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August 1, 2008

Via Overnight Courier

David A. Finley, Administrator
Division of Air Quality
Department of Environmental Quality
122 W. 25th Street
Cheyenne, Wyoming 82002

RE: Violations of Air Quality Standards and Regulations by the Proposed Permit for Medicine Bow Fuel & Power, LLC (Ref. AP-5873)

Dear Mr. Finley:

Please accept these comments submitted on behalf of the Sierra Club and the Wyoming Outdoor Council regarding the Wyoming Department of Environmental Quality/Division of Air Quality's (the "Division of Air Quality") proposal to approve the request of Medicine Bow Fuel & Power, LLC (the "Applicant") to construct a new source in Carbon County, Wyoming. These comments are in addition to comments submitted under separate cover by Bruce Pendery.

For the reasons set forth in these comments, the Division of Air Quality must deny the requested permit, and engage in a much more thorough analysis to address the numerous deficiencies and omissions contained in the current Permit Application Analysis. Substantial modifications and additions to the permit conditions and restrictions are required before the permit would be in compliance with the Wyoming Air Quality Standards and Regulations, and applicable federal law.

If the Division of Air Quality continues to process the draft permit, the agency must revise the terms and conditions of the draft permit substantially, and the revised draft must be re-noticed and the public must have a full and fair opportunity to comment and request a hearing on the revised draft.

Numerous deficiencies and omissions in the Permit Application Analysis prepared by the Division of Air Quality are detailed in our technical comments, copies of which are attached hereto as Exhibit 1 and Exhibit 2.

Importantly, the Applicant proposes technology that has not been tested on this scale, and does not provide firm commitments regarding the carbon sequestration and transfer that would be necessary to implement the technology. The proposed permit terms must be revised significantly to include enforceable guidelines and restrictions to regulate carbon dioxide sequestration, transfer and any possible re-use of the carbon dioxide in commercial applications.

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significantly to include enforceable guidelines and restrictions to regulate carbon dioxide sequestration, transfer and any possible re-use of the carbon dioxide in commercial applications.

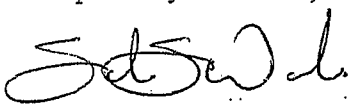
In addition, the speculative nature of this project makes it highly unlikely that the Applicant will have the financial resources necessary to live up to its commitments, and to undertake the proposed operations in an environmentally responsible manner. Prior to granting a permit, the Division of Air Quality must insist that the Applicant prove that it has the financial resources to complete the project in full compliance with all regulatory mandates.

Technical information concerning the Application and Draft Permit was not available, thereby denying our clients and the general public an opportunity for a thorough, detailed, and meaningful review. Specifically, modeling data was not available, thus denying Sierra Club and Wyoming Outdoor Council an opportunity for a comprehensive review and comment on the required air impacts analyses.

We requested all the modeling files necessary to recreate the proposed plant's emission calculations and tables, as well as the complete Class I impact analyses, and all the modeling files necessary to review the Class II impacts analyses. These materials are relevant to the draft permitting decision and are, therefore, required to be available for inspection during the public comment period. Reg. 8 sec. 2.1.7; Reg 18 sec. 18.306; Reg. 19; Reg. 26, Ch. 6. In order to remedy this failure, the public must be given access to this information and more time to review and analyze the information.

Because the proposed approval of the requested permit would violate Wyoming Air Quality Standards and Regulations, and applicable federal law, we respectfully request that you reject the proposed permit, as currently drafted, and insist that any future development move forward only after the numerous deficiencies and omissions set forth in these comments are addressed, in full compliance with all state and federal laws.

Respectfully submitted,



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Enclosures

EXHIBIT 1

Comments on the Air Quality and Visibility Impact Analyses of the PSD Permit Application for the Medicine Bow Fuel & Power IGL Plant

July 30, 2008

Prepared for:

Sierra Club
and
Earthjustice

Prepared by:

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I. INTRODUCTION

Medicine Bow Fuel & Power LLC (MBFP) has proposed to build and operate an underground coal mine and an industrial gasification and liquefaction (IGL) plant near Medicine Bow in Carbon County, Wyoming. AMI Environmental (AMI) has been retained by Sierra Club to review and comment on the air quality and visibility impact analyses of the proposed facilities. These analyses have been conducted for the Prevention of Significant Deterioration (PSD) Permit Application that has been submitted by MBFP to Wyoming Department of Environmental Quality (WDEQ). Qualifications of Mr. Khanh Tran, Principal of AMI, to perform the review are shown in Appendix A.

II. PROJECT DESCRIPTION

The proposed underground coal mine, known as the Saddleback Hills Mine, will process about 8,700 tons per day (tpd) of coal. The IGL plant will use the mined coal that will be gasified to produce synthesis gas (syngas) and other products, including 18,500 barrels per day of regular gasoline, 42 tpd of sulfur and 198 MMscfd of carbon dioxide (CO2). The IGL plant will also produce about 253 MMBtu/hr of fuel gas and about 400-500 MMBtu of liquefied petroleum gas (LPG). These fuels will be used by a 400 MW electric plant that will include three combustion turbines.

According to the WDEQ Permit Analysis, the project will emit, under normal operating conditions, significant amounts of NO_x (175.9 tons per year), SO_2 (32.9 tpy), PM_{10} (195.1 tpy), CO (176.9 tpy), VOC (188.5 tpy) and HAP (24.8 tpy). Under cold startup, the flares will emit large SO2 emissions (7508.1 lb/hr from the HP flare and 3,601.2 lb/hr from the LP flare). These are controlled emissions following the BACT controls proposed by MBFP.

The proposed facility will be located in Carbon County that is currently designated as attainment for all regulated pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), fine PM (PM2.5), lead, ozone and oxides of nitrogen (NO_x).

The project's surrounding area is classified as PSD Class II. There are eight PSD Class I areas and one sensitive Class II area within 300 km of the proposed project. Savage Run, the nearest Class I area, is located about 61 km south of the project.

III. REVIEW METHODOLOGIES

AMI's review has focused on the documents prepared by the WDEQ and those prepared by the applicant MBFP and its consultants (CH2MHill and URS). AMI has not performed a review of the modeling inputs and outputs of the Aermod and Calpuff modeling since these are not available to AMI. Below is a list of the documents that have been reviewed.

Wyoming DEQ Documents

Public Notice and Notice of Public Hearing
Permit Application Analysis – AP-5873, June 19, 2008 (hereinafter referred to as the WDEQ Permit Application Analysis)

Medicine Bow Fuel & Power (MBFP) Documents

PSD Permit Application for Medicine Bow Fuel & Power LLC Industrial Gasification & Liquefaction (IGL) Plant – December 31, 2007 Amended Permit Application (hereinafter referred to as the PSD Application)

Coal-to-Liquids Project, Carbon County, Wyoming – Industrial Siting Permit Application. Prepared by CH2MHill, September 2007.

Electronic Modeling Archive

Modeling inputs and outputs of the models Aermod (for Class II areas) and Calpuff (for Class I areas) were not provided to AMI and, hence, their review has not been performed.

IV. COMMENTS ON NEAR-FIELD MODELING FOR PSD CLASS II AREAS

Comment #1: Maximum modeled concentrations from the MBFP emissions alone and extents of significant impact areas have not been provided in the PSD application

The PSD Application indicates that maximum concentrations predicted by the AERMOD model with the MBFP emissions alone will exceed the significant impact levels (SIL) for all applicable pollutants. However, these maximum concentrations and information on significant impact areas are not presented in the PSD Application. The US EPA NSR Workshop Manual requires that the PSD Application reports these maximum modeled concentrations (US EPA, 1990). They are used to determine whether cumulative modeling (if the SIL are exceeded) and onsite monitoring (if the monitoring de minimis concentrations are exceeded) will be required. In addition, radius of significant impact areas (SIA) has to be presented for pollutants with modeled concentrations above the significant impact levels (SIL).

Comment #2: Cumulative air quality impacts have been understated due to the omission of emission sources

The cumulative modeling for PSD Class II increment analysis and NAAQS compliance only includes cumulative sources that are located within 35 km of the MBFP project. Normally, cumulative sources within 50 km of the proposed project are included in the modeling. This radius of 50 km is the maximum distance where a Gaussian plume model such as AERMOD is applicable.

Comment #3: Short-term air quality impacts have been understated due to the use of annual-averaged emissions from cumulative sources

The cumulative modeling for short-term (e.g. 1-hour, 3-hour and 24-hour) PSD Class II increment analysis and NAAQS/WAAQS compliance have used annual-averaged pollutant emissions for cumulative sources. The EPA NSR Workshop Manual requires that maximum allowable short-term emissions should be used not only for MBFP but also all other cumulative sources (US EPA, 1990). Higher emissions will result in larger air quality impacts at PSD Class II areas.

Comment #4: PM10 24-hour impacts have been understated due the omission of fugitive emissions

The AERMOD modeling for PM10 24-hour impacts only considers PM10 emissions from MBFP point sources and has neglected fugitive emissions. As shown in Table XVI of the WDEQ Permit Application Analysis, the maximum modeled PM10 24-hour concentration of 7.1 ug/m3 is much lower than the maximum annual-averaged concentration of 14.4 ug/m3. This is illogical and unacceptable! The AERMOD model has an improved algorithm for handling area sources such as fugitive emissions. Fugitive emissions should be included in the AERMOD modeling and this will result in higher air quality impacts in PSD Class II areas.

Comment #5: PM10/PM2.5 impacts from MBFP and cumulative sources cause exceedances of proposed PSD Class II 24-hour and annual increments

The PSD Application has not performed a comparison of MBFP and cumulative impacts against the PSD Class II PM2.5 increments recently proposed by the US EPA on September 21, 2007 (Federal Register vol. 72, no. 183). US EPA has also recommended that PM10 concentrations be taken as surrogate for PM2.5. Table XVI of the WDEQ Permit Application Analysis indicates that the annual-averaged PM10/PM2.5 concentrations for all modeled years (from 13.3 ug/m3 to14.4 ug/m3) will exceed the proposed PSD Class II increments of 9 ug/m3 for 24-hour and 4-5 ug/m3 for annual averages.

Comment #6: MBFP and cumulative sources will cause exceedances of $PM_{2.5}$ annual national ambient standard.

