-and-trade program is an unreasonable interpretation of its statutory authority under sections 111 and 112 of the CAA. The fact that Congress chose to list specific HAPs under section 112 of the CAA indicated that Congress believed that these pollutants required more stringent measures than those permitted under section 111 of the CAA. Moreover, regulation under section 112 of the CAA has been historically and consistently interpreted as requiring HAPs to be controlled through installation and operation of MACT. A cap-and-trade approach under this section was never contemplated as a control technology.

A commentator requested that the Commonwealth revise the definition of "EGU" in the State's rule to reflect the EPA's revised definition in the rule published at 71 FR 33388 entitled "Revision of December 2000 Clean Air Act Section 112(n) finding Regarding Electric Utility Steam Generating Units: and Standards of Performance for New and Existing Electric Utility Steam Generating Units: Reconsideration." The Board agrees. This change has been made.

One commentator requested that a number of terms that are now included in the CAMR by virtue of its reconsideration process be included in the final-form rulemaking. In addition, new definitions may be added once the EPA finalizes its Federal implementation plan on the CAMR. The Board agrees. To address the fact that the EPA will be revising definitions, possibly even after the Board's regulation is final, "incorporation by reference" regulatory language has been added. This new provision reads as follows: "The definitions under the Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources promulgated in 40 CFR Part 60 Subparts Da and HHHH are adopted in their entirety." The Board's final-form rulemaking contains the necessary EPA definitions and also provides for additional definitions, or changes in definitions, that are required for implementation of the Board's regulation.

The commentator was concerned by proposed § 123.204 that exempts EGUs replaced with IGCC technology from

the emission limitations under § 123.207 may not assure that the State Plan will meet the cap on annual mercury emissions for the State in 40 CFR 60.24(h) (relating to emission standards and compliance schedules). As a result, the Commonwealth's proposed rulemaking may not to be approvable under 40 CFR 60.24(h) if the Commonwealth submits it with § 123.204 as proposed. The Board agrees. Owners and operators of EGUs that are replaced with IGCC technology will only be exempt from the emission standards under § 123.206.

The commentator requested that the Commonwealth include a provision in § 123.205 notifying all owners and operators of new sources that they must also comply with the mercury control requirements in the EPA's NSPS as specified in 40 CFR Part 60, Subpart Da and as adopted by reference by the Commonwealth. The Board agrees. The final-form rulemaking will reflect this change.

Commentators proposed that owners and operators be given credit for coal cleaning. The Board agrees. Proposed § 123.205(a)(4) has been amended to read that the mercury removal efficiency due to pretreatment of coal or waste coal may be credited towards the minimum percent control efficiency of total mercury.

A commentator recommended that the Board eliminate the annual emission limitations for coal-fired EGUs and recommends a restricted market based trading program. The Board disagrees with this recommendation since it does not believe there is sufficient legal authority under existing Federal and State law to allow for the trading of a statutorily recognized HAP and potent neurotoxin like mercury.

A commentator asserted that the proposed rulemaking's prohibition of allowance trading and banking would cause the premature shutdown of smaller, older coal-fired plants in this Commonwealth leading to loss of jobs and reliable electric power. The Board disagrees. Section 123.206 provides that the Department may approve of an alternative mercury emission standard or schedule, or both, if the owner or operator of an EGU subject to the emission standards of § 123.205 demonstrates in writing to the Department's satisfaction that the mercury reduction requirements are economically or technologically infeasible. The provision was added at the request of the AQTAC to address the concerns about smaller, older plants. While the Department's approval of an alternate standard or a compliance schedule will not relieve the owner or operator of an EGU from complying with the other requirements of §§ 123.207—123.215, owners and operators of these smaller, older plants may also petition the Department for supplemental allowances under § 123.209. The Board also added a provision to § 123.207 to allow the owner or operator of an EGU to demonstrate compliance with the annual emission limit by using system-wide averaging. This compliance option will be in addition to the options included in the proposed rulemaking for compliance on a unit-by-unit basis or by facility-wide emissions averaging. As a result, there are a number of provisions in the final-form rulemaking to ensure that smaller, older plants are safeguarded. Because the Commonwealth is not electing to participate in the CAMR, the EPA has not provided the Department with the option of banking allowances from year to year.

A commentator stated that the CAMR allows emission trading, which provides a strong incentive for generators to reduce emissions more than and sooner than required. The Pennsylvania mercury rulemaking does not. The Board disagrees. The EPA admits that compliance with CAMR caps will not be achieved by 2026 or as late as 2030. To provide further incentive in this Commonwealth, the Board has revised § 123.207 to add a provision to allow the owner or operator of an EGU to demonstrate compliance with the annual emission limit by using system-wide averaging. This compliance option will provide an incentive for units within a system to over-control and will be in addition to the options included in the proposed rulemaking for compliance on a unit-by-unit basis or by facility-wide emissions averaging.

A commentator stated that the CAMR does not disadvantage Pennsylvania coal, which contains more mercury than coal from other states. The Pennsylvania mercury rulemaking disadvantages Pennsylvania coal. The Board disagrees. The CAMR discriminates against bituminous coal through the allowance allocation program as well as the NSPS emission limits. The final-form rulemaking treats all coal types evenly. Owners and operators may now take credit for the pretreatment of coal as a means of compliance. These same owners and operators may also take advantage of a system-wide compliance demonstration. Since owners and operators may use CAIR-type technologies to reduce mercury emissions, they are less likely to switch coals because bituminous coal allows for a higher capture rate. Additionally, this Commonwealth has an abundance of low-mercury-content coal found in the southwestern part of this Commonwealth.

Another commentator stated that under the proposed rulemaking, the Commonwealth will be in violation of its CAMR State Budget beginning in 2018. The Board disagrees. The Board reviewed the list of IPM runs that the EPA conducted in support of the CAMR. These model runs show that coal-fired power plants in this Commonwealth will emit 64% more mercury 0.451 ton (902 lbs.) than the established cap of 0.702 ton (1,404 lbs.) in 2020. In contrast, after Phase 2, it is anticipated that the Pennsylvania mercury rulemaking would achieve a 39% greater reductions than the CAMR under Phase 2. This means that the Commonwealth would achieve its 2018 cap of 0.702 ton (1,404 lbs.) by 2015.

Commentators asserted that the annual emission limit in § 123.207, which is based on the CAMR allocations, is an extremely stringent and unnecessary requirement. The imposition of this on a unit or even facility basis will force many Pennsylvania high-mercury coals out of the market for the generation of electricity. Some smaller generating units cannot employ the maximum control technologies that would be necessary to achieve the levels specified in this section and remain competitive in the wholesale power market. The Board disagrees. The annual emission limitation provisions are designed to ensure that the mercury emission cap established for EGUs in this Commonwealth is not exceeded. The Board has revised § 123.207 to include the option of system-wide emissions averaging. This provision allows the owners or operators of two or more affected EGUs under common ownership or operator control within this Commonwealth to demonstrate compliance by ensuring that the aggregate of actual mass emissions from all units, under the averaging demonstration, is less than the aggregate of allowable mass emissions from these units. Therefore, smaller units that belong to systems that include larger units that over-control will be able to average their annual emissions as part of the system-wide averaging provision. This averaging will help the smaller units meet their annual emission limitations. The Board has also decided to give credit to EGUs that pretreat their coal to reduce its mercury content. This will help EGUs meet both the unit-specific emission standards and the annual limit. Also, these owners and operators may petition the De-

partment for alternative emission standards or compliance schedules under § 123.206 and supplemental allowances under § 123.209.

Some commentators believed that the unused nontradable allowances in the new source set aside provision in § 123.207(c)(2) should not be retained in the supplemental pool. Those unused nontradable allowances should be returned to the affected units. The Board disagrees. The final-form rulemaking does not include banking and trading provisions. The Department made the determination that the state-of-the-art mercury control technology is such that each unit can, if the appropriate measures are taken, meet its emissions cap. The Department will retain the unused allowances for each unit and allocate them to units that have not met their cap and have applied for additional allowances from the annual emission limit supplement pool. The Department's petition process will ensure that those units that have demonstrated the most effort in reducing their mercury emissions will be eligible to receive allowances. The Board has also revised § 123.207(o) to include the option of system-wide emissions compliance demonstration. This provision allows the owners or operators of two or more affected EGUs under common ownership or operator control within this Commonwealth to demonstrate compliance by ensuring that the aggregate of actual mass emissions from all units, under the averaging demonstration, is less than the aggregate of allowable mass emissions from these units. This compliance option will be in addition to the options included in the proposed rulemaking for compliance on a unit-by-unit basis or by facility-wide emissions averaging.

Commentators contended that an owner of a standby unit cannot rely on the potential for allowances to be made available to assure they are in compliance with this proposed rulemaking. An owner must be certain a standby unit can come back into service and be in compliance, or there will be no choice but to prematurely retire that unit. A cap-and-trade program would provide that opportunity. The Board disagrees. This Commonwealth currently does not have units that qualify as standby units. If the owner or operator of a unit changes its designation to standby in the future, its allowances will be transferred to the annual emission limit supplement pool established under § 123.208. If the owner or operator subsequently applies to restart a designated standby unit, it would then need to meet the applicable emission limit requirements of § 123.205.

One commentator believed that the Department's compliance bank may not cover all potential requests for allowances. The Board disagrees. The annual emission limit supplement pool established under § 123.208 is not a "compliance bank" nor is it intended to be a permanent "crutch" for owners and operators of units to rely upon to meet their annual emissions cap. The owner or operator of each affected unit should design its compliance program to comply with the applicable requirements in the final-form rulemaking. In the event then that the unit happens to exceed its limit, the Department can make nontradable supplemental allowances available to that unit if the owners or operators successfully petition the Department in accordance with § 123.209. The Department's analysis shows that the Pennsylvania mercury rulemaking would achieve approximately a 29% greater reduction than the CAMR during Phase 1. This would amount to 1.2567 tons (2,513.4 lbs.) of mercury emissions as opposed to 1.77 tons (3,540 lbs.) mercury emissions under the CAMR cap. During Phase 2, it is anticipated that the Pennsylvania mercury rulemaking would achieve approximately a 39% greater reductions than the CAMR under Phase 2. Therefore, the Commonwealth would achieve its cap of 0.702 ton (1,404 lbs.) by 2015 rather than exceeding it by 0.451 ton (902 lbs.). As a result, there should be sufficient allowances in the supplemental pool.

One commentator believed that proposed §§ 123.206 and 123.209 are unconstitutional under the commerce clause of the United States Constitution because they effect a preference for Pennsylvania coal under the guise of bituminous coal. The Board disagrees that these sections are unconstitutional. However, after consideration of comments received on the proposed rulemaking, the Board has removed the provisions for presumptive compliance with the emission standards and preferential allowance allocations for bituminous coal. While the original intent of the bituminous coal preference was to reflect known control capabilities while burning bituminous coal, the intended simplification of implementation of the mercury regulations was outweighed by the possible legal challenges that jeopardized the reliance of our industry on these provisions. Therefore, the final-form rulemaking does not contain these provisions.

One commentator stated that the Commonwealth must modify proposed § 123.210(b) by adding a statement that source owners and operators must also comply with the requirements of 40 CFR Part 75 with regard to mercury mass emissions. The Board agrees and the requirements for 40 CFR Part 75, Subpart I compliance, for mass emission monitoring systems, have been added to the final-form rulemaking.

A commentator asked that the Commonwealth state in its regulation that 40 CFR Part 75 requirements will take precedence if a case should arise where there is a conflict between 40 CFR Part 75 and the Commonwealth's requirements. The Board agrees. This change has been made to § 123.210.

A commentator asked that the Commonwealth clarify in the proposed rulemaking that the Department will not approve alternative requirements unless they are consistent with 40 CFR Part 75. The Board agrees. This change has been made to § 123.210.

