Fields of Opportunities

STATE OF IOWA

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DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

March 23, 2004

Air Docket
Environmental Protection Agency
Mail code: 6102T
1200 Pennsylvania Ave., NW.
Washington, DC 20460

Attention Docket ID No. OAR-2003-0053

RE: Comments on the proposed Interstate Air Quality Rule (IAQR)

To Whom It May Concern:

The State of Iowa Department of Natural Resources (DNR) appreciates the opportunity to provide comments on the Interstate Air Quality Rule (IAQR) as proposed January 30, 2004 in the Federal Register. It is the intent of the DNR, through these comments, to provide constructive suggestions to the Environmental Protection Agency (EPA) concerning the proposed IAQR. The following comments and suggestions are provided for your full consideration.

1. Extension of the Public Comment Period

As proposed in the January 30, 2004 Federal Register, the *Rule To Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule);* proposed rule, omits critical information, data, details and proposed rule language necessary to develop and provide substantive comments during the provided public comment period. In full knowledge of this the EPA has publicly announced its intention to publish a supplemental notice of proposed rule making including, but not limited to the following issues:

a. Specific model cap and trade rules for NO_X and SO_2
b. Results from refined air quality modeling
c. Potential changes to states included as subject to provisions of the proposed rule
d. Details concerning requirements for states opting to regulate sources other than electrical generating units
e. Rules for integration with Title IV of the Clean Air Act
f. Rules for transitioning eastern U.S. emission sources included in the NO_X SIP call to the IAQR
g. Specific details for determining NO_X allowances
h. Rules for determining compliance with the cap and trade program
i. Updated economic analyses

For these reasons, in combination with the vast amount of supporting information in need of thorough review, an extension of the public comment period for this rule is formally requested. It is requested that the public comment period for this rule be extended, at a

minimum, to 90 days after the publication of the supplemental notice of proposed rulemaking to allow regulatory agencies, affected stakeholders and private citizens an adequate opportunity to fully and comprehensively review the complete rulemaking package. The current method of providing disjointed public comment periods on specific subsections of the complete rulemaking package does not allow for a comprehensive review of the proposal.

2. Adequacy of Supporting Technical Information

Department staff have begun review of the underlying data and technical methodologies employed in the development of the proposed rule. This review has raised serious concerns with the accuracy and adequacy of the technical assessment being used as the basis for determining which states significantly contribute to downwind nonattainment and are therefore subject to the provisions of this proposed rule. The following items have been identified in the limited time available to review the technical aspects of this proposed rule.

a. It does not appear that EPA has attempted to follow their own draft guidance for conducting the modeling studies serving as the technical basis for the development of this rule (i.e. Draft "Guideline for Demonstrating Attainment of Air Quality Goals for PM2.5 and Regional Haze" and "Draft Guidance for 8-hr Ozone NAAQS"). In particular, EPA has not followed the provisions of the referenced draft guidance for developing accurate and representative meteorological fields, accurate and representative emission inventories, or accurate and representative photochemical modeling results. EPA should provide clarification concerning what aspects of draft modeling guidance were omitted from practice in support of this proposed rule and quantify the potential impact any resulting assumptions might have had on the accuracy of their technical analyses.

b. In support of this rulemaking EPA did not make sufficient efforts to use the best available data. By contrast, EPA appears to have employed a data quality standard based on data that was the most conveniently available regardless of data accuracy. Specific examples of using the most conveniently available data in place of the best available data include:

1. Use of outdated and inadequately quality assured meteorological modeling data to support ozone and fine particulate modeling efforts. As meteorological parameters are the primary driving forces behind pollutant transport (e.g., advection, dispersion, deposition, particle growth, oxidant reaction rates, photolysis, etc.) EPA should use and/or develop meteorological model data supported by thorough model performance evaluation for use in photochemical modeling studies. It is suggested that EPA compare hourly and daily meteorological model performance with performance metrics proposed by Environ with attention to model performance in geographic sub-regions defined by climatological similarities. Specific examples of failure to use best available or quality assured meteorological data include:

   A. Of the 39 days of meteorological model output used to conduct the episodic ozone modeling in support of the IAQR only 4 days appear to have been partially reviewed as an attempt to justify the meteorological model accuracy. Of this incomplete performance analysis, no thorough statistical metrics concerning adequacy of the meteorological fields are provided by the EPA. EPA should develop hourly and daily model performance statistics for these meteorological

modeling episodes to determine the accuracy of the meteorological fields used in these analyses.

