**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

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|---|---|
| Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emission Standards into Procurement Policies. | R.06-04-009<br>(Filed April 13, 2006) |

**ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA**

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|---|---|
| Order Instituting Informational Proceeding AB-32 Implementation: Greenhouse Gases | Docket 07-OIIP-01 |

# LATE-FILED RESPONSE OF THE INDICATED CEMENT COMPANIES TO THE SEPTEMBER 26, 2007 PETITION FOR MODIFICATION OF THE INTERIM OPINION BY THE ENERGY PRODUCERS AND USERS COALITION

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Dated: June 18, 2008

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

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**LATE-FILED RESPONSE OF THE INDICATED CEMENT COMPANIES TO THE SEPTEMBER 26, 2007 PETITION FOR MODIFICATION OF THE INTERIM OPINION BY THE ENERGY PRODUCERS AND USERS COALITION**

Pursuant to Rule 16.4(f) of the Code of Practice and Procedure of the California Public Utilities Commission, the Indicated Cement Companies (ICC) hereby file a late-filed response to the September 26, 2007 Petition for Modification of the Interim Opinion by the Energy Producers and Users Coalition (EPUC) in the above-cited docket. ICC has concurrently filed a motion requesting leave to submit this late-filed response.

The Indicated Cement Companies are an ad hoc group consisting of CEMEX-Pacific Region (CEMEX), Lehigh/Hanson Cement, Inc. (L/H), Mitsubishi Cement Corporation (MCC), National Cement Company (NCC), and TXI-Riverside Cement Company (TXI). The ICC was granted party status in this proceeding on June 5, 2008, and filed opening and reply comments specifically on the subject of bottoming cycle combined heat and power (CHP), also known as

cogeneration. Consistent with these comments, ICC has determined that there are aspects of Decisions 07-01-039 and 07-08-009 which are prejudicial to bottoming cycle cogeneration and inconsistent with the law and engineering of this technology. For this reason, ICC submits this answer to the EPUC Petition for Modification.

Summary of Request

Decision 07-08-009 indicates that it is a clarification of Decision 07-01-039, which sets forth a methodology for calculating a greenhouse gas (GHG) emissions rate for bottoming cycle cogeneration pursuant to the Commission's responsibilities under SB 1368 to establish an Emissions Performance Standard (EPS) for GHG. ICC supports the position of EPUC in its Petition for Modification that the methodology does not accurately or appropriately characterize the operations of bottoming cycle cogeneration facilities. Furthermore, the decisions do not properly interpret SB 1368, and, in particular, Section 8340(d)(8) of the Public Utilities Code, which requires that the Commission act consistent with the rules established by the Federal Energy Regulatory Commission (FERC) regarding regulation of cogeneration and related efficiency standards.

> "In developing and implementing the greenhouse gases emission performance standard, the commission shall consider and act in a manner consistent with any rules adopted pursuant to Section 824a-3 of Title 16 of the United States Code." [1]

This section of the United States Code is implemented through Title 18 , Section 292.205 of the Code of Federal Regulations, which sets efficiency criteria for bottoming cycle (and, indeed, topping cycle) cogeneration. As will be shown below, the decisions sought to be modified herein are inconsistent with those regulations.

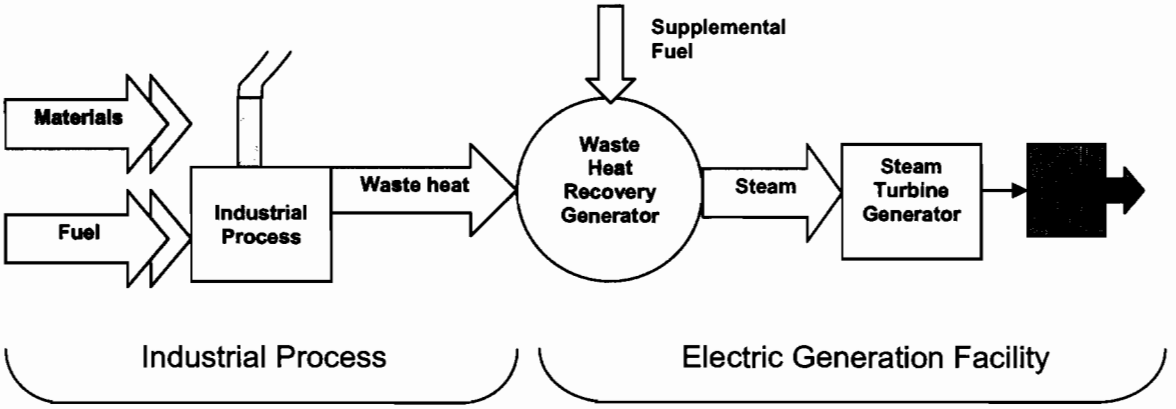
[1]Section 8340(d)(8) of the Public Utilities Code

