FILED

MAR 12 2008

Terri A. Lorenzon, Director
Environmental Quality Council

Patrick R. Day, P.C.
Mark R. Ruppert
HOLLAND & HART LLP
2515 Warren Avenue, Suite 450
P.O. Box 1347
Cheyenne, WY 82003-1347
Telephone: (307) 778-4200
Facsimile: (307) 778-8175

ATTORNEYS FOR BASIN ELECTRIC
POWER COOPERATIVE

**BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING**

In the Matter of:)
Basin Electric Power Cooperative) Docket No. 07-2801
Dry Fork Station,)
Air Permit CT – 4631)

BASIN ELECTRIC'S MEMORANDUM IN SUPPORT OF THE DEPARTMENT'S MOTION TO DISMISS

The Department of Environmental Quality (DEQ) has moved to dismiss Protestants' claims related to greenhouse gases and global warming. Greenhouse gases, including carbon dioxide (CO_2), are not pollutants currently subject to regulation under the Clean Air Act, and as a consequence there is no legal authority for the proposition that these gases must be considered by the DEQ in evaluating Best Available Control Technology (BACT) for PSD permits. Protestants' claims to the contrary in their Petition are without legal basis and should be dismissed.

This is one of the most significant legal issues presented by this appeal. The EPA has not yet decided whether, and if so how, standards should be set for CO_2. Regulation of greenhouse gases is a national political question of the highest order, yet Protestants invite this Council to regulate greenhouse gases in a single permit appeal without any legal basis for doing so and without the scientific and policy resources available to the EPA and the United States Congress.

Although Protestants claim they want greenhouse gases to be part of the BACT process, their real agenda is to eliminate all coal-fired generation, as they promote on their web site.[1] To accomplish that political objective, Protestants have taken positions in permit appeals for coal-fired power plants in other states which are precisely the opposite of the position they take in this appeal. A clear example of this is discussed below. Basin Electric contends that Protestants' arguments are not really based upon the four corners of the law, but rather on the most expedient way to attack coal-fired generation in the particular case in which they appear. This may be their legal right, but it is ultimately the law which should govern this appeal, not political agendas.

In fact, BACT is required only for pollutants regulated under the Clean Air Act, and CO_2 and other greenhouse gases are not regulated. The DEQ has therefore moved to dismiss the greenhouse gas claims as legally insufficient and the DEQ is correct. Basin Electric therefore joins in the DEQ's Motion for the reasons set forth below.

I. Introduction.

Protestants contend that the BACT analysis must consider CO_2 and other greenhouse gases because: 1) BACT is required for pollutants subject to regulation and CO_2 and greenhouse gases are subject to regulation; 2) even if CO_2 is not a regulated pollutant its "collateral impacts"

---

[1] See the Sierra Club's "Stopping the Coal Rush" webpage, documenting its efforts to prevent construction of new coal-fired power plants, available at http://www.sierraclub.org/environmentallaw/coal/.

must be considered in the BACT process; and 3) BACT must consider the consequences of future legislation of greenhouses gases, before anyone knows what such legislation might look like. None of these assertions has any merit, as explained below.

A. CO_2 is not a regulated pollutant.

The Clean Air Act does not require BACT controls for all conceivable "air pollutants." Just because something can be described as a pollutant does not mean that it is automatically subject to BACT in a PSD permit like that issued to Basin Electric. Section 165(a)(4) of the Clean Air Act only requires BACT for "each pollutant **subject to regulation**" under the Clean Air Act. 42 U.S.C. §§ 7475(a)(4), 7479(3). EPA regulations implementing this statute require a BACT analysis only for each "**regulated NSR [New Source Review] pollutant**" that will be emitted from the source. 40 C.F.R. §51.166(b)(12). CO_2 and greenhouse gases are not regulated NSR pollutants.

Wyoming's regulations likewise provide that BACT is required "for **each pollutant regulated** under these Standards and Regulations and under the Federal Clean Air Act." Wyoming Air Quality Standards and Regulations (WAQS&R) Chapter 6, Section 4(b)(ii)(A) (emphasis added). "**Regulated NSR pollutant**" is defined at WAQS&R Chapter 6, Section 4(a) and at 40 C.F.R. § 51.166(b)(49) to mean the following:

> (1) pollutants for which a **National Ambient Air Quality Standard** have been adopted;
>
> (2) pollutants for which a **New Source Performance Standard** have been adopted for one or more category of facilities under Section 111 of the Clean Air Act;
>
> (3) pollutants for which a **stratospheric ozone standard** have been adopted under Title VI of the Clean Air Act; and

> (4) any pollutant that otherwise is **subject to regulation** under the Clean Air Act (with the exception of hazardous air pollutants).

Protestants concede that there is no ambient standard that has been set for CO_2, there is no new source performance standard established for CO_2, and there is no stratospheric ozone standard for CO_2. Instead, Protestants rely entirely upon attenuated legal arguments that have not been accepted by the Environmental Appeals Board (EAB), the courts or the EPA to assert that CO_2 falls into the fourth "catch-all" category of a pollutant "otherwise subject to regulation" under the Clean Air Act.

Protestants' argument springs initially from the United States Supreme Court's recent holding, in a case involving vehicle emissions, that CO_2 is an "air pollutant" and therefore the EPA has authority to make CO_2 subject to regulation under the Clean Air Act. *Massachusetts v. EPA*, 127 S.Ct. 1438 (2007). The Supreme Court noted that the statutory definition of "air pollutant" is very broad—almost anything that goes into the air can be considered a pollutant under that definition. *Id.* at 1460. However, the Supreme Court recognized that not all things which constitute pollutants under the Clean Air Act are then automatically subject to regulation under the Clean Air Act. Instead, the EPA must first make a determination whether pollutants "may reasonably be anticipated to **endanger public health or welfare**." *Id.* The Supreme Court therefore remanded the case to EPA for the agency to determine whether vehicle greenhouse gas emissions contribute to global climate change and thereby endanger public health and welfare. This case did not make that finding, nor did it deal with emissions from coal-fired power plants.

Unless and until the EPA makes such a determination, and then adopts regulations for such emissions, CO_2 is not "subject to regulation" under the Clean Air Act. The EPA

Administrator long ago determined that the agency "lacks the authority to impose [PSD permit BACT] limitations or other restrictions directly on the emission of unregulated pollutants ..." *North County Resource Recovery Assoc.*, 2 E.A.D. 229 (EAB 1986). Protestants confuse the difference between a Supreme Court holding that something **can be made** subject to regulation with a holding that something **already is** subject to regulation. However, this distinction is critical because the decision whether and how to regulate CO_2 has enormous consequences and therefore should be made only after consideration of the best available science and after a robust opportunity for national public comment.

Following *Massachusetts v. EPA*, the EPA must carefully study whether, and if so how, to regulate CO_2 emissions. The economic costs and disruptions associated with any attempt to regulate CO_2 will be enormous, as evidenced by the vigorous debate over global warming, and EPA's decision deserves careful deliberation. EPA has not finished its deliberation, CO_2 has not been regulated, and therefore BACT cannot be required for CO_2. Protestants may argue that it is a foregone conclusion that CO_2 will someday be regulated and therefore this Council should proceed as if it is, but this is a request that the Council jump the gun and mandate BACT for CO_2 before EPA has made these complicated choices under the federal Clear Air Act. It would also violate Wyoming law, as the law does not impose BACT requirements until the pollutant actually is regulated for PSD purposes. WAQS&R Chapter 6, Section 4(a); 40 C.F.R. § 51.166(b)(49). Protestants' impatience with the state of the law is not grounds to ignore it.

Protestants argue that the Clean Air Act's requirement that pollutants be "subject to regulation" includes not only pollutants that are actually regulated but also those that conceivably **could be** regulated. This argument also lacks merit. First, only pollutants **actually regulated** under the Clean Air Act are "subject to regulation" and require BACT. In 1986, the Environmental Appeals Board held that pollutants not regulated under the Clean Air Act are not subject to BACT. *North County Resource Recovery Assoc.*, 2 E.A.D. 229 ("EPA lacks the authority to impose [BACT] limitations or other restrictions directly on the emission of unregulated pollutants ..." *Id.* at 230.) *See also Alabama Power Co. v. Costle*, 636 F.2d 323, 370, n.134 (D.C. Cir. 1979) ("Once a standard of performance has been promulgated [under Section 111 of the Clean Air Act] those pollutants [subject to the standard] become 'subject to regulation' within the meaning of [the statute that requires BACT in PSD permits] . . . ").

This law makes perfect sense because virtually anything in the air can be called a pollutant, so making all "pollutants" subject to BACT would ensure that nothing would ever get built or permitted. The Clean Air Act sensibly calls for regulating only those pollutants that endanger public health or welfare or have harmful effects on the environment. *E.g.,* 42 U.S.C. §§ 7408-09 (National Ambient Air Quality Standards); 42 U.S.C. § 7411 (New Source Performance Standards); 42 U.S.C § 7671a (Stratospheric Ozone Protection); 42 U.S.C. § 7521(a)(1) (vehicle emissions) For such pollutants, it is sensible to require BACT in PSD permits because their potential harmful effects justify the imposition of stringent control technology requirements to reduce emissions and thereby reduce harmful effects. To require BACT for pollutants not determined to have harmful effects would impose substantial costs and other burdens without producing any benefit.

In 2002, the EPA significantly revised its PSD regulations and adopted a definition of "regulated NSR pollutant." 40 C.F.R. § 51.166(b)(49). In the preamble to the new regulation, EPA listed all pollutants that were "currently regulated under the Act" and therefore "subject to

Federal PSD review and permitting requirements." 67 Fed. Reg. 80186, 80240 (Dec. 31, 2002). In this regulation, EPA made clear that only a limited number of specifically identified pollutants (14) are currently subject to regulation for PSD permitting purposes. EPA's list specifically **does not** include CO_2. The EPA also made clear that additional pollutants do not become subject to regulation until the EPA issues specific standards for those pollutants: "[t]he PSD program applies" upon "final promulgation of an NSPS applicable to a previously unregulated pollutant." *Id.* No such standards have been set for CO_2.

The EAB has also determined that carbon dioxide is not a regulated pollutant. *In re Inter-Power of New York, Inc.*, 5 E.A.D. 130, 151 (EAB 1994) (ruling that CO_2 was an unregulated pollutant and thus not subject to regulations designed to control emissions); *In re Kawaihae Cogeneration Project*, 7 E.A.D. 107, 132 (EAB 1997) (finding that CO_2 was not "a regulated air pollutant for permitting purposes.")

Protestants finally assert, as their ultimate fall-back argument, that CO_2 is "subject to regulation" under the Clean Air Act under an obscure provision of the 1990 Clean Air Act Amendments which is codified only in the Historical and Statutory Notes to 42 U.S.C. § 7651k under the heading "Information Gathering on Greenhouse Gases Contributing to Global Climate Change." This footnote cites Section 821 of the Clean Air Act Amendments of 1990, Pub. L. 101-549, which directed EPA to promulgate regulations under the Acid Rain program to require coal-fired power plants to monitor CO_2 emissions and report the results to EPA. To implement this monitoring process, EPA adopted regulations requiring CO_2 monitoring, recordkeeping and reporting, 40 C.F.R. §§ 75.1(b), 75.10(a)(3), 75.57, 75.60-64. However, EPA has not adopted regulations requiring that CO_2 emissions be controlled.

Gathering information about a pollutant to evaluate whether it should be regulated does not make the pollutant "subject to regulation" for purposes of BACT. If it did, every time an EPA administrator asked for data on a pollutant, BACT would be required for that pollutant in every subsequent PSD permit, even though at that point the EPA was only investigating it and would have made no decision that regulation is justified. The legislative history of Section 821 indicates that its sponsors were interested solely in collecting information and had no intention of requiring the control or reduction of CO_2 emissions. Reps. Cooper and Moorhead sponsored Section 821 as an amendment to the Clean Air Act Amendments of 1990, and Rep. Cooper explained: "This is a simple data collection amendment having to do with carbon dioxide emissions. We seek to get utilities across America to collect and report data on carbon dioxide emissions. Right now this data is not available and it needs to be collected. Mr. Chairman, **it is important to stress that this amendment does not force CO_2 reductions**." 136 Cong. Rec. H 2915, 2933-34 (May 23, 1990) (emphasis added).

Reps. Cooper and Moorhead, in a letter included in the Congressional Record, further stated that the purpose was to "begin the process of measuring CO_2 so that we can better understand the global threat, so that we can more intelligently fashion U.S. policy, and so that we can better negotiate with other nations," but noted specifically that this provision "**does not force reductions in CO_2**," and was "**not unduly expensive or burdensome to utilities**." *Id.* at 2934 (emphasis added). The sponsors of this amendment were motivated to establish a baseline to ensure that U.S. utilities would get credit for CO_2 reductions in the event the U.S. were to enter into an international agreement regarding global climate change in the future. *Id.* Protestants are attempting to manipulate the intent of Congress and wrench this information-gathering provision from its moorings to make CO_2 "subject to regulation" and thus subject to BACT review, thereby radically distorting this "not unduly expensive or burdensome" reporting requirement into a law that leads to billions and billions of dollars in higher costs for U.S. utilities and their customers.

