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Subject:	RE: Air Quality Permit Revision Application – Technical Review Letter #2
Date:	Friday, September 29, 2017 5:25:24 AM
Attachments:	47X.PDF 49P.PDF Plains-End-Revised-Permit.pdf

Good morning Rupesh,

This email transmits TEP's response to PDEQ's request for additional information regarding demonstration of compliance with the NO_X emissions cap. Specifically, your September 26, 2017 letter includes the following request:

> *6. The proposed NO_X testing and monitoring requirements described in Section 4.5.3 of the application are not sufficient to demonstrate compliance with the proposed NO_X emission limit (i.e., 179 tons NO_X per year, all engines combined). The permit will include NO_X compliance determination procedures that are sufficient to ensure continuous compliance with the proposed NO_X emission limit. Please provide a compliance demonstration approach that includes more frequent testing and monitoring of NO_X emissions from the RICE units.*

Our response at section I includes a general discussion of pertinent regulatory requirements and U.S EPA policy and practice. In section II we have provided a review of compliance demonstration provisions with respect to emissions caps in the permits for other RICE projects, including the permit for the Plains End facility in Colorado. Finally, in section III, we propose permit language for the IGS RICE project based generally on the provisions in the Plains End permit.

The attachments to this email comprise the Plains End permit and two pertinent U.S. EPA policy documents.

Please let us know of any questions regarding this response.

Thanks
Colin

I. U.S. EPA Policy Regarding Appropriate Monitoring Methodology for "Synthetic Minor" Limits on Potential to Emit

TEP first wishes to summarize the pertinent regulatory language and case law and the history and evolution of EPA policy regarding appropriate monitoring, because we are aware of some confusion regarding this issue.

The codified regulation at 40 CFR § 52.21(b)(4) defines PTE as "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design" and further provides that "[a]ny physical or operational limitation on the capacity of the source to emit a pollutant … shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable." The regulation expressly lists "air pollution control equipment" and "restrictions on hours of operation" as two of the types of limits which can be

used for this purpose. The requirement for federal enforceability was vacated by the U.S. Court of Appeals for the D.C. Circuit in *Chem. Mfrs. Ass'n v. EPA*, 70 F.3d 637 (D.C. Cir. 1995). Pursuant to U.S. EPA policy and case law, the rule language regarding enforceability is now interpreted as meaning "federally enforceable or legally and practicably enforceable by a state or local air pollution control agency." *U.S. v. Questar Gas Management Company*, No. 2:08-cv-00167 (D. Utah, May 1, 2011). Thus, what is required is a judgment regarding the permit terms necessary to ensure the proposed NO_X emission limit of 179 tons per year is practicably enforceable.

In policy statements issued prior to 1990, U.S. EPA purportedly established a "flat prohibition on use of emission limits to restrict potential to emit." These policy statements are inconsistent with the requirements of the regulation, as U.S. EPA has since acknowledged, and are of no effect. See, for example, the final order issued by the U.S. EPA Administrator in *In the Matter of Orange Recycling and Ethanol Production Facility, Pencor-Masada Oxynol, LLC* (April 8, 2002), where the agency evaluated the appropriateness of a "365-day 'rolling cumulative total' emissions limit" of 246 tons per year and concluded, "EPA finds that this rolling cumulative methodology is a practically enforceable and effective means of limiting PTE." The order includes the following general statements regarding the regulatory requirements:

> [T]he Clean Air Act and the implementing regulations allow for a flexible, case-by-case evaluation of appropriate methods for ensuring practical enforceability of PTE limits. The key consideration throughout these policy and guidance documents is whether the terms and conditions that limit the potential emissions are, in fact, enforceable as a practical matter.
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> *
> In order to be considered practically enforceable, an emissions limit must be accompanied by terms and conditions that require a source to effectively constrain its operations so as to not exceed the relevant emissions threshold. These terms and conditions must also be sufficient to enable regulators and citizens to determine whether the limit has been exceeded and, if so, to take appropriate enforcement action.

Over the past 15 years, consistent with the decision of the U.S. EPA Administrator in *Pencor-Masada*, U.S. EPA has consistently applied a policy of allowing annual emission limits to be used as constraints on PTE where those emission limits are enforceable as a practical matter. Two prominent examples not relying on continuous emissions monitoring systems are the final order issued by the U.S. EPA Administrator in *In the Matter of Pope and Talbot, Inc., Lumber Mill* (March 22, 2007) and the final order issued by the U.S. EPA Environmental Appeals Board in *In re: Shell Offshore, Inc.* (March 30, 2012).

