Southern Minnesota Beet Sugar Cooperative
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October 7, 2022

Submitted Via Online Public Comment Form

Minnesota Pollution Control Agency
c/o Maggie Wenger
520 Lafayette Road N
St. Paul, MN 55155

Re: Comments Regarding Minnesota's Draft Regional Haze State Implementation Plan

Southern Minnesota Beet Sugar Cooperative (SMBSC) appreciates the opportunity to submit comments to the Minnesota Pollution Control Agency (MPCA) regarding Minnesota's Draft Regional Haze State Implementation Plan (RHSIP). The enclosed comments provide a detailed overview of SMBSC's position regarding the draft RHSIP.

We appreciate your efforts in thoughtful consideration of SMBSC's position and welcome the opportunity to have additional discussions towards a mutually agreeable path forward for how SMBSC is considered in the RHSIP. Should you have any questions or comments regarding this submittal, please contact me by phone at 320-329-4174 or via email at sagar@smbsc.com.

Sincerely,

Sagar Sunkavalli
Manager of Environmental Affairs

cc: Margaret McCourtney, MPCA
Hassan Bouchareb, MPCA
Kari Palmer, MPCA

Comments Regarding Minnesota's Draft Regional Haze State Implementation Plan

October 2022

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Comments Regarding Minnesota's Draft Regional Haze State Implementation Plan

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Contents

Barr Engineering Co. ("Barr") has developed the following comments on behalf of Southern Minnesota Beet Sugar Cooperative (SMBSC) regarding Minnesota's draft Regional Haze State Implementation Plan (RHSIP), based on review of the draft RHSIP and its supporting technical documentation.

Brief Procedural History

As part of development of the second implementation phase for the RHSIP SMBSC was required to submit a Regional Haze Four-Factor Analysis (FFA) on July 31, 2020 for Boiler No. 1 (Boiler 1, EQUI 17). The Minnesota Pollution Control Agency (MPCA), Federal Land Managers (FLMs), and the U.S. Environmental Protection Agency (EPA) provided initial comments on SMBSC's FFA. SMBSC provided responses to these comments on July 23, 2021. On January 18th, 2022, the MPCA met with SMBSC to inform decisions regarding what emission reductions are necessary to make reasonable progress toward attaining regional haze visibility objectives. During the meeting, MPCA informed SMBSC that they are recommending the installation of selective non-catalytic reduction (SNCR) controls on Boiler 1, by virtue MPCA determining that SNCR is "cost effective." SMBSC and MPCA met again on February 14th, 2022 where SMBSC stated its disagreement with MPCA's recommendation. Although SMBSC responded to MPCA's initial request in 2020 with a complete FFA, SMBSC explained that it did not believe additional control measures for NO_X and/or SO_2 are cost effective when all considerations are taken into account, not just the cost per pollutant reduced. SMBSC provided an additional letter to the MPCA providing supporting information on March 14, 2022. MPCA provided a response to SMBSC's March 2022 letter on April 20, 2022. MPCA made limited edits to the RHSIP document, but has not changed the major findings or recommendations.

SMBSC appreciates the opportunity to discuss this topic with MPCA and provide this additional information. Upon review of the draft SIP and supporting documentation, SMBSC has several comments. Due to time constraints, SMBSC reserves the right to review supporting documentation in further detail to further bolster SMBSC's position.

I. MPCA's recommendation for SMBSC to install NO_X emission controls to make reasonable progress for regional haze improvement lacks technical basis and is arbitrary and capricious when all relevant factors are considered

A. Q/d Screening Considerations

For the second regional haze planning period, States focused on demonstrating there is reasonable progress being made towards natural visibility goals, and if additional efforts are warranted, used the FFA methodology as outlined by the EPA to select sources for additional emission reductions. At the outset, SMBSC should not have been selected by MPCA to conduct an FFA and thus evaluate potential control measures.

Initially, MPCA applied the Q/d analysis (a source's annual emissions in tons divided by the distance in kilometers between the source and the nearest Class I area) on an individual emission unit basis, using the top 80% of statewide stationary source emissions as a cutoff threshold, in the selection of the 13 facilities and specific emission units of interest at those facilities. This step used an effective Q/d threshold of 7. SMBSC did not quality for FFA analysis under this approach because SMBSC's Q/d for Boiler No. 1 is approximately 4.1.

In comments using "their own criteria", the FLMs contended that the Q/d analysis should be applied to the entire facility emissions and not an individual emissions source. The FLMs' criteria are not evident in the record. In addition, the FLMs provided a specific list of additional facilities they recommended for FFA review. This list included SMBSC. The record also does not disclose how the FLMs selected SMBSC for further analysis.

MPCA acceded to the FLMs' request, and selected an "effective" Q/d of 4.6 for source inclusion. This approach is problematic on several levels. First, inclusion of the full facility emissions in the calculation will greatly increase a facility's Q/d value, yet emissions can only be practically controlled on source-by-source basis. Essentially, the method is attributing facility-wide emissions to individual emission sources that *they are not emitting* because the MPCA only requested a FFA for Boiler 1 at SMBSC. Such source aggregation is legally problematic under *West Virginia v. EPA,* 142 S.Ct. 2587 (2022). Second, with the inclusion of higher emissions, MPCA also lowered the Q/d threshold making source selection more aggressive and out of character with neighboring states. For instance, WI used the Q/d information developed by the Lake Michigan Air Directors Consortium (LADCO) Workgroup to select emission units over a Q/d of 10 at three facilities for further analysis[1]. Minnesota should follow Wisconsin's selection criteria as the two neighboring states have stationary sources potentially contributing to the same Upper Midwest Class I areas. Third, the oddly selected Q/d threshold happens to coincide exactly with SMBSC's value. On its face this suggests a result-driven, arbitrary process. MPCA essentially admitted as much during the February 14, 2022 meeting with SMBSC, where MPCA stated that the reason MPCA deployed a Q/d to include SMBSC was to specifically ensure that SMBSC would be required to conduct a FFA analysis, out of a desire to further regulate SMBSC's coal-fired boiler. MPCA thus reverse-engineered the Q/d to produce a pre-determined result. The entire FLM-inspired revisions process was both scientifically and legally suspect.

