Texas Commission on Environmental Quality
INTEROFFICE MEMORANDUM

TO: Office of Chief Clerk DATE: December 29, 2014

FROM: Jennifer J. Furrow
Staff Attorney
Environmental Law Division

SUBJECT: Backup Documents Filed for Consideration of Hearing Requests at Agenda

Applicant: Indeck Wharton, LLC
Proposed Permit No.: New Source Review Authorization Nos. 111724 and PSDTX1374
Program: Air
Docket No.: TCEQ Docket No. 2014-0847-AIR

Enclosed please find a copy of the following documents for inclusion in the background material for this permit application:

- The summary of the technical review of the permit application.
- The modeling audit for the permit.
- The compliance summary of the applicant.
- The final draft permit (MAERT, special conditions, and preliminary determination summary for the permit application).

Construction Permit
Source Analysis & Technical Review

Company	**Indeck Wharton, LLC**	Permit Number	**111724 and PSDTX1374**
City	**Danevang**	Project Number	**194920 and 195710**
County	**Wharton**	Account Number	**N/A**
Project Type	**Initial**	Regulated Entity Number	**RN106844137**
Project Reviewer	**Mr. Sean O'Brien**	Customer Reference Number	**CN604350280**
Site Name	**Indeck Wharton Energy Center**		

Project Overview

Indeck Wharton, L.L.C. proposes to install three new natural gas fired combustion turbine generators (CTGs). The CTGs will either be the General Electric 7FA (~214 MW each) or the Siemens SGT6-5000F (~227 MW each), operating as peaking units in simple cycle mode.

Emission Summary

	Proposed Allowable Emission Rates (tpy)	
Air Contaminant	**GE 7FA Option**	**Siemens 5000F Option**
$PM/PM_{10}/PM_{2.5}$	111.1	112.9
VOC	58.3	108.1
NO_x	811.7	949.4
CO	624.1	894.1
SO_2	82.5	90.6

Compliance History Evaluation - 30 TAC Chapter 60 Rules

A compliance history report was reviewed on:	**5/1/2014**
Compliance period:	**8/31/2013-9/1/2008**
Site rating & classification:	**Unclassified**
Company rating & classification:	**Unclassified**
If the rating is 50<RATING<55, what was the outcome, if any, based on the findings in the formal report:	**n/a**
Has the permit changed on the basis of the compliance history or rating?	**no**

Public Notice Information - 30 TAC Chapter 39 Rules

Rule Citation	Requirement	
39.403	Date Application Received:	**June 18, 2013**
	Date Administratively Complete:	**July 11, 2013**
	Small Business Source?	**No**
	Date Leg Letters mailed:	**July 11, 2013**
39.603	Date Published:	**8/7/2013**
	Publication Name:	***El Campo Leader-News***
	Pollutants:	**nitrogen oxides, carbon monoxide, sulfur dioxide, particulate matter including particulate matter with diameters of 10 microns or less and 2.5 microns or less, organic compounds and hazardous air pollutants.**
	Date Affidavits/Copies Received:	**9/3/2013**
	Is bilingual notice required?	**Yes but no newspaper found**
	Language:	
	Date Published:	
	Publication Name:	

Rule Citation	Requirement	
	Date Affidavits/Copies Received:	
	Date Certification of Sign Posting / Application Availability Received:	**9/23/2013**
39.604	Public Comments Received?	**No**
	Hearing Requested?	**No**
	Meeting Request?	
	Date Response to Comments sent to OCC:	
	Consideration of Comments:	
	Is 2nd Public Notice required?	**Yes**
39.419	Date 2nd Public Notice/Preliminary Decision Letter Mailed:	
39.413	Date Cnty Judge, Mayor, and COG letters mailed:	
	Date Federal Land Manager letter mailed:	
39.605	Date affected states letter mailed:	
39.603	Date Published:	
	Publication Name:	
	Pollutants:	
	Date Affidavits/Copies Received:	
	Is bilingual notice required?	
	Language:	
	Date Published:	
	Publication Name:	
	Date Affidavits/Copies Received:	
	Date Certification of Sign Posting / Application Availability Received:	
	Public Comments Received?	
	Meeting Request?	
	Date Meeting Held:	
	Hearing Request?	
	Date Hearing Held:	
	Request(s) withdrawn?	
	Date Withdrawn:	
	Consideration of Comments:	
39.421	Date RTC, Technical Review & Draft Permit Conditions sent to OCC:	
	Request for Reconsideration Received?	
	Final Action:	
	Are letters Enclosed?	