In *Pope and Talbot*, the Administrator evaluated a petition regarding the adequacy of a permit issued by the state agency in South Dakota. The Administrator concluded that an annual CO emission limit of 238 tpy on a rolling 12-month basis was adequate to restrict PTE because the permit includes "three equations prescribing exactly how the Facility must calculate total monthly CO emissions" where "recorded monthly fuels usage is multiplied by prescribed fuels emissions factors for CO."

Similarly, in *Shell Offshore*, the EAB considered the adequacy of a permit decision issued by U.S. EPA Region 10. The EAB concluded that an annual NO_X emission limit of 240 tpy on a

rolling 365-day basis was adequate to restrict PTE because the permit requires that "daily emissions from each emission unit or group of emission units 'shall be determined by multiplying the appropriate emission factor … by the recorded daily operation rate'" [quoting the Region's response to comments document]. Notably, the NO_X emission factors prescribed in the permit written by Region 10 and upheld by the EAB assumed a control efficiency of 90 percent for selective catalytic reduction systems to be used on the largest emissions units at the facility.

II. Precedent for Monitoring to Determine Compliance with "Synthetic Minor" Limits at RICE Electric Generating Facilities

TEP reviewed a number of permits for other RICE projects and determined that the proposed permit terms for the IGS expansion as summarized in Section III, below, are generally more rigorous than those in the permits for similarly situated facilities. For example:

a. The Plains End facility in Colorado was built in two phases, each with its own "synthetic minor" limits for all pollutants. For the first phase (20 engines, each 5.65 MW and fired with natural gas), the NO_X and CO limits are 97.2 tpy and 227 tpy, respectively; for the second phase (14 engines, each 8.26 MW and fired with natural gas), the NO_X and CO limits are 83.3 tpy and 247.2 tpy, respectively. (Note that the applicable major source threshold for NO_X is 100 tpy in the Denver ozone nonattainment area.) The facility is required to monitor natural gas consumption and to perform monthly calculations multiplying the gas usage and a "compliance emission factor" that is written into the permit. Each engine is required to be tested using reference methods at a frequency of at least once per five years and semiannual sampling of each engine using a portable analyzer also is required. The "compliance emission factor" is not a limit; if semiannual sampling or reference method testing shows a higher emission factor, corrective action (i.e., either a retest to confirm the current factor or an update to the factor) is required. The permit also includes general duty provisions, i.e., control equipment must be operated and maintained in accordance with manufacturer's recommendations and good engineering practices. A similar approach is used for the synthetic minor limits for VOC and PM10, but with less frequent testing and no requirement for semiannual sampling. These provisions, which TEP considers to be appropriate and robust, generally form the basis for the proposed permit terms summarized in Section III, below. This is the only facility that is as large as the RICE project at IGS that is subject to synthetic minor limits for a pollutant for which air pollution control equipment is used (i.e., NO_X, CO, or VOC).

b. The Schofield facility in Hawaii comprises six engines, each 9.4 MW and fired with diesel and/or biodiesel. This new major stationary source was subject to PSD review for NO_X and VOC but is "synthetic minor" for CO. Using the AP-42 emission factor, the facility's CO PTE is nearly 2,000 tpy. The facility is not subject to any numeric limits or monitoring or testing requirements for CO emissions; the only permit term relating to the purportedly enforceable constraints on CO PTE is a requirement to install, operate, and maintain oxidation catalyst in order to meet the VOC BACT limit. The PSD applicability analysis for CO emissions performed by the permitting authority

is based on the emission estimates provided by Wärtsilä for startup conditions and for steady-state conditions. Notably, this is the most recent PSD permit issued for a RICE project where the U.S. EPA Administrator is the permitting authority (i.e., where § 52.21 applies).

c. The Barrick Goldstrike facility in Nevada comprises 14 engines, each 8.3 MW and fired with natural gas. This greenfield facility was treated as "synthetic minor" for all pollutants. The permit terms relating to the PTE emission limits are generally similar to those in the Plains End permit – an emissions cap for each pollutant, with requirements to monitor fuel usage and to calculate monthly emissions as the product of fuel usage and an emission factor. For each engine and each pollutant, emission factors are established based on annual testing.

d. The Marquette Board of Light and Power facility in Michigan comprises three engines, each 17 MW and fired with natural gas and diesel. This greenfield facility was treated as "synthetic minor" for all pollutants. The permit terms relating to NO_X PTE are substantially similar to those in the Plains End permit – an emissions limit of 224.2 tpy, with requirements to monitor fuel usage and to calculate monthly emissions as the product of fuel usage and "default emission factors" for each fuel. For CO and VOC, however, the permit is less robust, as it relies solely on a general requirement to install and operate oxidation catalyst systems – there are no facility-wide emissions limits, no requirements for monthly tracking, and no numeric limitations sufficient to ensure PTE less than 250 tpy.

e. The Humboldt Bay facility in California uses CEMS to demonstrate compliance with the NO_X and CO "synthetic minor" limits.

