Minnesota Center for Environmental Advocacy

Using law, science, and research to protect Minnesota's environment, its natural resources, and the health of its people.

26 East Exchange Street - Suite 206
Saint Paul, MN 55101-1667

651.223.5969
651.223.5967 fax

info@mncenter.org
www.mncenter.org

August 4, 2016

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

VIA ELECTRONIC SERVICE

Re: In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statute 216B.2422, Subd. 3
PUC Docket No. E-999/CI-14-643
OAH Docket No. 80-2500-31888

Dear Mr. Wolf:

In connection to Phase II or the Criteria Pollutants portion of the above-referenced docket, please find enclosed Clean Energy Organizations' Reply to Exceptions to the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendations filed on June 15, 2016. Also attached is an Affidavit of Service.

Please do not hesitate to contact me should you have any questions or concerns.

Sincerely,

/s/ Hudson Kingston
Hudson B. Kingston
Staff Attorney

HK/el

Enclosure

cc: Attached service list

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Investigation into the Environmental and Socioeconomic Costs Under Minn. Stat. § 216B.2422, Subd. 3

MPUC Docket No. E-999/CI-14-643, E-999/CI-00-1636
OAH Docket No. 80-2500-31888

PHASE II—CRITERIA POLLUTANTS REPLY TO EXCEPTIONS TO FINDINGS OF FACT, CONCLUSIONS, AND RECOMMENDATIONS: CRITERIA POLLUTANTS

of

CLEAN ENERGY ORGANIZATIONS

August 4, 2016

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INTRODUCTION

Minnesota Center for Environmental Advocacy, Fresh Energy, and Sierra Club—the Clean Energy Organizations (CEOs)—respectfully submit to the Public Utilities Commission (the Commission) this Reply to Exceptions filed July 15, 2016, by the Minnesota Pollution Control Agency and Department of Commerce (Agencies), Xcel Energy (Xcel), and the Minnesota Large Industrial Group (MLIG). The Agencies' Exceptions generally align with those submitted by CEOs and provide a helpful framework for the Commission; Xcel's Exceptions fail to help the Commission to resolve the fundamental questions in this proceeding; and MLIG's positions in its Exceptions have no merit. As a result, the Commission should, as described below, adopt changes suggested by the Agencies, reject Xcel's positions, and give no weight to MLIG's submission. The Commission should adopt the four framing questions used by the ALJ in the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendations: Criteria Pollutants (ALJ Report)[1] to decide this case, and should modify the ALJ Report's other recommendations as detailed in CEOs' Exceptions.

ARGUMENT

The Commission's adoption of parties' proposals to improve the ALJ Report should focus on what would most aid the Commission in reaching rational and defensible environmental cost values. Consequently, the Commission should concentrate on the record evidence that shows the actual damages of energy production in locations serving Minnesota, as proposed by

[1] *Findings of Fact, Conclusions, and Recommendations: Criteria Pollutants*, Pub. Util. Comm'n Docket No. E-999/CI-14-643, OAH Docket No. 80-2500-31888 (June 15, 2016). The four questions are in Recommendation ¶ 1. ALJ Report ¶ 1 at 103–04.

the Agencies. In contrast, Xcel's and MLIG's proposed Exceptions simply cannot be reconciled with the record or the law.

I. The Agencies Made Arguments That Improve Upon the ALJ Report and Will Inform the Commission's Decisions on Geographic Scope and Source Locations and Types

The Agencies have submitted Exceptions that address the two main questions that the ALJ Report left for the Commission to decide. These are: "What is the proper geographic scope of damages?" and "What sources and source locations should be included?" CEOs believe that many of the Agencies' proposed edits will assist the Commission in making an informed decision on these two questions.

A. The Agencies' Exceptions correctly support the Commission's adoption of a national geographic scope.

The Agencies agree with CEOs that a national geographic scope must be used in order to estimate actual damages from emissions of criteria pollutants. As the Agencies correctly explain, "to fully internalize an external cost, and thus to have accurate information on which to make resource decisions, all damages should be counted regardless of state boundaries."[2] This follows logically from the proceeding's purpose "to determine the damages caused by sources used to serve Minnesotans" [3] and the ALJ Report's finding that particulate matter results in damages hundreds of miles from emissions sources.[4] It is inappropriate to arbitrarily undercount known damages to society just because they occur out-of-state.

[2] Agencies Exceptions at 7–8.
[3] *Id.* at 8.
[4] *Id.* at 9.

Based on the above, and the fact that it is irrelevant whether a majority of damages occur on one side or another of the state line,[5] CEOs agree with the Agencies' proposed edits to Conclusion ¶ 37.[6] That conclusion makes an unnecessary finding that the Agencies did not prove the percentage of in-state versus out-of-state damages with a particular data set; the Agencies proposal would remove this irrelevant conclusion. This clarification allows the Commission to focus on what is the right scope of modeling without attempting to predetermine what the outcome of that modeling might be.

In accordance with the Agencies' reasoning in their Exceptions, CEOs again assert that a national geographic scope is the most appropriate choice for the Commission to adopt on this record. This is also the most important question for the Commission to get right, as it has the largest impact on the environmental cost values' overall validity.

B. The Agencies' Exceptions provide useful edits to the ALJ Report that will aid in selecting the right source types and source locations for modeling.

As already addressed in CEOs Exceptions,[7] we agree with the Agencies' positions that Conclusions ¶ 31 to ¶ 33 of the ALJ Report are incorrect and misleading, and should be deleted or changed.[8] These three conclusions describe reasons for excluding source locations, reasons that were not relevant to the proceeding and contradict the record evidence.[9] The same is true for the ALJ Report's Conclusion ¶ 45, which conflated the idea of baseline concentrations and

[5] For more discussion of this see CEOs Exceptions at 7.
[6] Agencies Exceptions at 9.
[7] CEOs Exceptions at 21–23.
[8] Agencies Exceptions at 6–7.
[9] CEOs Exceptions at 21–23.

marginal change with a perplexing illustrative example—it should be deleted because it is confusing and misleading, and probably scientifically inaccurate.[10]

We agree with the Agencies' position on Conclusion ¶ 21, which incorrectly rejects the Agencies' proof of AP2's validity based on generally-accepted performance standards.[11] The ALJ Report gave too much weight to Xcel's argument over inapposite EPA guidance on Clean Air Act modeling. As discussed in CEOs' Exceptions,[12] the ALJ Report's insistence that "[t]he model should produce accurate results, regardless of the use to which the data will be put"[13] misunderstands that reduced-form models are made for a specific task—in this case modeling small marginal changes across large distances using averaged meteorological data—and that it is not directly relevant to this proceeding how well these models would operate in a different kind of rulemaking that does not include marginal-ton modeling.[14] Consequently CEOs agree with the Agencies' argument that the modeling guidance used by Xcel is not germane to this case.[15] The guidance is not for modeling marginal-ton emissions, and, as the Agencies note, the EPA does not apply it to reduced-form models.[16] On this basis, CEOs agree that the Commission should reject Conclusion ¶ 44.[17]

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[10] Agencies Exceptions at 11–12; CEOs Exceptions 23–24.
[11] Agencies Exceptions at 5.
[12] CEOs Exceptions at 28, n.79.
[13] ALJ Report ¶ 21 at 96.
[14] Xcel continues to push this EPA guidance in its Exceptions at 32, n.98 & n.99. While the Exceptions again repeat that EPA "recommends using photochemical grid models . . ." it nonetheless continues to ignore what EPA recommends these models be used *for*. *Id.* at 32. Since the guidance in question is "for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze" it is apparent that it is not meant to be used as guidance for a fundamentally different modeling task, assessing the impacts of marginal ton emissions. *Id.* n.98 & n.99.
[15] Agencies Exceptions at 10.
[16] *Id.* at 10–11.
[17] *Id.* at 10.

