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**

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER ON CLAIMS OF APPELLANTS THAT THE DEPARTMENT OF ENVIRONMENTAL QUALITY FAILED TO COMPLY WITH PERMITTING REQUIREMENTS APPLICABLE TO PM2.5 AND PM10;RULING ON REGULATION OF CO2 FOR BACT PURPOSES

INTRODUCTION

The decision by this Board outlined below is directed solely to procedural issues and the process by which the Department of Environmental Quality made its Best Available Control Technology (BACT) determination for the particulate emissions from the Highwood Generating Station. In this decision the Board only holds that the Department failed to follow the procedures necessary to do a proper BACT analysis. Nothing in this opinion is intended to direct or require any particular substantive decision or outcome when the Department re-does that BACT determination, as this decision will require. Indeed, pre-judging the outcome of what control technologies are appropriate and technologically and economically feasible under a BACT determination is exactly what the Board's decision forbids.

No one disputes that the pollutants at issue in this decision, fine particulates less than 2.5 microns in size, are very hazardous to health, causing a broad range of serious health consequences. Since 1997, the Environmental Protection Agency has listed them under Clean Air Act regulations as "regulated pollutants" and, as such, since that time agencies considering air quality permits have been required to make

a BACT determination of what control technologies should be required on any facility producing fine particulate emissions.

A BACT determination is not a static process. What control technology is determined by a BACT process must be specific to the time and to the type of facility at issue and as technologies are developed or change and improve, those new and improved technologies must be taken into consideration.

Representatives of respondent Southern Montana Electric (SME) have appeared before this Board numerous times to assure it that SME was pursuing the best and most state of the art boiler and environmental technologies for this project and the Board has no doubt of their sincerity and applauds it for dedication to this goal. What this decision requires of SME and the Department is nothing more than a demonstration that, in fact, all the best, most protective– and possibly innovative– control technologies, or sequence of technologies, have been fully investigated, that their technological, economic, and environmental feasibility has been carefully, analyzed and that the analysis and final determination has been fully and explicitly described and explained so that the Board and the citizens of Montana can be assured that they have indeed done their best and that this project can move forward to provide needed electricity for Montana with that assurance.

Throughout these proceedings the Montana Environmental Information Center (MEIC) and Citizens for Clean Energy (CCE), collectively the "Appellants," appeared through Counsel, Ms. Abigail M. Dillen and Ms. Jenny K. Harbine. The Montana Department of Environmental Quality ("Department") appeared through Mr. David Rusoff. Mr. Kenneth A. Reich and Mr. Michael McCarter (through April 10, 2008) appeared on behalf of Southern Montana Electric Generation and Transmission Cooperative, Inc. ("SME").

On June 8, 2007, the "Appellants" filed an Affidavit pursuant to Mont. Code Ann. § 75-2-211(10). In the Affidavit, Appellants sought review of the decision of the Montana Department of Environmental Quality (Department) to issue an air quality permit authorizing SME to construct the Highwood Generating Station (HGS) near Great Falls, Montana.

In the Affidavit, Appellants contend that the language in the requirement in Mont. Admin. R. 17.8.819(2) and 42 U.S.C. § 7475(4) that each new proposed facility is subject to best available control technology (BACT) for each "pollutant subject to regulation" includes CO_2 and other greenhouse gases as pollutants and that the Department was required to conduct a top-down BACT analysis and set an emission limit that reflects best available control technology for CO_2 and other greenhouse gases.

The Affidavit also states that the Department failed to ensure compliance with the PM2.5 National Ambient Air Quality Standards (NAAQS) by using PM10 as a surrogate as required by Mont. Admin. R. 17.8.819(1). An air quality analysis for less dangerous, coarser grain particles (PM10) based on the assumption that all PM10 emitted from the plant would be PM2.5 does not comply with the NAAQS for PM2.5 according to Appellants. Using PM10 as a surrogate for PM2.5 would result in 24-hour concentrations of 33.5 micrograms per cubic meter just under the PM2.5 NAAQS limit of 35 micrograms per cubic meter. This raises concern that pollution from the plant would violate NAAQS for PM2.5. In neglecting to consider secondary PM2.5 the Department underestimated PM2.5 concentrations by as much as 50%. This violates the requirements to meet applicable emission limitations, according to the Affidavit. This claim was not addressed at the contested case hearing.

The Department also failed to subject PM2.5 to BACT analysis in violation of Mont. Admin. R. 17.8.819(2) according to the Affidavit.

Additionally, the Affidavit states, that the Department's established emission rate for condensable PM10 is not the lowest when compared to other BACT-determined rates set across the country and the Department failed to offer any reason why greater emissions reductions are not achievable at the HGS. Specifically, the Affidavit states, "[a]bsent a reasoned justification for the higher emissions limit, DEQ's permit cannot satisfy BACT requirements for PM10 let alone PM2.5."

Finally, the Affidavit states that the Department failed to provide interested parties with an opportunity to comment on air quality impacts, alternatives and control technology requirements in violation of Montana Administrative Rule 17.8.826(2)(e). This claim was not pursued at the contested case hearing. MEIC and CCE asked for relief in form of a stay of the issuance of the air quality permit and vacation and remand of the air quality permit pending compliance with all applicable laws and for other appropriate relief. There was no stay of the air quality permit during the proceedings.

PROCEDURAL BACKGROUND; RULING ON CO2

On November 16, 2007, Appellants filed a Motion to Exclude Expert Testimony and on November 19, 2007, SME filed a Motion to Strike Portions of the Affidavit of Appellants with supporting memoranda. Subsequent answer and reply briefs were filed concerning these motions. The Motion to Exclude Expert Testimony was not ruled on by the Board on the basis that testimony concerning credentials and experience and legal argument on the issue would be evaluated by the Board during the hearing on the merits. The Board's Hearing Examiner denied

the Motion to Strike Portions of the Affidavit in the "Third Order Setting Hearing and Denying Motion to Strike Portions of Affidavit of Appellants" dated January 22, 2008.

On November 16, 2007, Appellants filed a Motion for Summary Judgment with a supporting memorandum of law and exhibits. On November 19, 2007, SME filed a Motion for Summary Judgment of Permittee with a supporting memorandum of law with exhibits. On November 20, 2007, the Department filed a Motion for Summary Judgment and Supporting Brief with exhibits. Answer and reply briefs were filed by the respective parties.

On December 21, 2007, the Board of Environmental Review (Board) heard oral argument on the above referenced motions except for the Motion to Strike Portions of the Affidavit and the Motion to Exclude Expert testimony.

On January 11, 2008, the Board heard supplemental argument on the portion of the summary judgment motions pertaining to the question of whether the Department complied with federal and state requirements in not deeming CO_2 as a regulated pollutant subject to regulation in the BACT analyses conducted in issuing Permit No. 3423-00 to SME. The parties, the Department, SME and the Appellant filed supplemental written authorities on the question of whether CO_2 is a pollutant subject to regulation. On January 11, 2008, the Board decided to rule on the Motions for Summary Judgment regarding the requirement to consider CO2 in a BACT analysis. The Board hereby orders that there is no genuine issue of material fact and the Department's and SME's Motions for Summary Judgment as they pertain to regulation of CO_2 as regulated pollutant are granted as a matter of law. The basis for this decision is that CO2 does not fall into any of the 40 C.F.R. § 52.21(b)(50 categories. EPA has not promulgated a national ambient air quality standard for CO2, has not listed CO2 as a pollutant subject to regulation in the

Clean Air Act and has not yet established any other regulations for CO2. The pollutant CO2 is not a pollutant that is regulated as of yet under the New Source Review (NSR) Prevention of Significant Deterioration (PSD) regulatory program for authorizing construction permits to major air sources in attainment areas. The Board passed a resolution requesting an Affidavit from SME indicating SME's control technology plans for CO2. Mr. Tim Gregori submitted an "Affidavit of Tim Gregori Regarding Carbon Capture and Sequestration" dated January 22, 2008. This Affidavit is attached.

The Board decided that the portions in the summary judgment motions pertaining to the alleged failure of the Department to conduct a proper BACT analysis of PM10 and PM2.5 emissions for the setting of proper emissions limits when permitting the SME plant could not be resolved on summary judgment and determined to hear testimony and take evidence on these questions on the merits in a contested case hearing.

On January 22, 2008, and January 23, 2008, the Board heard testimony and received evidence on the PM2.5 and PM10 BACT analyses questions. The Board held two follow-up hearings to the fact-finding hearings on February 8, 2008, and April 21, 2008, giving the parties more time to supply legal briefing and provide legal argument concerning their contentions. The party's submitted written closing arguments prior to the February 11, 2008, hearing. On February 25, 2008, the Board issued a Request for Briefing to the parties asking for briefing on various legal questions and references to support in the factual record for respective assertions of the parties in respect to issues concerning the Board. Prior to the April 21, 2008, hearing the parties each filed written responses to the Request for Briefing as well as replies to the written closing arguments filed prior to

February 11, 2008. On April 21, 2008, the Board heard oral argument from the parties and conducted deliberations on the issues of correct PM2.5 and PM10 analyses in issuing Permit No. 3182-00 to SME. The second portion of this Order addresses the PM2.5 and PM10 analysis of the Department.