Another commentator believes that the Board should adopt the sampling provisions laid out in the CAMR and not the daily 'as fired' sampling protocol. The Board disagrees. The CAMR does not provide methodology for determining or demonstrating compliance with percent-reduction limits or coal sampling and analysis. The Board believes daily coal sampling in conjunction with outlet mercury emission monitoring will accomplish the goal of ensuring compliance with percent-reduction limits for subject EGUs without imposing unreasonable costs. Daily sampling is specified to establish a relationship between the coal that is sampled and that which is burned, and to conform with provisions of 40 CFR Part 60 (relating to standards of performance for new stationary sources) for pretreatment for sulfur removal, as well as the discussions and clarifications in the preamble to 40 CFR Part 60, Subpart Da and determinations under 40 CFR Part 60, Subpart Da recorded on the EPA's Applicability Determination Index.

One commentator believed that if sources in this Commonwealth purchase allowances from out-of-State sources that have over-controlled their emissions, in virtually all instances the selling sources would be located to the west and southwest of this Commonwealth. This would benefit the environment in this Commonwealth since those power

plants did over-control and are up-wind of this Commonwealth. The Board disagrees. Coal-fired power plants that burn bituminous coal emit oxidized forms of mercury, which are deposited near their source. Sources to the west and south west primarily burn bituminous coal and would see local deposition improve. In this Commonwealth, 85% of the coal burned by coal-fired power plants is bituminous, with the remainder waste coal. As a result, the Commonwealth would not see reductions in actual emissions of mercury within the environs of this Commonwealth and may even see increased emissions, if power plants in this Commonwealth were allowed to purchase allowances from out-of-State sources rather than installing controls.

One commentator believed that MACT would have been a superior way to reduce mercury emissions. By allowing trading, not all geographic areas benefit from pollution reductions. The Board agrees with this comment. The Board believes that the EPA does not have the legal authority to regulate HAP, like mercury, under the less stringent provisions of section 111 of the CAA, as opposed to the more stringent MACT provisions under section 112 of the CAA. Since the EPA promulgated its Section 111 approach for the control of mercury emission from power plants, petitions for review challenging this final EPA action were filed with the United States Court of Appeals for the D.C. Circuit. In addition to the Commonwealth, state challengers include California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Mexico, New Jersey, New York, Rhode Island, Vermont and Wisconsin.

Some commentators stated that Dr. Terry Sullivan of Brookhaven National Lab found no evidence of hot spots created by emissions trading. The Board disagrees. Impacts regarding mercury deposition were studied at the Bruce Mansfield coal-fired power plant in Shippingport, PA, and reported in Sullivan, T.M, et al., "Assessing the Mercury Health Risks Associated with Coal-Fired Power Plants: Impacts of Local Depositions," Brookhaven National Laboratory, Upton, NY. The Bruce Mansfield plant is characterized by high total mercury emissions. From the deposition modeling, the average increase in deposition as compared to a background deposition rate of 20 $\mu g/m^2/yr$ over a 2,500 km^2 area around the plant was 15% at Bruce Mansfield. Over an area that is 50—100 km^2, immediately adjacent to the plant, deposition doubled at the Bruce Mansfield plant. The report concluded that if the plant emissions double the local deposition, the fish concentration would be similarly doubled. As a result, the U.S. mean fish mercury content is 0.21 ppm and near the Bruce Mansfield plant the mean fish mercury content is 0.41 ppm.

One commentator stated that the Board's proposed rulemaking lacked a market-driven cap-and-trade program, a proven tool to reduce air pollution, to promote early reductions of mercury emissions in a cost-effective way. The Board disagrees. The Commonwealth has been a strong proponent of traditional cap-and-trade programs regarding criteria pollutants. However, because mercury is a designated HAP under section 112 of the CAA and a potent neurotoxin, trading of a substance such as this is illegal under the CAA and bad environmental and public health policy. Because of the trading provisions under the CAMR, owners and operators of EGUs in this Commonwealth do not have to make reductions of actual mercury emissions in this Commonwealth. They can purchase allowances to offset the amount of mercury they emit over their cap to ensure compliance, which means that reductions in this Commonwealth may only be realized on paper. Moreover, mercury emissions in this Commonwealth may be much higher than the EPA projects.

Some commentators said there is no certainty a pool of allowances will be created under the proposed rulemaking to be available to owners of EGUs without the economic incentives included in the CAMR cap-and-trade program. The Board disagrees. After Phase 1 of the program, the Board anticipates that the Pennsylvania mercury rulemaking will achieve approximately 29% greater reductions than the CAMR. After Phase 2, the Board anticipates that the Pennsylvania mercury rulemaking will achieve approximately 39% greater reductions than the CAMR. As a result, the Board anticipates that there will be a supplemental pool available for use for eligible owners or operators of EGUs. Furthermore, the Board has added a system-wide emissions averaging approach to address the commentator's concerns regarding incentives for early reductions. Under this approach, owners or operators of two or more affected EGUs under common ownership or operator control within this Commonwealth may achieve compliance with the annual mercury emission limitation by ensuring that the aggregate of actual mass emissions from all units, under the averaging demonstration, is less than the aggregate of allowable mass emissions from these units.

Some commentators believed that the Board has viewed the public comment period as a public opinion poll, rather than a genuine opportunity to solicit and consider substantive comments. The commentators felt that the vast majority of the comments received were form e-mails or letters drafted by advocacy organizations to "run up the numbers." The Board disagrees. It is undisputed that there is a substantial public interest in the State-specific rulemaking to reduce mercury emissions from coal fired power plants. The unprecedented number of commentators for this final-form rulemaking shows that the public is extraordinarily concerned about mercury emissions from coal-fired power plants and is exercising their constitutional right to comment on an issue that directly affects them. Many of these comments were substantive in nature, which resulted in the Board making revisions to the final-form rulemaking.

Some commentators believed that if trading is not added to the proposed rule and controls cannot be built because of time, labor or financial constraints. The Board disagrees. Section 123.206(c) provides that the Department may approve of an alternative mercury emission standard or schedule, or both, if the owner or operator of an EGU subject to the emission standards of § 123.205 demonstrates in writing to the Department's satisfaction that the mercury reduction requirements are economically or technologically infeasible. While the Department's approval of an alternate standard or a compliance schedule will not relieve the owner or operator of an EGU from complying with the other requirements of §§ 123.207—123.215, owners and operators of these plants may also petition the Department for supplemental allowances under § 123.209. As a result, there are a number of provisions in the regulation to ensure that plants are safeguarded. In addition, an alternate schedule would not require these units to operate at a reduced level of output.

One commentator stated that a recent study shows the proposed mercury rulemaking would increase this Commonwealth's cost for compliance by $1.7 billion, doubling the investments EGUs would have to make in advanced pollution control equipment over the CAIR/CAMR. The commentator further stated that the Board has done no

detailed study of the cost impacts of this proposed rulemaking on electric generators or electric customers. The Board disagrees. The Department has done a thorough cost analysis and has found that the increase in cost to electric utility customers in this Commonwealth would be very small, and that the increased cost would be $0.0012 to 0.0038 KWh.

Some commentators are extremely concerned about the impact the Board's proposed rulemaking will have on the economy. Imposition of burdensome, unnecessary mercury regulations can have a devastating, rippling effect throughout the energy production, mining and manufacturing sectors. The Board shares these concerns as well, but does not believe the final-form rulemaking will have this effect. There will be compliance costs related to the construction and operation of air pollution control devices to control mercury, NO_x and SO_2. The total cost of complying with the State-specific mercury rulemaking in Phase 1 is estimated to be between $15.4 and $15.8 million per year. Purchasing mercury allowances (at $953 per ounce, according to the DOE) would cost approximately $15.7 million per year.

The Phase 2 cost range is based on the control technologies needed to meet the annual limit. The high end cost estimate is based upon using TOXECON/COHPAC at an annual cost of $53.4 million. The low end is based upon utilizing B-ACI at an annual cost of $16.7 million. The capital costs for each of these technologies were annualized based upon 20 years and an interest rate of 10%. The Phase 2 mercury allowance cost was estimated to be $28.3 million annually based upon the assumption of allowances costing $41,900/lb. This allowance cost is based on an average from DOE projected costs for 2015 and 2030.

The cost differential between allowance costs and technology costs were $25.1 million on the high end and a savings of $11.6 million on the low end. The total kilowatt-hours calculated for the 18 units that may not be installing CAIR controls to meet the Phase 2 requirements are 13,748,393,901. The resulting cost per kilowatt-hour ranges from $0.0018/KWh for the use of the TOXECON/COHPAC control technology to a savings of $0.00084/KWh for using B-ACI to comply with the Phase 2 limits.

A commentator contended that there is a lack of evidence that the proposed rulemaking will provide an environmental benefit to this Commonwealth beyond the CAMR. The Board disagrees. The Board's analysis shows that a Pennsylvania-specific mercury reduction rule will reduce mercury emissions in this Commonwealth. A reduction in mercury emissions will lead to improved environmental quality. This improvement in the environment will lead to reduced environmental and public health impacts. These reduced impacts will improve the health of ecosystems and improve public health.

Commentators stated that in 1996, then Governor Tom Ridge promulgated Executive Order 1 of 1996. This order dictated that State rules should be no more stringent than Federal requirements unless there is a compelling State reason to do so. Commentators believed that to date, the Department has demonstrated no compelling reason to implement a State-specific mercury rulemaking. Since executive orders stand until formally withdrawn and this action has not occurred with Executive Order 1 of 1996, the Department's mercury rule should not be promulgated.

The Board disagrees. The Department believes that it has demonstrated that a State-specific rulemaking is necessary because of compelling reasons. A large body of scientific evidence, some of which was developed as a result of the EPA's obligations under the CAA, has clearly demonstrated that mercury is a persistent, toxic, bioaccumulative pollutant that can have adverse effects on human health and the environment. The Department has determined that effective mercury control technology does exist to significantly reduce mercury emissions from EGUs. Furthermore, mercury control technology is presently being implemented at a number of air pollution emitting sources, and recent testing of mercury control technologies on coal-fired utilities has been shown to be effective in reducing mercury emissions. The Department has joined a number of other parties in a lawsuit challenging the EPA's National cap-and-trade approach as both inappropriate for regulating a potent neurotoxin like mercury and also contrary to the statutory provisions of the CAA. The Department has determined that the provisions in the EPA's final mercury rule for the utility sector that was promulgated under section 111 of the CAA are not adequate to ensure that the citizens of this Commonwealth and the environment will be adequately protected from the harmful effects of mercury emissions.

G. *Benefits, Costs and Compliance*

Benefits

Overall, the citizens of this Commonwealth will benefit from this final-form rulemaking because they will result in improved air quality by reducing mercury emissions. In addition, it is anticipated that local mercury deposition will be reduced since coal-fired power plants that burn bituminous coal emit oxidized forms of mercury, which are deposited near their source. Moreover, the Board believes that there are a number of reliable cost/benefit studies which indicate cost savings and public health benefits from controlling mercury emissions from EGUs.

The Commonwealth is concerned that the CAMR's cap-and-trade approach will result in hot spots to which this Commonwealth is particularly susceptible given that all 36 coal-fired utilities in this Commonwealth burn bituminous coal as their primary fuel source. Bituminous coals generally have high mercury, chlorine and sulfur contents and low calcium content, resulting in a high percentage of organic mercury. This type of mercury has a residence time of a few days and is deposited near the source of the release. Therefore, it is not a suitable candidate for emission trading against emission reductions in other regions because it results in hot spots.