Construction Permit & Amendment Requirements - 30 TAC Chapter 116 Rules

Rule Citation	Requirement	
116.111(a)(2)(G)	Is the facility expected to perform as represented in the application?	**Yes**
116.111(a)(2)(A)(i)	Are emissions from this facility expected to comply with all TCEQ air quality Rules & Regulations, and the intent of the Texas Clean Air Act?	**Yes**
116.111(a)(2)(B)	Emissions will be measured using the following method:	**CEMS for NOx and CO. Emission calcs based on fuel flow for other pollutants**
	Comments on emission verification:	
116.111(a)(2)(D)	Subject to NSPS?	**Yes**
	Subparts **A** & **IIII, KKKK**	
116.111(a)(2)(E)	Subject to NESHAP?	**No**
	Subparts &	
116.111(a)(2)(F)	Subject to NESHAP (MACT) for source categories?	**Yes**
	Subparts **A** & **ZZZZ**	
116.111(a)(2)(H)	**Nonattainment review applicability:** N/A – located in attainment county	
116.111(a)(2)(I)	**PSD review applicability:** Yes, PSD triggered for NOx, CO, VOC, PM, PM10, PM2.5, and SO2	
116.111(a)(2)(L)	Is Mass Emissions Cap and Trade applicable to the new or modified facilities?	**No**
	If yes, did the proposed facility, group of facilities, or account obtain allowances to operate:	**n/a**
116.140 - 141	Permit Fee: $ **75,000** Fee certification:	**R330438**

Title V Applicability - 30 TAC Chapter 122 Rules

Rule Citation	Requirement
122.10(13)	**Title V applicability:** The site is a major source and will be required to get a SOP.
122.602	**Periodic Monitoring (PM) applicability:** Periodic monitoring is applicable because the site is a major source subject to 30 TAC Chapter 122. Periodic monitoring in the form of quarterly visible emissions/opacity observations; maintaining records showing the sulfur content of diesel fuel fired in the emergency generator and fire water pump and the hours of operation of these facilities; continuous monitoring of natural gas consumption for the CTGs; and continuous emissions monitoring of NOx and CO for the CTGs are used to demonstrate compliance with the permit limits.
122.604	**Compliance Assurance Monitoring (CAM) applicability:** The site has no control devices; therefore, CAM is not applicable.

Request for Comments

Received From	Program/Area Name	Reviewed By	Comments
Region:	**12**	**Irene Tucker**	**Minor corrections**
City:	**Danevang**		
County:	**Wharton**		
Toxicology:			
Compliance:			
Legal:			
Comment resolution and/or unresolved issues:			

Process/Project Description

Indeck Wharton, L.L.C. proposes to install three new natural gas fired combustion turbine generators (CTGs). The CTGs will either be the General Electric 7FA (~214 MW each) or the Siemens SGT6-5000F (~227 MW each), operating as peaking units in simple cycle mode. Each turbine will be limited to 2,500 hours of operation per year.

Pollution Prevention, Sources, Controls and BACT- [30 TAC 116.111(a)(2)(C)]

In addition to a review of control technology for steady state operations, the best available control technology (BACT) analysis includes startup and shutdown emissions and the numerical emission limits in the draft permit reflect this analysis. Although the units may not meet the ppm by volume dry (ppmvd) limits during startup and shutdown, they will meet the mass emission limits (pounds per hour and tons per year) unless a separate limit was established, and startup and shutdown events will be limited by Special Condition Nos. 7 and 8. Typical startup and shutdown of the turbine are conducted in accordance with manufacturer's recommendations to minimize emissions and maximize efficiencies.

As part of the BACT review process, the Texas Commission on Environmental Quality (TCEQ) evaluates information from the Environmental Protection Agency's (EPA's) RACT/BACT/LAER Clearinghouse (RBLC), on-going permitting in Texas and other states, and the TCEQ's continuing review of emissions control developments.