As described in the guidance[2] on regional haze state implementation plans for the second implementation period, States may find some or all of the following techniques useful for examining source impacts for the second implementation period:

a. Emissions divided by distance (Q/d)

b. Trajectory analyses

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[1] Wisconsin Regional Haze State Implementation Plan Revision for the Second Implementation Period, July 2021 (AM_WiRound2HazeSIP_20210730.pdf (widen.net))

[2] https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf?VersionId=QC2nPZHuAH1VYmm3EuhV9ABIGm5rQynb

c. Residence time analyses

d. Photochemical modeling (zero-out and/or source apportionment)

The above techniques are listed in order from the least complicated and least accurate (Q/d) to the most complicated and resource intensive (photochemical modeling). Each technique has advantages and disadvantages. In general, the simple techniques (Q/d) are easy to implement, but do not provide detailed information. The more sophisticated techniques provide detailed information on particulate matter (PM) and PM species impacts. States may use Q/d as a surrogate for source visibility impacts, along with a ***reasonably*** selected threshold for this metric. Q/d is a less reliable indicator of actual visibility impact because it does not consider transport directions and pathways, dispersion and photochemical processes, or the particular days that have the most anthropogenic impairment due to all sources. MPCA selected the ***easiest and least accurate*** (compared to the alternatives listed above) technique, Q/d, to develop a list of sources to conduct a four-factor analysis. That is not necessarily inherently invalid, but it raises the greatest concerns over adequacy and potential manipulation.

MPCA's low Q/d threshold (4.6) selection was particularly surprising given that visibility in Minnesota Class I areas is already below the uniform rate of progress (URP) "glide-path" and approaching natural visibility. Figure 1 demonstrates the visibility trends for the Boundary Waters Canoe Area Wilderness (BWCAW), Voyageurs National Park (Voyageurs), and Isle Royal National Park.

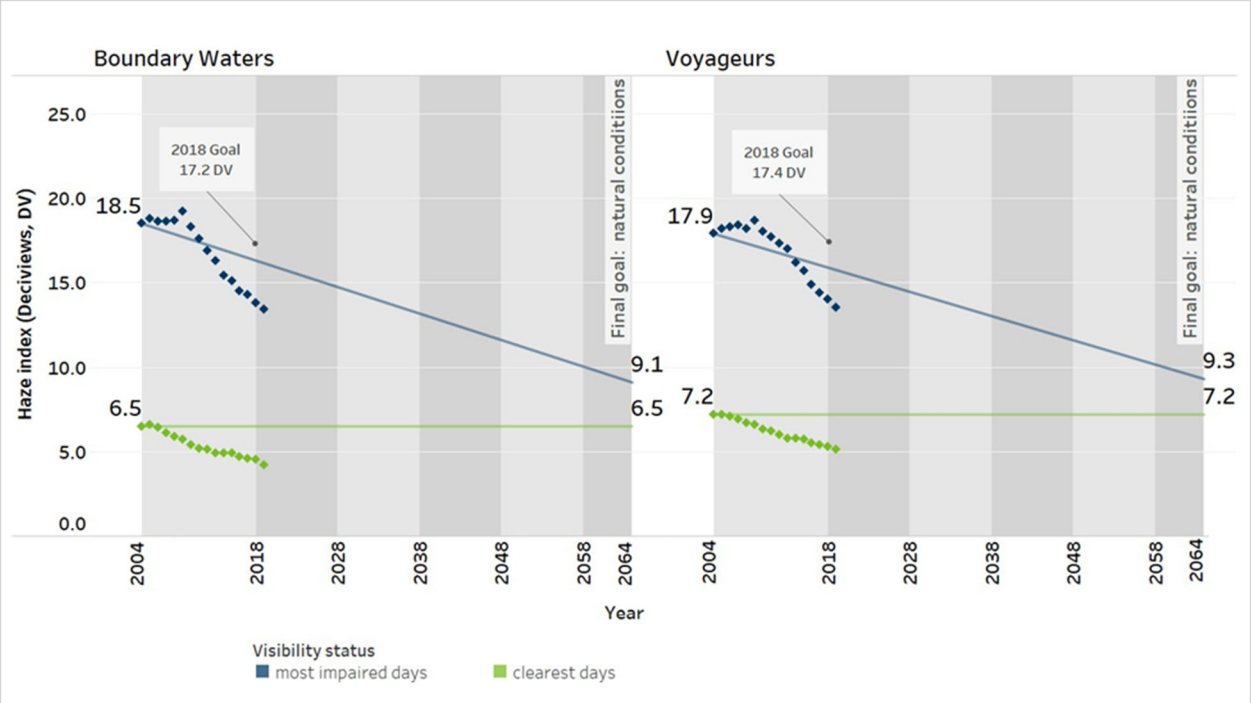

Figure 1 Visibility Trend versus URP – Boundary Waters Canoe Area (BOWA1) and Voyageurs National Park (VOYA1)

Notably, as part of Class I area Prevention of Significant Deterioration air permitting exercises, FLMs rarely evaluate permits at distances over 300 km and then only when sources are considerably larger than Boiler

1. Even then FLM-published guidance states that FLMs typically employ a Q/d of 10 to screen out sources from inclusion of visibility analysis on Class I areas[3]. The SMBSC example thus reveals a departure from normal practice on distance and emitter size, and a substantial departure on Q/d evaluation practices.