B. Of the 365 days of meteorological model output used to conduct the annual fine particulate modeling in support of the IAQR only one day per month in addition to monthly climatologies appear to have been analyzed to evaluate meteorological model performance. Of this incomplete performance analysis no thorough statistical metrics concerning adequacy of the meteorological fields are provided by the EPA. EPA should develop hourly and daily model performance statistics for this meteorological modeling episode to determine the accuracy of the meteorological fields used in these analyses.

C. Failure to conduct any analyses to determine the applicability or level to which the chosen modeled meteorological conditions are representative of conditions contributing to actual $PM_{2.5}$ and 8-hour ozone NAAQS exceedences or violations. EPA should, at a minimum, conduct a Classification and Regression Trees (CART) analysis of the three-year period (2000 – 2002) upon which initial fine particulate matter and 8-hour ozone designations are being based. This would provide at least a minimum level of comparison for how representative the meteorological fields being used in the photochemical modeling efforts are in comparison to the meteorological conditions underlying the pollutant design values used in these analyses.

D. EPA should conduct meteorological modeling specific to the time period being used to establish design values from ambient monitoring data. It is inappropriate and not technically justifiable to combine meteorological conditions from one time period with ambient pollutant concentrations from a different time period. This shortcoming is amplified through the use of the design values and photochemical model results to project future year design values upon which state by state culpability, control program development and efficacy are based.

E. EPA should have used the best available meteorological models, input data and model configurations in a way comparable to the meteorological modeling systems that have been used for air quality modeling for the past several years. Significant advances in meteorological modeling for air quality studies have taken place since the development of the meteorological fields being used by EPA to support this rulemaking. For example, EPA had contracted with Alpine Geophysics, LLC to develop more recent MM5 data for calendar year 2001 and these tools and methodologies were available to EPA had they chosen to use best available data instead of most conveniently available data.

2. Use of outdated and inadequately quality assured emissions data to support ozone and fine particulate modeling efforts. As the second critical piece to the photochemical modeling effort supporting the proposed IAQR, EPA should have developed an accurate and representative air pollutant emission inventory. In place of putting forth the effort to utilize an adequate emission inventory to support modeling studies, EPA opted to massage the most conveniently available emissions inventory for use in supporting the IAQR. Not only did EPA chose to use outdated and unrepresentative emission inventories, a poorly defined interpolation process on old emission modeling output that is virtually impossible to replicate or quality assure was created. To provide

a specific example of this, the 2001 base case "proxy" emission inventory used to support the IAQR has been developed in the following manner:

- Old emission model output for 1996 was grown (through various methods) to 2007 and 2020.
- Grown 2007 and 2020 emission inventories were linearly interpolated to 2010.
- The interpolated 2010 emission inventory was linearly interpolated with the 1996 emission inventory to establish the 2001 "proxy" emission inventory.

Limited comparisons of the EPA 2001 "proxy" inventory with emission inventory records maintained by the State of Iowa indicate significant discrepancies. For large point sources alone (point source emitting either NO_X or SO_2 in amounts greater than one ton per day) the methodology applied by EPA overestimated SO_2 emissions alone by at least 30,000 tons per year. Additionally, numerous sources listed in the scarce EPA reports concerning the emission inventories used to support this rulemaking include sources that no longer exist and omit sources that have existed for some time. EPA should develop and use an accurate and quality assured emission inventory in support of the IAQR. Additional examples of EPA's decision to use the most conveniently available data in place of the best available emission inventory data include:

