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**BEFORE THE BOARD OF ENVIRONMENTAL REVIEW
OF THE STATE OF MONTANA**

IN THE MATTER OF: SOUTHERN MONTANA ELECTRIC GENERATION AND TRANSMISSION COOPERATIVE-HIGHWOOD GENERATING STATION AIR QUALITY PERMIT NO. 3423-00	**CASE NO. BER 2007-07 AQ**

MEIC'S RESPONSE TO REQUEST FOR BRIEFING

Appellants Montana Environmental Information Center and Citizens for Clean Energy (collectively "MEIC") hereby submit their responses to questions posed by the Board. All questions are reprinted in their original form.[1] The questions and corresponding responses are as follows:

A BACT analysis is required for all proposed emitting units for "each pollutant" subject to regulation.

a. Is PM2.5 a "pollutant subject to regulation"?

Yes. PM2.5 is a "pollutant subject to regulation" under the Federal Clean Air Act. Therefore "best available control technology" ("BACT") requirements under state and federal law apply to PM2.5. 42 U.S.C. § 7475(4) (setting forth BACT requirements under federal Clean Air Act); Mont. Admin. R. 17.7.740(2)

[1] Note that the first question presented is unnumbered. MEIC has retained the numbering as set forth in the Board's Request For Briefing.

(setting forth BACT definition under Clean Air Act of Montana) (emphasis added), id. 17.8.801(6) (BACT definition under Montana's Prevention of Significant Deterioration ("PSD") program); see also id. 17.8.819, 17.8.852(1).

In 1997, the U.S. Environmental Protection Agency ("EPA") set primary health-based National Ambient Air Quality Standards ("NAAQS") for PM2.5 pursuant to Clean Air Act §§ 7408 and 7409. See Final Rule, 62 Fed. Reg. 38,652 (July, 18 1997). In 2006, EPA revised the 24-hour NAAQS for PM2.5, making them nearly twice as stringent, in order to address well-documented health problems caused by PM2.5 pollution. See 71 Fed. Reg. 61,144 (Oct. 17, 2006).

As a designated NAAQS pollutant, PM2.5 is, without question, "subject to regulation" for purposes of triggering BACT requirements under the Clean Air Act and corresponding provisions of Montana law. As EPA has acknowledged, "[t]he obligation to implement PSD was triggered upon the effective date of the NAAQS" for PM2.5." Exh. L, Rule to Implement the Fine Particle National Ambient Air Quality Standards, Notice of Proposed Rulemaking, 70 Fed. Reg. 65,984, 66,043 (Nov. 1, 2005)[2]; see also 40 C.F.R. § 52.21(b)(50)(i) (EPA regulations defining "regulated NSR [New Source Review] pollutant" to include "[a]ny pollutant for which a national ambient air quality standard has been promulgated and any constituents or precursors for such pollutants identified by the Administrator").

b. Does "each pollutant subject to regulation" refer to components of PM2.5 condensables?

Yes. All components of PM2.5, such as condensable organic compounds and acid gases, are "subject to regulation" as a single NAAQS pollutant. EPA has not carved out any fraction or component of PM2.5 that is not subject to Clean Air Act standards and limits. See Alabama Power Co. v. Costle, 636 F.2d 323, 370 n.134 (D.C. Cir. 1979) (While "EPA has discretion to define the pollutant termed "particulate matter" to exclude particulates of a size or composition determined not

[2] "Exh." As used herein refers to numbered and lettered exhibits that were admitted

to present substantial public health or welfare concerns," once EPA defines a class of particulate matter as a NAAQS pollutant, BACT is required for that pollutant in its entirety).

The NAAQS for PM2.5 are premised on EPA's determination that fine particles 2.5 microns and smaller, as a class, pose a threat to human heath and welfare due to their size. See Exh. 6, Clean Air Fine Particle Implementation Rule, 72 Fed. Reg. 20,586(Apr. 25, 2007) (explaining that "[f]ine particles in the atmosphere are comprised of a complex mixture of components" and that "[a]irborne particles generally less than or equal to 2.5 micrometers in diameter are considered to be "fine particles" (also referred to as PM2.5)"). Thus, from a regulatory perspective, it is particle size as opposed to any specific "component" or constituent that defines PM2.5 as a pollutant. See Exh. L, 70 Fed. Reg. at 65,992 (Nov. 1, 2005) (explaining that "PM2.5 in the atmosphere is composed of a complex mixture of constituents: Sulfate; nitrate; ammonium; particle bound water; black carbon (also known as elemental carbon); a great variety of organic compounds; and miscellaneous inorganic material (sometimes called ''crustal material,'' which includes geogenic dust and metals)."); see also 72 Fed. Reg. at 20,586 (same).

Moreover, PM2.5 includes both filterable and condensable components of fine particulate matter. See Exh. L, 70 Fed. Reg. at 65,992 (explaining that condensables, "[p]articles formed near their source by condensation processes in the atmosphere are also considered to be primary particles" along with "[f]ine particles emitted directly into the air in a stable or liquid form"); see also Exh. 6, 72 Fed. Reg. at 20,586 (recognizing both solid and condensable particles as "primary" PM2.5 particles); Joint Pre-Hearing Memorandum at 3 (Agreed Fact No. 18: "PM-2.5 consists of both filterable and condensable particulate"). In short, all fine particulate, regardless of composition, is "subject to regulation" as PM2.5.

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into evidence at the January 2008 hearing in this appeal.

To the extent the Board is questioning whether BACT requirements apply to each condensable component of PM2.5 individually, the answer in this case is also yes. In order to ensure that emission limits reflect BACT for PM2.5 as a whole, agencies must assess how best to control emissions of every PM2.5 component, including each condensable component. This is also true for PM10.

In the permitting process for the Highwood Generating Station, Southern Montana Electric Generation and Transmission Co-Operative ("SME") and the Department of Environmental Quality ("DEQ"), adopted a component-by-component approach to establishing BACT emission limits for condensable particulate in the PM10 context. Thus, they conducted separate BACT analyses for individual components of the condensable particulate fraction — i.e. volatile organic compounds, sulfuric acid mist, hydrofluouric acid mist, hydrochloric acid mist, "trace metals," and a catch-all category of "condensable PM10." See Exh. 7, Permit Analysis at 38-43. DEQ then set individual emission limits for each of these condensable components. See id. In turn, the sum of these individual limits were added to the filterable particulate emission limit to create an overall PM10 emissions limit. See id. at 42.

This approach can yield a valid emissions limit for PM10 or PM2.5 only if each of the component limits truly reflects BACT. In other words, the sum of the BACT limits is only as good as its parts. Thus, in the Highwood permitting context, BACT requirements for "each pollutant subject to regulation" were applicable to individual condensable components.

1. Did the Department intend to conduct a top down BACT analysis for PM2.5 emissions in issuing the Highwood Generation Station air quality permit ("Highwood Permit")?

No. DEQ did not intend to conduct any BACT analysis for PM2.5. There is no BACT analysis addressing PM2.5 in the Permit Analysis, and there is no PM2.5 emission limit in the Highwood Permit itself. See Exh. 7; see also Joint Pre-Hearing Memorandum at 3 (Agreed Fact No. 10: "The HGS Permit contains no PM-2.5 specific limits."); Trans. Vol. III at 335:8-23 (Mr. Merchant conceding that "I did not directly require a PM2.5 analysis without using a surrogate.").

DEQ and SME did, however, intend to conduct a top-down BACT analysis for PM10 emissions. For purposes of this litigation, SME and DEQ have argued that the BACT analysis undertaken for PM10 was a surrogate for PM2.5 BACT analysis that concededly was never done. With respect to PM10, DEQ has acknowledged that the top-down method was used. As Mr. Merchant testified with respect to the "top down procedure," SME "did use it." Trans., Vol. III at 277:7-11.

2. Is a top-down BACT analysis for PM2.5 emissions required for issuance of the Highwood Permit?

Yes. While there is no binding requirement to conduct top-down BACT analyses in Montana, SME and DEQ were legally obligated to conduct a proper top-down analysis once they elected to use the top-down method in the Highwood permitting process. See Alaska Dept. of Envtl. Conservation v. EPA, 298 F.3d 814, 822 (9th Cir. 2002), aff'd 540 U.S.461 (2004) ("Although the top-down approach is not mandated by the Act, if a state purports to follow this method, it should do so in a reasoned and justified manner"); see also In the Matter of the Air Quality Permit for the Roundup Power Project (Permit No. 3182-00), Case No. 2003-04 AQ, Findings of Fact, Conclusions of Law, and Order at 14, 18 (recognizing that "the Department tries to follow the NSR Manual's top-down approach for analyzing BACT" and further finding that Department should follow each step of the top-down method when it "use[s] the NSR manual"); Exh. E, Letter from Eric Merchant to Mark T. Story, 1 (May 15, 2007) (stating that " the Department generally applies the "Top-Down" process described in Chapter B of the United States Environmental Protection Agency's October 1999 Draft New Source Review Workshop Manual (NSR Manual)). Having determined to conduct a top-down BACT analysis, SME and DEQ were required to do so consistently for each pollutant, including PM2.5.