Furthermore, for the sake of the Commission's ability to make a rational decision on the issue of source locations, CEOs agree that the Commission should reject Conclusion ¶ 35.[18] Conclusion ¶ 35 needlessly ties the Commission's hands by saying that because the Commission did not explicitly ask for county-by-county damages ahead of this proceeding, such specific environmental cost values cannot be reasonable.[19] As the Agencies explain, simply because the Commission didn't require a particular granularity, that alone doesn't make that level of detail unreasonable.[20] The Commission can decide what is appropriate and reasonable based on the modeling evidence in the record in the absence of this Conclusion. As Xcel noted in its Exceptions, Conclusion ¶ 35 could be read to be inconsistent with the ALJ Report's Recommendation ¶ 4.b,[21] and so it will aid the Commission to reach a reasoned decision if it rejects Conclusion ¶ 35 as inconsistent with the record and illogical.

CEOs also agree with the Agencies' statement that reduced-form models can practicably model emissions for hundreds of sources at different locations.[22] It is clear from the record that both the Agencies and CEOs were able to model emissions from hundreds of different sources, and the record therefore demonstrates that this is practicable—i.e., feasible or capable of being accomplished.[23] CEOs further agree that it is practicable and useful to model a wide geographic scope of locations,[24] and that stack height has a large impact on the ultimate damage values even

[18] *Id.* at 8–9.
[19] ALJ Report ¶ 35 at 99.
[20] Agencies Exceptions at 8–9.
[21] Xcel Exceptions at 22–23.
[22] Agencies Exceptions at 5–6.
[23] This definition comes from the first environmental cost values proceeding. *Findings of Fact, Conclusion, Recommendation and Memorandum*, Docket no. E-999/CI-93-583 at 10 (Mar. 22, 1996) (*citing* Webster's New Universal Unabridged Dictionary (2d Ed. 1983)).
[24] Agencies Exceptions at 3 & 4 n.4.

if the locations are the same.[25] The Agencies are correct in stating that Xcel's modeling of only three sources fails to "capture the heterogeneity of damage costs across the state," and pointing out that Xcel's "urban" value is not representative of other urban settings in Minnesota.[26] The Commission should respond to the Agencies' arguments by adopting CEOs proposed changes to ALJ Report Recommendation ¶ 4.b,[27] which would also correct for Xcel's complaint about the different damage values between the Agencies' modeling at different stack heights.[28] Following these points and the Agencies' explanations of how the ALJ Report seemed to misunderstand the utility and detail of their modeling, CEOs support deleting both Conclusions ¶ 18 and ¶ 19 as the Agencies have explained.[29]

II. Xcel's Exceptions Do Not Assist the Commission in Resolving the Questions at the Heart of This Proceeding and Should Be Rejected

While Xcel repeats in Exceptions the issues it covered before in briefing, the company's submission does not provide the Commission with useful information to resolve parties' remaining disputes over the four central questions. Xcel's many positions can be grouped under the four questions posed by the ALJ Report, demonstrating its failure to supply useful information on these key issues. The four questions are:

- What is the proper geographic scope of damages?
- What is the most appropriate value for the VSL?
- What is the most appropriate concentration-response function?

[25] *Id.* at 3–4.
[26] *Id.* at 4 n.4.
[27] CEOs Exceptions at 25–29.
[28] Xcel Exceptions at 8 (noting that "that the estimated damage values for the hypothetical sources were far higher than the damages estimated for the actual, large power plants" but not identifying the stack height cause of the difference).
[29] Agencies Exceptions at 2–5.

- What sources and source locations should be included?[30]

This section will analyze Xcel's Exceptions in the frame of the four questions. Because the company continues to advance irrational proposals on each issue, CEOs encourage the Commission to reject Xcel's Exceptions.

A. Xcel's arguments in favor of a limited geographic scope are based on misunderstandings of the purpose of this proceeding and of its own modeling.

Xcel's Exceptions on geographic scope are overshadowed by two misconceptions that it has held throughout this proceeding. In order to argue that national modeling is impracticable Xcel again tries to redefine "practicable" to justify Xcel's decision to ignore damages shown by expert modeling in the record.[31] It is evident from the record that national modeling of damages is feasible, or capable of being accomplished; that was the Commission's definition in the last environmental cost values proceeding, which the Court of Appeals accepted. Xcel's points to the contrary are a misunderstanding of the everyday meaning of "practicable." The second misconception is the company's adherence to outdated science as "precedent." Xcel attempts to limit the Commission to "***Long-Standing Commission Precedence.*** [sic]"[32] of a smaller geographic scope, but this ignores the scientific advances this proceeding is supposed to capture. Using precedent to freeze the Commission's decisionmaking in 1990s scientific standards is inappropriate and a misunderstanding of the value of precedent.[33] Precedent is a legal concept

[30] ALJ Report ¶ 1 at 103–04.
[31] Xcel Brief at 1 (defining "practicable" as "meaning that they provide useful information and can in fact be applied for their intended purpose."); CEOs Reply Brief at 3, n.1 ("Contrary to Xcel's claim that practicability means the proposed values 'provide useful information and can in fact be applied for their intended purpose,' . . . the word means '"feasible," or capable of being accomplished.'" (citations omitted)); Xcel Exceptions at 11.
[32] Xcel Exceptions at 11.
[33] CEOs Reply Brief at 4–6.

that should not be used to retard the Commission's incorporation of current science into the environmental cost values.

