



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8

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Ref: 8ENF-AT

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Preston Phillips, Vice President  
Hyperion Energy Center  
Hyperion Refining LLC  
1350 Premier Place  
5910 N. Central Expressway  
Dallas, TX 75206

Dear Mr. Phillips:

The United States Environmental Protection Agency (EPA) is reviewing the draft prevention of significant (PSD) air quality preconstruction permit that the South Dakota Department of Environment and Natural Resource (DENR) has prepared in response to an application by Hyperion Refining LLC (Hyperion) to build an oil refinery and power plant known as the Hyperion Energy Center (HEC), near Elk Point, South Dakota. We have also reviewed two August 20, 2007, letters from RTP Environmental Associates Inc. (RTP), on behalf of Hyperion Resources, Inc., to the Director of EPA's Compliance Assessment and Media Programs Division in Washington, D.C., and EPA's September 24, 2007 response.

This letter is EPA's response regarding (1) whether the synthetic gas (syngas) and Pressure Swing Adsorption (PSA) tail gas to be produced by Hyperion's proposed integrated gasification combined cycle (IGCC) power plant gasification block should be considered a "fuel gas" under the new source performance standards (NSPS) Subparts J and Ja<sup>1</sup> and (2) whether the IGCC power plant is subject to maximum available control technology (MACT) Subpart CC.<sup>2</sup> EPA has determined that both the syngas and PSA tail gas are "fuel gas" for purposes of NSPS Subpart Ja and that the IGCC power plant is subject to MACT Subpart CC.<sup>3</sup>

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<sup>1</sup> Subpart J, 40 C.F.R. §§60.100 *et seq.*, is entitled "Standards of Performance for Petroleum Refineries," and Subpart Ja, 40 C.F.R. §§60.100 *et seq.*, is entitled "Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007."

<sup>2</sup> Subpart CC, 40 C.F.R. §63.640 *et seq.*, is entitled "National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries."

<sup>3</sup> It should be noted that South Dakota DENR has been authorized to implement and enforce MACT Subpart CC but not NSPS Subpart Ja. Therefore, EPA has the primary responsibility for implementing and enforcing NSPS Subpart Ja. Additionally, pursuant to 40 C.F.R. Subpart E –

In one of its August 20, 2007, letters, RTP stated that the syngas produced in the IGCC power plant gasification block is fuel gas, and that the IGCC combined cycle gas turbines are fuel gas combustion devices under the current NSPS Subpart J and are other fuel gas combustion devices under the proposed NSPS Subpart Ja. In the other August 20, 2007, letter, RTP determined that the gasification block does not fit within the definition of “petroleum refining process unit” and that none of the process vents, storage vessels, wastewater streams, or equipment leaks associated with this process unit are subject to any of the provisions of MACT Subpart CC. RTP requested EPA’s concurrence with these determinations. EPA responded by indicating that the facility should work with the State and EPA’s Regional Office.

Subsequently, the South Dakota DENR issued a draft PSD permit, along with a supporting Statement of Basis (SOB). In the SOB, the State indicated that NSPS Subparts J and Ja applied to the refinery and that the syngas was not a fuel gas and that the turbines were not considered fuel gas combustion devices under NSPS Subparts J and Ja. The SOB also indicated that the electrical power plant (IGCC system) is not a petroleum refining process unit and that MACT Subpart CC did not apply to the IGCC system.

## **Background**

On December 20, 2007, RTP, on behalf of Hyperion, submitted a PSD preconstruction permit application to the South Dakota DENR to construct and operate the HEC refinery and power plant complex. DENR’s SOB for the proposed permit indicates that the petroleum refinery will process up to 400,000 barrels per day of crude oil and 26,000 barrels per day of butane and that the IGCC power plant will supply the refinery with hydrogen, electric power, and steam for its operation. The power plant is designed to provide the refinery with up to 450 million cubic feet per day of hydrogen, 200 megawatts worth of electricity, and 2.4 million pounds of steam per hour.

Additionally, the SOB indicates that the IGCC power plant will use two major processes to produce the hydrogen, electricity and steam: (1) a gasification block; and (2) a power/steam block. The gasification block converts a solid fuel such as the petroleum coke or coal to a gas. This gas is generally referred to as synthetic gas or syngas. The syngas is composed of carbon monoxide, hydrogen, and impurities. The gasification process will also remove impurities before the syngas is burned in the power/steam block and will produce pure hydrogen, also called PSA tail gas, for the refinery process. Hyperion proposes to construct and operate five combined cycle gas turbines. Hyperion will not supply any of its electric output capacity to a utility power distribution system for sale.

Finally, the December 2007 PSD permit application (page 29) indicates that “[a]ll pollutant-emitting activities at the Hyperion Energy Center will be under common control and

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Approval of State Programs and Delegation of Federal Authorities, specifically 40 C.F.R. 63.90(d)(2), “nothing in this subpart shall prohibit the Administrator from enforcing any applicable rule, emission standard or requirement established under section 112.”

will be located on contiguous or adjacent sites. The petroleum refinery falls within two-digit SIC code 29. If the power plant were to sell a substantial quantity of electricity to outside users, its primary economic activity would be electric generation and transmission, and it would fall into the two-digit Sic code 49. However, the sole economic activities of the power plant at the Hyperion Energy Center will be production of steam, electricity, and hydrogen in support of the petroleum refinery. Accordingly, RTP has determined that the power plant is a support facility for the petroleum refinery, and that the two comprise a single stationary source.”