As a result of concerns about MPCA's methodology, and because the MPCA specifically invited permittees to prepare supplemental analyses to accompany the FFA, SMBSC prepared and included a trajectory analysis with the FFA, providing a more accurate picture of the relationship between SMBSC's emissions and conditions in the Upper Midwest Class I areas. The trajectory analysis showed that emissions from Boiler 1 are rarely if ever reach Upper Midwest Class I areas, let alone cause or impact visibility impairment.

B. MPCA lacks a technical basis to support that new NO_X emission controls at SMBSC are needed to make reasonable visibility progress

SMBSC provided a wind rose in correspondence with MPCA that the predominant wind directions near SMBSC are from the northwest and southeast/south-southeast, while all the Upper Midwest Class I Areas lie to the northeast. Refer to Figure 2 for details

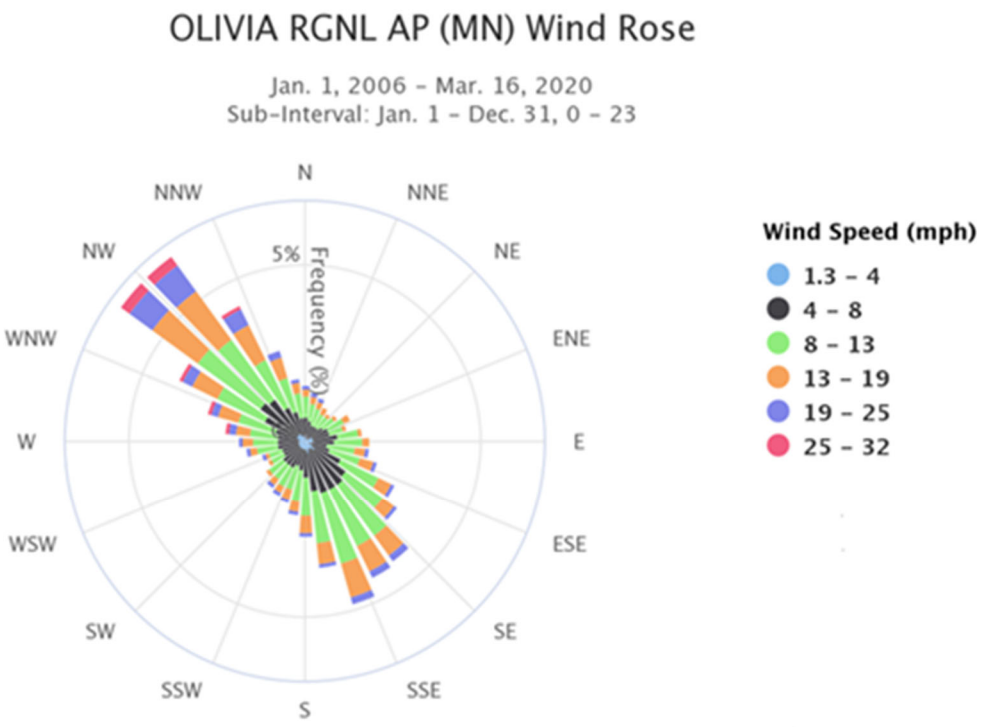

Figure 2 Olivia Wind Rose

[3]http://npshistory.com/publications/air-quality/flag-2010.pdf

The wind frequency from the southwest that is a precondition for transport SMBSC emissions to any of the Upper Midwest Class I areas is very rare (less than 1% of the time). This low frequency is compounded by SMBSC's 400-450 km distance to the nearest Upper Midwest Class I area. The distances alone are enough to eliminate SMBSC for consideration as part of any contribution analysis for the Upper Midwest Class I areas.

In addition, SMBSC included a forward-trajectory analysis with the original FFA submission, which is more accurate and sophisticated relative to MPCA's Q/d analysis for source inclusion. Refer to Figure 3.