Impacts regarding mercury deposition were studied at the Bruce Mansfield coal-fired power plant in Shippingport, PA. Sullivan, T.M., et al., *Assessing the Mercury Health Risks Associated with Coal-Fired Power Plants: Impacts of Local Depositions*, Brookhaven National Laboratory, Upton, NY. This plant is characterized by high total mercury emissions. From the deposition modeling, the average increase in deposition as compared to a background deposition rate of 20 $\mu g/m^2/yr$ over a 2,500 km^2 around the plant was 15% at Bruce Mansfield. Over an area that is 50—100 km^2, immediately adjacent to the plant, deposition doubled at the Bruce Mansfield plant. The report concluded that if the plant emissions double local deposition, the fish concentration would be similarly doubled. As a result, the United States mean fish mercury content is 0.21 ppm and near the Bruce Mansfield plant the mean fish mercury content is 0.41 ppm.

The 2003 results of the EPA Office of Water study "Draft Mercury REMSAD Deposition Modeling Results" reinforce the Commonwealth's concern. This Regulatory

Modeling System for Aerosols and Deposition modeling shows that, at mercury hot spots, local emission sources within a state can be the dominant source of deposition. At hot spots, local sources within a state commonly account for 50% to 80% of the mercury deposition. In-state sources contribute more than 50% of the pollution to sites in the top eight worst hot spot states, which are Michigan, Maryland, Florida, Illinois, South Carolina, North Carolina, Pennsylvania and Texas, respectively.

In addition to these studies, "Sources of Mercury Wet Deposition in Eastern Ohio, USA," which is the EPA-funded Steubenville Mercury Deposition Source Apportionment Study, was published in *Environmental Science and Technology*. *See Environ SciTechnol*. 40(19)5874-5881 (2006). This study found that approximately 70% of the mercury in rain collected at an Ohio River Valley monitoring site originated from nearby coal-burning industrial plants.

NESCAUM sponsored a report analyzing the cost savings and public health benefits of controlling mercury emissions from power plants. NESCAUM, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-fired Power Plants* (February 2005) (Harvard Study). The Harvard Study was prepared by the Harvard Center for Risk Analysis, funded by the EPA, co-authored by an EPA scientist and peer-reviewed by two other EPA scientists. The Harvard Study reveals that the EPA miscalculated the "nature of the risk involved" by underestimating the public health benefits of reducing mercury. Specifically, the Harvard Study indicates that the public benefit of reducing power plant mercury emissions to 15 tpy ranges from $119 million annually (if only persistent IQ deficits from fetal exposures to methylmercury are counted) to as much as $5.2 billion annually (if IQ deficits, cardiovascular effects and premature mortality are all counted).

The May 2005 edition of *Environmental Health Perspectives* indicates that the EPA underestimated the health benefits to be gained from reducing mercury. In one study, scientists from the Mount Sinai School of Medicine examined National blood mercury prevalence data from the CDC and found that between 316,588 and 637,233 children each year have cord blood mercury levels greater than 5.8 micrograms per liter—the level associated with loss of IQ. *See* Leonardo Trasande, *et al.*, *Public Health and Economic Consequences of Methylmercury Toxicity to the Developing Brain*, 113:590-596 *Environmental Health Perspectives* (2005). They estimated that the resulting loss of intelligence and diminished economic activity amounted to $8.7 billion annually, with $1.3 billion each year being directly attributable to mercury emissions from power plants. The scientists further caution that these costs will recur each year with each new birth cohort as long as mercury emissions are not controlled.

Trasande and his colleagues have further concluded that their calculations on economic cost may, in fact, be an underestimate. See "Mental retardation and prenatal methylmercury toxicity," *AM J Ind Med*. 2006 Mar; 49(3):153-8. Downward shifts in IQ resulting from prenatal exposure to methylmercury of anthropogenic origin are associated with 1,566 excess cases of mental retardation annually (range: 376—14,293). This represents 3.2% of mental retardation cases in the United States (range: 0.8%—29.2%). The mental retardation costs associated with decreases in IQ in these children amount to $2.0 billion/year (range: $0.5—$17.9 billion). Mercury from American power plants accounts for 231 of the excess mental retardation cases/year (range: 28—2,109), or 0.5% (range: 0.06%—4.3%) of all mental retardation. These cases cost $289 million (range: $35 million—$2.6 billion). Therefore, Trasande concludes that toxic injury to the fetal brain caused by mercury from coal-fired power plants exacts a significant human and economic toll on American children. These conclusions have been peer-reviewed.

On April 28, 2005, an unpublished report that was funded and completed by the EPA's Office of Wetlands, Oceans and Watersheds became available to the public. *See* Douglas Rae & Laura Graham, *Benefits of Reducing Mercury in Saltwater Ecosystems*. This study found that a 30%—100% reduction of mercury emissions would translate into a $600 million to $2 billion cost savings. The cost savings were largely attributable to reduced health risks, including cardiovascular risks.

As a result of these and other studies, the Board believes that there are substantial benefits regarding the final rulemaking. Moreover, the final rulemaking is designed to maximize the cobenefit of mercury emission reduction achieved through the installation of pollution controls, which are required for compliance with the CAIR program. Owners and operators of EGUs are not disadvantaged under this time frame, and there should not be any reliability concerns for delivery of power over the electric grid.

Under a Pennsylvania-specific mercury rule, EGUs in this Commonwealth will emit no more than 0.702 ton (1,404 lbs.) by 2015. As a result, annual benefit associated with IQ increases in the annual birth cohort ranges are $4.165 million to $10.08 million. This benefit is from reduced fetal methylmercury exposure. This means that the Pennsylvania mercury rulemaking will provide an additional benefit of $1.49 million to $3.63 million per year over the CAMR. If cardiovascular effects are only experienced by the male population that consumes nonfatty freshwater fish, then the monetized annual benefits are $1.8 million. This means that the Pennsylvania mercury rulemaking will provide an additional benefit of $0.65 million per year over the CAMR. If these positive cardiovascular effects are experienced by all citizens in this Commonwealth, then the monetized annual benefits are predicted to be $200.9 million. This means that the Pennsylvania mercury rulemaking will provide an additional benefit of $72.3 million per year over the CAMR. Moreover, citizens of this Commonwealth will see these results being achieved by 2015.

In comparison, the total cost of complying with Phase 1 of the Pennsylvania-specific mercury rulemaking would be no more than the cost of complying with the CAMR. For Phase 2, at the low end of the cost estimate, the annualized cost of mercury specific technology may not be any more than the costs of purchasing the allowances. However, at the high end of the cost estimate, the additional cost above purchasing allowance would be around $24.7 million. Consequently, the benefits of a Pennsylvania mercury rulemaking outweigh the costs.

The Department's analysis assumes the continued use of the existing coal feedstocks. Because it is anticipated that the majority of the mercury reductions in this Commonwealth will be achieved through the installation of CAIR controls for NO_x and SO_2, there will not exist the same incentive to utilize fuel switching to lower mercury content coal as there is under the CAMR. A control strategy combining fuel switching and the purchase of mercury allowances is a viable option that many companies are expected to use to meet the CAMR requirements. The Board's final-form rulemaking disallows the purchase

and trading of allowances. Based on the data submitted in response to the Department's data request, fuel switching is not necessary to comply with its final-form rulemaking emission standards. Therefore, fuel switching is not necessary to comply with the final-form rulemaking and the continued use of the existing coal feedstocks should not be affected. However, owners and operators of affected EGUs are free to employ any compliance strategy necessary to comply with this final-form rulemaking.

Compliance Costs

The Department performed a cost analysis as part of the development process of the Pennsylvania mercury rulemaking. The analysis was also conducted to determine the cost of the rulemaking emission limits above and beyond the CAIR. The CAIR involves the installation air pollution control equipment for SO_2 and NO_x control. For each applicable EGU in this Commonwealth, the Department determined the amount of mercury, if any, that would need to be controlled beyond CAIR control levels for Phase 1 and Phase 2.

For each unit the capital cost, annualized capital costs and operating costs were determined. This was offset against how much it would cost to purchase an equivalent amount of emissions allowances based on the EPA's projections of mercury allowance costs from 2010—2030. These projections come from a DOE document entitled "Annual Energy Outlook 2006 With Projections to 2030." The costs of control were based on cost estimates for installing and operating ACI systems. The capital costs were determined by estimating the cost ranging from $2/kW—$4/kW of plant electrical generating capacity. This capital cost was then annualized over 20 years assuming a 10% interest rate. The operating costs were calculated for Phase 1 based on a B-ACI injection rate of 6 lbs. per million actual cubic feet of exhaust gas. For Phase 2 an injection rate of 4.84 or 9.68 lbs. per million actual cubic feet of exhaust gas was used depending on how much was needed to meet the emission limit. The injection rate was multiplied by the average of the 3 highest years of heat input between 1998 and 2002 and then multiplied by $ 0.0175 lb of sorbent/Million Btu. This calculation was performed for each effected emission unit.

For Phase 1, the Department estimated that 16 units at 7 facilities might opt for mercury-specific control beyond the CAIR control installations. The total capital costs needed for B-ACI were estimated to be approximately $4.9 to $9.8 million. The annual operating costs were estimated to be approximately $14.7 million. The total annualized costs for Phase 1 were estimated to be approximately $15.4 to $15.8 million. The cost of $0.0012/kWh represents the upper bound cost estimate for the EGUs to comply with the Phase 1 limits.

The mercury allowance costs were approximately $15.7 million using the DOE's projections of mercury allowance costs from 2010—2015 at $953 per ounce. As a result, the total cost of complying with Phase 1 of the Pennsylvania-specific mercury rulemaking would be no more than the cost of complying with the CAMR.

For Phase 2, the Department estimated that 18 units at 7 facilities might opt for mercury specific control beyond the CAIR control installations. Some EGU owners and operators may choose to install compact hybrid powdered activated carbon (COHPAC) filter systems to comply with the Pennsylvania mercury rulemaking. The Electric Power Research Institute has patented the "TOXECON" process which employs COHPAC in the control configuration. TOXECON/COHPAC has been demonstrated to achieve around 90% reduction of mercury emissions. The capital costs for were determined by estimating the cost ranging from $56.53/kW—$125/kW of plant electrical generating capacity.

The difference between the lower-bound and upper-bound costs estimates reflects the difference between carbon injection and the installation of TOXECON/COHPAC filter systems. The total capital costs are estimated to range from $141.6 to $313.3 million. The total annualized cost (capital and operating) of mercury-specific control technology that EGU owners and operators might opt to install beyond CAIR to comply with the Pennsylvania mercury rulemaking would range from $16.7 to $53 million per year. The resulting cost per kilowatt-hour would be no greater than $0.0038/kWh for the EGUs utilizing the TOXECON/COHPAC control technology to comply with the Phase 2 limits. The cost of $0.0038/kWh represents the upper bound cost estimate for the EGUs to comply with the Phase 2 limits.

The estimated total cost of purchasing mercury allowances (using $2,619 per ounce, according to a DOE estimate) would be approximately $28.3 million per year if EGU owners and operators did not implement additional measures beyond the CAIR to comply with the CAMR. At the low end of the cost estimate, the annualized cost of mercury specific technology may not be any more than the costs of purchasing the allowances. However, at the high end of the cost estimate, the additional cost above purchasing allowance would be around $24.7 million. This would represent about $0.0018/kWh.

Based on the Department's analysis, there is no compelling evidence to suggest that electricity rates will significantly be impacted because of the final-form rulemaking.

Compliance Assistance

The Department plans to educate and assist the public and regulated community with understanding newly revised requirements and how to comply with them. This will be accomplished through the Department's ongoing Regional Compliance Assistance Program.

Paperwork Requirements

This final-form rulemaking will not increase the paperwork that is already generated during the normal course of business.

