Public Document

MPUC Docket No. E-6472-/M-05-1993
OAH Docket No. 12-2500-17260-2

BEFORE THE
MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
100 Washington Square, Suite 1700
Minneapolis, Minnesota 55401-2138
FOR THE
MINNESOTA PUBLIC UTILITIES COMMISSION
127 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

In the Matter of the Petition of Excelsior Energy Inc. and Its Wholly Owned Subsidiary MEP-I, LLC, for Approval of Terms and Conditions for the sale of Power from Its Innovative Energy Project Using Clean Energy Technology under Minn. Stat. § 216B.1694 and a Determination that the Clean Energy Technology Is or Is Likely to Be a Least-Cost Alternative under Minn. Stat. § 216B.1693

PREPARED SURREBUTTAL TESTIMONY OF EXCELSIOR ENERGY INC. AND MEP-I LLC

BAXTER L. JONES

OCTOBER 31, 2006

EXCELSIOR ENERGY INC.

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

PREPARED SURREBUTTAL TESTIMONY AND EXHIBITS OF

BAXTER L. JONES

Q Please state your name.

A My name is Baxter L. Jones.

Q By whom are you employed and what is your position?

A I am Senior Vice President for ICF International ("ICF"), 9300 Lee Highway, Fairfax, Virginia 22031.

Q For whom are you testifying?

A I am testifying on behalf of MEP-I LLC and Excelsior Energy Inc. (collectively "Excelsior"), the developers of the Mesaba Energy Project (the "Project").

Q Have you previously provided testimony in this proceeding?

A Yes. On June 19, 2006, I submitted supplemental testimony on behalf of Excelsior to incorporate the ICF Report entitled *Air Quality and Health Benefits Modeling: Relative Benefits Derived From Operation of the MEP-I/II IGCC Power Station*, included as Exhibit D, Volume I of Excelsior's original Petition in this Proceeding, which was filed on December 27, 2005. On October 10, 2006, I submitted rebuttal testimony on behalf of Excelsior in response to the Direct Testimony and Schedules of Northern States Power Company ("NSP"), d/b/a Xcel Energy witness Roger A. Clarke.

Scope and Summary

Q What is the purpose of your surrebuttal testimony in this proceeding?

A I will respond to certain statements in the October 10, 2006, rebuttal testimony of mncoalgasplant.com witness Dr. Edwin Anderson specifically as they apply to the

following points: (1) the design of ICF's modeling study, (2) the use of the term "health benefits" as it is traditionally applied to the results of such studies, (3) the potential change in localized $PM_{2.5}$ impacts expected as a result of lowering stack heights for aesthetic purposes, (4) the qualitative approach used by ICF in describing mercury impacts, (5) the manner in which the REMSAD model treats NO_X, ozone, and formation of secondary particulate matter, and (6) the conservative approach used to assess mortality and morbidity estimates.

Response to the Rebuttal Testimony of Edwin Anderson, M.D.

Q Do you agree with Dr. Anderson's rebuttal testimony at page 1 where he contends that the term "health benefits," as it applies to the results of ICF's modeling analysis, is based on a false premise and is, therefore, false?

A No. The ICF benefits study was intended and designed to be a comparative study between two specific scenarios for generating electricity in Minnesota—the Mesaba Energy Project's IGCC Power Station located in northern Minnesota's Iron Range compared to a supercritical pulverized coal-fueled power plant located in central Minnesota. Thus, per the study design, the estimated benefits (in terms of both health effects and damage costs) are due to the differences in emissions, location, and other parameters between the two scenarios. ICF believes the premise under which it conducted the health benefits modeling to be proper and that the results appropriately characterize the differences that could be expected to occur between the two scenarios modeled.

Q Please expand upon ICF's study design and methodology from the standpoint of comparing it with similar studies conducted for purposes of comparing health impacts between two alternative scenarios.