<u>CTGs</u>

Nitrogen Oxides (NO_x):
Each CTG is gas fired and equipped with dry low-NO_x burners (DLN) to control NO_x emissions to 9 ppmvd at 15% O_2 during steady state operations. DLN is a combustion zone technology that pre-mixes fuel and air to reduce thermal NO_x formation without the need for water or steam injection. Since the CTGs are each limited to 2500 hours per year of operation, based on a rolling 12-month period, installing a selective catalytic reduction unit (SCR) would not be economically reasonable. Recently issued permits in Texas for peaking turbines include Tradinghouse (issued 2/7/14), Guadalupe Power Partners (issued 10/2/2013) and DeCordova (8/29/2013). The permits have a NO_x concentration limit of 9 ppmvd at 15% O_2. Therefore, the use of DLN to control NO_x emissions to 9 ppmvd at 15% O_2 is consistent with recently issued permits for similar facilities and is BACT for the CTGs.

Carbon Monoxide (CO):
With DLN (designed to increase oxidation of CO to CO_2) and operating the CTGs according to good combustion practices, CO emissions will be controlled to 9 ppmvd at 15% O_2 during steady state operations for the Siemens 5000F option and 4 ppmvd at 15% O_2 for the GE 7FA option. Since the CTGs are restricted to the annual operating hours specified in the paragraph above for NO_x, installing an oxidation catalyst would not be economically feasible. Recently issued peaking turbine permit in Texas have been issued at 9 ppmvd at 15% O_2. Therefore, the use of DLN and good combustion practices to control CO emissions to 9 ppmvd at 15% O_2 is consistent with recently issued permits for similar facilities and is BACT for the CTGs.

Volatile Organic Compounds (VOCs):
Through maintenance of optimum combustion conditions and practices and firing the CTGs with pipeline-quality natural gas, VOC emissions will be controlled to 1.4 ppmvd at 15% O_2 during steady state operations for the Siemens 5000F option and 1.0 ppmvd at 15% O_2 GE 7FA option. This meets BACT.

Particulate Matter ($PM/PM_{10}/PM_{2.5}$):
The CTGs will be fired with pipeline-quality natural gas. Pipeline-quality natural gas has very low ash and sulfur contents. This meets BACT.

Sulfur Compounds (SO_2/H_2SO_4):
Emissions of SO_2 and H_2SO_4 from the CTGs will occur from the oxidation of sulfur in the natural gas during combustion, with the majority of the sulfur converted to SO_2 and a small fraction converting to H_2SO_4. The CTGs will be fired with pipeline-quality natural gas with a sulfur content not exceeding 0.2 grain sulfur per 100 dry standard cubic feet, which will minimize the formation of SO_2 and H_2SO_4. This meets BACT.

Turbine Planned Maintenance, Startup, and Shutdown (MSS):
During periods of planned MSS, control devices and process equipment are operated outside the optimal range they were designed to work most effectively, and it is technically infeasible to meet the primary BACT emission rates.

Therefore, secondary BACT limits are necessary during these periods to minimize emissions. BACT will be achieved by minimizing the duration of the MSS events (consistent with standard operating procedures) to minimize the amount of time the equipment is outside the optimal performance mode and meeting the emission limitations on the MAERT.

Also, planned MSS activities must be performed using good air pollution control practices and safe operating practices to minimize emissions.

Gas Line Heater

A small 3.0 MMBtu/hr natural gas-fired gas line heater is also proposed. Given the nature and quantity of emissions, no control is BACT.

Emergency Engines

An emergency generator and a firewater pump are proposed. BACT will be achieved through the installation of an engine which meets the requirements of 40 CFR 60, Subpart IIII. The engines will fire ultra low sulfur diesel fuel, containing no more than 15 parts per million (ppm) sulfur by weight. The emergency generator is limited to 500 hours of non-emergency operation per year. The firewater pump is limited to 26 hours per year of non-emergency operation per year.

Fugitive Emissions

The fugitive emissions include VOC from the natural gas fuel lines (EPN FUG). Given the nature and quantity of the emissions, no control is BACT.

Impacts Evaluation - 30 TAC 116.111(a)(2)(J)

Was modeling conducted?	**Yes**	Type of Modeling:	**AERMOD**
Will GLC of any air contaminant cause violation of NAAQS?			**No**
Is this a sensitive location with respect to nuisance?			**No**
[§116.111(a)(2)(A)(ii)] Is the site within 3000 feet of any school?			**No**
Additional site/land use information: rural			

Summary of Modeling Results

The air quality analysis (AQA) is acceptable for all review types and pollutants, as supplemented by the ADMT. The results are summarized below.