FINDINGS OF FACT AND CONCLUSIONS OF LAW AND PROPOSED ORDER ON CLAIMS OF PETITIONER THAT THE DEPARTMENT OF ENVIRONMENTAL QUALITY FAILED TO COMPLY WITH PERMITTING REQUIREMENTS APPLICABLE TO PM2.5 AND PM10

In the contested case hearing on January 22 and 23, 2008, the Appellants called Mr. Hal Taylor and Mr. Joseph Lierow. The Department called Mr. Eric Merchant. SME called Mr. Gary McCutchen. All of these witnesses provided testimony under oath.

The Department and SME submitted joint exhibits DEQ/SME Exhibits 1-4, 6, 7, 8, 10-18 which were admitted into evidence. Appellants submitted Exhibits A through J, L, N through S and U, which were admitted into evidence.

Oral argument requested by the parties to supplement their written briefing on questions of law or citations to the record was held on February 11, 2008, and April 21, 2008.

AGREED FACTS

1. On November 30, 2005, the Department received an application from SME for an air quality permit for the construction and operation of a 250-net megawatt, coal-fired, circulating fluidized bed (CFB) boiler, electric power generating plant, known as the Highwood Generating Station (HGS), to be located southeast of Great Falls, Montana.

2. On March 30, 2006, the Department issued, for public comment, a Preliminary Determination on the air quality permit application.

3. On June 22, 2006, the Department issued, for public comment, a Supplemental Preliminary Determination on SME's permit application.

4. On May 11, 2007, the Department issued the Department's Decision on the application, which decision was to issue the permit.

5. On May 29, 2007, the Appellants filed a request for a contested case hearing before the Board of Environmental Review ("Board"), concerning the Department's Decision.

6. On May 30, 2007, the Department's Decision became final and an air permit was issued.

7. On June 8, 2007, the Appellants filed an affidavit stating their claims regarding the Department's Decision.

8. Appellants' affidavit alleged that the Department violated the Clean Air Act and the Clean Air Act of Montana in failing to require compliance with Best Available Control Technology "BACT" requirements for very fine particulate matter ("PM2.5").

9. EPA promulgated primary health-based NAAQS for PM2.5, effective September 16, 1997. Effective December 18, 2006, EPA revised the 24-hour PM2.5 standard from 65 micrograms per cubic meter ("ug/m^3") to 35 ug/m^3.

10. The HGS permit contains no PM2.5-specific limits.

11. The area where the HGS would be located is designated as "unclassifiable/attainment" in regard to the National Ambient Air Quality Standards (NAAQS) for particulate matter. The formal designation is Prevention of Significant Deterioration of Air Quality (PSD) Class II.

12. PM2.5 is particulate matter with a diameter of 2.5 micrometers (microns) or smaller.

13. PM10 is particulate matter with a diameter of 10 microns or smaller.

14. PM10 includes PM2.5.

15. Particulate matter consists of filterable particulate and condensable particulate.

16. Filterable particulate from a boiler is material that is in a particulate form within the boiler stack and that can be collected on the filter of a filtering train.

17. Condensable particulate from a boiler includes condensable organic compounds and minerals that pass through filters in gaseous or vapor form. These gases or vapors condense into liquid and/or solid particles when they exit the stack and enter the atmosphere.

18. PM2.5 consists of both filterable and condensable particulate.

19. Condensable particulate is comprised mainly of PM2.5.

20. EPA promulgated NAAQS for PM2.5, effective September 16, 1997, and later revised the PM2.5 NAAQS, effective December 18, 2006.

21. EPA has never promulgated regulations governing implementation of the New Source Review program, including the PSD requirements, with respect to PM2.5.

22. On November 1, 2005, EPA proposed regulations to govern development of SIPs in non-attainment areas for PM2.5 and to implement the New Source Review program with respect to PM2.5.

23. On April 25, 2007, EPA finalized regulations governing SIPs for PM2.5 non-attainment areas.

24. On September 21, 2007, EPA proposed regulations to implement the PSD program, with respect to PM2.5.

25. No air quality permit issued in the United States for any power plant sets a limit for PM2.5.

FINDINGS OF FACT

1. On November 30, 2005, SME applied for a preconstruction permit for the Highwood Generating Station eight miles east of Great Falls, Montana. The SME-HGS plant is a coal-fired steam/electric generating station incorporating a circulating fluidized bed boiler (CFB Boiler) with a capacity of producing 270 gross megawatts of electrical power. On May 30, 2007, the Department issued a final permit to SME.

2. The permit sets emissions limits for the CFB Boiler as follows: Filterable particulate matter (filterable PM) emissions from the CFB Boiler stack are limited to 0.012 lb/MMBtu and 33.25 lb/hr. Particulate matter or PM10 emissions (filterable and condensable) from the CFB Boiler stack are limited to 0.026 lb/MMBtu and 72.04 lb/hr. DEQ/SME Exhibit 7.

3. The control technologies chosen by the Department as BACT to meet the designated emission limits are contained in the Permit Analysis. For filterable PM10, the emission control technology chosen is a Fabric Filter Baghouse (FFB). This control technology was designated as the technology of choice by SME in its application. DEQ/SME Exhibits 4 and 7. Whereas the applicant, SME proposed an emission limit of 0.015 lb/MmBtu, the Department determined this did not constitute BACT and instead determined that maintaining compliance with a limit of 0.012 lb/MmBtu constitutes BACT in this case.

4. Sulfuric acid mist, acid gases (hydrogen fluoride (HF) and hydrogen chloride (HCL) and trace metals, including lead, were grouped together with condensable PM10 in the BACT analysis because these pollutants area a major component of condensable PM10. The PM10 emission rate is "calculated based upon its components (listed above in this paragraph) plus BACT determined filterable PM emission limit."

5. The total condensables emission rates (for the components listed in

paragraph 4) were added to the emission rate for filterable PM to yield the PM10 limit of 0.026 lb/MmBtu. SME proposed that its CFB boiler have a dry Fluid Gas Desulphurization (FGD) followed by a FFB to maintain compliance with a PM10 emission limit of 0.026 lb/MMBtu. The Department determined that the emission control strategy of the applicant and the proposed emission limit of the applicant constitute BACT. DEQ/SME Exhibit 7, p. 43.

6. The Department intended to follow a NSR top-down BACT analysis approach to its PM10 analysis. Merchant, Vol. II (uncondensed version) p. 202, lines 9-12. Merchant, Vol. III, p. 320, lines 15-25, p. 321, lines 1-3. The applicant, SME, intended to follow a 5-step approach, Lierow, Vol. I, P. 161, lines 11, 12.

7. At the hearing on January 22 and 23, 2008, the Appellant called Mr. Hal Taylor and Mr. Joseph Lierow. The Department called Mr. Eric Merchant. SME called Mr. McCutchen. The following describes the experience and expertise of the witnesses as follows:

a) Mr. Hal Taylor: Mr. Taylor is an environmental consultant for designing emission control technologies for various sources such as boilers, metallurgical and mining sources. His clients are the industrial sector including the utility sector. Taylor, Vol. I, p. 38, lines 12-23. Mr. Taylor has a degree in engineering science with a nuclear option. Taylor, Vol. I, p. 39, lines 2-3. Mr. Taylor aided in the installations of power plant emission control systems primarily tied to the Riley Stoker Boiler at coal fired power plants. Taylor, Vol. I, pp. 42-45. Mr. Taylor has performed approximately 100 BACT analyses with a portion focusing on control of particulate matter. Taylor, Vol. I., p. 45, line 23. Mr. Taylor was accepted as an expert witness on control technologies that could be considered in a BACT analysis for fine particulate matter including wet ESP's.

Taylor, Vol. I, pages 59 and 60.

b) Mr. Gary McCutchen: Mr. McCutchen is a licensed engineer in North Carolina, South Carolina, Florida and Iowa. McCutchen, Vol. III, p. 375, lines 19-25. Mr. McCutchen has a Bachelor of Science degree in chemical engineering from Virginia Tech, and a Master of Science degree in chemical engineering from the University of Kentucky. McCutchen, Vol. III, p. 376, lines 5-8. Mr. McCutchen worked on the five New Source Performance Standards and priority lists for setting air pollution standards. McCutchen, Vol. III, p. 377, lines 1-5.