## ***NEW SOURCE PERFORMANCE STANDARDS (NSPS)***

### **Subparts J and Ja – General**

The SOB indicates that certain provisions of Subpart J apply to the HEC. We do not agree. Subpart J was amended on June 24, 2008 (73 FR 35838) and applies to any fluid catalytic cracking unit catalyst regenerator or fuel gas combustion device that commences construction, reconstruction, or modification after June 11, 1973, and on or before May 14, 2007, except for flares. Subpart J applies to flares that commence construction, reconstruction, or modification after June 11, 1973, and on or before June 24, 2008. Subpart J also applies to Claus sulfur recovery plants that commence construction, reconstruction, or modification after October 4, 1976, and on or before May 14, 2007. See 40 C.F.R. §60.100(b). The HEC has not yet commenced construction and therefore is not subject to Subpart J. Rather, the facility will be subject to Subpart Ja.

### **Subpart Ja – Fuel Gas**

The SOB indicates that Hyperion’s syngas and PSA tail gas are not considered “fuel gas” under Subparts J and Ja, citing EPA’s December 1, 1980 revision of the definition of “fuel gas” in Subpart J and the decision in Star Enterprises; Texaco Inc. v. United States Environmental Protection Agency, 235 F.3d 139 (3<sup>rd</sup> Cir. 2000). We do not agree with this conclusion, for the reasons explained below.

The SOB indicates that because Hyperion’s syngas and PSA tail gas will be produced by the gasification process of the IGCC system and not by a refinery process unit (defined in 40 C.F.R. §§60.101(f) and 60.101a as “any segment of the petroleum refinery in which a specific processing operation is conducted”), they are not “fuel gas” under Subparts J and Ja. Again, we do not agree.

The definition of “fuel gas” in 40 C.F.R. §60.101a<sup>4</sup> does not refer to a “process unit.”

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<sup>4</sup> In Subpart Ja, 40 C.F.R. §60.101a provides, “*Fuel gas* means any gas which is generated at a petroleum refinery and which is combusted. *Fuel gas* includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. *Fuel gas* does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners, but does include gases from flexicoking unit gasifiers. *Fuel gas* does not include vapors

Had EPA intended to limit the definition of “fuel gas” to gas produced at any “process unit,” EPA would have used the term “process unit” in the definition of “fuel gas,” as it did in the definition of “process upset gas” in 40 C.F.R. §60.101a. Having included the term “process unit” in the definition of “process upset gas” but excluded it in the definition of “fuel gas,” EPA further demonstrated its intent not to limit “fuel gas” to gas produced by a process unit.

Additionally, even if EPA had intended to limit the definition of “fuel gas” to gas produced by a refinery process unit, this would not be relevant, because the gasification block of the IGCC power plant is a refinery process unit. Subpart Ja’s definition of “refinery process unit” is open-ended, encompassing “any segment of the petroleum refinery in which a specific processing operation is conducted.” (See 40 C.F.R. §60.101a.) The IGCC’s gasification block clearly falls within this definition, because it is a segment of the refinery in which gasification, one of the refinery’s specific processing operations, is conducted.

Further, the Subpart Ja definition of “fuel gas” explicitly includes gases from flexicoking unit gasifiers. (See 40 C.F.R. §60.101a.) Although the IGCC power plant gasification block is not exactly the same unit as a flexicoking unit gasifier, its purpose is the same, i.e., to produce a synthetic fuel gas from petroleum coke.

The SOB also cites Star Enterprises; Texaco Inc. v. United States Environmental Protection Agency, *supra*, in support of its claim that Hyperion’s syngas and PSA tail gas are not “fuel gas.” However, this decision involved a different question: whether two stationary gas turbines located in an electrical power plant complex adjacent to a refinery were not subject to Subpart J because they were not “in” the refinery and therefore not an “affected facility” as defined in 40 C.F.R. §60.100(a). The court specifically noted that this conclusion meant there was no need to reach the question of whether the gas burned in those turbines was “fuel gas.” (See 235 F.3d at 145, n. 8.) As noted in the December 2007 PSD permit application (page 29), the IGCC “power plant is a support facility for the petroleum refinery, and the two comprise a single stationary source.”

The SOB suggests that if the turbines involved in the Star Enterprises case had been regulated by another subpart of 40 C.F.R. Part 60, they would not have been regulated by Subpart J. However, there was no indication in that opinion that a “fuel gas” regulated by Subpart J could not also be regulated another subpart. Instead, the court stated that the composition of the gas to be burned by the two turbines “may suggest” that another subpart of Part 60 would be the appropriate regulation for regulating the emissions from those turbines, while specifically noting that the unique composition of the gas to be burned in the turbines did not, in and of itself, exempt the turbines from regulation under Subpart J.

