

# **Appendix A**

**DNREC Air Quality Management Section**

**Response Document to Public Comment**

**Regulation No. 1146**

**Electric Generating Unit Multi-Pollutant Regulation**

**November 9, 2006**

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**Conectiv Comments**  
**Letter dated October 2, 2006**

**General Concerns**

Under its General Concerns comments, Conectiv discusses the attributes of an existing federal cap and trade program (NOx SIP Call) and two upcoming federal cap and trade programs (Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR)) toward achieving air quality improvements in Delaware. The CAIR rule addresses NOx and SO2 emissions from a variety of fossil-fueled power plants while the CAMR rule addresses mercury emissions from coal-fired power plants. These are both cap and trade programs that seek regional emissions reductions, and permit trading of allowances to balance emissions for units that choose to not make adequate emissions reductions.

Conectiv boasts the value of these cap and trade programs, and their ability to achieve regional emissions reductions in a cost effective manner, and indicate that the programs will allow Delaware to attain the applicable National Ambient Air Quality Standards (NAAQS). Conectiv points to the “success” of the existing NOx SIP Call as an example to justify acceptance of federal cap and trade programs instead of requiring local emissions reductions called for in the proposed multi-pollutant regulation.

The cited regional programs do not require or guarantee emissions reductions in any given location or state. They require only that mass caps are met through obtaining allowances to balance actual emissions. There is no limit in the rules on the quantity of allowances a unit can purchase to attain compliance with its assigned mass cap.

For example, the NOx SIP Call cap-and-trade program, which Conectiv presents as a “success”, established NOx emissions caps for certain units in Delaware, including those subject to the proposed multi-pollutant regulation. NOx emissions mass caps were established using historic heat input data and a NOx emission rate of 0.15 lb/MMBTU. The NOx SIP Call program has been in effect for a number of years. However, of the 8 units in Delaware subject to both the NOx SIP Call and the proposed multi-pollutant regulation, in 2005 only one unit operated with annual NOx mass emissions below its cap, and that was due to low operating capacity. All of the other units exceeded their NOx mass emissions caps by between 19% and 123%. None of the units came within 145% of the 0.15 lb/MMBTU NOx rate. This “successful” federal cap and trade program obviously did not cause Delaware’s units subject to both the NOx SIP Call and the proposed multi-pollutant regulation to produce the desired reductions. Their program compliance has been achieved through the purchase of allowances from other facilities.

In support of its CAIR regional cap and trade program, EPA performed modeling using the Integrated Planning Model (IPM), a sophisticated computer modeling that accounts for economics in predicting which units would add emission control technologies and estimate emissions for all units subject to the CAIR program. For Delaware, the IPM predicted the closure of the residual oil-fired units, and also predicted large increases in mass emissions from Delaware’s coal-fired units due to increased capacity factor. This

indicates, that like the actual results of the NO<sub>x</sub> SIP Call, affected Delaware units would find it advantageous to attain compliance through the purchase of allowances rather than achieve the target NO<sub>x</sub> mass emissions caps through emission reductions.

So while regional reductions may be attained through the Federal cap and trade programs, units in Delaware may not make such reductions and may, as predicted by EPA's IPM modeling, actually increase emissions under the federal cap and trade programs.

While EPA indicates that regional reductions will help states attain compliance with applicable National Ambient Air Quality Standards (NAAQS), EPA also recognizes that the regional reductions may be insufficient in some locations and local controls will be necessary for those locations to achieve attainment. This is because the goal of the regional programs is to mitigate transport; not to achieve attainment. This is the case for Delaware. Computer modeling indicates that Delaware sources alone can cause non-attainment of the federal ozone air quality standard in Delaware and in surrounding states, and that the Philadelphia non-attainment area (i.e., the one that Delaware is part of) is predicted to be in non-attainment after implementation of all planned measures to date. The EPA's CAIR analysis indicated that for New Castle County, which is in ozone non-attainment, only 37% of the 8-hr ozone loading is due to transport. Further, EPA's CAIR analysis indicates that Delaware sources contribute to PM<sub>2.5</sub> non-attainment in Delaware.

The reductions associated with the proposed multi-pollutant regulation will support the attainment of the 8-hour ozone and PM<sub>2.5</sub> NAAQS. The emissions reductions are also required to support Delaware meeting the reduction requirements necessary for the 8-hr ozone Reasonable Further Progress Plan. Meeting these goals will help clean Delaware's air, and will help Delaware avoid the sanctions and penalties associated with non-compliance with the associated Clean Air Act provisions.

Conectiv's statements indicate that mercury deposition is a global issue rather than a local issue, and that cap and trade programs address the issue on a large, regional scale. To the contrary, there has been significant study and research that indicates that mercury deposition tends to be higher near the source of mercury emissions, and that control of those local mercury emissions sources produce reductions in mercury concentrations locally.

Conectiv's statements oversimplify the relationship between regional emissions controls, implemented as cap and trade programs, and the effects (or lack of effects) in any particular location. Studies have shown that in many instances local emissions sources greatly affect local ambient conditions and pollutant deposition. Modeling has indicated that Delaware sources affect Delaware's environments, and can impact the ability to attain ambient air quality standards. Provisions of the Clean Air Act through the Reasonable Further Progress Plan require emissions reductions to occur in Delaware. For these reasons, reliance on the federal cap and trade programs alone provides little assurance that required emissions reductions will be attained or ambient air quality standards met.

## **Delaware Law Does Not Give DNREC Unbridled Discretion to Impose Any Level of Emissions Control it Chooses on Delaware Electric Generating Units**

Conectiv comments that before regulating an air contaminant, DNREC must determine and justify that regulation of the contaminant is in the best interest of human health, welfare, and the environment. Conectiv indicates that the federal programs will result in air quality improvements in Delaware, and that it is unlikely that reductions from Delaware sources will result in the reduction of ambient levels of NO<sub>x</sub>, SO<sub>2</sub>, and mercury significantly beyond those achieved by the federal programs. Conectiv states that DNREC must evaluate the effect on emissions and changes in air quality due to supposed emissions increases from units in neighboring states in the event Delaware units must limit or cease operation as a result of the proposed regulation's emissions limits.

DNREC has reviewed numerous references that indicate NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions pose a hazard to the public health and welfare and cause significant damage to the environment. The EPA has indicated that the public health and welfare benefits associated with SO<sub>2</sub>, NO<sub>x</sub>, and mercury emissions reductions are many times the costs to make those reductions. There would appear to be little doubt that regulation of NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions from Delaware sources is in the best interest of human health, welfare, and the environment.

Further, computer modeling indicates that Delaware sources alone can cause non-attainment of the federal ozone air quality standard in Delaware and in surrounding states. The EPA's CAIR analysis indicated that for New Castle County, which is in ozone non-attainment, only 37% of the 8-hr ozone loading is due to transport. EPA's CAIR analysis also indicates that Delaware sources contribute to PM<sub>2.5</sub> non-attainment in Delaware. Based on this information, it would seem highly unlikely that emissions reductions from Delaware sources would not have a significant effect on Delaware's air quality. Also, Delaware is part of a multi-state ozone and particulate matter non-attainment area. Under the CAA this entire area must attain compliance with the standards, and until it does the entire area remains non-attainment.

Under the CAIR program and without additional regulation, EPA's IPM modeling predicted increased emissions from Delaware's coal-fired EGU's subject to the proposed regulation. Based on this information, it would follow that Delaware's sources would have an even greater impact on Delaware's air quality under CAIR unless such emissions increases were prevented by other regulation. The proposed multi-pollutant regulation provides the necessary emissions limitations to ensure that actual emissions reductions occur in Delaware.

Conectiv's comment regarding potential emissions increases in neighboring states due to reduced Delaware EGU operation or cessation of Delaware EGU operation appears to oversimplify the nature of the electrical grid and overstate the impact of Delaware's EGU's on the grid. In 2003, Delaware electric generating units (not just those subject to the proposed regulation) supplied approximately 60% of Delaware's electrical

consumption. During this same period, the Delaware sources subject to the proposed multi-pollutant regulation operated at capacity factors below 50% on the average. This would seem to indicate that on an average basis, much of the electrical power being consumed in Delaware is already being generated elsewhere in PJM, and that the generators in the neighboring states can produce electrical power more economically than the Delaware units, on the average, as power suppliers are dispatched on an economic basis.

Delaware's EGU's are but a small percentage of the total generation in the PJM grid. The loss of a Delaware unit, or load limitation of a Delaware unit, under most circumstances would have little effect, on the average, on the rest of the units on the PJM grid. Indeed, this is a routine occurrence during planned maintenance outages or forced outage situations at Delaware units. And the majority of these units will be subject to CAIR and CAMR (for coal-fired units) emissions reduction programs that will also serve to limit the emissions from those units. Therefore, while the emissions from neighboring states may somewhat increase in the event a Delaware unit reduces its output or ceases operation, the unit(s) making up the load will be subject to emissions reduction requirements similar to those of the Delaware units so that the net emissions to the atmosphere would be little different. At the same time, the location near the source with the reduced or curtailed output would enjoy reduced environmental impact from emissions from the affected source. Also, note the DNREC has not proposed a shutdown regulation, rather it has proposed limits based on technologically and economically viable controls.

### **The Proposed Rule will not “Level the Playing Field”**

Conectiv comments that DNREC had stated it wanted to level the playing field with neighboring states regarding NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions using the proposed multi-pollutant regulation. Conectiv indicates that the proposed regulation will put Delaware's units subject to the proposed regulation at a competitive disadvantage with units in neighboring states. Conectiv indicates that this is because other states, such as Maryland, do not regulate oil-fired units, allow some trading for NO<sub>x</sub> and SO<sub>2</sub>, allow facility averaging for mercury, and are based on higher NO<sub>x</sub> and SO<sub>2</sub> emissions rates. Conectiv further comments that some states are not implementing rules that go beyond CAIR or CAMR.

While it was not DNREC's intent to disadvantage Delaware's EGU's relative to units in neighboring states, it was DNREC's intent to achieve emissions reductions that supported efforts to attain the NAAQS and meet the Reasonable Further Progress Plan emission reduction requirements. As discussed earlier, modeling indicated that under a cap-and-trade program without other regulatory limitations, Delaware's sources would increase rather than decrease annual emissions. This situation would not permit Delaware to provide the reductions necessary for the Reasonable Further Progress plan and would not provide the reductions indicated necessary to attain the NAAQS.

Delaware's large residual oil-fired EGU's tend to operate during weather extremes, and thereby become contributors to PM2.5 and ozone problems during periods of poor air quality (such as hot summer days). Without controls, these units would continue to emit at high rates during the times that the public health is at relatively high risk. The application of emission controls to these units is appropriate in Delaware as they represent a significant portion of the state's large electric generators. These units are also subject to CAIR for NOx and SO2.

Conectiv specifically comments on the differences between DNREC's proposed multi-pollutant regulation and the approach being taken by Maryland. Conectiv implies that sources in Maryland are allowed to comply with SO2 and NOx limits on a system-wide basis, which is somewhat misleading. Sources within the state are only allowed to comply by averaging with other units in the state that are owned by a common owner, not any or all other units in the state. Maryland does not permit "system-wide" averaging for mercury.

Conectiv also specifically states that the proposed multi-pollutant regulation is more restrictive than Maryland because Maryland uses a higher SO2 emission rate (in lb/MMBTU heat input) in the calculation of the SO2 mass caps. While this is true, Maryland uses a historic heat input average value for use as the heat input multiplier. DNREC uses the units' heat input rating, or 100% capacity factor, when calculating the proposed multi-pollutant regulation's SO2 mass caps. With their historic low capacity factors, if DNREC applied Maryland's methodology for calculating SO2 mass caps to the Delaware units, the mass caps for Phase II would be lower than the values currently shown in the proposed multi-pollutant regulation.

Conectiv provides reference to Maryland's proposed rules, indicting that waiver provisions are in place in the event a unit can not achieve the emission standards by the compliance deadline. Maryland's rule does not provide a waiver for a unit that can not attain the standard except under two limited circumstances. The first is in the circumstance that a source can prove to the authority that the emission control equipment necessary to achieve compliance is unattainable due to lack of available supply. The second is the circumstance that a limited supply of the required emission control has significantly increased the cost of the equipment such that there would be a significant increase in electric rates, penalties may be reduced or waived until the supply of the control equipment becomes available to reasonably reduce the cost of the control equipment. Maryland's rule does not provide any other relief for non-compliance. The provisions do not guarantee waivers or reductions in penalties, only that such equipment supply issues may be considered in responding to the non-compliance.