Mr. McCutchen was the Chief of Engineering for the State of Colorado responsible for issuing all air pollution permits. McCutchen, Vol. III, p. 377, lines 7-10. Mr. McCutchen wrote and edited the New Source Review Workshop Manual which includes the description of BACT processes and also chaired the BACT Task Force which developed the top-down BACT approach. McCutchen, Vol. III, p. 378, lines 10-19. Mr. McCutchen retired from the EPA in 1992 and is currently an Air Pollution Consultant. McCutchen, Vol. III, p. 379, lines 1-10. SME requested that Mr. McCutchen be qualified as a witness in the areas of BACT analysis, EPA policies with respect to BACT analysis; EPA policies with respect to New Source Review Program, including the PM2.5 program test methods and generally areas of NSR permitting and implementation. McCutchen, Vol. III, p. 385, lines 3-9. The Board qualified Mr. McCutchen as an expert in these areas. McCutchen, Vol. III, p. 387, lines 9-10.

c) Mr. Joseph Lierow: Mr. Lierow was called by Appellants to testify as a fact witness regarding the BACT analysis he performed for SME. Lierow, Vol. I, p. 154, lines 24-25. Mr. Lierow is employed by Bison Engineering who was hired to develop SME's permit application for the Highwood Generating

Station. Lierow, Vol. I, p. 155, lines 2-8. Mr. Lierow was responsible for performing the PM10 analysis and proposed emission limits for PM10. Lierow, Vol. I, p. 155, lines 9-15.

d) Mr. Eric Merchant: Mr. Merchant has a Bachelor of Science degree in biology with a minor in environmental studies. He also has a master's degree in environmental and occupational health. Merchant Vol. II, p. 197, lines 10-13. Mr. Merchant has had many training courses in PSD permitting, NSR and major NSR permitting. Mr. Merchant has also had training in BACT determination and analysis and effective permit writing. Merchant Vol. II, p. 197, lines 17-23. Mr. Merchant is an air quality specialist with the Montana Department of Environmental Quality having been with the Department for over nine years. Merchant Vol. II, p. 196, lines 2-7. Mr. Merchant spent over nine years in the Air Quality Permitting Section working with portable-type sources and other smaller minor sources and has spent several years working in permitting major sources. Merchant Vol. II, p. 196, lines 10-24.

8. For the following reasons in the paragraphs below, the Board finds that the BACT analysis of PM/PM10 contained in the Permit Analysis and based upon the testimony of Mr. Merchant, Mr. Lierow, Mr. McCutchen and Mr. Taylor was deficient.

9. In the Permit Analysis, DEQ/SME Exhibit 7, the following constitute deficiencies in the BACT process:

(a) There was no listing of all available control technologies for filterable PM10 or PM.

(b) There is no identification of proposed filterable PM10 control technologies and their respective control efficiencies as opposed to control technologies for PM. SME and the Department identified some control technologies

and ranked only some of their respective control efficiencies for total filterable PM as opposed to filterable PM10.

(c) As far as filterable PM emissions, linked control options such as a wet scrubber with wet Electrostatic Precipitator (ESP) are listed in the Permit Analysis, but there is no detailed analysis in the text as to technical feasibility or infeasibility of any of these linked technologies nor is there any further ranking by control efficiency or any further economic analysis of any linked technologies including the ones listed. There is no analysis of different types and relative efficiencies of the variety of ESP systems or filtration systems except for Teflon and fiberglass bags. The permit application states that only the control device is described, not each control option. DEQ/SME Exhibit 4, p. 5-21. There is no discussion of LAER emission limits for filterable PM or filterable PM10 even though LAER emission limits in the NSR Manual are presumptively top control technologies that should be considered in setting BACT limits.

(d) There is no description of the cost effectiveness of the technology options listed in the table on p. 25 of the Permit Analysis. For example, it is unknown how wet ESP as a control technology for filterable PM either alone or in combination with a Wet scrubber would price out. Taylor, Vol I, p. 124, l. 17, p. 126, l. 6. Generally the text describing the technologies does not track the technologies listed. The technical feasibility analysis, the ranking, the environmental impacts and the economic impacts are skeletal and do not demonstrate systematically why technologies should or should not be excluded. What is "commonly used" on boilers is not a sufficient explanation of why a technology is feasible or not feasible. DEQ/SME Exhibit 4, p. 5-20. There were no control efficiencies in tons per year produced ranked or discussed. This renders the economic analysis in cost per tons per year impossible.

(e) For condensable particulate the same findings apply, namely, of a lack of thorough listing of control technologies and a justification of why the technologies should or should not be excluded. SME provided no analysis in its Permit Application of energy, environmental and economic impacts. DEQ/SME Exhibit 4, p. 5-46 through 5-51. In the Permit Analysis, the Department, simply states that "[t]the environmental, economic, and energy impacts associated with the available H2S04, acid gas, trace metals, and condensable PM10 options are the same as the impacts for those control options addressed in the BACT analyses for SO_2 and filterable PM emissions." There is no explanation of why the impacts of control options for SO_2 and filterable PM emissions are applicable to an analysis of impacts for condensable PM10 and what these impacts are. DEQ/SME Exhibit 7, p. 38-42.

(f) The record does not show that the top control technology that could achieve LAER was identified for PM10 condensables or that there was an attempt to find out what technologies were being used to achieve the lower permit limits in other facilities. Vol. I, p. 161, lines 13-19. Mr. Lierow testified that "he did not look into all the [permit limits] listed and try to dig in and find out why there were lower than the proposed facility." Vol. I., p. 164, line 19 through p. 165, l. 2.

(g) In general the specific steps of the NSR manual for a top-down BACT analysis, DEQ/SME Exhibit 1, were not followed nor an equivalent evaluation system such that the choice of control technology and emission limitations can be shown definitively to constitute the maximum degree of reduction achievable for PM 10.

10. From MEIC Exhibit E, the Department's view of top-down BACT is the Department evaluates the energy, environmental, economic, and other costs associated with each alternative technology and then specifies an emissions limitation for the source that is considered the maximum degree of reduction

achievable for each regulated pollutant. Mr. Merchant stated, "[t]he top down procedure is a method that we generally think is a good method to use." Merchant, Vol. I, p. 277, lines 7-8. The Department's stated approach does not match what it actually implemented by way of a BACT analysis.

In contrast, the Department stated it "has the discretion to set BACT limits at levels that do not necessarily reflect the highest possible control efficiencies but, rather will allow permittees to achieve compliance on a consistent basis." More specifically, Mr. Merchant described the BACT process that the Department uses in various parts of his testimony. He states, "BACT isn't –you don't start with a lowest limit that is out there and being achieved, which we discussed as LAER…BACT is the process." Vol. III, p. 267, lines 1-8.

Mr. Merchant went on to admit that when he reviewed the draft application he was concerned, as to acid gases, and limits that the limit proposed by the applicant was not comparable to lower emissions set around the country. Vol. III, p. 268, lines 5, 17. Mr. Merchant later confirmed in response to a question whether LAER is the first step in the BACT process that the first step in the process is not LAER but it is to evaluate available controls. Vol III. p. 303, lies 9-10.
Mr. Merchant goes on to state that in Step I, the analysis of what is the best that being achieved out there, "that's not typically how it's practiced. We look at available control technologies for that project." Vol III. p. 305, lines 15-20. As far as development of the control efficiencies for condensible emission rates,
Mr. Merchant testified that for the components of a BACT analysis such as ranking as opposed to other technologies, justifying control efficiencies or considering other technologies, he relies on what is in the application. Merchant, Vol. III, p. 270, lines 1-5.

11. In contrast, Mr. McCutcheon testified that "the way the top-down

works is by obtaining all of the information the reviewer needs to know "by making the source begin with the top ranked level of control—which was EPA's idea behind the top down approach, in the first place—what we're doing is forcing the source to provide all of the information that the agency reviewer—in this case Mr. Merchant—needs to know whether he or she agrees or disagrees with rejecting that level of control." McCutchen, Vol. III. p. 414, lines 1-5.

12. Mr. McCutchen testified that his consulting group would have considered a fabric filter with a wet ESP had they been asked to do so by the State. Vol. III, p. 415, lines 2-4. Mr. McCutcheon also testified that when you do a BACT analysis in Step 1 of the BACT process, "…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 uses to meet LAER limits. You're not limited to the United States you start with…the EPA RACT/BACT/LAER Clearinghouse (RBLC) and you proceed from there with all of the other technologies that you're aware of and you just start listing them. Vol. III. p. 407, lines 10-20.

13. Mr. McCutcheon also testified that "available" means it's both "commercially available" and it has been proven out in a full scale operation. McCutchen, Vol. III. p. 407, lines 24-25; p. 408, lines 1-4. When asked about whether he advocates the use of the top down BACT process, Mr. McCutchen stated, "yes". McCutchen Vol. III. p. 483, l.11. He testified that the reason the EPA adopted the top down approach was that "it provided much more information to the regulator about the best control technologies. When we were doing what was called the bottom up approach, many times the applicant never got up to the best technologies so the regulator was stuck with either accepting where the applicant had stopped or having to gather all the information themselves which was a terrible resource burden." McCutchen, Vol. III, pages 483-484.

14. In this case, as demonstrated in the findings herein, the Board finds that the Department stopped short of where it was supposed to be in analysis of all of the control technologies in step 1 of the top-down BACT analysis. The eventuality that Mr. McCutchen described came to pass, namely, that the Department conducted a sort of bottom-up approach, starting from what was economically feasible, looking what was in common use and deriving limits as an average of a some of the other permitted sources and limiting its analysis to the technologies and emission limits the applicant submitted. These were in turn based upon what vendors of the boiler could guarantee. With this approach the Department faced a resource burden in gathering the information itself and didn't gather the BACT information and conduct an analysis based upon its independent analysis.