3. Is the Department subject to the requirements of the NSR Workshop Manual ("NSR Manual") (SME and Department Exhibit 1) in the BACT analyses of PM 2.5 emissions for the Highwood permit?

Yes. As discussed above, DEQ was obligated to follow the top-down BACT method set forth in the NSR Manual. Further, to the extent that agencies depart from the Manual, their permitting decisions may be vulnerable to challenge. The Environmental Appeals Board, which has authority to review PSD permitting decisions, refers to the NSR Manual to determine whether a BACT analysis is adequate. See In re: General Motors, 10 E.A.D. 360, 366 (EAB 2002) ("[I]n evaluating the rationality and defensibility of BACT determinations by permitting authorities, the Board has required an analysis that reflects a level of detail in the BACT analysis comparable to the methodology in the NSR Manual."); In re Knauf Fiber Glass, GmbH, 8 E.A.D. 121, 129-30 n.14 (EAB 1999) ("We would not reject a BACT determination simply because the permitting authority deviated from the Draft NSR Manual, but we would scrutinize such a determination carefully to ensure that all regulatory criteria were considered and applied appropriately."); see also Alaska Dept. of Envtl. Conservation v. EPA, 298 F.3d at 822-23 (upholding EPA's veto of state BACT determination on grounds that state's economic justification for rejecting top control technology was "not an accepted justification in the top-down approach"). Thus, a permitting authority may choose not to strictly follow the NSR Manual, but it must comply with all regulatory criteria that the NSR Manual is designed to address. See also Responses to Questions 2, 4, and 5.

4. Under the NSR manual is the top control technology the one that could achieve the "lowest achievable emission rate," or LAER?

Not necessarily. It is possible that a new technology may be identified during the BACT process that enables a facility to comply with emission limits that are even lower than existing LAER (lowest achievable emissions rate) limits. As defined by the NSR Manual, the "top" control technology is the "most stringent" in terms of "control effectiveness." Exh. 1, NSR Manual at B.2. In contrast, LAER is defined by the Clean Air Act to be the most stringent emission limitation contained in any State Implementation Plan or the most stringent emission limitation achieved in practice for a class or category of service, whichever is more stringent. See 42 U.S.C. § 7501(3). Thus, LAER technologies "usually represent the top alternative" in step one of a top-down BACT analysis. Exh. 1, NSR Manual at B.5 (emphasis added). However, a case-by-case analysis is required to determine whether LAER technologies are the most stringent control technologies or techniques for a specific application.

5. In choosing the top control technologies and in conducting a top-down BACT analysis, how should the information in the BACT/RACT/LAER Clearinghouse be used?

The RACT/BACT/LAER Clearinghouse is an important tool for identifying emission limits set around the country. Once low limits for a given pollutant at a comparable facility have been identified, it is possible to follow up with the relevant permitting agencies and learn more about the control technologies that are associated with those limits. In this way, the Clearinghouse can serve as a starting point for a BACT analysis. It is not, however, an end point, as it does not have complete, up-to-date information regarding permitted emission limits in the United States, or any information regarding emissions control achieved internationally. See Exh. 1, NSR Manual at B.5 (requiring identification of all control technologies including "control options … with a practical potential for application to the emission unit and the regulated pollutant under evaluation" and "technologies employed outside of the United States").

In order to compile a comprehensive list of all available control technologies, as required at step one of the top-down BACT process, applicants and agencies must look outside the Clearinghouse (1) to identify lower emission limits that may not be recorded there, and (2) to identify emerging or transferable technologies that have not been used before. See id.; see also Trans. Vol. III at 163:12-16 (Mr. McCutchen testifying that at Step One of a top-down BACT analysis, "[y]ou start with … the RACT/BACT/LAER Clearinghouse, and you proceed from there with all of the other technologies that you're aware of, and you just start listing them.").

6. With regard to condensable emissions for PM/PM10, was the Department obligated under the NSR manual to consider all available control technologies that would obtain the highest rates of pollutant removal using technologies that could achieve LAER as a starting point?

Not necessarily. The NSR manual provides that the "PSD applicant first examines the most stringent – or "top" -- alternative. Exh. 1, NSR Manual at B.2. While LAER technologies will "usually represent the top alternative," there may be new technologies or new applications of conventional technology that would yield higher control efficiencies than technologies required for existing LAER-determined limits. Id. at B.5. Thus, technologies that could achieve LAER will not always be the "starting point" for a BACT analysis.

LAER technologies, however, must always figure into Step One of the BACT analysis. Under the NSR Manual, DEQ was required to identify all available technologies, including "technologies required under lowest achievable emissions rate (LAER) determinations." Id. at B.5; see also Trans. Vol. I at 62:1-5 (Mr. Merchant's testimony that "[t]hose technologies that are associated with the LAER determination that would have been made for a project in a nonattainment area for that pollutant, those are certainly technologies that are evaluated" in a

BACT analysis.); Trans. Vol. III at 163:7-11 (Mr. McCutchen's testimony that, "[i]n Step 1, where you're pulling in all of the different possible control technologies, you look at everything out there that's available, including technologies that have been used to meet LAER limits.").

7. Please answer the same question as Number 7 but in reference to obtaining the highest rates of pollutant removal using the most stringent or top control alternative.

As set forth above, the most stringent or top control alternative is the starting point for the BACT examination of control alternatives. See Exh. 1 at B.2. ("[t]he PSD applicant first examines the most stringent – or 'top' alternative"). The Ninth Circuit has explained as follows:

> "[u]nder this [top-down] method, as detailed in the EPA's New Source Review Workshop Manual (1990), the applicant ranks all available control technologies in descending order of control effectiveness. The most stringent technology is BACT unless the applicant can show that it is not technically feasible, or if energy, environmental, or economic impacts justify a conclusion that it is not achievable. Citizens for Clean Air v. United States EPA, 959 F.2d 839, 845-46 (9th Cir.1992). If the top choice is eliminated, then the next most stringent alternative is considered, and so on. The most effective control option not eliminated is BACT. Id.

Alaska Dept. of Envtl. Conservation v. EPA, 298 F.3d at 822.

8. Are the control technologies identified in the BACT analysis in the Deseret permit the top control technologies for PM10 emissions?

The Deseret permit identifies some, but not all of the top control technologies for PM10.

a. Please answer this question in reference to PM10 particulate emissions, and

The Deseret permit does not specifically identify the top control devices for filterable PM10. The permit analysis correctly identifies Fabric Filtration and Electrostatic Precipitation ("ESP") as top control technologies generally. See Exh.

11, Deseret Power Electric Cooperative Bonanza Power Plant, Waste Coal Fired Unit, Final Statement of Basis (Aug. 30, 2007) at 60. However, the control efficiencies of different fabric filter bags and ESPs vary. See id. at 61 (EPA referencing "new ESP designs" with higher control efficiencies); see also Trans. Vol. I at 73:6-75:8 (Mr. Taylor's testimony regarding "different types of bags"); see also 87:1-7 (Mr. Taylor's testimony regarding identification of control technologies including a "membrane bag bag filter" and "bags of other materials for the fabric filter"). The Deseret permit analysis never attempts to identify top controls among these different ESP designs and bag-types. Thus, the permit analysis makes no mention of the "membrane bag," which is "the most efficient bag available" and therefore a top control device. Trans. Vol. I at 75:6-8 (unrebutted expert testimony by Mr. Taylor).

b. In reference to PM10 condensable emissions.

The Deseret permit analysis for PM/PM10 condensable emissions similarly fails to identify specific control devices such as membrane bags and advanced ESP designs. See Exh. 11 at 69-71. However, the analysis does identify the relevant categories of control technologies, and more importantly, combinations of control technologies that could most effectively reduce emissions of condensable particulate. See id. In this regard, the permit correctly identified the most stringent control option available: "alkali injection + dry SO2 scrubbing + fabric filter baghouse" with the addition of a "wet ESP downstream." Id. at 71-72.

9. For each of the specific individual steps in a BACT analysis for the Highwood Permit:

a. Show in the factual record where all available control technologies were, or were not, properly identified for PM2.5 emissions (particulate and condensable).

As set forth in MEIC's response to Question 1 above, there is no BACT analysis addressing PM2.5 in the Highwood Permit Analysis, and there is no PM2.5 emission limit in the Highwood Permit itself. See Hearing Exh. 7; see also

Joint Pre-Hearing Memorandum at 3 (Agreed Fact No. 10: "The HGS Permit contains no PM-2.5 specific limits."); Trans., Vol. III at 335:8-23 (Mr. Merchant conceding that DEQ did not require any PM2.5-specific BACT analysis). Given that SME and DEQ did not conduct a BACT analysis for PM2.5, the record does not contain any Step One analysis identifying all available control technologies for PM2.5.

b. Where in the record does it show that as a first step the most stringent or top controls were identified for PM/PM10?