The proposed multi-pollutant regulation was intended to ensure emissions reductions occurred in Delaware to meet Clean Air Act and other federal requirements, as well reduce the amount of local emissions impacting the health and welfare of Delaware's citizens. Strict implementation of CAIR and CAMR, without additional emissions limitations, will not assure that Delaware will get the emissions reductions needed to meet federal requirements or protect its citizens.

## **The Proposed Rule Does Not Provide Sufficient Time for Affected Units to Comply**

Conectiv comments that while the short term emission rates are phased in (Phase I compliance date is January 1, 2009 and the Phase II compliance date is January 1, 2012), application of “intermediate emissions control technologies” to meet the Phase I limits would not serve as a building block to attaining the Phase II limits, but rather would have to be replaced with more effective controls that would be capable of meeting the Phase II limits. Conectiv therefore indicates that application of the more effective Phase II controls is required “now”.

However, Conectiv estimates that installation of the required SCR technology (on Edge Moor Units 3, 4, and 5) and FGD scrubber technology (on Edge Moor Units 3 and 4) can not be completed even by the January 1, 2012 Phase II compliance deadline. Conectiv indicates that site-specific complications and congestion add to the complexity and time required to engineer, design, procure and construct the emission control technologies at Edge Moor. Conectiv also indicates that some of the equipment vendors have informed them that some equipment may not be available until after the implementation deadline. Conectiv refers to previous submittals to DNREC that indicated that the deadlines are not achievable and indicates that DNREC has ignored those submittals. In its referenced submittal, Conectiv states, “As discussed previously with the Department, the industry rule of thumb is typically thirty months from the manufacturer’s receipt of an equipment order to completion of construction for either a scrubber or an SCR system. This thirty month period does not include numerous front-end and back-end activities that need to be accomplished in order to ensure a viable system. Additional time needs to be added to the schedule for the implementation of these retrofit technologies at Edge Moor. For example, the thirty month period does not allow for the time necessary to conduct environmental permitting, equipment design, and equipment procurement on the front-end of the schedule as well as equipment tuning, and performance and compliance testing on the back-end of the schedule.”

Conectiv’s referenced document further states, “Site specific concerns at Edge Moor add additional challenges to these standard schedules. As you are aware, the Edge Moor Plant is directly on the Delaware River, with little space available for the installation of additional large pieces of equipment. To deal with the issue of site congestion less efficient sequential construction on some activities must be undertaken, rather than simultaneous construction, which in turn further extends the construction period. This situation is further complicated by Edge Moor’s need to continue operating during the construction period, as well as adhering to PJM Power Pool outage obligations in order that the facility can continue to provide reliable and adequate power within the Pool.”

Industry information indicates that SCR retro-fits have been accomplished in under 24 months, and that FGD scrubbers have been retro-fit in under 30 months. The EPA indicates that for SCR installation on a single unit an average 21-month schedule is required to complete purchasing, construction, and start-up activities. The EPA also indicates that for the same activities for FGD installation, an average 27-month schedule

is required. The EPA estimated that multiple unit, back-to-back installations at a single facility could be staged for completion at 3-month intervals following the first installations.

Conectiv's submittal indicates that in excess of 60-months would be required at Edge Moor to install the emissions controls that would be required to comply with the proposed multi-pollutant regulation. This period is approximately double that of other installations and EPA estimates. The Department does not feel that the statements provided by Conectiv provide specific documentation to justify the need for a period in excess of 60 months to complete installation of the emissions control technologies. While the Department agrees factors such as size of installation, degree of retrofit difficulty, and plant location can affect installation timing, the Department believes these factors should influence the timing by no more than a few months, not a few years.

Therefore, the Department is proposing to extend the Phase I compliance deadline for NO<sub>x</sub> and SO<sub>2</sub> emission limits from January 1, 2009 to May 1, 2009. Assuming the proposed regulation is finalized in December 2006, the change in the NO<sub>x</sub> and SO<sub>2</sub> Phase I compliance date will increase the compliance time from 24 months to 28 months.

Further, with regard to SO<sub>2</sub> emissions, the Department is proposing to add a provision to the proposed regulation that permits affected unit owners or operators the opportunity to petition the Department for an extension of the SO<sub>2</sub> emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO<sub>2</sub> Phase I compliance deadline could be extended up to May 1, 2010. If approved, the maximum time extension would increase the Phase I SO<sub>2</sub> emission limit compliance time to a total of 40 months.

### **There is a Need to Maintain Fuel Diversity for Generating Electricity in Delaware**

Conectiv comments that the proposed regulation will likely result in fundamental changes in the operation of the affected units, even potentially affecting the economic viability of the units, and affect all aspects of the electrical system. Conectiv comments that the mercury emissions limitations in the proposed regulation provide insufficient new-unit set asides so that without trading provisions, new coal-fired generation could not be operated in Delaware. Conectiv further commented that establishment of standards likely to have a significant impact on reliability without analysis of the impacts on electric reliability and fuel diversity would be arbitrary and capricious.

The new unit set aside for mercury emission is a small value, based on the small total federal CAMR program annual mercury emissions cap allocated to Delaware. The Delaware state mass cap is small based on the relatively small amount of historic coal-fired generation in Delaware. The Department agrees that the new unit set aside may be insufficient for a new unit in Delaware unless that new unit was very well controlled.

The Department anticipates that if and when a new coal-fired EGU project is started in Delaware, the final version of the proposed regulation may be revised to accommodate the new unit. If that becomes necessary, the methodology to deal with the new installation could be developed on a project-specific basis if and when a new generating unit construction project is initiated.

PJM is responsible for monitoring and ensuring electrical grid reliability in the region that includes Delaware. Proposed generating unit retirements are analyzed by PJM to ensure reliability issues are not encountered, and that if problems are predicted, appropriate up-front actions are taken to eliminate or minimize the potential effect.

In its presentation at one of the proposed regulation's public hearings, a representative from Delaware's public service commission indicated in their opinion that unit shutdowns would not be expected as a result of the proposed regulation. It was also indicated that in the event there was a shutdown, Delaware's electric grid reliability would not be severely impacted due to existing provisions such as the PJM analysis requirements.

The Department does not believe the proposed regulation would have significant impact on fuel diversity in Delaware. Over the last two decades, Delaware's electric generating unit owners and operators have chosen to construct oil and gas fired units, not coal-fired units. It must be assumed that those owners and operators made their choices based on business plans and economic factors that would be expected to have included fuel-related costs. The Department believes that any future electric generation developed in Delaware will also be selected with economics as a significant consideration. Emissions limitations will likely play a role in establishing the economics of any new unit, regardless of fuel choice, as existing rules and regulations are in place for all fossil-fired electric generating units.

### **DNREC Has Arbitrarily Selected Stringent Emission Standards Without Fully and Adequately Considering the Significant Cost Impacts of the Proposed Rule**

Conectiv comments that the emissions control technology required to comply with the emissions limitations of the proposed regulation would require a capital investment of approximately \$247.4 million, and increase annual operating costs by approximately \$31 million. Conectiv indicates that these costs would be a significant portion of the average regional wholesale power cost, and would render the Edge Moor Station as uneconomical and at-risk of early retirement. Conectiv comments that they have proposed installation of alternative NO<sub>x</sub> and SO<sub>2</sub> emissions control technologies that are more appropriate for the size and age of the Edge Moor units and are more "cost-effective" in terms of dollars/ton of emissions removed. However, Conectiv points out that these alternative NO<sub>x</sub> and SO<sub>2</sub> control technologies are not as effective as SCR and FGD, and would therefore require less stringent NO<sub>x</sub> and SO<sub>2</sub> emissions limits in the proposed regulation. Conectiv comments that they have committed to install ACI for mercury

removal, but request the proposed regulation include a provision for the establishment of alternative limits in the event ACI is not as effective as anticipated.

The emissions limits presented in the proposed regulation support Delaware's efforts to attain and maintain compliance with the ozone and fine particulate National Ambient Air Quality Standards (NAAQS) and provide emissions reductions to support Delaware's 8-hour ozone Reasonable Further Progress Plan. Adoption of less stringent emissions limitations would further jeopardize Delaware's efforts towards compliance with these federal requirements.

These emissions limitations reflect the performance of proven, commercially available emissions control technologies that are applicable to retrofit installations for a wide range of unit size and vintage that includes the units subject to the proposed regulation. There is no information that specifically indicates that a given size or age makes the emissions control technologies technically infeasible.

The Department agrees that unit size and age can affect the cost effectiveness of any emission control technology installation (in terms of cost per ton of pollutant reduced), as a smaller size and short remaining life result in fewer tons of emissions reduction on which to spread the cost. However, to date, the Department has not received any commitment from Conectiv identifying a permanent shut-down date for any of the Edge Moor Units. Because of this, the Department can not give any weight as to the age of the unit(s) affecting the remaining life of the unit(s).

In any event, compliance with the federal requirements necessitates the need for emissions reductions from historic and current levels as related to the same fleet of units. The size of the affected units has not been reduced. Establishing less stringent emissions limits would result in lower emissions reductions and create greater difficulties in meeting the federal requirements/standards.

With regard to the comment regarding the need for a regulatory provision to obtain less restrictive mercury emissions limitations in the event ACI is not as effective as anticipated, the Department does not see a need for such a provision based on Conectiv's submission. Conectiv's referenced evaluation document indicates that Edge Moor Unit 3 and 4 already have low mercury emission rates. The document states, "This is likely due to a high inherent carbon content of the fly ash in flue gas entering the cold-side ESPs on these units. These ESPs have large specific collecting area (SCA) of 380-400 sqft/1000 acfm, and this generous size combined with the high carbon content removes about 81% of the coal mercury content." The Conectiv reference document further states, "When FGD and SCR systems are installed on these units, their overall "co-benefit" for mercury removal would increase to 95%." The Conectiv referenced document states that, "The total 95% mercury removal satisfies the mercury emission limitations of DE-3P Rule (Sections 6.1.2 and 6.2.2) for all years", and also states, "The resulting 0.633 lb/TBtu emission rate is sufficiently low to meet the mass limits with no additional mercury-specific technology required." This information, supplied by Conectiv, would seem to imply that attaining compliance with the mercury emissions limits of the proposed

regulation should not present a significant problem for the Edge Moor units with or without the installation of ACI.

**The Short-Term Standards Based on a 24-Hour Average Do Not Allow For Equipment Upset and DNREC Has Failed to Demonstrate That Compliance on Such a Short Term Basis Is Achievable With The Required Retro-Fit Technology**

Conectiv comments that DNREC has provided no basis for imposing a 24-hour emissions average to determine compliance with the proposed regulation's stringent short term emission rate limits and has failed to evaluate if compliance is possible. Conectiv comments that the short term averaging provides no flexibility for control equipment upsets, unit startups, or normal process variances. Conectiv refers to referenced support document that contains data from four SCR-equipped units, which Conectiv indicates proves that compliance with a 24-hour rolling average is impossible. Conectiv suggests that a 12-month rolling average would be consistent with the most aggressive control scenario's being proposed in other states.

The Department does not agree that the referenced data proves that stringent NO<sub>x</sub> emissions limitations can not be complied with on a 24-hour rolling basis. In the Department's opinion, the data demonstrates at least two of the four units cited nearly comply with the limitations of the proposed regulation during the period for which data was collected, and if the units had been required to meet the same averaging period (rolling 24-hour regulatory or permitting requirement), they may well have been able to be in compliance with the proposed regulation. It is difficult to judge whether a unit can comply with a rolling 24-hour average when the data represents an attempt to comply with a 365 day average. It would seem inappropriate to judge that a unit could not meet a limitation if it has never been required, or actively attempted, to meet that limitation.

Conectiv's referenced document presents the four cited units as the only four in the US that are dry-bottom units that operate SCR's on an annual basis with a target NO<sub>x</sub> emission rate of 0.09 lb/MMBTU. The Department is aware that there are other dry-bottom utility boilers in the US that operate SCR's on an annual basis and achieve NO<sub>x</sub> emission rates lower than 0.09 lb/MMBTU on an average basis. At least one such unit even has a NO<sub>x</sub> emission compliance term on a rolling 24-hr basis.

