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DUFF&PHELPS

December 5, 2008

Texas Commission on Environmental Quality
Attention: Docket Clerk
TCEQ Office of Chief Clerk MC 105
P.O. Box 13087
Austin, Texas 78711-3087

Subject: Response to the appeal of the Executive Director's Use Determination (07-11971), regarding Borger Energy Associates; TCEQ Docket Nos. 2008-0832-MIS-U

Dear Commissioners:

Pursuant to Title 30 of Chapter 17 of the Texas Administrative Code, the Applications under appeal were prepared using the Texas Commission on Environmental Quality's ("TCEQ's") Application for Use Determination for Pollution Control Property (TCEQ-0611). For these Tier IV applications, the subject pollution control property included in the application is listed on the TCEQ's Equipment & Categories List ("ECL"), and is identified and summarized as follows:

Cogeneration Gas Turbine Plant Heat Recovery Steam Generators ("HRSG") and Supporting Systems: (ECL:B-8)

Pertinent Rule(s), Regulation(s) or Law(s):
40 CRF Part 60 Subparts DA and DB, NOx Limits for Electric Utility Steam Generating Units and Industrial commercial Institutional Steam Generating Units for New Source Performance Standards ("NSPS")

TAC Rule 106.512, Standard Permit for electric Generating Units (EGU)

Note: Permits issued under Texas Clean Air Act's Health & Safety code Sections 382.011, applies to all electric generating units that emit air contaminants, regardless of size, and it is to reflect Best Available Control Technology ("BACT") for electric generating units on an output basis in pounds of NOx per megawatt hour, adjusted to reflect a simple cycle power plant.

BACKGROUND

Texas Pollution Prevention Issue

Currently in the U.S. two thirds of the potential energy of fossil fuels burned to generate electricity in traditional fossil-fired steam boilers is lost in the form of waste heat released into the atmosphere or surface waters located near these facilities. Traditional U.S. power generation plant efficiencies have not increased since the 1950's and more than one fifth of the U.S. power plant designs are more than 50 years old. These power generation facilities are the leading contributors to U.S. emissions of carbon dioxide, NO_x, sulfur dioxide, and other contaminants into the air and water due to facility operations.

Combined Heat and Power Technology Background

Innovative power systems such as combined cycle technology, and combined heat and power ("CHP") generation, offer enormous potential to reduce the environmental impacts of power generation through the reduction and/or prevention of air emissions to the environment through the efficient use of fossil fuel. CHP is best thought of as a system, rather than a specific technology or device for efficient use of the inherent chemical energy within fossil fuels such as natural gas. Texas leads the nation in CHP applications, with 23% of all U.S. CHP capacity located in Texas.[1] This CHP capacity produces 20% of the electricity used in Texas.[2]

The U.S. EPA defines cogeneration or CHP, as the simultaneous production of electricity and heat from a single fuel source, such as the natural gas used in the subject plant, Blackhawk Cogeneration Facility. Use of the otherwise wasted heat in the combustion turbine exhaust gas results in a higher plant-wide thermal efficiency compared to other combustion-based technologies. As well, state-of-the-art combined-cycle plants can convert about 50 percent of the chemical energy of natural gas into electricity (HHV basis). CHP systems' capture and use of waste heat allows them to achieve plant-wide fuel efficiencies between 60% and 90%.

The two most common CHP system configurations are:

- Gas turbine or engine with heat recovery unit
- Steam boiler with steam turbine

Gas turbine CHP systems, like the subject plant, Blackhawk Cogeneration Facility, generate electricity by burning a fossil fuel and then use a heat recovery unit to capture heat from the combustion system's exhaust stream. This heat is converted into useful thermal energy, usually in the form of steam or hot water. Per the US EPA, CHP plays an important role in meeting the US energy needs. As well, it reduces the environmental impacts of power generation because of both its fuel efficiency benefits in producing more energy output per pound of fuel burned, and in the resulting reduction in air emissions due to less fuel burned for the same energy output.