The MBFP PSD Permit Application and the WDEQ Permit Application Analysis do not include a modeling analysis of the project and cumulative impacts against national ambient air quality standards (NAAQS) for particulate matter with less than 2.5 microns in diameter ($PM_{2.5}$). In July 1997, EPA issued an annual standard set at 15 ug/m^3, based on the 3-year average of annual mean $PM_{2.5}$ concentrations and a 24-hour standard of 65 ug/m^3, based on the 3-year average of the 98th percentile of 24-hour concentrations. EPA has recently (in September 2006) tightened the 24-hour standard from 65 ug/m^3 to 35 ug/m^3 and retained the annual standard at 15 ug/m^3. US EPA has also recommended the use of PM10 as a surrogate for PM2.5. The US EPA AirData website shows a PM2.5 annual average of 4.1 ug/m3 in Cheyenne in 2005 (the same year that background concentrations for other pollutants were derived in the PSD Application). Modeled PM10/PM2.5 annual impacts in Table XVI of the Permit Application Analysis range from 13.3 ug/m3 to 14.4 ug/m3. With the addition of the background concentration of 4.1 ug/m3, all modeled total impacts (ranging from 17.4 ug/m3 to 18.5 ug/m3) will exceed the PM2.5 annual NAAQS of 15 ug/m3.

Comment #7: PSD increment analysis has severely understated short-term SO2 increment consumption due to the omission of large MBFP flare emissions, and these emissions can lead to large exceedances of both 3-hour and 24-hour PSD Class II increments

Large SO2 emissions from the flares (7,508.1 lb/hr from the HP flare and 3,601.2 lb/hr from the LP flare) have been omitted in AERMOD modeling for comparison against short-term (3-hour and 24-hour) PSD Class II increments. Omitting these large SO2 emissions has severely understated short-term SO2 increment consumption by the MBFP project. The WDEQ Permit Application Analysis has stated that "all sources at the proposed IGL and adjacent coal mines were considered to be increment-consuming sources for purposes of determining compliance with the PSD increments". Flare emissions have been included as part of the NAAQS/WAAQS compliance analysis and modeling results reported in Table XIX show that the modeled concentrations due to MBFP emissions alone range from 1,016.2 ug/m3 to 1,127 ug/m3 (for 3-hour averages) and from 174.4 ug/m3 to 236.4 ug/m3 (for 24-hour averages). All these concentrations will largely exceed the PSD Class II increments of 512 ug/m3 (3-hour) and 91 ug/m3 (24-hour).

Comment #8: Project CO 1-hour impacts will exceed the 1-hour NAAQS with a higher CO background

Table XVIII of the WDEQ Permit Application Analysis reports a modeled total 1-hour CO impact of 39,174.2 ug/m3 for the year 2001. This total concentration is slightly below

the 1-hour NAAQS of 40,000 ug/m3. It includes a project contribution of 37,228 ug/m3 and a background of 1,946 ug/m3 that has been measured as the second highest value in 2005 at Yellowstone National Park (Table XI). It is normally acceptable to use the highest measurements during the last five years as the background. The US EPA AirData website indicates that in 2003 the highest and second highest CO measurements at Yellowstone are 2.9 ppm and 2.5 ppm, respectively. Using this second highest measurement of 2.5 ppm (2,857 ug/m3) as the background, the total 1-concentration will be 40, 085 ug/m3 (37,228+2,857). This total 1-hour concentration will exceed the CO 1-hour NAAQS of 40,000 ug/m3.

Comment #9: Project impacts on ozone air quality have not been addressed.

The proposed MBFP plant will emit large amounts of NO_x (175.9 tpy) and VOC (188.5 tpy). Known to be ozone precursors, these pollutants react under sunlight to form ozone. The MBFP PSD Application has not addressed their impacts against the 8-hour ozone standard. US EPA has recently lower the 8-hour standard from 0.08 ppm to 0.075 ppm. Ozone modeling should be performed to assess the impacts of project emissions on ozone air quality in Carbon County and other nearby areas.

Comment #10: Plume blight impacts from MBFP may be significant but they have not been analyzed.

Visibility impacts at PSD Class I areas have been addressed but those impacts within 10-20 km of the proposed site through plume blight of the MBFP project alone have not been analyzed as recommended by the U.S. EPA Modeling Guidelines (US EPA, 2005). These impacts should be analyzed by the VISCREEN model that implements the screening Level I recommended by the U.S. EPA. MBFP visibility impacts through plume blight can be significant, with its plumes visible for miles from the proposed site.

Comment #11: Project will emit several toxic chemicals and their health risks have not been quantified

The MBFP project will emit several toxic chemicals that are known to be carcinogens and/or to cause noncancer acute and chronic health effects. A screening level (Tier 1) analysis has been performed. However, this analysis only considers benzene, ethyl benzene, formaldehyde, methanol, hexane, toluene and xylene. As shown in the PSD Application, the MBFP project will also emit acetaldehyde, acrolein, mercury, naphthalene, PAH and propylene oxide. All these substances have been omitted in the screening analysis. Moreover, this analysis only focuses on inhalation risk and understates potential health effects by ignoring non-inhalation risks such as ingestion of soil, drinking water and food. Thus, the screening analysis in the PSD Application underestimates the health effects by not considering the additive effects of emitted toxics as well as the multipathway health risks.

A full health risk assessment will need to be conducted to assess potential health effects of the toxic chemicals emitted by MBFP as part of public health and environmental justice concerns. AMI has developed a model named ACEHWCF (Assessment of Chemical Exposure for Hazardous Waste Facilities) that can evaluate both inhalation and non-inhalation risks using the multipathway exposure algorithms recommended by the U.S. EPA (*Human Health Risk Assessment Protocol for Hazardous Waste Facilities, Final, EPA530-R-05-006, September 2005*). The ACEHWCF model has been described in a technical paper (Tran, 2001) that is available from AMI's website.

Comment #12: Acute noncancer risks from MBFP toxic emissions are significant

Results of the acute noncancer risk analysis of MBFP toxic emissions are reported in Table XXV of the WDEQ Permit Application Analysis. In a screening analysis, it is customary to add up all hazard quotients (HQ) from all individual substances. From Table XXV, the sum of all individual hazard quotients is slightly greater than 1.1. With a total HQ above 1, acute noncancer health effects from MBFP will be significant.

Comment #13: Project SO_2 emissions can cause significant impacts on sensitive soils and vegetation

The PSD Permit Application indicates that project emissions will not cause significant impacts on sensitive soils and vegetation since the modeled concentrations are below the secondary NAAQS and Wyoming AAQS. For assessing the effects of SO2 on sensitive plants and soils, US EPA has recommended screening levels of 917 ug/m3 for 1-hour averages and 786 ug/m3 for 3-hour averages (US EPA, 1980). Table XIX of the WDEQ Permit Application Analysis shows that modeled 3-hour SO2 concentrations (from 1,016.2 ug/m3 to 1,127 ug/m3) from MBFP will largely exceed both 1-hour and 3-hour screening levels recommended by the US EPA. It should be noted that the maximum SO2 1-hour concentrations should be higher than the 3-hour averages reported in Table XIX. Thus, project SO_2 concentrations will largely exceed the threshold levels for sensitive plants, and can cause significant impacts on local sensitive soils and vegetation.

Comment #14: Project ozone impacts on sensitive crops and plants have not been analyzed

Ozone is a secondary pollutant that is formed under sunlight from precursors NOx and VOC. Similar to sulfur dioxide, several plant species are affected by ozone. MBFP will emit large amounts of NO_x (175.9 tpy) and VOC (188.5 tpy). The PSD Permit Application has not presented an impact analysis of either ozone or VOC as a surrogate. US EPA (1980) has recommended VOC screening levels of 392 ug/m3 (1-hour), 196 ug/m3 (4-hour) and 118 ug/m3 (8-hour). It should be noted that these screening levels

were based on studies in the 1970s and may not be protective of crops and plants in the area around MBFP.

Comment #15: Greenhouse gas emissions and BACT have not been analyzed

The proposed MBFP facility will emit large amounts of greenhouse gases such as carbon dioxide that affect global warming. CO2 emissions from MBFP should be quantified and the BACT measures to capture and sequester them should be discussed.

V. COMMENTS ON FAR-FIELD MODELING FOR PSD CLASS I AREAS

Comment #16: Air quality and visibility modeling use meteorological data that are too coarse to resolve the effects of complex terrain in the impacted areas

The Calpuff model is the principal model used for analyzing air quality and visibility impacts of the proposed MBFP facility in PSD Class I areas. Meteorological data used by the Calmet preprocessor to generate the hourly, three-dimensional windfields required by the Calpuff modeling are based on outputs of the mesoscale model MM5 that were generated by the US EPA and Western Regional Air Partnership (WRAP) for the years 2001-2003. These MM5 runs used a coarse grid resolutions of 36 km. These MM5 36-km data were then used to generate MM5 data at a finer 12-km resolution. For the Best Available Retrofit Technology (BART) program, Wyoming DEQ has recommended the use of these MM5 12-km data in its BART Modeling Protocol (WDEQ, 2006). Instead of the 36-km data, the Calmet/Calpuff modeling for the MBFP project should also use this 12-km MM5 data set to better resolve the influences of complex terrain in southeast Wyoming and northern Colorado.

The above coarse 36-km MM5 data are then used by the Calmet preprocessor to generate three-dimensional wind fields for use by the Calpuff model. The Calmet/Calpuff wind fields are based on a horizontal resolution of four kilometers. This 4-km horizontal grid resolution is still too coarse for an accurate simulation of the complex terrain features as well as other micrometeorological processes such as fog, clouds that are controlling the pollutant formation and dispersion in mountainous areas of Colorado and Wyoming. The Federal Land Manager (FLM) has recently recommended a finer grid resolution (about one km) for Calpuff modeling in complex terrain, e,g. 1-km grid resolution in the recent modeling for the White Pine Energy Station in Nevada (Environ, 2006). A 2-km resolution has also been used in the modeling for the proposed Toquop power plant in Nevada (ENSR, 2007).

Thus, an accurate impact assessment of the MBFP project will require the use of 12-km MM5 data for the years 2001-2003 in the modeling. The Calmet/Calpuff models should then be rerun with a much finer resolution (e.g., 1 km or less) to obtain an accurate simulation of the topographical effects and micrometeorological processes.