The science available today tells us that criteria pollutants travel for hundreds or thousands of miles.[34] It doesn't matter at this point whether the majority of damages are on one side or another of Xcel's arbitrary geographic-scope-limiting box.[35] Even with a Conclusion that impacts occur regionally, the word "regional" in the air pollution context often means interstate regional pollution, with one representative example of this usage being the Regional Haze standard the EPA has promulgated under the Clean Air Act.[36] In the EPA's rule: "*Regional haze* means visibility impairment that is caused by the emission of air pollutants from numerous sources located over a wide geographic area."[37] The air pollutants the EPA sees causing damage "over a wide geographic area," or regionally, are the same ones at issue in this proceeding.[38] Even the EPA regional haze modeling guidance that Xcel relies upon in its Exceptions states "areas in the eastern U.S. have been shown to be impacted by transported ozone and/or PM and ozone and/or PM precursors *from hundreds of miles or more* upwind of the receptor area"[39] and "[a] number of [EPA] analyses show that regional ozone and PM transport can impact *areas*

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[34] CEOs Exceptions at 5–6.
[35] *Id.* at 7.
[36] *See* 42 U.S.C. §§ 7491, 7492 (Clean Air Act provisions that call on EPA to regulate regional haze and interstate visibility).
[37] 40 C.F.R. § 51.301.
[38] 79 Fed. Reg. 74818, 74820 (December 16, 2014) ("Regional haze is visibility impairment that is produced by a multitude of sources and activities which are located across a broad geographic area and emit fine particles ($PM_{2.5}$) (e.g., sulfates, nitrates, organic carbon, elemental carbon, and soil dust) and their precursors.").
[39] ENVIRONMENTAL PROTECTION AGENCY, GUIDANCE ON THE USE OF MODELS AND OTHER ANALYSES FOR DEMONSTRATING ATTAINMENT OF AIR QUALITY GOALS FOR OZONE, $PM_{2.5}$, AND REGIONAL HAZE 152–53 (April 2007) (emphasis added) (citations omitted), *available at* http://www3.epa.gov/scram001/guidance/guide/final-03-pm-rh-guidance.pdf; *see* Xcel Exceptions at 32, n.98 (citing this source).

several hundred miles or more downwind."[40] As a result, Xcel's insistence that these pollutants create "regional" pollution[41]—pollution it admits crosses out of the arbitrarily constrained geographic scope for which it advocates—undercut its argument for a smaller geographic scope for modeling.

Several of Xcel's key arguments are not supported by the record and should not be accepted by the Commission at this point. It is notable that Xcel has never offered scientific proof that "Uncertainty is significantly increased and estimates become less reliable the further the modeling distance from an emission source."[42] There is no scientific support for this opinion, and Xcel never proved how meaningful an asserted increase in uncertainty might be in testimony.[43] Furthermore, Xcel's Exceptions characterize some modeled differences as being "very small"[44] in an attempt to paint them as uncertain or unreliable. This ignores the simple truth that *all* of Xcel's damage values inside Minnesota are based on very small changes over an existing baseline. There is no scientific difference between "very small" changes modeled inside and outside of Xcel's arbitrary box. Xcel's illustrative examples of ambient concentrations of 0.001 to 0.00003 $\mu g/m^3$,[45] are further irrelevant because there is no record evidence that these ambient levels occur anywhere on Earth. To the contrary, MLIG's Exceptions anecdotally show that there are no places in or near Minnesota with values anywhere near Xcel's imaginary

[40] ENVIRONMENTAL PROTECTION AGENCY, GUIDANCE ON THE USE OF MODELS AND OTHER ANALYSES FOR DEMONSTRATING ATTAINMENT OF AIR QUALITY GOALS FOR OZONE, $PM_{2.5}$, AND REGIONAL HAZE 4 (April 2007) (emphasis added) (citations omitted); *see* Xcel Exceptions at 32, n.98 (citing this source).
[41] Xcel Exceptions at 12.
[42] *Id.* at 12.
[43] For a full discussion of Xcel's lack of support see CEOs Reply Brief at 6–9.
[44] Xcel Exceptions at 13.
[45] *Id.* at 13–14. For discussion of how Xcel made similar incorrect arguments in briefing see CEOs Reply Brief at 7–8.

ambient levels.[46] All modeling offered in this proceeding applied "very small" calculated changes to realistic baseline pollution levels, resulting in damages at ambient levels that have nothing to do with those Xcel derides in its Exceptions.

Finally, Xcel's insistence that the Clean Air Act applies outside of Minnesota[47] is irrelevant to the question of the correct geographic scope for modeling. This is because the Clean Air Act applies within Minnesota as well, and damages from pollution associated with Minnesota energy generation occur nonetheless. The ALJ Report was correct in Conclusion ¶ 47, and the Commission should follow this correct conclusion about the irrelevance of the Cross State Air Pollution Rule to this proceeding[48] in deciding to adopt a national geographic scope.

B. Xcel's suggested lowering of the ALJ Report Value of a Statistical Life is not supported by the record.

The Value of a Statistical Life (VSL) is a quantification of how much people value taking and avoiding risks to their lives, expressed as a dollar total. If the Commission sets the VSL too low it will underestimate society's risk aversion to the damages predicted by modeling in this proceeding.

The Commission should reject Xcel's proposed VSL and instead order the use of EPA's VSL. Xcel proposes an unsupported low-end value in addition to the $7.7 million value suggested by the ALJ Report.[49] For reasons CEOs articulated in Exceptions, Xcel's VSL proposal was not reasonable to begin with, and the Agencies' proposed range was not a proper

[46] *See* MLIG Exceptions at 30–38 (enumerating real-world weighted mean particulate levels in Minnesota and Wisconsin that never drop below 4 $\mu g/m^3$ and generally fall within a 6 to 12 $\mu g/m^3$ range).
[47] Xcel Exceptions at 14–15.
[48] ALJ Report ¶ 47 at 102.
[49] Xcel Exceptions at 9–10.

use of meta-analyses to produce a range.[50] Adopting either one of these low-end values would return these mistakes to the environmental cost values, making the ALJ Report's recommended value less accurate. As a result, neither of Xcel's proposed low-end values should be adopted, and the Commission should instead adopt the EPA VSL as the best value supported by the record.

We agree with Xcel's statement made elsewhere about deferring to EPA expertise, that "[o]ne must assume that the EPA had relevant and compelling scientific reasons"[51] for the positions it takes. As the Agencies pointed out in testimony and Xcel attempts to rebut in its Exceptions, Xcel has taken a hypocritical position of advocating strongly for deference to the EPA on Clean Air Act compliance modeling guidance but not on EPA's chosen VSL or concentration-response functions.[52] Xcel's lack of respect for EPA's VSL and attempt to insert a low-end VSL that is less than half of EPA's value is not consistent with its call for deference to EPA expertise.

C. Xcel's positions on concentration-response are not based on credible science and put its proposed environmental cost values in question.

The concentration-response function is the relationship epidemiologists have quantified between increased pollution and premature mortality. The percentages that leading studies give for the concentration-response functions, based on these studies' findings about deaths caused across large geographies and populations, allow the modelers in this proceeding to convert marginal increases in pollution into the equivalent marginal increases in mortality.