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that are collected and combusted to comply with the wastewater provisions in §60.692, 40 C.F.R. §§61.343 through 61.348, 40 C.F.R. §63.647, or the marine tank vessel loading provisions in 40 C.F.R. §63.562 or 40 C.F.R. §63.651.

For the reasons explained above, we have determined that the syngas and PSA tail gas proposed to be produced at Hyperion and burned in the turbines, are each a “fuel gas” for purposes of NSPS Subpart Ja and that the combustion turbines associated with the IGCC system are subject to Subpart Ja. Also, any other devices, such as process heaters, boilers, and flares at the refinery, including the IGCC system, that combust fuel gas, including syngas and PSA tail gas, are fuel gas combustion devices and subject to NSPS Subpart Ja.

### ***MAXIMUM AVAILABLE CONTROL TECHNOLOGY STANDARDS (MACT)***

#### **Subpart CC**

The SOB indicates that the electrical power plant (IGCC system) is not considered a petroleum refining process unit. Based on this characterization, the DENR agrees with the applicant that Subpart CC does not apply to the electrical power plant (IGCC system).

Based on the available information, we conclude that the IGCC system is in fact a petroleum refining process unit that is subject to Subpart CC. As stated in the SOB and discussed above, the IGCC power plant produces hydrogen. Therefore, the IGCC system is a hydrogen production unit under the definition of “petroleum refining process unit.” According to 40 C.F.R. §63.641, a “petroleum refining process unit” means

a process unit used in an establishment primarily engaged in petroleum refining as defined in the Standard Industrial Classification code for petroleum refining (2911), and used primarily for the following:

- (1) Producing transportation fuels (such as gasoline, diesel fuels, and jet fuels), heating fuels (such as kerosene, fuel gas distillate, and fuel oils), or lubricants;
- (2) Separating petroleum; or
- (3) Separating, cracking, reacting, or reforming intermediate petroleum streams.
- (4) Examples of such units include, but are not limited to, petroleum-based solvent units, alkylation units, catalytic hydrotreating, catalytic hydrorefining, catalytic hydrocracking, catalytic reforming, catalytic cracking, crude distillation, lube oil processing, hydrogen production, isomerization, polymerization, thermal processes, and blending, sweetening, and treating processes. Petroleum refining process units also include sulfur plants. [emphasis added]

Because the IGCC system will be located at an establishment primarily engaged in petroleum refining and because it produces hydrogen, it is a “petroleum refining process unit.”

Subpart CC applies to petroleum refining process units and to related emission points that are located at a plant site where: (1) the plant site is a major source as defined in section 112(a) of the Clean Air Act, and (2) the process unit emits or has equipment containing or contacting one or more of the hazardous air pollutants listed in Table 1 of Subpart CC. (See 40 C.F.R. §63.640(a).)

The IGCC system meets all of these criteria. It meets the definition of “plant site” in 40 C.F.R. §60.641<sup>5</sup> because the refinery and power plant are under common control and will be located on contiguous or adjacent sites. It also satisfies both conditions specified in 40 C.F.R. §63.640(a). It meets the definition of “major source” in section 112(a)(1) of the Clean Air Act,<sup>6</sup> because it is part of a facility that will emit or have the potential to emit more tons per year of hazardous pollutants (HAPs) than specified in that definition. Further, the December 2007 permit application and the SOB indicate that the IGCC system emits or has equipment containing or contacting more than one of the HAPs listed in Table 1 of Subpart CC. For example, the SOB indicates that there is benzene in wastewater from the IGCC system. The permit application indicates that methanol is used to clean the syn gas and removes, among other things, carbonyl sulfide (COS), in the IGCC system.

## CONCLUSION

For the reasons explained above, we have determined that the syngas and PSA tail gas to be produced at the IGCC plant are “fuel gas” Subpart Ja, and that the IGCC system is a refinery process unit subject to Subpart CC. Forthcoming, EPA will respond to RTP’s inquiry regarding 40 C.F.R. part 60 subparts Da, Db, and KKKK, part 61, subpart FF, and part 63, subparts UUU and FFFF.

If you have any questions or concerns regarding this letter, please contact Laurie Ostrand of my staff at (303) 312-6437 or by email at [ostrand.laurie@epa.gov](mailto:ostrand.laurie@epa.gov).

Sincerely,



Cynthia J. Reynolds, Director  
Technical Enforcement Program

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<sup>5</sup> The definition in 40 C.F.R. §63.641 states, “A *plant site* means all contiguous or adjoining property that is under common control including properties that are separated only by a road or other public right-of-way. Common control includes properties that are owned, leased, or operated by the same entity, parent entity, subsidiary, or any combination thereof.”

<sup>6</sup> The definition in section 112(a)(1) of the Clean Air Act states, “The term ‘major source’ means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants. The Administrator may establish a lesser quantity, for a major source than that specified in the previous sentence, on the basis of the potency or the air pollutant, persistence, potential for bioaccumulation, other characteristics of the air pollutant, or other relevant factors.”

cc: Brian Gustafson, Administrator  
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