In addition to the fact that Congress never intended Section 821 to require BACT or other controls for CO_2 emissions, EPA has consistently, since Section 821 was adopted, interpreted "subject to regulation" to mean subject to a requirement for actual control of emissions, not merely monitoring of emissions. In April 1993, soon after the CO_2 monitoring regulations cited by Protestants were promulgated, EPA issued an interpretation regarding Section 821 of the 1990 Amendments and concluded that Section 821 did not make CO_2 "subject to regulation" because it only required the monitoring and reporting of CO_2, and "not actual control of emissions." Memorandum from Lydia Wegman, Deputy Director, Office of Air Quality Planning and Standards, entitled "*Definition of Regulated Pollutants for Purposes of Title V*, at 5 (April 26, 1993) (attached as Exhibit A).[2]

In 1998, EPA's General Counsel issued an opinion (consistent with the Supreme Court's subsequent holding in *Massachusetts v. EPA*) that carbon dioxide qualified as an "air pollutant" under Section 302(g) of the Act, but at the same time made clear that CO_2 is not considered to be regulated under the Act. The opinion stated that:

> EPA's regulatory authority under the Clean Air Act extends to air pollutants, which, as discussed above, are defined broadly under the Act and include SO2, NOx, CO_2, and mercury emitted into the

---

[2] Because the Wegman memorandum defines "air pollutant" more narrowly than the Supreme Court in *Massachusetts v. EPA*, that part of the memo may no longer be viable. However, the *Massachusetts* decision does not contradict the memo's conclusion that only pollutants actually required to be controlled are considered to be "subject to regulation" under the Clean Air Act.

> ambient air. **EPA has in fact already regulated each of these substances...with the exception of CO_2.** While CO_2 emissions are within the scope of EPA's authority to regulate, the Administrator []has made no determination to date to exercise that authority under the specific criteria provide[d] under any provision of the Act.

Memorandum from Jonathan Z. Cannon, General Counsel, to Carol M. Browner, Administrator, entitled *EPA's Authority to Regulate Pollutants Emitted by Electric Power Generation Sources*, at 5 (April 10, 1998) (emphasis added) (attached as Exhibit B).

EPA's 2002 PSD rule changes, *Inter-Power of New York*, 5 E.A.D. at 151 and *Kawaihae Cogeneration Project*, 7 E.A.D. at 132, all cited above and all dated after the adoption of Section 821, all determined that CO_2 is not subject to regulation for purposes of the PSD program. The bottom line is that CO_2 is not yet a regulated pollutant under the Clean Air Act and thus not subject to a BACT analysis. Although Protestants have cobbled together tenuous legal arguments to the contrary, the EPA's position on this issue is firm and clear. A longstanding agency interpretation of a statute is entitled to deference. *Sec'y of Labor, Mine Safety and Health Admin. v. Excel Mining*, 334 F.3d 1, 7 (D.C. Cir. 2003) (giving weight to the fact that the administering agency had interpreted the statute the same way for 25 years), quoting *Barnhart v. Walton*, 535 U.S.212, 220 (2002) ("[T]his Court will normally accord particular deference to an agency interpretation of longstanding duration.") (internal quotations marks omitted).

Finally, this Council should be aware of the enormous collateral problems throughout Wyoming that would be triggered by a determination that CO_2 is "subject to regulation" under the Clean Air Act. Once that occurs, any source that emits more than 250 tons/year of CO_2

becomes a "major stationary source" subject to the PSD program.[3] 40 C.F.R. § 51.166(b)(1)(i)(b); WAQR&S Chapter 6, Section 4(a). Because all combustion sources emit CO_2 in far greater amounts than they emit pollutants that are currently regulated (such as nitrogen oxides, sulfur dioxide, particulate matter or carbon monoxide), an enormous number of minor sources would become major sources and subject to the PSD program. Examples of such minor sources could include a 320-horsepower diesel-fired water pump if operated more than 1220 hours per year; a 1000 kW output emergency diesel generator if operated more than 274 hours per year; or a small apartment building or small hotel operating a central natural gas-fired central furnace. There are also thousands of continuously running diesel compressors supporting coal bed methane production all over the Powder River Basin, and many of those sources may well become subject to the PSD program and require a permit.

This would result in a tremendous increase in permitting burdens on the DEQ, not to mention a huge increase in attendant costs. Ultimately, EPA may have to grapple with this concern as it responds to the Supreme Court's remand in *Massachusetts v. EPA*. However, it has resources available to it that the EQC does not have, and the EPA has the ability to engage in a robust national rulemaking process that will engage widespread public comment and involvement. This Council is simply not the venue for addressing the complicated global climate change issues.

---

[3] For 28 listed types of sources, the major source threshold is only 100 tons/year.

B. CO_2 cannot be regulated under BACT by characterizing it as collateral impact.

Protestants argue in the alternative that, even if CO_2 and other greenhouse gases are not subject **directly** to BACT, they should be **indirectly** subject to BACT because they present "collateral impacts." (Petition, paragraph 29.) This is an argument designed to make CO_2 emissions part of the economic considerations that are weighed in a BACT analysis for other regulated pollutants. Typically, BACT analyses are done using a "top-down" five-step process. The five steps are:

1. Identify all emission control options potentially applicable to the source;
2. Eliminate the technically infeasible options identified at step 1;
3. Rank the technically feasible options in order of the most to least effective;
4. Evaluate the energy, environmental and economic impacts (the "collateral impacts") of each control technology option to determine whether the top-ranked option should be eliminated in favor of another option based on these impacts; and
5. Select as BACT the most effective control option not eliminated at step 4.

EPA's Draft New Source Review Workshop Manual, October 1990 (EPA NSR Manual) at B.5-B.9.

Protestants seek to regulate CO_2 by contending that CO_2 emissions must be considered at step 4 of the BACT analysis as a "collateral" environmental impact to regulation of other pollutants. While it is true that on occasion it is appropriate to consider the collateral impacts on unregulated pollutants when weighing otherwise comparable technology choices in the BACT process, *North County Resource Recovery Assoc.*, 2 E.A.D. 229, the extent to which unregulated pollutants may be considered is very limited.

The collateral impacts analysis **only** asks whether the most effective control technology listed at step 3 for a regulated pollutant should be rejected in favor of a less effective control technology because the less effective technology would collaterally result in a significant reduction in unregulated CO_2 emissions. EPA's NSR Manual at B.8, B.26-.29 ("Step 4 validates the suitability of the top control option in the listing for selection as BACT, or provides clear justification why the top candidate is inappropriate as BACT." *Id* at B.26). Collateral impacts cannot justify choosing a control technology that is not listed in step 3 because it does not control regulated pollutants or was eliminated at BACT steps 1 or 2. Therefore, Protestants' CO_2 claims would be relevant **only** for technologies not rejected at steps 1 or 2, and **only** for technologies that controlled a regulated pollutant and also "collaterally" reduced CO_2 emissions.

None of the technologies evaluated as feasible for controlling regulated pollutants at Dry Fork Station have any effect on CO_2 emissions, which means the "collateral impacts" argument has no place here. Despite this, Protestants advance the suggestion that Integrated Gasification Combined Cycle (IGCC) technologies should have been considered as a control technology for regulated pollutants and, if it had been, this would have made possible lower emissions of greenhouse gases a collateral benefit of IGCC.

However, there are three reasons why this alleged IGCC "collateral impact" argument cannot stand: 1) IGCC technology is a redefinition of the emissions source and must therefore be rejected at Steps 1 and 2 of the BACT analysis, which makes it unavailable for consideration of collateral impacts at Step 4; 2) IGCC technology does not collaterally reduce emissions of greenhouse gases; and 3) even if consideration of IGCC were required, it is not possible to reduce CO_2 emissions to the atmosphere at this time because there is no regulatory framework, infrastructure or technical knowledge to implement CO_2 sequestration now or in the near future.

1. IGCC would fundamentally redefine the Dry Fork Station and therefore cannot be required as BACT.

Even if CO_2 were a regulated pollutant, consideration of IGCC technology would still not be legally appropriate for Dry Fork Station. The reason is simple. It is a completely different technology, and thus cannot be required by a BACT analysis.

IGCC is not an emissions control technology but rather a distinct power generation technology that would involve a total and fundamental redesign and redefinition of the plant, and therefore would be rejected at steps 1 and 2 of the BACT process. EPA guidance and Environmental Appeals Board decisions for more than twenty years have uniformly provided that a **permit applicant cannot be required to redefine its proposed source as part of the BACT analysis**. *See, e.g.*, EPA NSR Manual at B.13 ("Historically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives."); *In re Prairie State Generating Co.*, 13 E.A.D. __, PSD Appeal 05-05 (EAB Aug. 24, 2006), slip op. at 27 ("We have specifically stated that 'EPA has not generally required a source to change (i.e., redefine), its basic design.'" (quoting *In re Knauf Fiber Glass, GmbH*, 8 E.A.D 121, 136 (EAB 1999)); *In re Hawaiian Commercial and Sugar Co.*, 4 E.A.D 95, 99 (EAB 1992) ("EPA's PSD permit conditions [sic] regulations do not mandate that the permitting authority redefine the source in order to reduce emissions."); *In re Old Dominion Electric Cooperative Clover, Virginia*, 3 E.A.D. 779, n.38 (EAB 1992) ("Traditionally, EPA does not require a PSD applicant to change the fundamental scope of its project."); *In re Pennsauken County, New Jersey Resource Recovery Facility*, 2 E.A.D. 667 (EAB 1988), 1988 EPA App. LEXIS 27, *13 ("The permit conditions that define these systems are imposed on the source as the applicant has defined it. . . . the conditions themselves are not intended to redefine the source . . .")

To substitute an IGCC plant for Dry Fork Station's pulverized coal boiler would redefine the project. In a pulverized coal plant, finely ground coal is mixed with air and combusted in a boiler to heat water that is circulated through a network of boiler tubes and converted to steam. The steam turns the blades of a steam turbine which turns a generator to produce electricity. *See* "A Comparison of PC, CFB and IGCC Technologies for Basin Electric Power Cooperative's Dry Fork Station," Exhibit 22 to Responses of the Basin Electric Power Cooperative to EPA, NPS and Environmental Group Comments Regarding the Wyoming Department of Environmental Quality's Permit Application Analysis for the Dry Fork Station, June 2007, at 1-7 (attached as Exhibit C). In an IGCC plant, finely ground coal is oxidized in a pressurized vessel to convert it to a gas comprised mostly of hydrogen and carbon monoxide (syngas). After processing for removal of particulate matter and sulfur, the syngas is burned in a combined cycle power block, much like a natural gas-fired electrical generating plant. Syngas combustion powers a gas turbine to generate electricity, and then the exhaust gas is used to heat steam that drives a steam turbine to generate additional electricity. Exhibit C. Other than starting with coal as a fuel, these plants have nothing in common. One burns coal to heat steam that drives a steam turbine. The other turns coal into a gas that is combusted in a combined cycle power block. IGCC is not an emission control technology, it is a fundamentally different way to generate electricity.

EPA policy is that a permit applicant is not required by BACT to construct a natural gas-fired turbine instead of a pulverized coal plant, because that would be redefining the source. EPA NSR Manual at B.13. ("[A]pplicants proposing to construct a coal-fired electric generator have not been required by EPA as part of a BACT analysis to consider building a natural gas-fired electric turbine although the turbine may be inherently less polluting per unit product (in this case electricity)." The difference between an IGCC unit and a pulverized coal plant is even greater than the difference between a natural gas-fired unit and a pulverized coal plant. The IGCC plant includes a gasification unit in addition to the type of combined-cycle power block found in a natural gas-fired plant. Since a natural gas-fired plant would be a redefinition of the Dry Fork coal plant, it is even more clear that IGCC cannot be required as BACT.

2. The additional equipment required to reduce CO_2 emissions at an IGCC plant does not reduce emissions of regulated pollutants and therefore reduction of CO_2 is not a collateral benefit of controlling regulated pollutants.

An IGCC plant also does not inherently reduce emissions of CO_2, since applying CO_2 capture to IGCC requires three additional process units: shift reactors, an additional CO_2 separation process, and CO_2 compression and drying. *See* Exhibit C at 24-26. Therefore, even if Protestants were correct in alleging that IGCC would lower emissions of other regulated pollutants, and even if IGCC were not eliminated at steps 1 and 2 of the BACT process because it would redefine the source, IGCC still does **not** reduce CO_2 emissions and therefore does **not** produce any collateral benefit. In order to reduce CO_2 emissions from an IGCC plant an entirely **different and separate** process—three additional process units—would have to be added. This disqualifies use of IGCC as a control technology in BACT: only "if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act" may the effect on unregulated pollutants be evaluated as a collateral impact. *North County Resource Assoc.*, 2 E.A.D. 229.