De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The De Minimis analysis modeling results for 24-hr and annual PM_{10}, 24-hr and annual $PM_{2.5}$ (NAAQS and Increment), and 1-hr and 8-hr CO indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr NO_2 De Minimis level. As explained in EPA guidance memoranda[1], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 NAAQS.

The applicant provided an evaluation of ambient $PM_{2.5}$ monitoring data, consistent with draft EPA guidance for $PM_{2.5}$[2], for using the $PM_{2.5}$ De Minimis levels. If monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the $PM_{2.5}$ De Minimis level, then the proposed project with predicted impacts below the De Minimis level would not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and does not require a full impacts analysis. See the discussion below in the air quality monitoring section for additional information on the evaluation of ambient $PM_{2.5}$ monitoring data.

While the De Minimis levels for both the NAAQS and increment are identical for $PM_{2.5}$ in the table below, the procedures to determine significance (that is, predicted concentrations to compare to the De Minimis levels) are different. This difference occurs because the NAAQS for $PM_{2.5}$ are statistically-based, but the corresponding increments are exceedance-based.

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (µg/m³)

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
PM_{10}	24-hr	1.19	5
PM_{10}	Annual	0.1	1
$PM_{2.5}$ (NAAQS)	24-hr	0.66	1.2
$PM_{2.5}$ (NAAQS)	Annual	0.1	0.3
$PM_{2.5}$ (Increment)	24-hr	1.19	1.2
$PM_{2.5}$ (Increment)	Annual	0.1	0.3
NO_2	1-hr	19.3	7.5
NO_2	Annual	1.8	1
CO	1-hr	363	2000
CO	8-hr	65.5	500

The 24-hr and annual $PM_{2.5}$ (NAAQS) and the 1-hr NO_2 GLCmax are based on the highest five-year averages of the maximum predicted concentrations determined for each receptor. The GLCmax for all other pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

1 www.epa.gov/nsr/documents/20100629no2guidance.pdf

2www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf

The applicant reported the 8-hr CO predicted concentration based on a weighted average of the maximum 8-hr predicted concentration under start-up conditions (weighted by 1/8) plus the maximum 8-hr predicted concentration under normal operating conditions (weighted by 7/8).

The applicant provided an evaluation of secondary $PM_{2.5}$ impacts that considers modeling results of the directly emitted $PM_{2.5}$ emissions, ambient background monitoring data representative for the project site, and proposed allowable emission rates of SO_2 and NO_x:

- Modeling results from the directly emitted $PM_{2.5}$ emissions are less than the De Minimis levels.
- Adding the modeling results from the directly emitted $PM_{2.5}$ emissions to representative background concentrations gives total concentrations well below the NAAQS.
- The proposed emissions of SO_2 are less than the Significant Emission Rate (SER) of 40 tons per year (tpy) and would not be expected to result in significant secondary formation of $PM_{2.5}$.
- The proposed emissions of NO_x are greater than the NO_x SER (40 tpy). Secondary $PM_{2.5}$ formation occurs as a result of chemical transformations that occur in the atmosphere gradually over time and only a portion of the NO_x emissions would be affected. Furthermore, secondary $PM_{2.5}$ formation from NO_x is unlikely to overlap in space or time with nearby maximum primary $PM_{2.5}$ impacts associated with the project sources.

In addition, the applicant determined that the Dona Park monitor (EPA AIRS monitor 483550034) is a representative monitor of the project site and considered a review conducted by the ADMT of available $PM_{2.5}$ speciation data to support the conclusions regarding secondary formation of $PM_{2.5}$. Over an eight-year period, on average, ammonium nitrate makes up 5.5 percent of the total 24-hr concentration and 3.4 percent of the total annual concentration. On average, over the last eight years of monitoring data, the maximum 24-hr and annual ammonium nitrate concentrations are 1.4 µg/m³ and 0.3 µg/m³, respectively. Given that the proposed NO_x emissions are a small fraction of the NO_x emissions in the air shed, and that the ambient monitoring data shows relatively small fractions of ammonium nitrate, secondary $PM_{2.5}$ formation from the proposed NO_x emissions would be expected to be considerably smaller than the monitored concentration of nitrates. The monitoring information supports the applicant's conclusion that the secondary $PM_{2.5}$ formation would not be expected to cause a NAAQS or Increment exceedance.