H. *Pollution Prevention*

The Pollution Prevention Act of 1990 (42 U.S.C.A. §§ 13101—13109) established a National policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. The Department encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally friendly materials, more efficient use of raw materials and the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance. This final-form rulemaking will reduce mercury emissions from EGUs. Coal-fired power plants that burn subbituminous coal emit Hg^0, which can be transported over transcontinental distances. Coal-fired power plants that burn bituminous coal emit oxidized forms of mercury, which are deposited near their source. In this Commonwealth, 85% of the coal burned by coal-fired power plants is bituminous, with the remainder

as waste coal. Reducing mercury emissions will reduce mercury deposition and will therefore reduce mercury related water pollution.

I. *Sunset Review*

This final-form rulemaking will be reviewed in accordance with the sunset review schedule published by the Department to determine if the regulations effectively fulfill the goals for which they were intended.

J. *Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P. S. § 745.5(a)), on October 17, 2006, the Department submitted a copy of this final-form rulemaking and a copy of a Regulatory Analysis Form to IRRC and to the Chairpersons of the House and Senate Environmental Resources and Energy Committees for review and comment.

Under section 5(c) of the Regulatory Review Act, IRRC and the Committees were provided copies of the comments received during the public comment period, as well as other documents when requested. In preparing the final-form rulemaking, the Department considered the comments received by IRRC, the Committees and the public.

Under section 5.1(d) of the Regulatory Review Act (71 P. S. § 745.5a(d)), on November 15, 2006, this final-form rulemaking was deemed approved by the House Committee. Under section 5.1(e) of the Regulatory Review Act, IRRC met on November 16, 2006, and approved the final-form rulemaking. Under section 5.1(j.2) of the Regulatory Review Act, on October 18, 2006, the Senate Committee notified IRRC of its intent to review the regulation under section 5.1(j.2) of the Regulatory Review Act. The Senate Committee's 14 calendar day period for review began on the date that IRRC delivered notice of its approval, November 16, 2006. It expired without the Senate Committee taking further action.

(*Editor's Note:* The General Assembly adjourned *sine die* on November 28, 2006, leaving the Senate Environmental Resources and Energy Committee unable to assert its full 14-day review of the final form regulation.

Under section 5.1(j.3) of the Regulatory Review Act (71 P. S. § 745.5a(j.3)) the Department of Environmental Protection resubmitted this regulation to the Environmental Resources and Energy Committee of the Senate on January 31, 2007, to the Environmental Resources and Energy Committee of the House of Representatives and to the Independent Regulatory Review. The Environmental Resources and Energy Committee of the House of Representatives and the Independent Regulatory Review Commission affirmed their original approvals. The final form rulemaking was deemed approved by the Senate Committee on February 12, 2007.

K. *Findings*

The Board finds that:

(1) Public notice of proposed rulemaking was given under sections 201 and 202 of the act of July 31, 1968 (P. L. 769, No. 240) (45 P. S. §§ 1201 and 1202) and regulations promulgated thereunder, at 1 Pa. Code §§ 7.1 and 7.2.

(2) A public comment period was provided as required by law and all comments were considered.

(3) These regulations do not enlarge the purpose of the proposed rulemaking published at 36 Pa.B. 3185.

(4) These regulations are necessary and appropriate for administration and enforcement of the authorizing acts identified in Section C of this order.

L. *Order*

The Board, acting under the authorizing statutes, orders that:

(a) The regulations of the Department, 25 Pa. Code Chapter 123, are amended by adding §§ 123.201—123.215 to read as set forth in Annex A.

(b) The Chairperson of the Board shall submit this order and Annex A to the Office of General Counsel and the Office of Attorney General for review and approval as to legality and form, as required by law.

(c) The Chairperson of the Board shall submit this order and Annex A to IRRC and the Senate and House Environmental Resources and Energy Committees as required by the Regulatory Review Act.

(d) The Chairperson of the Board shall certify this order and Annex A and deposit them with the Legislative Reference Bureau, as required by law.

(e) This order shall take effect immediately upon publication in the *Pennsylvania Bulletin*.

KATHLEEN A. MCGINTY,
Chairperson

(*Editor's Note*: For the text of the order of the Independent Regulatory Review Commission, relating to this document, see 36 Pa.B. 7353 (December 2, 2006).)

Fiscal Note: Fiscal Note 7-405 remains valid for the final adoption of the subject regulations.

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE III. AIR RESOURCES

CHAPTER 123. STANDARDS FOR CONTAMINANTS

MERCURY EMISSIONS

Sec.

§ 123.201. Purpose.

Sections 123.202—123.215 establish mercury emission standards, annual emission limitations as part of a Statewide mercury allowance program with annual nontradable mercury allowances and other requirements for the purpose of reducing mercury emissions from coal-fired EGUs or cogeneration units.

§ 123.202. Definitions.

(a) In addition to the words and terms in subsection (b), the definitions promulgated in 40 CFR Part 60, Subpart Da (relating to standards of performance for electric utility steam generating units for which construc-

tion is commenced after September 18, 1978) and 40 CFR Part 60, Subpart HHHH (relating to emission guidelines and compliance times for coal-fired electric steam generating units) are adopted in their entirety and incorporated by reference in this subsection.

(b) The following words and terms, when used in this section and §§ 123.201 and 123.203—123.215, have the following meanings, unless the context clearly indicates otherwise:

Act—The Air Pollution Control Act (35 P. S. §§ 4001—4015).

Administrator—The Administrator of the EPA or the Administrator's authorized representative.

Btu—British thermal unit—The amount of thermal energy necessary to raise the temperature of 1 pound of pure liquid water by 1° F. at the temperature at which water has its greatest density (39° F.).

Bottoming-cycle cogeneration unit—A cogeneration unit in which the energy input to the unit is first used to produce useful thermal energy and at least some of the reject heat from the useful thermal energy application or process is then used for electricity production.

CFB—Circulating fluidized bed unit—Combustion of fuel in a bed or series of beds in which these materials are forced upward by the flow of combustion air and the gaseous products of combustion.

CO_2—Carbon dioxide.

CS-ESP—Cold side electrostatic precipitator—A particulate control device installed downstream of a boiler air preheater that does the following:

(i) Charges particles with an electric field and causes them to migrate from the gas to a collection surface.

(ii) Treats flue gas after heat extraction from the gas has been completed.

(iii) Operates within a temperature range of no greater than 400° F.

Clean Air Act—The Clean Air Act (42 U.S.C.A. §§ 7401—7642) and the rules and regulations promulgated thereunder.

Coal—

(i) Solid fuels classified as anthracite, bituminous, subbituminous or lignite by the ASTM International Standard D 388—77, 90, 91, 95, 98A or 99, Specification for Classification of Coals by Rank.

(ii) The term includes synthetic fuels derived from coal and coal refuse for the purpose of creating useful heat, including solvent refined coal, gasified coal, coal-oil mixtures and coal-water mixtures.

Coal refuse—Waste products of coal mining, physical coal cleaning and coal preparation operations (for example—culm, gob, and the like) containing coal, matrix material, clay and other organic and inorganic material.

Cogeneration unit—A stationary, coal-fired boiler or stationary, coal-fired combustion turbine which:

(i) Has equipment used to produce electricity and useful thermal energy for industrial, commercial, heating or cooling purposes through the sequential use of energy.

(ii) Produces, for a topping-cycle cogeneration unit, during the 12-month period starting on the date the unit first produces electricity and during any calendar year after the 12-month period in which the unit first produces electricity:

(A) Useful thermal energy not less than 5% of total energy output.

(B) Useful power that when added to one-half of useful thermal energy produced:

(I) Is not less than 42.5% of total energy input, if useful thermal energy produced is 15% or more of total energy output.

(II) Is not less than 45% of total energy input, if useful thermal energy produced is less than 15% of total energy output.

(iii) Produces, for a bottoming-cycle cogeneration unit, during the 12-month period starting on the date the unit first produces electricity and during any calendar year after the 12-month period in which the unit first produces electricity, useful power not less than 45% of total energy input.

Commence operation—To have begun any mechanical, chemical or electronic process, including, with regard to a unit, a start-up of a unit's combustion chamber.

Control period—The period beginning January 1 of a calendar year and ending on December 31 of the same year, inclusive.

EGU—Electric generating unit—

(i) Except as provided in subparagraphs (iv) and (v), a stationary, coal or coal refuse-fired boiler or stationary, coal-fired combustion turbine in this Commonwealth that serves or has served at any time, since the later of November 15, 1990, or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(ii) A stationary boiler or stationary combustion turbine in this Commonwealth that is not an EGU under subparagraph (i) that begins to combust coal or coal-derived fuel or to serve a generator with nameplate capacity of more than 25 MWe producing electricity for sale shall become an electric generating unit as provided in subparagraph (i) on the first date on which it both combusts coal or coal-derived fuel and serves the generator.

(iii) A unit that qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the requirements of subparagraph (iv) for at least 1 calendar year, but subsequently no longer meets the requirements shall become an EGU starting on the earlier of January 1 after the first calendar year during which the unit first no longer qualifies as a cogeneration unit or January 1 after the first calendar year during which the unit no longer meets the requirements of subparagraph (iv)(B).

(iv) A unit that is an EGU under subparagraphs (i) or (ii) and meets both of the following requirements will not be an EGU if it:

(A) Qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and continues to qualify as a cogeneration unit.

(B) Has not served at any time, since the later of November 15, 1990, or the startup of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWhs, whichever is greater, to any utility power distribution system for sale.

(v) A "solid waste incineration unit" as defined in section 129(g)(1) of the Clean Air Act (42 U.S.C.A. § 7554(g)(1)) that combusts "municipal waste" as defined

in section 129(g)(5) of the Clean Air Act will not be an EGU if it is subject to one of the following rules:

(A) An EPA-approved state plan for implementing the requirements of 40 CFR Part 60, Subpart Cb (relating to emissions guidelines and compliance times for large municipal waste combustors that are constructed on or before September 20, 1994).

(B) 40 CFR Part 60, Subpart Eb (relating to standards of performance for large municipal waste combustors for which construction is commenced after September 20, 1994 or for which modification or reconstruction is commenced after June 19, 1996).

(C) 40 CFR Part 60, Subpart AAAA (relating to standards of performance for small municipal waste combustors for which construction is commenced after August 30, 1999 or for which modification or reconstruction is commenced after June 6, 2001).

(D) An EPA-approved state plan for implementing 40 CFR Part 60, Subpart BBBB (relating to emission guidelines and compliance times for small municipal waste combustion units constructed on or before August 30, 1999).

(E) 40 CFR Part 62, Subpart FFF (relating to Federal plan requirements for large municipal waste combustors constructed on or before September 20, 1994).

(F) 40 CFR Part 62, Subpart JJJ (relating to Federal plan requirements for small municipal waste combustion units constructed on or before August 30, 1999).

Existing EGU—An EGU which commenced construction, modification or reconstruction on or before January 30, 2004, or which has three complete control periods of heat input data as of December 31 of the preceding control period.

FF-Fabric filter—An add-on air pollution control system that removes particulate matter (PM) and emissions of nonvaporous metals by passing flue gas through filter bags.

Facility—All units located on one or more contiguous or adjacent properties and which are owned or operated by the same person under common control.

GWh—Gigawatt-hour—One billion watt-hours.

Heat input—For a specified period of time, the product, expressed as million "Btus" per unit time (MMBtu/time), of the gross calorific value of the fuel (in "Btus" per pound fuel (Btu/LB fuel) divided by 1,000,000 Btu/MMBtu) multiplied by the fuel feed rate into a combustion device (in pounds of fuel per unit time (LB fuel/time)), as measured, recorded and reported to the Department by the owner or operator of an EGU and determined in accordance with 40 CFR 60.4170—60.4176 and excluding the heat derived from preheated combustion air, recirculated flue gases or exhaust from other sources.