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[1] US DOE, Energy Information Agency (EIA), 2005 Data.
[2] IBID.

RESPONSE TO PETITION

We concur with the Texas Commissions Executive Use Determination letter received May 1st, 2008 whereby the outcome of their review resulted in a Use Determination as follows:

> **A 100% positive use determination for the two Heat Recovery Steam Generators. This equipment is considered to be pollution control equipment and was installed to meet or exceed federal or State regulations.**

To date, neither the Appellant nor subsequent Executive Director-assembled workgroups have produced any valid evidence or reasonable agreed-upon conclusions that would lead us to believe that the facts, technical merits, and conclusion of our Application for Use Determination of Pollution Control Property are not valid.

The Executive Director's new technical position released on December 3rd, 2008 where by their findings produce a positive use determination of 61% for the HRSG is not technically correct and promotes environmental loss.

We are appealing the TCEQ's Workgroup and Executive Director's Recommendation regarding the modified version of the calculation presented by Cummings Westlake pertaining to a reasonable use determination percentage for HRSGs. The percentage calculation for this use determination based upon thermal efficiency increases resulting from technology provided by Cummings Westlake, LLC is flawed for a number of reasons. First, it departs from the Decision Flow Charts. Ironically, the TCEQ staff leveled this same change with regard to the application we originally submitted. Second, the calculation of a 39% increase in thermal efficiency is based upon all of the back-end equipment components of the plant contributing to the overall process, not just simply the HRSG - hence misappropriating efficiency and pollution control benefits to other items of machinery and equipment not currently identified on Part A or Part B of the ECL. Third, this very simplified calculation significantly underestimates the efficiency and pollution control contribution resulting from the HRSG as evidenced by the output based calculations provided in our application.

Finally, the most significant flaw in the Cummings Westlake calculation of the positive use determination is that it is contrary to public policy and to the purpose of H.B. 3732. Simple logic will prove that it would be inappropriate to provide a benefit based upon the reasoning provided in the Cummings Westlake calculation. By adopting this approach, it is inferred that there is an inverse relationship between thermal efficiency and pollution control. Assume that the efficiency increase was only 20% instead of 39%, then by the methodology set forth by the Cummings Westlake approach, there would be a resulting 80% positive use determination for the HRSG. Conversely, if there was a 60% increase in efficiency, as opposed to the 39%, then the positive use determination would be dramatically reduced to only 40%. This approach would hinder the advancement of clean energy projects through better efficiencies by penalizing the owner with a lower tax exemption percentage, which is clearly contrary to the intent of H.B. 3732.

Appellant: **I. Property Description**

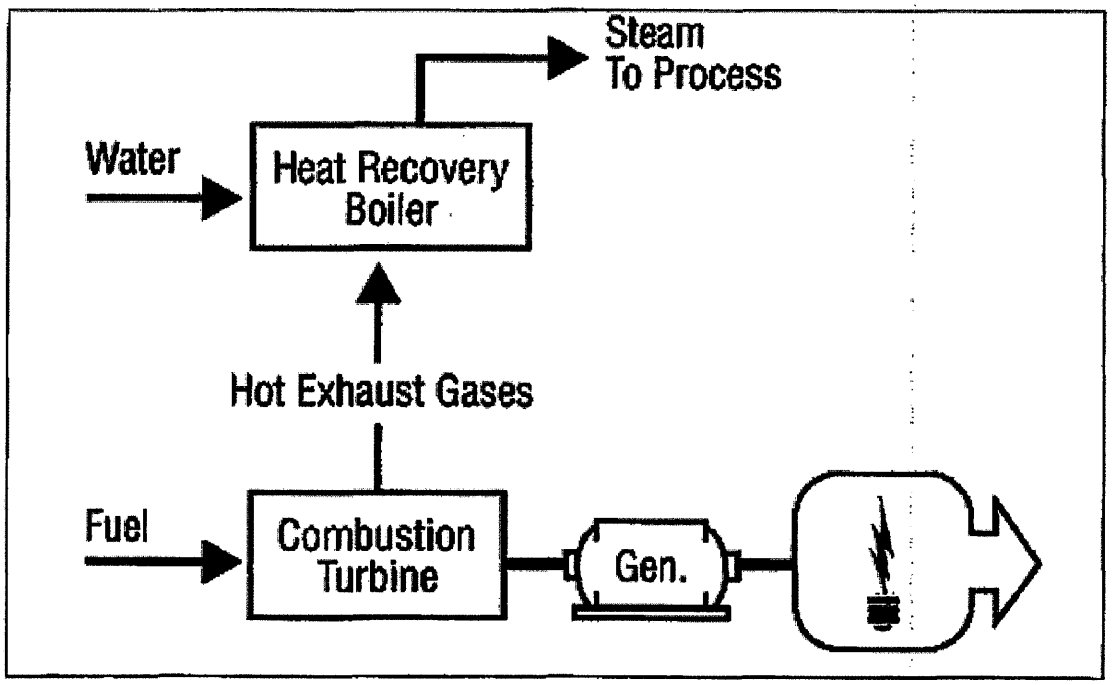
See Attached (Exhibit A)