A ICF's study design and methodology, in which one scenario with a certain set and level of impacts is compared to another scenario with a different set and level of impacts, is consistent with benefits studies conducted routinely by federal and state agencies to inform public policy analysis decisions. In fact, nearly every major air quality and other environmental regulation issued by the U.S. Environmental Protection Agency ("EPA") is accompanied by a similar kind of benefits study. For example, EPA's 2005 Clean Air Interstate Rule ("CAIR") regulations (which are targeted at $PM_{2.5}$ and ozone) included a detailed benefits analysis in which the CAIR regulatory case was compared against a baseline case without the CAIR requirements—some health impacts were estimated for both of these cases (that is, neither case was zero emission or zero risk), and the differences in impacts were characterized by EPA as benefits. Such comparison of impacts among reasonable alternatives is a well established methodology to aid in decision-making.

Q Please summarize ICF's response to Dr. Anderson's opinions regarding the comparisons made between the two generating scenarios noted above and the conclusions you reached based on the modeled outputs.

A ICF strongly disputes Dr. Anderson's characterization of the work we conducted. *See* Rebuttal Testimony of Edwin Anderson, at 1, 2, 3, and 10. First, Excelsior witness Robert S. Evans II's rebuttal testimony conclusively demonstrates the alternative scenario we modeled, both in terms of location and unit type, was appropriate and reasonable. Surrebuttal Testimony of Robert S. Evans II, at 6–7. Second, Mr. Evans provides evidence in his surrebuttal testimony that Minnesota utilities/power agencies have documented their intent to participate in the construction of baseload coal-fueled power plants. Rebuttal Testimony of Robert S. Evans II, at 5–6. On this basis, we believe the emissions profile of the supercritical pulverized-coal-fueled power plant modeled was a reasonable alternative;

this has been adequately justified by Mr. Evans' rebuttal testimony. Rebuttal Testimony of Robert S. Evans II, at 10–21. Third, ICF used monetary cost estimates for mortality and various morbidity endpoints that were derived by EPA for use in the CAIR regulatory impact analysis. These cost estimates are fully documented by EPA, they were based on extensive literature research and analysis by EPA, and they were subjected to thorough scientific peer review and public review as part of the regulatory process. Fourth, ICF stands by its estimates of mortality and morbidity damage costs and benefits related to $PM_{2.5}$ exposures. Fifth, on the preceding bases, we dispute all instances where Dr. Anderson claims there are no health benefits associated with the Mesaba Energy Project in comparison to a reasonable alternative for electricity generation. *See* Rebuttal Testimony of Edwin Anderson, at 2.

As noted in our report and elsewhere in my direct testimony, ICF did not attempt to quantify all types of impacts or benefits, so the total damage costs and benefits attributable to all types of impacts may well be higher than our estimates based on $PM_{2.5}$ alone. For example, we did not attempt to quantify mercury damage costs and benefits due to methodology and complexity issues, and did not attempt to quantify ozone damage costs and benefits due to complexity issues and our judgment that those results would likely be dominated by the results for $PM_{2.5}$.

Q Do you dispute other remarks made by Dr. Anderson in his testimony?

A Yes. In his testimony, Dr. Anderson criticizes ICF for failing to consider relevant chemical transformations that occur during the long range transport of pollutants released from elevated stacks at point sources; specifically as such transformations involve nitrogen oxides ("NO_X"). Rebuttal Testimony of Edwin Anderson, at 12–13. Dr. Anderson is wrong in this regard. ICF did consider and explicitly model NOx emissions and photochemistry

with respect to the formation of nitrates and its contribution to $PM_{2.5}$ (REMSAD, the model used by ICF, includes gas phase and aqueous chemistry modules that simulate the formation of sulfate, nitrate, and secondary organic aerosols). This was a major component of our modeling efforts.

Q Please comment on Dr. Anderson's concern with respect to the Mesaba Project and its impacts on ozone formation.