III. Proposed Permit Terms for IGS

TEP provided draft permit language to PDEQ on August 28, 2017. The following are proposed replacement terms for NO_X only.

III.A.1. Nitrogen Oxides (NO_X) Emissions Cap

a. The permittee shall not cause or allow the combined emissions of NO_X from emissions units RICE01 through RICE10 in excess of 179.0 tpy, based on a monthly rolling 12-month sum. *{This is 99% of the PSD applicability threshold for IGS. For reference, the Plains End, the NO_X and CO "synthetic minor" limits for phase I are equal to 100 % of the major NSR thresholds. (The emissions caps for the RICE, in condition 1.4, are 97.2 tpy for NO_X and 227 tpy for CO. The emission caps for other units installed as part of the project, in condition 1.16, are 2.8 tpy for NO_X and 23 tpy for CO.}*

b. Compliance with this limit shall be demonstrated by performance tests as detailed in Condition III.D.1; monitoring as detailed in Conditions III.B.1 and III.B.4 through III.B.6; and recordkeeping as detailed in Conditions III.C.1 through III.C.4. *{This proposed permit term is not substantive, but merely serves as a guide to where*

the compliance demonstration requirements are listed. The Plains End permit does not include a comparable term.}

c. The permittee shall equip each RICE with an SCR system and shall at all times, including periods of startup, shutdown, and malfunction, to the extent practicable, maintain and operate the RICE and the SCR system in a manner consistent with good air pollution control practice for minimizing NO_X emissions. Each RICE and the associated SCR system are subject to the specific requirements in Specific Conditions III.B.1.d through III.B.1.f. *{This term is equivalent to condition 1.8 in the Plains End permit.}*

d. Each RICE shall be operated and maintained in accordance with manufacturer's recommendations and good engineering practices. A copy of the operation and maintenance procedures, schedules for maintenance and/or inspection activities and the records related to operation and maintenance of the RICE and good engineering practices, such as records of routine maintenance and/or inspections shall be made available to the Control Officer upon request. *{This term is equivalent to condition 1.8.1 in the Plains End permit.}*

e. Except as provided below, for each SCR system, ammonia shall be injected into the SCR system at all times the associated RICE is operated. *{This term is equivalent to condition 1.8.2.1 in the Plains End permit.}*

i. Ammonia is not injected during periods of startup and shutdown. The permittee shall retain record of the date, time and duration of periods of startup and shutdown for each RICE.

ii. If at any time, excluding periods of startup and shutdown, ammonia injection fails, the permittee shall conduct an investigation of the SCR system. If ammonia injection cannot be restored within ten (10) minutes, the RICE shall be shut down. Failure to shut down the RICE after ten (10) minutes without ammonia injection shall be considered a deviation. Records shall be kept of any event, excluding those that occur during periods of startup and shutdown, in which ammonia injection fails for more than two (2) minutes while the RICE is in operation.

f. Each SCR system shall be equipped with a continuous NO_X process monitor capable of measuring and recording the NO_X concentration in the SCR outlet gases. Each SCR system and the associated NO_X process monitor shall be operated and maintained in accordance with manufacturer's recommendations and good engineering practices. Good engineering practices include the following: *{This term is more stringent than condition 1.8.2.2 in the Plains End permit; the Plains End permit does not require a NO_X process monitor.}*

i. The source shall clean, recondition and replace the catalyst in accordance with the manufacturer's and/or packager's recommendations. Records of the catalyst cleaning, reconditioning or replacement shall be documented and made available to the Control Officer upon request.

ii. Maintenance and/or inspections of the SCR system, including the integral NO_X process monitor, shall be conducted in accordance with the manufacturer's and/or

packager's recommendations and records of routine maintenance and/or inspections shall be retained. A copy of the operation and maintenance procedures, schedules for maintenance and/or inspection activities and the records of routine maintenance and/or inspections shall be made available to the Control Officer upon request.