Response: **I. Property Description**

The Blackhawk Cogeneration Facility is a 225 MW cogeneration facility located in Borger, Texas owned by Borger Energy Associates LP. Blackhawk Station's design incorporates two Siemens 501D5A gas turbines, and two Deltak HRSGs. The exhaust from the two combustion turbines is directed to the HRSGs where the thermal energy in the exhaust gases is recovered to generate steam. The HRSGs found in the Blackhawk Cogeneration Facility are therefore, in simple terms, heat exchangers that recover heat from a hot gas stream for reuse versus release into the atmosphere. A common application for an HRSG is in a cogeneration power station, where hot exhaust from a gas turbine is fed to an HRSG to generate steam which can be sold directly to a steam host.

The high pressure steam produced in the HRSGs is exported to the adjoining Wood River Borger Refinery. Natural gas serves as the fuel for each gas turbine. Use of the otherwise wasted heat in the turbine exhaust gas results in higher plant thermal efficiency compared to other power generation technologies employed in Texas.

The Figure below is representative of a simplified CHP plant process flow, similar to the Blackhawk Cogeneration Facility.



Appellant: **II. Rule Change**

See Attached (Exhibit A)

Response: **II. <u>Proposition 2 Expansion for Additional Pollution Control Devices</u>**

Under the legislation of Texas House Bill 3732 ("HB3732") enacted in 2007, Section 11.31 of the Texas Tax Code is amended by adding certain plant equipment and systems to the current list of air, water, or land pollution control devices. Specifically, the language reads as follows:

> *SECTION 4. Section 11.31, Tax Code, is amended by adding Subsections (k), (l), and (m) to read as follows:*
> *(k) The Texas Commission on Environmental Quality shall adopt rules establishing a nonexclusive list of facilities, devices, or methods for the control of air, water, or land pollution, which* ***must*** *include:*
> *(1) coal cleaning or refining facilities;*
> *(2) atmospheric or pressurized and bubbling or circulating fluidized bed combustion systems and gasification fluidized bed combustion combined cycle systems;*
> *(3) ultra-supercritical pulverized coal boilers;*
> *(4) flue gas recirculation components;*
> *(5) syngas purification systems and gas-cleanup units;*
> *(6) enhanced heat recovery systems;*
> *(7) exhaust heat recovery boilers;*
> *(8) heat recovery steam generators;*
> *(9) superheaters and evaporators;*
> *(10) enhanced steam turbine systems;*
> *(11) methanation;*
> *(12) coal combustion or gasification byproduct and coproduct handling, storage, or treatment facilities;*
> *(13) biomass cofiring storage, distribution, and firing systems;*
> *(14) coal cleaning or drying processes, such as coal drying/moisture reduction, air jigging, precombustion decarbonization, and coal flow balancing technology;*
> *(15) oxy-fuel combustion technology, amine or chilled ammonia scrubbing, fuel or emission conversion through the use of catalysts, enhanced scrubbing technology, modified combustion technology such as chemical looping, and cryogenic technology;*
> *(16) if the United States Environmental Protection Agency adopts a final rule or regulation regulating carbon dioxide as a pollutant, property that is used, constructed, acquired, or installed wholly or partly to capture carbon dioxide from an anthropogenic source in this state that is geologically sequestered in this state;*
> *(17) fuel cells generating electricity using hydrogen derived from coal, biomass, petroleum coke, or solid waste; and*
> *(18) any other equipment designed to prevent, capture, abate, or monitor nitrogen oxides, volatile organic compounds, particulate matter, mercury, carbon monoxide, or any criteria pollutant.*
> *(l) The Texas Commission on Environmental Quality by rule shall update the list adopted under Subsection (k) at least once every three years. An item may be removed from the list if the commission finds compelling evidence to support the conclusion that the item does not provide pollution control benefits.*