[50] CEOs Exceptions at 17–18.
[51] Xcel Exceptions at 29.
[52] *Id.* at 27–28.

As CEOs explained in Exceptions, any concentration-response function that incorporates Xcel's proposed values is unreasonable judged against the best science available,[53] which is included in the record as attachments to Dr. Jacobs's rebuttal testimony.[54] As such, CEOs disagree with Xcel's support of ALJ Report Recommendation ¶ 3[55] on concentration-response values. We do, however, agree with Xcel that the ALJ Report's Conclusion ¶ 50 and Recommendation ¶ 3 are difficult to reconcile and state inconsistent concentration-response values.[56]

Additionally, CEOs disagree with Xcel's position that the concentration-response function might not be linear.[57] The studies in the record shows that the relationship is linear, and the ALJ Report correctly found it was linear without threshold in Conclusion ¶ 54.[58] The environmental cost values offered by Dr. Desvousges in testimony were calculated with the understanding that the relationship is linear within its entire modeled domain, but the company now disputes this relationship. Xcel's position that the relationship might not be linear[59] puts all of its proposed environmental cost values in doubt, because the values cannot be accurate if the

[53] CEOs Exceptions at 12–14. As the ALJ Report summarized, regarding the two studies the Agencies and CEOs followed: "The Agencies relied on 'the most recently available updates to two landmark studies' for their concentration-response data. These studies are Lepeule's 2012 update of the *Harvard Six Cities* (*Lepeule or Six Cities*) study, and Krewski's 2009 update of the *American Cancer Society* (*Krewski or ACS*) study." ALJ Report ¶ 37 at 19 (citations omitted). "The CEOs relied on the *Lepeule* and *Krewski* studies . . . . [both] 'cohort' studies. A 'cohort' study is one that follows a group of people for an extended time period and, according to the CEOs, is the most robust type of study for this purpose." ALJ Report ¶ 104 at 39 (citations omitted). For more discussion of these two leading studies see Ex. 117 (rebuttal testimony of Dr. Jacobs).
[54] CEOs Exceptions at 13, n.36 (*citing* Ex. 117, Schedules 2 and 3 (copies of the Lepeule and Krewski studies)).
[55] Xcel Exceptions at 9.
[56] *Id.* at 9, n.31.
[57] *Id.* at 13.
[58] ALJ Report ¶ 54 at 103.
[59] Xcel Exceptions at 14.

relationship ceases to be linear for some of the receptor damages that Xcel modeled. Since Xcel seems to have taken a position that its own proposed environmental cost values are unreliable, the Commission should consider instead relying on the concentration-response values proposed by the Agencies and CEOs, which are not similarly in question.

D. Xcel's insistence on using a burdensome and unnecessary model leads it to propose modeling insufficient source locations and types that do not produce useful values.

Although the Commission should choose what source types and locations would be most useful and then choose a model to fit that decision, Xcel has insisted on discussing model choice before all else. CEOs believe that all three expert modelers picked the best models they were aware of, and that none of the three models is so flawed as to produce arbitrary results. Xcel makes clear in its Exceptions that it continues to disagree with the other parties' use of reduced-form models. To address the company's position, this response addresses Xcel's continued advocacy against the two reduced-form models used in this proceeding, and then discusses how the limited modeling that Xcel advocates is not as useful as it asserts.

1. Despite Xcel's criticisms of InMAP, the Commission can opt to use InMAP to set environmental cost values in this proceeding.

Reduced-form models allow for the modeling of diverse locations and source types. InMAP is reliable for this purpose, as demonstrated by its model description.[60] The model description explains that InMAP performed well when compared to a photochemical model. The ALJ Report demonstrated caution in adopting an innovative new model without a longer track record, [61] but the Commission can and should amend ALJ Report Conclusions ¶ 8 to ¶ 12 as

[60] Ex. 119, Schedule 1.
[61] ALJ Report ¶¶ 8–12 at 94.

being contrary to the evidence in the record that InMAP is reliable for modeling marginal ton impacts across the continental United States.

Xcel's enthusiastic condemnation of InMAP helps to demonstrate why adherence to precedent alone for model choice is not a satisfactory litmus test. Xcel's argument that the Commission should never use a "new, experimental model" requires the Commission to rely upon old, potentially-outdated models regardless of their fit to the proceeding.[62] While the ALJ Report is correct in saying the evidence following InMAP's peer review is absent from the record, peer review is one way to establish the reliability of a model—it is not the only way. The Commission can find InMAP sufficiently supported based on the analysis in the InMAP model description, provided in the record.

CEOs continue to believe that InMAP is reliable, but the Commission can call for modeling using AP2 or CAMx as described in CEOs Exceptions[63] if it does not choose to change the ALJ's Conclusions ¶ 8 to ¶ 12 on InMAP.

2. Xcel's criticisms of AP2 are based on application of incorrect metrics for reduced-form models.

As discussed in Section I, above, Xcel applies inappropriate EPA Clean Air Act guidance to evaluate reduced-form models designed for modelling marginal ton emissions, such as AP2.[64] Looking at the titles of the reports—both guidance intended "for Demonstrating Attainment of

[62] Xcel Exceptions at 6. To analogize, under Xcel's logic the gold medal at the 100 meter sprint in the Olympics should be given to whatever athlete has the longest record of completed marathon races at the Olympic level. Longevity of use for a different purpose should not be the Commission's only metric on which to determine model reliability. Under the metric that CEOs are advocating, the models would be evaluated based on their ability to perform the task at hand, not their seniority in EPA-mandated Clean Air Act compliance.
[63] CEOs Exceptions at 25–32.
[64] Xcel Exceptions at 32, n.98 & n.99.

Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze"[65]—each guidance document is, on its face, meant to help states with Clean Air Act compliance, and not intended for modeling marginal emissions' impacts. The Agencies never proposed using AP2 for Clean Air Act compliance in this proceeding, so Xcel's chosen metrics are inapposite.

The Agencies have explained satisfactorily how stack height affected AP2's county-level and individual plant damage values,[66] as discussed above, so Xcel's concern that "the estimated damage values for the hypothetical sources were far higher than the damages estimated for the actual, large power plants" [67] is overstated. Xcel's Exceptions highlighting this concern[68] ignore the issue of different stack heights' impacts on modeled values, and instead focuses on the fact that reduced-form models simplify both inputs and chemical conversion calculations. By focusing on the wrong aspect of the Agencies' modeling, Xcel fails to grasp the importance of stack height on the ultimate damage values.