Protestants' argument that IGCC can be imposed as BACT is also deliberately disingenuous. Protestants know that IGCC technology does not produce the collateral benefit of reducing CO_2 emissions. An IGCC plant does not capture CO_2 or store it. In fact, the Sierra Club appealed a permit issued for an IGCC plant in Illinois for exactly this reason, arguing that the permit for the IGCC plant should be denied because it did not provide for control of CO_2 emissions. *In re Christian County Generation, LLC*, 13 E.A.D. ___, PSD Appeal 07-01 (EAB, January 28, 2008). Protestants therefore argue from both sides of their mouth. In Illinois, IGCC was unacceptable to the Sierra Club because it did not control CO_2 emissions. Here, the Sierra Club argues IGCC should be imposed as BACT because it will help limit CO_2 emissions. Both cannot be true, which illustrates that Protestants' real objective is not to control emissions to the best available level but rather to kill coal in any technology that may be proposed, even if that requires taking blatantly inconsistent positions in different permit appeals.

3. Control of CO_2 emissions would require both capture and sequestration, which is not possible at this time or in the near future.

Protestants are asking for the impossible. Even if the capture of CO_2 emissions from an IGCC plant were possible, to reduce the amount of CO_2 released to the atmosphere would require that CO_2 be sequestered by underground injection after it is captured. At this time, there is no regulatory framework, technical knowledge, or available infrastructure to sequester CO_2 on a commercial scale:

> Significant technological development has to occur, significant planning for infrastructure has to occur, and significant development of a regulatory and legal framework has to occur before we can effectively require or implement programs for coal-based carbon capture and sequestration. . . . We are looking somewhere between, probably, around 15 years in developing the technology that would be economically, commercially attractive.

Deputy Secretary of Energy Clay Sell, quoted in *Climate: DOE proceeding with large-scale sequestration demos*, Greenwire, E&E Publishing, LLC, available at http://www.eenews.net/Greenwire/2007/10/09/10. Neither BACT nor any other aspect of the PSD program requires that which cannot be done.

Congress may soon enact climate change legislation, and such legislation may enable development of the technology, infrastructure and regulatory components necessary to enable the capture and sequestration of CO_2 from coal-fired power plants. This has not happened yet. If and when it does, Basin Electric and the Dry Fork Station will comply with whatever the law may require. In the meantime, however, the technology, the infrastructure or the regulatory regime to accommodate carbon capture and storage have not yet been developed. Protestants' desire to halt all projects until this technology exists is simply not authorized by law, and ignores the pressing need for power to support growth in Wyoming.

C. Collateral costs of future regulation is not part of BACT.

Protestants also argue that the DEQ and Basin Electric failed to consider the "collateral costs of future, imminent carbon regulation" as part of the BACT analysis. However, speculative consideration of potential future regulation is entirely outside the scope of the BACT process. In fact, it would directly contradict the BACT process. BACT identifies and evaluates available, not future, control technologies. EPA NSR Manual at B.5. There is no authority to support the assertion that the cost of complying with future unknown regulation should be part of BACT.

D. Basin Electric is committed to participating in new technologies.

Basin Electric's business is meeting the current needs for power in the region. The growth Wyoming is enjoying must be powered or the growth stops. This project is about meeting immediate needs, not becoming a battleground for the national debate over global warming strategies that may take a decade or more to implement.

Basin Electric is addressing the challenge of climate change and is actively engaged in efforts to promote the reduction of greenhouse gas emissions. It owns or has contracted to purchase electricity from wind turbines having a combined capacity greater than 136 megawatts today and has ordered turbines for an additional 215 megawatts to be online in 2009 and 2010. It has been purchasing 22 megawatts of waste heat recovery generation at four compressor stations along the Northern Border pipeline and has contracted for an additional 22 megawatts of waste heat recovery generation at four sites along the Northern Border pipeline to be online in 2008 and 2009. Its Dakota Gasification Company subsidiary participates in the largest carbon sequestration project in the world, supporting enhanced oil recovery in the Weyburn field in Canada. It is exploring the possibility of implementing a demonstration project to capture CO_2 from its Antelope Valley Station, which would promote the development of carbon capture technology. A feasibility study for this project is underway, which should be completed in early summer and help the company decide whether the project is practicable. It endorses reasonable climate change legislation that supports the development of technology to reduce greenhouse gas emissions in a time frame and at a cost that does not result in extreme disruptions in the U.S. economy and severe energy cost increases for consumers.

The development of a policy to address concerns about climate change must take into account complex considerations regarding energy resources and economic policy, and discern how mitigation of climate change can best be integrated into an overall energy policy that minimizes, to the extent possible, drastic economic disruptions. Basin Electric must, in the meantime, provide power where needed, and does not wish to sacrifice Wyoming's immediate future at the altar of as yet undeveloped global warming solutions. Protestants view it differently, as is their right, but their solution of halting all coal-fired generation is a political question, not a legal one. This Council's job is to review the permit under applicable law, not solve global warming.

E. The Wyoming legislature has strongly indicated its preference not to have the Council take the initiative with greenhouse gas issues.

Protestants may encourage the Council to use its environmental platform under Wyoming law to push their national agenda on the so-called war on global warming. Pointing to CO_2 emissions from coal fired generation as a major source of CO_2 emissions, Protestants may urge the Council to take an affirmative and aggressive stance against global warming.

However, the Wyoming legislature has clearly evidenced its desire not to have the Council take the lead on the battle against global warming. Although not directly relevant here, Wyo. Stat. § 35-11-213 provides that "neither the department nor the council shall propose or promulgate any new rule or regulation intended in whole or in part to reduce [CO_2] emissions as called for by the Kyoto protocol" and "the director of the department shall not submit to the

United States environmental protection agency or to any other agency of the federal government any legally enforceable commitments related to the Kyoto Protocol." This plainly reveals the legislature's desire not to thrust Wyoming to the forefront of the national and international debate on greenhouse gas emissions.

Protestants argue that this statute is inapplicable to PSD permitting of coal-fired power plants and even if it were applicable it would be preempted by the Clean Air Act. However, the statute expresses at a minimum the legislature's desire not to limit greenhouse gas emissions unless and until they are properly and legally regulated at the federal level. In light of the Kyoto protocol, the EQC certainly cannot view its statutory duties as including thrusting Wyoming to the forefront of greenhouse gas issues. The Wyoming legislature does not want to sacrifice Wyoming's interests in favor of taking the lead in the international debate on global warming. That is, however, precisely what Protestants seek: the elimination of a much needed power plant in Wyoming.

II. Conclusion.

The Department of Environmental Quality's Motion to Dismiss should be granted, and this permit appeal should be limited to the issues which exist under governing law.

DATED March 12, 2008.

Patrick R. Day, P.C.
Mark R. Ruppert
HOLLAND & HART LLP
P.O. Box 1347
Cheyenne, WY 82003-1347
Telephone: (307) 778-4200
Facsimile: (307) 778-8175
pday@hollandhart.com
mruppert@hollandhart.com

ATTORNEYS FOR BASIN ELECTRIC POWER COOPERATIVE

CERTIFICATE OF SERVICE

I hereby certify that on March 12, 2008, I served the foregoing by electronic service and by placing a true and correct copy thereof in the United States mail, postage prepaid and properly addressed to the following:

James S. Angell
Robin Cooley
Andrea Zaccardi
Earthjustice
1400 Glenarm Place, #300
Denver, CO 80202
rcooley@earthjustice.org
azaccardi@earthjustice.org
jangell@earthjustice.org

Jay A. Jerde
Deputy Attorney General
Nancy E. Vehr
Senior Assistant Attorney General
Kristen A. Dolan
Assistant Attorney General
123 Capitol Building
Cheyenne, WY 82002
NVEHR@state.wy.us
jjerde@state.wy.us
kdolan@state.wy.us

A

MEMORANDUM

SUBJECT: Definition of Regulated Air Pollutant for Purposes of Title V

FROM: Lydia N. Wegman, Deputy Director
Office of Air Quality Planning and Standards (MD-10)

TO: Air Division Director, Regions I-X

In response to requests for guidance on the definition of "regulated air pollutant," this memorandum clarifies the approach set forth by the definition in the 40 CFR part 70 regulations and indicates the ways in which the class of regulated air pollutants can change. The attachment provides a compilation of the lists of pollutants which are considered "regulated air pollutants" for purposes of the operating permits programs under title V of the Clean Air Act (Act). This memorandum also provides guidance on the Environmental Protection Agency's (EPA) definition of "air pollutant," as that term is used in determining major source status pursuant to section 302 of the Act. Finally, this memorandum emphasizes the ability of permitting authorities to designate certain quantities of emissions of regulated air pollutants as "insignificant" with respect to the obligation to report emissions of those pollutants in permit applications. The policies set out in this memorandum and attachment are intended solely as guidance, not final agency action, and cannot be relied upon to create any rights enforceable by any party.

I. Regulated Air Pollutant

The definition of regulated air pollutant, found at 40 CFR 70.2 is important because it determines which pollutants and emissions units must be addressed in a source's title V permit application. In addition, this definition can affect whether a State's fee revenue is presumed adequate to fund its title V program and in some cases, the amount of permit fees a source must pay. Each of these roles is discussed below.

Once a source is subject to a title V permitting program, its emissions of all regulated air pollutants (except those which meet the permitting authority's criteria for "insignificant" emissions) must be described in the permit application along with all emissions of pollutants for which the source is considered major. Similarly, applications must describe all emissions units which emit regulated air pollutants (except those deemed insignificant).

In addition, the concept of regulated air pollutant plays an important role in the area of permit fees. First, regulated air pollutants are the starting point for determining which pollutants must be included when relying on the $25 ton per year (as adjusted by the consumer price index) presumptive minimum program cost as a basis for demonstrating the adequacy of a State's projected fee revenue. As part of this demonstration, the State projects its revenue using a subset of regulated air pollutants [i.e., regulated pollutant (for presumptive fee calculation)]. Second, many States are developing fee schedules which impose fees based on emissions of regulated air pollutants."

The population of regulated air pollutants is composed of the following categories of pollutants:

(1) Nitrogen oxides (NO_x) and volatile organic compounds (VOC's). The definition of regulated air pollutant specifically includes these two significant precursors to ozone formation. This approach is consistent with the Act's treatment of VOC's and NO_x pursuant to part D of title I of the Act. (These ozone precursors are combined with the criteria pollutants for purposes of the attached list of regulated pollutants);

(2) Any pollutant for which a national ambient air quality standard has been promulgated [i.e., particulate matter (measured as PM-10: particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers), sulfur dioxide, ozone, nitrogen dioxide, carbon monoxide, and lead];

(3) Any pollutant that is subject to a new source performance standard promulgated under section 111 of the Act [including section 111(d)], which require new and modified sources to satisfy emissions standards, work practice standards, and other requirements;

(4) Any of the ozone depleting substances specified as a Class I (primarily chlorofluorocarbons) or Class II substance (hydrochlorofluorocarbons) under title VI of the Act [all of which became regulated pollutants when they became subject to standards and requirements for (1) servicing of motor vehicle air conditioners and (2) restrictions on the sale of ozone-depleting substances promulgated into 40 CFR part 82 (57 FR 31242, July 14,

1992)]; and

(5) Any pollutant subject to a standard promulgated under section 112 or other requirements established under section 112 of the Act, including sections 112(g)(2), (j), and (r) of the Act.

It is important to note that, if a pollutant is regulated for one source category by a standard or other requirement, then the pollutant is considered a regulated air pollutants for all source categories. This rule is relevant to all the pollutants listed under items (3),(4), and (5) above with one exception: those which are the subject of case-by-case MACT determinations under section 112(g)(2).

The issue of when a substance regulated under section 112 becomes a regulated air pollutants merits further discussion:

- When a permitting authority makes a case-by-case MACT determination under section 112(g)(2), then the pollutant for which the determination is made is regulated even though EPA has not issued a standard for that pollutant. However, the pollutant is considered regulated only with respect to the individual source for which the MACT determination was made.

- A pollutant will become regulated under section 112(j) of the Act (the "MACT hammer") if the Administrator fails to promulgate a standard by the date established pursuant to section 112(e) of the Act. Pursuant to section 112(j), permitting authorities will be required to make case-by-case MACT equivalent determinations. The pollutants become regulated nationwide upon the date this provision takes effect for the pollutant (i.e., 18 months after the missed deadline for the standard but not prior to 42 months after the enactment of the Act Amendments of 1990). Pollutants so regulated are considered regulated air pollutants for all sources that emit the pollutant because the hammer provision is a broadly applicable surrogate for the promulgation of a MACT standard. This is in contrast to the section 112(g)(2) determinations which are triggered only for the single source subject to the requirement, rather than nationwide.

- The EPA's proposed rule required by section 112(r)(3), lists substances which could cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment if accidentally released, was published in the Federal Register on January 19, 1993 (58 FR 5102). All of the listed pollutants will become regulated air pollutants upon promulgation of the list.