IGCC—Integrated gasification combined cycle unit—An electric utility steam generating unit that burns a synthetic gas derived from coal in a combined-cycle gas turbine. No coal is directly burned in the unit during operation.

MMBtu—One million British thermal units.

MW—Megawatt—A unit for measuring power equal to one million watts.

MWe—Megawatt electric—One million watts of electric capacity.

MWh—Megawatt-hour—One million watt-hours.

Nameplate capacity—The maximum electrical generating output (in MWe) that the generator is capable of producing on a steady-state basis during continuous operation (when not restricted by seasonal or other deratings):

(i) As specified by the manufacturer, starting from the initial installation of the generator.

(ii) As specified by the person conducting the physical change, starting from the completion of a subsequent physical change in the generator resulting in an increase in the maximum electrical generating output in MWe.

New EGU—An EGU which commenced construction, modification or reconstruction, as defined under 40 CFR Part 60 (relating to standards of performance for new stationary sources), on or after January 30, 2004, and has less than three complete control periods of heat input data as of December 31 of the preceding control period.

O_2—Oxygen.

Operator—

(i) A person who operates, controls or supervises an EGU or a facility that includes an EGU.

(ii) The term also includes a holding company, utility system or plant manager of an EGU or facility.

Owner—

(i) A holder of any portion of the legal or equitable title in an EGU or a facility in this Commonwealth that includes an EGU.

(ii) The term also includes a holder of a leasehold interest in an EGU or a facility in this Commonwealth that includes an EGU.

PCF—Pulverized coal-fired unit—

(i) A steam generating unit in which pulverized coal is introduced into an air stream that carries the coal to the combustion chamber of the steam generating unit where it is fired in suspension.

(ii) The term includes both conventional pulverized coal-fired and micropulverized coal-fired steam generating units.

Phase 1—The period from January 1, 2010, through December 31, 2014.

Phase 2—The period beginning January 1, 2015, and each subsequent year thereafter.

Rolling 12-month basis—A determination made on a monthly basis from the relevant data for a particular calendar month and the preceding 11 calendar months (total of 12 months of data).

SCR—Selective catalytic reduction—A process where a gaseous or liquid reductant (most commonly ammonia or urea) is added to the flue gas stream in the presence of a catalyst. The reductant reacts with nitrogen oxides in the flue gas to form molecular nitrogen.

SO_2—Sulfur dioxide.

Space velocity—The exhaust gas volume per hour of the SCR corrected to standard temperature and pressure divided by the volume of the catalyst.

Standby unit—A unit that is out of operation but under a Department-approved maintenance plan as provided under § 127.11a (relating to reactivation of sources), which will enable the source to be reactivated in accordance with the terms of the permit issued to the source.

System—The total number of EGUs under common ownership or operator control in this Commonwealth, which an owner or operator identifies to the Department as participating in an emissions compliance demonstration for the purpose of complying with § 123.207 (relating to annual emission limitations for coal-fired EGUs).

System-wide compliance demonstration—Demonstrating compliance with the annual emission limitation by ensuring that the aggregate of actual mass emissions is less than the aggregate of allowable mass emissions for all EGUs in the system which are included in the demonstration.

Topping-cycle cogeneration unit—A cogeneration unit in which the energy input to the unit is first used to produce useful power, including electricity, and at least some of the reject heat from the electricity production is then used to provide useful thermal energy.

WFGD—Wet flue gas desulfurization unit—An SO_2 control system located downstream of the steam generating unit that removes SO_2 from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution including lime and limestone.

Watt-hour—A unit of energy equivalent to 1 watt of power expended for 1 hour of time.

§ 123.203. Applicability.

The requirements of this section and §§ 123.201, 123.202 and 123.204—123.215 apply to owners and operators of an EGU located in this Commonwealth and, except as otherwise noted, supersede those requirements adopted in their entirety and incorporated by reference in § 122.3 (relating to adoption of standards).

§ 123.204. Exceptions.

Consistent with § 123.207(b)(1) (relating to annual emission limitations for coal-fired EGUs), the owner or operator of an EGU that enters into an enforceable agreement with the Department not later than December 31, 2007, for the shutdown and replacement of the unit with IGCC technology no later than December 31, 2012, shall be exempted from compliance with the Phase 1 emission standards specified in § 123.205 (relating to emission standards for coal-fired EGUs).

§ 123.205. Emission standards for coal-fired EGUs.

(a) *New EGUs.* In addition to the mercury emission limitation requirements in § 123.207 (relating to annual emission limitations for coal-fired EGUs), the owner or operator of a new EGU subject to § 123.203 (relating to applicability) shall comply at the commencement of operation on a rolling 12-month basis with one of the following standards:

(1) *PCF EGU.* The owner or operator of a PCF EGU shall comply with either of the following:

(i) A mercury emission standard of 0.011 pound of mercury per GWh.

(ii) A minimum 90% control of total mercury as measured from the mercury content in the coal, either as fired or as approved in writing by the Department.

(2) *CFB EGU.* The owner or operator of a CFB EGU shall comply with the following applicable provisions:

(i) CFB EGUs burning 100% coal refuse as the only solid fossil fuel shall comply with either of the following:

(A) A mercury emission standard of 0.0096 pound of mercury per GWh.

(B) A minimum 95% control of total mercury as measured from the mercury content in the coal refuse, either as fired or as approved in writing by the Department.

(ii) CFB EGUs burning 100% coal as the only solid fossil fuel shall comply with either of the following:

(A) A mercury emission standard of 0.011 pound of mercury per GWh.

(B) A minimum 90% control of total mercury as measured from the mercury content in the coal, either as fired or as approved in writing by the Department.

(iii) CFB EGUs burning multiple fuels shall comply with a prorated emission standard based on the percentage of heat input from the coal and the percentage of heat input from the coal refuse.

(3) *IGCC EGU.* The owner or operator of an IGCC EGU shall comply with one of the following:

(i) A mercury emission standard of 0.0048 pound of mercury per GWh.

(ii) A minimum 95% control of total mercury as measured from the mercury content in the coal, either as processed or as approved in writing by the Department.

(b) *Other requirements for new EGUs.* In addition to the emission requirements of subsection (a), the applicable requirements for a new EGU include:

(1) *Best available technology requirement.* The emission standards in this subsection will serve as a baseline for review and approval of case-by-case best available technology determinations for a new EGU in accordance with Chapter 127 (relating to construction, modification, reactivation and operation of sources).

(2) *Standards of performance for new stationary sources requirements.* In addition to the requirements of this section and §§ 123.201—123.204 and 123.206—123.215, the owner or operator of a new EGU shall also comply with the standards of performance for new stationary sources promulgated in 40 CFR Part 60, Subpart Da (relating to standards of performance for electric utility steam generating units for which construction is commenced after September 18, 1978) and adopted in their entirety and incorporated by reference in Chapter 122 (relating to National standards of performance for new stationary sources).

(c) *Existing EGUs.* In addition to the mercury emission limitation requirements of § 123.207, the owner or operator of an existing EGU subject to the emission standards for EGUs specified in this section shall comply on a rolling 12-month basis with one of the following standards:

(1) *Phase 1.* Effective from January 1, 2010, through December 31, 2014:

(i) *PCF EGU.* The owner or operator of a PCF shall comply with one of the following:

(A) A mercury emission standard of 0.024 pound of mercury per GWh.

(B) A minimum 80% control of total mercury as measured from the mercury content in the coal, either as fired or as approved in writing by the Department.

(ii) *CFB EGU.* The owner or operator of a CFB burning coal refuse shall comply with one of the following:

(A) A mercury emission standard of 0.0096 pound of mercury per GWh.

(B) A minimum 95% control of total mercury as measured from the mercury content in the coal refuse, either as fired or as approved in writing by the Department.

(2) *Phase 2.* ˆEffective beginning January 1, 2015, and each subsequent year:

(i) *PCF EGU.* ˆThe owner or operator of a PCF shall comply with one of the following:

(A) A mercury emission standard of 0.012 pound of mercury per GWh.

(B) A minimum 90% control of total mercury as measured from the mercury content in the coal, either as fired or as approved in writing by the Department.

(ii) *CFB EGU.* The owner or operator of a CFB burning coal refuse shall comply with one of the following:

(A) A mercury emission standard of 0.0096 pound of mercury per GWh.

(B) A minimum 95% control of total mercury as measured from the mercury content in the coal refuse, either as fired or as approved in writing by the Department.

(d) *Credit for fuel pretreatment.* The owner or operator of an EGU may request, in writing, credit for the mercury removal efficiency resulting from the pretreatment of coal or coal refuse towards the minimum percent control efficiency of total mercury requirements specified in this section. The credit shall be approved, in writing, by the Department consistent with the process outlined in 40 CFR 60.50da (relating to compliance determination procedures and methods).

§ 123.206. Compliance requirements for the emission standards for coal-fired EGUs.

(a) The owner or operator of one or more EGUs subject to the emission standards of § 123.205 (relating to emission standards for coal-fired EGUs) shall demonstrate compliance with the standards using one of the following methods:

(1) Compliance on a unit-by-unit basis.

(2) Facility-wide emissions averaging.

(b) The Department may approve in a plan approval or operating permit, or both, an alternate mercury emission standard or compliance schedule, or both, if the owner or operator of an EGU subject to the emission standards of § 123.205 demonstrates in writing to the Department's satisfaction that the mercury reduction requirements are economically or technologically infeasible. The Department's written approval of an alternate mercury emission standard or compliance schedule does not relieve the owner or operator of the EGU from complying with the other requirements of §§ 123.201—123.205 and 123.207—123.215. The owner or operator shall:

(1) Submit a plan approval application or operating permit application requesting an alternate emission standard or compliance schedule, or both, to the Department for approval no later than 120 days before the applicable compliance deadline.

(2) Include the following in the application:

(i) A brief description, including make, model and location of each EGU.

(ii) A list of all air pollution control technologies and measures that have been installed on each EGU and are operating to control emissions of air contaminants including mercury.

(iii) The dates of installation and commencement of operation for each of the technologies and measures required under subparagraph (ii).

(iv) An explanation of how the technology or measure was installed and if it is being operated according to the manufacturer's instructions for each of the technologies and measures required under subparagraph (ii).

(v) The results of each mercury stack test and other emissions measurements for the EGU following installation and commencement of operation of the air pollution control technologies and measures listed in accordance with subparagraph (ii).

(vi) A list of other air pollution control technologies or measures that the owner or operator proposes to install and operate on each EGU to control emissions of air contaminants including mercury.

(vii) A summary of how the owner or operator of the EGU intends to operate and maintain the unit during the term of the approved plan approval or operating permit, or both, including the associated air pollution control equipment and measures that are designed to maintain compliance with all other applicable plan approval or operating permit requirements and that are designed and operated to minimize the emissions of mercury to the extent practicable.

(viii) A proposed schedule that lists the increments of progress and the date for final compliance if an alternate compliance schedule is requested.

(ix) An emission reduction proposal and information on the technological feasibility of meeting the requirements of this section and § 123.205 if an alternate emission standard is requested.

(x) Other information which the Department requests that is necessary for the approval of the application.

(c) The Department's written approval of an alternate emission standard or compliance schedule will be based on the information provided in the application submitted by the owner or operator of the EGU in accordance with subsection (b).

(d) For an EGU complying with the energy output-based mercury emission standards of § 123.205 (expressed in pounds of mercury per GWh), the actual mercury emission rate of the EGU for each 12-month rolling period, monitored in accordance with §§ 123.210—123.215 and calculated as follows, may not exceed the applicable emission standard:

$$ER = \sum_{i=1}^{12} E_i \div \sum_{i=1}^{12} O_i$$

Where:

ER = Actual mercury emissions rate of the EGU for the particular 12-month rolling period, expressed in pounds per GWh.