Comment #17: Air quality and visibility impact modeling used meteorological data whose validity and accuracy have not been evaluated

Besides the problem of coarse resolution (Comment #16 above), the wind fields and meteorological inputs generated by the Calmet preprocessor have not been evaluated before their use in the Calpuff modeling. A quantitative performance evaluation of these meteorological inputs against actual measurements in the modeling region should be performed to evaluate their validity and accuracy. Similar to the 2002 MM5 evaluation performed by WRAP, both graphical and statistical measures should be used in the performance evaluation (Environ, 2005). Further, the meteorological inputs should be shown to be applicable to impact assessment at the PSD Class I areas, e.g. backward/forward trajectories should be generated to show whether or not pollutant plumes from MBFP will be transported to and impacting those areas. Such trajectory analysis will provide information on the magnitude, duration and frequency of MBFP plumes impacting the PSD Class I areas.

Comment #18: Coarse receptors have been used in impact modeling for Savage Run and air quality and visibility impacts may be underestimated

Savage Run is the nearest Class I area (61 km) to the MBFP project. Some receptors used in the Calpuff modeling for this PSD Class I area have been placed at 2 km apart. This resolution is coarser than the 1-km resolution that is normally used by the National Park Service to discretize receptors in Class I areas. The use of coarse receptors may miss the peak concentrations. This leads to underpredicting the air quality and visibility impacts at Savage Run.

Comment #19: The top of the Calpuff modeling domain may be too low

The top ZIMAX/ZFACE of the Calpuff modeling domain is set at 3,500 m. This value may be too low since maximum afternoon mixing heights in Colorado, where several Class I areas are located, may be higher than 3,500 m during the summer months. In its BART Modeling Protocol, Colorado Department of Public Health and Environment has noted that mixing height in Colorado has reached 6,000 m and has recommended a ZIMAX value of 4,500 m (Colorado DPH&E, 2005). The Calmet and Calpuff models should be rerun with this higher ZIMAX to ensure that no mass loss from the MBFP plumes occurs and air quality and visibility impacts will not be underpredicted.

Comment #20: PSD Class I increment consumption and visibility impacts have been severely understated due to the omission of large MBFP flare emissions

The WDEQ Permit Application Analysis has stated that "all sources at the proposed IGL and adjacent coal mines were considered to be increment-consuming sources for purposes of determining compliance with the PSD increments". However, large SO2 emissions from the flares (7,508.1 lb/hr from the HP flare and 3,601.2 lb/hr from the LP flare) have been omitted in the Calpuff modeling for comparison against short-term (3-hour and 24-hour) PSD Class I increments. These flares are known to operate under startup or malfunction, and their emissions are much larger than those from the turbines and other MBFP sources. Omitting these large SO2 emissions has severely understated short-term SO2 increment consumption and visibility impacts at PSD Class I areas by the MBFP project. Large SO2 emissions from flares may also cause exceedances of the PSD Class I 3-hour and 24-hour increments.

Comment #21: Air quality and visibility impacts have been understated due to the omission of emissions of intermittent sources.

The Calpuff modeling of air quality and visibility impacts at PSD Class I areas has omitted several emission sources that operate during startup or malfunction such as flares (see Comment #20 above), gasifier preheaters, Black Start generators, CO2 vents and firewater pumps. Thus, air quality and visibility impacts from MBFP are understated due to the omission of these sources. At a minimum, emissions from these sources (except the flares) should be added to those of the auxiliary boiler and modeled by Calpuff. Due to their large SO2 emissions and high plume rise, the flares should be modeled separately.

Comment #22: No PM2.5 PSD Class I increment analysis has been performed.

US EPA has proposed in September 2007 PSD increments and significant impact increments for PM2.5 (particulate matter with less than 2.5 microns in diameter). PM2.5 emissions from MBFP should be quantified and their impacts modeled at PSD Class I areas. PM2.5 impacts should include not only the concentrations from the PM2.5 primary emissions but also the secondary contributions due to chemical conversion of precursors such as NOx, SOx and VOC. These secondary contributions can be larger than the PM2.5 concentrations from primary emissions. The modeled impacts should be compared against the EPA-proposed PSD Class I increments of 2 ug/m3 (24-hour) and 1 ug/m3 (annual).

VI. CITED REFERENCES

Colorado Department of Public Health and Environment, 2005. CALMET/CALPUFF BART Protocol for Class I Federal Area. Available from http://apcd.state.co.us/documents/Colorado-subject-to-BART-CALPUFFprotocol.pdf

ENSR, 2007. Toquop Energy Project Class I-B Operating Permit to Construct Application. Available from http://ndep.nv.gov/bapc/toq.html

Environ, 2006. Class I Area Quality and AQRV Impact Assessment for the White Pine Energy Station – Revised Final Draft Report. Available from http://ndep.nv.gov/bapc/download/ls/app8a.pdf

Environ, 2005. Annual 2002 MM5 Meteorological Modeling to Support Regional Haze Modeling of the Western United States. Draft Final Report. Prepared for WRAP. Available from http://pah.cert.ucr.edu/aqm/308/reports/mm5/DrftFnl_2002MM5_FinalWRAP_Eval.pdf

Federal Land Managers Air Quality Related Values Workgroup (FLAG, 2000). Phase I Report. Available from the NPS Website http://www2.nature.nps.gov/air/Permits/flag/flagDoc/index.cfm

Tran, Khanh, 2001. *ACEHWCF – A Comprehensive Risk Assessment Model for Hazardous Waste Combustion Facilities.* A&WMA Hazardous Waste Combustors Specialty Conference, Kansas City, March 2001. Available from AMI's website http://www.amiace.com

US EPA AirData website http://iaspub.epa.gov/airsdata/adaqs.monvals?geotype=st&geocode=WY&geoinfo=st%7EWY%7EWyoming&pol=CO&year=2003&fld=monid&fld=siteid&fld=address&fld=city&fld=county&fld=stabbr&fld=regn&rpp=25

US EPA, 2005. *Revisions to the Guidelines on Air Quality Models.* 40 CFR Part 50. Federal Register, vol. 70, no. 216. November 9, 2005.

US EPA, 1990. *New Source Review Workshop Manual – PSD and Nonattainment Area Permitting.* Draft October 1990.

US EPA, 1980. *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals.* EPA-450/2-81-078. December 1980.

Wyoming DEQ, 2006. BART Air Modeling Protocol. Individual Source Visibility Assessments for BART Control Analyses. Available from http://deq.state.wy.us/aqd/BART/2006-09_BART%20Air%20Modeling%20Protocol.pdf

APPENDIX A

Qualifications of Khanh T. Tran

Mr. Khanh Tran is the owner and Principal Scientist of AMI Environmental since its establishment in 1980. He has over 30 years of experience in project management, meteorological modeling, air quality modeling, emissions inventory and visibility analysis. He has successfully managed over 200 air quality studies conducted by AMI on behalf of government agencies (including US Department of Energy, Bureau of Land Management, Minerals Management Service, Arizona Department of Environmental Quality, California Energy Commission and California South Coast Air Quality Management District) as well as large utilities (including Duke Power, Los Angeles Department of Water and Power and Southern California Edison) and oil companies (including Arco, Occidental Petroleum and Texaco).

Mr. Tran received his B.S. (1973) and M.S. (1974) degrees in Mechanical Engineering from the University of California, Santa Barbara. From 1978-1980, he completed graduate courses in Atmospheric Sciences, Computer Sciences and Environmental Fluid Dynamics at UCLA. In 1978, he also developed a predictive atmospheric modeling system for real-time emergencies as part of his Ph.D. research at UCLA. Mr. Tran is a former member of the National Committee on Meteorological Aspects of Air Pollution of the American Meteorological Society.

Mr. Tran has extensive experience in the development, evaluation and application of air quality simulation models, from simple Gaussian dispersion models (AERMOD, CALPUFF, ISCST3) to complex photochemical grid models (UAM, CAMx, Models3/CMAQ). He has also developed air quality models that have received approval from regulatory agencies. He has performed a wide variety of air quality modeling studies, including:

- He has recently reviewed the air quality and visibility impact analyses that have been performed as part of PSD permit applications of proposed coal-fired power plants in Georgia (Longleaf and Washington), Kentucky (Trimble), Montana (Highwood), Nevada (Ely), New Mexico (Desert Rock), Ohio (AMP), Virginia (Virginia City Hybrid) and Wyoming (Dry Fork). He has performed AERMOD, ISCST3 and CALPUFF modeling to verify the results documented in the PSD permit applications and predict air quality and visibility impacts from alternative emissions scenarios.
- He has performed a comparative study of short-range dispersion models (ISCST3, ISC-PRIME and AERMOD). He has extensive experience in applying these models to air quality impact analyses for power plants, oil refineries and other facilities. He had applied Gaussian-based models to proposed coal leases by the Bureau of Land Management in New Mexico. He had used the ISCST3 model

to assess potential impacts of several proposed gas-fired power plants in California.

- He modified and applied the long-range transport MESOPUFF (a predecessor of CALPUFF) to coal development projects in Utah and North Dakota. As part of these project EIS, he had performed visibility modeling to assess potential impacts of end-use facilities (e.g. power plants) at nearby PSD Class I areas.
- He developed the diagnostic wind module that has been included in the preprocessor CALMET of the CALPUFF model.
- He developed PC-based versions of the MM5 model, and applied the model to air quality modeling studies, e.g. the 1997 Southern California Ozone Study (SCOZ). He also modified the MM5 model to provide Web-based real-time weather forecasts for wind energy plants in California and Texas as well as tropical storms in Southeast Asia.
- He had developed the photochemical trajectory model TRACE and applied to power plant siting (e.g. the Lucerne Valley generating station for Southern California Edison) and offshore oil and gas development in California. He also applied other photochemical grid models to the development of ozone air quality attainment plans (AQAP) for Santa Barbara County, San Diego County and Kern County in California, and the Phoenix metropolitan area of Arizona. He recently applied the Urban Airshed Model to predict ozone impacts from proposed power plants in southern California and Phoenix.
- He developed the multipathway risk assessment model ACE2588 that has become widely used in over 1000 facilities under California's air toxics regulations (AB 2588). The ACE2588 model has also been used in other states and foreign countries. He improved the ACE2588 model to include a Monte Carlo uncertainty analysis to provide more realistic risk estimates.
- He developed the ACEHWCF model that implements the U.S. EPA health risk assessment guidelines for hazardous waste combustion facilities.
- He was in charge of prioritizing over 800 air toxics facilities in the Los Angeles air basin, reviewing and modifying their risk assessments submitted under the California Air Toxics Hot Spots AB 2588.
- He completed the development of a comprehensive emission inventory of over 10,000 point sources, including power plants, for regional exposure modeling of air toxics in the Los Angeles area.
- He has also used several dispersion models ranging from simple Gaussian puff to multiphase, dense gas models (e.g., DEGADIS and SLAB) to simulate accidental releases of hazardous chemicals.