It is the Department's opinion that the emissions limitations and 24-hour averaging period, as presented in the proposed regulation, are achievable.

**Development of the Unit-Specific Annual Mass Emissions Limits Based on Retro-BACT Emissions Levels Is Arbitrary and will Unnecessarily Restrict Unit Operations**

Conectiv comments that the proposed regulation's annual mass emissions caps are even more restrictive than the short term emission limits, and could require a unit to restrict

operation in order to remain in compliance with the annual mass cap. Conectiv cites Edge Moor 5 as an example, commenting that even using the required 0.5% sulfur fuel oil the annual SO<sub>2</sub> mass cap would restrict annual operation to a 24% capacity factor. Conectiv further comments that even shutting down a unit would not save another unit at a facility, as the lack of an averaging provision in the proposed regulation would still require the installation of “retro-BACT” controls on the remaining unit(s).

The annual emissions caps for the fleet of units was established by determining the total annual heat input capacity for the fleet of units at 100% capacity (heat input basis) and multiplying by the emission rate capabilities of SCR NO<sub>x</sub> reduction technology for NO<sub>x</sub> emissions, FGD SO<sub>2</sub> reduction technology for SO<sub>2</sub> emissions, and ACI mercury reduction technology for mercury emissions. Individual unit mass caps were allocated based on the units’ historic heat input basis as a percentage of the fleet, and that percentage multiplied by the fleet mass cap.

The proposed regulation’s fuel sulfur limitation of 0.5% will result in an SO<sub>2</sub> emission rate of 0.5 lb/MMBTU. It can be seen that this value is much higher than the proposed regulation’s short term SO<sub>2</sub> emissions limitation for coal units of 0.26 lb/MMBTU. The higher short term emission rate results in a lower capacity factor before reaching the SO<sub>2</sub> mass emissions limitation that was calculated on the same basis as those for the coal – fired units. But this lower value is again a function of the historic relatively low utilization of the Edge Moor Unit 5.

The Department is aware that there are technological options for achieving lower SO<sub>2</sub> emission rates that would permit Edge Moor Unit 5 to operate at higher capacity factors with the existing SO<sub>2</sub> annual mass emissions cap. One is the use of 0.3% sulfur fuel oil, a compliance fuel that is in used at multiple electric generating facilities in New York, Connecticut, and Massachusetts. The use of 0.3% sulfur fuel oil for Edge Moor Unit 5 was estimated to allow annual operation at a 39% capacity factor (heat input basis). To put this in perspective, on a heat input basis, Edge Moor Unit 5’s highest annual average capacity factor over the last 10 years was 38%.

The Department is also aware that FGD scrubber technology has been applied to residual oil-fired units overseas (although none have been applied in the US that the Department is aware of). Such technologies could potentially be employed at Edge Moor Unit 5 to reduce the SO<sub>2</sub> emissions rate from the unit and thereby increase the units capacity factor under the proposed SO<sub>2</sub> mass cap, but it has not been investigated by DNREC.

Conectiv’s statement that the proposed regulation contains no averaging provision and would therefore require installation of controls even if a unit shuts down is not entirely correct. The proposed regulation does contain an averaging provision for Phase I (January 1, 2009 through December 31, 2011) that would allow “bubbling” of facility SO<sub>2</sub> mass emissions. Under certain scenario’s, this could provide some flexibility towards compliance. However, the Department does agree that under Phase II (January 1, 2012 and beyond) that no averaging provision is included in the proposed regulation and that compliance is required on individual unit basis. It is the Department’s opinion

that the averaging provision is appropriate in Phase I to provide installation/startup/tuning flexibility, while unit-specific compliance is feasible and appropriate by the Phase II date.

**The Requirement to Utilize Mercury CEMS to Demonstrate Compliance with Hard Limits on Emissions of Mercury without Analyzing the Accuracy and Reliability of Mercury CEMS is Arbitrary and Capricious**

Conectiv comments that DNREC's proposed regulation assumes that commercially available control technologies will reduce mercury emissions so as to allow compliance with the proposed regulations emission limits, and that CEMS measurements needed to make compliance determination can be made accurately, precisely, without bias, and with no consideration for propagation of error. Conectiv comments CEMS capable of demonstrating compliance with the proposed regulations emissions limits are not available, and it is therefore impossible to determine compliance with the regulation or properly administer the program. Conectiv comments that promulgation of a regulation without the ability to make accurate measurements at the appropriate levels would be arbitrary, capricious, and an abuse of discretion.

Conectiv is correct that DNREC assumes that commercially available control technologies (ACI) will reduce mercury emissions to allow compliance with the proposed regulation's mercury emissions limits, and that CEMS are available to accurately measure those emissions.

Conectiv's referenced evaluation document indicates that Edge Moor Unit 3 and 4 already have low mercury emission rates. The document states, "This is likely due to a high inherent carbon content of the fly ash in flue gas entering the cold-side ESPs on these units. These ESPs have large specific collecting area (SCA) of 380-400 sqft/1000 acfm, and this generous size combined with the high carbon content removes about 81% of the coal mercury content." The Conectiv reference document further states, "When FGD and SCR systems are installed on these units, their overall "co-benefit" for mercury removal would increase to 95%." The Conectiv referenced document states that, "The total 95% mercury removal satisfies the mercury emission limitations of DE-3P Rule (Sections 6.1.2 and 6.2.2) for all years", and also states, "The resulting 0.633 lb/TBtu emission rate is sufficiently low to meet the mass limits with no additional mercury-specific technology required." This information, supplied by Conectiv, would seem to imply that attaining compliance with the mercury emissions limits of the proposed regulation should not present a significant problem for the Edge Moor units with or without the installation of ACI.

The US EPA established mercury monitoring and reporting requirements in 40 CFR Part 60 and 40 CFR Part 75 in support of the federal CAMR mercury program. The proposed regulation has adopted the mercury monitoring provisions of 40 CFR Part 60 and 40 CFR Part 75 established by the US EPA. Adoption of those monitoring and reporting provisions is necessary for the US EPA to approve Delaware's SIP (111d plan) for control of coal-fired electric generating unit mercury emissions.

STAPPA/ALAPCO also adopted the federal CAMR mercury monitoring and reporting requirements by reference in the development of the STAPPA/ALAPCO mercury model rule.

DNREC is aware, through statements of the Institute for Clean Air Companies (ICAC) that there are multiple manufacturers of mercury CEMS that have passed the US EPA's RATA requirements.

For these reasons, DNREC believes that mercury emission controls and monitoring systems are available to facilitate and demonstrate compliance with the mercury emission limitation of the proposed regulation.

### **The Requirement to Use 40 C.F.R. Part 75 Missing Data Substitution Provisions to Demonstrate Compliance is Arbitrary, Capricious and an Abuse of Discretion**

Conectiv comments that that the use of 40 C.F.R. Part 75 Missing Data Substitution Provisions was developed for the Acid Rain SO<sub>2</sub> allowance trading program and has been adopted by EPA for NO<sub>x</sub> and mercury allowance trading programs. However, Conectiv indicates that these provisions are inappropriate for compliance with emissions "hard caps" because monitor problems and unavailability would result in the use of estimated emissions rather than actual emissions for times when the monitor was unavailable for whatever reason. Conectiv comments that this could lead to non-compliance without the emissions being high in reality. Conectiv comments that such a situation is not as critical in a cap and trade program, as a source could purchase additional allowances if the data substitution caused a unit to go above its allocation.

The EPA has indicated that the missing data substitution provisions of 40 CFR Part 75 provide strong incentive to maintain CEMS with high availability. The data substitution procedures offer multiple tiered algorithms based on the historic performance of the monitoring system; if the unit has historic high availability there is less of an impact from the values required to be submitted than for systems that have historic poor availability. Such provisions were included by EPA to help improve and ensure the accuracy of reported emissions.

Monitoring provisions of 40 CFR Part 60, Subpart Da, the new source performance standards for electric utility steam generating units, are more concerned with emission rates rather than long term mass emissions measurements, such as those addressed by 40 CFR Part 75. Any Subpart Da electric utility steam generating unit of sufficient size would also be subject to Acid Rain Program provisions (or CAIR or CAMR) and the corresponding 40 CFR Part 75 monitoring requirements.

The data substitution requirements of 40 CFR Part 75 are included as provisions of the federal CAIR and CAMR programs. Such requirements will be imposed on Delaware units subject to the proposed regulation as they will also be required to comply with all

CAIR provisions, and must comply with CAMR monitoring provisions in order to meet Delaware's 111d plan obligations.

It is the Department's opinion that the monitoring requirements of 40 CFR Part 75, including data substitution, ensure that accurate emissions measurements are made to verify compliance with applicable limitations. The estimation procedures/algorithms used for substitution provide reasonable estimates of actual emissions for monitoring systems that have good historic availability. With regards to mercury emissions monitoring, such provisions are necessary to ensure 111d plan acceptability to the EPA.

**The Proposed Rule Should Include a Waiver Provision in the Event the Installed Pollution Controls Are Unable to Achieve the Proposed Standards**

Conectiv comments that the proposed regulation imposes stringent emissions limits that require specific, costly control technologies on affected units. Conectiv comments that the proposed rule should contain a provision to allow affected units to obtain alternative emission limits in the event the pollution control technologies installed do not achieve the stringent limits.

The Department does not agree that it is necessary or appropriate to include a provision in the proposed regulation to automatically provide for alternate emission limits in the event the installed technologies do not attain the applicable emissions limits of the proposed regulation. It is the Department's opinion that existing provisions, such as under Regulation 1102, Permits, provide for the establishment of compliance plans in the event that installed emission controls do not achieve the required limits of the proposed regulation. In addition, it is the Department's opinion that pollution control technology is technologically and economically available to reduce emissions below the proposed limits (e.g., SCR and FGD), and that the proposed limits already provide for an ample compliance margin.

**City of Dover Comments**  
**Letter to Jim Werner Dated October 2, 2006**

**Request to Extend Public Comment Period**

The City of Dover comments the Department did not release a technical support document to the public record until one business day before the first of three public hearings (which was held on September 25, 2006), which City of Dover states is insufficient time to review the document. City of Dover requests that the public comment period be extended from October 2, 2006 to at least October 31, 2006.

The Hearing Office ruled on this request and indicated that the public comment period would not be extended. (See: Presiding Hearing Officer's Ruling on Motion to Extend Public Comment Period, October 12, 2006)

**Cost of Compliance with Proposed Regulation will be Passed to the Consumer**

The city of Dover quotes a brochure made available by the Department at the September 25, 2006 Public Hearing, providing the quote "(this regulation) will not result in costs being directly passed on to the rate payers - the electric market is deregulated". The City of Dover comments that that statement is incorrect, as electric generators affected by the proposed regulation will have to bid into the market each day with the costs of complying with the proposed regulation built into their bids. City of Dover comments that this increase the real-time cost of energy and the consumers will pay for the cost.

The City of Dover is greatly over-simplifying the complex process of providing electrical energy in a deregulated market and operating under PJM control. The City of Dover's comments may be more accurate for a municipality such as Dover where rates are established by approval of City Council to obtain the levels of income necessary to support various city functions/funds (or when various city funds are used to supplement consumer electricity costs), but the comments are not accurate for areas served by public utilities in deregulated areas of the PJM region.

City of Dover is correct that that a generating unit must bid into the PJM energy supply queue, and the owner/operator bids in at whatever rate that they feel is appropriate. If an owner bids in high, the owner can expect that the unit(s) will not be called on or will be operated less. In this event, the impact on overall/regional power costs may be minimal, depending on where the next economical unit is in the queue, as the cost increase will depend on the cost for the next increment of needed generation in the area/region. This situation was discussed by Conectiv and NRG during their presentations, indicating that under deregulation they were not guaranteed to make any return on their investment (because they could not pass along the cost) and that the units would run less if their operating costs were increased. The Department has stated a number of times in the

workgroup meetings and public workshops that under a deregulated market the costs could not be passed directly to the consumer, as pointed out by Conectiv, and that because of deregulation any impact is difficult to assess.

### **Document Referenced in the Technical Support Document Not Available to the Public**

The City of Dover comments that a document referenced in the Technical Support Document for the proposed regulation was not made available to the public for review.