It is also notable that Xcel does not apply its high standards for AP2 to its own CAMx modeling. Although it states in Exceptions that "[o]zone and secondary $PM_{2.5}$ formation have highly variable seasonal and daily variations that must be accounted for in order to accurately simulate the change in ambient concentrations,"[69] Xcel's modeling "exclude[d] the spring period when stratospheric ozone intrusion events can cause high ozone concentrations that are difficult for the model to simulate."[70] Xcel's expert air modelers explained that excluding the entire spring season was not a problem, as "[m]odel performance for these stratospheric ozone events is

[65] *Id.*
[66] Agencies Exceptions at 3–4.
[67] Xcel Exceptions at 8.
[68] *Id.* at 30–32.
[69] *Id.* at 32.
[70] Ex. 604, Schedule 3 at 50.

not important for the current study because it will not have a big effect on the air quality impacts."[71] If Xcel is so concerned with the exact seasonal damage values of ozone, its own modeling fails to reflect this concern.

In another example of applying standards differently between AP2 and CAMx, when addressing why it believes its incorrect modeling of particulate matter does not impact overall results Xcel argues it is not important for CAMx to model all the criteria pollutants together.[72] "Because CAMx (as well as InMAP and AP2) treat primary $PM_{2.5}$ linearly, this ultimately means that it does not matter whether 9.4 tons, 500 tons, or 1,000 tons of primary $PM_{2.5}$ was modeled."[73] Xcel's explanation supports the Agencies' position that it is acceptable for AP2 to model different pollutants separately, a common practice in reduced-form air modeling.[74]

3. Xcel's three modeled locations are not representative of the geographic diversity of sources providing electricity to Minnesota.

Xcel's three modeled sources are not representative of potential source locations and stack heights, and do not show the Commission what is practicable to model. Source location creates a hundred-fold difference in damage values,[75] so Xcel is incorrect when it states "there is not much difference in the values from county to county."[76] In saying that county-level values are not "practicable," Xcel again misunderstands the word because it concentrates on how the values might be used.[77] For example, it inserts the word "practicable" into an unrelated argument about how often it might employ certain values, stating "we do not believe there are *practicable*

[71] *Id.*
[72] Xcel Exceptions at 20–21.
[73] *Id.* at 21–22.
[74] Agencies Exceptions at 1.
[75] CEOs Exceptions at 25.
[76] Xcel Exceptions at 24.
[77] *Id.* at 25.

reasons to model any sources outside of Minnesota, considering that these values *would rarely be used*."[78] Using the values in other proceedings is a "Stage 2" question for the Commission,[79] therefore the use of the values is not directly at issue in this quantification proceeding and does not determine if a particular value is *practicable* (i.e., capable of being accomplished or feasible). It is within the Commission's discretion to decide whether or not to adopt county-level values, and the record demonstrates that county-level damages are practicable.

The three locations Xcel chose do not adequately reflect other potential locations and types of generating units. Xcel calls its three locations "representative of a rural, metropolitan-fringe, and urban area" but does not define these three categories.[80] Their "rural" value is not rural even by Xcel's own understanding of the term: "The city of Marshall has a larger population than a typical rural setting and is located in the western part of the state, allowing air dispersion over a greater part of Minnesota."[81] Xcel helpfully adds that "CAMx does take into account topography,"[82] which supports CEOs' position in Exceptions that the Marshall rural value is not applicable to other parts of the state with other topographies.[83] Xcel only modeled plants in its own service territory. As a result the three sources obviously do not "provide realistic potential locations for a new power plant" [84] for any other company. As discussed in Section I, above, the Agencies also explained how Xcel's "urban" value is not representative of

[78] *Id.* at 25 (emphasis added).
[79] CEOs Exceptions at 6 (*quoting* Order Establishing Environmental Cost Values, *In the Matter of the Quantification of Environmental Costs Pursuant to Laws of Minnesota 1993, Chapter 356, Section 3*, Pub. Util. Comm'n Docket No. E- 999/ CI- 93- 583 at 11, n.4 (Jan. 3, 1997)).
[80] Xcel Exceptions at 24.
[81] *Id.*
[82] *Id.* at 18–19.
[83] CEOs Exceptions at 29–30.
[84] Xcel Exceptions at 18.

other urban areas. The Commission should add source locations to Xcel's three if it opts for CAMx as explained in CEOs' Exceptions.

Based on these concerns and failures to account for variability in Xcel's proposals, should the Commission decide to use CAMx for modeling CEOs ask that it also adopt the changes to Recommendation 4.a outlined in CEOs' Exceptions.[85] This would more appropriately account for diversity of source location and type.

III. MLIG's Exceptions Are Based on Mistakes of Law and Are Unsupported by the Record Evidence.

MLIG's Exceptions failed to directly address the four questions at issue in this proceeding. This section first addresses its legal errors, then discusses its attempts to rehabilitate its expert and discredited evidence. The Commission should give no weight to MLIG's Exceptions.

A. MLIG's constitutional argument has no merit.

While MLIG states several different truisms within constitutional law—i.e., rational basis review, due process clauses, and a standard for arbitrary action—it fails to make a coherent argument for why or how anything in the ALJ Report is unconstitutional as applied to MLIG.[86] Since there is not a clear as-applied due process argument to rebut, this section goes through MLIG's constitutional law statements and explains how they are either mischaracterized or inapplicable. MLIG's argument that the ALJ Report contains an unconstitutional reinterpretation

[85] CEOs Exceptions at 30–32.

[86] As a technical matter, the ALJ Report cannot be unconstitutional since it is not law: "The recommendations of the Administrative Law Judge have no legal effect unless expressly adopted by the Commission as its final order." ALJ Report at 105. For the sake of discussion this section addresses the possibility that there will be a later claim against the Commission based on the record to date, but at this stage there is not any final agency action to review and hold to a constitutional standard.

of the environmental costs statute has no merit because it underestimates the Commission's discretion, fails to identify any injury to MLIG in this or any later proceeding, and does not articulate how a due process violation occurred during the contested case hearing.

The Minnesota Court of Appeals has addressed the externalities law and found the Commission's interpretation of it constitutional.[87] It also affirmed that courts will not question the Commission's interpretation in this domain, which is within the agency's expertise:

> Here, the legislature assigned the task of determining environmental cost values to the administrative agency it presumably thought would be most appropriate to take on this responsibility. There is no challenge that the legislature made an improper delegation of authority to the agency, and it is fundamental that the courts cannot take on the functions of administrative agencies without violating the separation of powers. *Arrowhead Bus Serv., Inc. v. Black & White Duluth Cab Co.*, 226 Minn. 327, 329, 32 N.W.2d 590, 592 (1948). Thus, this court will not substitute its judgment for the commission's in such a situation. *See Gibson v. Civil Serv. Bd.*, 285 Minn. 123, 126, 171 N.W.2d 712, 715 (1969) (stating district courts and appellate courts should avoid "substituting their judgment concerning the inferences to be drawn from the evidence for that of the agency").[88]

[87] Matter of Quantification of Environmental Costs, 578 N.W.2d 794, 799 (Minn. Ct. App. 1998). The Court went on to explain:

> While we acknowledge the concerns about the uncertain and speculative nature of the available data, we are disinclined to prohibit the state from directing its instrumentalities to engage in environmentally-conscious planning strategies. Hopefully, the administrative process ensures the use of the best information available and takes precautions to guard against the dangers surrounding the use of such data. Here, the process adequately explained its decisions.