The record shows that the most stringent controls were not identified for PM/PM10 during the Highwood permitting process. The permit analysis identifying and evaluating control technologies for PM/PM10 is set forth in the Permit Analysis (Exh. 7) at pages 24-29 (BACT analysis for filterable PM) and 37-43 (BACT analyses for condensable particulate components and resulting limit for PM10). Nowhere in this analysis is there any mention of membrane bags, which are the "the most efficient bag[s] available." Trans. Vol. I at 75:6-8 (unrebutted expert testimony by Mr. Taylor); see also id. Vol. III at 274:24-275:3 (Mr. Merchant confirming that "the Department never considered membrane bags, and the additional efficiency that they might add if they were used, in this permitting process"). This analysis contains no acknowledgement that new ESP designs may achieve control efficiencies equal to new fabric filter installations. Compare Exh. 7 at 25-27 with Exh. 11 at 61 (EPA reporting that "[p]articulate collection industry experts currently consider new ESP designs capable of levels of particulate control equivalent to fabric filters"). Moreover, this analysis never identified the top control technology combination for condensable particulate, that is, dry scrubbing in combination with a fabric filter baghouse followed by a wet ESP. See Exh. 7, Permit Analysis at 39-40; Trans. Vol. III at 272:11-12 (Mr. Merchant conceding that a "wet ESP following the fabric filter" was "never considered"); see also Trans. Vol I. at 88 (Mr. Taylor's testimony that "the number one combination would be a membrane bag filter followed by the wet ESP); Exh.

11 at 71-72 (the Desert Permit's consideration of "alkali injection + dry SO2 scrubbing + fabric filter baghouse" with the addition of a "wet ESP downstream").

Finally, it is important to note with respect to filterable particulate that SME and DEQ identified control technologies and ranked their respective control efficiencies for total filterable PM as opposed to filterable PM10. See Exh. 7, Permit Analysis at 24 (stating that "[t]his BACT analysis focuses on control technologies for filterable PM. PM10 (filerable and condensable) is addressed later in the BACT analysis for the proposed project"); see also id. at 27 (specifying that the summary table regarding control technologies "ranks the filterable PM control efficiency") (emphasis added). Thus, the control efficiency rankings for filterable control technologies reflect the relative ease of capturing a very high percentage of total particulate as opposed to a very high percentage of finer particles (10 microns and less in size) that are harder to capture.

c. Where in the record does it show that the top control technology that could achieve LAER was identified for filterable PM/PM10?

The record does not show that the top control technology that could achieve LAER was identified for filterable PM/PM10. There is no discussion of LAER emission limits for filterable PM/PM10, much less the technology associated with those limits, either in the Permit Analysis or elsewhere in the record. While SME's permit application identified permitted emission rates from around the country, it is unclear whether any of those limits were LAER-determined emission limits for facilities in PM10 non-attainment areas. See Exh. 4, Permit Application at 5-27.

Further, DEQ expressly declined to consider whether LAER limits could be achieved when it established the Highwood Permit's BACT emission limits for PM10. U.S. Forest Service and National Park Service officials, in their capacity as Federal Land Managers charged with protecting air quality in Class I areas, see 42 U.S.C. § 7475(d)(2), provided formal comments on the Highwood Permit. See Exh B, Email from Mark T. Story to Eric Merchant (May 1, 2006) (sent with attached memorandum prepared by Howard Gephart ("Gephart Memo")); Exh. C, Email from Liana Reilly to Eric Merchant (May 1, 2006) (sent with attached comments from the National Park Service Air Resources Divsision ("NPS Comments")). Foremost among their concerns was the fact that other similar facilities "ha[d] been permitted at even lower filterable PM-10 emission rates." Exh. B (Gebhart Memo at 2); see also Exh. C (NPS Comments at 2-3, 4). DEQ's response to those concerns was that "[s]ince SME-HGS proposed operations in an area classified as attainment or unclassified for all pollutants, BACT applies" and that any limits associated with LAER were therefore irrelevant. Exh. E. at 2. As the NSR Manual makes clear, however, the technologies required for LAER limits are presumptively the top control technologies that should be considered in setting BACT limits. See Exh. 1, NSR Manual at B.5.

d. Where in the record does it show that the top control technology that could achieve LAER was identified first by the Department for PM10 condensables.

The record does not show that the top control technology that could achieve LAER was identified for PM10 condensables. There is no discussion in the record either of LAER emission limits for condensable PM10 or the technology associated with such limits. Again, SME compiled a list of permitted emission rates for condensable components, but there is no indication whether any of these permitted limits are LAER limits for facilities in PM10 non-attainment areas. See Exh. 4, Permit Application at 5-44, 5-48, 5-49, 5-51. Further, SME and DEQ did not attempt to find out what technologies were being used to achieve the lower permit limits that had been identified. See Trans. Vol. I at 161:13-19 (Mr. Lierow testifying on behalf of SME that he "did not look into all the [permit limits] here listed and try to dig in and find out why they were lower than the proposed facility"); id. at 164:19-165:2 (same); 166:21-167:2 (same); see also Exh. E. (declining to investigate how other comparable facilities were complying with lower permitted limits notwithstanding concerns expressed by the U.S. Forest Service and the National Park Service).

e. Show whether or not there is credible evidence in the factual record of other top control options for the Highwood Generating Station plant such as membrane bags, wet electrostatic precipitators (ESP) or membrane bags in combination or in sequence with a wet ESP which had the potential of achieving greater control efficiencies than the ones DEQ considered for PM/PM10 emissions.

There is credible evidence in the record that SME and DEQ failed to consider at least three top control options that have the potential to achieve higher control efficiencies for PM/PM10 emissions from the Highwood coal plant: (1) a baghouse using membrane bags; (2) a baghouse followed by a wet ESP; and (3) most efficient of all, a baghouse using membrane bags followed by a wet ESP.

Credible evidence of the superior control efficiency of membrane bags was presented in testimony by Mr. Hal Taylor, who was qualified at the hearing as the only "expert witness on the control technologies available for fine particulate matter." Trans. Vol. 1 at 49:23-25, 57:18-22, 59:19-60:9. Mr. Taylor testified that he has substantial experience with the installation and subsequent performance of membrane bags in reducing fine particulate emissions from industrial boilers. See id. at 9-12 (Mr. Taylor's testimony that he has "installed membrane bags or called for their installation…on a number of occasions"); id. at 45:24-47:22 (testimony regarding project where Mr. Taylor was tasked with improving control efficiency of a fabric filter baghouse for a petroleum coke fired boiler, and "the solution was to change the bag type … to what's classically termed a membrane bag); id. at 76:5-11 (further testimony regarding same project: "once we put in the membrane bags, they not only got rid of their particulate emissions problems, both visible and measured, but their longevity of the bag. The bag life, the last time I checked, it's been a little over five years now, and they have not had any massive bag replacements in that baghouse"); see also id. at 89:8-12 (testimony that there is "quite a bit of literature" on "membrane bag filtration").

Based on his professional experience, Mr. Taylor testified that membrane bags could achieve greater reductions in filterable particulate emissions than the teflon bags considered by SME and DEQ. See id. 128:12-15 (testimony that membrane bags "would be more efficient still than Teflon coated bags"); 75:6-8 (testimony that the membrane bag is "the most efficient bag available"); see also id. at 76:12-77:3 (testimony that Mr. Taylor recommends the use of membrane bags to his clients "right away" because "it is such an excellent device for fine particulate, and it lasts a long time" and is "low maintenance").

There is no credible evidence in the record to rebut Mr. Taylor's testimony that membrane bags are the top fabric filtration control device available today . On behalf of DEQ, Mr. Merchant testified that he did not "have any reason to disagree" with Mr. Taylor's expertise on membrane bags. Trans. Vol. III at 336:6-337:7. On behalf of SME, Mr. McCutchen readily acknowledged in response to questioning regarding Mr. Taylor's experience with membrane bags, "[i]f he has any experience directly dealing with membrane bags, he has more experience than I do." Id. at 448:5-10; see also id. at 447:25-448:4 (Mr. McCutchen conceding that he had "never looked at [membrane bags] at [sic] a BACT analysis" and "never overseen the installation of membrane bags"); id. at 447:7-24 (Mr. McCutchen testifying that he was "aware to just a kind of general extent about membrane bags and their possibilities").

f. Show whether or not there is credible evidence in the factual record of other control technologies such as membrane bags or wet ESP used separately or in sequence which had potential to achieve greater control efficiency of PM10 condensable emissions than the 80% to 90% efficiency listed for the technologies considered by SME and DEQ.

At the outset, it is necessary to clarify what is meant by the 80% to 90% control efficiencies assumed by SME and DEQ in its BACT analysis for condensable particulate emissions. These were rough estimates of the co-benefit controls that could be achieved with technologies that otherwise would be used to control SO2 and filterable particulate. Specifically, SME and DEQ considered three "top" control combinations: (1) wet SO2 scrubbing plus wet ESP; (2) dry SO2 scrubbing plus fabric filter baghouse; and (3) dry SO2 scrubbing plus ESP.

