SOUTH TEXAS ELECTRIC COOPERATIVE, INC.

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July 31, 2014

U.S. Environmental Protection Agency, Region 6
Air Permits Section (6PD-R)
Ms. Kyndall Cox
Multimedia Planning and Permitting Division
1445 Ross Avenue
Suite 1200
Dallas, Texas 75202-2733

Re: Process and Operational Description

Dear Ms. Cox:

South Texas Electric Cooperative, Inc. (STEC) is providing this letter in response to EPA's July 21, 2014 phone request for a process flow diagram, process description and operational description to support our Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) construction permit application for a proposed Red Gate Power Plant near Edinburg, Texas. Please let us know if there are any comments on these documents.

EPA Request:

1. *Please provide a process flow diagram and process description for the proposed Red Gate Power Plant.*

STEC Response:

Please see attachment 1 (previously sent by email) for a process flow diagram.

The Red Gate Power Plant will be composed of twelve Wartsila 18V50SG is a nominal 18.76MW four-stroke, spark-ignition, lean burn reciprocating internal combustion engines in simple cycle (ENG01 through ENG12). The engines will be fueled by pipeline quality natural gas and will be connected to air cooled generators to produce electricity. During starts and stops, a small amount of natural gas will be vented to atmosphere (ENGVENT) during the double block and bleed process that prevents accumulation of natural gas in the engine due to valve leakage when the engine is offline. Natural gas fugitive from piping and equipment will be emitted from the facility. These natural gas fugitives are collectively referred to under the permit as "NGFUG."

Exhaust gases from the combustion of the natural gas in ENG01 through ENG12 will flow through a catalyst module containing both oxidation catalyst and selective catalytic reduction (SCR) catalyst. Aqua ammonia (19%) will be injected upstream of the catalyst module for the SCR. Fugitives from the ammonia injection piping will be emitted at the facility. The ammonia fugitive emissions are collectively referred to in the permit as "NH_3FUG."

Auxiliaries will include a fire pump driven by a diesel-fueled engine (FP01), a diesel fuel blackstart generator (GEN01), radiators for closed-cycle cooling of the engines and auxiliaries, electrical switchgear, electrical motor-control centers, lubricating oil storage facilities, and aqua ammonia storage facilities.

EPA Request:

2. Please provide a description of how the proposed facility will be operated.

STEC Response:

South Texas Electric Cooperative, Inc. (STEC) has proposed the Red Gate Power Plant consisting of 12 Wartsila 18V50SG reciprocating engines capable of producing a combined 220MW of power. The Wartsila 18V50SG is a nominal 18.76MW four-stroke, spark-ignition, lean burn reciprocating internal combustion engine that is well suited to the demands of the energy only Energy Reliability Council of Texas (ERCOT) market. The engines will be used to provide renewable support, transmission grid support, energy and ancillary services to meet its eight member distribution cooperatives' energy and capacity needs as well as to support the ERCOT grid.

Renewable Support
The influx of renewable energy into the ERCOT market and the variability associated with renewable technologies, such as wind and solar, put increased demands on grid stability. Larger baseload units are unable to respond adequately to the large swings in generation caused by connection of large quantities of renewables to the grid. Fast ramping, quick starting, gas reciprocating engines stabilize this volatility and enable the grid to handle the increase renewable profile. ERCOT has recognized this need and increased the amount of responsive reserve and regulation resources that are needed to support grid operations. This trend is expected to continue, as more renewables are needed to meet proposed greenhouse gas reduction targets under the current administrations proposed Clean Power Plan.

Transmission Grid Support
Resources are dispatched considering possible transmission grid contingencies as well as the economic offer curves of the generators. This analysis is frequently termed "n-1 contingency analysis" and considers the loss of the next line element, transformer, or generator. If possible, generators are dispatched in such a way as to mitigate potential contingencies or alleviate

realized transmission issues (e.g. overloading, voltage support). For this reason, a unit that may not normally be dispatched due to economics may run for grid reliability reasons.

Energy

The Wartsila 18V50SG provides the highest simple cycle efficiency of any combustion engine in the world. Although combined cycles typically provide higher peak efficiency, longer startup times typically where the unit may be a low load levels, and partial loading due to larger unit sizes significantly impact overall efficiency. Small but efficient units, such as the ones proposed for the Red Gate plant, mean efficiency can be maintained over a much broader range of output levels on a combined plant basis. This translates into lower emissions and better annual efficiency compared to comparably sized combined cycle units with no compromise in performance or flexibility.

Ancillary Services

Load serving entities are required to procure their load ratio share of ancillary services to support reliable grid operation. These services include responsive reserve, regulation up, regulation down, and non-spinning reserve and may be purchased on the market or self-provided. Quick start capability along with fast ramp rates and good part-load efficiency are essential qualities for units providing ancillary services. Since these services are awarded and paid on a capacity basis even if the service is not dispatched in real-time, they may artificially lower the energy cost and increase the dispatch of flexible simple cycle units, such as those proposed for Red Gate.