A. Use of outdated emission model output as a substitute for actual emission inventory development. In place of using National Emission Inventory (NEI) data available from the EPA for 1999, EPA chose to use already processed emission model output fields based on the 1996 NEI. At a minimum, EPA should have used the best available data, the 1999 NEI in place of the 1996 NEI and allowed the states the opportunity to review and correct errors in the 1999 NEI as possible. At this time it is suggested that EPA use the 2002 NEI as the basis for supporting the IAQR for the simple fact that the 2002 NEI is the first comprehensive emission inventory that states are required to submit by federal mandate as part of the Consolidated Emissions Reporting Rule (CERR). As such, the 2002 NEI will contain state specific air pollutant emission inventories of greater accuracy than the emission estimates generated by EPA for the 2001 "proxy" inventory. This fact is amplified for states such as Iowa, where statewide attainment of the NAAQS in addition to being omitted from regulatory programs such as the NO_X SIP Call have resulted in a lack of resources and priority for developing an accurate emission inventory.

B. Use of inconsistent future year (2010) culpability and control strategy emission inventories. EPA provided gross emission inventory estimates for two future year (2010) emission inventories. One future year emission inventory (2010 Base-1) was used to establish state by state culpability for significant contribution to downwind non-attainment. Another future year (2010) emission inventory (2010 Base-2) was used to establish the emission control program and quantify the efficacy of that program. The two future year emission inventories are inconsistent. In fact, through the limited comparisons possible due to the methodologies employed by EPA, the difference between the two future year cases for SO_2 emissions for sources in the State of Iowa is 16,351 tons. Restated, the emission inventory used to establish whether or not emissions from sources located in the State of Iowa were culpable for significant contribution to downwind non-attainment included at least 16,351 tons more SO2 emissions than the emission inventory

used by EPA to develop and determine the efficacy of their proposed emission control program. On its face it appears that EPA has either overstated the impact of Iowa emission sources, overstated the projected efficacy of the proposed emission control program and therefore cost benefit analysis, or both. EPA should develop accurate and consistent projected emission inventories is attempting to establish specific culpability and control program determination and efficacy.

C. Failure to use readily available continuous emissions monitoring data. It appears that EPA chose not to utilize readily available continuous emission monitoring (CEM) data for large point sources including electrical generating units. Therefore, EPA has not accurately quantified the emissions or impact of these large emission point sources to a level that could be considered best available data. This is likely the result of EPA's choice to utilize, the most conveniently available emission model output in place of developing an accurate and representative air pollutant emission estimates. It appears that the original intent of the modeled emission inventory utilized by EPA to support the IAQR was to support the national heavy-duty diesel rulemaking. As such, it is understandable that the base emission inventory used for the national heavy-duty diesel rulemaking would have placed less emphasis on being specifically accurate for large point sources as the primary intent was generalized applicability and efficacy instead of specific culpability determination as is the case with the IAQR. EPA should develop an emission inventory representing the best available data to accurately determine state culpability and control program development and efficacy. Included in this inventory should be readily available CEM data since the proposed control program is designed to control those sources, specifically electrical generating units.

D. Failure to develop or acquire adequate emission inventories for a state that has not previously been required to submit comprehensive emission inventory data. Iowa has maintained the NAAQS and was not included in previous interstate pollutant mandates (such as the NO_X SIP Call). Inadequate effort was made to accurately quantify Iowa emissions in support of the IAQR. EPA should utilize state specific emission reports required under the CERR to establish an accurate, comprehensive air pollutant emissions inventory to support the determinations of culpability and emission control program efficacy.

E. Failure to take into account economic growth for projecting future year emissions. It appears that since the EPA utilized outdated emission model output in place of an accurate emission inventory they were unable to incorporate projected changes in air pollutant emissions based on projected economic growth. As such, EPA has omitted an essential component in determining future year culpability and emission control program development and efficacy. EPA should utilize a comprehensive and accurate emission inventory in support of the IAQR and make specific efforts to accurately quantify the impact of projected economic growth on future year emission estimates.