See Exh. 4 at 5-46-47; see also Exh. 7, Permit Analysis at 39-40. The "ESP" contemplated in the third-listed control option was apparently a dry ESP, as SME and DEQ expressly referred to the use of a "wet ESP" in the first-listed control option. See Exh. 7, Permit Analysis at 39 (identifying the following control options: "i. Wet FGD," "ii. Wet FGD followed by wet ESP," and "iii. Dry FGD followed by FFB or ESP"); see also Exh. 4, Permit Application at 5-46. Ultimately, SME and DEQ concluded that option 1 (wet SO2 scrubbing followed by a wet ESP) and options 2 and 3 (dry scrubbing followed either by a fabric filter baghouse or an ESP) would all result in 90% control efficiency for sulfuric acid mist (H2SO4) and Condensable PM10. See Exh. 7, Permit Analysis at 40. For acid gas control, SME and DEQ assumed that the dry scrubbing options (2 and 3) would result in 80% control efficiency as opposed to 90% efficiency if a wet ESP (Option 1) were used. See id. Conversely, for Trace Metals, they assumed 90% control efficiency with a fabric filter baghouse or ESP (Options 2 and 3) as opposed to 80% control efficiency with a wet ESP (Option 1). See id.

Had SME and DEQ considered the use of more efficient controls for Options 2 and 3, i.e. membrane bags or a wet ESP in combination with dry scrubbing, the control efficiencies for these options would necessarily have increased. As set forth in MEIC's response to Question 9(e) above, there is credible evidence in the record that membrane bags are the most efficient fabric filtration device available. Similarly, it is undisputed that wet ESPs are more efficient at collecting the finest particles than dry ESPs. See Trans. at 67:3-68:25 (Mr. Taylor's testimony explaining the difference between a dry ESP and a wet ESP, which is "a much more efficient device" for condensables). In short, more efficient controls for condensable particulate would necessarily achieve higher control efficiencies than the 80% to 90% efficiencies estimated by SME and DEQ.

Further, SME and DEQ entirely omitted to consider the very top control combination of dry scrubbing plus a fabric filter baghouse (ideally stocked with membrane bags) plus a downstream wet ESP. See Trans. Vol I. at 88 (Mr.

Taylor's testimony that "the number one combination would be a membrane bag filter followed by the wet ESP"). As discussed above in response to Question 9(b), EPA identified this combination as "the only option that might achieve greater control effectiveness" than the option selected in the Highwood permitting process, i.e. dry scrubbing followed by a fabric filter baghouse. EPA's "conservative" estimate was that a downstream wet ESP could capture 86% of the condensable particulate that had escaped control by the upstream scrubbing and baghouse devices. Exh. 11 at 72-73 (estimating 86% control efficiency of "pre-wet ESP Control emissions"). Thus, by EPA's estimates, the add-on of a wet ESP would capture an additional 86% of the remaining 10% to 20% of emissions that would otherwise go uncontrolled under the scenarios considered by SME and DEQ. Just as a start, addition of a wet ESP would significantly boost the 80% control efficiency that SME and DEQ estimated for acid gases with the dry FGD and fabric filter baghouse option. See Trans. Vol. I at 68:6-8 (Mr. Taylor explaining that wet ESPs were "developed primarily to handle … acid mists"). Thus, the record leaves no doubt that the use of more efficient controls and/or the addition of a wet ESP would boost the 80% to 90% percent control efficiencies estimated by SME and DEQ.

g. Show whether or not there is credible evidence in the factual record that all top control technologies were analyzed to determine whether they were, or were not, technically feasible for this plant.

As set forth above, the factual record is clear that membrane bag technology, either alone or in combination with a wet ESP, was never analyzed by SME or DEQ to assess whether its installation would be technically feasible at the Highwood coal plant. See Response to Question 9(b) above. Further, the factual record is clear that SME or DEQ never considered any sequencing of technologies that would place a wet ESP downstream of a fabric filter baghouse. See id. In short, the record shows that the feasibility of top control technologies was never analyzed in the Highwood coal plant permitting process.

h. In particular show where there is credible evidence in the factual record showing that each top technology option was systematically analyzed to determine whether they were technically feasible or infeasible, and why.

As set forth above, SME and DEQ never identified the top control technologies, much less analyzed their feasibility.

i. Show where in the record the remaining technologically feasible control options were ranked according to Step 3 of the NSR Manual?

As set forth above, the top controls were never ranked according to Step 3 of the NSR Manual. The control options that were identified and deemed feasible by SME and DEQ were ranked based on extremely cursory analysis at page 5-23 (filterable particulate) and page 5-47 (condensable particulate) of SME's Permit Application (Exh. 4) and at page 27 (filterable particulate) and 40-41 (condensable particulate) of the final Permit Analysis (Exh. 7).

j. Show where in the record the remaining most effective control technologies starting with the top option were subjected to a case by case consideration of the factors in Step 4 of the NSR Manual including energy, environmental and economic impacts?

The Permit Application and ultimate Permit Analysis very briefly address energy, environmental and economic impacts for identified filterable particulate controls in a generalized fashion. See Exh. 4, Permit Application at 5-24-25; Exh. 7, Permit Analysis at 27-28. For condensable particulate, SME provided no analysis of energy, environmental, and economic impacts in its Permit Application. See Exh. 4 at 5-46-51. In the final Permit Analysis, DEQ stated that: "The environmental, economic, and energy impacts associated with the available H2SO4, acid gas, trace metals, and condensable PM10 options are the same as the impacts for those control options addressed in the BACT analyses for SO2 and filterable PM emissions" Exh. 7, Permit Analysis at 41.

k. Show where in the factual record all available control technologies starting with the top control technology were analyzed to determine whether they were, or were not, economically feasible for this plant. In particular show

where each control technology option was systematically analyzed to say whether they were economically feasible or infeasible, and why.

There is no such economic analysis in the factual record.

l. What does "available control technology" mean as used in the NSR manual and in the definition of BACT in 17.8.740?

"Available" control technologies for BACT purposes are any technologies that could potentially work to reduce emissions of a given pollutant at the given source. Mont. Admin. R. 17.8.740. The NSR Manual explains that "available control options' are "those air pollution control technologies or techniques with a practical potential for application to the emissions unit and the regulated pollutant under evaluation." Exh. 1, NSR Manual at B.5. Importantly, "the control alternatives should include not only existing controls for the source category in question, but also (through technology transfer) controls applied to similar source categories and gas streams, and innovative control technologies." Id. Further, as discussed above, "[t]echnologies required under lowest achievable emission rate (LAER) determinations are available for BACT purposes and must also be included as control alternatives and usually represent the top alternative." Id.

The NSR manual's definition of "available technology" is not controversial. Federal and state courts, including Montana courts, have not questioned it. Moreover, the Environmental Appeals Board has expressly adopted it. See, e.g., In re Prairie State Generating Co., PSD Appeal No. 05-05, 2006 WL 2847225 (E.A.B. Aug. 24, 2006), --- E.A.D. --- (explaining that "[t]he NSR Manual's recommended top-down analysis employs a five-step analysis. The first step requires the permitting authority to identify all 'potentially' available control options. Available control options are those technologies, including the application of production processes or innovative technologies, that have a practical potential for application to the emissions unit and the regulated pollutant under evaluation") (internal citations and quotations omitted).

10. Under a top-down BACT analysis, even if sequencing

technologies such as a membrane bag and a wet ESP were ultimately deemed economically unfeasible, must not these methods of reducing emissions be first identified as an available control technology, then be analyzed economically and then be specifically determined on the record to be unfeasible before they can be eliminated?

a. Why?

b. Why not?

Yes. The point of using the top-down method is to identify all potential technologies and avoid making any premature or superficial determinations that would preempt the use of the best technology available. This is why the NSR Manual establishes five steps to be followed in sequence. See Exh. 1, NSR Manual at B.5-B.9 (setting forth the 5 steps). The structured analysis helps to ensure consideration of all the statutory factors and ultimately a defensible emission limit that genuinely reflects the maximum reduction in emissions that can reasonably be achieved. See id. at B.1-B.3 (explaining purpose of NSR Manual); see also In re Cardinal FG Co., PSD Appeal No. 04-04, slip op. at 12 (EAB Mar. 22, 2005), 12 E.A.D. --- ("[A] careful and detailed analysis of the criteria identified in the regulatory definition of BACT is required, and the methodology described in the NSR Manual provides a framework that assures adequate consideration of the regulatory criteria and consistency within the PSD permitting program.").