Argument: The Decisions Set an EPS that is Inconsistent with SB 1368 and Federal Statute and Logically Incorrect

The Interim Opinion bases its conclusion on language in SB 1368, which directed the Commission to develop an "output based" methodology for calculating emission rates for cogeneration. It suggests that the "output based" methodology must include in the EPS calculation the waste heat from the industrial process, which is a thermal energy input into the generation process. As discussed below, employing the waste heat from the industrial process results in an unworkable or meaningless calculation and pushes the Commission's jurisdiction beyond its boundaries. It is also important that the Federal Energy Commission Regulations (FERC) regulations, with which SB 1368 requires the CPUC's regulations to be consistent, do not employ the industrial waste heat in the calculation of efficiencies. Moreover, SB 1368 does not confine the Commission to these results, but permits a more rational EPS calculation.

**A. An Overview of Bottoming Cycle Operations**

Bottoming cycle generation converts waste heat, the output of an industrial process, into electricity. The waste heat is captured in a waste heat recovery generator, which produces steam. The steam is then used to drive a steam turbine and generator electricity. Additional fuel (supplemental fuel) may be added to the waste heat recovery generator to increase electricity production. Diagrams to explain the bottoming cycle process were provided by both ICC and EPUC-CAC in their June 2, 2008 comments in R. 06-04-009. The EPUC-CAC diagram provides a useful way to visualize FERC's approach, and we reproduce it here.




**B. Using Energy Data from the Industrial Process in the EPS Calculation Results in Perverse or Meaningless Conclusions.**

Public Utilities Code sections 8340 and 8341, which address the EPS calculation for cogeneration, must be read in a manner that results in a reasonable calculation. *Commission On Peace Officer Standards And Training v. Superior Court*, 42 Cal.4th 278, 165 P.3d 462, 64 Cal.Rptr.3d 661 (2007); *Moyer v. Workmen's Comp. Appeals Bd.*, 514 P.2d 1224 (Cal 1973).

Using illustrative data for a bottoming cycle facility at a manufacturing facility for petroleum coke, it is difficult to design an EPS calculation that includes waste heat from the industrial process and yields a rational result.

| **Fuels consumed in calcining process:** | **$CO_2e$ Emissions** | **Units** | **Heating Value (MMBtu/yr)** | **MWh Conversion** |
|---|---|---|---|---|
| Natural gas | 6,600 | $tCO_2e/yr$ | 125,000 | 36,624 |
| Green Coke | 95,000 | $tCO_2e/yr$ | 1,230,000 | 360,387 |
| Total due to process | 101,600 | $tCO_2e/yr$ | 1,355,000 | 397,011 |
| Duct firing | 0 | $tCO_2e/yr$ | 0 | 0 |
| Net electricity produced | 64,000 | MWh | | 64,000 |
| Calcined coke produced | 126,000 | $tCO_2e/yr$ | 3,910,000 | 2,181,645 |
| Steam to Turbine | | | 700,000 | 205,098 |

Using these data, it is possible to construct several different formulas that yield a value, although not a meaningful value, with respect to the EPS.