F. The use of state level averages in place of facility specific emissions to project future year emission estimates. As part of EPA's methodologies to interpolate emissions from year to year, state-wide totals were used to develop generic growth factors. As such, facility specific emissions were inappropriately locked to 1996 emission inventory distributions potentially biasing emission control program development and efficacy. This emissions averaging was undertaken in place of at least utilizing

available CEM data and is not scientifically justifiable. EPA should use an accurate emission inventory and sector and region specific growth estimates to develop future year emission inventory estimates for establishing state level culpability and control program development and efficacy.

G. Failure to describe the temporal allocation of emissions. EPA has provided insufficient information to adequately asses the temporal allocation of emissions supporting their modeling studies. At a minimum, EPA should use month specific average weekday, Friday, Saturday and Sunday temporal profiles for annual and episodic modeling efforts. Such an approach was available to EPA as they undertook this modeling effort and would constitute the best available data in place of the most conveniently available data (annual average emissions plus summer season) utilized to support this rulemaking.

H. Failure to develop an accurate and comprehensive ammonia emission inventory. Due to the critical role of ammonia emissions in the formation and transport of fine particulate matter (primarily ammonium nitrate and ammonium sulfate) EPA should have utilized readily available information concerning improvements to ammonia emission inventory estimates. This aspect of the emission inventory supporting the IAQR is particularly important for states, including Iowa, that make up the "western edge" of the proposed emission control program due to the fact that significant ammonia emissions from soil, fertilizer and animal husbandry practices in agricultural regions are poorly quantified. Coupling the outdated ammonia emission inventory used by EPA with the critical role of ammonia emissions in the formation of ammonium sulfate and ammonium nitrate, the two primary fine particulate species being addressed in the IAQR, creates an inordinate level of uncertainty in the accuracy of the modeled base case and future year pollutant estimates. As such, EPA should develop, or make resources available to states to develop, an accurate ammonia emission inventory. Failure to use or develop an accurate ammonia emission inventory undermines the scientific justification for the proposed emission control program development and efficacy.

3. Selection of modeling episodes without adequate ambient monitoring data to conduct comprehensive model performance analyses. EPA used technically suspect methods in establishing model biases and therefore development of the resulting relative reduction factors. EPA should conduct photochemical modeling and model performance analysis for a time period when adequate ambient monitoring data is available for comparison and relative reduction factor development. It is suggested that EPA conduct annual fine particulate matter modeling for the three year period (2000 – 2002) being used to make initial designations for the fine particulate matter NAAQS. Additional examples of shortcuts used in the modeling analysis supporting the IAQR follow:

A. Model performance evaluation for PM2.5 lacks adequate spatial and temporal resolution to accurately quantify model performance and applicability (modeling TSD figure C-1). This aspect is most pronounced in the central Untied States where available fine particulate monitoring sites are virtually non-existent during 1996. As such, model performance for most states in the central United States and upper midwest can not be determined and therefore the adequacy of proposed control programs are uncertain. EPA should use available PM2.5 data collected

during the three-year period upon which attainment designations are being made to perform a robust analysis of PM2.5 model performance and utility.

B. The choice of model selected for fine particulate matter simulation and control strategy development is inappropriate. The REMSAD model contains minimized atmospheric chemistry algorithms as compared with other available models such as the CMAQ model developed by EPA. EPA should utilize the best available science through utilization of the most comprehensive photochemical models available.

C. The use of seasonal and annual model performance metrics are inappropriate for adequate model performance evaluation. This methodology averages localized or regional over/under predictions skewing actual model performance. This fact is likely even more pronounced in the central United States and upper midwest where fine particulate monitoring data was widely unavailable in 1996.

D. In addition to the general concerns listed above, limited statistical evaluations conducted with the sparse daily monitoring data available in 1996 indicate daily errors approaching a factor of 2 for sulfates and errors of up to 166% for nitrate predictions. These errors, the lack of adequate model performance evaluation, amplified by the lack of observational data resulting from the episode chosen for analysis by EPA, create serious concerns with the culpability determination, control program efficacy and cost benefit of the proposed PM2.5 control program proposed.