The attachment to this memorandum contains a list of pollutants which are regulated as well as a list of pollutants which are subject to regulation under section 112 in the future, as discussed above. It is also important to note that the attached lists are dynamic and subject to change. For example, the EPA is required to review periodically the statutory list of pollutants in section 112(b) and is authorized to delete and add substances if the scientific data demonstrate that such a change is appropriate.

We have attempted to note the likely near-term changes in the regulations that determine which pollutants are "regulated air pollutants," and we will provide updates to this guidance periodically.

The definition of regulated air pollutants does not limit the air pollutants which a State may choose to regulate nor does it limit the information (such as for permit applications) which a State may require of a source. States are free to adopt more expansive approaches to the regulation of toxic air pollutants than is required by part 70.

II. Definition of "Air Pollutant" Pursuant to Section 302

Considerable interest has been expressed in a related, but distinct, area: the definition of "air pollutant" contained in section 302(g) of the Act. This definition governs which pollutants are to be considered in determining whether a source is "major" pursuant to section 302(j) of the Act. This is important to the operating permit program because all major sources must obtain a title V permit. Although section 302(g) can be read quite broadly, so as to encompass virtually any substance emitted into the atmosphere, EPA believes that it is more consistent with the intent of Congress to interpret this provision more narrowly. Were this not done, a variety of sources that have no known prospect for future regulation under the Act would nonetheless be classified as major sources and be required to apply for title V permits. Of particular concern would be sources of carbon dioxide or methane.

As a result, EPA is interpreting "air pollutant" for section 302(g) purposes as limited to all pollutants subject to regulation under the Act. This would include, of course, all regulated air pollutants plus others specified by the Act or by EPA rulemaking. This approach results in the inclusion of the pollutants on the list of hazardous air pollutants in section

112(b) that are not otherwise regulated. It should be noted that the 1990 Amendments to the Act did include provisions with respect to carbon dioxide (section 821) and methane (section 603), but these requirements involve actions such as reporting and study, not actual control of emissions. Therefore, these provisions do not preempt EPA's discretion to exclude these pollutants in determining whether a source is major. If the results of the studies required by the 1990 Amendments to the Act suggest the need for regulation, these pollutants could be reconsidered at that time for classification as pollutants subject to regulation under the Act.

This approach to interpreting section 302(g) is similar to the traditional practice of the prevention of significant deterioration (PSD) program under part C of title I of the Act [see, e.g., Implementation of North County Resource Recovery PSD Remand, Gerald Emison, Director, OAQPS, dated September 22, 1987].

III. De Minimis Thresholds

With the 1990 Amendments, the Act expressly addresses a significantly broader range of pollutants. The EPA believes that this will confer real benefits to air quality management and that the title V permit program offers the flexibility for efficient implementation of these requirements. This function includes providing information about emissions of these pollutants, through the permit application process, even if the particular pollutant is not currently required to be controlled at the individual source. The EPA also realizes, though, that in many cases these pollutants are emitted in amounts of no significance to air quality management. It would be unduly burdensome to require permit applicants to quantify all emissions of these pollutants, especially given their considerable number and, in some cases, difficulty in quantification.

The part 70 promulgation recognized this fact but gave only very general guidance as to the approvable options for States in developing their part 70 programs. Section 70.5(c) provides that "[T]he Administrator may approve as part of a State program a list of insignificant activities and emissions levels which need not be included in permit applications." The regulation further provides that "[T]he permitting authority shall require additional information related to the emissions of air pollutants sufficient to verify which requirements are applicable to the source, and other information needed to collect any permit fees owed under the fee schedule approved pursuant to §70.9(b) of this part." §70.5(c)(3)(i).

The EPA understands the need for States to establish de minimis thresholds for emissions reporting purposes in permit applications and recognizes that the particular thresholds selected by individual States can vary based on their air quality management needs and professional judgement. The EPA will work with States to develop part 70 programs that will best meet their program needs.

For further information, call Kirt Cox at (919) 541-5399 or Candace Carraway at (919) 541-3189.

Attachment

cc: Air Branch Chiefs, Regions I - X
Regional Office Permit Program Contacts
OAQPS Division Directors

LIST OF REGULATED AIR POLLUTANTS
(As of April 1993)

I. Pollutants for Which an NAAQS Has Been Established

lead
sulfur dioxide
nitrogen dioxide
carbon monoxide
particulate matter (PM10)
ozone, including precursors:
    nitrogen oxides (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, N_2O_5)
    volatile organic compounds (VOC's)

As defined in 40 CFR 51.100(s), the term VOC includes any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which participates in atmospheric photochemical reactions. The EPA has developed a list of substances (which is subject to change) which are excluded from the VOC definition because of their negligible reactivity. The EPA's proposal to exclude perchloroethylene from the definition was published in 57 FR 48490 (October 26, 1992).

The following organic compounds are excluded from the definition of VOC because of they have been determined to have negligible photochemical reactivity:

methane

ethane
methylene chloride (dichloromethane)
1,1,1-trichloroethane (methyl chloroform)
1,1,1-trichloro-2,2,2-trifluoroethane (CFC-113)
trichlorofluoromethane (CFC-11)
dichlorodifluoromethane (CFC-12)
chlorodifluoromethane (CFC-22)
trifluoromethane (FC-23)
1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114)
chloropentafluoroethane (CFC-115)
1,1,1-trifluoro 2,2-dichloroethane (HCFC-123)
1,1,1,2-tetrafluoroethane (HFC-134a)
1,1-dichloro 1-fluoroethane (HCFC-141b)
1-chloro 1,1-difluoroethane (HCFC-142b)
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124)
pentafluoroethane (HFC-125)
1,1,2,2-tetrafluoroethane (HFC-134)
1,1,1-trifluoroethane (HFC-143a)
1,1-difluoroethane (HFC-152a)

perfluorocarbon compounds which fall into these classes:

(i) Cyclic, branched, or linear, completely fluorinated alkanes;

(ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;

(iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and

(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

II. Pollutants Regulated Under New Source Performance Standards

Criteria pollutants (including VOC's and NO_x) plus:

dioxin/furan (defined in 40 CFR 60.53a to mean total tetra through octachlorinated dibenzo-p-dioxins and dibenzofurans)*
fluorides
hydrogen chloride*
hydrogen sulfide (H_2S)
sulfuric acid mist

total reduced sulfur
reduced sulfur compounds
total suspended particulate

* The new source performance standard (NSPS) for municipal waste combustors (MWC) controls emissions of dioxin/furans and hydrogen chloride gas (40 CFR 60.53a and 60.54a) as surrogates for controlling emissions of organic compounds and acid gases which are emitted in the exhaust gases from MWC units. Thus, the indicated dioxin/furan compounds and hydrogen chloride are regulated pollutants.

Note that the EPA has drafted a proposed revision to the NSPS for MWC's which will regulate substances like cadmium which are not currently regulated air pollutants. As this revised NSPS and other standards are developed, there may be additions to the list of regulated pollutants.

III. Class I and Class II Substances Under Title VI

Class I Substances

carbon tetrachloride
chlorofluorocarbon-11 (CFC-11)
chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)
chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
halon-1211
halon-1301
halon-2402
methyl chloroform

Class II Substances
hydrochlorofluorocarbon-21 (HCFC-21)
hydrochlorofluorocarbon-22 (HCFC-22)
hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)
hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)
hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
hydrochlorofluorocarbon-225 (HCFC-225)
hydrochlorofluorocarbon-226 (HCFC-226)
hydrochlorofluorocarbon-231 (HCFC-231)
hydrochlorofluorocarbon-232 (HCFC-232)
hydrochlorofluorocarbon-233 (HCFC-233)
hydrochlorofluorocarbon-234 (HCFC-234)
hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-241 (HCFC-241)
hydrochlorofluorocarbon-242 (HCFC-242)
hydrochlorofluorocarbon-243 (HCFC-243)
hydrochlorofluorocarbon-244 (HCFC-244)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)
hydrochlorofluorocarbon-271 (HCFC-271)

IV. Pollutants Regulated Under Section 112

pollutants for which national emission standards for hazardous air pollutants (NESHAP's) have been established:

arsenic
asbestos
beryllium
benzene
mercury
radionuclides

vinyl chloride

POLLUTANTS SUBJECT TO REGULATION UNDER SECTION 112

I. Pollutants listed in Section 112(b):

The 189 pollutants listed in section 112(b) are not considered regulated air pollutants until addressed in a requirement that it be controlled by a source. None of the listed pollutants meets the definition except: asbestos, benzene, and vinyl chloride (for which NESHAP's have been established); and hydrogen chloride (gas), dibenzofurans, and 2,3,7,8-Tetrachlorodibenzo-p-dioxin (regulated under the municipal waste combustor NSPS). Most of the listed pollutants will become regulated when EPA promulgates the Hazardous Organic NESHAP (HON) which is discussed below. The remaining pollutants will become regulated: (1) when EPA promulgates a Maximum Achievable Control Technology (MACT) standard for the pollutant under section 112(d), (2) for a particular source, when case-by-case MACT determinations are made under section 112(g) for the source, or (3) the later of June 15, 1994 or 18 months after EPA fails to issue emissions standards for categories of sources in compliance with the timetable promulgated pursuant to section 112(e) as mandated by Section 112(j).

The section 112(b) list contains some technical errors which will be corrected in subsequent rulemaking. The majority of the technical corrections likely to be made are noted below. Also, the pollutants from the 112(b) list which are addressed in the proposed HON are followed by an asterisk.

CAS number	Chemical name
75070	Acetaldehyde*
60355	Acetamide*
75058	Acetonitrile*
98862	Acetophenone*
53963	2-Acetylaminofluorene*
107028	Acrolein*
79061	Acrylamide*
79107	Acrylic acid*
107131	Acrylonitrile*
107051	Allyl chloride*
92671	4-Aminobiphenyl*
62533	Aniline*
90040	o-Anisidine*
1332214	Asbestos

71432	Benzene (including benzene from gasoline)*
92875	Benzidine*
98077	Benzotrichloride*
100447	Benzyl chloride*
92524	Biphenyl*
117817	Bis(2-ethylhexyl)phthalate (DEHP)*
542881	Bis(chloromethyl)ether*
75252	Bromoform*
106990	1,3-Butadiene*
156627	Calcium cyanamide
105602	Caprolactam*
133062	Captan
63252	Carbaryl
75150	Carbon disulfide*
56235	Carbon tetrachloride*
463581	Carbonyl sulfide*
120809	Catechol*
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid*
532274	2-Chloroacetophenone*
108907	Chlorobenzene*
510156	Chlorobenzilate
67663	Chloroform*
107302	Chloromethyl methyl ether*
126998	Chloroprene*
1319773	Cresols/Cresylic acid (isomers and mixture)*
95487	o-Cresol*
108394	m-Cresol*
106445	p-Cresol*
98828	Cumene*
94757	2,4-D (2,4-Dichlorophenoxyacetic acid, including salts and esters)*
	DDE* [recommended technical correction: CAS number 72559] (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)
334883	Diazomethane*
132649	Dibenzofurans* [recommended technical correction: Dibenzofuran]
96128	1,2-Dibromo-3-chloropropane*
84742	Dibutylphthalate*
106467	1,4-Dichlorobenzene(p)* [recommended technical correction: 1,4-Dichlorobenzene]

91941

3,3-Dichlorobenzidene* [recommended technical correction: 3,3'-Dichlorobenzidine] 111444

Dichloroethyl ether (Bis(2-chloroethyl)ether)* 542756

1,3-Dichloropropene* 62737

Dichlorvos 111422
Diethanolamine* 121697
N,N-Diethyl aniline (N,N-Dimethylaniline)*
[recommended technical correction:
N,N-Dimethylaniline]
64675 Diethyl sulfate*
119904 3,3-Dimethoxybenzidine* [recommended technical
correction: 3,3'-Dimethoxybenzidine]
60117 Dimethyl aminoazobenzene*
119937 3,3',-Dimethyl benzidine* [recommended
technical correction: 3,3',-Dimethylbenzidine]
79447 Dimethyl carbamoyl chloride*
[recommended technical correction:
Dimethylcarbamoyl chloride] 68122 Dimethyl formamide*
[recommended technical correction: N,N-
Dimethylformamide] 57147 1,1-Dimethyl
hydrazine* [recommended technical correction: 1,1-
Dimethylhydrazine] 131113 Dimethyl
phthalate* 77781
Dimethyl sulfate*
4,6-Dinitro-o-cresol, and salts* [recommended
technical correction to remove CAS number]
51285 2,4-Dinitrophenol*
121142 2,4-Dinitrotoluene*
123911 1,4-Dioxane (1,4-Diethyleneoxide)*
122667 1,2-Diphenylhydrazine*
106898 Epichlorohydrin (1-Chloro-2,3-epoxypropane)*
106887 1,2-Epoxybutane*
140885 Ethyl acrylate*
100414 Ethyl benzene* [recommended technical correction:
Ethylbenzene]
51796 Ethyl carbamate (Urethane)*
75003 Ethyl chloride (Chloroethane)*
106934 Ethylene dibromide
(Dibromoethane)* 107062 Ethylene
dichloride (1,2-Dichloroethane)* 107211
Ethylene glycol* 151564
Ethylene imine (Aziridine) [recommended technical
correction: Ethyleneimine (Aziridine)] 75218
Ethylene oxide* 96457
Ethylene thiourea* 75343
Ethylidene dichloride (1,1-Dichloroethane)* 50000
Formaldehyde* 76448
Heptachlor 118741
Hexachlorobenzene* 87683
Hexachlorobutadiene* 77474
Hexachlorocyclopentadiene 67721
Hexachloroethane* 822060
Hexamethylene-1,6-diisocyanate* 680319