**Formula 1:**

$$\frac{\text{Total GHG Emissions at Industrial Site}}{\text{Total Btu Consumed in Process (in MWh)} + \text{MWh Produced}}$$

$$\frac{101{,}600\ tCO_2e}{397{,}011\ \text{MWh} + 64{,}000\ \text{MWh}}$$

The result of this calculation is .22 $tCO_2e$ MWh, or 486 pounds/MWh. This value obviously falls under the 1100 pound EPS threshold. The calculation, however, is not output based. It combines in the denominator the MMBtu "input" to the industrial process with the electricity "output" from the bottoming cycle generation. It also has the effect of double counting Btu by mixing input and output.

**Formula 2:**

$$\frac{\text{Total GHG Emissions at Industrial Site}}{\text{Total Btu in Manufactured Product (coke)(in MWh)} + \text{MWh Produced}}$$

$$\frac{101{,}600\ tCO_2e}{3{,}910{,}000\ \text{MWh} + 64{,}000\ \text{MWh}}$$

The result of this calculation is.025 $tCO_2e$ MWh, or 50 pounds per MWh. Once again, this meets the EPS. It does not derive any meaningful value, however, since it uses the Btu value of products produced, and the coke product Btu have nothing to do with the thermal input to the waste heat recovery generator. Moreover, the only reason this calculation can be performed in this illustration is because coke, an energy form, is the manufactured product. The same calculation could not be performed for cement or other industrial processes.

**Formula 3:**

Total GHG Emissions at Industrial Site
Total Btu from Heat Recovery Steam Generator + MWh Produced

$$\frac{101{,}600\ tCO_2e}{205{,}098\ MWh + 64{,}000\ MWh}$$

The result of this calculation is.38 $tCO_2e$ MWh, or 841 pounds per MWh. Once again, this meets the EPS. It does not, however, fairly reflect the value of bottoming cycle generation. A bottoming cycle facility such as this, which uses no supplemental firing, adds no incremental emissions beyond what already exists in the industrial process. It is, essentially, pure supply side energy efficiency, since all of the electric generation comes from the use of waste heat. This calculation, however, suggests that generation using pure waste heat is less efficient than a combined cycle gas turbine! Such a perverse result could not have been intended.

All of these calculations show the difficulty and perversity of trying to include the industrial process energy data for bottoming cycle facilities in the standard EPS formula. Indeed, the FERC regulations, with which the Commission is directed to be consistent, implicitly recognize this problem and do not account for these emissions.

The FERC regulations define bottoming cycle as follows:

> *a cogeneration facility in which the energy input to the system is first applied to a useful thermal energy application or process, and at least some of the reject heat emerging from the application or process is then used for power production;*[2]

FERC's definition thus identifies the thermal energy dimension of bottoming cycle facilities. It is important, however, to look further. FERC's efficiency standards better inform the interpretation of a "bottoming cycle" cogeneration facility. These standards provide:

> *Efficiency standards for bottoming-cycle facilities. (1) For any bottoming-cycle cogeneration facility for which any of the energy input as supplementary firing is natural gas or oil, and the installation of which began on or after March 13, 1980, the useful power output of the facility during the 12-month period*

[2] 18 CFR §292.202(e).

*beginning with the date the facility first produces electric energy, and any calendar year subsequent to the year in which the facility first produces electric energy must be no less than 45 percent of the energy input of natural gas and oil for supplementary firing.*

*(2) For any bottoming-cycle cogeneration facility not covered by paragraph (b)(1) of this section, there is no efficiency standard.*[3]

Nothing in FERC's efficiency calculation for bottoming cycle facilities looks to the industrial process producing the waste heat; the only input relevant to electricity generation is the supplemental fuel used in the electric generation process. This approach is carried through in the FERC regulations. In certifying a bottoming cycle facility as a QF, in fact, FERC does not examine or consider data regarding the underlying industrial process. When FERC Form 556 asks for the principal components of the "facility", it specifies "*boilers, prime movers and electric generators.*"[4] When asking for the energy input, it seeks only a demonstration that the energy used by the bottoming cycle facility is a valid waste fuel. [5] Finally, Form 556 asks for only a very general description of the underlying industrial process: "*Provide a description of the commercial or industrial process or other thermal application to which the energy input to the system is first applied and from which the reject heat is then used for electric power production.*"[6]

FERC's regulations have particular relevance to the CPUC as they resolve the treatment of bottoming cycle facilities and assure that such treatment is consistent with Section 8341(d)(8) enacted by SB 1368, which requires such consistency.