EXHIBIT 2

TECHNICAL AND REGULATORY COMMENTS ON THE MEDICINE BOW INDUSTRIAL GASIFICATION AND LIQUEFACTION (IGL) PLANT

July 30, 2008

Prepared for:

Sierra Club
and
Earthjustice

1.) WDEQ and Medicine Bow should address applicability to standards governing petroleum refineries in the permit application, permit application analysis, and the draft permit conditions.

The permit application analysis is flawed because it does not address all potentially applicable air quality regulations. The plant will produce gasoline or coal naphtha[1]. The plant expects to produce approximately 18,500 barrels per day of gasoline. This equates to 777,000 US gallons per day or 283,505,000 gallons of gasoline per year. With a typical density of 6.17 pounds per gallon[2], the facility has the physical capacity to produce 793,715 Mg of gasoline, which contains benzene. In an applicability determination regarding New Source Performance Standard (NSPS), Subpart J, for petroleum refineries constructed, modified or reconstructed on or before May 14, 2007, the US EPA determined that Subpart J requirements apply to "liquid solvent refining of coal" or SRC II processes where the product is gasoline.[3] The SRC II process and the methanol-to-gasoline process, utilized by Medicine Bow, are similar methods for coal liquefaction.[4] Since there is no distinction between the SRC II process and the methanol process for coal liquefaction that would render the 1980 determination from EPA invalid, and the applicability for Subpart Ja under NSPS is identical to that of Subpart J except for later construction, it stands to reason that Subpart Ja is applicable to all affected facilities at Medicine Bow. Similarly, since the methanol-to-gasoline process at Medicine Bow meets the definition of "petroleum refinery" per the 1980 determination and the site is major for hazardous air pollutants, all affected facilities under 40 CFR Part 63 Subpart CC and UUU must comply with its provisions.

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[1] http://www.billingsgazette.net/articles/2007/12/08/news/wyoming/20-coaltoliquid.txt, "Siting Permit OK'd for Coal-to-Liquid Operation", Billings Gazette, published on Saturday December 08, 2007, Accessed 07/10/2008

[2] http://www.epa.gov/ttn/chief/ap42/appendix/appa.pdf, AP-42,Fifth Ed., Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Appendix A, "Densities of Selected Substances", page A-7 Accessed 07/10/2008

[3] "Applicability Determination for Solvent Refined Coal Plants" Letter from Edward E. Reich to Jim Snydor, Dated 03/19/1980, US EPA, Applicability Determination Index, http://cfpub.epa.gov/adi/index.cfm?CFID=1708823&CFTOKEN=72203075&jsessionid=b2302cf85fa81922cb0636212b6f103a7512TR&requesttimeout=180, Accessed 07/23/2008

[4] http://www.princeton.edu/~ota/disk3/1982/8224/822405.PDF, "Selected Technical and Economical Comparisons" Part 5, Chapter 3, Accessed 07/25/2008

2.) WDEQ must require BACT and ensure compliance with the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$.

The permit application analysis is flawed because it does not address applicability to 40 CFR 52.21 for $PM_{2.5}$. In fact, it completely ignores $PM_{2.5}$ as a pollutant. The permit application does not purport to use PM_{10} as a surrogate for $PM_{2.5}$, but if we look to PM_{10} modeling analysis in the application, it is clear that Medicine Bow and cumulative sources will cause exceedances of $PM_{2.5}$. WEQ must require BACT for $PM_{2.5}$ to meet its statutory requirements and in order to adequately protect public health.

$PM_{2.5}$ (sometimes referred to as fine particulate matter) is the smallest and most dangerous category of particulate matter by the Clean Air Act and its Amendments. These particles are small enough to be extremely invasive and to cause serious respiratory illness in humans. Risk to human health and welfare caused by fine particulate matter is so great that in 2006 the US EPA was prompted to revise its 1997 National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ to a level that is nearly twice as stringent as the 1997 standard.

To further address the health threat posed by $PM_{2.5}$, the EPA promulgated rules under the 40 CFR 52.21 "Prevention of Significant Deterioration" (PSD) to ensure that the $PM_{2.5}$ standards, which protect human health and the environment, are maintained and not violated by new or modified sources of air pollution. This "Final $PM_{2.5}$ NSR Implementation Rule" took effect on July 15, 2008.[5]

So far, all counties in Wyoming have been designated as "attainment/unclassifiable" for the $PM_{2.5}$ NAAQS.[6,7]

The US EPA has offered SIP-approved states the option of only reviewing PM_{10} emissions in PSD applications for NAAQS compliance only **when the state "could not implement" the Final $PM_{2.5}$ NSR Implementation Rule.**[8] This recent rule is not yet incorporated into the Wyoming SIP, and so the "surrogate" approach described by the rule is at this point only guidance that is not legally-binding on WDEQ. Moreover, the US EPA has been quick to remind states that the NAAQS for $PM_{2.5}$ "must be protected" during this transition period.[9] Where information exists

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[5] *Federal Register*, Volume 73, No. 96, "EPA-HQ-OAR-2003-0062, FRL-8566-1,RIN-2060-AN86, 40 CFR parts 51 and 52, Final Rule: Implementation of New Source Review (NSR) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$), pp 28321 - 28350

[6] http://www.epa.gov/pmdesignations/1997standards/final/region8desig.htm "1997 PM2.5 Standards – Region 8 State Designations" Accessed 07/11/2008

[7] http://www.epa.gov/pmdesignations/2006standards/rec/letters/08_WY_rec.pdf, "2006 24-hour PM2.5 Standards – Region 8 Recommendations and EPA Responses", Accessed 07/11/2008

[8] *Federal Register*, Volume 73, No. 96, "EPA-HQ-OAR-2003-0062, FRL-8566-1,RIN-2060-AN86, 40 CFR parts 51 and 52, Final Rule: Implementation of New Source Review (NSR) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$), pp 28341

[9] *ibid*

that indicates that the NAAQS for $PM_{2.5}$ is threatened, the states are mandated to ensure that measures are taken to attain the $PM_{2.5}$ standard.

Wyoming (except Indian Country) is a "SIP-approved state" for the purposes of 40 CFR 52.21 "Prevention of Significant Deterioration" (PSD).[10] If WDEQ and Medicine Bow are using PM_{10} significant emission thresholds, significant monitoring concentrations, significant impact levels, and the PM_{10} NAAQS as a surrogate for $PM_{2.5}$, the permit application should so explicitly state.[11] However, in Tables I, III, Va, Vb, VI, the Chapter 6, Section 4 Top-down Analysis, Table 13, and page 37 of the permit application analysis, **WDEQ has completely ignored $PM_{2.5}$ as a PSD-regulated pollutant.** Specifically, Table IV of the permit application analysis does not even quantify $PM_{2.5}$ nor does it identify Medicine Bow as a source of "significant" emissions either for direct $PM_{2.5}$ or by virtue of "significance thresholds" for its precursors NO_X, SO_2, and VOC at 40 TPY. The permit application analysis does not even make mention of the intent to use PM_{10} as a surrogate for $PM_{2.5}$ nor does it compare PM_{10} emission rates to the 24-hr and annual $PM_{2.5}$ NAAQS. The only particulate matter limit in the "Proposed Permit Conditions", which is contained in Condition No. 10, makes clear that the limit only pertains to "Filterable" particulate matter. Since particulate matter less than 2.5 microns is not "filterable" by definition, Medicine Bow is given free reign by these draft conditions to emit as much fine particulate as they can.

WDEQ's use of EPA's guidance would be understandable if data did not already exist to demonstrate compliance with the $PM_{2.5}$ NAAQS, using PSD requirements for $PM_{2.5}$. However, a "significant emission" level exists, a significant impact level exists, and background monitoring data exist for $PM_{2.5}$ for the same year from which background emission data for other pollutants was obtained. Therefore, Best Achievable Control Technology for $PM_{2.5}$ can be determined, compliance with the $PM_{2.5}$ NAAQS can be ensured, and PSD Increment and visibility can be protected by WDEQ.

Medicine Bow and cumulative sources will cause exceedances of $PM_{2.5}$ NAAQS. If all PM_{10} is used as a surrogate and assumed to be emitted at particle sizes of 2.5 microns or less, a review of the enclosed report, "Comments on the Air Quality and Visibility Impact Analyses of the PSD Permit Application for the Medicine Bow Fuel & Power IGL Plant" by AMI Environmental, Inc., indicates that the **$PM_{2.5}$ NAAQS will be exceeded by the Medicine Bow construction and operation.** AMI's review indicates that the $PM_{2.5}$ concentrations for all modeled years will **exceed** the proposed PSD Class II increments for annual averages. Also, AMI finds that background data for emission of $PM_{2.5}$ is readily available and can be obtained from the US EPA AirData website. Using the background concentration of 4.1 μg/m3 for $PM_{2.5}$

[10] http://www.epa.gov/air/nsr/live/wy.html , US EPA "Prevention of Significant Deterioration Program Status – May 2007"

[11] US EPA, EPA-HQ-OAR-2003-0062, FRL-8566-1,RIN-2060-AN86, 40 CFR parts 51 and 52, "Final Rule: Implementation of New Source Review (NSR) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$), pp 28321 - 28350

obtained from this website, all impacts of $PM_{2.5}$ form the construction and operation of Medicine Bow will **exceed** the $PM_{2.5}$ annual NAAQS of 15 μg/m3. AMI's review shows that these exceedances will occur even without inclusion of fugitive PM_{10} or $PM_{2.5}$ sources, which Medicine Bow and WDEQ neglected to include in the ambient impact analysis.

WDEQ and Medicine Bow are ignoring available information such as "significant emission" thresholds, EPA-recommended $PM_{2.5}$ significant impact levels, and background concentrations of $PM_{2.5}$. By ignoring the $PM_{2.5}$ "significant emission" threshold, WDEQ is failing to ensure that the National Ambient Air Quality Standards are maintained through the application of Best Achievable Control Technology for sources of $PM_{2.5}$ emissions at Medicine Bow. In doing so, WDEQ is failing to protect public health and welfare by ensuring that the primary NAAQS for $PM_{2.5}$ is met.