Hexamethylphosphoramide*	110543
Hexane*	302012
Hydrazine*	7647010
Hydrochloric acid [recommended technical correction: Hydrochloric acid (hydrogen chloride)(gas only)]	7664393
Hydrogen fluoride (Hydrofluoric acid)	123319
Hydroquinone*	78591
Isophorone*	
Lindane (all isomers) [Recommended technical correction: 1,2,3,4,5,6-Hexachlorocyclohexane (all stereo isomers, including lindane)]	108316
Maleic anhydride*	67561
Methanol*	72435
Methoxychlor	74839
Methyl bromide (Bromomethane)*	74873
Methyl chloride (Chloromethane)*	71556
Methyl chloroform (1,1,1-Trichloroethane)*	78933
Methyl ethyl ketone (2-Butanone)*	60344
Methyl hydrazine* [recommended technical correction: Methylhydrazine]	74884
Methyl iodide (Iodomethane)*	108101
Methyl isobutyl ketone (Hexone)*	624839
Methyl isocyanate*	80626
Methyl methacrylate*	1634044
Methyl tert butyl ether* [recommended technical correction: Methyl tert-butyl ether]	101144
4,4-Methylene bis(2-chloroaniline)* [recommended technical correction: 4,4'-Methylenebis(2-chloroaniline]	

75092	Methylene chloride (Dichloromethane)*
101688	Methylene diphenyl diisocyanate (MDI)* [recommended technical correction: 4-4' Methylenediphenyl diisocyanate (MDI)]
101779	4,4,-Methylenedianiline*
91203	Naphthalene*
98953	Nitrobenzene*
92933	4-Nitrobiphenyl*
100027	4-Nitrophenol*
79469	2-Nitropropane*
684935	N-Nitroso-N-methylurea*
62759	N-Nitrosodimethylamine*
59892	N-Nitrosomorpholine*
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol*
106503	p-Phenylenediamine*
75445	Phosgene*

7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride*
1336363	Polychlorinated biphenyls (Aroclors)*
1120714	1,3-Propane sultone*
57578	beta-Propiolactone*
123386	Propionaldehyde*
114261	Propoxur (Baygon)*
78875	Propylene dichloride (1,2-Dichloropropane)*
75569	Propylene oxide*
75558	1,2-Propylenimine (2-Methyl aziridine)*
91225	Quinoline
106514	Quinone*
100425	Styrene*
96093	Styrene oxide*
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin*
79345	1,1,2,2-Tetrachloroethane*
127184	Tetrachloroethylene (Perchloroethylene)*
7550450	Titanium tetrachloride
108883	Toluene*
95807	2,4-Toluene diamine* [recommended technical correction: 2,4-Toluenediamine]
584849	2,4-Toluene diisocyanate*
95534	o-Toluidine*
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene*
79005	1,1,2-Trichloroethane*
79016	Trichloroethylene*
95954	2,4,5-Trichlorophenol*
88062	2,4,6-Trichlorophenol*
121448	Triethylamine*
1582098	Trifluralin*
540841	2,2,4-Trimethylpentane*
108054	Vinyl acetate*
593602	Vinyl bromide*
75014	Vinyl chloride*
75354	Vinylidene chloride (1,1-Dichloroethylene)*
1330207	Xylenes (isomers and mixture)*
95476	o-Xylenes* [recommended technical
correction:	
	o-Xylene
108383	m-Xylenes* [recommended technical correction: m-Xylene]
106423	p-Xylenes* [recommended technical correction: p-Xylene]
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds

0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds [1]
0	Glycol ethers* [2]
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds
0	Fine mineral fibers [3]
0	Nickel Compounds
0	Polycylic Organic Matter [4]* [recommended technical correction: Polycyclic Organic Matter]
0	Radionuclides (including radon) [5]
0	Selenium Compounds

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

1 X'CN where X = H' or any other group where a formal dissociation may occur.
For example KCN or $Ca(CN)_2$

2 Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n-OR' where

n = 1, 2, or 3

R = alkyl or aryl groups

R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH2CH)$_n$-OH.* [recommended technical correction: R-(OCH2CH2)$_n$-OH] Polymers are excluded from the glycol category.

3 Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

4 Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.* [recommended technical correction: Limited to, or refers to, products from incomplete combustion of organic compounds (or material) and pyrolysis processes having more than one benzene ring, and which have a boiling point greater than or equal to 100°C.]

5 A type of atom which spontaneously undergoes radioactive decay.

II. Pollutants subject to the Hazardous Organic NESHAP (HON):

As part of the effort to regulate pollutants listed in section 112(b), the EPA has developed the (HON) which will apply to the synthetic organic chemical manufacturing industry and will control emissions of 149 volatile hazardous air pollutants (HAP's). All of the pollutants listed in the HON are among the 189 HAP's listed in section 112(b) and are identified (with an asterisk) in the preceding section of this document. Pollutants addressed by the HON will become regulated on the effective date specified in the HON.

III. Pollutants listed under Section 112(r):

Section 112(r)(3) requires that EPA promulgate an initial list of at least 100 substances with threshold quantities which would cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment if accidentally released. The EPA's proposed rule to implement 112(r)(3) was published in the Federal Register on January 19, 1993 (58 FR 5102). The proposed list of substances includes 100 acutely toxic substances, 62 flammable gases and volatile flammable liquids, and commercial explosives (classified by the Department of Transportation in Division 1.1). The listed pollutants will become "regulated" for purposes of title V upon final promulgation of the list.

The toxic and flammable substances listed in the proposed rule are arranged alphabetically and by CAS number on the attached lists.

NOTICE

The policies set out in this guidance document are intended solely as guidance and do not represent final agency action and are not ripe for judicial review. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. The EPA officials may decide to follow the guidance provided in this guidance document, or to act at variance with the guidance, based on an analysis of specific circumstances. The EPA may also change this guidance at any time without public notice.

B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Office of
General
Counsel

APR 10 1998

MEMORANDUM

SUBJECT: EPA's Authority to Regulate Pollutants Emitted by Electric Power Generation Sources

FROM: Jonathan Z. Cannon
General Counsel

TO: Carol M. Browner
Administrator

I. Introduction and Background

This opinion was prepared in response to a request from Congressman DeLay to you on March 11, 1998, made in the course of a Fiscal Year 1999 House Appropriations Committee Hearing. In the Hearing, Congressman DeLay referred to an EPA document entitled "Electricity Restructuring and the Environment: What Authority Does EPA Have and What Does It Need." Congressman DeLay read several sentences from the document stating that EPA currently has authority under the Clean Air Act (Act) to establish pollution control requirements for four pollutants of concern from electric power generation: nitrogen oxides (NOx), sulfur dioxide (SO2), carbon dioxide (CO2), and mercury. He also asked whether you agreed with the statement, and in particular, whether you thought that the Clean Air Act allows EPA to regulate emissions of carbon dioxide. You agreed with the statement that the Clean Air Act grants EPA broad authority to address certain pollutants, including those listed, and agreed to Congressman DeLay's request for a legal opinion on this point. This opinion discusses EPA's authority to address all four of the pollutants at issue in the colloquy, and in particular, CO2, which was the subject of Congressman DeLay's specific question.

The question of EPA's legal authority arose initially in the context of potential legislation addressing the restructuring of the utility industry. Electric power generation is a significant source of air pollution, including the four pollutants addressed here. On March 25, 1998, the Administration announced a Comprehensive Electricity Plan (Plan) to produce lower prices, a cleaner environment, increased innovation and government savings. This Plan includes a proposal to clarify EPA's authority regarding the establishment of a cost-effective interstate cap and trading system for NOx reductions addressing the regional transport contributions needed to attain and maintain the Primary National Ambient Air Quality Standards (NAAQS) for ozone. The Plan does not ask Congress for authority to establish a cap and trading system for emissions of carbon dioxide from utilities as part of the Administration's electricity restructuring proposal. The President has called for cap-and-trade authority for greenhouse gases to be in place by 2008, and the Plan states that the Administration will consider in consultation with Congress the legislative vehicle most appropriate for that purpose.

As this opinion discusses, the Clean Air Act provides EPA authority to address air pollution, and a number of specific provisions of the Act are potentially applicable to control these pollutants from electric power generation. However, as was made clear in the document from which Congressman DeLay quoted, these potentially applicable provisions do nor easily lend themselves to establishing market-based national or regional cap-and-trade programs, which the Administration favors for addressing these kinds of pollution problems.

II. Clean Air Act Authority

The Clean Air Act provides that EPA may regulate a substance if it is (a) an "air pollutant," and (b) the administrator makes certain findings regarding such pollutant (usually related to danger to public health, welfare, or the environment) under one or more of the Act's regulatory provisions.

A. Definition of Air Pollutant

Each of the four substances of concern as emitted from electric power generating units falls within the definition of "air pollutant" under section 302(g). Section 302(g) defines air pollutant" as

> any air pollution agent or combination of such agents, including any physical, chemical, biological, [or] -radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air. Such term includes any precursors to the formation of any air pollutant, to the extent that the Administrator has identified such precursor or precursors for the particular purpose for which the term "air pollutant" is used.

This broad definition states that "air pollutant" includes any physical, chemical, biological, or radioactive substance or matter that is emitted onto or otherwise enters the ambient air SO2, NOx, CO2, and mercury from electric power generation are each a "physical [and] chemical... substance which is emitted into . . the ambient air," and hence, each is an air pollutant within the meaning of the Clean Air Act.[1]

---

[1] See also section 103(g) of the Act (authorizes EPA to conduct a basic research and technology program to develop and demonstrate nonregulatory strategies and technologies for air pollution prevention, which shall include among the program elements "[i]mprovements in nonregulatory strategies and technologies for preventing or reducing multiple air pollutants, including sulfur oxides, nitrogen oxides, heavy metals, PM- 10 (particulate matter), carbon monoxide, and carbon dioxide, from stationary sources, including fossil fuel power plants.")

A substance can be an air pollutant even though it is naturally present in air in some quantities. Indeed, many of the pollutants that EPA currently regulates are naturally present in the air in some quantity and are emitted from natural as well as anthropogenic sources. For example, SO2 is emitted from geothermal sources; volatile organic compounds (precursors to ozone) are emitted by vegetation and particulate mater and NOx, are formed from natural sources through natural processes, such a naturally occurring forest fires. Some substances regulated under the Act as hazardous air pollutants are actually necessary in trace quantities for human life, but are toxic at higher levels or through other routes of exposure. Manganese and selenium are two examples of such pollutants. EPA regulates a number of naturally occurring substances as air pollutants, however, because human activities have increased the quantities present in the air to levels that are harmful to public health, welfare, or the environment.