The referenced document, “Analysis of Speciation Trend Network Data Measured at the State of Delaware”, was introduced into the public record in the list of reference documents for the Technical Support Document at the September 25, 2006 public hearing for the proposed regulation.

### **SCR is Applicable Only to Coal-Fired Generation**

The City of Dover comments that most of the reference documents in the Technical Support Document that discuss SCR describe SCR technology being applicable only to coal-fired generation. The City of Dover comments that they are not aware of any SCR installed on oil-fired units in the United States.

The Department agrees that many of the reference documents discuss SCR installation on coal-fired plants. A number of the documents discuss installation of SCR on oil-fired units, and EPA documents provide SCR installation project cost estimation methodologies for installation of SCR on oil-fired units. Most of the SCR installations in the United States have been on coal-fired units to date due to the “bang for the buck”, as the coal-fired fleet tends to have the most NOX emissions due to the quantity of units, size of the units, and capacity factor of the units relative to oil-fired steam units. There is no technological reason that SCR can not be successfully installed and operated on a residual oil-fired generating unit. SCR has been successfully installed on gas-fired units, oil-fired units, coal-fired units, diesel generators, and combustion turbine/combined cycle units in the United States and overseas. SCR’s have been extensively retrofit on California gas and residual oil fired units.

Further, the proposed regulation does not require the installation of SCR on any unit. The proposed regulation provides flexibility to meet the required NOx emissions limits in a manner best suited to the owner or operator of the unit.

**NRG Comments**  
**Letter Dated October 2, 2006**

NRG indicates that they have three primary concerns with the proposed regulation; the 2009 timeline associated with the interim requirements, the final 2012 unit-specific emissions limits, and the lack of clarity regarding mercury allowances and new generation in the Section 111(d) plan. NRG also submitted an emissions reduction plan for Indian River, and included a copy of a document previously submitted to Ali Mirzakhali, dated August 10, 2006.

In the October 2, 2006 letter, NRG recommends replacement of the 2009 timeline with facility implementation plans, accept facility averaging in place of unit-specific limitations, adopt an hourly emission rate to address SIP requirements and to ensure a facility never exceeds net hourly emissions objectives, and reconsider the lack of provisions (mercury mass emissions provisions) that would facilitate the construction of new clean-coal units in Delaware.

**Replace the 2009 timeline with facility implementation plans**

NRG is recommending replacement of the 2009 Phase I emissions limitations with facility implementation plans. (NRG does not comment on whether such facility implementation plans be required to meet the same level of emissions reductions represented in the proposed regulation. It must be assumed that the purpose of this recommendation is to allow facilities to adopt plans that are less stringent than the emissions reduction requirements in the proposed regulation, as averaging is already permitted for Phase I in the proposed regulation.) NRG includes a facility implementation plan for Indian River as an attachment.

NRG's implementation plan for Indian River indicates that SO<sub>2</sub> and NO<sub>x</sub> emission rate reductions are made for Phase I for Units 1,2, and 3. The SO<sub>2</sub> and NO<sub>x</sub> reductions do not attain the Phase I level emission rate requirements of the proposed regulation, and further are not improved upon subsequent to Phase I, so they do not attain the Phase I or Phase II emission rate levels.

NRG's implantation plan indicates Unit 4 would not attain the Phase I emission rate limits of the proposed regulation, but would attain the Phase II emission rate limits of the proposed regulation by 6/1/2011.

NRG's implementation plan indicates that the all of the proposed regulation's mercury emission rate requirements would be met in accordance with the provisions of the proposed regulation.

The emissions reductions associated with Phase I of the proposed regulation are necessary to support Delaware meeting the reduction requirements necessary for the 8-hour ozone Reasonable Further Progress Plan. The Phase I reductions associated with the

proposed regulation will also support Delaware's attainment of the 8-hour ozone and PM2.5 National Ambient Air Quality Standards (NAAQS). Meeting these goals will help clean Delaware's air, thereby benefiting the health and welfare of Delaware's citizens, and will help Delaware avoid the sanctions and penalties associated with non-compliance with the associated Clean Air Act provisions. Any plan that does not provide for emissions reductions that are at least as stringent as the proposed regulation are not in the best interest of Delaware meeting Clean Air Act requirements or in the best interest of the health and welfare of Delaware's citizens.

However, based on information from other commenters, the Department is proposing to extend the Phase I compliance deadline for NOx and SO2 emissions limits from January 1, 2009 to May 1, 2009. Further, with regards to SO2 emissions only, the Department is proposing to add a provision to the proposed regulation that permits affected owners or operators the opportunity to petition the Department for an extension of the SO2 emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO2 Phase I compliance deadline could be extended up to May 1, 2010.

#### **Accept facility averaging in place of unit-specific limitations**

NRG appears to be recommending the establishment of facility-wide emissions limitations in place of the proposed regulation's emissions limitations that are applied to each subject unit.

The proposed regulation does contain an averaging provision for Phase I (January 1, 2009 through December 31, 2011) for NOx and SO2 emissions that would allow "bubbling" of facility SO2 and NOx emissions. (There is no similar provision in the proposed regulation for mercury, as the Department does not feel it is appropriate to "average" toxic emissions.) Under certain scenarios, this could provide some flexibility towards compliance. The proposed regulation does not permit such averaging or bubbling in Phase II. It is the Department's opinion that the averaging provision is appropriate for NOx and SO2 emissions for Phase I to provide installation/startup/tuning flexibility, while unit-specific compliance is feasible and appropriate by Phase II.

#### **Adopt an hourly emission rate to address SIP requirements and to ensure a facility never exceeds net hourly emissions objectives**

This recommendation from NRG appears to be building upon the previous request to provide for facility averaging rather than unit-specific emissions limitations. The recommendation further indicates that the facility emissions limitations be set such that the facility never exceeds hourly emissions limits.

The proposed regulation is only one of several initiatives being taken in Delaware to reduce emissions in order to meet the 8-hour ozone Reasonable Further Progress Plan requirements and support Delaware's attainment of the 8-hour ozone and PM2.5 National Ambient Air Quality Standards. Any shortfalls in emissions reduction from the proposed regulation will have to be made up in other, less economically-viable areas. Reductions in the stringency of the emissions limitations of the proposed regulation would provide less support in meeting Clean Air Act requirements (adding to the possibility of federal sanctions and penalties for Delaware) and not be as protective of the health and welfare of Delaware's citizens.

The emission rates reflected in the proposed regulation are reflective of the capabilities of selective catalytic reduction (SCR) for NOx emissions reduction, flue gas desulfurization (FGD) for SO2 emissions reduction, and activated carbon injection (ACI) for mercury emissions reductions. These technologies are proven, cost-effective emissions reduction technologies that are commercially available for coal-fired unit retrofit applications. It is the Department's opinion that proper design, engineering, installation, and operation of these emission control technologies will permit the affected unit(s) to be in compliance with the emissions limitations of the proposed regulation.

**Reconsider the lack of provisions (mercury mass emissions provisions) that would facilitate the construction of new clean-coal units in Delaware**

NRG is concerned that the proposed regulation has no provisions to allow transfer of mercury mass emissions "allowances" from one unit to another, and has no provisions to increase the mercury mass limit above "implied" state limits. This would prohibit the construction of new clean-coal units in Delaware and make Delaware an increasingly larger importer of electric power.

It is the Department's opinion that the trading of toxic materials, such as mercury, is not an appropriate compliance mechanism. The proposed regulation prohibits the trading or "averaging" of mercury emissions from subject coal-fired power plants. The "implied" state mercury mass emissions cap is the allocation imposed on Delaware by the federal Clean Air Mercury Rule (CAMR), and represents CAMR's mercury mass cap for Delaware that must not be exceeded in order for Delaware to avoid participation in the CAMR cap and trade program.

The proposed regulation does include provisions for a new unit set aside for mercury mass emissions. The new unit set aside for mercury is small, based on the small total federal CAMR program annual mercury mass emissions cap allocated to Delaware. The Delaware state mass cap is small based on the relatively small amount of historic coal-fired generation in Delaware. The new unit set aside may be insufficient for a new unit in Delaware unless that new unit is very well controlled. The Department anticipates that if and when a new coal-fired EGU project is started in Delaware, the final version of the proposed regulation may be revised to accommodate the new unit. If that becomes

necessary, the methodology to deal with the new installation could be developed on a project-specific basis if and when a new generating unit construction project is initiated.

## **NRG Comments Letter Dated August 10, 2006**

NRG's October 2, 2006 letter included the August 10, 2006 letter as an attachment. The August 10, 2006 letter summarized some concerns, and included an attachment with more detailed concerns. The following items address the August 10, 2006 letter's attachment comments.

### **2009 Interim Compliance**

NRG indicates that they can not comply with the Phase I (January 1, 2009 through December 31, 2011) timelines for attaining emissions reductions for NO<sub>x</sub> and SO<sub>2</sub>. NRG recommends the regulation be revised to replace the interim (2009) compliance requirements with facility specific reduction implementation plans between 2009 and 2012. NRG indicates that this would allow plants to effectively and efficiently meet the final objective which is long term emissions reductions by 2012.

The emissions reductions associated with Phase I of the proposed regulation are necessary to support Delaware meeting the reduction requirements necessary for the 8-hour ozone Reasonable Further Progress Plan. The Phase I reductions associated with the proposed regulation will also support Delaware's attainment of the 8-hour ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS). Meeting these goals will help clean Delaware's air, thereby benefiting the health and welfare of Delaware's citizens, and will help Delaware avoid the sanctions and penalties associated with non-compliance with the associated Clean Air Act provisions. Any plan that does not provide for emissions reductions that are at least as stringent as the proposed regulation are not in the best interest of Delaware meeting Clean Air Act requirements or in the best interest of the health and welfare of Delaware's citizens.

However, based on information from other commenters, the Department is proposing to extend the Phase I compliance deadline for NO<sub>x</sub> and SO<sub>2</sub> emissions limits from January 1, 2009 to May 1, 2009. Further, with regards to SO<sub>2</sub> emissions only, the Department is proposing to add a provision to the proposed regulation that permits affected owners or operators the opportunity to petition the Department for an extension of the SO<sub>2</sub> emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO<sub>2</sub> Phase I compliance deadline could be extended up to May 1, 2010.

### **Compliance Timelines**

NRG indicates that the proposed regulation does not provide sufficient time to install the emissions controls necessary to meet the Phase I deadlines. NRG states that their best estimated feasible timeline for one FGD/SCR installation on a single unit would be 36 to 48 months from start to finish. NRG recommends the regulation be revised to replace the interim (2009) compliance requirements with facility specific reduction implementation plans between 2009 and 2012. NRG indicates that this would allow plants to effectively and efficiently meet the final objective which is long term emissions reductions by 2012.

Industry information indicates that SCR retro-fits have been accomplished in under 24 months, and that FGD scrubbers have been retro-fit in under 30 months. The EPA indicates that for SCR installation on a single unit an average 21-month schedule is required to complete purchasing, construction, and start-up activities. The EPA also indicates that for the same activities for FGD installation, an average 27-month schedule is required. The EPA estimated that multiple unit, back-to-back installations at a single facility could be staged for completion at 3-month intervals following the first installations.

It is the Department's opinion that the statements provided by NRG do not provide specific documentation to justify the need for a period of up to 48 60 months to complete installation of the emissions control technologies. While the Department agrees factors such as size of installation, degree of retrofit difficulty, and plant location can affect installation timing, the Department believes these factors should influence the timing by no more than a few months.

The Department is proposing to extend the Phase I compliance deadline for NO<sub>x</sub> and SO<sub>2</sub> emission limits from January 1, 2009 to May 1, 2009. Assuming the proposed regulation is finalized in December 2006, the change in the NO<sub>x</sub> and SO<sub>2</sub> Phase I compliance date will increase the compliance time from 24 months to 28 months.

Further, with regard to SO<sub>2</sub> emissions, the Department is proposing to add a provision to the proposed regulation that permits affected unit owners or operators the opportunity to petition the Department for an extension of the SO<sub>2</sub> emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO<sub>2</sub> Phase I compliance deadline could be extended up to May 1, 2010. If approved, the maximum time extension would increase the Phase I SO<sub>2</sub> emission limit compliance time to a total of 40 months.