Skipping over required steps in the top-down analysis is the same as jumping to conclusions. As explained by the NSR Manual, "[i]n the course of the BACT analysis, one or more of the options may be eliminated from consideration because they are demonstrated to be technically infeasible or have unacceptable energy, economic, or environmental impacts on a case-by-case (or site-specific) basis. However, at the outset, applicants should identify all control options with potential application to the emission unit under review." Exh. 1, NSR Manual at

B.5-B.7 (emphasis added). Thus, in his testimony at the hearing, Mr. McCutchen agreed that "at Step 1, when you identify control technologies, cost does not come into that consideration," and that "when you're first considering various controls at Steps 1 and 2, cost would not come into it at that point." Trans., Vol. III at 468:5-8, 468:13-15. Further, Mr. McCutchen agreed that "in Step 3 [ranking], you're still not considering cost" and that "it's not until you get to the very end, when you've assessed how good all the technologies are in terms of emissions reductions, that you start thinking about the money." Id. at 468:25-469:6; see also id. at 469:8-15 ("Q. And until you do that analysis, can you come up with a conclusion at Step 1, or Step 2, or Step 3? A. A conclusion? Q. – as to whether a technology could or could not be designated as BACT? A. Not in those first three steps, no.").

In the Highwood permitting process, SME and DEQ's failed to identify the top technologies at Step One and to evaluate them at Steps Two through Four. This omission requires remand of the Highwood Permit. "Where a more stringent alternative is not evaluated because the permitting authority erred in not identifying it as an 'available' option, a remand is usually appropriate, because proper BACT analysis requires consideration of all potentially 'available' control technologies." In re Inter-Power of N.Y., Inc., 5 E.A.D. 130, 144 (EAB 1994). Having failed to identify and analyze the feasibility of using membrane bags and/or a wet ESP after the proposed baghouse, SME and DEQ cannot defend their BACT analysis based on the unsupported assertion that these options would be cost-prohibitive.

Crucially, BACT determinations must be justified in the record. "Because the BACT analysis is so critical to the PSD permitting process, it should be well documented in the record, and any decision to eliminate a control option should be adequately explained and justified." In re Indeck-Elwood, LLC, PSD Appeal 03-04, 2006 WL 3073109 (E.A.B. Sept. 27, 2006) --- E.A.D. --- (remanding permit for failure to justify rejection of more stringent limit for particulate matter). As the

EAB has held repeatedly, a BACT-determined emissions limit cannot withstand review in the absence of reasoned analysis in the record:

> As the Board has previously explained, the BACT analysis is one of the most critical elements of the PSD permitting process and, as such, it should be well documented in the administrative record. … The decision to eliminate a particular control option must be adequately explained and justified in the administrative record. See In re Newmont Nev. Energy Inv., L.L.C., PSD Appeal No. 05-04, slip op. at 19 (EAB, Dec. 21, 2005), 12 E.A.D. -- (holding that while rejection of more stringent limitations is not a per se violation of the BACT requirements, the permit issuer must provide an appropriate rationale in light of the evidence in the record). The failure to provide an adequate justification may result in a remand to the permitting authority. See Knauf I, 8 E.A.D. at 131; see also In re Gen. Motors, Inc., 10 E.A.D. 360, 374 (EAB 2002) (remanding permit where BACT determination lacked adequate support in the record); In re Steel Dynamics, Inc., 9 E.A.D. 165, 224-25 (EAB 2000) (remanding BACT limitation where permit issuer failed to provide adequate explanation for why limits deviated from those of other facilities); In re Masonite Corp., 5 E.A.D. 551, 566 (EAB 1994) (remanding PSD permit decision in part because BACT for one emission source was based on an incomplete cost-effectiveness analysis); In re Pennsauken County N.J., Res. Recovery Facility, 2 E.A.D. 667, 62 (Adm'r 1988) (remanding PSD permit decision because "[t]he applicant's BACT analysis * * * does not contain the level of detail and analysis necessary to satisfy the applicant's burden" of showing that a particular control technology is technically or economically unachievable).

Id. Here too, a remand of the challenged permit is necessary because SME and DEQ have not met their "burden of showing" that the use of membrane bags with or without the addition of a downstream wet ESP is "technically or economically unachievable." Id.

11. Is there any legal authority for not considering the overall sum economic cost or impact of control technologies used in sequence, rather than looking at each technology in the sequence separately to determine cost effectiveness?

No. There is no provision of the Clean Air Act or its implementing regulations that requires calculation of cost effectiveness based on sequenced rather than combined technologies. Mr. McCutchen conceded this point in his testimony before the Board. See Trans. Vol. III at 525:10-15 ("Congress made it clear that the states have the ability to weigh those three factors — the energy, environmental, and economic factors — any way they wish to, as long as it isn't unlawful, or arbitrary or capricious, I would assume under state laws or federal laws.").

12. Where in the record of the permit issuance does it show that control devices for PM/ PM10 (or PM2.5) condensables installed after control devices for PM/PM10 filterables are not cost effective?

There is no such showing in the record of the permit issuance.

13. Did the Department fulfill its responsibility to conduct a BACT analysis for PM/PM10 by depending on the permittee to identify top control technologies and their control efficiencies?

No. As a general principle, the Department has an obligation to independently verify the information it receives from permit applicants. See, e.g. Davis v. Mineta, 302 F.3d 1104, 1114 (10th Cir. 2002) (remanding agency decision for failure to "conduct a sufficient independent review" of applicant's environmental analysis under the National Environmental Policy Act); Utahns for Better Transp. v. U.S. Dept. of Transp., 305 F.3d 1152, 1186 (10th Cir. 2002) (holding that "the burden is on the Applicant [entity], with independent verification by the [agency], to provide clear and convincing information" sufficient to obtain Clean Water Act permit) (emphasis added); Sierra Club v. U.S. Army Corps of Engineers, 701 F.2d 1011, 1031 (2nd Cir. 1983) (remanding Clean Water Act permit where the permitting agency failed to "conduct its own investigation" and "had no independent … study made" of key issues); Friends of the Payette v. Horseshoe Bend Hydroelectric Co., 988 F.2d 989, 995 (9th Cir. 1993) (upholding permit where agency undertook "its own independent analysis").

In addition, in the BACT context, the failure to identify an available technology — regardless whether the applicant or the agency is responsible for the oversight — requires a remand of the permit. See In re Inter-Power of N.Y., Inc., 5 E.A.D. at 144 (EAB 1994). Here, the record demonstrates that top control technologies, including top technologies identified by EPA, were never considered in the BACT process. DEQ's reliance on incomplete information from SME cannot excuse this legal violation.

14. Under the legal requirements for BACT is it necessary to be able to predict emission rates from new emission sources and to determine compliance with those rates before the first two steps of a BACT analysis can be done?

No. In general, it is necessary to project emissions rates from a source in order to determine whether BACT requirements apply. Under Montana rules, "[a] new major stationary source shall apply BACT for each pollutant subject to regulation under the FCAA that it would have the potential to emit in significant amounts." Mont Admin. R. 17.8.819(2). "Significant" is defined to mean "a rate of emissions that would equal or exceed" designated rates for specific pollutants. Id. 17.8.801(27)(a). For pollutants such as PM2.5 for which no rate has been established, "any emission rate" at all qualifies as "significant" for purposes of triggering BACT requirements. Id. 17.8.801(27)(b). Thus, in the Highwood permitting context, so long as SME and DEQ knew that the boiler would emit PM2.5, BACT was required.

At Steps One and Two of the top-down BACT process, there is no need to predict emission rates or determine compliance with any rate that has yet to be determined. At this point in the analysis, the applicant and the agency are simply identifying available technologies and determining whether any other are technically infeasible "based on physical, chemical, and engineering principles." Exh. 1, NSR Manual at B.7.

15. Because there were no standard emission factors yet developed for PM2.5 did the Department have the authority, for the BACT analysis, to obtain information from the boiler manufacturers and control equipment manufacturers to obtain emission rates and control efficiencies for PM2.5?

Yes. DEQ staff were free to seek out emissions information from boiler manufacturers and control equipment manufacturers. Moreover, they had the authority to require SME to obtain this information in the first instance. Under governing rules, information provided in the permit application "shall include …a detailed description as to what system of continuous emission reduction is planned by the source or modification, emission estimates, and any other information as necessary to determine that BACT as applicable would be applied." Mont. Admin. R. 17.8.823(1)(c). Thus, Mr. Merchant testified that he could have required SME to provide this information, even though he elected to rely on the PM10 surrogate analysis instead. See Trans. Vol. III at 332:9-333:13.

If DEQ had required the inclusion of such information in the permit application, as provided by Mont. Admin. R. 17.8.823(1)(c), the record indicates that SME and other applicants would have been able to obtain it from boiler manufacturers and control equipment vendors interested in making a sale. Based on a decade of experience working with the boiler manufacturer, Riley Stoker Corporation, Mr. Taylor testified that "very explicit discharge information" should be available for any boiler that has even been "installed somewhere else" or pilot tested by the manufacturer with the relevant fuel types. Trans., Vol. I at 83:22-86:6. Here, Alstom's circulation fluidized bed ("CFB") boiler not only has been installed elsewhere, Alstom also has conducted a test burn with sub-bituminous coal for SME. See Trans. Vol. III at 340:11-14 (Mr. Merchant's testimony that

SME's permit application included "DVDs" with the results of a "coal test test burn"). Accordingly, Mr. Lierow conceded that although he "didn't specifically" ask Alstom for detailed particulate emissions information, he nevertheless "had a good indication of PM2.5 emissions with the condensibles portion." Trans. Vol. III at 538:13-15, 24-25.

a. Did it have a duty to obtain that information from manufacturers or vendors?