E. EPA has not provided adequate analysis of model performance for precursor gasses primarily involved in the formation of particulate nitrate and particulate sulfate. In choosing to perform model performance evaluations for 1996, EPA has actively dismissed substantial precursor gas measurements taken throughout the country including federally funded studies such as the supersites program. EPA should conduct base case modeling during the time period of attainment designations when adequate ambient monitoring data is available to perform a thorough model performance evaluation for fine particulate matter.

F. The use of zero out modeling for determining state by state culpability is technically flawed. Such an approach requires the assumption of a linear atmospheric chemistry response when the real response is non-linear. Tools for establishing culpability without severely altering the underlying atmospheric chemistry are available for ozone at this time and should be the only source of modeling culpability used. Tools for PM2.5 culpability determination outside of zero out methodologies are becoming available. EPA should assist in the development of these tools and delay determination of state by state culpability until they are available and an adequate model performance evaluation has been conducted.

G. For PM2.5 culpability determinations a 2001 to 2010 relative reduction factor was used even though model performance was not determined for 2001. This is likely due to the fact that 1996 meteorology was used with the 2001 emission inventory making model performance evaluation for 2001 moot. EPA can not assume that the 2001 model simulation accurately depicts actual PM2.5 concentrations. The only remedy to this is for EPA to conduct modeling for a period in which time-

coordinated meteorology, emission inventories and ambient monitoring data are available.

H. Zero-out modeling with estimated future concentrations introduces additional uncertainty into in already imperfect contribution assessment method. The 2010 Base-1 inventory estimated Iowa's SO2 emissions would increase by 46,478 tons/yr, versus the 2001 proxy inventory. This tonnage increase is likely not accurate, and in light of uncertain basecase model performance EPA can not make a scientifically justifiable determination of future year state by state culpability. EPA should conduct culpability assessments using current year(s) modeled culpability in place of potential future year contributions to establish specific causality to significant contribution to downwind non-attainment.

I. Ozone modeling episodes occur in 1995 and PM2.5 modeling within 1996, however, design values were calculated using data from the 2000-2002 period. Modeled episodes should, at a minimum, occur within the time frame represented by design value data used in the analysis.

J. Local control studies (for PM2.5) utilized a 36 km grid when higher resolution modeling should have been conducted to accurately quantify the local impacts of local controls instead of spreading the emission reductions and chemical and physical process out over 1,296 square kilometers for each impacted grid cell.

K. Page C-22 of the modeling technical support document states: "*Also, there are a number of issues associated with the emissions and meteorological inputs, as well as ambient air quality measurements and how these should be paired to modeled predictions that are currently under investigation by EPA and others*." EPA should not proceed with rules for PM2.5 controls prior to adequately understanding the limitations of the data, methodologies, and accuracy of the modeling being used to support this rulemaking.

3. Determination of Significant Contribution

As proposed in the IAQR, EPA has made a preliminary finding that air pollutant emissions from sources located in the State of Iowa contribute significantly to non-attainment of a National Ambient Air Quality Standard (NAAQS) in at least one downwind state. In light of the technical concerns listed in section two of these comments, Adequacy of Supporting Technical Information, EPA has not reasonably established a determination of significant contribution to downwind non-attainment of the PM2.5 or 8-hour ozone NAAQS for emission sources located in the State of Iowa. Such a finding, in light of the numerous and compounding technical errors, can not be reasonably substantiated.

Proposing to hold emission sources in the State of Iowa to a higher environmental standard than others maintaining compliance with all of the NAAQS creates an undue burden that has not been justified by the supporting technical analysis conducted by EPA for this rulemaking. EPA should conduct adequate culpability determinations (as described in section 2) or implement a national emission control program that treats emission sources in all states equally. As such, the State of Iowa should not be held to any emission control standard greater than that of any other state meeting attainment of the NAAQS.