### **Planning and cost (A)**

NRG indicates that the use of the phased in approach in the proposed regulation will require the installation of expensive Phase I controls that will be of little benefit to achieving Phase II limits, such that different technologies will have to be added to comply with Phase II, and the Phase I controls will be abandoned. NRG indicates that for

this comment, their recommendation is that same as for the **2009 Interim Compliance** comment above.

As NRG indicates that their recommendation is the same as the **2009 Interim Compliance** comment above, the Department's response is also the same.

### **Planning and cost (B)**

NRG discusses some of the Department's cost estimates for compliance with the emissions limits of the proposed regulation, and indicates that the estimates are too low and therefore, the impact of the costs are underestimated. NRG recommends the Department revise the cost estimates.

NRG has not properly represented the Department's cost estimates. The Department estimated a wide range of costs, depending upon compliance strategies (that could include combinations of operating scenarios and control technologies), that ranged from the \$100 million to \$175 million identified by NRG up to \$500 million to \$750 million. This range encompassed a cost estimate provided by a representative of a coal industry trade group (CEED). The Department has also stated that the actual impact is difficult to assess due to the influences of deregulation and the impact of the PJM ISO.

### **Level Playing Field**

NRG indicates that the proposed regulation is more stringent than neighboring and regional state rules. NRG indicates their proposed facility compliance plan would be acceptable in other regional states. NRG recommends the proposed regulation be revised to be comparable to neighboring state initiatives by allowing limited intra and inter facility emissions averaging.

NRG's statement that their proposed facility compliance plan would be acceptable in other states may be correct, but is misleading. Under multi-facility averaging or trading programs, compliance is virtually assured under all cases as long as the facility can afford to buy allowances to balance excess emissions. However, under such a program, emissions reductions may or may not occur at any given facility.

The proposed regulation does contain an averaging provision for Phase I (January 1, 2009 through December 31, 2011) for NO<sub>x</sub> and SO<sub>2</sub> emissions that would allow "bubbling" of facility SO<sub>2</sub> and NO<sub>x</sub> emissions. (There is no similar provision in the proposed regulation for mercury, as the Department does not feel it is appropriate to "average" toxic emissions.) Under certain scenarios, this could provide some flexibility towards compliance. The proposed regulation does not permit such averaging or bubbling in Phase II. It is the Department's opinion that the averaging provision is appropriate for NO<sub>x</sub> and SO<sub>2</sub> emissions for Phase I to provide installation/startup/tuning flexibility, while unit-specific compliance is feasible and appropriate by Phase II.

## **Federal Rule Allowance Allocation**

NRG comments that the proposed regulation is silent with regards to the allocation of NO<sub>x</sub> and Hg emissions allowances. NRG indicates that Delaware has adopted CAIR and, therefore, should also adopt CAMR and maintain both the state program as well as CAMR. NRG recommends that the proposed rule also be revised to contain a provision allowing the use of CAMR allowance in the event a unit meets the Hg emissions rate but is over the Hg mass cap.

NRG is not correct that that Delaware has adopted CAIR. The Department expects that Delaware will come under a federal implementation plan (FIP) for CAIR, and therefore sources in Delaware will be required to also participate in CAIR. CAIR provisions are not part of the proposed regulation, and the proposed regulation does not interface or interfere with CAIR. The FIP will allocate NO<sub>x</sub> allowances to affected Delaware units per the prescribed FIP methodology, independent of the proposed regulation or any action by the Department.

It is the Department's opinion that the trading of toxic materials, such as mercury, is not an appropriate compliance mechanism. The proposed regulation prohibits the trading of mercury emissions for compliance purposes. The state mercury mass emissions cap represented by the total mercury mass emissions permitted by the proposed regulation (less new unit set asides) is the allocation imposed on Delaware by the federal Clean Air Mercury Rule (CAMR). The CAMR's mercury mass cap for Delaware is a value that is identified in the state's SIP submittal and must not be exceeded in order for Delaware to avoid participation in the CAMR cap and trade program.

## **Monitoring and Reporting**

NRG comments that the monitoring, recordkeeping, and reporting requirements are unreasonable and unclear. NRG also comments that the full Part 75 QA/QC requirements are not practical for use as a compliance determination of emission rates or annual mass emissions.

The proposed regulation specifies the monitoring requirements specified for the federal CAIR and CAMR programs. Compliance with the CAIR monitoring and reporting requirements will be required for the units subject to the proposed regulation as these units will also be part of the CAIR FIP for Delaware. The CAMR monitoring and reporting requirements will also be imposed on the coal fired units subject to the proposed regulation as they must meet the CAMR monitoring and reporting requirements to satisfy Delaware's 111d plan.

Data substitution requirements of 40 CFR Part 75 are included as provisions of the federal CAIR and CAMR programs.

The EPA has indicated that the missing data substitution provisions of 40 CR Part 75 provide strong incentive to maintain CEMS with high availability. The data substitution procedures offer multiple tiered algorithms based on the historic performance of the monitoring system; if the unit has historic high availability there is less of an impact from the values required to be submitted than for systems that have historic poor availability. Such provisions were included by EPA to help improve and ensure the accuracy of reported emissions.

It is the Department's opinion that the monitoring requirements of 40 CFR Part 75, including data substitution, ensure that accurate emissions measurements are made to verify compliance with applicable limitations. The estimation procedures/algorithms used for substitution provide reasonable estimates of actual emissions for monitoring systems that have good historic availability.

### **Zero Emitting Unit Offsets**

NRG comments that the use of zero-emitting unit credits for compliance is unclear and not applicable to the regulation as written. NRG recommends revising the proposed regulation's applicability to include installed capacity instead of actual generation (MWh).

NRG is commenting on a provision that was included in an early draft of the proposed regulation, and not the final draft as published in the Delaware Register. During the final multi-pollutant regulation workgroup meeting there was considerable unfavorable comment, from both the utilities and environmental groups, regarding the zero-emitting unit credit provisions of that version of the proposed regulation. Upon further evaluation, it was determined that there was no way to make such provisions workable or beneficial to the proposed regulation. Therefore, the zero-emitting provisions were removed from the proposed regulation before the proposed regulation was published in the Delaware Register. Therefore, this comment is no longer applicable.

### **Margin of Compliance**

NRG comments that the proposed regulation provides definitive emission rate limitations but does not provide any provisions in the event applied technology does not achieve the compliance target.

The emission rates reflected in the proposed regulation are reflective of the capabilities of selective catalytic reduction (SCR) for NO<sub>x</sub> emissions reduction, flue gas desulfurization (FGD) for SO<sub>2</sub> emissions reduction, and activated carbon injection (ACI) for mercury emissions reductions. These technologies are proven, cost-effective emissions reduction technologies that are commercially available for coal-fired unit retrofit applications. It is the Department's opinion that proper design, engineering, installation, and operation of

these emission control technologies will permit the affected unit(s) to be in compliance with the emissions limitations of the proposed regulation.

**CEED Comments  
Letter Dated September 28, 2006**

**EPA Air Quality Modeling Studies**

CEED comments that there is no air quality rationale for imposing SO<sub>2</sub> limits on Delaware power plants more stringent than CAIR under current PM<sub>2.5</sub> nonattainment designations.

The Department does not agree that there is no air quality rationale for imposing SO<sub>2</sub> emissions limitations beyond the CAIR cap-and-trade program. SO<sub>2</sub> emissions are a precursor for PM<sub>2.5</sub>. The EPA has indicated that Delaware sources contribute to PM<sub>2.5</sub> problems in Delaware. Further, EPA modeling has indicated that under the CAIR cap-and-trade program, coal-fired sources in Delaware would see an increase in capacity factor. This is due to the Delaware units finding it economically advantageous under the CAIR cap-and-trade program to purchase allowances rather than reduce emissions. Without other rules or regulations, SO<sub>2</sub> emissions from Delaware's power plants would increase under the CAIR cap-and-trade program. The proposed regulation provides hard SO<sub>2</sub> emission caps to ensure SO<sub>2</sub> emissions reductions are achieved at the subject Delaware power plants.

CEED comments that modeling studies for New York City ozone non-attainment indicate that local and regional EGU's contribute less than 10% of total ozone on days exceeding the ozone standard. CEED states that area and mobile sources are the primary contributors. CEED states that Delaware's location in the I-95 corridor is the principal cause of ozone non-attainment, and that further NO<sub>x</sub> reduction at a few elevated point sources will not change Delaware's non-attainment status.

In the Department's opinion, NO<sub>x</sub> reductions from the units subject to the proposed regulation can have a significant effect on achieving ozone attainment in Delaware. In 2002, Delaware's electric generating units contributed approximately 61% of the state's total point source NO<sub>x</sub> emissions.

As discussed above, EPA's modeling indicates that under CAIR the capacity factor of Delaware's coal-fired power plants would increase and that emissions controls would not be installed. "Zero-out" modeling has shown that Delaware emissions by themselves can cause exceedances of the federal ozone air quality standards in Delaware and surrounding states. The proposed regulation provides hard mass emissions caps to ensure NO<sub>x</sub> emissions are actually reduced, thereby reducing the impact on ozone exceedances.

Under the 8-hour ozone National ambient Air Quality Standard (NAAQS), the entire state of Delaware is included in the Philadelphia-Wilmington-Atlantic City (PWAC) non-attainment area. The PWAC non-attainment area is required by the Clean Air Act to attain the ozone standard by 2010. The NO<sub>x</sub> reductions associated with the proposed

regulation are needed to support Delaware's 8-hour ozone Reasonable Further Progress Plan.

### **Benefits of Alternative Mercury Reduction Strategies in Delaware**

CEED comments that "zero-out" mercury strategy throughout the United States provides negligible benefits in Delaware, and that accelerating the CAMR timeline has similar negligible benefits. CEED indicates that the only meaningful reductions occur as a co-benefit of CAIR. CEED indicates that Delaware's proposed regulation on a few relatively minor sources of mercury would not measurably reduce mercury deposition in Delaware relative to the implementation of CAIR and CAMR.

EPA's modeling has indicated that under the CAIR/CAMR cap-and-trade program, the capacity factor for Delaware's coal-fired power plants would increase. As the modeling also predicted that the subject sources would not install emissions controls (instead buying allowances for compliance), the modeling predicts that mercury emissions from Delaware's sources would increase. Recent studies have indicated that mercury deposition is heaviest in the vicinity of the source of the mercury emissions, including those of coal-fired power plants. It is the Department's opinion that without some additional rule or regulation, mercury deposition in Delaware would likely increase under the CAIR/CAMR cap-and-trade programs.

Further, it is the Department's opinion that the trading of emission allowances for toxic substances, such as mercury under CAMR, is inappropriate.

### **Penn State Analysis of the Economic Benefits of Coal Utilization**

CEED discusses a study that estimates the economic impact of large scale displacement of coal fired generation with higher priced gas, oil, nuclear and renewable generation sources. CEED indicates that the study finds that the displacement of coal fired generation results in loss of average household income, jobs, and economic output. CEED includes a copy of the study as an attachment to their letter.

The study cited by CEED does not discuss the impact of displacement of residual oil-fired units, of which two such units are addressed by the proposed regulation.

Delaware is a net importer of electric generation. Delaware is served by the PJM ISO, so that unconstrained, generation is supplied to Delaware on an economic basis (who can pick up the next needed increment of load at the least cost). In 2003, all of Delaware sources (not just the units subject to the proposed regulation) provided less than 60% of Delaware's total load. During the same time period, the units subject to the proposed regulation collectively operated at a 37% capacity factor, based on heat input capacity. This is indicative that for a significant portion of time, sources outside Delaware can

meet Delaware's electrical needs more economically. It is likely this external source of generation is coal-fired generation.

The report also appears to assume that loss of existing coal-fired generation in a given state would be replaced by generation from new facilities, not existing facilities that have excess or unused capacity. The capital costs for these new units adds greatly to the replacement power cost.

The report cited by CEED primarily determines the impact of the loss of "lower-priced" coal-fired electrical power that is generated and used in that state. For an importing state such as Delaware then, the impact would be as great or greater for a loss of "lower-priced" generation in other states than it would be for a loss inside Delaware.

### **Public Health Consequences of Reduced Coal Use**

CEED discusses a report by Dr. Brenner of Johns Hopkins University that links mortality changes in the US population to economic factors and the large-scale loss of coal fired generation (as a source of affordable energy). CEED indicates that the report finds that increased unemployment and reduced household incomes can generate premature mortality. CEED indicates that the earlier referenced coal-displacement report (that predicts job loss and high economic impact) taken together with the Dr. Brenner report (predicting mortality increases with adverse economic impact) suggests that a reduction in coal-fired generation can have adverse public health impact.