Wyoming Department of Environmental Quality, Air Quality Division Standards (WAQSR), Chapter 2, Section 1, "Introduction to Ambient Standards" acknowledges the necessity of maintaining the $PM_{2.5}$ primary and secondary standards and clearly quantifies those standards in "Ambient Standards for Particulate Matter", Section 2 of the same chapter. Furthermore, WAQSR, Chapter 6, Section 2 **prohibits the construction of a source that prevents the National Ambient Air Quality Standard and requires the application of Best Achievable Control Technology**, as outline in Section 4 of the same Chapter, for "reducing or eliminating emission".

Therefore, Medicine Bow is failing to demonstrate compliance with 40 CFR 52.21 and WAQSR Chapters 2 and 6 and WDEQ failing to ensure compliance with 40 CFR 52.21 and WAQSR Chapters 2 and 6. Because Medicine Bow cannot ensure compliance with the National Ambient Air Quality Standards and WAQSR Chapters 2 and 6, **WDEQ must disapprove the construction of the Medicine Bow Coal Liquefaction Plant.**

3.) The Application does not contain a top-down BACT analysis for total PM_{10}, comprising the sum of filterable plus condensable particulate matter.

The Application does not contain a top-down BACT analysis for total PM_{10}, comprising the sum of filterable plus condensable particulate matter, but rather only an analysis for filterable particulate matter. Total PM_{10} is a regulated PSD pollutant and a BACT analysis must be performed for it. Particulate matter ("PM") consists of two fractions -- condensibles and filterables.[12] The EPA explained in the preamble in which it adopted the PSD significance threshold for PM_{10} that: "[p]articulate matter" is the generic term for a broad class of chemically and physically diverse substances that exist as discrete particles (liquid droplets or solids).... They may be

[12] The filterable fraction is the material that is collected on a filter paper during a Method 201 or 201A test and is primarily ash originally present in the coal. The condensible fraction is gases that condense during a Method 202 test. See 56 FR 65,433 (Dec. 17, 1991).

emitted directly or formed in the atmosphere by transformations of gaseous emissions such as sulfur oxides, nitrogen oxides and volatile organic substances." 52 Fed. Reg. 24635 (July 1, 1987). The "liquid material" and material that forms in the atmosphere are condensable particulate matter. See 55 Fed. Reg. 14246 (April 17, 1990). The U.S. EPA considers condensible particulate matter ("CPM") to be included in PM_{10}.

The preamble promulgating test methods to measure PM_{10}, Methods 201 and 201A states: "the EPA recognizes that condensible emissions are also PM_{10}, and that emissions that contribute to ambient PM_{10} concentrations are the sum of in-stack PM_{10}, as measured by Method 201 or 201A, and condensable emissions." 55 Fed. Reg. 14246 (April 17, 1990). In the preamble both proposing and promulgating a method to measure condensible PM_{10}, the agency affirmed: "[s]ince CPM [condensable particulate matter] emissions form very fine particles in the PM10 size range and are considered PM_{10} emissions, the Agency is adding a method for measuring CPM emissions from stationary sources to appendix M in 40 CFR part 51." 55 Fed. Reg. 41546 (October 12, 1990); 56 Fed. Reg. 65433 (December 17, 1991).

The EPA has defined "primary PM" in criteria documents that establish the basis for the PM_{10} NAAQS as particles that are either emitted directly as a solid or liquid or are emitted as a vapor but condense or react upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack.[13] The EPA has consistently implemented this definition by requiring that condensible PM_{10} be included in the emission inventories required to meet State Implementation Plan ("SIP") requirements for complying with the PM_{10} and $PM_{2.5}$ NAAQS.[14] In 1994 guidance, EPA advised the States: "[c]ondensible particulate matter is of potential importance because it usually is quite fine and thus falls primarily within the PM-10fraction. As a consequence, condensible particulate matter should always be included in the emission inventory." Id., Sec. 2.1.2.

In written guidance to Iowa, US EPA, in response to the question, "Does the Environmental Protection Agency (EPA) definition for PM-10 include condensible particulate matter (CPMP)" stated: "Yes, the definition of PM-10 includes CPM. CPM is of potential importance to attainment of the PM-10 national ambient air quality standards because it usually is quite fine and thus falls primarily within the PM-10 fraction."[15] Thus, the regulated pollutant for purposes of a BACT determination is total PM10, comprising the sum of filterable and condensable PM10.

Finally, several recent permits for coal-fired electrical generating units contain BACT analyses and permit limits for total PM, including the filterable and condensable fractions. See Virginia Dominion Plant Permit, at

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[13] EPA, Air Quality Criteria for Particulate Matter, Report EPA-600/P-95/001, April 1996.

[14] EPA, PM-10 Emission Inventory Requirements, Final Report, September 1994.

[15] Letter from Thompson G. Pace, Acting Chief, SO2/Particulate Matter Programs Branch, EPA Region VII, to Sean Fitzsimmons, Iowa Department of Natural Resources, March 31, 1994.

http://www.deq.virginia.gov/info/vchecPermits.html and Desert Rock plant in New Mexico, at http://www.epa.gov/region09/air/permit/desertrock/index.html.

The Application does not contain a BACT analysis for total PM10. The agency should require that Medicine Bow perform a top-down analysis for total PM10.

4.) Medicine Bow must conduct a case-by-case MACT analysis for CO.

The permit application analysis is flawed because page 27 identifies 40 CFR part 63 Subpart DDDDD "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters" as an applicable standard. On June 8, 2007 the entire rule of 40 CFR Part 63 Subpart DDDDD "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters" was vacated and that decision was upheld on July 30, 2007 by the US Court of Appeals.[16],[17] Since there is no rule promulgated for this source category, "the collection of all boilers and process heaters", Medicine Bow must submit an application for Notice of MACT Approval for a new source under 40 CFR Part 63 Subpart B and WDEQ must conduct a case-by-case MACT analysis.

Since one of the items questioned by the courts in vacating the MACT rule was the "MACT Floor" it is not appropriate for Medicine Bow to propose and WDEQ to accept emission limitations for CO previously promulgated under the vacated MACT. Instead, Medicine Bow must apply for and WDEQ must establish at least "MACT Floor" or "the level of emission control that is achieved in practice by the best controlled similar source" (See 42 U.S.C § 7412(d)(3) and 40 CFR 63.43(d)(1)) based on the best "available information". In accordance with 40 CFR 63.43(d)(2), WDEQ must approve and Medicine Bow must achieve "the maximum degree of reduction in emissions of [Hazardous Air Pollutant] HAP which can be achieved by utilizing those control technologies that can be identified from the available information" and any control technology beyond MACT Floor may allow considerations for economic, environmental, energy, and health impacts. "Available Information" is defined in §63.41 to include "any additional information provided by the applicant or others, and any additional information considered available by the permitting authority". Currently, the best "available information" is that provided by the National Association of Clean Air Agencies' (NACAA formerly STAPPA and ALAPCO) Boiler Model Permit Guidance which was published on June 27, 2008.[18] According to data complied by NACAA and provided by state agencies such as WDEQ, the best performing gas-fired units emit CO in the range of **0.002 to 0.007 lb/MMBtu which is far less** than Medicine Bow's proposed emission rates **0.08 lb/MMBtu** from each of the Auxiliary Boiler, Catalyst Regenerator, Reactivation Heater, HGT Reactor

[16] US EPA, Technology Transfer Network, Air Toxics Website, http://www.epa.gov/ttn/atw/129/ciwi/boilers_mandate-07_30_07.pdf, Accessed 07/14/2008
[17] US EPA, Technology Transfer Network, Air Toxics Website, http://www.epa.gov/ttn/atw/boiler/boilerpg.html#IMP, Accessed 07/14/2008
[18] NACAA, "Reducing Hazardous Emissions from Industrial Boilers: Model Permit Guidance, http://www.4cleanair.org/Documents/RHAP.pdf, Accessed 07/14/2008

Charge Heater, and Gasifier Preheaters. **Therefore, the affected facility at Medicine Bow must comply with both 40 CFR 63.43 and 40 CFR 52.21 (MACT and BACT), and the CO limit on page 27 of the permit application analysis should be more stringent than 0.08 lb/MMBtu per source.**

5.) **Medicine Bow Fuel & Power, LLC's owner DKRW Advanced Fuels, LLC's website indicates that some of the electrical power generated by Medicine Bow will be sold back to the grid.[19] The permit application analysis is flawed because it does not apply to 40 CFR Part 72 Acid Rain Provisions for fossil fuel -fired turbines and boilers.**

Medicine Bow acknowledges their need for an Acid Rain Permit on page 3-3, Table 3-2 of the "Industrial Siting Permit Application" "contingent on selling" electricity. However, the permit application review makes no mention of Medicine Bow's intent to sell surplus electricity back to the utility grid. Furthermore, page 27 of the permit application analysis does not address Acid Rain applicability as a contingency or otherwise. According to a press release on January 12, 2007[20], Medicine Bow intends to sell 60 MW of power back to the grid.

The gas turbines and auxiliary boiler at Medicine Bow may meet the definition of "utility unit" and may be required to submit an Acid Rain application. 40 CFR 72.2; 40 CFR 72.6

Further, under 40 CFR Part 70 and WAQSR, Chapter 6, Section 2, a source can operate on a SIP-approved construction permit, such as a PSD permit, for up to 12 months and then may operate as much as 18 months on a timely and complete, initial Title V application :

70.5 Permit Applications

a) Duty to apply. For each part 70 source, the owner or operator shall submit a timely and complete permit application in accordance with this section.

*(1) **Timely application.** (i) A timely application for a source applying for a part 70 permit for the first time is one that is submitted within 12 months after the source becomes subject to the permit program or on or before such earlier date as the permitting authority may establish.*

*(ii) **Part 70 sources required to meet the requirements under section 112(g) of the Act, or to have a permit under the preconstruction review program approved into the applicable implementation plan under part C or D of title I of the Act, shall file a complete application to obtain the part 70 permit or permit revision within 12 months after commencing operation or on or before such earlier date as the permitting authority may establish.** Where an existing part 70 permit would prohibit such construction or change in operation, the source must obtain a permit revision before commencing operation.*

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[19]" DKRW Energy, LLC: Medicine Bow CTL Project", http://www.dkrwenergy.com/fw/main/Overview-46.html, Accessed 07/15/2008

[20]" Medicine Bow Coal-To-Liquids Project: Press Conference January 12, 2007", http://www.futurecoalfuels.org/documents/011207_dkrw_presentation.pdf

70.7 Permit issuance, renewal, reopenings, and revisions.

(2) Except as provided under the initial transition plan provided for under §70.4(b)(11) of this part or under regulations promulgated under title IV of title V of the Act for the permitting of affected sources under the acid rain program, ***the program shall provide that the permitting authority take final action on each permit application (including a request for permit modification or renewal) within 18 months, or such lesser time approved by the Administrator, after receiving a complete application.***

As such, Medicine Bow may operate up to one year on the PSD permit in question and up to 18 months under an application shield. Therefore, Medicine Bow may be required to submit an Acid Rain application during the life of this PSD permit.