> *(m) Notwithstanding the other provisions of this section, if the facility, device, or method for the control of air, water, or land pollution described in an application for an exemption under this section is a facility, device, or method included on the list adopted under Subsection (k), the executive director of the Texas Commission on Environmental Quality, not later than the 30th day after the date of receipt of the information required by Subsections (c)(2) and (3) and without regard to whether the information required by Subsection (c)(1) has been submitted, shall determine that the facility, device, or method described in the application is used wholly or partly as a facility, device, or method for the control of air, water, or land pollution and shall take the actions that are required by Subsection (d) in the event such a determination is made.*

Based upon the amended language of Section 11.31 of the Texas Tax Code, it is clear that the enumerated facilities, devices or methods must be considered in whole, or in part, as pollution control facilities, devices or methods by the TCEQ; the TCEQ must treat the enumerated facilities, devices or methods as eligible, in whole or in part, for property tax exemption as pollution control property; and finally, such eligibility for tax exemption must be based upon a methodology to be established by the TCEQ. Therefore, in response to the concern raised by the appellant, it is our contention that the HRSGs embedded within the CHP system of the subject plant are to be treated as qualifying pollution control facilities, devices or methods, and are no longer to be considered solely within the context of a power/steam generation use.

TCEQ's updated ***"Tax Relief for Pollution Control Property – Application Instructions and Equipment and Categories List – Effective January 2008"*** incorporates a list of the pollution control property categories adopted and set forth in TTC Sec. 26.045(f). Item B-8 of the ECL – Part B lists Heat Recovery Steam Generators (HRSGs).

As required in these instructions, the taxpayer, in its Tier IV application, supplied a pollution control percentage for the equipment listed in Part B via calculations demonstrating pollution control, prevention and/or reductions achieved by the listed equipment or systems, i.e., the subject facility's HRSGs. The subject facility received a 100% property tax exemption from the TCEQ for its HRSGs based upon the technical and statutory positions represented in the facility's application dated Mach 27, 2008.

Current Regulatory Authority for Output Based Emissions Standards

Consideration of the use of output based emissions standards, as is now incorporated within the U.S. EPA's New Source Performance Standards ("NSPS") for NO_x, are gaining importance for a reason: by determining emission levels based upon the amount of electricity and or thermal energy generated, output based standards support improved efficiency and pollution prevention without regard to the type of fuel or technology used to achieve that improvement. The use of innovative methods of power generation such as combined cycle and CHP reduces fossil fuel use and leads to multi-media reductions in the environmental impacts of the production, processing transportation, and combustion of fossil fuels. Reducing fossil fuel combustion is a pollution prevention measure that reduces emissions of all products of combustion, not just the target pollutant of a regulatory program.