15. For instance, the Department did not consider a wet ESP following a fabric filter. Merchant, Vol. III, p. 272, l. 12. The Department determined that a "redundant control" such as this arrangement would not be cost effective, but did not evaluate or consider the cost or cost effectiveness of this (for example, in terms of numbers of particulates reduced or health impacts) prior to rejecting it. Merchant, Vol. III, p. 273, l. 12. The Department never considered membrane bags and the additional efficiency that they might add if they were used. Merchant, Vol. III. p. 275, l. 3. Mr. Merchant did not address membrane bags because they were not addressed in the application and he wasn't aware of this technology being used. Vol. III, p. 293, lines 21-25; p. 294, p. 1. Mr. McCutchen testified that they did not analyze pairing fabric filters with wet ESP's as BACT control devices because they knew it would not be cost effective and it would be "wasted work." McCutchen, Vol. III, p. 415, l. This contradicts his other testimony that the NSR top down analysis is "highly encouraged" and best to achieve maximum pollutant reduction.

McCutchen, Vol. III, p. 489, l. 22 and further, that sources should be forced to provide information to agencies so that the agency knows all it needs to know to reject levels of control. McCutchen, Vol. III, p. 414, lines 1-5.

16. The EPA in a similar permit for a CFB Boiler, the Desert Permit, DEQ/SME Exhibit 11, identified various linked technologies including alkali injection plus dry SO_2 scrubbing plus fabric filter baghouse plus wet electrostatic precipitation as potential control technologies for condensable emissions. DEQ/SME Exhibit 12, p. 69. Wet ESP was identified as effective to capture 86% of the condensable particulate that has escaped control by the upstream scrubbing and baghouse devices.

17. Thus, it was demonstrated that the addition of a wet ESP could increase by 86% the existing control efficiencies that SME and DEQ estimated for acid gases. Mr. Taylor's unrebutted testimony was that it is known wet ESP's were developed primarily to handle acid mists. Vol. I, p. 68, lines 6-8.

18. The permit and the Permit Analysis lack an explanation of why the HGS could not meet lower emission limits of other facilities with lower limits on filterable PM10. Merchant, Vol. III, p. 260, p. 23. For an adequate explanation of other permit technologies and permit limits, see DEQ/SME Exhibit 12. The Board finds that lower PM10 emissions have been permitted elsewhere and the justification provided in the Permit Analysis for addressing and then dismissing the lower BACT levels established in other facilities is inadequate. The explanation of the Department that it didn't have to analyze LAER, see Merchant, Vol. III, p. 267, lines 1-8, because this is not a non-attainment area, see Appellants' Exhibit E, is misplaced. As a matter of BACT analysis, the lowest rates such as what have been achieved elsewhere at other facilities must be evaluated first when the Department

follows a top down BACT analysis which it intended to do, Merchant, Vol. III, p. 277, l. 11. At least for condensable PM10 precursors, the Department was concerned at one time that there were facilities with lower emission limits and the differences as compared to the proposed emission limits for the SME permit were not explained in the application. See Appellants' Exhibit H. This concern was eclipsed by a later position of the Department that it is not necessary to start when doing a BACT analysis with the lowest emission rates achievable. Merchant, Vol. III, p. 267, lines 3-8.

19. In the permit application submitted, there is no justification showing how technologies were ranked as oppose to other technologies or the justification for control efficiencies. The application included certain control technologies. Mr. Merchant stated that the Department relied on what was in the application and didn't go beyond it in addressing doing its BACT analysis and evaluating technologies. Merchant, Vol. III, p. 270, lines1-5, lines 18-22. In the Permit Analysis, the control technologies and efficiencies are what SME provided in its application. Merchant, Vol. III, p. 273, l. 17.

20. As to the controls used, Mr. Merchant stated that wet ESP's are one of the top two controls for controlling particulate in general. As to fabric filters, he stated there can be a problem where the gases that are condensables pass through the fabric filters and are not controlled. Merchant, Vol. III, p. 271, lines 1-13. Despite this, the Department did not analyze wet ESP's as a potential top control technology either alone or in combination with fabric filtration. DEQ/SME Exhibit 7. There is no economic or feasibility discussion in the Permit Analysis of wet ESP's in the analysis aside from listing a wet ESP as potential control technology. DEQ/SME Exhibit 7.

21. Mr. Taylor's unrebutted testimony is that "in the hierarchy of emission

control devices, the wet ESP is the most efficient "emission control device that you can put on a process." Taylor, Vol. I, p. 67, lines 23-25. Mr. Taylor also testified without rebuttal from SME or DEQ that the membrane bag is the most efficient bag at controlling small fine particles. Taylor, Vol. I, p. 75, l. 8. Mr. Taylor's testimony is that there is no evidence that membrane bags are unreliable. Taylor, Vol. I, p. 108, lines, 17, 18. Mr. McCutcheon testified that he was aware of membrane bag technology and was deferring to Mr. Taylor's expertise on it. McCutcheon, Vol. III, p. 337, lines 1-2.

22. As far as the ability of wet electrostatic precipitators ("ESP's") to achieve up to 99% control of particulate in the PM2.5 size, Mr. Merchant testified that he has not seen this information. Merchant, Vol. III, p. 338, l. 15, 16.

23. The Department and SME did not consider using membrane bags to control filterable particulate from the HGS boiler. Merchant, Vol. III, p. 338, l. 21.

24. SME did not provide as part of the permit application the name of the vendor for the specific technology that SME proposed as a part of its BACT analysis. Merchant, Vol. III, p. 339, lines 20-22.

25. At least four other CFB boilers have been permitted with lower filterable emissions rates than the HGS limit of .012 bl/MMBtu. These include permitted limits for Reliant Energy's Seward Power Plant (.011 lb/MMBtu), JEA Northside's Generating Stations # 1 (.011 lb/MMBtu), JEA Northside Generating Station # 2 (.011 lb/MMBtu), and the River Hill Power Company Facility (.010 lb/MMBtu). DEQ/SME Exhibit 4.

26. With respect to condensable particulate, many comparable facilities have been permitted with lower limits for components of total condensable emissions. At least eight similar boilers have been permitted with limits for sulfuric acid mist that are well below the limit of .0054 lbs/MMBtu set for the

HGS. These plants include Santee Cooper plant (.0014 lbs/MMBtu), Reliant Energy's W.A. Parish Electric Generating Station (.0015 lbs/MMBtu), AES Puerto Rico (.0024 lbs/MMBtu), MidAmerican Energy Company (.0042 lbs/MMBtu), Reliant Energy Washington Parish Electric Generating Station (.00433 lbs/MMBtu), Thoroughbred Generating Company (.00497 lbs/MMBtu), and East Kentucky Power Group (.005 lbs/MMBtu). Similarly, the HGS permitted limit for acid gas emissions is merely an average of the emissions rates set for similar facilities, with several facilities achieving significantly lower limits. DEQ/SME Exhibit 4.

27. In formal comments to the Department, both the U.S. Forest Service and the National Park Service questioned why the HGS could not achieve the lower particulate emissions limits permitted for other CFB boilers as listed in the preceding paragraphs and because of the lack of this analysis, the Department's analysis was not a BACT analysis. MEIC Exhibit B.

28. The Permit Analysis prepared by the Department provides no analysis why these lower particulate limits are not achievable at the HGS. DEQ and SME Exhibit 7.

29. The permit application submitted by SME provides no analysis why these lower particulate emissions limits in the comparable facilities with lower emission rates from other facilities are not achievable at the HGS. DEQ/SME Exhibit 4.

30. The emissions limits proposed by SME as BACT and accepted by DEQ as BACT were set by working backwards from limits that SME's vendor was willing to guarantee. Lierow, Vol. 1, p. 158, l. 22. See also Lierow, Vol I., pp. 160, 161, 163, 167. This method improperly prejudges the outcome of what is

the BACT. What is achievable is not only what a vendor can guarantee.

31. The emission limits were also set by using an average of permit limits from other permit analyses from the RBLC instead of a BACT analysis of the technologies that could produce the limits. This method is of concern. Taylor, Vol. I, p. 116, lines 1-4. Lierow, Vol. I. p. 160, l. 17. Mr. McCutchen stated you don't just have to rely on vendor guarantees. If a vendor can't guarantee a rate, a [reviewing authority] could evaluate test data showing some other facility with that

equipment and similar gas stream characteristics that have met the emission limit. McCutchen, Vol. III, p. 510, lines 12-16.

32. As to linked technology, states have the ability to put extra emphasis on concerns of public health or on the beauty of the area and use higher cost effectiveness numbers in an area of the state. McCutchen Vol. III, p. 525, lines 16-25.