Since Acid Rain requirements to submit an application may become applicable during the life of this PSD permit, the permit should contain a condition requiring the following:

"Pursuant to 40 CFR 72.6, Medicine Bow shall submit an application at least 24 months before the gas turbines or auxiliary boiler become a "utility unit" as defined under 40 CFR 72.2"

6.) **The permit application analysis, proposed permit conditions, and public notice are flawed because the they do not address applicability of the vacatur of NSPS Subpart HHHH, the vacatur of the delisting of "fossil fuel-fired electric steam generating units" from 112(c), and the subsequent applicability of the process train from the gasifier to the power block to the requirements of 40 CFR Part 63 Subpart B.**

It has already been discussed in Comment No. 5 that Medicine Bow has intent to sell electricity back to the utility grid. The process boundary extending from the gasifier to the outlet of the power block qualifies as an "electric utility steam generating unit" because the following conditions are met:

On February 08, 2008, the DC Circuit Court vacated the Clean Air Mercury Rule under 40 CFR Part 60 Subpart HHHH and vacated 40 CFR 63.41's delisting of the "electric utility steam generating units" source category from the list of source categories under Section 112(c). The last petition to overturn this decision was denied on May 20, 2008. This action left the source category of "electric utility steam generating units" listed under Section 112(c) of the Act without emission standards for hazardous air pollutants after the MACT Hammer deadline had passed. Because legal analysts see little hope for an overturning of this delisting, state agencies have been advised to issue case-by-case determinations for "electric utility steam generating units" which will be new or reconstructed after February 8, 2008.

While it is true that the process boundary from the gas turbines, including the HRSGs, to the steam turbine is a category regulated by 40 CFR Part 63 Subpart KKK and it is also true that the process boundary from the gasifier to the Methanol Synthesis outlet stream is a category regulated under 40 CFR Subparts H and EEEE, the process boundary from the gasifier to the grid is a separate source category that in and of itself is a major source of hazardous air pollutants[21], is not a category regulated under Section 112(c) of the Act, and meets the following criteria for a "electric utility steam generating units":

a.) "coal-fired"[22] – Both the proposed Mercury Rule under NESHAP and the vacated Clean Air Mercury Rule under NSPS defined coal-fired as follows:

> *Coal-fired* means combusting any amount of coal or **coal-derived fuel**, alone or in combination with any amount of any other fuel, during any year.

Where,

[21] Federal register Notice FRL-4152-7, July 16, 1992, US EPA, "Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990", Section A "Delineation of Categories and Subcategories", pp 31576-31591

[22] US EPA, Federal Register Notice, [OAR-2002-0056; FRL-7606-3], RIN 2060-AJ65, "Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units", pp. 4652

Coal-derived fuel means any fuel (whether in a solid, liquid, or gaseous state) produced by the mechanical, thermal, or chemical processing of coal.

Coal means any solid fuel classified as anthracite, bituminous, subbituminous, or lignite by the American Society of Testing and Materials (ASTM) Standard Specification for Classification of Coals by Rank D388–77, 90, 91, 95, 98a, or 99 (Reapproved 2004)ϵ[1] (incorporated by reference, see §60.17).

and since the proposed Mercury MACT regulated the combustion of syngas as a coal-fired electric utility steam generating unit:

"Integrated gasification combined cycle units combust a synthetic coal gas. No coal is directly combusted in the unit during operation (although a coal-derived fuel is fired), and, thus, IGCC units are a distinct class or type of boiler for the proposed rule"[23]

the gasifier is coal-fired therefore it is "fossil fuel-fired".

Fossil fuel-fired means the combustion of fossil fuel or any derivative of fossil fuel, alone or in combination with any other fuel, independent of the percentage of fossil fuel consumed in any calendar year (expressed in mmBtu).[24]

b.) "of more than 25 megawatts" – The gasifier serves gas turbines rated at a total of 183 MW and a steam turbine rated at 215 MW.

c.) "that serves a generator that produces electricity for sale" - Medicine Bow has made public its plans to sell 60 MW of electricity.

Unlike the provisions of 40 CFR Part 72, which require an Acid Rain permit before **operating**, if a source is subject to the requirements of 40 CFR Part 63.42, the determination pursuant to this part must be issued **before construction can commence.**

(c) ***Prohibition.*** After the effective date of section 112(g)(2)(B) (as defined in §63.41) in a State or local jurisdiction and the effective date of the title V permit program applicable to that State or local jurisdiction, no person may begin actual construction or reconstruction of a major source of HAP in such State or local jurisdiction unless:

(1) The major source in question has been specifically regulated or exempted from regulation under a standard issued pursuant to section 112(d), section 112(h) or section 112(j) in part 63, and the owner and operator has fully complied with all procedures and requirements for preconstruction review established by that standard, including any applicable requirements set forth in subpart A of this part 63; **or**

(2) The permitting authority has made a final and effective case-by-case determination pursuant to the provisions of §63.43 such that emissions from the constructed or reconstructed major source will be controlled to a level no less stringent than the maximum achievable control technology emission limitation for new sources.

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[23] *ibid*

[24] http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=50ef06cecfd2c73da3efa713f4a6b26e&rgn=div8&view=text&node=40:16.0.1.1.1.1.1.2&idno=40 "e-CFR: Electronic Code of Federal Regulations", Government Printing Office Access Database, Accessed on 07/31/2008

It appears that WDEQ has essentially conducted an appropriate case-by-case review and required Maximum Achievable Control Technology in requiring the installation of the activated carbon beds:

> *"For IGCC units (regardless of coal rank fired), the Administrator has concluded that use of a carbon bed is considered to be the most effective Hg control technology"*[25]

However, the draft permit conditions and permit application analysis must clearly identify what equipment constitutes the "electric utility steam generating unit", the applicability of 40 CFR Part 63 Subpart B to the "electric utility steam generating unit", and that the public notice is also being issued pursuant to 40 CFR 63.43 (h) "Notice of MACT Approval".

7.) **Similar to Comment No. 4, the PSD permit should contain a permit condition requiring the submission of a complete Title V application within 12 months of startup of the facility and notification of actual startup.**

Under 40 CFR Part 70, a source can operate on a SIP-approved construction permit, such as a PSD permit, for up to 12 months and then may operate as much as 18 months on a timely and complete, initial Title V application. 40 CFR 70.5, 70.7.

To ensure that a timely Title V Operating Permit application is received, the permit should contain a condition requiring the following:

> **"Pursuant to 40 CFR 70.5, Medicine Bow shall submit a complete application within 12 months of startup of the source for an operating permit for a 40 CFR Part 70 Operating permit"; and**
>
> **"Medicine shall notify the Air Quality Division of the anticipated and actual initial startup of the source"**

8.) **Startup and shutdown emissions should be considered for the application of BACT and the GE Gasifier and the SynGas Cleanup Processes are emission sources and should comply with all applicable air quality rules and regulations.**

Figure 1 of the permit application analysis shows that during startup/shutdown/malfunction the GE gasifier and the SynGas Cleanup process will vent to the High Pressure Flare and/or Low Pressure Flare, however Table II does not quantify emissions during startup/shutdown/malfunction for these sources. While it is true that temporary emissions and emission during startup shutdown, and malfunction are not considered in the determination of applicability to 40 CFR 52.21(j), once "significant emissions" are established for a pollutant under steady-

[25] US EPA, Federal Register Notice, [OAR-2002-0056; FRL-7606-3], RIN 2060-AJ65, "Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units", pp. 4652

state operations, the provisions of 52.21(j) must be applied to temporary emissions contributing to the overall emission of that significant pollutant.

In accordance with the EPA Memorandum to William O. Sullivan dated February 14, 2006 from the US EPA, "to determine PTE [Potential-to-Emit], a source must estimate its emissions based on the worst case scenario taking into account startups, shutdowns, and malfunctions".[26]

Also, in accordance with the December 11, 1978 memorandum to Anita B. Turpin from the US EPA, "BACT should be applied to the emissions [temporary]... and should be included as condition to the PSD permit. Equipment or work practice standards may be specified for BACT if an emission standard is not feasible. See 43 FR 26397, Column 3".[27]

In the case of the gasifier venting to the high pressure flare during startup, this operation would be analogous to combustion of syngas which has been widely permitted across the US. Therefore, it is feasible to establish BACT limits and other applicable emission limitations for NO_X, CO, and VOC from the gasifier venting to the flare during startup.

While the WDEQ did draft Condition No. 20 which is a general condition requiring adherence to Medicine Bow's "Startup/Shutdown Emissions Minimization Plan", the WDEQ should justify in the permit application analysis why a BACT emission limit for the gasifier and flare during startup is not possible. If possible, the PSD permit should contain a BACT emission limitation, instead of a general SSM plan.