DEQ does not have an affirmative duty to obtain information directly from vendors and manufacturers, but it cannot proceed to issue an air quality permit in the absence of information necessary to conduct an adequate BACT analysis. DEQ's duty is to ensure the maximum achievable reductions in PM2.5 emissions by imposing BACT-determined emission limits for PM2.5. See Mont. Admin. R. 17.8.819 (requiring BACT as part of the Clean Air Act Prevention of Significant Deterioration ("PSD") program); id. 17.8.752 (requiring BACT in order to obtain construction permit under Clean Air Act of Montana). "A Montana air quality permit may not be issued for a new or modified facility or emitting unit unless the applicant demonstrates that the facility or emitting unit can be expected to operate in compliance with the Clean Air Act of Montana and rules adopted under that Act, the Federal Clean Air Act and rules promulgated under that Act (as incorporated by reference in ARM 17.8.767), and any applicable requirement contained in the Montana State Implementation Plan (as incorporated by reference in ARM 17.8.767)." Mont. Admin. R. 17.8.749(3) (emphasis added). Thus, DEQ has no authority to issue an air quality permit unless the applicant provides the information necessary to comply with governing BACT requirements, which all parties concede are applicable to PM2.5.

b. What is the significance of the Department asking the permittee for more information from the vendors about emission rates and control efficiencies for PM2.5 but then not doing more to obtain that information?

Having failed to follow up with SME on its initial request for information, and having failed to require that SME provide this information in its permit application, DEQ cannot meet its "heavy burden" to show that it was impossible to conduct a PM2.5-specific BACT analysis in the absence of published emissions factors. Alabama Power Co. v. Costle, 636 F.2d 323, 359 (D.C. Cir. 1980) (An agency bears "a heavy burden to demonstrate the existence of an impossibility.").

c. Is there any evidence of record to rebut the testimony of Mr. Taylor that equipment manufacturers and vendors can and will provide emission rate and control efficiency information about their products?

No. Even Mr. Lierow testified that he was able to obtain sufficient information regarding emission rates and control efficiencies to conduct a BACT analysis for condensable particulate, which is essentially PM2.5. See Trans. Vol. I at 155:24-156:11.

16. Does the Department and SME's insistence that emission information must be based first on vendor guarantees satisfy the requirement that the Department identify the stringent technology or technology that achieves LAER pursuant to the NSR Manual, ARM 17.8.740 and 17.8.752(a) (referring to BACT) and (b) (referring to LAER)?

No. Vendor calculations regarding liability risks cannot pre-determine the outcome of required BACT and LAER analyses. There is no mention of vendor guarantees anywhere in the NSR Manual, in Montana's PSD BACT requirements, see Mont. Admin. R. 17.8.819, or Montana's air permitting provisions requiring BACT. See id. 17.8.752. Nor is there any role for vendor guarantees to play in the identification of available control technologies.

17. Is the gathering of more top control technologies than the vendors of SME can identify and guarantee required for a proper BACT analysis by the Department of PM2.5 emissions?

Yes. In order to comply with governing BACT requirements, SME and DEQ must identify "all" top control technologies, not just the technologies offered by the chosen vendor. Exh. 1, NSR Manual at B.2, B.5, B.7; see also In re Inter-Power of N.Y., Inc., 5 E.A.D. at 144 ("Where a more stringent alternative is not evaluated because the permitting authority erred in not identifying it as an 'available' option, a remand is usually appropriate, because proper BACT analysis requires consideration of all potentially 'available' control technologies.").

18. Please answer the same question in reference to PM/PM10 emissions?

The answer is the same for PM/PM10. For each pollutant subject to BACT, SME and DEQ must identify all available technologies. It is not sufficient to rely on vendor information if the vendor neglects to identify available technologies.

19. Can "achievable" under BACT be based on information that is obtained exclusively from a vendor or manufacturer?

Not necessarily. SME and DEQ have an independent obligation to determine the maximum "achievable" emissions reduction that is required under governing BACT provisions. See Responses to Questions 13 and 15(a) above. However, vendors and manufacturers will often have the most detailed emissions and control information available with respect to the particular technologies they market. See Trans. Vol. I at 22:25-86:21. There is nothing to prevent applicants and agencies from relying on such information so long as they undertake an adequate independent investigation and otherwise conduct thorough BACT analysis.

20. Can the Department legally require the use of conditional test methods to analyze air impacts of PM2.5 even though these methods have not been approved by the EPA?

Yes. DEQ has discretion to require the use of conditional test methods to analyze air impacts and determine compliance with BACT-determined emission limits. See Mont. Admin. R. 17.8.106 (allowing for the use of alternate test methods so long as sources obtain written approval from DEQ); see also Exh. O (same). Mr. Merchant conceded this point, stating that "[i]t's possible" for DEQ to approve the use of conditional test methods. Trans. Vol. III at 276:13-277:3.

Further, EPA has made it clear that use of conditional test methods such as CTM-39 and CTM-40 for PM2.5 is appropriate. These published methods are expressly "available for application without EPA oversight for other non-EPA program uses including state permitting programs and scientific and engineering applications." Exh. S at 4; see also Trans. Vol. III at 455:3-456:3 (Mr. McCutchen confirming that EPA has authorized states to use conditional test methods in the PSD permitting context).

21. The NSR manual addresses the situation where there is no economically reasonable or technologically feasible way to accurately measure the emissions and to impose an enforceable emissions standard, by saying the reviewing authority may require the source to use design, alternative equipment, work practices or operational standards to reduce emissions of the pollutant to the maximum extent.

Importantly, the NSR Manual's guidance regarding narrative emission limits comes directly from the Clean Air Act's implementing regulations. 40 C.F.R. § 52.21(b)(12) provides:

> If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.

Id.; see also id. at 51.166(b)(12)(same). Montana's binding SIP rules also include this same language. See Mont. Admin. R. 17.8.801(6). Thus, regardless of the NSR Manual's guidance, there is no question that DEQ can, and must, impose design, equipment, work practice, or operational standards when it is impracticable to set numeric emission limits.

a. Is that NSR guidance applicable to this permitting action?

The NSR guidance and corresponding regulations are applicable to this permitting action because SME and DEQ argue that setting numeric emission limits is impossible in the alleged absence of emission factors and test methods. As set forth below in response to Questions 22 through 24, the record demonstrates that setting numeric emission limits for PM2.5 is feasible. However, even if this were not the case, DEQ could impose narrative limits based on design, equipment, work practice, and/or operational standards. The impossibility defense advanced by DEQ and SME must fail in light of Mont. Admin. R. 17.8.801(6) and parallel guidance in the NSR manual.

b. If so, what is the significance?

See response to Question 21(a) above.

22. What is the significance to this permit of the statement in the Federal Register Vol. 70 dated November 1, 2005, on page 66043 that the difficulties of projecting ambient impacts have been resolved in most respects?

The referenced statement by EPA is significant for two reasons. First, it is yet another piece of evidence that discredits the impossibility defense advanced by DEQ and SME. As of 2005, EPA recognized that the "difficulties" cited in the Seitz memo — "the lack of necessary tools to calculate the emissions of PM2.5 and related precursors, the lack of adequate modeling techniques to project ambient impacts, and the lack of PM2.5 monitoring sites" — were "resolved in most respects." Exh. L, 70 Fed. Reg. at 66043. Accordingly, EPA was able to develop and propose a comprehensive NSR implementation rule that included provisions for PSD permitting. See id. at 66,061-62. Given that EPA recognized that PSD permitting for PM2.5 was feasible over two years ago, it is unreasonable for SME and DEQ to argue that BACT analysis is impossible based on the 1997 Seitz memo (Exh. 2).[3]

Notably, in the more recent Page Memo (Exh. 3), EPA cites only one remaining hurdle to "administration of a PM-2.5 PSD program": the fact that the agency "ha[s] not promulgated the PM-2.5 implementation rule." Exh. 3 at 4; see also Exh. 14 (72 Fed. Reg. 54,112, 54,116 (Sept. 21, 2007)) (identifying no technical impediments to imposing BACT-determined emission limits). This is not a practical hurdle that prevents DEQ from setting PM2.5 emission limits in the Highwood Permit. See 70 Fed. Reg. at 66,043 ("The requirements applicable top NSR SIPs for and the obligation to subject NSR sources to NSR permitting for PM2.5 direct and precursor emissions are codified in the existing federal regulations, and can be implemented without specific regulatory changes."). As Mr. McCutchen testified, to "go ahead and do a 2.5 BACT, as soon as the tools become available, that would be a very good step to take, that you wouldn't necessarily have to wait for EPA to say, 'Okay, now we're going to force you to do so.'" Trans. Vol. III at 495:5-9. EPA's statements in 2005 confirm that "the tools" are now available, and that there is nothing to prevent long overdue compliance with PM2.5. BACT requirements.