33. For the following reasons, the Board finds that a PM 2.5 BACT analysis is required and achievable at least to the point in the BACT process of (1) determining that either a technology is technically infeasible or economically unfeasible and (2) determining whether emission control efficiencies can be obtained from equipment manufacturers and if not (3) whether there are design, alternative equipment, work practices or operational standards which can reduce emissions of the PM 2.5 to the maximum extent possible. DEQ/SME Exhibit 1, p. B states that (from the NSR manual) "even if a review authority determines that there is no economically reasonable or feasible way to accurately measure the emissions, and hence to impose an enforceable emissions standard, it may require the source to use design, alternative equipment, work practice, or operational standards to reduce emissions of the pollutant to the maximum extent."

34. As background concerning PM2.5, the Board the makes the following findings. Eric Merchant agrees with the statement in Appellants' statement of contentions in the prehearing filed by the parties on January 22, 2008 ("statement") and it is therefore a finding of the Board that, "[r]educing emissions of PM2.5 is a major public health concern. According to EPA, decreasing PM2.5 in the ambient air by only 0.5 ug/m^3 can prevent as many as 25-50 premature deaths each year." 70 Fed. Reg. at 66,006. Merchant, Vol. III, p. 328, l. 5; l. 13.

35. Eric Merchant agrees with the statement and it is a finding that, "[m]icroscopic particles in the PM2.5 size range are small enough to lodge deep into the lungs. Even short-term exposure to PM2.5 is known to cause serious respiratory illnesses, including asthma, cardiovascular illness, including heart attacks, as well as premature death. Those particularly sensitive to PM2.5 exposure include children, older adults, and people with heart and lung disease." Merchant, Vol. III, p. 328, l. 22; p. 329, l. 2.

36. Eric Merchant agrees with the statement and it is a finding that, "PM2.5 is produced chiefly by combustion processes and by atmospheric reactions of various gaseous pollutants, and they can remain suspended in the atmosphere for days to weeks and be transported many thousands of kilometers." Merchant, Vol. III, p. 329 l. 11.

37. As to whether HGS will be a major source of PM2.5 emissions, Mr. McCutchen testified that there is an uncontrolled emission of 140 tons per year of PM2.5 particulate. McCutchen, Vol. III, p. 417, lines 7-11, 13-15. This qualifies the CFB Boiler at HGS as a major stationery source of PM2.5 emissions. Mont. Admin. R. 17.8.801(22).

38. Mr. Merchant agrees with the statement, "[t]he CFB boiler, alone, is

anticipated to emit 299 tons of PM10 each year. Given that SME is anticipated to achieve over 99% control efficiency for filterable particulate in the larger PM10 size range, and 80 to 90% control efficiency for condensable particulate in the larger PM10 size range, the vast majority of the HGS' uncontrolled PM emissions will be in the smaller PM2.5 size range." Merchant, Vol. III, p. 334, l. 4.

39. Mr. Merchant agrees with the statement and it is a finding that, "EPA acknowledges that "[t]he obligation to implement PSD was triggered upon the effective date of the NAAQS" for PM2.5. 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)." Merchant, Vol. III, p. 334, l. 24.

40. Mr. Merchant agrees with the statement and it is a finding that, "[t]he primary health-based PM2.5 NAAQS became effective over ten years ago, and the 24-hour NAAQS have since been revised to be nearly twice as stringent in response to extensive data regarding the health impacts of PM2.5." Merchant, Vol. III, p. 335, l. 7. Effective, December 18, 2006, EPA revised the 24-hour PM2.5 standard from 65 micrograms per cubic meter to 35 micrograms/cubic meter. (Agreed Facts)

41. While NAAQS have been in effect for PM2.5 for over a decade, Mr. Merchant stated that he did not directly require a PM2.5 BACT analysis of the applicant, Merchant, Vol. III, p. 335, lines 12-23, and instead required a BACT analysis of PM2.5 through a surrogate analysis consisting of a BACT analysis of PM10. Merchant, Vol. III., p. 330, lines 4 and 5.

42. Technologies for control of PM2.5 emissions, both filterable and condensable are available and in use. Mr. Merchant testified that he was not aware of membrane bag technology *through any BACT analysis* but that the fabric filter as analyzed through the Department process is also capable of controlling filterable

particulate *down to the submicron size including PM2.5*. Mr. Merchant did not know of the relative efficiency of membrane bags versus Teflon bags at the submicron size but stated that he had no reason to disagree with Mr. Taylor on this. Merchant, Vol. III, pp. 336, 337, lines 12-25, 1-7.

43. In 1997, when the EPA first promulgated the NAAQS for PM2.5, the agency expressed concern that insufficient information was available on how PM2.5 is distributed geographically, how PM2.5 should be modeled, and how PM2.5 emissions should be measured. Citing these concerns, John Seitz, then Director of EPA's Office of Air Quality Planning and Standards (OAQPS), issued a memo stating that, until these issues were satisfactorily resolved, states could rely on PM10 as a surrogate for PM2.5 in PSD reviews including BACT analyses. DEQ and SME Exhibit 2.

44. This so-called "Seitz memo" was never adopted through notice-and-comment federal rule-making. DEQ and SME Exhibit 2.

45. The Seitz memo is not legally biding on the Montana DEQ or any other state agency. As the memo itself expressly provides, its "statements do not bind State and local governments and the public as a matter of law." Memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards, to Regional Air Directors, Interim Implementation of New Source Review for PM2.5 (Oct. 23, 1997). DEQ and SME Exhibit 2.

46. Mr. Merchant agrees with the statement and it is a finding that, "[t]he Seitz memo's guidance to rely on BACT analysis for PM10 does not ensure maximum achievable reductions in emissions of PM2.5." Merchant, Vol. III, p. 344, l. 1.

47. Mr. Merchant agrees with the statement and it is a finding that, "[a] control technology that is deemed to be BACT for PM10 may not be BACT for

PM2.5. Merchant, Vol. III, p. 343, l. 20. See also, Taylor, Vol. I, p. 95, lines 6-10; p. 123, lines 9-24.

48. Mr. Merchant testified that he doesn't have the information to answer whether some particulate matter control such as membrane bags and wet ESP are better than others at capturing smaller particles. He also stated that without a spec sheet from the manufacturer of the control technology, (Alston) it would be hard to know if the manufacturer could provide information about what the uncontrolled emissions were. Merchant, Vol. III, pp. 345, l. 7, 346, lines 14-17.

49. Mr. Merchant generally agrees with the statement and it is finding that "PM2.5 is more significantly more toxic in smaller concentrations than PM10" hazardous than PM10 and that there are toxic characteristics of particles in the PM10 range. Merchant, Vol. III, 348, l. 4.

50. Mr. Merchant agrees that with the statement and it is a finding that, "[i]n November, 2005, EPA announced that the concerns raised in the Seitz memo had largely been resolved and on this basis, the agency proposed new implementation rules with respect to PM2.5." Mr. Merchant agreed that the 70 Fed. Reg. 66043 dated November 1, 2005 contains the language written by the EPA, "[t]he 1997 guidance stated that sources would be allowed to use implementation of a PM10 program as a surrogate for meeting PM2.5 NSR requirements until certain difficulties were resolved, primarily the lack of 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. As discussed in this preamble, *those difficulties have been resolved in most respects*, and where they have not been, the proposal contains appropriate provisions to account for it." Merchant, Vol. III, p. 349 lines 9, 10; p. 351, l. 3.

51. Mr. Merchant agrees with the statement that the EPA acknowledged in November 2005, no new regulations are required to conduct BACT analyses for PM2.5 (despite the fact that no final PM2.5 NSR implementation rule for attainment areas has been promulgated yet). This is reflected in the language in 70 Fed. Reg. 66,042 dated November 1, 2005, "[t]he requirements applicable to NSR [New source Review] SIPs for and the obligation to subject sources to NSR permitting for PM2.5 direct emissions are codified in the existing federal regulations and can be implemented without specific regulatory changes.'" Merchant, Vol. III, p. 351, l. 18.

52. With respect to measuring PM2.5, the difficulties cited by SME and the Department relate to a lack of emission factors and testing methods for predicting amount of emissions impacted by control technologies, specifically the emission rate without controls, with control and the difference, the control efficiency, which is needed to rank the control devices from the most stringent controls to the least stringent. McCutcheon, Vol. III, p. 391, lines 21-23.

53. The Department and SME have argued that it is impossible to complete a PM2.5 BACT analysis for the HGS because the emission factors or tools to calculate emissions of PM2.5 don't exist and the surrogate PM10 analysis may be used in place of PM2.5 analysis because there is an EPA policy that allows use of the surrogate analysis, referring to the Seitz memorandum of 1997.

54. In this case, the record consisting of the findings of the Board shows that setting BACT emission limits for PM2.5 emissions for the HGS CFB boiler is feasible using existing test methods, by using emissions estimates from boiler manufacturers and by requiring SME pursuant to DEQ/SME Exhibit 1, NSR Manual, p. B.2., to use design alternative equipment, work practices or operational standards to reduce emissions of PM2.5 to the maximum extent.

55. An "emission factor" consists of a large amount data to predict emissions from a particular control technology of a boiler and is obtained from the manufacturer. The ideal emission factor is one that is based on the manufacturing unit being analyzed whereas a generally published emission factor might be just a best guess. Merchant, Vol. III, p. 352, l. 12-16 and 21-22.