Air Quality Monitoring

The De Minimis analysis modeling results indicate that 24-hr PM_{10}, annual NO_2, and 8-hr CO are below their respective monitoring significance levels.

Table 2. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax (µg/m³)	Significance (µg/m³)
PM_{10}	24-hr	1.19	10
NO_2	Annual	1.8	14
CO	8-hr	65.5	575

The GLCmax for all pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant evaluated ambient $PM_{2.5}$ monitoring data to satisfy the requirements for the pre-application air quality analysis. Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480290059 located at 14620 Laguna Road, San Antonio, Bexar County. The applicant used a three-year average (2010-2012) of the 98th percentile of the annual distribution of the 24-hr concentrations for the 24-hr value (23 µg/m³). The applicant used a three-year average (2010-2012) of the annual mean concentrations for the annual value (9.3 µg/m³). The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 kilometers (km) of the project site and monitor location.

National Ambient Air Quality Standards (NAAQS) Analysis

The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The full NAAQS modeling results indicate the total predicted concentrations will not result in an exceedance of the NAAQS.

Table 3. Total Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m³)	Background (µg/m³)	Total Conc. = [Background + GLCmax] (µg/m³)	Standard (µg/m³)
NO_2	1-hr	135.6	37.7	173.3	188
NO_2	Annual	6.3	15.2	21.5	100

The 1-hr NO_2 GLCmax is the highest five-year average of the 98th percentile of the annual distribution of the daily maximum 1-hr predicted concentrations. The annual NO_2 GLCmax represents the maximum predicted concentration over five years of meteorological data.

The applicant reported the 1-hr NO_2 predicted concentration incorrectly. The ADMT supplemented this value based on the modeling output files.

Background concentrations for NO_2 were obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. The three-year average (2010-2012) of the 98th percentile of the annual distribution of the daily maximum 1-hr concentrations was used for the 1-hr value and the highest annual concentration from three years (2010-2012) was used for the annual value. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 4. PSD Ambient Air Quality Analysis for Ozone

Pollutant	Monitor	Averaging Time	Background (ppb)	Standard (ppb)
O_3	480391016	8-hr	72	75

A background concentration for ozone was obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. A three-year average (2010-2012) of the annual fourth highest daily maximum 8-hr concentrations was used in the analysis. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

EPA Region 6 has previously recommended a conservative analysis based on the NO_2 modeling to estimate the potential impacts on ozone levels. Considering that it takes time for the NO_2 emissions to react to generate ozone, an evaluation of maximum estimated NO_2 concentrations at a distance of 10-to-11 km downwind from the project source could be used to estimate the potential ozone impacts. EPA Region 6 has recommended that emission sources would have an average ozone yield of up to 2-3 ozone molecules per NO_2 molecule. The applicant used AERMOD to calculate a maximum 8-hr NO_x concentration for normal operations and startup operations at a distance of 10 km. The maximum 8-hr NO_x concentration of 0.44 parts per billion (ppb) at a distance of 10 km is based on one hour of startup operations and seven hours of normal operations in an eight hour duration. Assuming 90% conversion of NO_x to NO_2 and an ozone yield of three ozone molecules per molecule of NO_2, the 8-hr maximum predicted increase of ozone would be 1.3 ppb. Adding 1.3 ppb to the 8-hr ozone background of 72 ppb will result in a total 8-hr ozone concentration less than the 8-hr ozone NAAQS of 75 ppb.

Increment Analysis

The De Minimis analysis modeling results indicate that annual NO_2 exceeds the de minimis concentration and requires a PSD increment analysis.

Table 5 .Results for PSD Increment Analysis

Pollutant	Averaging Time	GLCmax (µg/m³)	Increment (µg/m³)
NO_2	Annual	6.3	25

The GLCmax represents the maximum predicted concentration over five years of meteorological data.

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Table 6. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	4.8	20.4
H_2SO_4	1-hr	0.36	1
H_2SO_4	24-hr	0.05	0.3

The justification for selecting the EPA's interim 1-hr SO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr SO_2 De Minimis level. As explained in EPA guidance memoranda[3], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr SO_2 NAAQS.