B. <u>EPA Authority to Regulate Air Pollutants</u>

EPA's regulatory authority extends to air pollutants, which, as discussed above, are defined broadly under the Act and include S02, NOx, CO2, and mercury emitted into the ambient air. Such a general statement of authority is distinct from an EPA determination that a particular air pollutant meets the specific criteria for EPA action under a particular provision of the Act. A number of specific provisions of the Act are potentially applicable to these pollutants emitted from electric power generation.[2] Many of these specific provisions for EPA action share a common feature in that the exercise of EPA's authority to regulate air pollutants is linked to determination by the Administrator regarding the air pollutants' actual or potential harmful effects on public health, welfare or the environment. <u>See</u> also sections 108, 109, 111(b), 112, and 115. <u>See also</u> sections 202(a), 211(c), 231, 612, and 615. The legislative history of the 1977 Clean Air Act Amendments provides extensive discussion of Congress' purposes in adopting the language used throughout the Act referencing a reasonable anticipation that a substance endangers public health or welfare. One of these purposes was "to emphasize the preventative or precautionary nature of the act, i.e., to assure that regulatory action can effectively prevent harm before it occurs, to emphasize the predominant value of protection of public health." H.R. Rep. No. 95294 95th Cong., 1st Sess, at 49 (Report of the Committee on Interstate and Foreign Commerce). Another purpose was "[t]o assure that the health of

---

[2] <u>See, e.g.</u>, section 108 (directs Administrator to list and issue air quality criteria for each air pollutant that causes or contributes to air pollution that may reasonably be anticipated to endanger public health or welfare and that is present in the ambient air due to emissions from numerous or diverse mobile or stationary sources); section 109 (directs Administrator to promulgate national primary and secondary ambient air quality standards for each air pollutant for which there are air quality criteria, to be set at levels requisite to protect the public health with an adequate margin of safety (primary standards) and to protect welfare (secondary standards)), Section 110 (requires States to submit state implementation plans (SIPs) to meet standards); Section 111 (b) (requires Administrator to list, and set federal performance standards for new sources in, categories of stationary sources that cause or contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare); section 111(d) (states must establish performance standards for existing sources for any air pollutant (except criteria pollutants or hazardous air pollutants) that would be subject to a performance standard if the sources were a new source), section 112(b) (lists 188 hazardous air pollutants and authorizes Administrator to add pollutants to the list that may present a threat of adverse human health effect or adverse environmental effects); section 112(d) (requires Administrator to set emissions standards for each category or subcategory of major and area sources that the Administrator has listed pursuant to section 119(c)); section 112(n)(1)(A) (requires Administrator to study and report to Congress on the public health hazards reasonably anticipated from emissions of limited hazardous air pollutants from electric utility steam generating units, and requires regulation if appropriate and necessary); section 115 (Administrator may require state action to control certain air pollution if, on the basis of certain reports, she has reason to believe that any air pollutant emitted in the United States causes or contributes to air pollution that may be reasonably anticipated to endanger public health or welfare in a foreign country that has given the United States reciprocal rights regarding air pollution control) Title IV (establishes cap-and-trade system for control of SO2 from electric power generation facilities and provides for certain controls on N0x).

susceptible individuals, as well as healthy adults, will be encompassed in the term 'public health,'..." Id. at 50. "Welfare" is defined in section 302(h) of the Act, which states:

> [a]ll language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.[3]

EPA has already regulated SO2, NOx, and mercury based on determinations by EPA or Congress that these substances have negative effects on public health, welfare, or the environment. While C02, as an air pollutant, is within EPA's scope of authority to regulate, the Administrator has not yet determined that CO2 meets the criteria for regulation under one or more provisions of the Act. Specific regulatory criteria under various provisions of the Act could be met if the Administrator determined under one or more of those provisions that CO2 emissions are reasonably anticipated to cause or contribute to adverse effects on public health, welfare, or the environment.

C. EPA Authority to Implement an Emissions Cap-and-Trade Approach

The specific provisions of the Clean Air Act that are potentially applicable to control emissions of the pollutants discussed here can largely be categorized as provisions relating to either state programs for pollution control under Title I (e.g., sections 107, 108, 109, 110, 115, 126, and Part D of Title I), or national regulation of stationary sources through technology-based standards (e.g., sections 111 and 112). None of these provisions easily lends itself to establishing market-based national or regional emissions cap-and-trade programs.[4]

The Clean Air Act provisions relating to state programs do not authorize EPA to require states to control air pollution through economically efficient cap-and-trade programs and do not provide full authority for EPA itself to impose such programs. Under certain provisions in Title I, such as section 110, EPA may facilitate regional approaches to pollution control and encourage states to cooperate in a regional, cost-effective emissions cap-and-trade approach (see Notice of Proposed Rulemaking: Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone, 62 F.R. 60318 (Nov. 7, 1997)). EPA does not have authority under Title I to require states to use such measures, however, because the courts have held that EPA cannot mandate specific emission control measures for states to use in meeting the general provisions for attaining ambient air quality standards. See Commonwealth of Virginia v. EPA, 108 F.3d 1397 (D.C. Cir. 1997). Under certain limited circumstances where states fail to carry out their responsibilities under Title I of the Clean Air Act, EPA has authority to take certain actions, which might include establishing a cap-and-trade

---

[3] The language in Section 302(h) listing specific potential effects on welfare, including the references to weather and climate, dates back to the 1970 version of the Clean Air Act.

[4] Title IV of the Act provides explicit authority for a cap and trade program for SO2 emissions from electric power generating sources.

program.[5] Yet EPA's ability to invoke these provisions for federal action depends on the actions or inactions of the states.

Technology-based standards under the Act directed to stationary sources have been interpreted by EPA not to allow compliance through intersource cap-and-trade approaches. The Clean Air Act provisions for national technology-based standards under sections 111 and 112 require EPA to promulgate regulations to control emissions of air pollutants from stationary sources. To maximize the opportunity for trading of emissions within a source. EPA has defined the term "stationary source" expansively, such that a large facility can be considered a "source." Yet EPA has never gone so far as to define as a source a group of facilities that are not geographically connected, and EPA has long held the view that trading across plant boundaries is impermissible under sections 111 and 112. See, e.g., National Emission Standards for Hazardous Air Pollutants for Source Categories; Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry, 59 Fed. Reg. 19402 at 19425-26 (April 22, 1994).

III. Conclusion

EPA's regulatory authority under the Clean Air Act extends to air pollutants, which, as discussed above, are defined broadly under the Act and include SO2, NOx, CO2, and mercury emitted into the ambient air. EPA has in fact already regulated each of these substances under the Act, with the exception of CO2. While C02 emissions are within the scope of EPA's authority to regulate, the Administrator or has made no determination to date to exercise that authority under the specific criteria provide under any provision of the Act.

With the exception of the SO2 provisions focused on acid rain, the authorities potentially available for controlling these pollutants from electric power generating sources do not easily lend themselves to establishing market-based national or regional cap-and-trade programs, which the Administration favors for addressing these kinds of pollution problems. Under certain limited circumstances, where states fail to carry out their responsibilities under Title I of the Act, EPA has authority to take certain actions, which might include establishing a cap-and-trade program. However, such authority depends on the actions or inactions of the states.

---

[5] For example, section 110(c) requires EPA to promulgate a Federal implementation plan where EPA finds that a state has failed to make a required submission of a SIP or that the SIP or SIP revision does not satisfy certain minimum criteria, or EPA disapproves the SIP submission in whole or in part in addition, section 126 provides that a State or political subdivision may petition the Administrator for certain findings regarding emissions from certain stationary sources in another state. If the Administrator grants the petition, she may establish control requirements applicable to sources that were the subject of the petition.

C

A Comparison of PC, CFB and IGCC Technologies for Basin Electric Power Cooperative's Dry Fork Station

PREPARED FOR: Basin Electric Power Cooperative

PREPARED BY: Steve Jenkins / Gary Brown

DATE: June 26, 2007

This technical memorandum provides our response to some of the key issues addressed by the National Park Service and the environmental groups on the draft air permit for the pulverized coal (PC) unit proposed for the Dry Fork Station.

1. WYDEQ is not required to consider IGCC in the BACT analysis for Dry Fork

Step 1 of the Best Available Control Technology (BACT) analysis involves identifying all potentially applicable emission control options. However, it does not require the project sponsor to redefine the design of the source. Redefining the design of the source relates to meeting the purpose and need for the project, and/or in changing the fundamental constituents of the project's design.

The BACT process is set up to identify the emission control technologies available to reduce emissions from the source as defined by the applicant. The BACT process, coupled with PSD increment and ambient air quality modeling, will ensure that emissions from the proposed facility will be minimized and that the proposed facility will not cause or contribute to any violation of an ambient air quality standard.

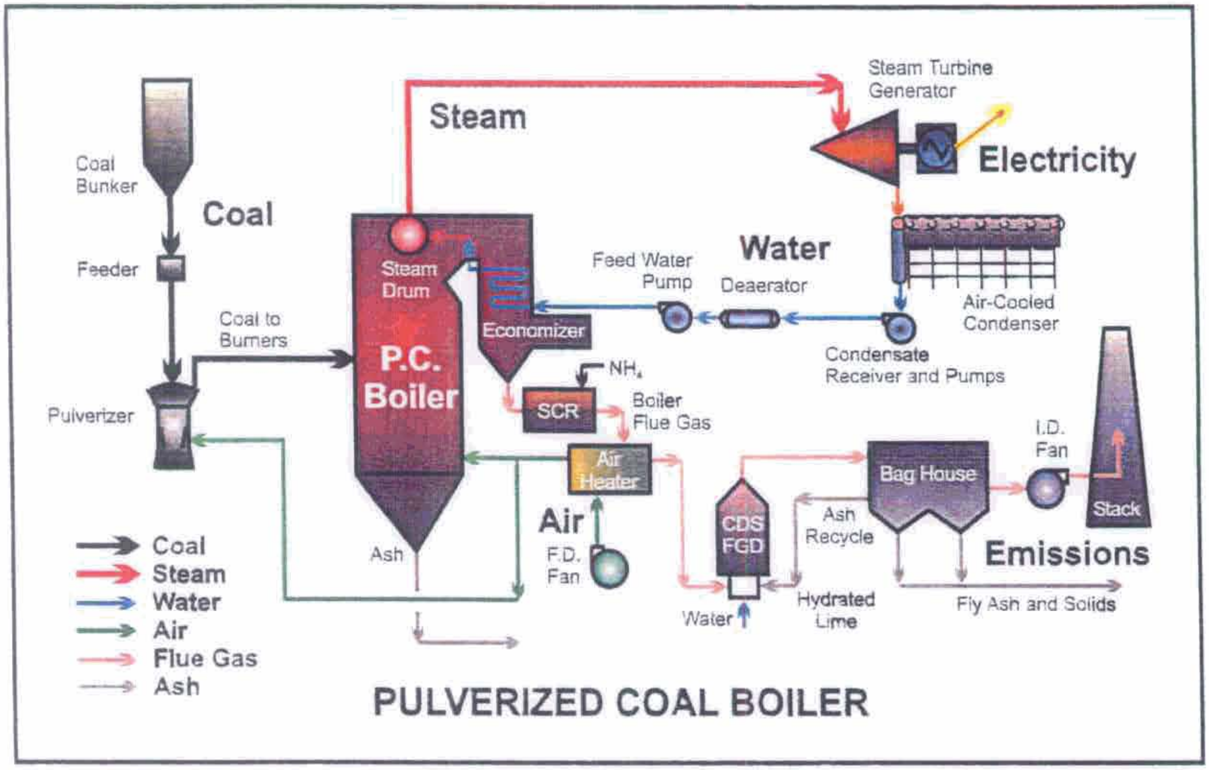
1.1 IGCC would constitute a fundamental redefinition of the Dry Fork Plant

Integrated Gasification Combined Cycle (IGCC) is a fundamentally different process and design than a PC or circulating fluidized bed (CFB) boiler. In PC and CFB boilers, the fuel is coal, which is combusted. In IGCC, the coal is not the fuel. It is a chemical feedstock used in a series of chemical reactions called gasification. In gasification, the coal is not combusted, but is thermally converted in a series of chemical reactions, to create a synthetic gas, or syngas, which is the fuel for a separate combustion turbine power plant. An IGCC plant is more akin to a chemical plant, and has little in common with the combustion, steam generation and air pollution control (APC) systems utilized in PC and CFB boilers.

Pulverized Coal Process

PC plants represent the most mature of coal-based power generation technologies considered in this assessment. Modern PC plants generally range in size from 80 MW to 1,300 MW and can be designed to use coal from various sources. Units operate at close to atmospheric pressure, simplifying the passage of materials through the plant, reducing vessel and ductwork construction cost, and allowing onsite fabrication of boilers. A typical process flow diagram for a PC unit is shown in Figure 1.

FIGURE 1
Pulverized Coal Unit Process Flow Diagram



The concept of burning coal that has been pulverized into a fine powder stems from the fact that if the coal is made fine enough, it will burn almost as easily and efficiently as a gas. Crushed coal from the silos is fed into the pulverizers along with air preheated to about 580°F. The hot air dries the fine coal powder and conveys it to the burners in the boiler. It is important that as much moisture as possible be removed from the coal, so that it can flow freely and not become sticky, as that would cause plugging. The burners mix the powdered coal in the air suspension with additional pre-heated combustion air and force it out of nozzles similar in action to fuel being atomized by fuel injectors.

Combustion takes place at temperatures from 2,400-3,100°F, depending largely on coal rank (i.e., lignite, subbituminous, bituminous, anthracite). In order to ensure complete combustion, excess air is blown in with the coal and into the burners. Particle residence time in the boiler is typically 2-5 seconds, and the particles must be small enough for complete burnout to take place during this time. The heat of combustion is transferred to the boiler tubes, which contain circulating water. The water in the boiler tubes is turned into steam, which is piped to the steam turbine generator, where the steam's thermal energy is converted into mechanical energy. The steam turbine then turns the generator to produce electricity.