A recent BACT determination from the state of Iowa for startup/shutdown flares fired on natural gas or syngas from a gasification process at Homeland Energy Solutions, LLC provided BACT limits for 0.0076 lb/MMBtu for PM or PM_{10}, Opacity of 0%, 0.200 lb/MMBtu for NO_X, 1.1 lb/MMBtu CO, and 0.0060 VOC on a 25 MMBtu/hr throughput. These emission rates compare to the rates proposed for a 1.02 MMBtu/hr (<< 25 MMBtu/hr) throughput at Medicine Bow as follows:

BACT-regulated Pollutant	Homeland Energy (All Flares) Only Operated for Startup[28]	Medicine Bow (All Flares including startup emissions)	Medicine Bow (All Flares only normal operations)
PM	0.0076 lb/MMBtu	None Specified in Application	None Specified in Application

[26] US EPA, Region 2, Letter from Steve C. Riva, Chief to William O'Sullivan, Director, dated February 14, 2006.
[27] US EPA, Region 6, Memorandum from Director of Stationary Source Enforcement Division to Anita B. Turpin, Director, dated February 14, 2006.
[28] http://cfpub.epa.gov/rblc/cfm/ProcDetl.cfm?facnum=26711&Procnum=106236, US EPA, "RACT/BACT/LAER Clearing House Standard Search: Process Type: Miscellaneous Combustion: Flares", Accessed 07/16/2008

BACT-regulated Pollutant	Homeland Energy (All Flares) Only Operated for Startup[28]	Medicine Bow (All Flares including startup emissions)	Medicine Bow (All Flares only normal operations)
PM10	0.0076 lb/MMBtu	None Specified in Application	None Specified in Application
Opacity	0%	20%	20%
NO_X	0.200 lb/MMBtu	**2. 35 lb/MMBtu**	0.13 lb/MMBtu
CO	1.1 lb/MMBtu	**3204 lb/MMBtu**	0.29 lb/MMBtu
VOC	0.0060 lb/MMBtu	**60.5 lb/MMBtu**	**0.83 lb/MMBtu**

It can be seen that it is possible to apply BACT emission limits to startup flaring operations and that the startup emissions from the flares at Medicine Bow are significantly higher than those generated for startup at Homeland Energy in Texas. WDEQ should include short-term BACT emission limits for PM, PM_{10}, Opacity, NO_X, CO, and VOC in the draft permit for the startup of the gasifier and SynGas Cleanup-to-flare(s) system and for the flare under normal operation as other permits issued pursuant to PSD have. Further, WDEQ and Medicine Bow should address why lower Opacity, NO_X, CO, and VOC emission rates or work practices to achieve lower emission rates for these pollutants are not feasible during startup. Also, the flares should be identified as air pollution control devices for VOCs during startup and should be monitored during startup to ensure proper operation including ensuring the presence of a pilot flame on the flares at all times during startup and proper residence time (or flow as required by potentially applicable NSPS and NESHAP) for vent gases in the flare. The permit should also contain work practice standards such as minimum loads for the gasifier during startup, maximum duration of startup, and maximum number of startup events per year. The permit should also require the recording of the occurrence of startup and shutdown and the duration of startup and shutdown of the gasifier and the maintenance of those records in a format suitable for Division personnel to inspect.

9.) **Startup and shutdown emissions should be considered for the application of BACT and the Sour Water Stripper is an emission source and should comply with all applicable air quality rules and regulation.**

The overhead stream from the Sour Water Stripper may contain NH_3, NO_X, CO, SO2, H2S, Carbonyl Sulfide (COS), and VOC.

The RBLC contains examples of storage of sour water and venting of sour gas as emission sources regulated with BACT emission limitations.[29,30]

[29] http://cfpub.epa.gov/rblc/cfm/ProcDetl.cfm?facnum=26430&Procnum=105389, US EPA, "RACT/BACT/LAER Clearing House: Standard Search", Accessed 07/18/2008
[30] http://cfpub.epa.gov/rblc/cfm/ProcDetl.cfm?facnum=26430&Procnum=105388, US EPA, "RACT/BACT/LAER Clearing House: Standard Search", Accessed 07/18/2008

As previously discussed, the WDEQ should justify in the permit application analysis why BACT emission limits for NO_X, CO, and VOC from the Sour Water Stripper during startup is not possible. If possible, the PSD permit should contain a BACT emission limitation, instead of a general SSM plan.

10.) The WDEQ and Medicine Bow must quantify emissions of CO2 and must include in the PSD application and permit application review an analysis of technically feasible control options for minimizing CO2 emissions during startup of the facility, and during any other time when export of CO2 is not feasible.

Startup and shutdown emissions should be considered for the application of BACT and the Sulfur Recovery Unit (SRU) and Solexol® Acid Gas Removal processes are emission sources and should comply with all applicable air quality rules and regulation. CO2 emissions must be addressed. Synthesis gas treated by Solexol ® and sent to the SRU can contain hydrogen cyanide, hydrocarbons (possiblyVOCs), sulfur dioxide, hydrogen sulfide, or ammonia (NO_X) in the presence of oxygen).

A recent BACT determination for a 50 MMBtu/hr thermal oxidizer controlling gases from a sulfur recovery unit at Valero Refining in Louisiana provided BACT emission limits for NO_X, PM_{10}, CO, VOC, and H_2S. Several BACT determinations exist under the RBLC for SRUs and Solexol ® processes.[31]

As previously discussed, the WDEQ should justify in the permit application analysis why a BACT emission limit for NO_X, PM_{10}, CO, VOC[32] from the Sulfur Recovery Unit and flare during startup is not possible. If possible, the PSD permit should contain a BACT emission limitation, instead of a general SSM plan.

Furthermore, the Solexol ® process and the "CO2 Vent Stack (VS)", referenced in the permit application analysis in Tables II, Va, and Vb, are sources of CO_2 emissions during startup. A June 30, 2008 decision by the Georgia State Superior Court has mandated that CO_2 is a pollutant "subject to regulation under the [Clean Air] Act"..." a PSD permit cannot be issue[d] ...without CO2 emission limitations based on BACT analysis."[33]

Therefore, the WDEQ and Medicine Bow must quantify emissions of CO_2 and must include in the PSD application and permit application review an analysis of technically

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[31] http://cfpub.epa.gov/rblc/cfm/rbeazres.cfm?RequestTimeout=500&CFID=1539661&CFTOKEN=16584359&jsessionid=9830b843b4cd1e52a08666622a62282555d3TR, "RACT/BACT/LAER Clearing House Standard Search, Accessed 07/16/2008

[32] H_2S emissions from normal operation are below the emission threshold given in 52.21 for H2S and are not considered further for this source in this discussion.

[33] http://www.green-law.org/Files/GreenLaw/2008/LongleafFinalOrderSigned.pdf, *Friends of the Chattahoochee and Sierra Club vs. Dr. Carol Couch, Environmental Protection Division, Department of Natural Resources*, Final Order in the Superior Court of Fulton County State of Georgia, Docket No. 2008CV146398

feasible control options for minimizing CO_2 emissions during startup of the facility or during any other time during which export of CO_2 is not feasible.

Medicine Bow has no firm contractual commitments regarding carbon storage and the plant will be emitting massive quantities of CO2 initially and perhaps for an extended period. The Company's proposed activities regarding carbon capture and storage do not alleviate its responsibility to conduct a BACT analysis for CO2 and require the company to install pollution control technology.

Medicine Bow should consider both work practice standards to limit the amount of CO and CO_2 available to be vented during startup or during inability to export CO_2. Medicine Bow should also demonstrate why it is an adverse economic, energy, or environmental impact for the additional storage of CO_2 product that cannot be exported.

11.) The ambient impact analysis for compliance with the NAAQS and air toxics modeling should include startup emissions from the two flares and the Sour Water Stripper.

The National Ambient Air Quality Standards contain both short and long-term emission averaging periods. The shortest averaging period for a PM_{10} standard is 24 hours, while SO_2 has a 3-hour standard, and Ozone and CO have 1 and 8-hour standards.

The modeled point source emission rates in Table XIII do not, but should, include potential startup emissions of NO_X, CO, SO_2, and VOC from the Sour Gas Stripper. Similarly, H_2S and COS are hazardous air pollutants and any hourly emission rate evaluated for risk assessment should include potential startup emissions of hazardous air pollutants from the Sour Water Stripper.

12.) The risk assessment of hazardous air pollutants does not, but should, include an assessment of elemental mercury and mercury compound emissions.

Because mercury is a regulated pollutant under Section 112(b) of the Clean Air Act, has a very low reference concentration for chronic inhalation exposure or RfC of 3×10^{-7} $\mu g/m^3$, and because elemental mercury is not classifiable as a carcinogenic risk,[34] the WDEQ and Medicine Bow should assess both chronic and acute non-cancer risk associated with mercury. Mercury Chloride and methylmercury, on the other hand are possible human carcinogens[35],[36] and should be assessed for Cancer Risk and Non-chronic and Acute Non-cancer Risks. The WDEQ and Medicine Bow should assess the risk

[34] http://www.epa.gov/ncea/iris/subst/0370.htm, US EPA, Integrated Risk Information System (IRIS), Accessed on 07/21/2008

[35] http://www.epa.gov/ncea/iris/subst/0692.htm, US EPA, Integrated Risk Information System (IRIS), Accessed on 07/21/2008

[36] http://www.epa.gov/ncea/iris/subst/0073.htm, US EPA, Integrated Risk Information System (IRIS), Accessed on 07/21/2008

associated with whatever form or forms of mercury would be most likely released to the atmosphere based on process phenomenon.

13.) The ambient impact analysis does not include ozone and preconstruction monitoring data.

Table VI of the permit application analysis indicates that potential emissions of VOC are associated with the normal operation of Medicine Bow's CTL plant are approximately 188 tons per year (TPY), **far greater than 100 TPY**. 40 CFR 52.21 "Prevention of Significant Deterioration (PSD)" Footnote 1, of Subparagraph (i)(5)(i) **only exempts** sources from the requirements of preconstruction monitoring for ozone if potential emissions **are less than 100 TPY** of VOC. Otherwise, an ambient impact analysis including pre-application monitoring data is required for ozone".[37] Furthermore, when a permitting authority waives the requirement for pre-application monitoring, 40 CFR 52.21 "Prevention of Significant Deterioration (PSD)" Subparagraph (m)(1)(vi) requires post-approval monitoring, compliance with the Lowest Achievable Emission Rate (LAER), emissions offsets, and demonstration of compliance for all statewide sources under the same ownership as the applicant.