Table 7. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	1.37	7.8
SO_2	3-hr	2.53	25
SO_2	24-hr	0.6	5
SO_2	Annual	0.05	1

The 1-hr SO_2 GLCmax is based on the highest five-year average of the maximum predicted concentration determined for each receptor. The GLCmax for all other averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant reported the 3-hr SO_2 predicted concentration based on a weighted average of the maximum 3-hr predicted concentration under start-up conditions (weighted by 1/3) plus the maximum 3-hr predicted concentration under normal operating conditions (weighted by 2/3).

3 www.epa.gov/region07/air/nsr/nsrmemos/appwso2.pdf

The applicant reported the 24-hr SO_2 predicted concentration based on a weighted average of the maximum 24-hr predicted concentration under start-up conditions (weighted by 1/24) plus the maximum 24-hr predicted concentration under normal operating conditions (weighted by 23/24).

Table 8. Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m³)	Background (µg/m³)	Total Conc. = [Background + GLCmax] (µg/m3)	Standard (µg/m³)
Pb	3-mo	0.0005	0.011	0.0115	0.15

The GLCmax represents the maximum 1-hr predicted concentration over five years of meteorological data. Using the maximum 1-hr predicted concentration is a conservative representation of the 3-month rolling average.

The applicant did not provided an evaluation of ambient background concentrations for lead. The ADMT reviewed lead monitoring data in Harris County and used the monitor with the highest lead concentration as a conservative representation of background concentrations for Wharton County. A background concentration for lead was obtained from the EPA AIRS monitor 482011034 located at 1262 ½ Mae Drive, Houston, Harris County. The highest 24-hr concentration from 2013 was used as a conservative representation of the 3-month rolling average. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 9. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	ESL (µg/m³)
acetaldehyde 75-07-0	1-hr	0.41	15
acetaldehyde 75-07-0	Annual	0.001	45
acrolein 107-02-8	1-hr	0.05	3.2
acrolein 107-02-8	Annual	0.0002	0.15
arsenic & inorganic cpds 7440-38-2	1-hr	3.23×10^{-5}	3
arsenic & inorganic cpds 7440-38-2	Annual	1.3×10^{-7}	0.067
benzene 71-43-2	1-hr	0.63	170
benzene 71-43-2	Annual	0.002	4.5
cadmium & compounds (as Cd) NA	1-hr	3.59×10^{-6}	0.1
chromium metal 7440-47-3	1-hr	0.01	3.6
chromium metal 7440-47-3	Annual	3.5×10^{-5}	0.041
formaldehyde 50-00-0	1-hr	0.64	15

Pollutant & CAS#	Averaging Time	GLCmax (µg/m3)	ESL (µg/m3)
formaldehyde 50-00-0	Annual	0.002	3.3
mercury, alkyls 7439-97-6	1-hr	7.21×10^{-6}	0.1
naphthalene 91-20-3	1-hr	0.07	200
naphthalene 91-20-3	Annual	0.0003	50
nickel, metal & cpds 7440-02-0	1-hr	0.001	0.33
nickel, metal & cpds 7440-02-0	Annual	4.17×10^{-6}	0.059
polycyclic aromatic HC's, particulate, <10% b(a)p, not otherwise classified NA	1-hr	0.13	0.5
propylene oxide 75-56-9	1-hr	2.54	70
selenium oxide 7446-08-4	1-hr	0.0002	2
toluene 108-88-3	1-hr	0.26	640
toluene 108-88-3	Annual	0.001	1200
xylene mixture 1330-20-7	1-hr	0.18	350
xylene mixture 1330-20-7	Annual	0.001	180

The annual ESL for acrolein reported in Table 9 was the ESL in effect at the time that the modeling analysis was conducted. The current ESLs are available from the Toxicology Division's website.

Permit Concurrence and Related Authorization Actions

Is the applicant in agreement with special conditions?
Company representative(s):
Contacted Via:
Date of contact:
Other permit(s) or permits by rule affected by this action:
List permit and/or PBR number(s) and actions required or taken:

Project Reviewer Date Team Leader/Section Manager/Backup Date

TCEQ Interoffice Memorandum

To: Sean O'Brien
Combustion/Coatings Section

Thru: Daniel Menendez, Team Leader
Air Dispersion Modeling Team (ADMT)

From: Rachel Melton and Justin Cherry, P.E.
ADMT

Date: April 29, 2014

Subject: Air Quality Analysis Audit – Indeck Wharton LLC (RN106844137)

1. Project Identification Information

Permit Application Number: PSDTX1374
NSR Project Number: 195710
ADMT Project Number: 4223
NSRP Document Number: 501232
County: Wharton
ArcReader Published Map: \\tceq4apmgisdata\GISWRK\APD\MODEL PROJECTS\4223\4223.pmf

Air Quality Analysis: Submitted by Tetra Tech, Inc., February 2014, on behalf of Indeck Wharton LLC. Supplemental information was provided April 2014.