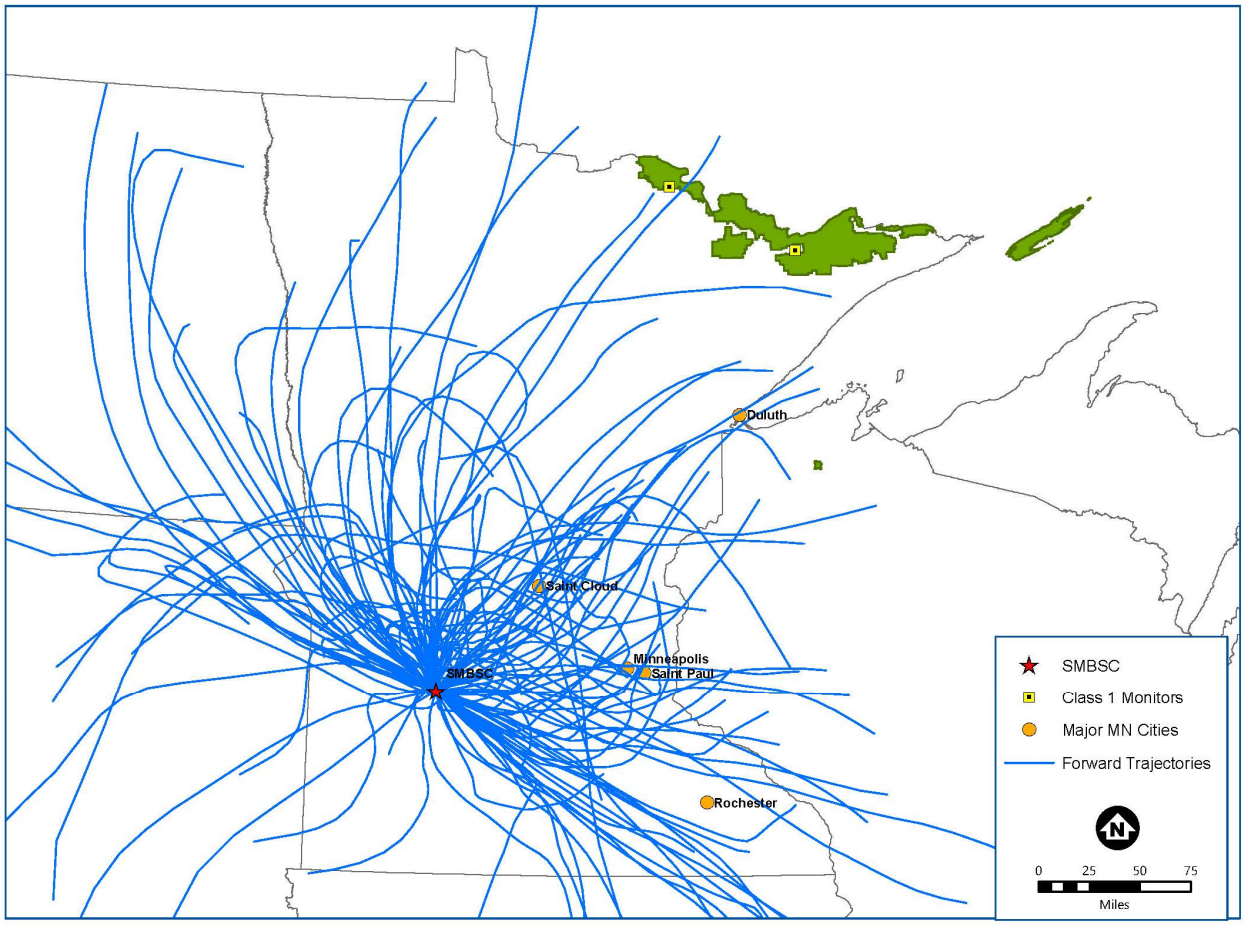

Figure 3 2018 Most Impaired Days Forward Trajectories

The analysis indicates that SMBSC's emissions seldom if ever reach the BWCAW and there is only a day or two each year the emissions even reach Voyageurs. Collectively, emissions from SMBSC only have the potential to reach Upper Midwest Class I areas in very rare circumstances, much less have ***any*** impact on visibility. By the time the emissions reach the Upper Midwest Class I areas, the emissions have undergone maximum dispersion and attenuation.

Therefore, SMBSC has contended that NO_X controls on a dollar per ton of pollutant removed basis are not cost-effective because the current evidence suggests there will be ***negligible or no*** visibility improvement resulting from the controls. This means that there should be no universal cost effectiveness ($7,600/ton

per draft SIP) threshold applied equally to all facilities irrespective of distance to Upper Midwest Class I areas, wind directions, and trajectories provided by SMBSC to determine if NO_X controls are needed for reasonable progress. Further, while MPCA's cost threshold may be within the range of other state proposals, it is unnecessarily aggressive for a state with visibility conditions well below the uniform rate of progress glide path and is certainly on the higher end of other state proposals. Although SMBSC had not previously seen or taken a position on the MPCA's updated cost of NO_X controls set forth in the draft SIP, the principal disagreement is over whether they should be required in general. SMBSC has several comments on the MPCA's updated control costs and supporting documentation. However, based on a review of the draft SIP supporting documentation and recent pricing updates due to inflation, SMBSC recalculated the cost of SNCR and demonstrated that it is higher than $5,700/ton NO_X removed based on current pricing factors, which certainly should not be considered cost effective given the considerations in this section. Supporting documentation can be provided upon request. Additional detail on SMBSC control cost comments is provided in Section II.

Unfortunately, the MPCA states in the draft SIP that they did not consider visibility impacts to determine if NO_X and/or SO_2 controls would be required for reasonable progress. MPCA acknowledged that they would not complete modeling of proposed control measures to demonstrate reasonable progress would be made should the proposed control measures be installed. MPCA did not consider the trajectory analysis provided by SMBSC in its decisions. Further, the MPCA stated in a meeting with SMBSC that they ***would not consider the results of a full photochemical model demonstrating no or negligible impact*** to determine if NO_X and/or SO_2 controls would be required for reasonable progress, even though SMBSC offered to prepare such an analysis. The burden of proof then rests upon the agency to demonstrate that new controls are required to make reasonable progress. This is especially true because SMBSC conducted a more technically intensive analysis than MPCA that demonstrated no or negligible visibility impact on the Upper Midwest Class I areas. Therefore, MPCA's recommendation to install pollution new NO_X controls is unreasonable and lacks any technical basis for SMBSC to install pollution controls to make reasonable progress.