E_i = Actual mercury emissions of the EGU, in pounds, in an individual month in the 12-month rolling period, as determined in accordance with the monitoring provisions.

O_i = Gross electrical output of the EGU, in GWhs, in an individual month in the 12-month rolling period.

(e) For an EGU complying with the percent control requirements of § 123.205, the actual control efficiency for mercury emissions achieved by the EGU for each 12-month rolling period, monitored in accordance with §§ 123.210—123.215 and calculated as follows, shall meet or exceed the applicable efficiency requirement:

$$CE = 100 * \left\{1 - \left(\sum_{i=1}^{12} E_i \div \sum_{i=1}^{12} I_i\right)\right\}$$

Where:

CE = Actual control efficiency for mercury emissions of the EGU for the particular 12-month rolling period, expressed as a percent.

E_i = Actual mercury emissions of the EGU, in pounds, in an individual month in the 12-month rolling period, as determined in accordance with the monitoring provisions of §§ 123.210—123.215.

I_i = Amount of mercury in the fuel fired in the EGU, in pounds, in an individual month in the 12-month rolling period, as determined in accordance with § 123.214 (relating to coal sampling and analysis for input mercury levels).

(f) The owner or operator of an EGU may demonstrate compliance with § 123.205 by means of facility-wide averaging that demonstrates that the actual mercury emissions from EGUs covered under the emissions averaging demonstration are less than the allowable mercury emissions from all EGUs covered by the demonstration on a rolling 12-month basis.

§ 123.207. Annual emission limitations for coal-fired EGUs.

(a) *Statewide mercury nontradable allowance program.* In addition to the mercury emission standard requirements of § 123.205 (relating to emission standards for coal-fired EGUs), the owner or operator of a new or existing affected EGU subject to § 123.203 (relating to applicability) shall comply with the annual emission limitations established through a Statewide mercury nontradable allowance program under this section. The Department will issue to the owner or operator of an affected EGU a plan approval or operating permit (including Title V) that contains the applicable requirements of this section and §§ 123.202—123.206 and 123.208—123.215 before the later of January 1, 2010, or the date on which the affected EGU commences operation.

(b) *Emission limitation set-asides.* The total ounces of mercury emissions available for emission limitation set-asides as annual nontradable mercury allowances in the Statewide mercury allowance program are:

(1) 56,928 ounces (3,558 pounds) of mercury emissions for Phase 1, effective from January 1, 2010, through December 31, 2014.

(2) 22,464 ounces (1,404 pounds) of mercury emissions for Phase 2, effective beginning January 1, 2015, and each subsequent year.

(c) *New affected EGUs.* For each calendar year beginning January 1, 2010, the Department will set aside a total number of annual nontradable mercury allowances for the owners and operators of new affected EGUs in this Commonwealth that do not yet have a baseline heat input determined in accordance with the requirements of an approved plan approval or operating permit.

(1) The total number of annual nontradable mercury allowances set aside for the owners and operators of new affected EGUs will be equal to a percentage of the amount of ounces of mercury emissions in the Statewide mercury allowance program established in subsection (a). The percentage of set-aside is:

(i) 5% of the Phase 1 annual nontradable mercury allowances established in subsection (b)(1) for the years beginning January 1, 2010, through December 31, 2014.

(ii) 3% of the Phase 2 annual nontradable mercury allowances established in subsection (b)(2) for the calendar year beginning January 1, 2015, and subsequent years.

(2) The annual nontradable mercury allowances set aside for the owners and operators of new affected EGUs shall be placed in the annual emission limitation supplement pool established under § 123.208 (relating to annual emission limitation supplement pool).

(3) After a new EGU has commenced operation and completed three control periods, the EGU will become an existing EGU. The new EGU will continue to receive annual nontradable mercury allowances from the new unit set-aside until the new EGU is eligible for annual nontradable mercury allowances allocated from the set-aside for existing EGUs. The annual nontradable mercury allowances allocated from the set-aside for existing EGUs may not exceed the allowable mercury emissions limitation specified in a plan approval or operating permit (including Title V) for the new EGU.

(4) When a new EGU is eligible to receive annual nontradable mercury allowances from the set-aside for existing EGUs, new maximum allowance levels for all existing EGUs will be established and published in the *Pennsylvania Bulletin* for comment by May 31 of the year that is 2 years prior to the affected control period.

(5) If the actual emissions of mercury reported to the Department from the operation of a new EGU during a specific control period are less than the maximum number of annual nontradable mercury allowances specified in the plan approval or operating permit for the EGU, the Department will include the unused portion of the annual nontradable mercury allowances in the set-aside for new EGUs.

(6) The unused portion of annual nontradable mercury allowances set aside under paragraph (3) may not be added to the maximum number of annual nontradable mercury allowances set aside in subsequent years for the owner or operator of a new EGU. The annual nontradable mercury allowances may not be banked for use in future years.

(d) *Existing affected CFBs.* For each calendar year beginning January 1, 2010, the Department will set aside for the owners and operators of existing affected CFBs a total number of annual nontradable mercury allowances from the total ounces of mercury emissions available for annual emission limitation set-asides in Phase 2 of the Statewide mercury allowance program established in subsection (b)(2).

(e) *Maximum allowances set aside for CFBs.* The maximum number of annual nontradable mercury allowances set aside for the owner or operator of each existing affected CFB in accordance with subsection (d) shall be determined by multiplying the affected CFB's baseline heat input fraction of the State's total baseline annual heat input for all EGUs by the Department's Phase 2 annual mercury allowance set-aside for existing EGUs, as follows:

(1) The baseline heat input in MMBtu for each existing affected CFB will be the average of the three highest amounts of annual heat input using the heat input data for the CFB from EPA's acid rain database and the Department's database for the calendar years 2000—2004.

(2) The State's annual mercury allowance set-aside for existing EGUs for Phase 2 is 21,790 ounces.

(f) *Existing affected EGUs other than CFBs.* For each calendar year beginning January 1, 2010, the Department will set aside for the owners and operators of existing affected EGUs other than CFBs a total number of annual nontradable mercury allowances from the total ounces of mercury emissions available for annual emission limitation set-asides in Phase 1 and Phase 2 of the Statewide mercury allowance program established in subsection (b).

(g) *Maximum allowances set aside for existing affected EGUs other than CFBs.* The maximum number of annual nontradable mercury allowances set aside for the owner or operator of each existing affected EGU other than CFB in accordance with subsection (f) shall be determined for the existing affected EGU other than CFB by multiplying its baseline heat input fraction of the State's total baseline annual heat input for all EGUs by the Department's annual mercury allowance set-aside for existing affected EGUs in each phase, as follows:

(1) The baseline heat input in MMBtu for each existing affected EGU other than CFB will be the average of the three highest amounts of annual heat input using the heat input data for the EGU other than CFB from the EPA's acid rain database and the Department's database for calendar years 2000—2004.

(2) The State's annual mercury allowance set-aside for existing affected EGUs is:

(i) 54,080 ounces for Phase 1.

(ii) 21,790 ounces for Phase 2.

(h) *Publication of maximum number of allowances set aside for Phase 1.* By May 31, 2008, the Department will publish for comment in the *Pennsylvania Bulletin* the maximum number of annual nontradable mercury allowances set aside for the owner or operator of each existing affected CFB and EGU other than CFB for Phase 1 of the Statewide mercury allowance program. The nontradable allowances shall only be used to demonstrate compliance with the annual emission limitation requirements.

(i) *Publication of maximum number of allowances set aside for Phase 2.* By May 31, 2013, the Department will publish for comment in the *Pennsylvania Bulletin* the maximum number of annual nontradable mercury allowances set aside for the owner or operator of each existing affected CFB and EGU other than CFB for Phase 2 of the Statewide mercury allowance program. The nontradable allowances shall only be used to demonstrate compliance with the annual emission limitation requirements.

(j) *Maximum number of allowances awarded.* By March 31 of the year following each reporting year, the Department will notify the owner or operator of each affected EGU, facility or system, in writing, of the actual number of annual nontradable mercury allowances awarded to the owner or operator of the EGU, facility or system for the control period.

(1) The actual number of annual nontradable mercury allowances awarded to the owner or operator of the EGU, facility, or system shall be based on the actual emissions reported to the Department in accordance with §§ 123.210—123.215.

(2) If the actual emissions of mercury reported to the Department in accordance with §§ 123.210—123.215 are less than the maximum number of annual nontradable mercury allowances set aside in the Statewide mercury allowance program for the owner or operator of an EGU, facility or system in accordance with either subsection (c), (d) or (f), the Department will place the unused portion of annual nontradable mercury allowances in the annual emission limitation supplement pool established under § 123.208 (relating to annual emission limitation supplement pool).

(3) The unused portion of annual nontradable mercury allowances set aside under subsection (c), (d) or (f) may not be added to the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the affected EGU, facility or system for subsequent years. The annual nontradable mercury allowances may not be banked for use in future years.

(4) The actual number of annual nontradable mercury allowances awarded to the owner or operator of the EGU, facility or system may not exceed the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the EGU, facility or system in the Statewide mercury allowance program in accordance with subsection (c), (d) or (f) except as provided in § 123.209 (relating to petition process).

(5) Each ounce of mercury emitted in excess of the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the affected EGU, facility or system in accordance with subsection (c), (d) or (f) shall constitute a violation of this section and the act, except as provided under § 123.209.

(k) *Standby units and units permanently shut down.* Annual nontradable mercury allowances will not be set aside for the owner or operator of an existing affected EGU that is already shut down or scheduled for shutdown unless the owner or operator of the EGU obtains a plan approval for the construction of a new EGU, or is on standby as of the effective date of each set-aside phase under subsection (c), (d) or (f). When a standby unit is ready for normal operation, the owner and operator may petition the Department for a number of annual nontradable mercury allowances as provided under § 123.209. Annual nontradable mercury allowances will be allocated to the owner or operator of the EGU. The annual nontradable mercury allowances allocated from the existing EGU set-aside may not exceed the allowable mercury emissions limitation specified in a plan approval or operating permit (including Title V) for the new EGU.

(l) *Units scheduled for permanent shutdown.*

(1) The requirements of this section and §§ 123.202—123.206 and 123.208—123.215 do not apply to the owner or operator of an EGU that will be permanently shut down no later than December 31, 2009. The owner or operator of the EGU scheduled for shutdown shall do the following:

(i) Within 180 days prior to the shutdown, notify the Administrator and the Department, in writing, that the EGU is scheduled to be permanently shut down. The notice must contain a description of the actions that have been taken to shut down the EGU, the future actions and schedule for completing the shut down of the EGU, and the anticipated date of permanent shutdown of the EGU.

(ii) Execute a legally enforceable document prior to shutdown that requires the EGU to be permanently shut down in accordance with this section.

(2) Within 30 days after the permanent shutdown of the EGU, the mercury designated representative shall provide written notice to the Administrator and the Department of the actual date of the permanent shutdown of the unit.

(3) For 5 years from the date the records are created, the owner and operator of an EGU shall retain records demonstrating that the EGU is permanently shut down.

The Administrator or Department may, in writing, extend the recordkeeping time period for cause, at any time before the end of the 5-year period. The owners and operators bear the burden of proof that the unit is permanently shut down. The records shall be retained at the facility where the EGU is located and submitted to the Department upon request.

(m) *Future emission limitations.* The Department may revise the percentage of set-aside used to determine the number of ounces of mercury set aside for future annual mercury emission limitations to accommodate the emissions from new EGUs so that the total number of ounces of mercury emissions in the Statewide mercury allowance program is not exceeded. The Department will publish notice of the proposed and final revisions in the *Pennsylvania Bulletin*.