The Dr. Brenner report also states, "However, the model does not reliably lend itself to estimation of mortality effects associated with relatively minor shifts in regional coal production or electricity generation (e.g., 10-15%). In many instances, such production shifts tend to be off-setting, as production decreases in one region are offset by gains elsewhere."

The proposed regulation is not a shutdown rule, rather it establishes emissions limitations and provides the affected sources the flexibility to determine the best compliance strategy for that unit. The Department assumes that such decisions will have economic factors, and that if a source determines to retire a facility that the decision will be on an economic basis.

Within the PJM region there is approximately 68,000 MW of capacity. In Delaware, there are six coal fired power plants for a combined nameplate capacity of a little more than 1000 MW. It would seem unlikely that even large scale shifts in Delaware's coal fired generation would significantly affect the PJM region as a whole.

**Cambridge Environmental Comments**  
**September 28, 2006 Letter from Laura green, PhD**

Cambridge Environmental Inc. (CEI) comments that particulate matter (PM) from modern coal-fueled power plants in the US does not harm the public health. CEI indicates that this is because the predominant forms ambient PM due to coal plant emissions, ammonium sulfate and ammonium nitrate, are benign materials that are expected to be harmless at and considerably above current concentrations in outdoor air. CEI comments that PM (including PM<sub>2.5</sub> and PM<sub>10</sub>) refers to thousands of different physical, chemical, and biological substances. CEI indicates that it is inappropriate to assess the health risks of PM without assessing the risk of the individual constituent(s). CEI indicates that because the EPA programs and the proposed Delaware regulation fail to recognize that sulfates and nitrates at relevant concentrations are harmless, the PM reductions associated with the programs do not produce the health benefits predicted by the programs. The CEI submittal included several support documents.

A similar comment indicating power plant PM emissions being harmless was presented at one of the public hearings for the proposed regulation. In response to that comment, the American Lung Association of Delaware (ALA) submitted comments (via e-mail dated October 2, 2006). That e-mail countered the CEI statements that PM from power plant emissions was harmless. In support of their position, the ALA provided, among other documentation, the following:

- Provided a quote from the EPA's *Responses to Significant Comments on the 2006 Proposed Rule on the National Ambient Air Quality Standards for Particulate Matter*, (January 17, 2006, 71 FR 2620), "...while most epidemiological studies continue to be indexed by PM<sub>2.5</sub>, some epidemiologic studies also have continued to implicate various components within the mix of fine particles that have been more commonly studied (e.g., sulfates, nitrates, carbon, organic compounds, and metals) as being associated with adverse effects."

- Provided a quote from EPA's *Provisional Assessment of Recent Studies on Health Effects of Particulate Matter Exposure*, (EPA/600/R-06/063, July 2006), "Recent analyses continue to indicate that particles related to traffic, residual oil combustion, wood smoke, and regional sulfate pollution and primary coal burning are associated with increased mortality."

- Provided a quote from Jana Milford of Environmental Defense; "In the face of the extremely strong evidence linking ambient PM to serious health consequences and mortality, some representatives of the electric power industry have argued that short-term time series studies conducted as part of the utility-sponsored Aerosol Research Inhalation Epidemiology Study (ARIES) in Atlanta exonerate sulfate, a major constituent in fine particles, as not causing significant health problems. These assertions are fundamentally flawed, for several reasons:

1. They misrepresent the results of the ARIES studies, which in fact have consistently found a positive association of sulfate with increased daily mortality.
2. They ignore the significant limitations of the ARIES studies, including their limited statistical power and potential biases due to cofounding between sulfate and other PM<sub>2.5</sub> constituents and weather factors.
3. They ignore the role that sulfate and acidic particles appear to play in promoting the growth of other PM constituents, especially organic carbon aerosols.”

- Provided a quote from Jana Milford of Environmental Defense; “...numerous epidemiological studies point specifically to sulfate, sulfur oxides and pollution associated with coal-combustion as strongly associated with health impacts and mortality. The current scientific literature provides no basis for discounting sulfate compared to other constituents of PM<sub>2.5</sub>...”

One of the studies cited by the CEI submittal, “*Comments on “Proposed Methodology for Particulate Matter Risk Analyses for Selected Urban Areas,” by Abt Associates, January 2002*”, written by Crouch et al and dated February 26, 2002, does not state that there is any PM that is not detrimental to human health. In its conclusion, the report states, “Without question, sufficiently high levels of ambient air pollution cause morbidity and mortality. High levels of air pollution experienced in Donora, Pennsylvania in 1948, and various wintertime smogs in London, England prior to the 1960’s, clearly caused disease and hastened death. But these smogs were formed under unusual meteorologic conditions, and contained complex mixtures of PM, SO<sub>2</sub>, acid aerosols, and many less-well-characterized industrial pollutants (such as from a local zinc works in Donora), so that the specific causal roles of the individual air pollutants (let alone mixtures such as PM) could not be discerned.” It is the Department’s opinion that this statement does not support the conclusion that power plant SO<sub>2</sub> and NO<sub>x</sub> emissions are not harmful to human health.

Additionally, the Department has reviewed numerous documents that indicate that PM<sub>2.5</sub> is a contributor to a variety of adverse human health effects. Some of this documentation also indicates that PM<sub>2.5</sub> (from nitrate and sulfate aerosols) can combine with other substances in the atmosphere to become complex, harmful mixtures of sulfur, nitrogen, carbon, acids, metals, and airborne toxics. It is the Department’s opinion that there are numerous examples from knowledgeable sources indicating that reductions in power plant SO<sub>2</sub> and NO<sub>x</sub> emissions will bring a positive effect on human health and welfare.

**Delaware State Chamber of Commerce Comments**  
**Letter Dated September 27, 2006**

The Delaware State Chamber of Commerce (DSCC) comments that the proposed regulation would severely impact the state's power plants, diminish the supply of power available on the market, and cause an increase in electricity costs. Summarizing their comments, the DSCC comments that DNREC has failed to consider the specific benefits to be achieved under the proposed regulation beyond what will be accomplished by federal programs, fails to consider the economic and other costs of imposing the regulation, fails to consider the technical feasibility of implementing the regulation, and fails to consider the cost effectiveness of the regulation. DSCC also comments that the public comment period should be increased due to the late publication of the "Technical Support Document".

The federal programs referred to by DSCC, the Clean Air Interstate Rule and the Clean Air Mercury Rule, are cap-and-trade programs developed by the EPA with the goal of controlling the interstate transport of the subject pollutants, not to achieve attainment. Cap-and-trade programs do not ensure emissions reduction in any given location, and only require that a source hold sufficient allowances (through either direct allocation or purchase on the open market) to balance out the emissions from the source. Under such a program, the only actual emissions limitation is the amount of money the source has available to purchase allowances. The EPA recognizes that regional reductions may be insufficient in some areas, and that local controls may be necessary for those areas to achieve attainment.

EPA's modeling, by a sophisticated economic computer model, predicted that Delaware sources would not install control equipment and would purchase allowances to attain compliance with the CAIR and CAMR requirements. In fact, the computer models predicted that emissions from Delaware's coal fired units would actually increase, not decrease, under CAIR and CAMR.

The increased emissions from Delaware sources would impact the local air quality and the health and welfare of Delaware's citizens. The increased emissions would impact Delaware's ability to attain and maintain the ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS). The increased NO<sub>x</sub> emissions would also interfere with Delaware's 8-hour ozone Reasonable Further Progress Plan (RFP). Failure to meet the Clean Air Act's provisions for NAAQS and RFP could cause Delaware to be subject to sanctions and penalties. Based on these impacts, and the fact that the federal program do not ensure any reductions in Delaware, it is the Department's opinion that controls beyond the federal programs are necessary to protect the health and welfare of Delaware's citizens and to meet Clean Air Act requirements.

The Department prepared estimates of the capital and operation and maintenance costs for compliance with the proposed regulation. The range of costs prepared by the Department overlapped the estimate by CEED that DSCC refers to in their comments.

Under a deregulated market in the PJM region, the cost of electricity, absent other constraints, is a function of the cost for the next most economical unit to pick up the required increment of generation. The impact of a change in cost for one unit (or small group of units) in the PJM region is difficult to estimate. For example, all of Delaware's coal fired units summed together represent less than 2% of the PJM regions coal-fired units.

Additionally, Delaware is already a net importer of electricity, with internal generation sources only providing approximately 60% of the electrical load in 2003. During the same time frame, Delaware's large units subject to the proposed regulation operated with annual capacity factors of 50% to 60% or less. This is indicative that these units are not among PJM's most economic to operate on the average over a year and are not the driving force for electrical supply costs for the majority of the time.

The proposed regulation establishes emissions limitations based on the capabilities of selective catalytic reduction (SCR) for NO<sub>x</sub> control, flue gas desulfurization (FGD) for SO<sub>2</sub> control, and activated carbon injection (ACI) for mercury control. SCR, FGD, and ACI emission control technologies are cost-effective, commercially available technologies that been proven to be effective in retro-fit installation on a wide range of unit sizes. However, the reduction establishes only emissions limitations, and provides the affected sources the flexibility to determine a compliance strategy to meet those limitations.

The DSCC should also recognize that there are potential benefits to businesses of improved ambient air quality and health and welfare of workers and customers. Documents reviewed by the Department indicate that improved ambient quality reduces school absences (which could cause parent workers to also stay home), reduced workplace absence due to illness, and reduced health insurance costs (due to fewer doctor and emergency room visits). The EPA has estimated human health and welfare benefits far in excess of the costs of emissions reductions.

The Hearing Office ruled on the request to extend the comment period, and has indicated that the public comment period would not be extended. (See: Presiding Hearing Officer's Ruling on Motion to Extend Public Comment Period, October 12, 2006)

**Central Delaware Chamber of Commerce Comments**  
**Letter Dated September 27, 2006**

The Central Delaware Chamber of Commerce (CDCC) comments that the proposed regulation imposes limits that are far above the reach and reality of what Delaware's power plants can implement. CDCC further comments that the cost of complying with the regulation would cause an increase in power costs, which would drive businesses out of Delaware and discourage new businesses from entering Delaware. CDCC indicates that this will then cause a loss of employment in Delaware.

The proposed regulation establishes emissions limitations based on the capabilities of selective catalytic reduction (SCR) for NO<sub>x</sub> control, flue gas desulfurization (FGD) for SO<sub>2</sub> control, and activated carbon injection (ACI) for mercury control. SCR, FGD, and ACI emission control technologies are cost-effective, commercially available technologies that have been proven to be effective in retro-fit installation on a wide range of unit sizes. However, the regulation establishes only emissions limitations, and provides the affected sources the flexibility to determine a compliance strategy to meet those limitations.

Delaware is already a net importer of electricity, and its large units subject to the proposed regulation operate with annual capacity factors of 50% to 60% or less. This is indicative that these units are not among PJM's most economic to operate on the average over a year.

In the deregulated electric market, it is difficult to assess the impact of plant modifications on local electric rates at any given time. PJM is the regional electric grid operator, and units are brought on or load increased based on the cost per next increment of generation. If there are no transmission restraints and a unit outside Delaware can pick up the next increment of load more inexpensively than a Delaware unit, then that out of state unit will be instructed to pick up the load. Under most circumstances it is difficult to predict where the electric supply is coming from or what the cost will be at any given time.

Based on the cost driven PJM electric market under deregulation, the Department's opinion is that the proposed regulation will not lead to CDCC prediction that "implementation of such emissions regulations would completely eliminate our ability as a State to be competitive in encouraging businesses to continue operations here and in soliciting new businesses."

Additionally, CDCC has also ignored the potential benefits to businesses of improved ambient air quality. Documents reviewed by the Department indicate that improved ambient quality reduces school absences (which could cause parent workers to also stay home), reduced workplace absence due to illness, and reduced health insurance costs (due to fewer doctor and emergency room visits). The EPA has estimated human health and welfare benefits far in excess of the costs of emissions reductions.

**EVA-CEED-Hewson Comments**  
**Letter dated September 30, 2006**

**1) State Lacks Documentation for Setting Emission Rate Limitation**

EVA/CEED comments that the State has provided no air quality modeling to justify strict emissions limitations, that the incremental reductions below CAIR would provide no health benefit, and the proposed regulation puts all of the emissions reduction burden on the power industry.