MPCA's decision to intentionally ignore visibility improvement at the Upper Midwest Class I areas to determine whether facilities should install controls is concerning. It is also logically inconsistent because MPCA is saying that visibility is not a consideration for the FFAs, but at the same time the MPCA is claiming that the pollution controls are needed to make reasonable (visibility) progress. Therefore, MPCA is in essence saying that visibility is not a factor for controls, but yet argues controls are needed to make a ***visibility*** improvement, with no technical demonstration that it is actually true. This is inconsistent and arbitrary.

The draft SIP contains many statements that further demonstrate that NO_X controls for SMBSC are unwarranted to achieve visibility objectives for the Second Implementation Period, even if SMBSC's emissions would actually reach the Class 1 areas:

- MPCA states: "Boundary Waters and Voyageurs *could reach adjusted goals before year 2064*… Between 2004 and 2009 there were measured increases in visibility impact at both Class I areas, but since 2009 the most impaired annual 5- year visibility impacts have declined per year an

average 0.6 dv at Boundary Waters and an average 0.5 dv at Voyageurs. Should this trend continue, Boundary Waters and Voyageurs potentially could reach an adjusted endpoint by the third implementation period" and "Achieving natural conditions in 2064 looks promising even without adjusting for international impacts and wildland prescribed fires. Should those adjustments be made in future implementation periods, meeting natural conditions might begin to occur much earlier than 2064. While Minnesota does not seek U.S. EPA approval to make adjustments to adjust the 2064 end goal this implementation period, readily available information described in Section 2.1 (Step 1 – Ambient data analysis) suggests an earlier end point." Notably, MPCA's 2028 modeling does not even include all future emission reductions included in the long-term strategy (refer to Table 65 of the draft SIP) suggesting that visibility conditions will improve more than predicted. Therefore, MPCA has no basis to be recommending new NO_X controls for Boiler 1 when they don't appear to be needed to reach natural visibility conditions and where there is no technical basis to claim there will be any visibility improvement as a result of installing new NO_X controls on Boiler 1.

- The net effect following points clearly show that there is essentially no discernable potential to improve Upper Midwest Class I area visibility if SMBSC were to install new NO_X controls for Boiler 1. In essence the potential impact from the facility is a small fraction of several other small fractions, which clearly shows there is a diminishing return for visibility improvement.
    - Table 12 of the draft SIP shows that Minnesota only contributes 16.2% and 17.6% (for BWCAW and Voyageurs respectively) to visibility impairment.
    - Table 13 of the draft SIP shows that industry only contributes to 1.5% to the "Rest of Minnesota" visibility impairment.
    - SMBSC's emissions are a small fraction of the total emissions from the industry category in Table 13.
    - SMBSC's Q/d (emissions as it relates to distance) is insignificant compared to other sources and only accounts for a 0.74% and 0.77% percentile from BWCAW and Voyagers respectively. Refer to Table 29 and 30 of the draft SIP for details.
    - The wind frequency from the southwest that is a necessary precondition for transport SMBSC emissions to any of the Upper Midwest Class I areas is very rare (less than 1% of the time).
- MPCA states "Given that Minnesota is a major contributor to visibility impairment at its own Class I areas". This statement is misleading because Minnesota only accounts for a small percentage (16.2% and 17.6% for BWCAW and Voyageurs respectively) to visibility impairment, whereas there are many other contributors (including Canadian sources) that have a greater impact to Minnesota Class I areas.
- MPCA provided a brief summary of the proposed SIP strategies of other states in the "LADCO Regional Haze Workgroup." MPCA's draft SIP appear to be much more stringent and aggressive

compared to other LADCO states. Other sates primarily relied on previously planned emission reductions or changes to EGUs. MPCA is focusing unnecessarily on smaller industrial sources like SMBSC.

SMBSC recognizes that visibility improvement is the product of the aggregation of many reductions from many sources. SMBSC is not averse to considering controls where there appears to be real cost-effective benefits within an appropriate regulatory framework. SMBSC's objection lies in the fact that the draft RHSIP has been manipulated to recommend expensive controls specifically for SMBSC, without any visibility benefits.

C. There is substantial evidence of arbitrary targeting of SMBSC

SMBSC summarized several factors below that appear to be clear indications of arbitrary and capricious targeting by the MPCA and FLMs for SMBSC to install new NO_X controls:

- During meetings between SMBSC and MPCA staff, the MPCA emphasized fuel switching several times, which was not discussed in the FFA because it fundamentally changes the source and it is not economically viable for SMBSC. The only additional sources that MPCA sent FFA request letters to on February 14, 2020 were coal-fired sources. The MPCA's focus on fuels rather than visibility benefits is not consistent with the regulations or guidance. Further, SMBSC was not originally included in MPCA's list to complete FFAs.

- As described under item A. above, MPCA's change from an initial Q/d of 7 for individual emission sources to an "effective" Q/d of 4.6 for full facility emissions, precisely matching SMBSC's value. Especially where FLMs typically employ a Q/d of 10 to screen out sources from inclusion of visibility analysis on Class I areas[4], SMBSC appears to have been singled out and purposely selected due to FLMs specific interests.