Second, the fact that EPA has yet to promulgate a final New Source Review implementation rule for PM2.5 highlights the need for DEQ to honor its own, independent obligation to enforce state law BACT requirements for PM2.5. See Mont. Admin. R. 17.8.819 (requiring BACT as part of the Clean Air Act Prevention of Significant Deterioration ("PSD") program); id. 17.8.752 (requiring

[3] EPA's proposed rule could allow for continued reliance on the Seitz memo pending completion of PM2.5 SIP revisions. However, the reason given for this "transition period" was that some states would "need additional time to incorporate the final NSR rule change for PM2.5 into their SIPs." 70 Fed. Reg. at 66,043. EPA did not suggest that a transition period was necessary based on any practical impediments to conducting a valid BACT analysis for PM2.5.

BACT in order to obtain construction permit under Clean Air Act of Montana); see also Montana Environmental Information Center v. Montana Dept. of Environmental Quality, 326 Mont. 502, 515 (Mont. 2005) (stressing DEQ's duty to enforce Montana law, regardless whether federal agencies require compliance with parallel federal requirements). If DEQ continues to wait for EPA to finalize PM2.5 NSR rules, the agency may be illegally permitting facilities without Pm2.5 emission limits for many years to come.

23. Does the record show that the impediments to conducting a BACT analysis for PM2.5 condensables been removed?

Yes. The Highwood Permit's BACT-determined emission limit for condensable particulate shows that it is possible to conduct a BACT analysis for condensable PM2.5. It is undisputed that condensable particulate is $PM_{2.5}$. See, e.g. Trans. Vol. III at 453:8-9 (SME's expert witness, Gary McCutchen stating that "PM10 condensibles are exactly the same as PM2.5 condensibles"); id. Vol I. at 95:15-19 (MEIC's expert witness, Hal Taylor, agreeing that condensible emissions are made up of particulate matter in the 2.5 size range" and "smaller"). It is further undisputed that SME was able to propose, and DEQ was able to set, BACT-determined emissions limits for condensable particulate matter. See Trans. Vol. 1 at 155:24-11 (Mr. Joseph Lierow admitting same). In short, there was no practical impediment to completing a BACT analysis for condensable PM2.5 in the Highwood permitting process.

More generally, EPA has stated that "uncertainties remain" with respect to "our current knowledge base on condensable PM emissions." Exh. 6 (72 Fed. Reg. at 20,652). However, these uncertainties have not prevented agencies from conducting BACT analyses for condensable particulate. EPA reports that "States have established emission limits or otherwise require PM emissions testing that includes measurement of condensable PM." Montana is now one of these States.

In addition, EPA has developed at least three test methods for measuring condensable particulate emissions Conditional test method CTM-40 has been available since December 3, 2002, and EPA has affirmed that "further validation of this method is unwarranted since the technology and procedures are based upon the same as evaluated for promulgated Method 201A." Id. at 20,653 (Apr. 15, 2007). CTM-039 has been available since July, 2004, and EPA has stated with regard to CTM-039 that "[w]e believe that a dilution sampling method for measuring direct PM2.5 [Conditional Test Method CTM–039] eliminates essentially all artifact formation and provides the most accurate emissions quantification" of condensable PM2.5 emissions. Id. Finally, in implementing the NAAQS for PM2.5, EPA has recommended the use of EPA Method 202 (with appropriate options) combined with EPA Method 5 or EPA Method 17 or Method 201 or 201A, all previously promulgated test methods. See Exh. S at 11. The advent of these new test methods largely resolves any lingering problems with measuring condensable particulate — the only concern raised in the Seitz memo that is directly relevant to compliance with BACT requirements.

a. If so, what is the significance for this case?

Because it is possible to conduct a BACT analysis for condensable PM2.5, SME and DEQ cannot justify the decision to use PM10 as a surrogate. They were required to conduct an analysis specifically targeted at PM2.5. This means they were required to identify the top control technologies for condensable PM2.5 as opposed to PM10, and, in evaluating the cost-effectiveness of these top controls, they were required to account for the very serious health threat posed by PM2.5 as opposed to the lesser threat posed by PM10. As Mr. McCutchen explained, in a PM2.5 BACT analysis, "one thing that's going to happen is that the cost effectiveness numbers are going to increase over the cost effectiveness numbers for PM10. It's just one of the many things the agency is going to need to consider." Trans. Vol. III at 473:14-474:13. The failure to consider issues that apply uniquely to PM2.5, including the need for more efficient controls and higher cost-effectiveness thresholds, is indefensible given that a BACT analysis for PM2.5 was practicable.

24. Does the record show that there are no impediments to conducting a BACT analysis for PM2.5 filterables?

Yes. There is no impediment to conducting a BACT analysis for PM2.5, including filterable PM2.5. First, it is possible to quantify filterable particulate emissions using information from equipment vendors. See Trans. Vol I at 84:21-86:6; see also id. at 40:3-41:13 (discussing Mr. Taylor's substantial career experience measuring very fine particulate emissions and, in particular, "determin[ing] particle size, morphology -- in other words, shape of the particle -- as well as speciation, in other words, what the particle was made -- what it consisted of"").

Second, there are mature technologies available to control filterable particles 2.5 microns and smaller, and their control efficiencies are known. For instance, Mr. Merchant testified that the Teflon-coated bags that SME is proposing to use at the Highwood coal plant are "capable of controlling filterable particulate down to submicron size." Trans. Vol. III at 336:15-17. The relative control efficiencies of other particulate controls such as scrubbers, electrostatic precipitators ("ESPs"), and membrane bags are similarly well-documented. See, e.g. Trans. Vol I at 86:22-87:13, 96:2-97:2. Thus, Mr. Taylor testified that he could use existing information to rank the effectiveness of various control technologies for $PM_{2.5}$:

> Q. And how would you know how effective each of these controls are at getting at PM2.5?
>
> A. Well, besides published literature, working with the vendors of this type of equipment, and looking at what they indicate they can achieve.
>
> Q. Is there a fair amount of literature about all of these technologies that we've talked about today?
>
> A. Yes. Membrane bag filtration, there is quite a bit of literature. Wet ESP, there is literature, but again, it's vendor related, so that's when you have to get the vendors involved, because there is many configurations of wet ESP's.
>
> Q. So do you think there would be enough information for you to have a fairly accurate idea of what each of these control technologies could do to reduce emissions of PM2.5?

A. Yes.

Trans. Vol. I at 89:2-20.

Ultimately, the expert opinion of Mr. Taylor, the only witness qualified as an expert on control technologies for fine particulate matter, was that a PM2.5 BACT analysis "could be done." Id. at 96:2-24 There is no credible evidence in the record to counter his testimony. Indeed, Mr. McCutchen's testimony bolsters Mr. Taylor's conclusion. With respect to filterable emissions, Mr. McCutchen agreed that it is currently possible to do the equivalent of a filterable PM2.5 BACT analysis today:

> … Now, if we're talking just filterable, all that 140 tons or so coming out after all the controls that are mandated to be put on this particular facility, ought to be very fine particles. So if there is any more efficient control technologies on, what they will be controlling is PM2.5.
>
> So you don't necessarily have to switch to PM2.5 to get more controls of fine particles. All you have to do is improve the efficiency, or find higher efficiency control technologies that pass the top down BACT test, including the cost effectiveness. So there could be a focus on, or a more intensified focus through the Board on looking to make sure that the highest level, most recent technologies have been evaluated.

Trans. Vol III. at 497:8-24. This "intensified focus" on the "highest level, most recent technologies" for controlling particulate matter is precisely what MEIC is advocating in the form of BACT analysis targeted at PM2.5.

25. Do the Page Memorandum dated April 5, 2005, and Fed. Reg. Vol. 72, dated April 25, 2007, apply only to non-attainment areas?

The Page Memorandum applies to attainment areas. See Exh. 3 at 4. The Clean Air Fine Particle Implementation Rule published at 72 Fed. Reg. 20,586 addresses the designation of non-attainment areas and the development of SIPs to bring these areas back into attainment with the PM2.5 NAAQS.

26. If the answer to No. 26 is yes, does the Page Memorandum apply

to this permit?

The non-binding guidance in the Page Memorandum extends to this permit.

27. Does the 72 Fed. Reg. 20586 (Apr. 25, 2007) apply to the Highwood permit?

No.

a. Why or why not?

This rule expressly "does not include final PM2.5 requirements for the new source review (NSR) program." 70 Fed. Reg. at 20,586. The Highwood permit is a PSD permit, and as such, was issued under the auspices of the NSR program.

b. What is the significance for this case?