56. Mr. Merchant testified that there is no published emission factor for PM2.5 but if he had a reliable way of estimating PM2.5 emissions, he could have conducted a BACT analysis specific to PM2.5. Merchant Vol. III, p. 353, lines 16-18. Mr. Merchant testified that the best emission factor comes from the source itself. Merchant, Vol. III, p.352, lines 13-14. Yet, the record shows that the Department didn't follow up on its request for PM2.5 emission factors from the manufacturer. This indicates the Department prematurely concluded that the tools were not available to obtain emission factors for PM2.5. (It is noteworthy that although the Department didn't know what test method it would use for PM10 condensables, it did a BACT analysis before designating this test method. Lierow, Vol. I, p. 179, lines 1-15, p. 180, lines 1-20.)

57. Mr. Merchant relies on the application of the permittee plus his own research to verify the information that is provided to him. He stated that information such as on PM2.5 emissions control technology from the manufacturer, as in this case, Alstom Boilers, would not be given to him either because it is not available or because it's not something the that manufacturers want to share. Merchant, Vol. III, p. 357, lines 6-16.

58. Mr. Merchant stated he did have enough information necessary to estimate and limit condensable PM emissions based on precursor pollutants (even though SME asked the Department not to have a condensable limit and even though the EPA suggested that regulators did not need to impose condensable limits.)

Merchant, Vol. III, p. 359, lines 6-10. Based on specifications provided by Alstom, SME was able to propose, and DEQ was able to set BACT-determined emission limits for condensable particulate matter. Lierow, Vol. I, p. 155, lines 24-11, p. 156, l 3.

59. With respect to condensable emissions, SME and DEQ clearly could have performed a BACT analysis and set emission limits for PM2.5 especially since it already did so for PM10 condensables. Mr. McCutcheon stated that whether you use PM10 as a surrogate or not, you're still doing a BACT analysis for condensables and that PM10 condensables are the same as PM2.5 condensables. McCutchen, Vol. III, p. 453, lines 8, 9. See also Mr. Taylor's testimony that condensable emissions are made up of particulate matter in the 2.5 size range and smaller. Taylor, Vol. I, p. 95, lines 15-19. Mr. Lierow testified, as to MEIC Exhibit A, that he didn't need to inquire about PM 2.5 emission data from the manufacturer because "they had a pretty good indication of what the PM2.5 emission rate would be based on the condensable emission rate [for PM10]. He also stated that they ultimately used PM10 as a surrogate but they had a good indication that condensables were mainly PM2.5. Lierow, Vol. II (uncondensed version) p. 192, lines 8-15.

60. With respect to filterable PM2.5 emissions, SME and DEQ possibly could have relied on data from Alston to conduct a BACT analysis based on emission factors provided by the manufacturer. Taylor Vol. I., p. 84, line 21 through p. 86, lines 2-21. He stated, "I've been given very explicit discharge information (categories of particulate, size, range of particulate matter) for all of the boiler equipment I have worked on (from the boiler vendors)." Id. at p. 85, lines 1-3. According to Mr. Taylor, there are many technologies for control of PM2.5 emissions, such as wet ESP, dry ESP's, fabric filter and a combination of dry filtration and wet ESP, dry ESP, wet FGD. Vol I. p. 87, lines 1-13.

61. There is some question as to whether data on the CFB Boiler as to PM2.5 emissions was unobtainable or whether such information was even requested. Mr. Merchant testified that he asked for it but never followed up on its request for PM2.5 emissions data. Merchant, Vol. III, p. 330, l. 20-333, p. 331, l. 13. Mr. Lierow testified that he didn't need to ask for data from the manufacturer as to PM2.5 condensibles because they had a good idea of what they were based on the condensable emission rate for PM10. Lierow, Vol. II, (uncondensed version), p. 192, lines 8-15. Thus, essentially SME did provide reliable estimates of condensable PM2.5 emissions and the Department never required SME to provide data on filterable PM2.5 emissions.

62. An e-mail interchange between an employee for the consultant for SME that helped prepare the permit application and another consultant for SME indicates that the consultants were already contemplating factoring in PM2.5 emission reduction technology. Mr. Lierow was able to ask an SME contractor in an e-mail to talk to the baghouse manufacturer about providing PM2.5 emissions rates. The consultant responded by saying if PM2.5 regulations come into effect, "our solution to comply is to install higher efficiency bags. These will cost more and require more frequent replacement. We probably don't want to get into this discussion with MDEQ to avoid any tighter restrictions being placed upon us." MEIC Exhibit A. This indicates that the SME's consultant was contemplating PM2.5 control technology and presumably had at least a good idea of PM2.5 emissions rates available from the manufacturer or knew he could obtain this information from the manufacturer. Mr. Lierow himself testified that he could have asked the vendor for the main baghouse boiler for PM2.5 emission rates. Lierow, Vol III. p. 536, l. 25.

63. Mr. McCutchen testified that if there is a problem with measuring particulate matter, and emission limits can't be specified, the reviewing authority can mandate inspection and maintenance procedures to make sure equipment is operated properly [to reduce emissions to the maximum extent.] McCutchen Vol. III, p. 511, l. 20-21.

64. The record shows there are technologies available to control particulate PM2.5 emissions. Mr. Merchant testified that Teflon - coated bags "are capable of controlling filterable particulate down to submicron size. Merchant, Vol. III, p. 336, lines 15-17. There are many other control devices such as scrubbers, ESP's and of fabric filter devices that can reduce PM2.5 emissions. Taylor, Vol. I p. 86, lines 22-25, p. 87, lines 1-13, p. 96, lines 2-25, p. 97, l. 2. It is possible to rank effectiveness of the control devices based on vendor specifications and existing literature. Taylor, Vol. I, p. 89, lines 2-20.

65. Mr. Taylor specified that there are ways to determine control efficiencies for the different control technologies for MP2.5, Taylor, Vol. I, p. 88, lines 20-25, p. 89, l. 1. There is published literature, information from vendors that can help develop how effective each of the controls is of getting at PM2.5. Taylor, Vol. I, p. 89, lines 4-20. Mr. Taylor testified that a BACT analysis of PM2.5 can be done because there is equipment available to control it and the control efficiencies for these technologies is very high. Taylor Vol. I, p. 96, lines 9-25. He stated there are other facilities that have had to control condensable and filterable PM2.5 as where facilities have visible emissions (caused in part by PM2.5 emissions) to control. These facilities have installed wet ESP's to control the filterable PM2.5. Taylor, Vol. I, p. 93, lines 3-17. Conceivably, even if the applicant or the reviewing authority could not accurately measure PM2.5 emissions, the source could evaluate

wet ESP as an alternative equipment to reduce emissions of the pollutant to some extent.

66. The tools needed to derive BACT determined limits for PM2.5 were available to SME and DEQ. This, coupled with the fact that manufacturers can provide PM2.5 emissions data, if asked, and with Mr. Merchant's statement that had he had the correct emissions data, he would have imposed a PM2.5 BACT analysis, indicate that there was no impediment to the Department at least initiating a PM2.5 analysis to determine how or if PM2.5 emissions could be reduced.

67. The EPA has developed at least three test methods for measuring condensable particulate emissions for filterable PM 2.5. There is Conditional Test Method 40 available since December 3, 2002, and Conditional Test Method 39 available since July 2004 for filterable and condensable together. There are a number of levels of validation already achieved for these test methods. McCutchen, Vol. III, p. 475, lines 15-19. Mr. McCutchen's testimony is that test method 202 is usable for determining control efficiencies for condensable emissions. Vol. III, p. 453, lines 1-3, p. 479, lines 9-16. Mr. McCutchen testified that for the individual condensables, there are reference test methods that are acceptable. McCutchen, Vol. III, p. 504, lines 2-3. He also did not object to the testimony being read into the record from his deposition that there is a dilution method out there that is a reliable way of testing for PM2.5 emissions. McCutchen, Vol. III, p. 457, lines 17, 18. A state can use a conditional test method so long as EPA has the power to veto that decision. McCutchen, Vol. III, p. 455, l. 13. Rulemaking is not necessary to approve the use of a Conditional Test Method in a BACT permitting process. McCutchen, Vol. III, p. 455, l. 18. Mr. McCutchen did confirm that there is no referenced test method as among many boilers of a similar type that is usable today. McCutchen, Vol. III, p. 458, lines 6-24. The Stephen D. Page Memorandum dated

April 5, 2005, acknowledges that a source may quantify its PM2.5 fraction by applying two test methods in series, the Conditional Test Method 40 and the Method 202 sampler to collect condensable materials. DEQ/SME Exhibit 3, p. 3.

68. The cost per ton of removal of PM2.5 emissions is higher than for PM10 because PM2.5 particles weigh less. McCutchen, Vol. III, p. 524, lines 13-17. He testified states can use a higher cost effectiveness number if they want to. Vol. III, p. 525, lines 21-24.