A In his testimony Dr. Anderson discusses the health impacts of ozone. *See* Rebuttal Testimony of Edwin Anderson, at 13–14. As noted above, the model used by ICF considers photochemical transformations that include ozone formation. That said, ICF did not include analysis of the ozone modeling results as part of the health benefits study design, in part based on other studies (e.g., EPA's detailed CAIR benefits analysis) that indicate that ozone-related benefits related to control of power plant air emissions would be expected to be much smaller than $PM_{2.5}$-related benefits. For example, EPA's estimate of monetizable ozone-related health benefits resulting from CAIR regulations is less than 1% of its estimate of monetizable $PM_{2.5}$-related health benefits. Inclusion of ozone impacts and benefits in the ICF study would be expected to increase, at least slightly, the overall benefits attributed to the Mesaba plant in comparison to the SCPC alternative, both due to the Mesaba plant's lower emissions of ozone precursors and its location farther away from large urban areas where ozone impacts would be spread across higher population densities.

Q At pages 3–4 of his testimony, Dr. Anderson raises concerns with regard to the health-impact-related implications that changes in (i.e., lowering) the Mesaba One and Mesaba Two stack heights modeled by ICF would have on the local population around the plant site. Do you agree with the level of concern voiced by Dr. Anderson in this regard?

A No. Although local impacts near Mesaba for some air pollutants could be greater than modeled for the ICF report because of the change in stack height, such localized concerns are addressed through different ambient air quality modeling studies conducted as part of the PSD Permit Application submitted on behalf of Mesaba One and Mesaba Two. In such studies, the impacts of a facility's worst case criteria pollutant emissions on localized air quality are compared against national ambient air quality standards ("NAAQS") that have been set to protect public health and welfare.[1] The results of such studies for the Mesaba Energy Project show that all criteria pollutant levels are found to be within such NAAQS.

One could argue that the latest revision to the Particulate Matter NAAQS (promulgated at 71 FR 61144 on October 17, 2006) creates uncertainties with respect to local fine particulate matter impacts as EPA has not finalized how it intends to address issues related to new source review (*see* 71 FR 61214). However, the fine particulate matter studies conducted by ICF remove some of the uncertainty related thereto.

[1] Section 109 of the Clean Air Act (42 U.S.C. 7409) directs the Administrator of the U.S. EPA to propose and promulgate "primary" and "secondary" NAAQS for pollutants identified under section 108. Section 109(b)(1) defines a primary standard as one "the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health." A secondary standard, as defined in Section 109(b)(2), must "specify a level of air quality the attainment and maintenance of which, in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of [the] pollutant in the ambient air." The legislative history of section 109 indicates that a primary standard is to be set at "the maximum permissible ambient air level . . . which will protect the health of any [sensitive] group of the population," and that for this purpose "reference should be made to a representative sample of persons comprising the sensitive group rather than to a single person in such a group" [S. Rep. No. 91-1196, 91st Cong., 2d Sess. 10 (1970)]. Welfare effects as defined in section 302(h) [42 U.S.C. 7602(h)] include, but are not limited to, "effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being." Excerpt from EPA-452/R-05-005a, December 2005, "Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information" OAQPS Staff Paper.

Q Please explain how ICF's studies of fine particulate matter remove uncertainties with respect to localized health impacts associated with fine particulate matter and the lowering of the Project's stack heights.

A The logic used by Dr. Anderson in claiming that increased local health impacts associated with fine particulate matter would result from decreased stack heights is simplistic with respect to this pollutant. To wit, it does not automatically follow that lower stack heights will result in increased ambient concentrations of fine particulate matter in the area immediately surrounding Mesaba One and Mesaba Two. Sulfate and nitrate are secondary pollutants and are formed gradually after precursor material (sulfur dioxide ("SO_2") and nitrogen oxides ("NO_x"), respectively) is emitted. A shorter stack would cause the plume to impact the surface closer to the stack (with the potential health-related impacts associated with primary gaseous pollutant emissions and large particles being addressed through demonstration of compliance with applicable NAAQS via ambient air quality modeling studies conducted as part of the PSD Permit Application), but at that point a smaller percentage of the precursor emissions would have been converted to various forms of fine particulate matter.