In addition to the fundamental technical aspects detailed in the previous section, an adequate culpability determination should include:

a. The form of the culpability determination should reflect the NAAQS being considered. As such, EPA should conduct three-year (2000 – 2002) air quality modeling and culpability analyses in a manner that reflects not only the form of the standard (e.g. for 8-hour ozone the highest 4th highest value), but also the time period being used to determine designation status.

b. EPA should provide adequate scientific justification for the culpability levels used to determine states significantly contributing to downwind non-attainment. In particular, EPA should address inconsistencies such as the percentage of the NAAQS considered significant for 8-hour ozone as compared to fine particulate matter and codified levels of significance such as those provided for particulate matter in 40 CFR 51.165.

c. EPA should provide an explanation as to why the stayed 8-hour findings developed in support of the NOX SIP Call were not considered as part of the IAQR. EPA should review the 8-hour findings and explain discrepancies between those findings and the culpability determinations being provided in the IAQR.

d. EPA should interpret CAA110(a)(2)(D) as considering the impacts of emission sources from a state on not only non-attainment areas but also, as provided for in that provision of the Act, should include "[…] emissions which will […] interfere with maintenance by, any other State […]"of the NAAQS. For example, studies conducted by the State of Iowa indicate that over 75% of the ozone measured in the eastern portion of the state results from interstate transport. While this area currently monitors as attainment with the 8-hour ozone standard the ability of the state to maintain the area in attainment is interfered with by transport of pollutants from downwind states. As such, EPA should hold all states to an equal standard of emission control based on total downwind impact regardless of downwind attainment/non-attainment designation status.

e. EPA should conduct an adequate cost benefit analysis for states currently, and projected to be, in attainment for the $PM_{2.5}$ and ozone air quality standards. This analysis should provide state by state cost benefit analyses in an attempt to ensure that disproportionate burdens are not being placed on specific states and/or geographic regions.

f. EPA should conduct an economic impact analysis of the proposed rule on the agricultural sector. In particular, EPA should identify the potential impact of increased fertilizer prices resulting from increased demand for NH3 and urea for control of NOX emissions and the potential impact of increased natural gas prices on fertilizer costs.

g. EPA has proposed to establish an unfunded mandate for states that are included in the IAQR but have no non-attainment areas. CAA Section 105 funds are distributed on a basis that includes increased funding for states with non-attainment areas. For the IAQR, the state of Iowa may be required to undertake significant work effort with no additional funding under section 105. This is in contrast to areas in non-attainment that will receive additional funding while work to address their non-attainment issues are being at least partially completed by upwind states. EPA should restructure their section 105 grant allocations to reflect the increased demand that this rule will place on state and local agencies meeting all of the NAAQS.

4. Final Recommendations

The DNR suggests that EPA take the following actions before publishing the final version of the IAQR:

a. EPA should extend the public comment period to allow adequate review of the entire Interstate Air Quality Rule. It is suggested that the public comment period be extended for both the proposed rule and the upcoming supplemental notice of proposed rulemaking to 90 days following publication of the supplemental notice of proposed rulemaking.

b. EPA should either develop scientifically justifiable determinations of state by state culpability or establish a national emission control program for PM2.5 and 8-hour ozone.

c. In order to provide regulatory certainty for air pollution control agencies and the regulated public EPA should integrate multiple regulatory air quality issues likely to be addressed under such a national, or to a lesser degree regional, emission control program:

    1. EPA should accept compliance with the IAQR as fulfilling state requirements for the first reasonable progress goal of the Regional Haze Rule.

    2. EPA should accept compliance with the IAQR as fulfilling requirements for sources subject to Best Available Retrofit Technology.

    3. EPA should establish stringent requirements for consideration of petitions submitted under section 126 of the Clean Air Act.

D. EPA should allow states the flexibility to secure emission reductions from non-EGU sources that can be included in any IAQR emission trading program.

Once again the Iowa Department of Natural Resources appreciates the opportunity to provide comments on the proposed Interstate Air Quality Rule.

Sincerely,

Jeffrey R. Vonk
Director
Iowa Department of Natural Resources

cc. Mr. James B. Gulliford, Regional Administrator - EPA Region VII