Finally, FERC has specifically held that a bottoming cycle cogeneration facility is limited to the equipment used in the generation of electricity and does not include the industrial

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[3] 18 CFR §205.
[4] FERC Form 556, Question 4b. http://www.ferc.gov/industries/electric/gen-info/qual-fac/completing.asp
[5] *Id.* Question 4d.
[6] *Id.*, Question 14.

equipment creating the waste heat. In a decision on the El Segundo Refinery, FERC ruled that the bottoming cycle "facility" was limited to the waste heat recovery boiler and electric generator, and did not include the de-sulphurization equipment in the refinery which produced the waste heat.[7] Similarly, in the case of cement plants and calciners, the industrial kiln producing the commodity is an industrial facility; the waste heat recovery boiler and generator is a separate "facility" and comprises the bottoming cycle facility.

## B. Using the Thermal Input from the Industrial Process in the EPS Calculation Goes Beyond This Commission's Jurisdiction.

Basing regulatory compliance in the electricity sector on emissions from an industrial process oversteps the Commission's jurisdiction. This Commission's jurisdiction rests with electricity generation. The process of electricity generation in a bottoming cycle plant begins with the facilities that are added on to the underlying industrial operation: namely, the heat recovery steam generator and the steam turbine. All facilities before that point are part of the industrial process, which in essence produces fuel – waste heat -- for electric generation. To base the regulatory compliance on the efficiencies of an industrial process would be akin to using emissions from natural gas production – the production of the fuel -- in determining the emissions rate for a CCGT.

As noted above, FERC avoided this jurisdictional problem. FERC regulations keep its scope of jurisdiction over bottoming cycle facilities limited to the components of the process involved taking waste heat from the industrial process and converting it to electricity. The Commission should similarly tailor its regulatory oversight.

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[7] *Chevron U. S. A. Inc.-El Segundo Refinery, Small Power Production and Cogeneration Facilities-Qualifying Status*, Docket No. QF84-192-000, 27 FERC ¶62330, June 19, 1984.

## C. SB 1368 Does Not Restrict the Use of a Rational and Meaningful EPS Calculation.

The ICC submit that SB 1368 is not as restrictive as the Interim Opinion suggests. Section 8341(d)(3) requires:

> *The commission shall establish an output-based methodology to ensure that the calculation of emissions of greenhouse gases for cogeneration recognizes the total usable energy output of the process, and includes all greenhouse gases emitted by the facility in the production of both electrical and thermal energy.*

Section 8340(k) defines "output-based methodology" as

> *a greenhouse gases emission performance standard that is expressed in pounds of greenhouse gases emitted per megawatthour and factoring in the* ***useful thermal energy*** *employed for purposes other than the generation of electricity.*

When these terms are read together, particularly in the context of relevant Federal Energy Regulatory Commission cogeneration regulations, they do not encumber the Commission in trying to establish a rational treatment for bottoming cycle facilities.

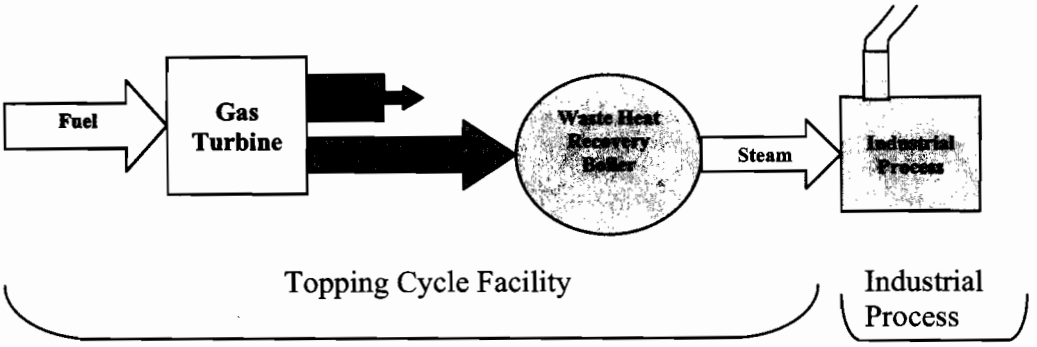
The definition contained in statute appears designed to address the characteristics of a "topping cycle" CHP facility rather than a bottoming cycle facility. FERC regulations define "topping cycle cogeneration" as follows:

