

Decision 07-08-009 August 23, 2007

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies.

Rulemaking 06-04-009
(Filed April 13, 2006)

**INTERIM OPINION ON
PETITION FOR MODIFICATION OF DECISION 07-01-039 WITH REGARD TO
THE TREATMENT OF BOTTOMING-CYCLE COGENERATION**

By this decision, we deny the Petition for Modification filed by the Energy Producers and Users Coalition and the Cogeneration Association of California (collectively EPUC/CAC) on February 26, 2007. However, we modify Decision (D.) 07-01-039 to further clarify how our adopted cogeneration thermal credit methodology will be applied to bottoming-cycle cogeneration.

1. Background

In D.07-01-039, we adopted an interim greenhouse gas (GHG) emissions performance standard for new long-term financial commitments to baseload generation undertaken by all load-serving entities (LSEs), consistent with the requirements and definitions of Senate Bill (SB) 1368 (Stats. 2006, ch. 598). Among other things, we established a methodology for calculating the GHG emissions rate associated with cogeneration facilities. Consistent with the provisions of SB 1368, our adopted methodology recognized both the thermal

and electrical output associated with cogeneration. More specifically, we included the steam output of the cogeneration process (converted to kilowatt hour (kWh) equivalent using a standard conversion factor) in the calculation of the emissions rate, as follows:

Total GHG Emissions From Cogeneration Facility

kWh Electricity + British thermal unit (Btu) Thermal Energy (expressed in kWh)

As a result, the denominator of the emissions rate (lbs/MWh) is larger (and the resulting emissions rate is lower) than if the thermal energy output of the process were ignored.

We adopted the conversion method for all cogeneration facilities, irrespective of the order in which useful thermal energy was produced. As explained in D.07-01-039, most cogeneration facilities are “topping-cycle” facilities in which the energy input into the system produces electricity and waste heat (steam) as a by-product that can be used directly to do work (e.g., for an industrial or commercial process). However, some cogeneration facilities are “bottoming-cycle,” in which the energy input to the system is first applied to a thermal energy application or process (such as the industrial process of calcining petroleum coke), and then at least some of the reject heat emerging from the application is used to produce electricity. EPUC/CAC¹ urged us to either

¹ EPUC is an ad hoc group representing the electric end-use and customer generation interests of the following companies: Aera Energy LLC, BP America Inc. (Including Atlantic Richfield Company), Chevron U.S.A. Inc., Shell Oil Products US, THUMS Long Beach Company, and Occidental Elk Hills, Inc.

CAC represents the power generation, power marketing and cogeneration operation interests of the following entities: Coalinga Cogeneration Company, Mid-Set Cogeneration Company, Kern River Cogeneration Company, Sycamore Cogeneration

Footnote continued on next page

exempt bottoming-cycle cogeneration facilities outright from the performance standard, or else reflect in the calculation of emissions rates only the amount of fuel associated with supplemental firing in the electric generating process (and none of the input fuel associated with the industrial process). We rejected both recommendations in D.07-01-039.

On February 26, 2007, EPUC/CAC filed an “Application for Rehearing, or in the Alternative, Petition for Modification” of D.07-01-039 (EPUC/CAC Petition) with regard to the treatment of bottoming-cycle cogeneration.² On March 13, 2007, Southern California Edison Company (SCE) and the Natural Resources Defense Council (NRDC) filed replies in opposition to EPUC/CAC’s Petition. By ruling dated March 27, 2007, the assigned Administrative Law Judge provided parties further opportunity to comment on the workability of the formula adopted in D.07-01-039 for calculating the carbon emissions from bottoming-cycle cogeneration and certain operating assumptions presented by EPUC/CAC in their petition. NRDC filed supplemental comments on May 25, 2007.³ EPUC/CAC filed a reply on June 8, 2007.

Company, Sargent Canyon Cogeneration Company, Salinas River Cogeneration Company, Midway Sunset Cogeneration Company and Watson Cogeneration Company.

² The Commission originally accepted the pleading as an application for rehearing, but changed the filing upon review. We therefore refer to this pleading as a Petition for Modification, as reflected in the Docket record.