During the workgroup meetings and public workshops, there was considerable discussion concerning the relationship of Delaware's power plants to Delaware's air quality and compliance with federal standards. It was discussed that "zero-out" modeling indicated that Delaware sources alone could cause exceedances of the federal ozone air quality standard in Delaware and in surrounding states. It was also discussed that at least New Castle County and Sussex County are predicted to be non-attainment with EPA's proposed new PM<sub>2.5</sub> standard. It was also discussed that EPA modeling predicted Delaware would not add significant emissions controls, and that emissions from Delaware's coal-fired power plants under the federal programs would increase, not decrease.

Further, Delaware's 8-hour ozone Reasonable Further Progress Plan (RFP), a requirement of the Clean Air Act, requires significant reductions in NO<sub>x</sub> emissions. A portion of these reductions are needed from the power plants and, as noted above, the federal CAIR program does not assure these reductions. EPA and OTC modeling has indicated that more than the minimum RFP reductions are needed for Delaware and upwind states to attain the 2010 ozone NAAQS. Further reductions will likely be needed to offset growth and maintain the ozone NAAQS.

The comment that the proposed regulation focuses on the power plants is correct; that is the purpose of the regulation. However, this proposed regulation is not the only initiative being undertaken by the Department to reduce emissions and progress towards NAAQS attainment. As discussed in multiple workgroup meeting and public workshops, the Department is working to reduce emissions through controlling emissions from large industrial and refinery boilers, emission controls for electric generation peaking units, emission controls for small generators, crude oil lightering controls, reduction of volatile organic compound content of architectural and industrial maintenance coatings and consumer products, adopting statewide limits for fuel sulfur content, etc.

**2) Proposed Limitation – Sets Both Emission Rate and Tonnage Cap Limitations That Exceed Established Cost-Effective Options With Little Incremental Health Benefit**

EVA/CEED comments that the proposed regulation establishes NO<sub>x</sub> and SO<sub>2</sub> limitations that are far beyond federal CAIR requirements and are also more strict than surrounding states. EVA/CEED further comments indicates that the strict requirements pose very high incremental costs due to the units' small size, age, and already low emission rate which causes the cost effectiveness of the controls to be poor.

The Department agrees that the proposed regulations NO<sub>x</sub> and SO<sub>2</sub> limitations are more strict than CAIR. Modeling information and Clean Air Act provision requirements indicate that Delaware must achieve emission reductions beyond those predicted for Delaware under CAIR (which actually predicts increased emissions from Delaware's coal fired units). These requirements were discussed above. Regardless of current emissions levels, modeling and Clean Air Act requirements indicate the need to reduce emissions further.

The proposed regulation sets emissions limitations based on application of selective catalytic reduction (SCR) technology for NO<sub>x</sub> control, flue gas desulfurization (FGD) technology for SO<sub>2</sub> control, and activated carbon injection (ACI) for mercury control. The Department has reviewed numerous documents that suggest these technologies are commercially available, technically feasible emission control technologies for retrofit application across a wide range of unit types and sizes. However, the proposed regulation does not specify the installation of such technologies, but rather sets the emissions limits and allows the sources the flexibility to develop compliance strategies that best fit the individual source and its business plan. The Department has reviewed numerous documents that suggest that alternatives to application of SCR/FGD/ACI are available that provide cost savings relative to SCR/FGD/ACI.

The Department does not believe that the age of the subject units is an issue. At this time, the Department is not aware that any of the subject units has a set retirement date that has been committed to by the owner. Without such a retirement commitment, it must be assumed that the subjects units will be in operation for 20 years or longer.

### **3) Emissions Trading Limitations- Loss of Compliance Flexibility, Increases Compliance Costs and Inhibits Future Clean Coal Technology Additions**

EVA/CEED comments that no trading is permitted, and indicates that this increases the compliance costs for Delaware's power industry and result in units outside Delaware picking up the load and transporting more emissions into Delaware. EVA/CEED also comments that the lack of mercury trading provisions may prohibit a clean coal technology unit from locating in Delaware as it would not be allowed to purchase the mercury allowances needed to operate.

As discussed above, EPA modeling predicted that under CAIR the Delaware coal-fired power plants would increase their capacity factor and thereby also increase emissions. Such a situation does not support Delaware's 8-hour ozone RFP or efforts to attain and maintain compliance with the applicable NAAQS, both Clean Air Act requirements.

Trading, as under the federal CAIR and CAMR cap and trade programs, facilitates such an increase in emissions from Delaware units.

EVA/CEED has already commented that the CAIR/CAMR cap-and-trade programs will significantly reduce the amount of emissions transported into Delaware. Due to the fact that the Delaware units subject to the proposed regulation are but a very small percentage of the regional generation capacity, it would not be anticipated that capacity reductions in Delaware would cause a significant shift in the generation characteristics of the region. Therefore, the impact on the emissions transported into Delaware under CAIR/CAMR would likely not be significantly affected with implementation of the proposed regulation. And with the proposed regulation, the locations near the affected Delaware power plants would enjoy reduced environmental impact from the emissions reductions required by the proposed regulation.

The proposed regulation contains a new unit set aside for mercury. The new unit set aside for mercury emissions is a small value, based on the small total federal CAMR program annual mercury emission cap allocated to Delaware. The Delaware state mass cap is small based on the relatively small amount of historic coal-fired generation in Delaware. The Department agrees that the new unit mercury set aside may be insufficient for a new unit unless the new unit is very well controlled. The Department anticipates that if and when a new coal-fired EGU project is started in Delaware, the final version of the proposed regulation may be revised to accommodate the new unit. If that becomes necessary, the methodology to deal with the new installation could be developed on a project specific basis if and when a new generating unit construction project is initiated.

#### **4) Compliance Timelines- Too tight to engineer, permit and construct needed environmental controls**

EVA/CEED comments that the compliance timelines of the proposed regulation are too short to install the necessary emissions controls. EVA/CEED also comments that the project times could be extended further if the necessary permits are delayed or challenged/appealed. EVA/CEED comments that the proposed regulation should adopt the CAIR/CAMR compliance schedules, with the exception of CAMR Phase II.

The compliance deadlines in the proposed regulation represent EPA guidance, input from emission control suppliers and trade groups, and examples from actual control technology installation projects. However, in response to comments, the Department is proposing to extend the Phase I compliance deadline for NO<sub>x</sub> and SO<sub>2</sub> emission limits from January 1, 2009 to May 1, 2009. Assuming the proposed regulation is finalized in December 2006, the change in the NO<sub>x</sub> and SO<sub>2</sub> Phase I compliance date will increase the compliance time from 24 months to 28 months.

Further, with regard to SO<sub>2</sub> emissions, the Department is proposing to add a provision to the proposed regulation that permits affected unit owners or operators the opportunity to

petition the Department for an extension of the SO<sub>2</sub> emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO<sub>2</sub> Phase I compliance deadline could be extended up to May 1, 2010. If approved, the maximum time extension would increase the Phase I SO<sub>2</sub> emission limit compliance time to a total of 40 months.

If the SO<sub>2</sub> compliance extension is approved to the maximum amount, the Phase I SO<sub>2</sub> compliance deadline is extended 4-months from the CAIR Phase I SO<sub>2</sub> compliance deadline of January 1, 2010. The proposed May 1, 2009 deadline extension for Phase I NO<sub>x</sub> limits is also extended 4-months from the CAIR Phase I NO<sub>x</sub> compliance deadline of January 1, 2009. The Department does not believe it is appropriate to extend the compliance deadline for a toxic substance such as mercury.

#### **5) Mercury Reductions – Lack of commercial demonstrated control options increases compliance risks**

EVA/CEED comments that by the proposed regulation advancing the compliance deadline for mercury emissions control to 2009, the proposed regulation is not allowing an advancement of mercury emissions control technology that could allow the affected units to benefit from improved and/or more cost effective mercury control technologies. EVA/CEED comments that mercury control performance beyond currently demonstrated levels will be needed to meet the Phase II mercury emissions limits. EVA/CEED comments that the proposed regulation should provide some flexibility in the event the installed mercury controlled technologies do not achieve design performance.

The Department has reviewed documents indicating the mercury emissions limitations in the proposed regulation may be achieved as a co-benefit of installation and operation of combined certain NO<sub>x</sub> and SO<sub>2</sub> control technologies. The Department has also reviewed documents that indicate that carbon injection systems have the capability of achieving the emissions limitations of the proposed regulation, and may also be utilized as a “trim” technology in conjunction with the mercury removal effects of NO<sub>x</sub> and SO<sub>2</sub> control technologies. All of these demonstrated technologies are commercially available for retrofit application.

#### **6) 24 Hour Rolling Average Emission Rate Limit- Provides no allowance for control equipment upsets**

EVA/CEED comments that the short averaging time provides no allowance for unscheduled pollution control equipment upsets, unit start-up and shutdown, or process fluctuations. EVA/CEED comments that the averaging period should be increased to at least 30-days and the limits increased.

The PM2.5 and ozone NAAQS have short term components (24-hr for PM2.5 and 8-hr for ozone). Short term emission limits are necessary to ensure that emissions from affected sources are limited to values that do not compromise the short term NAAQS. In the Department's technical opinion the averaging times should, in most cases and where practicable, be equal to or shorter than the time frame associated with the standard. The proposed regulation requires that the NOx and SO2 emissions limitations be complied with on a rolling 24-hour basis.

The Department recognizes that day-to-day variations such as unit output, amount of load following, fuel quality variability, and the need to perform routine maintenance can affect achievable emission rates over a short duration. The proposed regulation includes short term NOx and SO2 emission rates that are protective of the short term NAAQS, but are less stringent than that which would be equivalent to the long term mass cap. It is the Department's opinion that these emission rates are supportive of the short term environmental goals while recognizing that routine operating variability may make it difficult to comply with emission rates equivalent to 100% capacity factor with the mass caps.

#### **7) Mass Emission unit limitation caps oil generation- No flexibility to meet future Delaware demand even with controls**

EVA/CEED comments that the NOx and SO2 emission mass caps limit the production output of the affected units, especially the two oil-fired units subject to the proposed regulation.

The NOx and SO2 fleet mass caps were determined by adding the heat input rating of the units subject to the proposed regulation and multiplying, at 100% annual capacity factor, by the emission rate capabilities of SCR NOx reduction technology and FGD SO2 reduction technology. Individual unit annual mass allocations were determined multiplying the appropriate fleet mass cap by the historic percentage of the individual unit's annual heat input capacity of the total.

Should the units determine to install control technologies that achieve the control capabilities of SCR and FGD, the units could operate at high capacity factors and comply with the annual mass caps. With regards to the oil-fired units, the use of lower sulfur fuel and /or installation of available emission control technologies would allow operation at higher capacity factors.

#### **8) Retirement Risk is Extremely High for Most Targeted Units**

EVA/CEED comments that the plants subject to the proposed regulation are already at a disadvantage to other regional coal-fired plants because of their location (higher fuel transportation cost), size, and age. EVA/CEED comments that the cost of compliance with the proposed regulation will increase the risk of retirement for the subject units.

EVA/CEED indicates that this could result in reduced system reliability, increased electricity prices, increase Delaware's reliance on imported power, increase regional reliance on natural gas, increase unemployment, jeopardize rail service, and cause a loss in state and local tax revenue. EVA/CEED comments that these impacts could be incurred and the proposed regulation not provide any net emission changes.

It is the Department's opinion that economics dictated where the power plant owners built their units, what size to build them, and when to build them. Over the past two decades, the construction on new large power plants in Delaware has been predominately gas-fired, and again it is the Department's opinion that this has been an economic decision by the power plant owners. The Department agrees that if the plant owners and operators determine that it does not make economic sense to continue to operate a unit if the emissions must be controlled (or for any other reason), then the owners of the subject unit will likely seek to shut down the unit or curtail its output. But based on comments and information reviewed by the Department, the Department does not believe that the requirements of the proposed regulation will result in drastic changes in power costs, unemployment, or system reliability.

Further, it is the Department's opinion that the proposed regulation will not only help Delaware meet certain Clean Air Act obligation, but that it will also improve the ambient air quality in Delaware to the benefit of the health and welfare of Delaware's citizens. The Department has reviewed numerous documents indicating that power plant emissions can impact the air quality in areas close to the subject plants, and can have a significant effect on the health of people living and working in those areas.