EPA's statements in the rule's preamble provide information regarding the status of conditional test methods for condensable particulate. See Response to Question 23 above. The rule itself has no bearing on this appeal.

28. Does the Department have authority in issuing the Highwood permit to place conditions in the permit to the effect that if control technologies become more economically or technologically efficient for PM2.5 (and CO2 and mercury) that SME must install control technologies to implement the technologies that can achieve higher control efficiencies?

No. There is no provision of the federal Clean Air Act or the Clean Air Act of Montana that authorizes a permitting agency to impose new BACT-determined limits after a PSD permit has issued. The are only two points at which the agency can revisit BACT emission limits in light of new technological advances: (1) when a source undertakes a major modification; and (2) at each "independent phase" of a "phased construction project." Mont. Admin. R. 17.8.819(3), (4). This is why it is critically important to ensure that SME and DEQ undertake a thorough BACT analysis in the first instance.

Even if SME were to agree voluntarily to the inclusion of such a permit condition, it is unclear what such a condition would look like or how it would be enforced. For instance, what event would trigger a permit review? What party would be responsible for determining when technologies become available? How would SME and DEQ define economic and technological efficiency in this context? Would the new limit be determined through a BACT process or some other process? Would the new limit be subject to review?

Even if all of these questions were resolved so as to ensure the best possible control of PM2.5 emissions at some point in the future, uncontrolled PM2.5. emissions from the Highwood Permit, as it is currently permitted, would unnecessarily degrade air quality in the meantime. This result is antithetical to governing BACT requirements under state and federal law.

29. Does the Montana Constitution, Article II, Sec. 3 and cases interpreting it make reliance on the surrogate PM10 BACT analysis and set of controls for PM2.5 BACT analysis and set of emission controls unlawful?

The Montana Constitution provides that all persons have a "right to a clean and healthful environment." Art. II, Sect. 3, Mont. Const. In establishing a fundamental right to a clean and healthful environment, delegates to the 1972 constitutional convention intended "to permit no degradation from the present environment and affirmatively require enhancement of what we have now." MEIC v. Dept. of Env'l Quality, 296 Mont. 207, 227 (Mont. 1999) (quoting Montana Constitutional Convention, Vol. IV at 1205, March 1, 1972); see id. at 230 (" The delegates did not intend to merely prohibit that degree of environmental degradation which can be conclusively linked to ill health or physical endangerment."). Interference with the fundamental right to a clean and healthful environment receives the highest level of judicial scrutiny: state action may impede the right only if the state demonstrates a compelling interest in doing so. Id. at 225.

PM2.5 pollution directly interferes with the right to a clean and healthful environment because it poses a serious health threat. As environmental health workers and physicians summarized in comments cited by EPA:

> More than 2,000 peer-reviewed studies have been published since 1996 * * *. These studies, as discussed and interpreted in the 2004 EPA Criteria Document, validate earlier epidemiologic studies linking both acute and chronic fine particle pollution with serious morbidity and mortality. The newer research has also expanded the list of health effects associated with PM, and has identified health effects at lower exposure levels than previously reported.

71 Fed. Reg. 61,144 61,155 (Oct. 17, 2006).

The failure to conduct a BACT analysis specifically for $PM_{2.5}$ is fundamentally a failure to preserve air quality in Montana as the constitution demands. Using PM10 as a surrogate for PM2.5 does not ensure the maximum achievable reduction in PM2.5 emissions from a major polluting facility such as the Highwood coal plant. Once the permitted plant is allowed to construct without installing the best available controls for PM2.5, it will unnecessarily degrade air quality for many decades to come.

Mr. McCutchen conceded at the January, 2008 BER hearing, "all that 140 or so tons coming out after all of the controls that are mandated to be put on this particular facility, ought to be very fine particles. So if there is any more efficient control technologies on, what they will be controlling will be essentially all PM2.5." Trans. Vol. III at 497:9-14. There is no compelling state interest that can justify DEQ's failure to investigate "any more efficient controls" for PM2.5 emissions from the Highwood coal plant. Issuing a permit without BACT-determined limits for PM2.5 not only violates the Clean Air Act of Montana, it also infringes "the constitutional right to a clean and healthy environment and to be free from unreasonable degradation of that environment." MEIC, 296 Mont. at 231.

The Board can and should be mindful that the failure to comply with BACT requirements implicates a fundamental constitutional right. The Board does not have the authority to declare DEQ decisions unconstitutional if they are otherwise in compliance with governing statutes. Merlin Myers Revocable Trust v. Yellowstone County, 311 Mont. 194, 199-200 (Mont. 2002) ("It is the exclusive power of the courts to determine if an act of the legislature is unconstitutional."). However, when the constitution and state law are aligned, as they are in the BACT context, it is appropriate for the Board to consider the right to a clean and healthful environment in determining whether DEQ's permitting action is consistent with the governing regulatory requirements at issue. See MEIC, 296 Mont. at 231 ("the constitution applies to agency rules as well as to statutes"); Shammel v. Canyon Res. Corp., 2003 MT 372, ¶ 26, 319 Mont. 132, 82 P.3d 912 ("because Montanans have a fundamental right to a clean and healthful environment, it is in the public interest to ensure that funds are available for potential clean up of contaminants on [certain] property").

Here, state and federal air pollution laws—which are designed to protect public health and the environment—are consistent with Montanan's right to a clean and healthful environment. Montana's administrative rules expressly mandate that "[a] new major stationary source shall apply BACT for each pollutant subject to regulation under the FCAA." Mont. Admin. R. 17.8.819(2) (emphasis added); see also id. at 17.7.740(2) (BACT means "the maximum degree of reduction for each pollutant subject to regulation) (emphasis added); id. at 17.8.801(6) (same). The right to a clean and healthful environment, guaranteed by Montana's constitution, provides an additional reason why DEQ's failure to conduct a PM2.5-specific BACT analysis was improper.

30. Where in the record does it show in the BACT analysis that the technology controls for PM/PM10 adequately control PM2.5 emissions.

There is no such showing in the record. In order to "adequately" control PM2.5 under governing BACT requirements, SME must comply with emission limits that ensure "the maximum degree of reduction" that can feasibly be achieved. Mont. Admin. R. 17.7. 740(2), 17.8.801(6). Top-ranking, cost-effective controls for PM10 are not necessarily top controls for PM2.5. First, control technologies that have extremely high control efficiencies for PM/PM10 will have significantly lower control efficiencies for PM2.5. See Trans. Vol. I at 144:9-17 (Mr. Taylor's testimony that high control efficiencies for PM10 would be lower for PM2.5); id. Vol. III at 497:8-498:9 (explaining that the "focus" needs to be on "higher efficiency controls" and "the highest level, most recent technologies" in order to achieve maximum reductions in PM2.5 emissions). Second, highly efficient control technologies that would be deemed unnecessarily expensive based on the cost-per-ton removal price for PM10 could be deemed cost-effective for PM2.5. See Trans. Vol. III at 473:14-474:13 (Mr. McCutchen's testimony that "cost effectiveness numbers [for PM2.5] are going to increase over the cost effectiveness numbers for PM10").

SME and DEQ have argued that control of PM2.5 will be adequate, notwithstanding the shortcomings of the surrogate approach, because emissions from the Highwood coal plant are not anticipated to violate the PM2.5 NAAQS. However, compliance with the NAAQS is no substitute for compliance with BACT requirements. The express purpose of the PSD permitting program is to prevent polluters from driving air quality down to the level of the NAAQS. See 42 U.S.C. § 7470(1) (stating Congress' intent to "protect human health and welfare from any actual or potential adverse impact which may … reasonably be anticipated to occur from air pollution or exposure to pollutants … notwithstanding the attainment and maintenance of all air quality standards") (emphasis added).

31. Can a control technology for a PM2.5 condensable be deemed a top control technology just because it is a co-benefit control with controls deemed BACT for SO2 filterable and filterable PM?

If a co-benefit control is truly among the most stringent controls available for condensable PM2.5, it should be deemed a top control technology. However, in this case, the record does not establish that co-benefit controls are BACT for

PM2.5. See Response to Question 9 above.

32. Where in the record does it show that the Department knew what test method it was going to apply before determining what was BACT for PM/PM10?

There is no such showing in the record. On the contrary, the record shows that the Department had not decided which, if any, test method to approve for use when the Highwood permit issued. See Exh. N; Exh. O.

33. Where in the Seitz memo is there authorization for using the PM10 surrogate analysis of measuring emissions as a basis to substitute PM10 control technologies for PM2.5 control technologies?

There is no express guidance addressing control technologies in the Seitz memo. The Seitz memo generally states that "EPA believes that sources should continue to meet PSD and NSR program requirements for controlling PM10 emissions … and for analyzing impacts on PM10 air quality. Meeting these measures in the interim will serve as a surrogate approach for reducing PM2.5 emissions and protecting air quality." Exh. 2 at 2.

Respectfully submitted this 24th day of March, 2008.

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