Appellant: **III. Compliance**

See Attached (Exhibit A)

Response: **III. Compliance**

The basis by which the taxpayer represented the percentage of tax exemption eligibility for the HRSGs utilized an output-based emissions philosophy to demonstrate the level of emissions avoidance, or reduction, achieved by incorporating the CHP system approach within the Facility's operations. Emissions reductions, as represented by NO_x emissions reductions achieved through fuel consumption savings, represents the pollution control or prevention purpose of the CHP system. For simplicity, NO_x emissions were chosen; additional emissions reductions for SO_2, CO_2, etc., were also available.

Currently, the subject facility's input based NOx emissions standard, as represented in data provided by the taxpayer, does not recognize the subject facility for its fuel consumption savings and resulting emissions reductions. By establishing the amount of reduction found by using output based annual emissions versus input-based standards and multiplying this amount by the subject facility's historical costs, we were able to derive a surrogate for the subject plant's capital costs dedicated to additional NOx emissions avoidance, above the historically granted pollution control exemptions recognized on prior TCEQ Tier I or II application reviews. As this value was equal to or greater than the historical cost of the equipment item established on the ECL – Part B, it was considered to be eligible for 100% tax exemption status.

The subject appeal requests that the 100% tax exemption status granted under the methodology demonstrated be vacated and that the technical presumption that the HRSGs are major components of electrical and/or steam production be the only measure of equipment contribution to the subject facility's performance. This argument has ignored the broader policy-driven mandate established in Texas to support and further efficiency in fuel consumption in the state as a measure of pollution control. It also ignores the presentation of fact - made earlier within this rebuttal - that CHP is recognized by the U.S. EPA, by the state of Texas, and in most industry applications currently using such systems have resulted in the prevention and/or reduce air pollution in the State under an output based emissions standard.

Appellant: **IV. Limitations**

See Attached (Exhibit A)

Response: **IV. Limitations**

Pollution control percentages greater than 100% is not a flawed calculation; the breakpoints for facility-wide contributions versus equipment-specific contributions should be made relative to the necessary balance-of-plant systems and equipment supportive of the HRSGs in the subject facility. We agree with the appellant that the entire balance of plant equipment that supports the HRSG, e.g., the steam condensing systems, circulating water systems, chemical treatment systems etc., are completely intertwined and necessarily included within the plant-wide calculation of fuel efficiency and emissions reductions for CHP and combined cycle systems.

Therefore, although all such systems and equipment would more appropriately be identified as tax exempt for its emissions prevention capabilities, it can be inferred that the Texas Legislature judiciously considered the two major pieces of equipment within the Combined Cycle and CHP systems - HRSGs and enhanced steam turbine systems - and enumerated them specifically in the equipment list that ultimately exists in the final statute for tax exemption consideration. It is therefore the taxpayer's contention that such equipment's 100% exempt status represents that portion of the entire balance of plant CHP systems eligible for exemption and the remaining portion of the subject plant remain taxable for property tax considerations.

Appellant: **V. Conclusions**

See Attached (Exhibit A)

Response: **V. <u>Conclusions</u>**

As stated in the sections above, it is the taxpayer's continued belief, as demonstrated through the Avoided Emissions Approach presented in the attached Appendix, that the HRSGs found in the subject plant are 100% exempt from property tax under their definition as pollution control facilities, devices or methods within the statute established by the Texas Legislature, and that their eligibility as pollution control/pollution prevention devices may be measured through a calculation of emissions avoidance demonstrated within the calculations developed.

If you have any questions regarding the application or the information supplied with these application, please contact me at (512) 671-5580 or Ms. Kathy Tronsberg of Duff & Phelps LLC at (215) 430-6059.

Very truly yours,

Mr. Greg Maxim
Duff & Phelps LLC.