- MPCA's admission that they will not consider a complete photochemical model to demonstrate no or negligible impacts at Upper Midwest Class I areas is concerning. This approach is the most technically and scientific intensive means to determine potential visibility improvement, and *SMBSC has offered to prepare such analysis*. The entire purpose of the regional haze rule is to improve visibility. Yet the MPCA will not even consider scientific methods to demonstrate pollution controls are needed to improve visibility, which is unreasonable especially when current evidence suggests there will be no meaningful impact on visibility. MPCA's opposition to consider improved scientific methods and analysis to demonstrate whether their proposed controls have any meaningful impact to visibility at the Upper Midwest Class 1 areas goes against the agency's commitment[5] that "its work is built on sound science" and "use dependable data to make reasonable decisions and drive the most effective environmental restoration and protection efforts." The regional haze rule per 40 CFR § 51.308(f)(2)(iv) requires

[4]https://www.fws.gov/guidance/sites/default/files/documents/FLAG%20Air%20Quality%20Phase%201%20report.pdf
[5] https://www.pca.state.mn.us/about-mpca/science-and-data

state to consider five factors to develop the long-term strategy. This includes consideration of the anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy. However, MPCA states in the draft SIP that they "did not consider the anticipated net effect on visibility due to emission changes expected in this implementation period. " Therefore, MPCA has failed to fulfill its regulatory obligations because MPCA did not complete the necessary modeling to demonstrate the impact on visibility with the proposed changes in the SIP including the recommendation for SMBSC to install NOx controls. Lack of resources to perform more sophisticated analysis **is not a reasonable justification**, given that the emitter has offered to conduct the analysis for agency review, and given the cost-of-controls at issue.

- As noted under item B. above per MPCA's admission in the SIP, Minnesota is already well on the way to achieving natural visibility at both the BWCAW and Voyageurs before 2064 with no changes to SMBSC emissions. If that is the case, the MPCA should not need new NO_X controls on SMBSC to make reasonable progress. Further, the 2028 modeling is overly conservative because it does not account for all planned emission reductions.

- MPCA states that visibility was not considered to determine if pollution controls were needed, but argues that pollution controls are needed to make a visibility improvement for reasonable progress with no technical demonstration that it is true. This is inconsistent, unreasonable, and arbitrary.

II. SMBSC Review of MPCA and NPS Control Cost Analyses and Comments

SMBSC conducted a detailed review of MPCA and NPS control cost comments and revisions. Specific details are included below:

- Universal comments applicable to all control cost analyses:

    - Interest rates – both the MPCA and NPS adjusted interest rates based on the current prime bank rate. For example, the MPCA used 3.5%. SMBSC provided comments in July 2021[6] explaining why using a historically low prime bank rate is not appropriate because interest rates fluctuate significantly over time. The current prime bank rate is 6.25% as of 10/4/2022. Therefore, MPCA and NPS revisions to SMBSC's interest rate are not appropriate, especially since financing for any future projects would not occur in 2022 if the compliance date Is 2028.

    - Reagent costs (e.g., fuel, water, urea, ash disposal, etc.) – the MPCA and NPS updated many of the reagent costs to default values from previous years with no adjustments for inflation. SMBSC assumed 3% inflation each year from the estimate year when current

[6] SMBSC. July 23, 2021. Responses to MPCA/EPA/FLM Four Factor Analysis Comments letter.

estimates were unavailable to estimate the time value of money. MPCA and NPS are incorrect to assume that historic pricing would continue to be representative of current day costs (e.g., 2017 costs do not reflect 2020 costs). In addition, rapid inflation in 2021 and 2022 have greatly increased prices for all sectors of the economy[7], further justifying adjustments made by SMBSC. NPS' assertion that outdated default cost estimates cannot be adjusted for inflation has no basis. MPCA and NPS should seek out updated figures for present day costs or provide realistic means of correcting for the time value of money to adjust reagent pricing for future control cost evaluations. In addition, NPS compared the inflationary scaling for reagents to the Chemical Engineering Plant Cost Index (CEPCI), which is used for equipment cost scaling, not reagents. This comment is incorrect.

- SMBSC disagrees with NPS that any controls are cost-effective for this implementation period especially when considering all factors presented in Section I.

- NPS commented that the CEPCI index used by SMBSC's consultant was too high. If anything, the index used by the consultant was too low. Costs have increased greatly since 2020 due to inflation. For example, the June 2022 CEPCI index was 832.6. MPCA should revise all cost estimates to reflect this change.

- Uncontrolled emission rates – SMBSC used the 2028 EPA modeling emission inventory for the basis of uncontrolled NO_X and SO_2 emissions (approximately 907 and 786 tpy respectively). MPCA made minor adjustments to these emission rates in their updated control costs (presumably as a result of NPS comments). While relatively inconsequential, SMBSC believes that the emission rates proposed in the FFA are reasonable representations of future actual emissions for 2028.

- SMBSC did not evaluate NPS wet FGD cost effectiveness calculations because the technology would increase sulfate and potentially mercury wastewater loading. Further, this is expected to generate a new wastewater stream requiring additional wastewater treatment and consuming significant amounts of energy. SMBSC reserves the right to evaluate the cost effectiveness of wet FGD at later time if required by MPCA or EPA. However, even the NPS cost calculations ($13,000/ton SO_2 removed) exceed MPCA's screening threshold of $10,000/ton for cost-effectiveness

- SMBSC's operating hours assumption (7,536 hr/yr) was based on the average Boiler 1 operating days for 2015 – 2019 (314 days/year). MPCA's value of 6,525 hours is too low and underestimates various costs particularly regarding labor and reagent use. In addition, it can misrepresent emission reductions from control devices. SMBSC's operating hours assumption is the appropriate value to use.