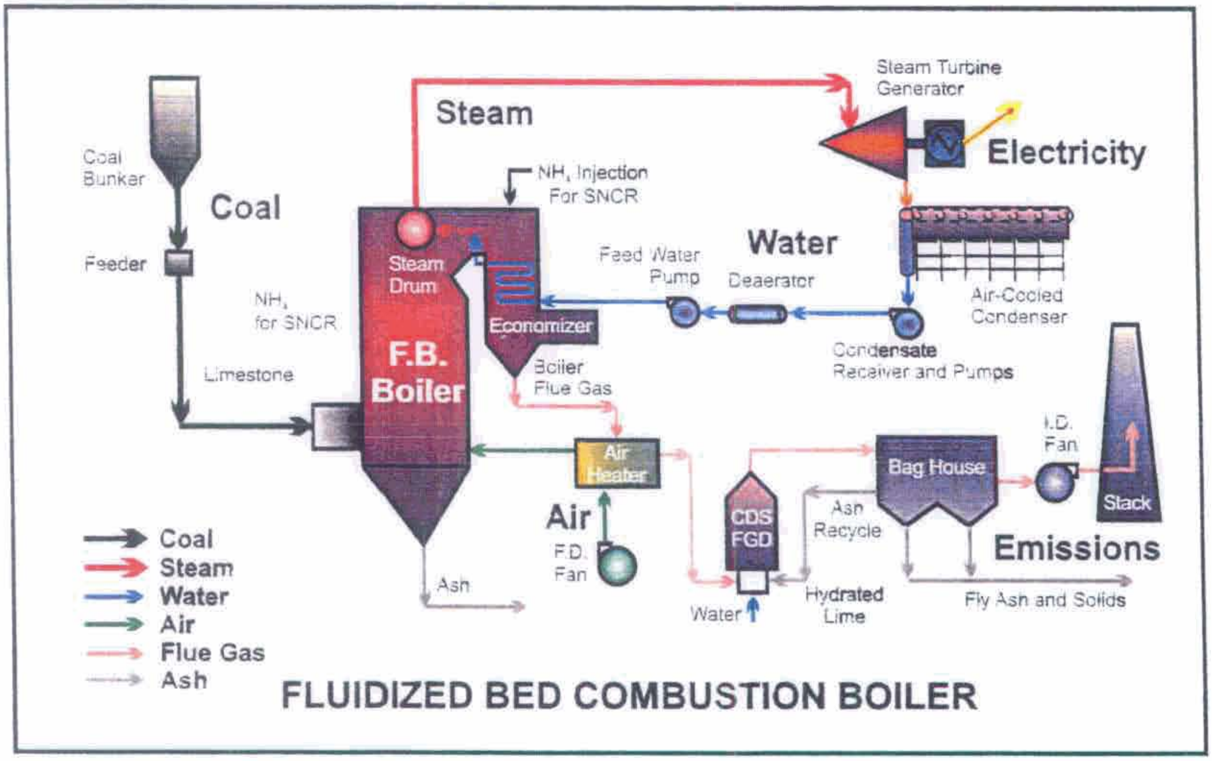
The combustion of the coal produces combustion gases which must be treated before exiting the exhaust stack to remove fly ash, nitrogen oxides (NO_x), and sulfur dioxide (SO_2). The APC systems include a fabric filter or electrostatic precipitator (ESP) for particulate control (fly ash), Selective Catalytic Reduction (SCR) system for control of NO_x, and a Flue Gas

Desulfurization (FGD) system for removal of SO_2. Limestone is required as the reagent for the most common wet FGD process. A spray dryer FGD process, which is more commonly used on lower sulfur western coal, uses lime as the reagent and provides significant savings in water consumption compared to wet FGD systems. A lime or limestone storage and handling system is required in the design of FGD systems. Depending on the type of FGD system used, the byproduct may or may not be commercially saleable. If not, sufficient storage area on site must be included in the plant design.

Circulating Fluidized Bed Process

The CFB fuel delivery system is similar to that of a PC unit, but somewhat simplified to combust a coarser material which is more difficult to burn completely. The plant fuel handling system unloads the fuel, stacks out the fuel, crushes or otherwise prepares the fuel for combustion, and reclaims the fuel as required. The fuel is usually fed to the CFB by gravimetric feeders. The bed material is composed of fuel, ash, sand, and the sulfur removal reagent (typically limestone), also referred to as sorbent. In the CFB, the fuel is combusted with excess air to produce steam in the boiler tubes. Steam is piped to the steam turbine generator, which converts the steam's thermal energy into mechanical energy. The steam turbine then drives the generator to produce electricity. A typical process flow diagram for a CFB unit is shown in Figure 2.

FIGURE 2
Circulating Fluid Bed Unit Process Flow Diagram



CFB combustion temperatures of 1,500 to 1,600°F are significantly lower than a PC boiler, which results in lower NO_x emissions and reduction of slagging and fouling concerns that are characteristic of PC units. In contrast to a PC unit, SO_2 can be partially removed during the combustion process by adding limestone to the fluidized bed. This is because the reaction of sulfur dioxide (SO_2) with limestone (calcium carbonate) peaks at about 1,500 °F, which is in the range of CFB boiler combustion.

Circulating beds use a high fluidizing velocity, so the particles are constantly held in the flue gases, and pass through the main combustion chamber and into a particle separation device such as a cyclone, from which the larger particles are extracted and returned to the combustion chamber. Individual particles may recycle anywhere from 10 to 50 times, depending on their size, and how quickly the char burns away. Combustion conditions are relatively uniform throughout the boiler, although the bed is somewhat denser near the bottom of the combustion chamber. There is a great deal of mixing, and residence time during one pass is very short.

One of the main advantages of CFBs is that they have the ability to efficiently combust a wide range of low quality fuels. CFBs are often recommended for low grade, high ash coals which are difficult to pulverize, and which may have variable combustion characteristics. CFBs are also suitable for co-firing coal with low grade fuels, including some waste materials, as well as petroleum coke, which has low volatile matter content. The advantage of fuel flexibility often mentioned in connection with CFB units can be misleading; the combustion portion of the process is inherently more flexible than PC, but material handling systems must be designed to handle larger quantities associated with lower quality fuels. Once the unit is built, it will operate most efficiently with whatever design fuel is specified.

CFB design must take into account ash quantities and ash properties. While combustion temperatures are low enough to allow much of the mineral matter to retain its original properties, particle surface temperatures can be as much as 350°F above the nominal bed temperature. If any softening takes place on the surface of either the mineral matter or the sorbent, then there is a risk of agglomeration or fouling.

The CFB produces combustion gases, which must be treated before exiting the exhaust stack to remove fly ash and SO_2. NO_x emissions can be mitigated through use of selective non-catalytic reduction (SNCR) using ammonia injection, usually in the upper area of the combustor. The emission control equipment external to the CFB includes either a fabric filter (baghouse) or ESP for particulate control (fly ash). A polishing FGD system is often required for additional removal of SO_2 to achieve similar emission levels to PC units with FGD systems. Limestone is required as the reagent for the most common wet FGD process, and also as sorbent for the fluidized bed. A spray dryer FGD process, another option for low SO_2 concentration flue gas streams, uses lime as the reagent. A limestone storage and handling system is a required design consideration for CFB units. A lime storage and handling system is required if a lime spray dryer is used for the polishing FGD system. Due to the method of SO_2 control, the byproduct is not typically commercially saleable. Therefore, sufficient byproduct storage area must be planned for the CFB unit.

IGCC Process

The gasification portion of an IGCC plant for use in coal-based power generation combines a chemical feedstock, coal, with steam and oxygen or air at high temperature and pressure to produce a gaseous mixture consisting primarily of hydrogen and carbon monoxide. This gaseous mixture, called syngas, is the result of a thermal conversion process, and not combustion. Where PC and CFB boilers use excess air to assure combustion, gasification occurs in an "oxygen-starved" environment, in order to assure that combustion is precluded. Where the product of combustion in a PC or CFB is hot flue gas that, after transferring its heat to boiler tubes, has no further use and must be exhausted through a stack, the product of gasification is a usable syngas, the intermediate step in providing a fuel for power generation in a combustion turbine, or for the production of chemicals. Where PC and CFB boilers are based on the Rankine thermodynamic cycle (steam production and use in a steam turbine), IGCC uses the Brayton cycle, based on firing a fuel, syngas, in a rotating combustion turbine. These two thermodynamic cycles are completely different.

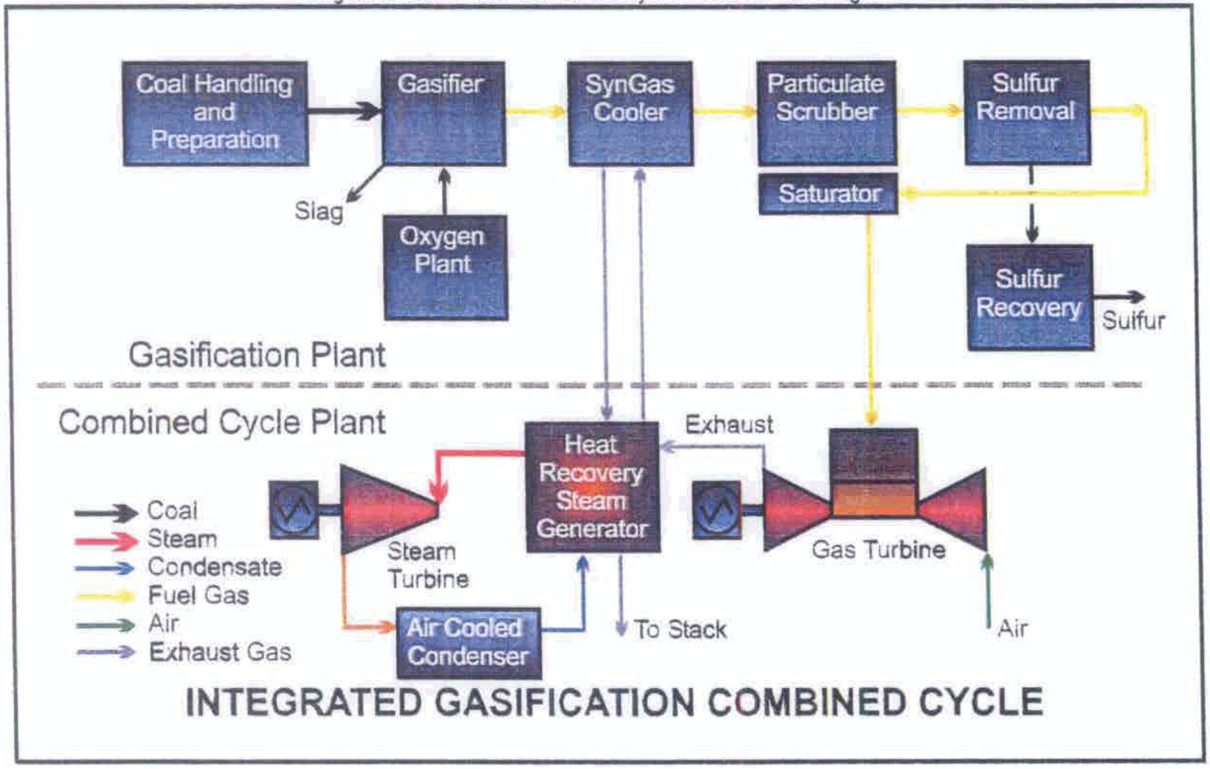
The syngas requires cooling and cleanup to remove contaminants to produce a synthesis gas (syngas) suitable for use in the combustion turbine portion of a combined cycle unit. The combined cycle portion of the plant is similar to a conventional natural gas-fired combined cycle plant. The most significant differences in the combined cycle are modifications to the combustion turbine to allow use of a low heating value, 250 Btu/scf syngas (about 1/4th that of natural gas), which is then mixed with nitrogen for NOx reduction, resulting in a heating value of about 125 Btu/scf. The nitrogen is added in order to cool the flame and lower NOx emissions, as well as providing additional mass flow in the combustion turbine to boost power output. The fuel mixing system and burners for combusting syngas (CO and H_2) are very different than those used for burning natural gas (methane). Combustion turbines designed for natural gas firing utilize a dry low NOx burner design, which has been optimized for burning methane at a heating value of about 1,000 Btu/scf. However, syngas combusts very differently, since it contains a high concentration of hydrogen. Combustion of syngas requires a diffusion burner design, which accounts for the lower heating value of the syngas and higher flame speeds of hydrogen. It also allows for the injection of nitrogen for cooling the flame and reducing the production of NOx. While natural gas can be used as a supplemental fuel in syngas combustion turbines, it does not combust as efficiently as in combustion turbine designed for natural gas use as the primary fuel.

In addition, the steam turbine portion of an IGCC unit is much larger than that of a natural gas-fired combined cycle unit, since a majority of the steam production in IGCC comes from the syngas coolers in the gasification portion of the plant, versus all of it being produced in the heat recovery steam generator (HRSG) in a gas-fired combined cycle plant. Specifics of a plant design are influenced by the gasification process and matching coal supply, degree of heat recovery, and methods to clean up the syngas. A typical process flow diagram for an IGCC unit is shown in Figure 3.

Coal gasification takes place in the presence of a controlled "shortage" of air/oxygen, thus producing reducing conditions, whereas combustion of coal in a PC or CFB creates an oxidizing environment. The process is carried out in an enclosed pressurized reactor, and the syngas product is a mixture of CO, H_2 and CO_2. Prior to use, the syngas must be cleaned. It is important to note here that in gasification it is not the coal that is cleaned. Rather, it is the syngas, the product of gasification reactions, which is cleaned so that it can be used as a fuel in a separate process.