2. Report Summary

The air quality analysis (AQA) is acceptable for all review types and pollutants, as supplemented by the ADMT. The results are summarized below.

A. De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The De Minimis analysis modeling results for 24-hr and annual PM_{10}, 24-hr and annual $PM_{2.5}$ (NAAQS and Increment), and 1-hr and 8-hr CO indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr NO_2 De Minimis level. As explained in EPA guidance memoranda[1], the EPA

[1] www.epa.gov/nsr/documents/20100629no2guidance.pdf

believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 NAAQS.

The applicant provided an evaluation of ambient $PM_{2.5}$ monitoring data, consistent with draft EPA guidance for $PM_{2.5}$[2], for using the $PM_{2.5}$ De Minimis levels. If monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the $PM_{2.5}$ De Minimis level, then the proposed project with predicted impacts below the De Minimis level would not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and does not require a full impacts analysis. See the discussion below in the air quality monitoring section for additional information on the evaluation of ambient $PM_{2.5}$ monitoring data.

While the De Minimis levels for both the NAAQS and increment are identical for $PM_{2.5}$ in the table below, the procedures to determine significance (that is, predicted concentrations to compare to the De Minimis levels) are different. This difference occurs because the NAAQS for $PM_{2.5}$ are statistically-based, but the corresponding increments are exceedance-based.

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (µg/m³)

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
PM_{10}	24-hr	1.19	5
PM_{10}	Annual	0.1	1
$PM_{2.5}$ (NAAQS)	24-hr	0.66	1.2
$PM_{2.5}$ (NAAQS)	Annual	0.1	0.3
$PM_{2.5}$ (Increment)	24-hr	1.19	1.2
$PM_{2.5}$ (Increment)	Annual	0.1	0.3
NO_2	1-hr	19.3	7.5
NO_2	Annual	1.8	1
CO	1-hr	363	2000
CO	8-hr	65.5	500

[2]www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf

The 24-hr and annual $PM_{2.5}$ (NAAQS) and the 1-hr NO_2 GLCmax are based on the highest five-year averages of the maximum predicted concentrations determined for each receptor. The GLCmax for all other pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant reported the 8-hr CO predicted concentration based on a weighted average of the maximum 8-hr predicted concentration under start-up conditions (weighted by 1/8) plus the maximum 8-hr predicted concentration under normal operating conditions (weighted by 7/8).

The applicant provided an evaluation of secondary $PM_{2.5}$ impacts that considers modeling results of the directly emitted $PM_{2.5}$ emissions, ambient background monitoring data representative for the project site, and proposed allowable emission rates of SO_2 and NO_x:

- Modeling results from the directly emitted $PM_{2.5}$ emissions are less than the De Minimis levels.
- Adding the modeling results from the directly emitted $PM_{2.5}$ emissions to representative background concentrations gives total concentrations well below the NAAQS.
- The proposed emissions of SO_2 are less than the Significant Emission Rate (SER) of 40 tons per year (tpy) and would not be expected to result in significant secondary formation of $PM_{2.5}$.
- The proposed emissions of NO_x are greater than the NO_x SER (40 tpy). Secondary $PM_{2.5}$ formation occurs as a result of chemical transformations that occur in the atmosphere gradually over time and only a portion of the NO_x emissions would be affected. Furthermore, secondary $PM_{2.5}$ formation from NO_x is unlikely to overlap in space or time with nearby maximum primary $PM_{2.5}$ impacts associated with the project sources.