Enclosures

cc: Kathy Tronsberg (Duff & Phelps LLC - Philadelphia)
Rick Fine (Duff & Phelps LLC - Austin)

APPENDIX

Avoided Emissions Approach

This approach relies on thermal output differences by calculating the displacement of emissions associated with the thermal output and subtracting them from a baseline emission rate. These displaced emissions are emissions that would have been generated by the same thermal output from a conventional system. Greater energy efficiency reduces all air contaminant emissions, including the greenhouse gas carbon dioxide. Higher efficiency processes include combined cycle operation and combined heat and power (CHP) generation. For electric generation the energy efficiency of the process expressed in terms of MMBTU per Megawatt-hr. Lower fuel consumption associated with increased fuel conversion efficiency reduces emissions across the board – that is NOx, SOx, PM, hazardous air pollutants, and greenhouse gas emissions.

In calculating the percent exempt for the listed items from the ECL-Part B, Duff & Phelps LLC utilized an output based NOx allocation method for both Greenfield and Replacement power and heat generation. We looked at the various fossil fuel technologies in use today and chose the baseline facility to be a natural gas fuel-fired steam generator without waste heat recovery. The construction of the Blackhawk station and its ability to produce steam replaced some of the steam production generated by the boiler steam plant located at the Wood River Borger Refinery. With this in mind the baseline steam generation facility selected is a gas-fired industrial steam boiler operated without the thermal benefit of waste heat recovery similar to the equipment formerly operated by the refinery. Duff & Phelps LLC benchmarked this conventional generation to the subject natural gas-fired cogeneration equipment at the Facility. By doing so, we narrowed the heat rate factors as much as possible to be conservative and uniform in modeling. The benchmark heat rate factor is the following:

- Natural Gas-Fired Turbine and Industrial Steam Boiler: **8,864 BTU's/kWh**

This heat rate baseline purposely omits other fossil fuel source in order to eliminate impurities typed characteristics, which in turn eliminated the NOx emission and cost of control differences of each fossil fuel and generator type. Comparing the emissions impacts of different energy generation facilities is easy and clear when emissions are measured per unit of useful energy output. For the purpose of our calculations, we converted all the energy output to units of MWh (1 MWh = 3.413 MMBtu), and compared the total emission rate to the baseline facility.

The comparison steps to calculate the NOx reduction are as follows:

A. Plant Input Factors

Input-based Limit = 0.0551 lbs NOx/MMBtu
Unit Design Capacity = 225 MW
Capacity Factor = 78.5 Percent
Baseline/Replacement Plant Heat Rate = 8,864 Btu/kWh
Subject Plant Heat Rate = 7,781 Btu/kWh

B. Calculation

Step 1 – Subject Plant

$$\frac{(\text{Input Based Limit}) \times (\text{Heat Rate})}{1{,}000{,}000\ \text{Btu}} \times 1{,}000\ \text{kWh/MWh} = \text{Output : lbs NOx/MWh}$$

Step 2 – Subject Plant

$$\frac{(\text{Output}) \times (\text{Unit Design Capacity MW}) \times (\text{Capacity Factor}) \times (365\ \text{Days}) \times (24\ \text{hrs/day})}{2{,}000\ \text{Tons}} = \text{Output : NOx Tons/Year}$$

Step 3 & 4 – Baseline Plant or Replacement Plant
Same as Step 1 and Step 2 (except use Baseline Heat Rate)

Step 5 – Percent NOx Reduction Calculation

$$\frac{(\text{Output Baseline}) - (\text{Output Subject})}{(\text{Output Subject})} \times 100 = \%\ \text{Reduction}$$

Step 6 – Percent NOx Reduction Calculation

(Total Subject Unit Cost) (% Reduction) = Capital Cost of NOx Avoidance

Step 7 – Percent Exempt Calculation

$$\frac{\text{Total Cost of NOx Avoidance}}{\text{Total Cost of HB 3732 Equipment}} \times 100 = \%\ \text{Exempt}$$

- If % Exempt is greater than 100 then HB 3732 Equipment is 100% Exempt
- If % Exempt is less than 100 then HB 3732 Equipment is partially exempt at the Step 7 calculation

EXHIBIT A

Concerning Eligibility of Heat Recovery Steam Generators
in the
Blackhawk Cogeneration Plant
for
Texas Commission on Environmental Quality
Proposition 2 - Property Tax Exemption Program

By: Charles Wayne Frazell P.E.