Deposition rates differ for SO_2 versus sulfate (and for NO_x versus nitrate), so the amount of emissions that ultimately result in fine particulate matter may be different with a lower stack height. Therefore, although Dr. Anderson's comments about stack height may apply to directly emitted particulate matter, they do not necessarily apply to secondary particulate matter. ICF's professional opinion regarding this matter is that the overall results and conclusions of our comparative benefits study (related to fine particulate matter impacts) would not be expected to change in a material manner if we modeled Mesaba at a lower stack height. We make this statement based on the information provided above and

given that (1) the stack height difference is expected to have limited impact on the $PM_{2.5}$ results distant from the stack, and (2) the majority of the $PM_{2.5}$-related benefits accrue distant from the emission source (e.g., as noted in our report, our modeling demonstrated that greater than 75% of impacts occurred farther than 200 miles from the source).

Q Dr. Anderson has stated his concern at page 12, "that the severity and extensive impacts of mercury are downplayed in the [ICF] report." Do you agree with this characterization?

A No. ICF treated mercury emissions and potential mercury health and environmental effects in considerable detail, including an appendix that described potential adverse effects of mercury exposures, and we modeled the transport of emitted mercury through air and its deposition to land. Given the lack of accepted methods and the complexity of modeling mercury as it cycles through the environment and of quantitatively modeling and monetizing the health effects of mercury exposures, ICF did not attempt to quantify the potential health impacts and benefits of lower mercury emissions for Mesaba in comparison to the alternative SCPC plant. We stand behind our qualitative analysis and restate for the record that our efforts and report sufficiently address what can be said with confidence in comparing the two generating alternatives identified. We reject categorically any suggestion that our report seeks to downplay the potential impacts of mercury.

Q Do you believe the change in stack height would materially affect the local deposition of mercury from the Mesaba Energy Project?

A No. Mercury emitted from the Mesaba Energy Project is expected to be in its elemental, gas phase state. *See* Rebuttal Testimony of Robert S. Evans II, at 24–25. Deposition of mercury in its gaseous, elemental state is expected to be very slow, and the half life of gaseous, elemental mercury in the atmosphere approaches 6 months. Therefore,

any change in local impact expected to occur as a result of the decrease in stack heights would be trivial. This would not necessarily be the case for a conventional plant where part of the mercury emitted is expected to be in its ionized, more soluble form.

Q At page 3 of his rebuttal testimony, Dr. Anderson states that ICF compared Mesaba's smaller 531 MW plant to a larger 600 MW coal-fueled plant in a more densely populated area to manipulate the results in order to look better. Is this correct?

A No. I have already discussed the validity of comparing two alternative generating scenarios and quantifying differences between them as health benefits. However, in the statement noted, Dr. Anderson implies that ICF has compared emissions from differently sized plants without compensating the results for such a difference. This is untrue. ICF's objective was to model the most realistic plant sizes, based on information available at that time, and then scale the results to allow for valid comparisons. In our original report at pages 2–7, I discuss the fact that the modeling results were appropriately scaled to reflect the difference in capacity. As well, in my direct testimony, I reconfirmed the fact that we appropriately scaled numbers to reflect equivalent capacity comparisons. *See* Supplemental Testimony of Baxter Jones, at 5–6.

Q Please comment on the "seemingly out of proportion number of work loss days" noted in Dr. Anderson's rebuttal testimony at page 14.

A Dr. Anderson has correctly identified a calculation error in ICF's benefits report. The numbers for work loss days in Exhibit 3-8 of the ICF benefits report are incorrect, and are overstated by a factor of 10 to 100. At this time, we are uncertain as to the exact source of this calculation error. However, we are confident that it has not propagated throughout the remainder of our modeling effort because we have determined that the health benefit results in stated in Exhibit 3-10 (stated in terms of dollars, based on the monetized damage

costs associated with the work loss days) of our report, which reflect a substantially lower number of work loss days (than the number tabulated in Exhibit 3-8), are in the expected range. We will continue to search for the exact source of the error in estimated work loss days and report our findings as part of this record. As an aside, the estimated damage costs associated with work loss days are an extremely low fraction of the total damage costs associated with mortality and all causes of morbidity. Therefore, ICF stands by its overall estimates of damage costs and benefits associated with the two scenarios modeled.

Q Does this conclude your testimony?

A Yes, it does.