The sulfur present in the feedstock mainly forms hydrogen sulfide (H_2S) but there is also a small amount of carbonyl sulfide (COS). The H_2S can be more readily removed than COS in syngas cleanup processes; therefore, a hydrolysis process is typically used to convert COS to H_2S. The syngas is cleaned and then burned with air in the combustion turbine, generating combustion products at high temperature and pressure. Although no NO_x is formed during gasification, some is formed when the syngas is subsequently burned in the combustion turbines.

FIGURE 3
Integrated Gasification Combined Cycle Process Flow Diagram



Three basic gasifier designs are used: fixed beds (not normally used for power generation), fluidized beds and entrained flow gasifiers. Fixed bed units typically use lump coal, fluidized bed units use a feed of 3-6 mm size, and entrained flow gasifiers typically use a pulverized coal slurry feed or dry feed, depending on the gasification technology supplier. Oxygen-blown, entrained-flow gasifiers are used in modern IGCC plants, although several new technologies under development plan to use air as the oxidant.

In PC and CFB, the moisture must be removed from the coal for combustion to occur efficiently. In coal gasification, moisture is an important part of the coal feedstock. Without water, the chemical reaction that is the basis of gasification cannot occur. That is why low moisture coal must be ground up and made into a slurry, and then pumped into the gasifier. Some gasification technologies use a dry coal feed, usually for high moisture coals, i.e. subbituminous and lignite. The coal is milled and dried, and then fed with nitrogen into the gasifier. If there is not sufficient inherent moisture left in the coal to provide the needed water for gasification reactions, steam can be injected into the gasifier.

The coal-based IGCC plants that are in operation use different process designs, and are demonstrating the practicalities and economics of different degrees of integration. The syngas is produced at temperatures up to 2,900°F (in entrained flow gasifiers), so that the syngas must be cooled sufficiently to utilize conventional acid gas removal systems (for removal of sulfur compounds), which operate at about 100°F. The acid gas cleaning processes used are variants of well proven natural gas sweetening processes to remove acid impurities and any sulfur compounds present.

Large radiant and convective heat exchangers are required to accomplish this reduction in syngas temperature; in doing so, a large amount of high pressure steam is produced, which is used in the combined cycle portion of the plant for power generation. In the heat exchangers, solids deposition, fouling and corrosion may take place. This has been a significant cause of low availability at Tampa Electric Company's (TECO) Polk Power Station. The plant must be brought down every few months just to clean out the convective syngas coolers.

Conclusion

EPA's NSR Manual states clearly that a proponent of a coal-fired power plant is not required to consider converting its proposed plant to a natural gas-fired turbine as part of a BACT analysis, because that would be redefining the design of source. Where PC and CFB combust coal to produce steam and electricity using the Rankine thermodynamic cycle, an IGCC plant generates electricity by means of converting coal to a syngas in a chemical reaction and burning it in a combustion turbine using the Brayton thermodynamic cycle, like a natural gas-fired combustion turbine. Clearly, changing from the Rankine thermodynamic cycle of PC and CFB to the Brayton cycle of IGCC would be redefining the fundamental design of the source.

1.2 Purpose and Need for Project

BEPC desires to identify the most prudent power generation technology for this new coal-fired power plant. That identification process is guided by these requirements for the proposed generating unit:

- Providing Base Load Capacity with High Reliability and Availability
- Assuring Environmental Compliance
- Utilizing Commercially Available and Proven Technology
- Generating Electricity at a Reasonable Cost

Coal-based power generation technology selected for this project must be capable of meeting all of the desired characteristics listed above to meet the purpose and need for the project.

Providing Base Load Capacity with High Reliability and Availability

Basin Electric requires the Dry Fork Station to be a base load plant with high reliability and availability. This relates directly to the ability of the power generation station to provide the electricity to the Basin Electric customers when they need it. If the Dry Fork plant is not reliable, and has low availability, its generation must be made up by other sources of power generation, if available; these are likely to be less efficient, more costly sources of generation. Both PC and CFB technologies are technically and commercially mature and are used for baseload power plants. The overall plant availability of well-designed and maintained base load PC and CFB units is over 90 percent. A good example of the high availability of PC units is BEPC's own Laramie River Station. Over the last six years, the availability of the three PC units at that plant has been 91.4%. During some years, units achieved as high as 99.4%. This underscores the performance of this well-proven technology for meeting the

3. CO_2 Capture

With the potential for reductions in greenhouse gas emissions, interest in the capture of carbon dioxide (CO_2) emissions from power plants has grown. While the capture (removal) of CO_2 is technically feasible, it has not yet been applied at high removal efficiencies at large, commercial scale PC, CFB or IGCC power plants. This also applies to the overall concept of carbon capture and sequestration (CCS). As clearly noted in the recent report, "The Future of Coal", prepared by the Massachusetts Institute of Technology (MIT), "There is no operational experience with carbon capture from coal plants and certainly not with an integrated sequestration operation." The MIT report also states that "neither IGCC nor other coal technologies have been demonstrated with CCS."

While there is limited CO_2 removal experience with the gasification of coal and pet coke, it is done at fairly small scale and only where the user of the CO_2 actually pays for the CO_2, offsetting the additional capital and operating costs for CO_2 removal. None of the operating IGCC plants incorporate CO_2 removal.

Whether for PC, CFB or IGCC, capture of CO_2 results in the following impacts on the overall plant:

- A significant increase in total plant capital cost for the large CO_2 absorption and concentration system
- A reduction in the plant's output (due to the steam extraction for the CO_2 absorption reactions and then for driving off the CO_2 from the sorbent for separation, as well as for higher internal load from additional pumps and for CO_2 compression)
- A reduction in plant efficiency
- A resulting increase in the cost of electricity

There are two general (mis)understandings of CO_2 emissions and IGCC. First, many believe that IGCC produces much lower CO_2 emissions than PC technology. This is not the case at all. When the Wabash River and Polk IGCC plants began operation, it was expected that the next generation of IGCC plants would be much more efficient than PC technology. However, this has not yet occurred. Data from the proposed IGCC plants being designed today for operation in the 2011-2013 timeframe show that they will actually be less efficient than PC plants planned for operation in the same time frame. Lower efficiency means using more coal for the same amount of electricity that is generated. Using more coal means higher emissions of CO_2. So PC presently has an edge over IGCC with respect to CO_2 emissions. Even if 90 percent CO_2 capture were to be applied to both technologies, the PC technology would still have lower CO_2 emissions than IGCC.

The second misunderstanding is that IGCC technology inherently captures all or a large portion of the CO_2. This is not the case. Significant additions of equipment are required for IGCC to incorporate CO_2 capture technology. Syngas from coal gasification has a CO_2 concentration of only 2-14%; this varies based on the coal and the gasifier technology. CO_2 is considered an acid gas, as it forms weakly acidic carbonic acid in water. It can be removed using acid gas removal (AGR) technology developed in the refinery industry.

In order to efficiently remove CO_2 from the syngas stream, the concentration of CO_2 must be substantially greater than the 2-14% range. The concentration of the CO_2 can be increased, using the water shift reaction shown below.

$$CO + H_2O \leftrightarrows H_2 + CO_2$$

This reaction takes place over a catalyst bed, and requires the introduction of steam to provide the water needed to convert about 95% of the CO in the syngas to CO_2. In doing this, the water is converted to hydrogen, raising the concentration of hydrogen in the syngas going to the combustion turbine (this issue will be discussed later). This is an exothermic reaction, and the heat produced could be to generate steam for use elsewhere in the IGCC plant.

While AGR technology is also used to remove sulfur compounds from syngas, it is much smaller in size and less costly for that application than for CO_2 capture, since the solvents used in AGR systems have a much greater affinity for removing sulfur compounds than CO_2. This means that removing CO_2 from the syngas is much more difficult and expensive that only removing the H_2S.

For CO_2 capture, the IGCC plant must be modified significantly. Figure 6 shows an IGCC configuration without CO_2 capture. Figure 7 shows the placement of the water shift reactor prior to the CO_2 capture step, and then the substantially larger AGR system for both H_2S and CO_2 removal. The new items added for CO_2 capture are shown in red boxes. In Figure 6, the syngas stream going to the combustion turbines is normal syngas. In Figure 7, it is a concentrated stream of hydrogen.

FIGURE 6

IGCC without CO_2 Capture

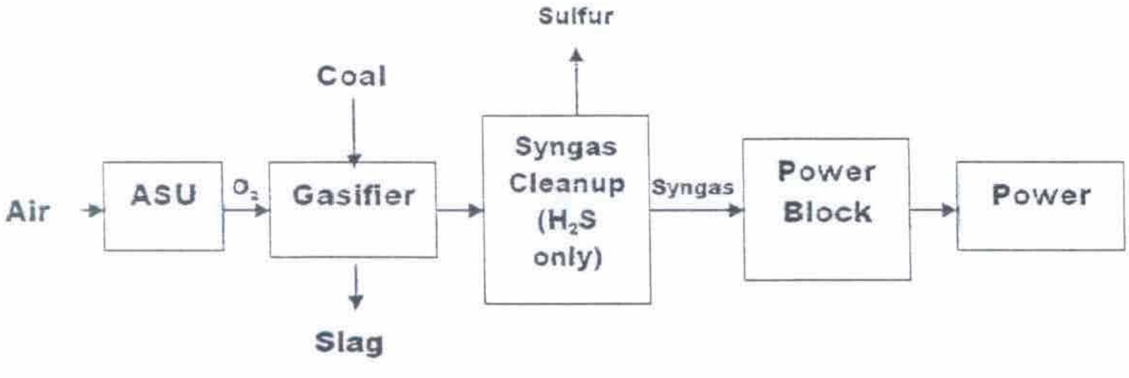
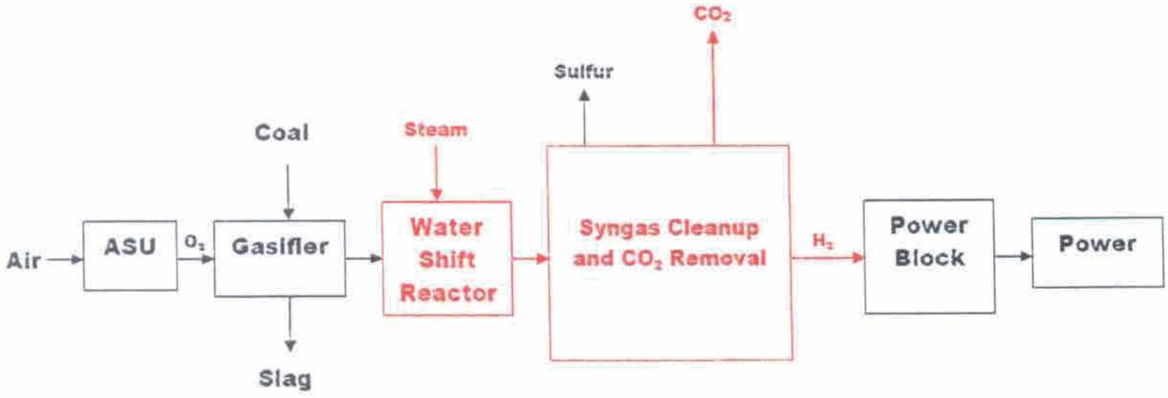


FIGURE 7
IGCC with Water Shift Reactor and CO_2 Capture System



After the water shift reactor, the syngas will have about 40% CO_2 and 50% H_2. At that point, the modified AGR system is capable of high removal of H_2S and capture of CO_2. Once the CO_2 is removed in concentrated form, it must be pressurized to greater than 2,000 psi for transport off the plant site, for use or sequestration.

The removal of the CO_2 results in a syngas with a very high concentration of hydrogen. While small industrial combustion turbines have experience in combusting syngas with a high hydrogen content, large frame combustion turbines capable of combusting this hydrogen-rich syngas are not yet commercially available at the sizes needed to support the 368 net MW Dry Fork plant. Combustion turbine manufacturers are involved in development work (with co-funding by the DOE) of these next-generation hydrogen-fired combustion turbines, with commercially available units expected in the 2014 timeframe. Major development is required in the fuel handling and mixing system, in order to safely and efficiently blend the hydrogen, back-up fuel (natural gas or fuel oil) and nitrogen.

R&D on CO_2 capture systems has been receiving much attention and funding. The goal is to increase the efficiency of CO_2 capture systems, while reducing the capital costs, heat rate penalties, and internal load requirements. Much work is needed over the next few years in order to reach these goals and to make this technology technically and commercially feasible at large scale.

The capture of CO_2 is only the first step. Capture would typically be followed by either use of the CO_2 for enhanced oil recovery or sequestration. While CO_2 is presently being used for enhanced oil recovery, long-term CO_2 sequestration is still in its infancy. The ability to sequester CO_2 in large amounts is directly dependent on the geology. While states such as Texas and Louisiana have large salt domes and geologic formations (i.e. deep saline aquifers and basalt layers) that can provide long-term sequestration, such good sequestration geology may not exist in Wyoming and adjacent states. Therefore, while CO_2 capture may one day become technically and economically feasible, the ability to sequester it on a safe, reliable, and long-term basis is likely to be a major hurdle in Wyoming and many other areas of the U.S.