Id. at 800–01.

[88] Matter of Quantification of Environmental Costs, 578 N.W.2d at 799.

Despite this clear statement on the law at issue here from the Court of Appeals, MLIG suggests that Minnesota courts will now decide to violate separation of powers by parsing the Commission's decisionmaking. The applicable case law demonstrably rebuts MLIG's claim.

Nonetheless, MLIG argues that the ALJ Report's interpretation of the statute somehow, without violating the statute's wording, fails under rational basis constitutional review. Rational basis is the lowest bar to lawmaking that the government ever has to meet—the agency's interpretation of the law is almost certain to be constitutional. This standard was first elucidated in "famous footnote four"[89] of *United States v. Carolene Products*.[90] As Dean Erwin Chemerinsky, a leading constitutional scholar, explains:

> Under the rational basis test, a law will be upheld if it is *rationally related to any legitimate government purpose*. In other words, the government's objective only need be a goal that is legitimate for the government to pursue, which means any objective that it is legal for the government to pursue. In fact, the goal need not be the actual purpose of the legislation, but rather any conceivable legitimate purpose. The means chosen need be only a reasonable way to accomplish the objective.[91]

This is a remarkably low bar and one that the Commission has already met in previous litigation on this statute. In this case, the Commission can meet this standard simply by finding that the statute calls for the quantification of environmental cost values and that the record reflects the

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[89] Erwin Chemerinsky, *The Rational Basis Test Is Constitutional (and Desirable)*, at 1 (University of California Irvine Legal Studies Research Paper Series No. 2016-30), *available at* http://ssrn.com/abstract=2782109 (Forthcoming in the Georgetown Journal of Law and Public Policy).

[90] 304 U.S. 144, 152 n.4 (1938). *See* J.M. Balkin, *The Footnote*, 83 NW. U. L. REV. 275 (1989).

[91] Erwin Chemerinsky, *The Rational Basis Test Is Constitutional (and Desirable)*, at 2 (University of California Irvine Legal Studies Research Paper Series No. 2016-30) (*citing* Pennell v. City of San Jose, 485 U.S. 1 (1988); U.S. R.R. Retirement Bd. v. Fritz, 449 U.S. 166 (1980); Allied Stores v. Bowers, 358 U.S. 522 (1959); Williamson v. Lee Optical, 348 U.S. 483 (1955); Day-Brite Lighting, Inc. v. Missouri, 342 U.S. 421 (1952); Schweiker v. Wilson, 450 U.S. 221 (1981)).

best science available regarding modeling of air pollution impacts from sources serving Minnesota, which shows the costs associated with such pollution.[92] As the quantification of environmental cost values continues to be justified under Minnesota's various public welfare and economic regulatory powers, there is no serious question that the Commission's action in this proceeding will be constitutional under a rational basis standard.

MLIG claims that it is illegal to arbitrarily "impose a liability, deprive citizens of resources, or prohibit them from engaging in an otherwise lawful activity."[93] But this proceeding is merely a quantification exercise and does not have any of these impacts on any party or nonparty. The Commission has clearly stated that "as applied" constitutional challenges are not ripe at the environmental cost value quantification stage.[94] Even at a later stage, when the

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[92] The previous court case on this statute lays out what the Commission can put in its final order to overcome such a challenge, noting:

> Furthermore, in its order, the commission explained its decision to set the values on the following factors (1) the IPCC report was the most accurate and useful source available; (2) some expert testimony and suggested ranges were more strongly supported by the evidence than others; (3) Dr. Ciborowski's approach was supported by the evidence; (4) the experiences of New York in setting environmental costs; and (5) the uncertainties inherent in the research would be taken into account by using a lower estimate of global damage and a higher damage discount rate. The commission also argues that it believed it should attempt to do *what was practicable, given the uncertainties, instead of doing nothing* as LEC's argument implies. Under these circumstances, the commission based its decision on sufficient evidence in the record (primarily the IPCC report and Dr. Ciborowski's testimony and recommendations) and has given an adequate and reasonable explanation of its decision.

Matter of Quantification of Environmental Costs, 578 N.W.2d at 800 (emphasis added). Just as it did in the previous proceeding, the Commission should opt to do what is practicable instead of doing nothing, as MLIG suggests.

[93] MLIG Exceptions at 10.

[94] Order Establishing Environmental Cost Values, *In the Matter of the Quantification of Environmental Costs Pursuant to Laws of Minnesota 1993, Chapter 356, Section 3*, Pub. Util.

environmental cost values are used in planning, there will be no direct impact to rates and neither MLIG nor any other entity will have to pay the environmental costs assessed to any planned project. As a result, MLIG likely has no valid challenge based on alleged unconstitutionality because the outcome of this proceeding and subsequent planning proceedings will in no way impact its rights sufficiently to give it a cognizable claim.

Since MLIG has had the benefit of a full hearing on the merits, it has no argument at this point that it was denied procedural due process. While invoking Articles 5 and 14 of the U.S. Constitution and Article 1, § 7, of the Minnesota Constitution,[95] MLIG fails to make any clear allegation about how its due process rights have been infringed—but even assuming a claim has been made, there is no possible violation of its procedural due process rights. This is because a contested case hearing such as the one the Commission provided in this docket affords the parties a full opportunity to be heard, present testimony, cross examine witnesses, and build a factual and legal record.

Though MLIG's Exceptions attempt to make a constitutional issue out of a hypothesized change in Commission interpretation of law[96] there is no coherent explanation of how such a claim applies to MLIG's constitutionally-protected rights. Assuming it follows the ALJ Report's legal conclusions, the Commission is not in danger of violating constitutional due process on this record.[97]

Comm'n Docket No. E- 999/ CI- 93- 583 at 6–7 (Jan. 3, 1997). The Commission also found that it cannot find the statute facially unconstitutional, *id.* at 6, so any MLIG argument that it is facially unconstitutional is not a valid argument before the Commission.

[95] MLIG Exceptions at 67.

[96] *Id.* at 9–17.

[97] As discussed *supra*, note 86, the Commission has yet to take a final action, so it could potentially make an unconstitutional decision in a later action. But on the record provided by the ALJ there does not seem to be any such violation.