(n) *Changes in calculation of baseline heat input.* The Department may revise the percentage of set-aside used to determine the number of ounces of mercury set aside for future annual mercury emission limitations to accommodate changes in the calculation of baseline heat input in accordance with subsection (e) or (g) so that the total number of ounces of mercury emissions in the Statewide mercury allowance program is not exceeded. The Department will publish notice of the proposed and final revisions in the *Pennsylvania Bulletin*.

(o) *Maintained by Department.* The Statewide mercury allowance program established under subsection (a) and the annual nontradable mercury allowances set aside for emission limitations under subsections (b)—(n) will be maintained by the Department.

(p) *Demonstration of compliance.* The owner or operator of one or more affected mercury allowance program EGUs subject to this section shall demonstrate compliance with the applicable requirements using one of the following methods by March 1 for the preceding control period:

(1) Compliance on a unit-by-unit basis.

(2) Compliance on a facility-wide basis.

(3) Compliance on a system-wide basis.

(q) *Facility-wide compliance demonstration.* The owner or operator of an EGU may demonstrate compliance with this section on a facility-wide basis. The total of the actual mercury emissions from the EGUs included in the demonstration must be less than the total of the allowable mercury emissions from all EGUs included in the demonstration on an annual basis.

(r) *System-wide compliance demonstration.* The owner or operator of two or more EGUs under common ownership or operator control in this Commonwealth may demonstrate compliance with this section as follows:

(1) The total of the actual mercury emissions from the EGUs at the facility and other EGUs at other facilities included in the system-wide demonstration must be less than the total of the allowable mercury emissions from all EGUs included in the demonstration on an annual basis.

(2) An owner or operator may not include an EGU, or a portion thereof, in more than one system-wide demonstration submitted for purposes of complying with this section and §§ 123.201—123.206 and 123.208—123.215.

§ 123.208. Annual emission limitation supplement pool.

(a) Effective January 1, 2010, the Department will establish an annual emission limitation supplement pool to monitor annual nontradable mercury allowances that:

(1) Have been created as part of the new affected EGU set-aside under § 123.207(c) (relating to annual emission limitations for coal-fired EGUs).

(2) Are unused annual nontradable mercury allowances set aside as annual emission limitation supplements under § 123.207(j)(2).

(b) The annual emission limitation supplement pool of annual nontradable mercury allowances established under subsection (a) will be administered in accordance with § 123.209 (relating to petition process) by the Department.

§ 123.209. Petition process.

(a) Each calendar year beginning January 1, 2010, the owner or operator of either a new EGU or an existing affected EGU that emits amounts of mercury in excess of the maximum number of annual nontradable mercury allowances set aside in accordance with § 123.207 (relating to annual emission limitations for coal-fired EGUs) or a standby affected EGU that is ready for normal operation may petition the Department, in writing, for supplemental annual nontradable mercury allowances to be set aside for the owner or operator from the annual emission limitation supplement pool established under § 123.208(a) (relating to annual emission limitation supplement pool).

(b) The owner or operator shall submit a separate petition for each calendar year for which the owner or operator requests supplemental annual nontradable mercury allowances to be set aside from the annual emission limitation supplement pool.

(c) The owner or operator with more than one affected EGU shall submit a separate petition for each EGU for which the owner or operator requests supplemental annual nontradable mercury allowances to be set aside from the annual emission limitation supplement pool.

(d) The owner or operator of the existing affected EGU shall submit the petition to the Department by January 31 of the year following the calendar year for which the supplemental annual nontradable mercury allowances are requested to be set aside.

(e) The owner or operator of the standby affected EGU shall submit the petition to the Department no later than 120 days before the date of anticipated start-up of the EGU.

(f) The petition must include the following:

(1) A brief description, including make, model and location of each affected EGU.

(2) A list of all air pollution control technologies and measures that have been installed on each affected EGU and are operating to control emissions of air contaminants, including mercury.

(3) For each of the technologies and measures listed in accordance with paragraph (2), the date of installation and original commencement of operation.

(4) For each of the technologies and measures listed in accordance with paragraph (2), an explanation of how the mercury control technology or measure as installed has been optimized for the maximum mercury emission reduction.

(5) The results of each mercury stack test and other emissions measurements for the affected EGU following installation and commencement of operation of the air pollution control technologies and measures listed in accordance with paragraph (2).

(6) A list of other air pollution control technologies or measures that the owner or operator proposes to install and operate on each affected EGU to control emissions of air contaminants, including mercury.

(7) A summary of how the owner or operator of the affected EGU intends to operate and maintain the EGU during the term of the approved plan approval or operating permit, or both, including the associated air pollution control equipment and measures that are designed to maintain compliance with all other applicable plan approval or operating permit requirements and that are designed and operated to minimize the emissions of mercury to the extent practicable.

(g) Each calendar year beginning January 1, 2010, the Department may allocate supplemental annual nontradable mercury allowances from the annual emission limitation supplement pool established under § 123.208(a) for the owners or operators of new and existing affected EGUs. If a petition is approved by the Department in accordance with the requirements of this section, the allowances will be distributed to the following:

(1) Each owner or operator of a standby unit as defined under § 123.202 (relating to definitions) which meets the requirements of this section and §§ 123.205—123.208 and 123.210—123.215.

(2) Each owner or operator of an EGU that enters into an enforceable agreement with the Department by December 31, 2007, for the shut down and replacement of the unit with IGCC technology by December 31, 2012.

(3) Each owner or operator of a new EGU.

(4) Each owner or operator of an existing affected EGU based on the performance of the air pollution control technologies and measures that have been installed and are operating to control mercury emissions.

(h) If the petition for supplemental annual nontradable mercury allowances is approved by the Department, the supplemental annual nontradable mercury allowances set aside for the owner or operator of the existing affected EGU will be added to the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the EGU in accordance with § 123.207 only for the calendar year of the request.

(i) The Department's approval of supplemental annual nontradable mercury allowances will be based on the information provided in the petition submitted by the owner or operator of an EGU in accordance with subsection (f).

(j) The supplemental annual nontradable mercury allowances set aside under subsection (h) may not be added to the maximum number of annual nontradable mercury allowances set aside for the owner or operator of the EGU for subsequent years.

§ 123.210. General monitoring and reporting requirements.

(a) The owner or operator of a new EGU subject to the requirements of this section and §§ 123.201—123.209 and 123.211—123.215 shall demonstrate compliance with §§ 123.205 and 123.207 (relating to emission standards for coal-fired EGUs; and annual emission limitations for coal-fired EGUs) by installing and operating continuous emissions monitoring systems to measure, record and report mercury emissions from each EGU. The monitoring, recordkeeping and reporting requirements provided in this section, §§ 123.211—123.215 and 139.101 (relating to general requirements), 40 CFR Part 75, Subpart I (relating to Hg mass emission provisions) and the applicable provisions of the *Continuous Source Monitoring Manual* (DEP 274-0300-001) shall apply. For the purpose of complying with this section, the provisions in 40 CFR 60.4110—60.4114 are adopted in their entirety and incorporated herein by reference.

(b) Except as provided in subsection (c), the owner or operator of an existing EGU subject to this section, §§ 123.201—123.209 and 123.211—123.215 shall demonstrate compliance with §§ 123.205 and 123.207 (relating to emission standards for coal-fired EGUs; and annual emission limitations for coal-fired EGUs) by installing and operating continuous emissions monitoring systems to measure, record and report mercury emissions from each EGU. The monitoring, recordkeeping and reporting requirements as provided in this section, §§ 123.211—123.215 and 139.101, 40 CFR Part 75, Subpart I (relating to Hg mass emission provisions) and the applicable provisions of the *Continuous Source Monitoring Manual* (DEP 274-0300-001) shall apply. In addition, for purposes of complying with these requirements, the definitions in § 123.202 (relating to definitions) and in 40 CFR 72.2 (relating to definitions) shall apply. For the purpose of complying with the requirements of this section, the provisions in 40 CFR 60.4110—60.4114 are adopted in their entirety and incorporated herein by reference.

(c) For an affected EGU that emits 464 ounces (29 lbs.) or less of mercury per year, the owner or operator of the affected EGU shall either:

(1) Meet the requirements in subsections (a) and (b) for demonstrating compliance with §§ 123.205 and 123.207 and 40 CFR Part 75, Subpart I.

(2) Implement the excepted monitoring methodology for an EGU meeting the requirements in 40 CFR 75.81(b)—(e) (relating to monitoring of Hg mass emissions and heat input at the unit level).

(d) The owner or operator of an EGU that emits 464 ounces (29 lbs.) or less of mercury per year, may demonstrate compliance with the percent control requirements by averaging the coal mercury content and stack emission data collected during the control period.

(e) The owner or operator of each EGU shall:

(1) Install all monitoring systems required under this section and §§ 123.211—123.215 and the applicable provisions of Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources) for monitoring mercury emissions, including all systems required to monitor mercury concentration, stack gas moisture content, stack gas flow rate and CO_2 or O_2 concentration, as applicable, in accordance with 40 CFR 75.81 and 75.82 (relating to monitoring of Hg mass emissions and heat input at common and multiple stacks).

(2) Successfully complete the certification tests required under § 123.211 (relating to initial certification and recertification procedures for emissions monitoring) and meet the other requirements of this section and §§ 123.211—123.215 that are applicable to the monitoring systems required under paragraph (1).

(f) The owner or operator of each EGU shall comply with the monitoring system certification and other requirements of subsection (e) on or before the later of:

(1) January 1, 2009.

(2) Ninety EGU operating days or 180 calendar days, whichever occurs first, after the date on which the EGU commences commercial operation.

(g) The owner or operator of each EGU shall record, report and quality-assure the data from the monitoring systems required under subsection (e)(1) on and after the later of:

(1) January 1, 2009.

(2) Ninety EGU operating days or 180 calendar days, whichever occurs first, after the date on which the EGU commences commercial operation.

(h) The owner or operator of an EGU for which construction of a new stack or flue, installation of add-on mercury emission controls, a flue gas desulfurization system, an SCR system or a compact hybrid particulate collector system is completed after the applicable deadlines of subsections (f) and (g), shall:

(1) Comply with the monitoring system certification and other requirements of subsection (e).

(2) Record, report and quality assure the data from the monitoring systems required under subsection (e)(1).

(3) Comply with this section within 90 EGU operating days or 180 calendar days, whichever occurs first, after the date on which emissions first exit to the atmosphere through the new stack or flue, add-on mercury emission controls, flue gas desulfurization system, SCR system or compact hybrid particulate collector system.

(i) The owner or operator of an EGU that does not meet the applicable monitoring date in subsections (f)—(h) for any monitoring system required under subsection (e)(1) shall, for each monitoring system, determine, record and report maximum potential (or, as appropriate, minimum potential) values for:

(1) Mercury concentration.

(2) Stack gas flow rate.

(3) Stack gas moisture content.

(4) Other parameters required to determine mercury mass emissions in accordance with 40 CFR 75.80(g) (relating to general provisions).

(j) The owner or operator of an EGU that does not meet the applicable monitoring date in subsections (f)—(h) for a monitoring system required under subsection (e)(1) shall, for each monitoring system, determine, record and report substitute data using the applicable missing data procedures in 40 CFR 75.80(f) instead of the maximum potential (or, as appropriate, minimum potential) values for a parameter if the owner or operator demonstrates that there is continuity between the data streams for that parameter before and after the construction or installation of the monitoring systems required under subsection (e)(1).

(k) An owner or operator of an EGU may not use any alternative monitoring system, alternative reference method or any other alternative to any requirement of 40 CFR Part 75 (relating to continuous emission monitoring) unless the alternative system, method or requirement is approved, in writing, by the Administrator in accordance with 40 CFR Part 75, Subpart E (relating to alternative monitoring systems).