³ *Administrative Law Judge’s Ruling Soliciting Further Comment on Petition to Modify Decision 07-01-039 With Regard to the Treatment of Bottoming Cycle Cogeneration.* March 27, 2007.

2. EPUC/CAC's Petition

In its Petition, EPUC/CAC argues that the treatment of bottoming-cycle cogeneration is based on an incorrect assumption that such facilities have “useful thermal output.” Rather, EPUC/CAC contends that bottoming-cycle plants “only produce an industrial commodity and electricity” and therefore “the formula for calculating emissions from a cogenerator does not work for bottoming-cycle units.”⁴ EPUC/CAC presents a diagram of bottoming-cycle cogeneration units developed in conjunction with petroleum coke calcining facilities to support its argument that “all of the energy input to the process is consumed in calcining coke and producing a coke product.”⁵

EPUC/CAC further argues that if bottoming-cycle plants were forced to use the adopted conversion formula, there would be no amount of thermal energy included in the denominator, resulting in the assignment of total emissions from the calcining operation to the electricity generation. Instead, EPUC/CAC submits that all of the emissions created by the calcining operation should be assigned to that industrial process. EPUC/CAC recommends that the Commission recognize that “electricity generation function in a bottoming-cycle unit does not consume any fuel,” and deem the electrical generation function to comply with the emissions performance standard, comparable to the treatment given renewable technologies in D.07-01-039. In the alternative, EPUC/CAC suggests that the Commission recognize this characteristic of a bottoming-cycle

⁴ EPUC/CEC Petition, February 26, 2007, p. 2.

⁵ *Ibid.*, p. 3.

cogeneration unit in finding that this is not the type of powerplant that SB 1368 was designed to regulate.⁶

3. Discussion

We have carefully reviewed EPUC/CAC's pleadings and agree with SCE and NRDC that EPUC/CAC presents no persuasive new policy, legal or factual arguments to warrant reversing our determinations in D.07-01-039 with regard to the treatment of bottoming-cycle cogeneration. As we discussed in that decision, the statute is clear that cogeneration facilities are not exempt from the GHG emissions performance standard, and that a bottoming-cycle facility is indeed a "powerplant" as defined by that law.⁷ Moreover, D.07-01-039 clarifies that the performance standard applies to individual facilities. Categorically exempting certain powerplant technologies from that application, as EPUC/CAC suggests, would not be reasonable from a policy perspective irrespective of the requirements of SB 1368.

EPUC/CAC argued in earlier pleadings that there are no emissions associated with the production of electricity using bottoming-cycle cogeneration, and reiterates this argument in its petition. However, to reach this conclusion, we would need to assign all the emissions to the industrial process on a stand-alone basis, as though there were no electrical production involved at all.

⁶ *Id.*, p. 6. In its reply comments, EPUC/CAC proposes a third alternative, namely, that an emissions rate for bottoming-cycle cogeneration only be calculated if there is supplemental firing to produce electricity, whereby the natural gas used in that supplemental firing would then be divided by the incremental generation produced. (*EPUC/CAC Reply Comments*, p. 3.)

⁷ D.07-01-039, pp. 99-100.

This is the only way that “no emissions” could be associated with the production of electricity from this cogeneration facility. This is essentially how EPUC/CAC explains the process depicted in Exhibit A to its petition: “Calcining by itself produces no electricity. All of the natural gas input to the calcining process is necessary for the calcining and therefore the carbon emissions from the consumption of the natural gas should be entirely allocated to the industrial process.”⁸

A facility is either a cogeneration facility as defined by the Federal Energy Regulatory Commission (FERC), or not. As we discuss in D.07-01-039, FERC defines a cogeneration facility as “equipment used to produce energy and forms of useful thermal energy (such as heat or steam).”⁹ That definition captures both topping- and bottoming-cycle cogeneration. We also pointed out in D.07-01-039 that the FERC regulations refer to “useful thermal energy” in defining bottoming-cycle cogeneration facilities as follows:

Bottoming-cycle cogeneration facility means 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.¹⁰

In effect, the only way that EPUC/CAC’s assertion of “no emissions” associated with the production of electricity from bottoming-cycle cogeneration could be true is if there were no “cogeneration” involved at all – that is, none of

⁸ EPUC/CAC Petition, p. 3.