B. MLIG's proposed causation standard has no merit and is unethical if applied.

The ALJ Report correctly found that MLIG's proposed causation standard is inapplicable in this proceeding. Before, in briefing, MLIG attempted to further a "proximate cause" standard that is easily met by the record at hand and is, regardless, not required by Minnesota law.[98] Regardless of its failure to advocate for this standard to the ALJ, MLIG's Exceptions seeks to further an invented "medical causation" standard. The ALJ Report concluded that "Medical causation is not the standard."[99] This is obvious on the face of the statute, which requires the Commission to quantify harms "*associated* with each method of electricity generation."[100] The Commission should accordingly follow the ALJ Report's conclusion "that MLIG focused on the incorrect standard when it insisted that the parties . . . had to prove a causal link, as defined by the medical literature, between increased ambient concentration of [criteria pollutants] and increased mortality."[101]

MLIG fails to offer any additional arguments in its Exceptions to upset the ALJ Report's correct conclusion. Despite asserting the opposite, MLIG's quotation of various dictionaries shows that "associated with" does not mean "caused by."[102] Among the definitions offered is "join or connect in any of various intangible or unspecified ways" and "something that is closely connected with or that usually accompanies another."[103] Absent from the examples that MLIG quotes is any definition that would imply "association" is synonymous with "causation," which is MLIG's stated position.

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[98] CEOs Reply Brief at 22–23.
[99] ALJ Report at 108.
[100] *Id.*
[101] *Id.*
[102] MLIG Exceptions at 14–15.
[103] *Id.*

In order to shoehorn the wrong standard into this proceeding, MLIG attempts to redefine epidemiology to make it into a medical practice. "Epidemiology is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems."[104] Epidemiologists do not practice medicine as medical doctors and do not give medical opinions, no matter if their scientific findings are based on medical statistics. As a result, when MLIG tries to describe Dr. Jacobs as "medically trained"[105] it is misunderstanding his qualifications—Dr. Jacobs is a leading professor of epidemiology who works with studies of human health; but he is not a medical doctor. His qualifications are absolutely applicable to this proceeding, and the information he provided on epidemiology is very helpful in assisting the Commission to correct errors in the ALJ Report. But to say that his qualifications are the same as Dr. McClellan, a veterinarian who performs "laboratory animal investigations,"[106] is to misunderstand what type of scientific evidence is relevant to this proceeding. When MLIG also later refers to "the ALJ's medical analysis" it becomes apparent that the word "medical" has become untethered from any meaning in its Exceptions.[107] Shortly thereafter MLIG flips the conflation and speaks of "Dr. McClellan's epidemiological opinion,"[108] which is not based on any of the expert modeling in the record or professional qualifications similar to Dr. Jacobs, an epidemiologist.

[104] World Health Organization, WHO Epidemiology, http://www.who.int/topics/epidemiology/en/ (last visited Aug. 1, 2016).
[105] MLIG Exceptions at 42.
[106] *Id.* at 44, n.90. MLIG attempts to blur the line between these two experts. *See id.* at 42.
[107] *See* MLIG Exceptions at 54.
[108] *Id.*

MLIG's medical causation standard, if adopted by the Commission, would require studies that introduce particulate pollution that induces "premature mortality or damage."[109] While this might be a standard acceptable to experiments on laboratory animals, when applied to human beings it is understandably beyond all scientific ethical standards. The Commission should reject any suggestion that this standard of causation is the appropriate measure for establishing environmental cost values in Minnesota. There is no reason to accept such an extreme and unethical measure in order to set environmental cost values for various planning dockets.

C. MLIG's expert was not credible and MLIG fails to rehabilitate him or its discredited arguments.

While MLIG's expert, Dr. McClellan, may be a qualified veterinarian, he provided irrelevant testimony, which MLIG points out "likely" contained typographical errors.[110] As MLIG explained, his qualifications are in veterinary experiments,[111] not in epidemiological science regarding human health. The ALJ Report was correct in questioning his assertions and qualifications.[112]

MLIG describes Dr. McClellan's testimony as "unchallenged"[113] even though the ALJ Report found sufficient record evidence that disproved his testimony and concluded: "neither the

[109] *Id.* at 41; *see also id.* at 71 (proposing that the Commission require such experiments "to show causation at these concentrations.").
[110] *Id.* at 29 n.71. MLIG would have the Commission accept in Exceptions that its expert made mistakes in his testimony and that the Commission ought to rewrite Dr. McClellan's testimony to be more favorable to MLIG's position. *Id.* Such action by the Commission would be arbitrary and capricious, as it is wholly without sufficient evidentiary support in the record to meet a preponderance standard.
[111] *Id.* at 44, n.90.
[112] ALJ Report at 108.
[113] *See, e.g.*, MLIG Exceptions at 64.

law nor the evidentiary record supports MLIG's arguments."[114] The ALJ Report lays out in clear and supported analysis how MLIG's positions were both irrelevant and refuted—MLIG's Exceptions do nothing to put that analysis in question.

In one example, MLIG grossly mischaracterizes the Greven epidemiological study and what it actually shows.[115] By taking a sensitivity analysis out of context, MLIG attempts to make the Greven study prove something it does not stand for.[116] The Commission should reject MLIG's attempts to muddy the record and follow the ALJ Report's findings and conclusions regarding MLIG's failure to make its case.

IV. Recommendation

Based on the above, CEOs recommend that the Commission adopt the Agencies' recommendations in their Exceptions and retain the ALJ Report's four framing questions, both of which are helpful for reaching the best and most representative environmental cost values. CEOs also ask the Commission to reject Xcel's recommendations in Exceptions and give MLIG's submission no weight. In order to set environmental cost values based on actual damages, as required under the Commission's past orders and Minn. Stat. § 216B.2422, Subd. 3, the Commission should follow the best science in the record, and reject attempts to confuse this quantification proceeding with inapplicable legal standards or misunderstandings of law and fact furthered by these two parties.

[114] ALJ Report at 108.
[115] MLIG Exceptions at 48–50; addressed in CEOs Reply Brief at 22.
[116] For a full explanation of how this study is being misused, and how the conclusion MLIG draws was repudiated by MLIG's expert on the stand, see CEOs Reply Brief at 22

CONCLUSION

The Minnesota Legislature called on the Commission to, "to the extent practicable, quantify and establish a range of environmental costs associated with each method of electricity generation." Minn. Stat. § 216B.2422, subd. 3. The Commission has interpreted this statute to require the quantification of all damages from certain air pollutants. Knowing that any such calculation will be done with some amount of uncertainty the Commission nonetheless set out to update these values, and the parties have produced a thorough scientific record that supports setting values that: show damages calculated over the continental U.S.; reflect the best Value of a Statistical Life data, the VSL compiled and vetted by the EPA; reflect the most credible and robust concentration-response data in the field of epidemiology; and provide useful diversity of source type and location that will be helpful in future Commission planning dockets. CEOs encourage the Commission to continue this process in the spirit that the Legislature showed when it passed the law, and set values that fully account for externalities based on the modeling record and the best available science. Doing so will follow the statute, the intent behind the law, and Minnesota's longstanding leadership role in planning for our nation's energy future.