> *a cogeneration facility in which the energy input to the facility is first used to produce useful power output, and at least some of the reject heat from the power production process is then used to provide useful thermal energy...*[8]

A topping cycle facility thus **produces** two forms of output: electricity and useful thermal energy. A topping cycle fits comfortably into the SB 1368 definition because these facilities have measurable electrical and thermal energy *outputs*. They also produce "***useful thermal energy***", often in the form of steam to be used in an industrial process.

The process can be depicted as follows:

[8] 18 CFR §292.202(d).




The SB 1368 provisions do not as easily accommodate a bottoming cycle facility. As a preliminary matter, a bottoming cycle facility does not have ***"useful thermal energy*** *employed for purposes other than the generation of electricity"* to include in the EPS calculation as required by Section 8340(k). All useful thermal energy in the overall bottoming cycle process is used **solely** for the generation of electricity, so there is no thermal energy output. Thus, there is no "**useful thermal energy** employed for purposes other than the generation of electricity reason" to consider in the Section 8340(k)-defined "output-based methodology").

Conclusion:

The ICC appreciates this opportunity for a late-filed respond to the September 26 2007, Petition for Modification of the Interim Opinion by the EPUC. Our intention has been to 1) support this petition, 2) clarify the underlying nature of bottoming cycle cogeneration, and 3) provide further interpretation of SB 1368 in the context of FERC regulation of bottoming cycle cogeneration and related efficiency standards, with which the Commission has been directed by statue to act in a consistent manner. Taken as a whole, ICC believes that the methodology for calculating a GHG emissions rate for bottoming cycle cogeneration in Decisions 07-08-009 and 07-01-039 should be changed as a matter of law as well as engineering. Where there is no

supplemental firing, there is no GHG emission attributable to the electrical production, whose fuel is entirely waste heat. Where there is supplemental firing, only the GHG emissions associated with that supplemental firing are appropriately attributable to electricity production. We urge the Commission to take these considerations into account and modify the above-mentioned decisions.

Respectfully submitted,

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## CERTIFICATE OF SERVICE

I, Judy Pau, certify:

I am employed in the City and County of San Francisco, California, am over eighteen years of age and am not a party to the within entitled cause. My business address is 505 Montgomery Street, Suite 800, San Francisco, California 94111.

On June 18, 2008, I caused the following to be served:

**LATE-FILED RESPONSE OF THE INDICATED CEMENT COMPANIES TO THE SEPTEMBER 26, 2007 PETITION FOR MODIFICATION OF THE INTERIM OPINION BY THE ENERGY PRODUCERS AND USERS COALITION**

via electronic mail to all parties on the service list R06-04-009 who have provided the Commission with an electronic mail address and by First class mail on the parties listed as "Parties" and "State Service" on the attached CPUC service list who have not provided an electronic mail address.

I also caused this filing to be served on the California Energy Commission, as directed in the CPUC's May 20, 2008 Ruling, by e-mail to docket@energy.state.ca.us and kgriffin@energy.state.ca.us; and by mailing a copy to: California Energy Commission, Docket Office, MS-4, Re: Docket No. 07-OIIP-01, 1516 Ninth Street, Sacramento, CA 95814-5512.

/s/ Judy Pau

Judy Pau

cc: Commissioner Michael R. Peevey (via U.S. Mail and Email)
ALJ Charlotte TerKeurst (via U.S. Mail and Email)
ALJ Jonathan Lakritz (via U.S. Mail and Email)
ALJ Meg Gottstein (via U.S. Mail and Email)
California Energy Commission Docket Office
Karen Griffin, California Energy Commission