⁹ See D.07-01-039, mimeo., p. 112, quoting 18 CFR § 202(h).

¹⁰ *Ibid.* p. 112, footnote 144, quoting 18 CFR § 292.202(e), emphasis added.

the reject heat from the application or process was used for power production. Otherwise, as described in the FERC definition above, the energy input is applied to produce *both* useful thermal energy *and* power production, albeit in a different sequence than a topping-cycle facility. In fact, Exhibit B to the EPUC/CAC Petition, which is the notice of self-certification of the qualifying facility depicted in Exhibit A, describes the bottoming-cycle cogeneration plant in precisely this same way:

The Facility is a bottoming-cycle cogeneration plant. The plant calcines petroleum coke to produce high quality carbon for the manufacture of aluminum and other industrial uses. The petroleum coke is heated on a rotating kiln to drive off moisture and volatile hydrocarbons. The waste heat produced by the burning of volatiles and coke dust is recovered in a boiler which produces steam. All the steam generated by the boiler is utilized by a turbine-generator unit to produce electricity.”¹¹

EPUC/CAC argues that because Exhibit B indicates only “electrical output” from the bottoming cycle facility (and indicates “none” under “useful thermal output”), that our adopted conversion formula is unworkable. More generally, EPUC/CAC contends that bottoming-cycle cogeneration facilities only have one useful energy output (electrical power) and therefore the application of the methodology does not make sense. As NRDC points out in its supplemental comments, the conversion formula can indeed be applied for bottoming-cycle cogeneration: The numerator would reflect the total emissions from the facility (including both fuel used in the industrial process as well as any supplemental firing). The denominator consists of the sum of the electricity generated from the

¹¹ EPUC/CAC Petition, Attachment B, p. 4.

facility (in kWh) and the energy content (expressed in kWh) of the thermal energy that was used to generate the electricity, not including any waste heat that is vented to the atmosphere.¹²

As discussed above, EPUC/CAC attempts to characterize bottoming-cycle cogeneration facility as an anomalous cogeneration technology, in which the energy input does not produce useful thermal energy. This is contradicted by FERC definitions as well as by the description of the bottoming-cycle facility presented in EPUC/CAC's Exhibit B.¹³ Moreover, SB 1368 has directed us to develop a methodology for calculating emission rates for cogeneration 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.*"¹⁴ We have done so in D.07-01-039.

In sum, we do not find merit to EPUC/CAC's arguments for changing the treatment of bottoming-cycle cogeneration technologies that we adopted in D.07-01-039. However, we will modify D.07-01-039 to further clarify how the conversion formula will be applied to those technologies, as described above.

¹² As discussed in D.07-01-039, the Federal Energy Regulatory Commission's definition of "useful thermal energy output" includes "only the thermal energy that is actually intended to be delivered to the thermal host (or in the case of bottoming-cycle cogeneration, first applied to the thermal application or process), and not any remaining thermal energy intended to be exhausted as waste heat." (D.07-01-039, mimeo., p. 112.)

¹³ We further note that under "average net steam output" in that exhibit, the cogenerator responded "0 lbs/hr (all the steam produced is used to generate electricity)," which echoes the verbal description of its process as producing useful thermal energy (steam) as well as electricity.

¹⁴ SB 1368, Section 8340(k), emphasis added.

Finally, EPUC/CAC suggests that the standard conversion factor adopted in D.07-01-039 may not be appropriate for this purpose because “the conversion process is not 100% efficient.”¹⁵ Revisiting this conversion factor is beyond the scope of the EPUC/CAC Petition and today’s decision. Accordingly, we will use the 3,413 Btu/kWh conversion factor adopted in D.07-01-039 in applying the cogeneration credit to all cogeneration technologies.

4. Comments on Proposed Decision

The proposed decision of the assigned Commissioner in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and Rule 14.3 of the Commission’s Rules of Practice and Procedure. NRDC and EPUC filed comments on August 13, 2007, and NRDC filed reply comments on August 20, 2007. In response to the comments, we make certain clarifications to the proposed decision, but do not substantively modify the resolution of issues. In particular, as NRDC notes in its reply comments, EPUC seems to misunderstand the formula for calculating the net emissions rate associated with bottoming-cycle cogeneration facilities. To further clarify the application of the thermal crediting formula to bottoming-cycle cogeneration facilities, we adopt NRDC’s proposed language modification to Ordering Paragraph 2 of the proposed decision.¹⁶

¹⁵ *EPUC/CAC Reply Comments*, June 8, 2007, p. 3.