While it is true that the permitting authority, WDEQ, may allow the use of existing monitors toward pre-construction or post-construction monitoring requirements[38], this does not exempt Medicine Bow or WDEQ from ensuring compliance with the National Ambient Air Quality Standards for ozone (O_3).[39]

Furthermore, monitors in the "area of concern", e.g. the Boulder Monitoring Station, recorded ozone greater than 80 ppb in 2005 and 2006. The Medicine Bow application was submitted in September of 2007 and the WDEQ did not collect elevated ozone data in 2007, due to meteorological data[40] Therefore, the monitoring data cannot possible satisfy the requirement of 40 CFR 52.21(m)(1)(iv) which requires that data be representative of "at least the year preceding receipt of the application" ,nor can it possibly satisfy the US EPA-recommended 80% data recoverability of collected data.[41]

The existing monitoring data shows that there is potentially a threat to the NAAQS for ozone and the existing data is not sufficient to meet the requirements of 40 CFR 52.21(m) for the Medicine Bow construction. Medicine Bow and WDEQ should explicitly address

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[37] http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=e49103cd6380376d1a202c096b47703f&rgn=div8&view=text&node=40:3.0.1.1.1.1.1.19&idno=40, "e-CFR: Electronic Code of Federal Regulations", Government Printing Office Access Database, Accessed on 07/23/2008

[38] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990, pp C.18

[39] *Intermediate Permitting: Student Manual*, Written and Presented by RTP Environmental Associates, Inc., Page 23

[40] Wyoming Department of Environmental Quality, Air Quality, Monitoring program Information, "Upper Winter Ozone Study", http://deq.state.wy.us/aqd/Monitoring%20Data.asp, Accessed 07/28/2008

[41] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990, pp C.19

in the permit application and the application analysis how the proposed construction at Medicine Bow and the draft PSD permit conditions satisfy the requirements of 40 CFR 52.21(m).

14.) The air toxics modeling shows a risk or cancer from benzene almost two orders of magnitude higher than the unit risk provided by the US EPA (1 in 10^6) for probable human carcinogens.

Table XXV of the permit application analysis shows a cancer risk from benzene emissions associated with the Medicine Bow's operation of 8.81 $x10^{-5}$. This risk is almost **two orders of magnitude higher** than the unit risk (1 in 1,000,000)[42] provided by the US EPA for developing cancer from lifetime exposure to probable human carcinogens.

Since the benzene leaks or fugitive emissions will most likely result from the Methanol-to-Gasoline process and beyond, and the Leak Detection and Repair (LDAR) under Subpart VVa and EEEE is not required to extend beyond the Methanol Synthesis, the proposed LDAR may not represent BACT or MACT for benzene equipment leaks or fugitive HAPs and VOCs. These subparts under NSPS and NESHAP will only regulate the processes up to and including the Methanol Synthesis process, not the Methanol to Gasoline process. Therefore, the WDEQ needs to ensure that any emission standard or work practice standard, LDAR or otherwise, reflects both BACT and Maximum Achievable Control Technology for all sources of benzene emissions.

We have already established that the process boundary from the gasifier to the Methanol-to-Gasoline process should be considered a "Petroleum Refinery". Benzene emissions will most like occur as the result of leaks from piping components in the "petroleum refinery" portion of Medicine Bow. Under Section 112(c)(9)(b) of the Act, the Administrator, US EPA and WDEQ must regulate a listed source under Section 112(c) for which a cancer risk greater than 1 in 1,000,000 exists.[43] Benzene equipment leaks from gasoline production are regulated under 40 CFR 63 Subpart CC. Therefore, WDEQ and Medicine Bow must ensure that the proposed LDAR also meets the requirements of 40 CFR part 63 Subpart CC.

15.) On page 24 of the permit application analysis, the Division identifies BACT for SO_2 emissions from the combustion turbines as the use of "low sulfur fuel", however there are no draft permit conditions limiting the sulfur content in all potential fuels, including auxiliary fuel such as liquefied petroleum gas (LPG) and natural gas.

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[42] http://www.epa.gov/ncea/iris/subst/0276.htm, US EPA, Integrated Risk Information System (IRIS), Accessed on 07/21/2008

[43] Federal register Notice FRL-4152-7, July 16, 1992, US EPA, "Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990", Section A "Delineation of Categories and Subcategories", pp 31576-31591

Even though the syngas product specifications and ASTM standards for these fuels specify low sulfur contents, the permit should contain practically enforceable conditions that ensure that the emission rate of SO_2 from the gas turbines is the rate associated with the Best Achievable Control Technology or the lowest sulfur content required for gas turbines under BACT streamlined with any requirement from NSPS Subpart KKKK. Furthermore, in order for the BACT limit to be enforceable in a practical manner, as required by the 1990 NSR Manual and court rulings[44], the permit should require either fuel analysis or vendor fuel certification, particularly for auxiliary fuels that would not undergo quality assurance analysis by Medicine Bow as a product.

[44] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990, pp A.5

16.) **Similarly to Comment No. 15, the permit should specify sulfur content limits for fuel combusted in natural gas-fired Black Start Generators.**

In order for the BACT limit to be enforceable in a practical manner, the permit should require either fuel analysis, fuel certification by the vendor, or limit the generators to combusting only natural gas.

17.) **The top-down analysis for PM_{10} does not consider PM_{10} from ash storage or handling.**

While neither the "Industrial Siting Application" submitted by Medicine Bow nor the permit application analysis by WDEQ identify ash storage and/or handling as an emission source, a January 12, 2007 presentation from DRKW, the parent company for Medicine Bow, indicates that the facility plans to market ash as a saleable product.[45]

Since the Coal Liquefaction process at Medicine Bow is considered to meet the definition of "fuel conversion plant"[46], pages A.10 and B.5 of the 1990 NSR Manual stipulate that BACT and an ambient impact analysis must be applied to both point sources (emission units) and fugitive emissions (processes or activities) of PM_{10}.[47]

Therefore, WDEQ has not ensured the application of BACT for PM_{10} and Medicine Bow has not demonstrated that it can comply with the requirements of 40 CFR 52.21 or Wyoming Air Quality State Rule (WAQSR) Chapter 6.

18.) **The top-down analysis for mercury and particulate matter does not consider the use of coal cleaning and drying processes to limit the amount of ash and mercury available, thereby limiting the amount for ash needing to be stored or sold and limiting the amount of mercury load on the activated carbon beds.**

On page B.10 of the 1990 NSR Manual, the US EPA requires that a top-down BACT analysis consider "inherently lower emitting process" **and** combinations of these processes with add-on control technologies.[48] While it is true that Medicine Bow has proposed and WDEQ has required the installation and operation of activated carbon pursuant to 40 CFR 52.21 and Wyoming Air Quality State Rule Chapter 6, Section 2, additional control of mercury and particulate matter is technically feasible.

There are several technologies in use for wet and dry cleaning or beneficiation of coal to remove ash and mercury. These include conventional wet cleaning which removes

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[45] " Medicine Bow Coal-To-Liquids Project: Press Conference January 12, 2007", http://www.futurecoalfuels.org/documents/011207_dkrw_presentation.pdf

[46] Wyoming Department of Environmental Quality, Air Quality Division, "Permit Application Analysis for Medicine Bow, Industrial Gasification and Liquefaction (IGL) Plant: AP-5873" Published June 19, 2008

[47] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990

[48] *ibid*

ash, sulfur, moisture, and mercury; dry cleaning processes such as the Allair® Jig Process followed by coal drying[49] and the K Fuel® and K Direct® process by Evergreen Energy Inc. for removal of moisture (and mercury)[50]; and Coal Beneficiation consisting of sizing, handling, and washing thereby removing moisture, mercury, and sulfur[51].

Medicine Bow has proposed to capture some of these impurities and market them as a saleable ash product. Certainly, Medicine Bow's primary product is not ash and minimization of ash is desired.

Medicine Bow should consider coal beneficiation as a technically feasible option for limiting $PM_{2.5}$, PM_{10}, PM, Hg, and SO_2. If Medicine Bow chooses to perform an economic impact analysis, it should be based on "baseline emissions", before any proposed add-on control devices are considered. Cost of add-on controls should be considered as incremental cost increases to inherently lower emitting processes[52].

19.) The draft permit conditions do not specify opacity limits as surrogate to PM and PM10 consistent with BACT determinations.

Condition No. 19 of the "Proposed Permit Conditions" in the "Permit Application Analysis" provides a default opacity limit of 20% for "all sources not covered by NSPS/NESHAP regulations"[53] However, there are sources of air pollution at the site that are not covered by one of the aforementioned regulations, for which lower opacity limits have been established by BACT requirements. Furthermore, the emission limitations established by NSPS are the maximum emissions that can be established as BACT, but by no means are automatically considered to be Best Available Control technology emission limits.[54]

On page H.6 of the 1990 NSR Manual, the US EPA mandates the use of opacity as a surrogate parameter when continuous, quantitative measurements are infeasible.[55]

For instance, storage or handling of ash piles would not be subject to NSPS or NESHAP and would meet these qualifications for a surrogate opacity limit pursuant

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[49] Weinstein, Dr. Richard, Falkirk Mining Company, "Lignite Fuel Enhancement: Dry Process Coal Cleaning" FY-05-LI(51)-132

[50] http://www.evgenergy.com/documents/Release-Indonesia-Evergreen-FINAL.shtml Accessed on 07/23/2008

[51] "One Year of Operating Experience With a Prototype Fluidized Bed Coal Dryer at Coal Creek Generating Station", http://www.netl.doe.gov/technologies/coalpower/cctc/ccpi/pubs/GRE/GRE%20Clean%20Coal%20Conf%20Sardinia%20Paper%20May%202007_1.pdf, Accessed 07/07/2008

[52] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990, pp B.39 – B.42

[53] Wyoming Department of Environmental Quality, Air Quality Division, "Permit Application Analysis for Medicine Bow, Industrial Gasification and Liquefaction (IGL) Plant: AP-5873" Published June 19, 2008

[54] US Environmental Protection Agency, "Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Permitting", October 1990, pp B.12

[55] *ibid*

to BACT. In fact, a review of the RBLC reveals several opacity limits, particulate matter emission limitations, and work practice standards established for ash handling and storage pursuant to BACT.[56]

In fact, Condition No. 2.22 of the recent PSD Permit issued to the Longleaf Energy Associates by the Georgia Department of Natural Resources establishes an opacity limit on Ash Handling of 10% or less pursuant to 40 CFR 52.21 BACT requirements.[57]

Medicine Bow and WDEQ should review the RBLC to ensure that Condition No, 19 of the "Proposed Permit Conditions" represents BACT for all sources of particulate matter.

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[56] US EPA, "RACT/BACT/LAER Clearing House Standard Search",http://cfpub.epa.gov/rblc/cfm/rbeazres.cfm?RequestTimeout=500&CFID=1678690&CFTOKEN=79317783&jsessionid=4c307fff6a040d03e98a4184935b31762659TR, Accessed on 07/27/2008

[57] Air Quality Permit No. 4911-099-0033, Issued by the GA Department of Natural Resources, Air Quality Branch, to Longleaf Energy Associates, LLC on May 14 2007, http://www.georgiaair.org/airpermit/psd/dockets/longleaf/permitdocs/0990030final.pdf, Accessed 07/28/2008