**EVA/CEED Recommendation 1 – “First, Delaware should change its draft regulation to allow its power industry emissions trading such as offered in surrounding states.** This program flexibility would allow Delaware to reduce compliance costs by up to \$30 million per year and result in the same emission reduction effectiveness.”

This comment/recommendation appears to be in conflict with comments made by some of the owners of plants subject to the proposed regulation. While those owners have also requested trading, they have also indicated that the proposed regulation's emission rate requirements will require the installation of the most expensive control technologies for compliance. EVA/CEED's recommendation seems to infer that “lesser” control technologies would be capable of meeting the proposed regulations emission rate limitations and that trading mass emissions allowances would allow compliance with the proposed regulation's mass emissions limits.

It is the Department's opinion that trading will not “result in the same emissions reduction effectiveness”. EPA's modeling has indicated that economics will drive the units subject to the proposed regulation to purchase emission allowances, if permitted, instead of making significant emission reduction. Emissions reductions made out of state will not be effective in supporting Delaware's compliance with certain Clean Air Act

obligations, including the 8-hour ozone Reasonable Further Progress plan. Further, allowing emissions trading will deprive Delaware's citizens of the benefits in health and welfare associated with local emissions reductions.

**EVA/CEED Recommendation 2 – “Second, Delaware should change its schedule to allow sufficient time for suppliers to comply with the requirements in they make their best efforts.** Why establish a schedule that no engineer can meet. If the permits are held up, the compliance schedule should be extended. At a minimum, the deadlines should be extended to 2014 or 2015 for FGD and SCR retrofits.”

The Department has reviewed numerous documents indicating that the compliance schedules in the proposed regulation are achievable. These documents include documents from the EPA and an industry trade organization. Further, the Department has reviewed documents where FGD and SCR retrofit projects have been completed at other facilities within the time frames associated with the proposed regulation's compliance deadlines. Also, the deadlines proposed by EVA/CEED are extended by years more than the extremely long compliance deadlines proposed by the owners of the units subject to the proposed regulation.

However, in response to comments from other sources, the Department is proposing to extend the Phase I compliance deadline for NOx and SO2 emission limits from January 1, 2009 to May 1, 2009. Assuming the proposed regulation is finalized in December 2006, the change in the NOx and SO2 Phase I compliance date will increase the compliance time from 24 months to 28 months.

Further, with regard to SO2 emissions, the Department is proposing to add a provision to the proposed regulation that permits affected unit owners or operators the opportunity to petition the Department for an extension of the SO2 emissions limit compliance deadline of up to 1-year. The petition must demonstrate clear and convincing evidence that the requested extension is necessary to achieve unit specific compliance at the facility with the regulation's emissions limitations. If the petition is approved by the Department, the SO2 Phase I compliance deadline could be extended up to May 1, 2010. If approved, the maximum time extension would increase the Phase I SO2 emission limit compliance time to a total of 40 months.

The Department does not believe it is appropriate to extend the compliance deadline for a toxic substance such as mercury.

**EVA/CEED Recommendation 3 – “Third, Delaware should deem suppliers to be in-compliance with mercury requirements in they install state-of-the art activated carbon controls.** If the suppliers make best efforts and these controls prove to be insufficient to achieve stated performance goals, should the companies be considered out-of-compliance and shut down?”

The Department has reviewed many documents that indicate that the mercury emissions limitations in the proposed regulation are realistic and achievable. The information also suggests that there is also more than one path that may be utilized to achieve the mercury emissions limitations. This suggests that the sources have some flexibility in determining a compliance methodology. The Department believes that the mercury limitations of the proposed regulation are achievable by the coal-fired sources subject to the proposed regulation.

Also, the Department is somewhat confused by the comment. Some sources subject to the proposed regulation have indicated that they can meet the mercury emissions limitations of the proposed regulation ahead of the proposed regulations deadlines.

**EVA/CEED Recommendation 4 – “Delaware should revise its emission rate limitations based upon 30 day or longer rolling averages to recognize unit start-up/shutdown and process fluctuations/upsets.”**

One of the goals of the proposed regulation is to help Delaware achieve and maintain compliance with the PM2.5 and ozone NAAQS. The PM2.5 and ozone NAAQS have short term components (24-hr for PM2.5 and 8-hr for ozone). Short term emission limits are necessary to ensure that emissions from affected sources are limited to values that do not compromise the short term NAAQS. In the Department’s technical opinion the averaging times should, in most cases and where practicable, be equal to or shorter than the time frame associated with the standard. The proposed regulation requires that the NOx and SO2 emissions limitations be complied with on a rolling 24-hour basis.

The Department recognizes that day-to-day variations such as unit output, amount of load following, fuel quality variability, and the need to perform routine maintenance can affect achievable emission rates over a short duration. The proposed regulation includes short term NOx and SO2 emission rates that are protective of the short term NAAQS, but are less stringent than that which would be equivalent to the long term mass cap. It is the Department’s opinion that these emission rates are supportive of the short term environmental goals while recognizing that routine operating variability may make it difficult to comply with emission rates equivalent to 100% capacity factor with the mass caps.

**EVA/CEED Recommendation 5 – “Fifth, Delaware should conduct the air quality and economic modeling to justify that reductions beyond EPA CAIR limitations are required and that no more cost-effective approaches exist. If this modeling is completed in 2007, the state would provide sources sufficient time to plan, engineer, permit and install needed controls. Is it fair to place additional burdens on one industry if there are no incremental benefits?”**

During the workgroup meetings and public workshops, there was considerable discussion concerning the relationship of Delaware’s power plants to Delaware’s air quality and

compliance with federal standards. It was discussed that “zero-out” modeling indicated that Delaware sources alone could cause exceedances of the federal ozone air quality standard in Delaware and in surrounding states. It was also discussed that at least New Castle County and Sussex County are predicted to be non-attainment with EPA’s proposed new PM<sub>2.5</sub> standard. It was also discussed that EPA modeling predicted Delaware would not add significant emissions controls, and that emissions from Delaware’s coal-fired power plants under the federal programs would increase, not decrease.

Further, Delaware’s 8-hour ozone Reasonable Further Progress Plan (RFP), a requirement of the Clean Air Act, requires significant reductions in NO<sub>x</sub> emissions. A portion of these reductions are needed from the power plants and, as noted above, the federal CAIR program does not assure these reductions. EPA and OTC modeling has indicated that more than the minimum RFP reductions are needed for Delaware and upwind states to attain the 2010 ozone NAAQS. Further reductions will likely be needed to offset growth and maintain the ozone NAAQS.

However, this proposed regulation is not the only initiative being undertaken by the Department to reduce emissions and progress towards NAAQS attainment. As discussed in multiple workgroup meeting and public workshops, the Department is working to reduce emissions through controlling emissions from large industrial and refinery boilers, emission controls for electric generation peaking units, emission controls for small generators, crude oil lightering controls, reduction of volatile organic compound content of architectural and industrial maintenance coatings and consumer products, and adopting statewide limits for fuel sulfur content.

As indicated above, the Department is looking in multiple areas to find the emissions reductions needed for compliance with federal requirements and standards. Further, it is the Department’s opinion that emission reductions that occur in Delaware will serve to improve Delaware’s air quality and benefit the health and welfare of Delaware’s citizens.

**Technical Comments from General Public  
In Opposition to the Proposed Regulation  
Public Hearing comments**

During the course of the public hearing, the general public was in support of the proposed regulation. However, there were two comments in opposition to the proposed regulation that were raised during the public hearings.

The first comment was that the proposed regulation did not specifically address direct fine particulate (PM<sub>2.5</sub>) emissions (particulate emitted directly from the power plant stacks) from the power plants subject to the proposed regulation. The Department agrees that the proposed regulation does not address direct PM<sub>2.5</sub> emissions from the units subject to the proposed regulation, although it will reduce secondary PM<sub>2.5</sub> (PM<sub>2.5</sub> formed by chemical reaction of various pollutants in the atmosphere) through the required reductions in NO<sub>x</sub> and SO<sub>2</sub>. The issue of direct PM<sub>2.5</sub> reductions will be addressed through other rulemaking activities, including those related to the federal Regional Haze Rule.

The second comment was that the proposed regulation was not stringent enough, although no specific emissions thresholds were offered. The proposed regulation establishes emissions limitations based on installation and proper operation of selective catalytic reduction (SCR) technology for NO<sub>x</sub> emissions control, flue gas desulfurization (FGD) scrubber technology for SO<sub>2</sub> emissions control, and activated carbon injection (ACI) technology for mercury emissions control. SCR, FGD, and ACI emission control technologies represent the current state-of-the-art for effective, proven, commercially available power plant emission controls for NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions. These emission control technologies have been demonstrated to be effective over a wide range of electric generating unit designs and sizes, and in both new and retrofit applications. It is the opinion of the Department that establishing emissions rate limitations based on the capabilities of these state-of-the-art emission control technologies is appropriate for the proposed regulation.

**US Environmental Protection Agency Comments  
Letter Dated September 20, 2006**

I – EPA requests that the proposed regulation and 111(d) plan be revised to state that any future revisions to the proposed regulation and 111(d) plan, that would change mercury emissions allocations to Delaware’s electric generating units, will not exceed the applicable federal mercury mass caps. EPA also requested that the proposed regulation be revised to include provisions for establishing new unit set asides and the process to be used to allocate such allowances.

It is the Department’s opinion that existing review processes (that would be required for future revisions to the proposed regulation or 111(d) plan) would ensure that total Delaware mercury emissions allocations, subject to the federal CAMR program, would not exceed the CAMR mercury mass cap for Delaware. Further, future revisions to the proposed regulation or 111(d) plan would require review and approval by the US EPA, thereby providing an additional review and approval mechanism that would serve to ensure the applicable mercury mass caps would not be exceeded.

II – EPA requests that the proposed regulation’s Table III, be revised to indicate the total mercury mass emissions of all subject units in addition to the mercury mass emissions limitations for the individual subject units.

It is the Department’s opinion that the proposed regulation’s existing Table III adequately provides the emissions limitations for the units subject to the proposed regulation, and that providing a total would not add to the accuracy or clarity of the table and would be inconsistent with the tables for the other pollutants addressed by the proposed regulation.

III – EPA requests that the proposed regulation’s applicability statement be revised to reflect the EPA’s CAMR applicability definition, including applicability to new units and existing coal-fired units that meet the definition of EGU in the future.

It is the Department’s opinion that the proposed regulation adequately defines the applicability of the proposed regulation to existing units. Any new unit for which mercury emissions limitations would be applicable would require revision to the proposed regulation, and, if the applicability definition was viewed to be inadequate it could also be revised at that time. Further, the Department knows of no existing unit in DE not covered by the regulation that could reasonably be modified to meet the definition of EGU.

IV – The EPA requests revisions to several of the definitions in the proposed regulation to match similar definitions in the federal CAMR. The EPA also points out a

typographical error (“of” instead of “or”) in the proposed regulation’s definition of Administrator.

It is the Department’s opinion that the identified definitions in the proposed regulation adequately specify the meaning of the applicable terms to meet the requirements of the existing proposed regulation. If a revision of the regulation is required in the future that would also require changes in the definitions in the proposed regulation, those changes could be made as part of the revision process. The Department agrees with the EPA’s comment regarding the typographical error in the proposed regulation’s definition of Administrator and has made the noted change.

V – EPA comments that it would not be advisable to require monitoring mercury emissions with Part 75 monitoring prior to January 1, 2009. EPA also comments that, for clarity, it be considered to expand the proposed regulation’s stated reporting requirements from just 40 CFR Part 60 to specific subsections and paragraphs in 40 CFR Part 60.

The proposed regulation does not require mercury emissions monitoring with Part 75 monitors prior to January 1, 2009. It is the Department’s opinion that the proposed regulation’s monitoring and reporting requirements, in accordance with 40 CFR Part 75 and 40 CFR Part 60, sufficiently defines the requirements, including those of the designated representative.

VI – EPA indicates that there may be a revision to the federal CAMR plan rule in the future, and that these changes may require revision to the proposed regulation and 111(d) plan.

The Department will initiate required revisions to the proposed regulation and 111(d) if necessary in the future.