Dated: August 4, 2016

Respectfully submitted,

/s/ Hudson Kingston

Hudson B. Kingston
Leigh K. Currie
Minnesota Center for Environmental Advocacy
26 East Exchange Street, Suite 206
St. Paul, MN 55101
Phone: (651) 223-5969
hkingston@mncenter.org

Attorney for Clean Energy Organizations

STATE OF MINNESOTA
FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Investigation into
Environmental and Socioeconomic Costs
Under Minn. Stat. § 216B.2422, Subd. 3

AFFIDAVIT OF SERVICE

PUC Docket No. E-999/CI-14-643
OAH Docket No. 80-2500-31888

STATE OF MINNESOTA)
)ss.
COUNTY OF RAMSEY)

Eric Lindberg being duly sworn says that on the 4th day of August, 2016, he served via electronic service the following:

- Clean Energy Organizations Reply to Exceptions to Findings of Fact, Conclusions, and Recommendations

on the following persons, in this action, by filing through e-dockets:

Attached Service List

Eric Lindberg

Subscribed and sworn to before me
this 4th day of August, 2016

Karen Moss

KAREN E. MOSS
NOTARY PUBLIC - MINNESOTA
My Commission Expires 01/31/2021

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
David	Aafedt	daafedt@winthrop.com	Winthrop & Weinstine, P.A.	Suite 3500, 225 South Sixth Street Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Michael	Ahern	ahern.michael@dorsey.com	Dorsey & Whitney, LLP	50 S 6th St Ste 1500 Minneapolis, MN 554021498	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Marc	Al	marc.al@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP	Suite 1500 50 South Sixth Street Minneapolis, MN 554021498	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Carl	Cronin	carl.cronin@xcelenergy.com	Xcel Energy	414 Nicollet Mall Minneapolis, Minnesota 55401	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Leigh	Currie	lcurrie@mncenter.org	Minnesota Center for Environmental Advocacy	26 E. Exchange St., Suite 206 St. Paul, Minnesota 55101	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Patricia	DeBleeckere	tricia.debleeckere@state.mn.us	Public Utilities Commission	Suite 350 121 Seventh Place East St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
James	Denniston	james.r.denniston@xcelenergy.com	Xcel Energy Services, Inc.	414 Nicollet Mall, Fifth Floor Minneapolis, MN 55401	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Jessica	Dexter	jdexter@elpc.org	Environmental Law & Policy Center	394 Lake Avenue, Ste. 309 Duluth, MN 55802	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Brian	Draxten	bhdraxten@otpco.com	Otter Tail Power Company	P.O. Box 496 215 South Cascade Street Fergus Falls, MN 565380498	Electronic Service	No	OFF_SL_14-643_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tristan	Duncan	tlduncan@shb.com	Shook Hardy & Bacon, L.L.P.	2555 Grand Blvd. Kansas City, MO 64108	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Bret	Eknes	bret.eknes@state.mn.us	Public Utilities Commission	Suite 350 121 7th Place East St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Jim	Erickson	jim.g.erickson@xcelenergy.com	Xcel Energy	414 Nicollet mall 7th Flr Minneapolis, MN 55401	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Bruce	Gerhardson	bgerhardson@otpco.com	Otter Tail Power Company	PO Box 496 215 S Cascade St Fergus Falls, MN 565380496	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Emerald	Gratz	emerald.gratz@state.mn.us	Office of Administrative Hearings	PO Box 64620 Saint Paul, Minnesota 55164-0620	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Thomas J.	Grever	tgrever@shb.com	Shook, Hardy &Bacon L.L.P.	2555 Grand Blvd. Kansas City, MO 64108	Electronic Service	No	OFF_SL_14-643_Official CC Service List
J Drake	Hamilton	hamilton@fresh-energy.org	Fresh Energy	408 St Peter St Saint Paul, MN 55101	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Linda	Jensen	linda.s.jensen@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota Street St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Kevin D.	Johnson	kdjohnson@stoel.com	Stoel Rives LLP	Suite 4200 33 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Sarah	Johnson Phillips	sjphillips@stoel.com	Stoel Rives LLP	33 South Sixth Street Suite 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-643_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Hudson	Kingston	hkingston@mncenter.org	MN Center for Environmental Advocacy	26 East Exchange Street, Suite 206 St. Paul, Minnesota 55101	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Brad	Klein	bklein@elpc.org	Environmental Law & Policy Center	35 E. Wacker Drive, Suite 1600 Suite 1600 Chicago, IL 60601	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Kevin	Lee	kevin@kevinleelaw.com		400 S. 4th St. Suite 401-111 Minneapolis, MN 55415	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Jonathan	Massey	jmassey@masseygail.com	Massey & Gail LLP	1325 G Street NW Washington, DC 20005	Electronic Service	No	OFF_SL_14-643_Official CC Service List
David	Moeller	dmoeller@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022093	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Jeff	Oxley	jeff.oxley@state.mn.us	Office of Administrative Hearings	600 North Robert Street St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Michelle	Rebholz	michelle.rebholz@state.mn.us	Public Utilities Commission	Suite 350121 Seventh Place East St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Kevin	Reuther	kreuther@mncenter.org	MN Center for Environmental Advocacy	26 E Exchange St, Ste 206 St. Paul, MN 551011667	Electronic Service	No	OFF_SL_14-643_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Laureen	Ross McCalib	lrossmccalib@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 55369-4718	Electronic Service	No	OFF_SL_14-643_Official CC Service List
LauraSue	Schlatter	LauraSue.Schlatter@state.mn.us	Office of Administrative Hearings	PO Box 64620 St. Paul, MN 55164-0620	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates	Ste 122 9100 W Bloomington Frwy Bloomington, MN 55431	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Sean	Stalpes	sean.stalpes@state.mn.us	Public Utilities Commission	121 E. 7th Place, Suite 350 Saint Paul, MN 55101-2147	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Philip	Steger	steger.phil@dorsey.com		50 South Sixth Street Suite 1500 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Donna	Stephenson	dstephenson@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 55369	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Eric	Swanson	eswanson@winthrop.com	Winthrop Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_14-643_Official CC Service List
SaGonna	Thompson	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List
Erin	Vaughn	evaughn@shb.com	Shook, Hardy &Bacon L.L.P.	2555 Grand Blvd. Kansas City, MO 64108	Electronic Service	No	OFF_SL_14-643_Official CC Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Colin	Wicker	wicker.colin@dorsey.com	Dorsey & Whitney LLP	50 6th Street South Suite 1500 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Alexis	Williams	williams@fresh-energy.org	Fresh Energy	408 St. Peter St Suite 220 St. Paul, MN 55102	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Cam	Winton	cwinton@mnchamber.com	Minnesota Chamber of Commerce	400 Robert Street North Suite 1500 St. Paul, Minnesota 55101	Electronic Service	No	OFF_SL_14-643_Official CC Service List
Daniel P	Wolf	dan.wolf@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_14-643_Official CC Service List