[7] https://www.bls.gov/news.release/cpi.nr0.htm

- SMBSC disagrees with all of NPS' comments regarding equipment life assumptions. SMBSC assumed a 20-year life for amortizing costs for all control technologies. SMBSC provided additional detail supporting this position in the July 2021[8] comment response letter to MPCA. While equipment may last longer than 20 years and there are examples of this in practice, SMBSC will not assume a "best-case" scenario to estimate costs that the facility may have to incur, especially when equipment life is not guaranteed. Further, NPS commented that operating time assumption of 314 days per year is considered a seasonal basis and could justify a longer equipment life. This is incorrect because 314 days per year represents 86% of a full year, which SMBSC does not consider to be seasonal because unit downtime is for routine maintenance. In addition, NPS quotes the EPA Control Cost Manual (CCM) section for SO_2 controls that states "Manufacturers reportedly design scrubbers to be as durable as boilers, which are generally designed to operate for more than 60 years"[9] to justify longer equipment life. This comment is baseless and SMBSC will not estimate life based on hearsay comments in the CCM.

- NPS stated "The vendor estimate relied on by SMBSC is not included in the SIP and the NPS cannot comment upon its usefulness. The cost methodology for estimates provided by SMBSC is of unknown origin." Capital cost estimates were provided by reputable vendors. Equipment quotes cannot be shared due to vendor confidentiality requirements and competitive advantage concerns.

- NPS stated "It appears that all values associated with operating costs are general (not specific to this site) and may be inflated. The NPS recommends that, SMBSC use established methods and present documentation to support a robust analysis." Refer to SMBSC comments above regarding reagent cost adjustment to account for inflation. Further, operating cost assumptions were provided in the calculations. In addition, SMBSC used established control cost calculation procedures per the CCM where appropriate with site-specific modifications as needed or applicable.

- SMBSC believes that the cost estimates provided by the facility to MPCA accurately represent costs that the facility may incur for both NO_X and SO_2 controls. SMBSC did not review NPS control cost estimates in detail, but reserves the right provide comments if requested in the future.

- NPS cost estimates used a retrofit factor of 1. SMBSC provided additional justification for the basis of the 1.5 retrofit factor in the July 2021[10] response to MPCA.

- Specific comments regarding SNCR and SCR NO_X controls

[8] SMBSC. July 23, 2021. Responses to MPCA/EPA/FLM Four Factor Analysis Comments letter
[9] https://www.epa.gov/sites/default/files/2021-05/documents/wet_and_dry_scrubbers_section_5_chapter_1_control_cost_manual_7th_edition.pdf
[10] SMBSC. July 23, 2021. Responses to MPCA/EPA/FLM Four Factor Analysis Comments letter

- MPCA changed the coal higher heating value (HHV) to 8,999 btu/lb from the original value of 9,152 btu/lb. This value is an input for the CCM cost estimation tool. It is not clear why the change was made since the original value was based off site-specific sampling from 2015-2019.

- MPCA adjusted the estimated annual fuel use parameter for SNCR and SCR per the CCM cost estimation tool. It is not clear why the change was made since the original value was based on the average of 2015-2019 actual fuel use.

- NPS states "MPCA assumed 49% efficiency by SNCR with an estimated Normalized Stoichiometric Ratio (NSR) = 1.57. NPS application of CCM Equation 1.17 yielded NSR = 0.94. As a result, NPS analyses project a 30% NO_X reduction (from CCM Figure 1.1c) down to 0.30 lb/MMBtu with much less reagent." MPCA's calculated NSR appears to be correctly applying equation 1.17 from the CCM. However, MPCA's calculations changed the inlet NO_X to 0.59 lb/MMBtu, but still assumed that the outlet concentration of 0.3 lb/MMBtu was achievable. SMBSC agrees that a 30% NO_X reduction suggested by the NPS more accurately represents the expected NO_X reduction. Incorporating this change, all the SMBSC cost comments in this letter, updating equipment costs with the most recent CEPCI (May 2022), and updating utility costs, the control costs for SNCR have increased above $5,700/ton. Coupling this with all comments included in this letter, SNCR is clearly not cost-effective and would be overly burdensome for the facility. SMBSC reserves the right to provide an updated cost estimate upon request.

- NPS commented specifically that SMBSC should use a retrofit factor of 1 for SNCR. SMBSC disagrees with this statement. The July 2021[11] comment letter from SMBSC to MPCA described in detail the retrofit considerations and expected difficulty that would apply to any control technology installation on Boiler 1 as mentioned above. NPS stated that they considered the July 2021[12] letter in their analysis, but it appears they disregarded SMBSC's explanation without a vendor cost estimate and reverted to the CCM default. SMBSC expects this to significantly underestimate costs. Further, SMBSC believes that Google earth photos support the facility's position that a retrofit of any pollution control technology would be very challenging and costly. Refer to the July 2021[13] letter for a detailed explanation. In addition, NPS is not familiar with facility operations and constraints, whereas SMBSC staff (and MPCA) are. Therefore, the NPS comment is not justified and should be rejected.

- NPS commented "SMBSC (and MPCA) has included costs to reheat the flue gas entering the SCR in addition to applying a 1.5 retrofit factor due to the difficulty of locating the SCR above the boiler exhaust. The SIP could be improved by a demonstration of why

[11] SMBSC. July 23, 2021. Responses to MPCA/EPA/FLM Four Factor Analysis Comments letter
[12] Id.
[13] Id.

both of these costs (retrofit factor =1.5 and reheat costs) are necessary." SMBSC already provided an explanation for the use of a reheat design for SCR in the July 2021[14] response to MPCA and provided justification for the retrofit factor as well. NPS even stated in their consultation comments (Appendix G of the draft SIP) that a 1.5 retrofit factor for SCR may be justified in their comments.