¹⁶ See *Reply Comments of NRDC*, August 20, 2007, pp. 3-4.

5. Assignment of Proceeding

Michael R. Peevey is the assigned Commissioner in this proceeding and Meg Gottstein is the assigned Administrative Law Judge in this phase of the proceeding.

Findings of Fact

1. All cogeneration facilities are subject to the GHG emissions performance standard under SB 1368.

2. A bottoming-cycle is indeed a “powerplant” as defined by that law.

3. Categorically exempting certain powerplant technologies from that application, as EPUC/CAC suggests in its Petition, would not be reasonable from a policy perspective irrespective of the requirements of SB 1368.

4. EPUC/CAC’s assertion that there are no emissions associated with the production of electricity using bottoming-cycle cogeneration is premised on the treatment of all emissions associated with the fuel input as attributable only to the industrial process, as though there was no electrical production associated with the facility at all. In effect, EPUC/CAC asks that we treat bottoming-cycle cogeneration facilities as if there was no “cogeneration.”

5. As discussed in this decision, this treatment is not consistent with FERC’s definition of a cogeneration facility or even the description of the qualifying facility of its own process, as described in Exhibit B of the EPUC/CAC Petition. Both clearly acknowledge that the fuel input to the facility is applied to produce both useful thermal energy and power production, albeit not in the sequence as occurs under a topping-cycle process.

6. Moreover, this treatment is not consistent with the SB 1368 direction that the methodology for calculating emission rates be 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.” (SB 1368, Section 8340(k), emphasis added.)

7. Contrary to EPUC/CAC’s assertions, the conversion formula adopted in D.07-01-039 can readily be applied to bottoming-cycle cogeneration, as described in NRDC’s comments and the order set forth below.

8. Reconsidering the standard conversion factor adopted in D.07-01-039, as suggested in EPUC/CAC’s reply comments, is beyond the scope of the EPUC/CAC Petition.

Conclusions of Law

1. EPUC/CAC’s Petition for Modification of D.07-01-039 should be denied for the reasons stated herein.

2. D.07-01-039 should be further clarified as to how the conversion formula will be applied to bottoming-cycle cogeneration technologies, as described in NRDC’s comments.

3. In applying that formula, the 3,413 Btu/kWh conversion factor adopted in D.07-01-039 should be used in calculating the cogeneration credit for all cogeneration technologies.

4. In order to move forward as expeditiously as possible in implementing SB 1368, this decision should be effective today.

INTERIM ORDER

IT IS ORDERED that:

1. The Petition for Modification filed by the Energy Producers and Users Coalition and the Cogeneration Association of California on February 26, 2007 is denied.

2. Decision 07-01-039 is modified as follows:

- a) The following language shall be *added* to footnote 140, which appears on page 107:

The numerator of the conversion formula for a bottoming-cycle cogeneration facility would reflect the total emissions from the facility, including both fuel used in the industrial process as well as any supplemental firing. The denominator of energy produced would consist of the kWh of electricity produced by the facility, plus a thermal credit (through the 3,413 Btu/kWh standard conversion factor) for the thermal energy produced by the industrial process that is used for electricity generation in the waste heat boiler.

- b) The following sentence shall be *added* to page 6 of Attachment 7 at the end of the second full paragraph under Section C. Cogeneration:

The denominator of energy produced would consist of the kWh of electricity produced by the facility, plus a thermal credit (through the 3,413 Btu/kWh standard conversion factor) for the thermal energy produced by the industrial process that is used for electricity generation in the waste heat boiler.

This order is effective today.

Dated August 23, 2007, at San Francisco, California.

MICHAEL R. PEEVEY
President
DIAN M. GRUENEICH
JOHN A. BOHN
RACHELLE B. CHONG
TIMOTHY ALAN SIMON
Commissioners