69. Even without switching to PM2.5 to get more controls of fine particles, such as the 140 tons approximately coming out after all of the controls that are mandated to be put on the particular facility, Mr. McCutchen stated that "[a]ll 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 through the Board on looking to make sure that the highest level, most recent technologies have been evaluated.…you could say from X date forward we want every BACT analysis to include for filterable PM2.5 and look at membrane filters." Vol. III, McCutchen, p 497, lines 15-25, p. 498, lines 1-9. This characterizes the Board's position.

70. NAAQS pollutants such as PM2.5 are subject to BACT requirements, McCutchen, Vol. III, p. 461, l. 19.

71. It is acceptable to send a BACT analysis back to the Department to consider more control options. McCutchen Vol. III, p. 488, l. 12.

72. Mr. McCutchen stated the incentive to develop more efficient control technologies has occurred especially when a source knows it won't get a permit unless a correct BACT analysis (for example to show that NAAQS is not violated) is done. McCutchen, Vol. III, p. 521, lines 22-25, p. 522, lines 1-9.

CONCLUSIONS OF LAW

1. This board has jurisdiction over this matter pursuant to Mont. Code Ann. Sec. 75-2-211(10) which states that a person may appeal the issuance of an air quality permit to the Board within 15 days after the Department renders its decision. Appellants timely filed their appeal on May 29, 2007.

2. Contested case hearings occurred on January 22 and 23, 2008. Oral argument was held on February 11, 2008, and April 21, 2008, on matters of law and clarification of the existing record. The parties submitted written closing statements and replies and written responses to the Board's Request for Briefing on various questions of law and support in the record for assertions of law or fact. The parties supplemented the record on May 5, 2008. On this date the matter was deemed submitted. All hearings and dispositions in this case have been scheduled an expedited basis. This hearing complies with the Montana Administrative Procedure Act, Mont. Code Ann. Title 2, Chapter 4, Part 6 and the Attorney General's Model Rules, Mont. Admin. R. 1.3.211 through 1.3.225 and Mont. Code Ann. § 75-2-211(10).

3. Montana law requires all air pollution sources to obtain permits from the Department before commencing construction and operation. See Mont. Code Ann. § 75-2-211(2)(a).

4. The Department administers its permitting program regarding the issuance of air quality construction permits through rules and regulations adopted by the Board pursuant to Mont. Code. Ann § 75-2-211(1) and (11). The rules list specific requirements for various types of air permits depending on the air quality I the area of the source, e.g. whether the source is located in an area that is in "attainment" or "nonattainment" of applicable National Ambient Air Quality Standards ("NAAQS"). The site of the HGS lies in an "attainment area" for all

regulated pollutants. This means the air quality in the area is in compliance with state and federal air quality standards.

5. The Federal Clean Air Act ("CAA"), 42 U.S.C. § 7401, et. seq., requires states to adopt regulatory programs for issuing a certain type of construction permit to major air pollution sources located in attainment areas. This permit is known as a "Prevention of Significant Deterioration" or "PSD" permit, because it is designed to prevent significant deterioration of air quality in areas that are currently meeting NAAQS. See 42 U.S.C. § 7470(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 the federal Clean Air Act. See 42 U.S.C. §§ 7408 and 7409. In 2006, the EPA revised the 24-hour NAAQS for PM2.5 making them nearly twice as stringent from 65 micrograms/cubic meter to 35 micrograms/cubic meter.

Montana has adopted a regulatory program for PSD permits which the United States Environmental Protection Agency or EPA has approved as part of Montana's Implementation Plan ("SIP"). The Department issues PSD permits to qualifying sources pursuant to rules promulgated for prevention of significant deterioration. PSD permits require a number of demonstrations and conditions to ensure protection of ambient air quality standards, "NAAQS" and to restrict future air quality degradation. See 42 U.S.C. § 7475(a)(3). All new major air pollution sources must use best available control technology ("BACT") for each pollutant regulated under the EPA's New Source Review ("NSR") program. See 42 U.S.C. § 7475(a)(4). Admin. R. Mont. 17.8.752, 17.8.819.

6. The HGS plant is a new major stationary source. A new major stationary source shall apply best available control technology for each regulated

NSR pollutant that it would have the potential to emit in significant amounts. Admin. R. Mont. 17.8.819.

7. BACT under Mont. Admin. R. 17.8.740 is defined as follows:

> "means an *emission limitation* (including a visible emission standard) based on the *maximum degree of reduction* for *each pollutant subject to regulation* under 42 U.C.C. 7410, et. seq. or 75-2-101, et seq., MCA, that would be emitted from any proposed emitting unit…which the department, on a case-by case basis taking into account energy, environmental and economic impacts and other costs, determines is achievable for such emitting unit…through application of production processes or available methods, systems and techniques…for control of such contaminant….If the department determines that technological or economic limitations on the application of measurement methodology to a particular class of emitting units would make the imposition of an emission standard infeasible, it may instead prescribe a design, equipment, work practice or operational standard or combination thereof to *require the application of BACT*. Such standard must to the degree possible, set forth the emission reduction achievable by implementation of such design, equipment work practice, or operation and must provide for compliance by means that achieve equivalent results. (Emphasis supplied) Admin. R. Mont. 17.8.740. See also Admin. R. Mont. 17.8.801(6) (BACT definition under Montana's Prevention of Significant Deterioration, "PSD" program.

8. The HGS plant is a major stationary source of PM2.5 emissions because the HGS plant has the potential to emit 100 tpy of PM2.5. Admin. R. Mont. 17.8.801(22).

9. The pollutant, PM2.5, a fine particle 2.5 microns and smaller, is a "pollutant subject to regulation." See 40 C.F.R. 52.21(b)(50)(i) which states that a regulated NSR pollutant includes "[a]ny pollutant for which a national ambient air quality standard has been promulgated and any constituents or precursors for such pollutant identified by the Administrator." The EPA has promulgated National Ambient Air Quality Standards (NAAQS) for PM2.5 in 40 C.F.R. 50.7. Therefore, best available control technology ("BACT") requirements apply to PM2.5 under the definition of BACT.

10. In 1997, the EPA issued a Memorandum entitled "Interim Implementation of New Source Review Requirements for PM2.5." This memorandum observes that "[i]n view of the significant technical difficulties that now exist with respect to PM2.5 monitoring, emissions estimation, and modeling, that PM10 may be properly used as a surrogate for PM2.5 in meeting NSR requirements until these difficulties are resolved." SME/DEQ Exhibit 2, page 1. This is a so-called "surrogate" approach for reducing PM2.5 emissions and protecting air quality using PM10. According to the memorandum, it does not bind State and local governments and the public as a matter of law. The memorandum is not applicable as a law or regulation. The memorandum states, "[w]hen the technical difficulties are resolved, the EPA will amend the PSD regulations…to establish a PM2.5 significant emissions rate and EPA will also promulgate other appropriate regulatory measure pertinent to PM2.5 and its precursors.

In another memorandum dated April 5, 2005, see SME/DEQ Exhibit 3, page 4, the EPA through Mr. Paige, stated that the EPA interprets Part C of the Clean Air Act to require PSD permits for PM2.5 upon the effective date of the PM2.5 NAAQS but that significant technical difficulties with implementing PSD for PM2.5 because of limitations in ambient monitoring and modeling were identified. Mr. Paige stated that "[b]ecause we have not promulgated the PM2.5 implementation rule, administration of a PM2.5 PSD program remains impractical" and that states should continue to follow the October 23, 1997, guidance for PSD requirements. Again the memorandum states that the statements in this policy guidance do not bind State and local governments.

11. There is no promulgated rule prohibiting States from requiring PSD permit analysis of PM2.5 and no promulgated rule of the EPA excepting from the BACT definition, PM2.5 as a pollutant. The Department is required to conduct a

BACT analysis for each pollutant, including PM2.5. Under Mont. Admin.R. 17.8.749 (1), when the Department issues a Montana air quality permit, the permit must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and to the requirements of subchapter 7 [of Title 17, chapter 8] and the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act, with the Clean Air Act of Montana and rules adopted under those acts. A Montana air quality permit may not be issued for a new facility unless the applicant demonstrates that the facility can show that is will not cause or contribute to a violation of any Montana or national ambient air quality standard.

12. There is no binding requirement for a the Department as the permitting authority to conduct a top-down BACT analysis, however, because it elected to use the top-down method in the HGS permitting process it is obligated to conduct a correct top-down BACT analysis correctly following the NSR Manual in a reasoned and justified manner. See Alaska Dept. of Envtl. Conservation v. EPA, 298 F3d 814, 822 (9th Cir. 2002), aff'd 540 U.S. 461 (2004).

13. The NSR ("New Source Review") Manual, DEQ/SME Exhibit 1, as described EPA Environmental Appeals Board in In re: Prairie State Generating Company, 2006 EPA App. LEXIS 38 p. 11, summarizes the top-down method described in the NSR Manual, for determining BACT as follows:

> The top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent-or "top"-alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations or energy, environmental, or economic impact justify a conclusion that the most stringent technology is not "achievable" in that case.