- NPS commented "Due to the high cost of natural gas, NPS analyses included a 70%-efficient heat exchanger in the reheat system and applied CCM methods to estimate operating parameters and costs. In estimating the capital and operating costs of SCR, the NPS included the duct burner heat input to size the SCR to handle the additional load." SMBSC's costs include the same heat exchanger design with a 70% heat recovery. NPS estimated a reheat heat input of 231 MMBtu/hr. SMBSC's calculated 26 MMBtu/hr for supplemental natural gas combustion. The NPS value is incorrect. SMBSC did not originally include the reheat firing in the SCR design. With this update combined with all other SMBSC comments in this letter, SCR control costs are above $11,000/ton.

- NPS commented "SMBSC selected "Method 2" to estimate catalyst replacement cost; this tends to produce higher cost estimates than "Method 1." 20,000 hours is an acceptable mid-range value for catalyst life for a high-dust configuration. However, SCR located following the ESP should have a longer catalyst life—NPS estimates 24,000 hours." SMBSC elected to use Method 2 for catalyst replacement costs. There is no requirement to use Method 1 for catalyst replacement. SMBSC is not going to assume "best-case" assumptions to estimate costs that the facility may reasonably incur with an SCR installation. Further, the catalyst operating assumption applies only to Method 1. Therefore, NPS' catalyst life comment is irrelevant.

- NPS commented "According to the CCM, "For other sources, the equipment life can be between 20 and 30 years." The CCM workbook assumes use of the 25-year mid-range value, which the NPS accepts as appropriate for a seasonal facility that only operates 314 days per year." SMBSC responded to this in previous comments and believes that a 20-year equipment life is appropriate.

- SO_2 control costs

  - Spray dry absorber (SDA) capital costs listed in the MPCA cost revisions improperly footnote the source of the estimate. Capital costs were based on a vendor estimate, not a former BART report from a separate facility.

[14] Id.

- NPS states that the dry sorbent injection (DSI) control efficiency with a baghouse should be 80-90%. SMBSC believes the estimated DSI control efficiency of 70% is a reasonable estimate and is even on the high end of the CCM DSI SO_2 control efficiencies (50-70%).[15]

- The 90% control efficiency applied for SDAs represents the mid-range of typical removal efficiencies and is a reasonable representation of what may be expected in practice.

- NPS states "MPCA and SMBSC could improve this analysis by explaining the rationale for requiring replacement of the existing electrostatic precipitator (ESP) with a new baghouse. This may be an unnecessary expense because the IPM DSI models include both ESPs and baghouses. Further, EPA's Clean Air Markets data for 2021 includes several coal-fired Electric Generating Units (EGUs) with DSI and ESPs" and that DSI can be added without a new baghouse with no existing emissions increase. The SDA/DSI designs were for a polishing baghouse. SMBSC was not planning to remove the existing ESP. In addition, SMBSC will not jeopardize compliance with existing limits to accommodate a new pollution control device with increased dust loading to the existing ESP without additional control. In addition, it is unlikely that there would be no particulate emissions increase with higher inlet ESP dust loading. As an example, if an ESP can capture 99% of the inlet particulate load, then a higher inlet load will also lead to a higher outlet loading. Further, it is unknow if the ESP can handle the increased dust loading without physical modification. SMBSC provided costs for a system that would be sized appropriately for this application that can guarantee no emissions increase, does not risk compliance or existing operations of the ESP, and provides consistent SO_2 control. These costs clearly show that SO2 controls are not cost effective.

- NPS provided ESP demolition costs and energy savings. However, the SDA/DSI designs were for a polishing baghouse installed downstream of the existing ESP. Therefore, the demolition and energy saving costs do not apply. SMBSC did not evaluate the validity of NPS cost savings estimates from demolition of the ESP, but reserves the right to evaluate and provide comments if requested at a later date.

- NPS states "NPS review finds that SMBSC and MPCA appear to have used an obsolete method to estimate costs of adding a Spray Dry Absorber (SDA). The current CCM SDA/CDS model includes a new baghouse in its cost estimates." SMBSC based costs off vendor quotes, which provide the purchased equipment cost. To estimate the total capital investment (TCI), SMBSC applied installation cost factors from the 6th edition of the CCM as a reasonable means to estimate these costs. The 7th edition cost procedures do not provide a means to estimate the TCI when only a purchased equipment cost is available. Therefore, the approach applied by SMBSC is a sufficient way of estimating these costs. NPS' comment is not valid unless they have documentation from EPA stating that the 6th

[15] https://www.epa.gov/sites/default/files/2021-05/documents/wet_and_dry_scrubbers_section_5_chapter_1_control_cost_manual_7th_edition.pdf

edition procedures are incorrect. SMBSC holds that site-specific vendor estimates are more accurate and better representations of expected costs than EPA's CCM cost tool.

- NPS states "NPS analyses assumed that a new baghouse could be installed inside of the shell of the existing ESP or within its footprint and would not incur an extra retrofit penalty." The proposed SDA and DSI designs called for polishing baghouses, not a replacement of the existing ESP. Further, NPS has no basis to demonstrate that a replacement baghouse could be installed inside of the shell of the existing ESP or within its footprint. NPS cannot assume that this is a valid equipment design and that no extra retrofit penalty would occur. SMBSC disagrees with this statement and reserves the right to evaluate this further if requested.