(l) An owner or operator of an affected EGU may not operate the EGU so as to discharge or allow to be discharged mercury emissions to the atmosphere without accounting for all of the emissions in accordance with the applicable provisions of this section, §§ 123.211—123.215 and Chapter 139, Subchapter C.

(m) An owner or operator of an affected EGU may not disrupt the continuous emission monitoring system or portion of it or other approved emission monitoring method to avoid monitoring and recording mercury mass emissions discharged into the atmosphere, except for periods of recertification or periods when calibration, quality assurance testing or maintenance is performed in accordance with the applicable provisions of this section, §§ 123.211—123.215 and Chapter 139, Subchapter C.

(n) An owner or operator of an affected EGU may not retire or permanently discontinue use of the continuous emission monitoring system or component of it or other approved monitoring system required under this section and §§ 123.211—123.215, except under either of the following circumstances:

(1) The owner or operator is monitoring emissions from the affected EGU with another certified monitoring system that has been approved by the Department, in writing, for use at that EGU and that provides emission data for the same pollutant or parameter as the retired or discontinued monitoring system, in accordance with the applicable provisions of this section, §§ 123.211—123.215 and Chapter 139, Subchapter C.

(2) The owner or operator submits notification of the date of certification testing of a replacement monitoring system for the retired or discontinued monitoring system in accordance with § 123.211(a)(5)(i) and a complete certification application in accordance with § 123.211(a)(5)(ii).

(3) The owner or operator of an EGU that is using a continuous emission monitoring system or a sorbent trap system to continuously monitor mercury emissions under § 123.210(c)(1) (relating to general monitoring and reporting requirements) and 40 CFR 75.81(a), may elect to comply with the methodology specified in § 123.210(c)(2) and 40 CFR 75.81(b)—(f).

§ 123.211. Initial certification and recertification procedures for emissions monitoring.

(a) By the applicable deadline specified in § 123.210 (f)—(h) (relating to general monitoring and reporting requirements), the owner or operator of an affected EGU shall comply with the following initial certification and recertification procedures for a continuous monitoring system (continuous emission monitoring system) and an excepted monitoring system (sorbent trap monitoring system) as required under 40 CFR 75.15 (relating to special provisions for measuring Hg mass emissions using the excepted sorbent trap monitoring methodology) and Chapter 139 (relating to sampling and testing):

(1) The owner or operator of the EGU shall ensure that each continuous monitoring system required by the applicable provisions of § 123.210 successfully completes all of the initial certification testing required under 40 CFR 75.80(d) (relating to general provisions) and Chapter 139.

(2) If the owner or operator of the EGU installs a monitoring system to meet the requirements of this section and §§ 123.210 and 123.212—123.215 in a location where no monitoring system was previously installed, initial certification testing is required in accordance with the applicable provisions of 40 CFR 75.80(d) and Chapter 139.

(3) If the owner or operator of the EGU makes a replacement, modification or change to a certified continuous emission monitoring system or excepted monitoring system (sorbent trap monitoring system) required by § 123.210 that may significantly affect the ability of the system to accurately measure or record mercury mass emissions or heat input rate or to meet the quality-

assurance and quality-control requirements of 40 CFR 75.81 (relating to monitoring of Hg mass emissions and heat input at the unit level) or 40 CFR Part 75, Appendix B (relating to quality assurance and quality control procedures), the monitoring system for the EGU shall be recertified in accordance with 40 CFR 75.20(b) (relating to initial certification and recertification procedures) and Chapter 139.

(4) If the owner or operator of the EGU makes a replacement, modification or change to the flue gas handling system or the operation of the EGU that may significantly change the stack gas flow or concentration profile, the owner or operator shall recertify each continuous emission monitoring system and each excepted monitoring system (sorbent trap monitoring system) whose accuracy is potentially affected by the change in accordance with 40 CFR 75.20(b) and Chapter 139.

(5) This subsection applies to both the initial certification and recertification procedures of a continuous monitoring system required by § 123.210. For recertifications, replace the words "certification" and "initial certification" with the word "recertification," replace the word "certified" with the word "recertified," and follow the procedures required under 40 CFR 75.20(b)(5) or Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources) as directed by the Department instead of the following procedures:

(i) The owner or operator shall submit to the Department written notice of the dates of certification testing.

(ii) The owner or operator shall submit to the Department a certification application for each monitoring system. A complete certification application must include the information specified in Chapter 139, Subchapter C.

(iii) If the Department issues a notice of disapproval of a certification application or a notice of disapproval of certification status, the owner or operator shall:

(A) Substitute, for each disapproved monitoring system, for each hour of EGU operation during the period of invalid data specified under 40 CFR 75.20(a)(4)(iii) or 75.21(e) (relating to quality assurance and quality control requirements) and continuing until the applicable date and hour specified under 40 CFR 75.20(a)(5)(i), either the following values or, if approved by the Department in writing, an alternative emission value that is more representative of actual emissions that occurred during the period:

(I) For a disapproved mercury pollutant concentration monitor and disapproved flow monitor, respectively, the maximum potential concentration of mercury and the maximum potential flow rate, as defined in 40 CFR Part 75, Appendix A, Sections 2.1.4.1 and 2.1.7.1 (relating to specifications and test procedures).

(II) For a disapproved moisture monitoring system and disapproved diluent gas monitoring system, respectively, the minimum potential moisture percentage and either the maximum potential CO_2 concentration or the minimum potential O_2 concentration (as applicable), as defined in 40 CFR Part 75, Appendix A, Sections 2.1.3.1, 2.1.3.2 and 2.1.5.

(III) For a disapproved excepted monitoring system (sorbent trap monitoring system) under 40 CFR 75.15 and disapproved flow monitor, respectively, the maximum potential concentration of mercury and maximum potential flow rate, as defined in 40 CFR Part 75, Appendix A, Sections 2.1.4.1 and 2.1.7.1.

(B) Submit a notification of certification retest dates and a new certification application in accordance with subparagraphs (i) and (ii).

(C) Repeat all certification tests or other requirements that were failed by the monitoring system, as indicated in the Department's notice of disapproval, within the time period specified by the Department in the notice of disapproval.

(b) The owner or operator shall submit a certification application to the Department within 45 calendar days after completing all initial certification or recertification tests required under this section.

§ 123.212. Out-of-control periods for emissions monitors.

(a) If an emissions monitoring system fails to meet the quality-assurance and quality-control requirements or data-validation requirements of Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources), data for the demonstration of compliance with § 123.207 (relating to annual emission limitations for coal-fired EGUs) shall be substituted using the applicable missing data procedures in the *Continuous Source Monitoring Manual* (DEP 274-0300-001). If a mass emissions monitoring system fails to meet a quality-assurance or quality-control requirement, mass emissions data shall be substituted using the missing data procedures in 40 CFR Part 75, Subpart I (relating to Hg mass emission provisions).

(b) If both an audit of a monitoring system and a review of the initial certification or recertification application reveal that a monitoring system should not have been certified or recertified because it did not meet a particular performance specification or other requirement under § 123.210 (relating to general monitoring and reporting requirements) or the applicable provisions of 40 CFR Part 75 (relating to continuous emission monitoring), both at the time of the initial certification or recertification application submission and at the time of the audit, the Department will issue a notice of disapproval of the certification status of the monitoring system.

(1) For the purposes of this subsection, an audit must be either a field audit or an audit of information submitted to the Department.

(2) By issuing the notice of disapproval, the Department revokes prospectively the certification status of the monitoring system. The data measured and recorded by the monitoring system will not be considered valid quality-assured data from the date of issuance of the notification of the revoked certification status until the date and time that the owner or operator completes subsequently approved initial certification or recertification tests for the monitoring system.

(3) The owner or operator shall follow the applicable initial certification or recertification procedures in § 123.210 for each disapproved monitoring system.

§ 123.213. Monitoring of gross electrical output.

The owner or operator of an EGU complying with the requirements of § 123.206(d) (relating to compliance requirements for the emission standards for coal-fired EGUs) using electrical output (Oi) shall monitor gross Oi of the associated generators and report in watt-hours per hour.

§ 123.214. Coal sampling and analysis for input mercury levels.

(a) Except as provided in § 123.210(c) (relating to general monitoring and reporting requirements), the

owner or operator of an EGU complying with this section and §§ 123.201—123.213 and 123.215 shall:

(1) Perform daily sampling of the coal combusted in the EGU for mercury content, in pounds per trillion Btu, as follows:

(i) Collect coal samples from the feeders or other representative location in accordance with 40 CFR 63.7521(c) (relating to what fuel analyses and procedures must I use?).

(ii) Composite coal samples in accordance with the requirements of 40 CFR 63.7521(d).

(2) Analyze each of the composited coal samples for mercury content in accordance with the procedures of ASTM D 6414-01 or the current revision of this method, or other alternative as approved by the Department.

(b) The owner or operator of an EGU shall use the data collected from the sampling and analysis required under subsection (a) to determine the input mercury content of the coal combusted in the EGU in terms of pounds of mercury per trillion Btu.

(c) The Department may change the frequency of the sampling and analysis of the coal combusted in the EGU for the input mercury level based on historical data provided by the owner or operator of the EGU. The change in the frequency will be approved by the Department as a minor modification to the Title V operating permit.

(d) Upon the written request of an EGU owner or operator, the Department may approve, in writing, an alternate coal sampling and analysis program submitted by the owner or operator of the EGU to demonstrate compliance with this section and §§ 123.201—123.213 and 123.215.

§ 123.215. Recordkeeping and reporting.

(a) The owner or operator of an affected EGU shall comply with the recordkeeping and reporting requirements in this section and the applicable recordkeeping and reporting requirements of 40 CFR 75.84 (relating to recordkeeping and reporting) and Chapter 139, Subchapter C (relating to requirements for source monitoring for stationary sources).

(b) The owner or operator of an affected EGU complying with this section and §§ 123.201—123.214 through the requirements of § 123.206(d) (relating to compliance requirements for the emission standards for coal-fired EGUs) by using electrical output to determine the allowable emissions of the EGU shall maintain the daily gross electrical output in GWhs in the file required under 40 CFR 75.84(a).

(c) The owner or operator of an affected EGU complying with this section and §§ 123.201—123.214 through the requirements of § 123.206(e) by using input mercury levels to determine the allowable emissions of the EGU shall maintain the daily mercury content of coal used in pounds of mercury per trillion Btu and the daily input mercury content in pounds in the file required under 40 CFR 75.84(a).

(d) Except as provided in § 123.210(c) (relating to general monitoring and reporting requirements), the owner or operator of an affected EGU shall maintain records as follows:

(1) Record the daily outlet mercury or output mercury data using the time period appropriate to the excepted monitoring system (sorbent trap monitoring system).

(2) If using an averaging methodology, record all other information collected on a daily basis necessary to calculate the average.

(3) Record for each control period the method through which each EGU demonstrated compliance.

(4) For an owner or operator who uses the averaging option of § 123.206(a)(2), calculate and record:

(i) The monthly actual mercury emissions within 30 days of the end of each month.

(ii) The 12-month rolling actual emissions each month.

(5) Maintain the following records onsite:

(i) The results of quarterly assessments conducted under 40 CFR Part 75, Appendix B, Section 2.2 (relating to quality assurance and quality control procedures).

(ii) Daily/weekly system integrity checks under 40 CFR Part 75, Appendix B, Section 2.6.

(iii) Quality assurance records as required by the *Continuous Source Monitoring Manual* (DEP 274-0300-001).

(6) Make available to the Department upon request the records required under paragraph (5).

(e) The owner or operator shall submit quarterly reports to the Department in accordance with the *Continuous Source Monitoring Manual* (DEP 274-0300-001).

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