III.B. MONITORING REQUIREMENTS

1. Each emissions unit RICE01 through RICE10 shall be equipped with a monitoring system capable of measuring and recording hours of operation (in tenths of an hour) and natural gas consumption (in standard cubic feet). *{This term is more stringent than condition 1.8.2.2.c in the Plains End permit.}*

4. The Btu content of the natural gas used to fuel each RICE shall be verified semi-annually using the appropriate ASTM Methods or equivalent, if approved in advance by the Control Officer. The Btu content of the natural gas shall be based on the higher heating value of the fuel. Calculation of monthly emissions shall be made using the heat content derived from the most recent required analysis. *{This term is equivalent to condition 1.7 in the Plains End permit.}*

5. The ammonia injection rate to each SCR system shall be monitored and recorded daily when the RICE is operating. When performance testing is performed as required in Condition III.D.1, ammonia injection rate shall be recorded during the performance test event. *{This term is equivalent to condition 1.8.3 in the Plains End permit, except that references to portable monitoring are omitted because TEP will rely on continuous process monitoring rather than semiannual portable monitoring.}*

6. For each RICE, NO_X concentration at the SCR outlet shall be continuously monitored while the RICE is operating using the continuous process monitoring system required by Condition III.A.1.f. When performance testing is performed as required in Condition III.D.1, NO_X concentration at the SCR outlet as measured by the continuous process monitoring system shall be recorded during the performance test event. *{This term is proposed in lieu of condition 1.4.5 in the Plains End permit. We believe the proposed requirement for using the continuous process monitor is more robust and more stringent than the portable monitoring because both rely on monitoring using well-established methods other than reference method but the proposed monitoring for IGS will generate much more frequent readings.}*

III.C. RECORDKEEPING AND REPORTING REQUIREMENTS

1. On a monthly basis, the permittee shall monitor and make records of natural gas consumption in each RICE, in units of standard cubic feet, and heat input to each RICE, in units of Btu, separately for startup periods and for periods other than startup. *{This term is equivalent to condition 1.6 in the Plains End permit.}*

2. Except as provided below, the following NO_X emission factors have been approved by the Control Officer and shall be used to calculate emissions from each RICE: 0.02 lb per MMBtu heat input for non-startup periods, 10.3 lbs per cold catalyst startup event, and 3.5 lbs per warm catalyst or hot catalyst startup event. If the results of performance testing on any RICE show that the NO_X emission factor for non-startup periods for that RICE is greater than 0.02 lb per MMBtu heat input at any tested load,

and in the absence of subsequent testing results to the contrary (as approved by the Control Officer), the permittee shall apply for a modification to this permit to reflect, at a minimum, the higher emission factor within 60 days following the completion of the test. *{This term is more stringent than the first and third parts of condition 1.4.3 in the Plains End permit; the Plains End permit is silent as to how or whether startup emissions are taken into account.}*

3. On a monthly basis, for each RICE, the permittee shall calculate and record NO_X emissions using the monthly records of heat input during periods other than startup, the approved NO_X emission factor for non-startup periods for that RICE as established in Condition III.C.2, the number of startup events during the month, and the approved NO_X emission factor for each startup event as established in Condition III.C.2. *{This term is more stringent than the Plains End permit; the Plains End permit does not require emissions calculations for each RICE individually and is silent as to how or whether startup emissions are taken into account.}*

4. On a monthly basis, by no later than the 15^{th} day of each month, the permittee shall calculate and record total NO_X emissions for the ten RICE, both for the most recent month and as an annual sum calculated using data from the most recent month and the eleven immediately preceding months. *{This term is more stringent than the second part of condition 1.4.3 in the Plains End permit; the Plains End permit provides twice as long before the calculations must be completed and it is silent as to how or whether startup emissions are taken into account.}*

III.D. TESTING REQUIREMENTS

The Permittee shall use the following reference test methods to conduct performance tests for the specified pollutants when required:

1. Nitrogen Oxides (NO_X)

a. The permittee shall conduct NO_X performance testing of each RICE using the methods and procedures in 40 CFR § 60.4244 and Table 2 of 40 CFR part 60, subpart JJJJ. A performance test shall comprise three test runs at each required load. Tests shall be performed at 40, 70, and 100 percent of peak load or at a minimum and peak load capacity in the normal operating range of the engine. *{This term is more stringent than condition 1.9.1 in the Plains End permit; the Plains End permit does not require testing at multiple loads.}*

b. Each RICE shall be subjected to a performance test at least once during its first year of commercial operation. Thereafter, testing shall be conducted annually according the following schedule: The Permittee shall conduct performance tests of at least three RICE in each calendar year, and each RICE shall be subjected to a performance test no less frequently than once in each period of three consecutive calendar years. *{This term is more stringent than conditions 1.4.4 and 1.9.1 in the Plains End permit; the Plains End permit requires testing of each engine at a reduced frequency of once per five years rather than once per three years.}*