STEC is forecasting that the engines' high efficiency and exceptional flexibility, combined with dispatch from ERCOT for ancillary services and transmission support will lead to dispatch levels that are considerably higher than other comparably sized simple cycle facilities.

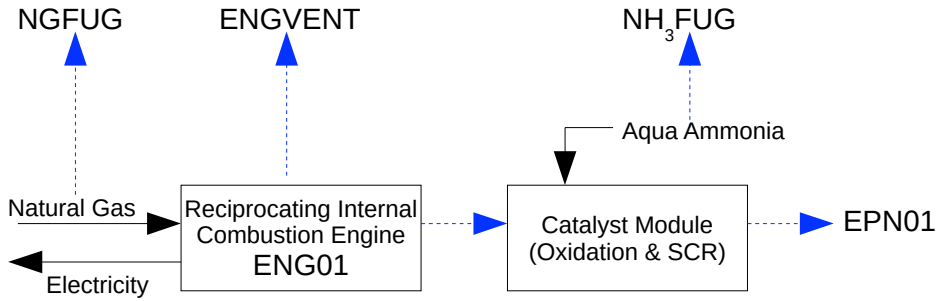
Please contact me at japackard@stec.org or 361.485.6320 if you have any questions or need additional information.

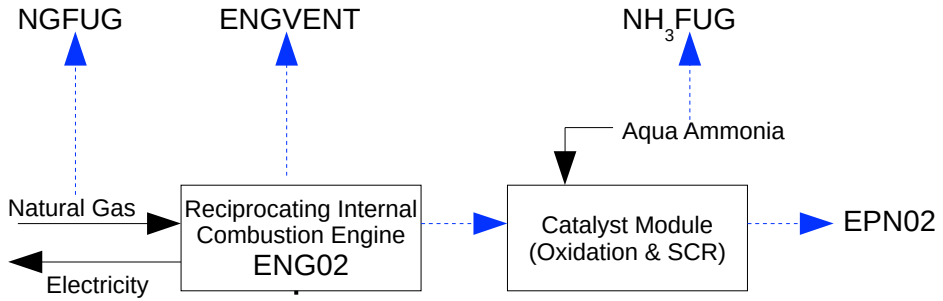
Sincerely,

John Packard
Manager of Generation

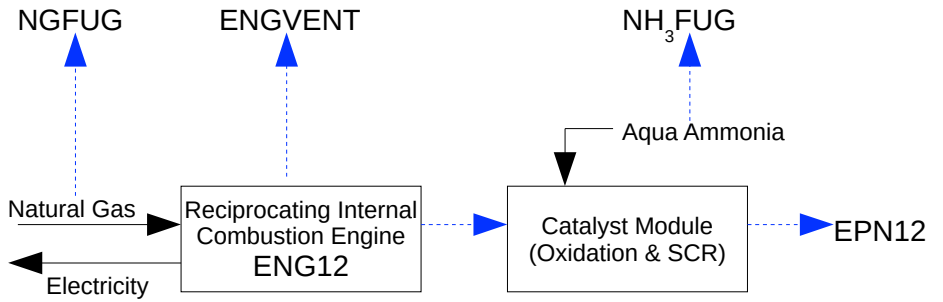
Attachments

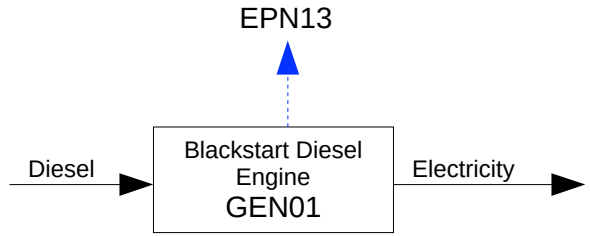
Cc: Mike Lehr, Leidos
Andrea Adams, Leidos

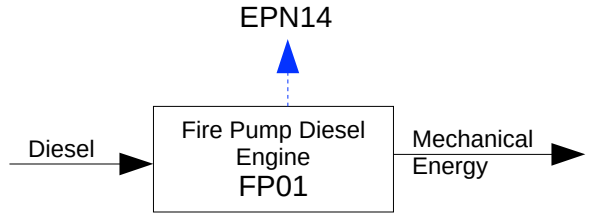


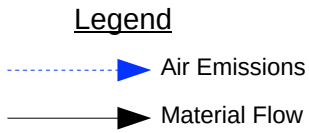


Typical ENG03 through ENG11









South Texas Electric Cooperative, Inc.
Red Gate Power Plant
Hidalgo County, TX

Process Flow Diagram

July 28, 2014