I. Property Description

Cogeneration power plants consist of one or more generators powered by industrial size jet engines. These engines can be fueled by most combustible gas or liquids, but currently, most are fueled by natural gas. The hot exhaust from these engines is passed through a heat recovery steam generator (HRSG). A HRSG is essentially a boiler without the burners. The Blackhawk plant boilers create steam that is sold to a neighboring oil refinery.

II. Rule Change

The TCEQ rules were changed in response to the 2007 Texas Legislature HB 3732. The modified rules created the Part B List which includes Exhaust Heat Recovery Boilers (B-7) and Heat Recovery Steam Generators (B-8).

A HRSG is often added to recover exhaust gases to preheat water entering the boiler of a conventional boiler to improve efficiency, but, they are not the driving force behind the plant production. I believe that this is the type of application that was intended by the inclusion of B-7 and B-8 in the TCEQ Part B List.

III. Compliance

To some it will appear that the boiler that recovers the exhaust heat from the turbine engines qualifies as a pollution control item. This of course ignores the fact that this boiler is a major component of production. It was installed to produce steam to sell and not to reduce pollution. If the jet engines were not ducted to the boiler and burners were added, the HRSG side of the plant would operate as a conventional steam power plant. The Blackhawk plant uses burners to produce steam to sell when the jet engines are down for repair. It is not the boiler that reduces the pollution. Ducting the hot gases from the jet engine(s) reduces the pollution by reducing the need for an additional heat source (burners).

As a general rule when a component for pollution control is removed, there is little or no loss in production. For example, when a catalytic converter is removed from an engine it still produces the same horsepower. If electronic precipitators are removed from the exhaust of a coal-burning power plant, it still produces the same amount of electricity.

If the boiler is removed from a cogeneration power plant, there is no steam produced. Since removal of this component eliminates production of a product (steam), this boiler is primarily production equipment. It is not a pollution control device.

In 1992 the people of Texas voted and approved Proposition 2 creating the current environmental tax exemption. The ballot read "The constitutional amendment to promote the reduction and encourage the preservation of jobs by authorizing the exemption from ad valorem taxation of real and personal property **used for the control of air, water, or land pollution**." These boilers are used for production and not to control pollution. I believe the majority of the people would have voted **"NO"** on this proposition, if they thought it would include production equipment that produces INCOME and is not MANDATED by law!

IV. Limitations

A detailed description of what will be exempted needs to be provided to the appraisal district and not just identifying the HRSG. If the HRSG is found to be pollution control equipment, where is the limit? Do we also include the deaerator, the condenser, the pumps and all of the other steam piping and equipment which is installed to produce INCOME? Should we also exempt the plant lighting since this yields fewer emissions than if they had gas lamps? Although there are safety and convenience reasons for electric lighting, the primary reason for their installation is economics - not pollution control.

The primary reason for building a cogeneration power plant is economics and not pollution control. If the gas turbine is removed, then all you need is a set of burners and an intake fan to have the same production on the steam side. Since this type of boiler is a major component of production, it is not pollution control equipment. Only the ducting that conducts the exhaust heat from the gas turbine to the boiler should receive a 100% exemption.

V. Conclusions

. The Texas Commission on Environmental Quality TCEQ rule changes in response to the 2007 Texas Legislature HB 3732 that created the new Part B non-exclusive list was intended to clarify pollution control devices not previously recognized. There was no mention of including equipment that is in place for producing a product.

The boiler in a cogeneration power plant is installed to produce steam to sell rather than to reduce pollution and does not qualify for a 100% tax exemption. **Therefore, I respectfully request that no Use Determination be granted for the primary boiler (HRSG) of any cogeneration power plant**. Thank you for your favorable consideration.