14. The Department is not obligated to strictly follow the NSR manual providing policy guidance as to how to conduct a top-down BACT analysis, however, 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. In re: Prairie State Generating Company, Id., citing In re: Cardinal FG Co., PSD Appeal No. 04-04 Slip op. at 12 (EAB Mar. 22, 2005).

15. Therefore, the Department is obligated to comply with the requirement to identify, as an initial matter, all of the possible control technologies that could reduce emissions and to generally comply with all regulatory criteria that the NSR manual is designed to address. The first step requires the Department to identify all "potentially" available control options. NSR Manual at B.5. The Appeals Board stated in In re: Prairie State Generating Company that "[a]vailable control options are those technologies including the application of production processes or innovative technologies, 'that have a practical potential for application to the emission unit and the regulated pollutant under evaluation.'"

16. The most stringent or top control alternative is the starting point for the BACT examination of control alternatives. In Alaska Dept. of Envtl. Conservation v. EPA, 298 F.3d 822, the Court stated, "[t]he 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, citing Citizens for Clean Air v. United State 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. Alaska Dept. of Envtl. Conservation v. EPA, 298 F.3d at 822.

17. Also applicable is the opinion of the Environmental Appeals Board, In re: Knauf Fiber Glass, GmbH, 8 E.A.D. 121, 129-30 n.14 (EAB 1999) that remanded an Air Quality Management District's permit decision on the basis that there was an inadequate BACT analysis, specifically a failure to identify multiple pollution control options and to provide infeasibility analyses as necessary. The Environmental Appeals Board states that the "goal of step one in the top-down BACT analysis is to develop a comprehensive list of control options. In compiling the list of available control options, a variety of information sources may be reviewed including information on pollution control and emission limitations for other industrial facilities." Id. at 9. The Appeals Board also observed that "[t]he BACT analysis is one of the most critical elements of the PSD permitting process. As such it should be well documented in the administrative record. A permitting authority's decision to eliminate potential control options as a matter of technical infeasibility or due to collateral impacts must be adequately explained and justified. Id. at 10. The point of the BACT analysis is to know if the most stringent options were really adopted. Id at. 13. In the Knauf case, Knauf did not document the preliminary steps of a BACT determination by including a listing of all possible control options and including a discussion of the emission control technologies and limits for other manufacturing facilities. See also In re: Inter-Power of N.Y., Inc., 5 E.A.D. 130, 144 (EAB 1994); In re: Indeck-Elwood, LLC. PSD Appeal 03-04, 2006 WL 307109 (E.A.B. Sept. 27, 2006) (remanding a permit for failure to justify rejection of more stringent limits for particulate matter).

18. The lowest achievable emission rate ("LAER"). LAER technologies "usually represent the top alternative" in step one of the top-down BACT analysis. DEQ/SME Exhibit 1 at B.5. See also, McCutchen, Vol. III, p. 305, l. 26, p. 306, l. 1.

19. As established in MEIC v. Montana Department of Environmental Quality, 2005 MT 96 ¶ 16, 326 Mont. 502 ¶ 16, 112 P.3d 964 ¶ 16, the burden is on the Appellants to prove by a preponderance of evidence that any permit procedures that they have challenged violate laws and rules governing the issuance of a preconstruction air quality permit. See also, Mont. Code Ann. § 26-1-401.

20. Here the Appellants have shown, and the record supports the conclusion, that the Department failed to conduct a proper BACT analysis of PM10 by unduly limiting its scope of analysis primarily to information supplied by the applicant which was in turn limited almost exclusively by what could be guaranteed by the vendor. This approach precludes consideration of neutral analyses of technologies and emissions limitations that manufacturers and sources may have successfully achieved. Moreover, the Department failed to evaluate top or most stringent control technologies at least initially by determining, in some instances first, what is economically unfeasible and excluding possible control technologies on this basis. This approach prejudges the outcome of which technology can be used to achieve which maximum reduction. Moreover, as to identification of the top control measures, the Department has instituted a process that precludes its own depth of exposure or understanding of the top control technologies, by for instance, failing to identify and examine all available technologies beyond what is submitted in the permit application, including technologies required under the lowest achievable emissions rate determinations, by failing to evaluate applications of similar plants being similarly permitted, for example the Deseret plant application, DEQ/SME Exhibits 11-13, by failing to fully evaluate and compare the relative control efficiencies of permitted technologies and lower limits of other permitted facilities and ruling out why these lower limits may not be implemented, by failing to evaluate different control efficiencies for top control technologies and design

alternatives through consultation with industry experts and manufacturers of control equipment or boilers, and by failing to evaluate linked technologies as top control technologies especially in reference to reducing pollution with different particulate sizes and different compositions, (filterable and condensable) and by failing to take into account special removal capabilities of certain technologies relative to certain pollutants, such as for wet ESP and acid mists. Taylor, Vol. I, p. 68, lines 6-8. In short, the Department's top down BACT analysis of PM10 and resultant emissions limitation were not well reasoned and justified based on the NSR or similar evaluation methods which do yield a defensible emission limit that represents the maximum reduction of PM10 emissions achievable.

21. Specifically, as the result of the failure to implement the top-down BACT analysis for PM10, the Permit Analysis identifies only control efficiencies for total filterable PM as opposed to filterable PM10. The record does not contain any discussion of possible implementation of LAER emission limits for filterable PM/PM10 or condensable PM10 or limits of facilities listed in the RBLC with lower limits or the relative feasibility or infeasibility of using technology associated with those limits as BACT. The permit application and Permit Analysis briefly address energy, environmental and economic impacts for identified filterable particulate controls but they do not contain any economic analysis for identified condensable particulate controls. The BACT analysis in the Permit Analysis identifies certain control technologies in lists but does not provide a rationale as to technical feasibility or infeasibility of these technologies. In the case of condensable PM10, there is no economic justification as to why certain control technologies were excluded or included.

22. The Court in Citizens for Clean Air v. United States Environmental Protection Agency, 959 F.2d 839 (9th Cir. 1992), the PSD permit procedure

imposes different burdens on different parties at various stages of the process. The top-down approach places the burden of proof on the applicant at the permitting stage to justify why the proposed source is unable to apply the best technology available. 959 F. 2d 839 at 845. Under Mont. Admin. R. 17. 8.749 and 17.8.819, the burden rests with the PSD applicant and ultimately the Department to identify and adopt the best available control technology that can reach the maximum degree of reduction for each pollutant subject to regulation. Here, the Department has the burden to show that a BACT analysis for PM2.5 was attempted since PM2.5 is a regulated pollutant. Mr. Merchant stated he was never provided information about anticipated PM2.5 emissions and it was his understanding that PM2.5 information was not available and he therefore used a surrogate analysis. Vol. III, p. 331, lines 11-12; p. 332, lines 1-8; p. 361, lines 23-25, p. 362, lines 1-7. At page 362, Vol. III, l. 7, Mr. Merchant stated that the surrogate analysis was an acceptable methodology and was "appropriate by all standards." Because of the existence of the surrogate analysis, the Department did not call the application that didn't have PM2.5 emission data incomplete. Id., lines 12-18. Mr. Merchant also stated that he could have asked the applicant for a quantification of uncontrolled PM2.5 emissions from the boiler because there is a NAAQS specifically for PM2.5. Vol. III, p.333, l. 13. He admits that promulgation of the NAAQS standard triggers PSD permitting for PM2.5, Vol. III, P. 334, line 24. The Department should have at the least analyzed what PM2.5 emission data could be produced and what if any barriers existed to evaluate emission factors particular to the HGS plant. Because the Department had the burden of identifying emission limitations and adopting the best control technology for PM2.5, it should have evaluated what control technologies exist for PM2.5 and should have determined conclusively (by applying existing conditional test methods and gathering data from the manufacturers, the applicant and from

other credible sources, (of which there is now a considerable amount developed)) that a PM2.5 BACT analysis was not technically possible before failing to conduct one.

23. The record shows there are higher efficiency control technologies in use to control PM10 condensables and particulates to pass the BACT test. The most recent technologies as discussed throughout this opinion should be evaluated for PM10 and PM2.5 including membrane filters and wet ESP's alone, in combination and with other technologies.

24. The Board, in adopting this ruling, finds that the BACT approach is a fluid, forward looking process intended to take into account the newest technologies and most complete compilations of information. Because the duration of a permit can be for decades, the most modern technologies must be considered and analyzed in the BACT process.

WHEREFORE, IT IS HEREBY ORDERED, that Permit No. 3423-00 is remanded for a thorough top-down BACT analysis of PM2.5. If a PM2.5 filterable, BACT analysis cannot be performed, a thorough top-down BACT analysis of PM10 shall be conducted. In either case, a top-down BACT analysis conforming to the NSR Manual will be deemed to be sufficiently thorough.

DATED this _____ day of May, 2008.

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Joseph W. Russell, Chairman, M.P.H., Chairman
Montana Board of Environmental Review

c: Mr. David M. Rusoff
Mr. Kenneth A. Reich

Ms. Abigail M. Dillen
Ms. Jenny K. Harbine
Ms. Katherine J. Orr