In addition, the applicant determined that the Dona Park monitor (EPA AIRS monitor 483550034) is a representative monitor of the project site and considered a review conducted by the ADMT of available $PM_{2.5}$ speciation data to support the conclusions regarding secondary formation of $PM_{2.5}$. Over an eight-year period, on average, ammonium nitrate makes up 5.5 percent of the total 24-hr concentration and 3.4 percent of the total annual concentration. On average, over the last eight years of monitoring data, the maximum 24-hr and annual ammonium nitrate concentrations are 1.4 $\mu g/m^3$ and 0.3 $\mu g/m^3$, respectively. Given that the proposed NO_x emissions are a small fraction of the NO_x emissions in the air shed, and that the ambient monitoring data shows relatively small fractions of ammonium nitrate, secondary $PM_{2.5}$ formation from the proposed NO_x emissions would be expected to be considerably smaller than the monitored concentration of

nitrates. The monitoring information supports the applicant's conclusion that the secondary $PM_{2.5}$ formation would not be expected to cause a NAAQS or Increment exceedance.

B. Air Quality Monitoring

The De Minimis analysis modeling results indicate that 24-hr PM_{10}, annual NO_2, and 8-hr CO are below their respective monitoring significance levels.

Table 2. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax (µg/m³)	Significance (µg/m³)
PM_{10}	24-hr	1.19	10
NO_2	Annual	1.8	14
CO	8-hr	65.5	575

The GLCmax for all pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant evaluated ambient $PM_{2.5}$ monitoring data to satisfy the requirements for the pre-application air quality analysis. Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480290059 located at 14620 Laguna Road, San Antonio, Bexar County. The applicant used a three-year average (2010-2012) of the 98th percentile of the annual distribution of the 24-hr concentrations for the 24-hr value (23 µg/m^3). The applicant used a three-year average (2010-2012) of the annual mean concentrations for the annual value (9.3 µg/m^3). The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 kilometers (km) of the project site and monitor location.

C. National Ambient Air Quality Standard (NAAQS) Analysis

The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The full NAAQS modeling results indicate the total predicted concentrations will not result in an exceedance of the NAAQS.

Table 3. Total Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m³)	Background (µg/m³)	Total Conc. = [Background + GLCmax] (µg/m³)	Standard (µg/m³)
NO_2	1-hr	135.6	37.7	173.3	188
NO_2	Annual	6.3	15.2	21.5	100

The 1-hr NO_2 GLCmax is the highest five-year average of the 98th percentile of the annual distribution of the daily maximum 1-hr predicted concentrations. The annual NO_2 GLCmax represents the maximum predicted concentration over five years of meteorological data.

The applicant reported the 1-hr NO_2 predicted concentration incorrectly. The ADMT supplemented this value based on the modeling output files.

Background concentrations for NO_2 were obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. The three-year average (2010-2012) of the 98th percentile of the annual distribution of the daily maximum 1-hr concentrations was used for the 1-hr value and the highest annual concentration from three years (2010-2012) was used for the annual value. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 4. PSD Ambient Air Quality Analysis for Ozone

Pollutant	Monitor	Averaging Time	Background (ppb)	Standard (ppb)
O_3	480391016	8-hr	72	75

A background concentration for ozone was obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. A three-year average (2010-2012) of the annual fourth highest daily maximum 8-hr concentrations was used in the analysis. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

EPA Region 6 has previously recommended a conservative analysis based on the NO_2 modeling to estimate the potential impacts on ozone levels. Considering that it takes time for the NO_2 emissions to react to generate ozone, an evaluation of maximum estimated NO_2 concentrations at a distance of 10-to-11 km downwind from the project source could be used to estimate the potential ozone impacts. EPA Region 6 has recommended that emission sources would have an average ozone yield of up to 2-3 ozone molecules per NO_2 molecule. The applicant used AERMOD to calculate a maximum 8-hr NO_x concentration for normal operations and startup operations at a distance of 10 km. The maximum 8-hr NO_x concentration of 0.44 parts per billion (ppb) at a distance of 10 km is based on one hour of startup operations and seven hours of normal operations in an eight hour duration. Assuming 90% conversion of NO_x to NO_2 and an ozone yield of three ozone molecules per molecule of NO_2, the 8-hr maximum predicted increase of ozone would be 1.3 ppb. Adding 1.3 ppb to the 8-hr ozone background of 72 ppb will result in a total 8-hr ozone concentration less than the 8-hr ozone NAAQS of 75 ppb.

D. Increment Analysis

The De Minimis analysis modeling results indicate that annual NO_2 exceeds the de minimis concentration and requires a PSD increment analysis.

Table 5 .Results for PSD Increment Analysis

Pollutant	Averaging Time	GLCmax (µg/m³)	Increment (µg/m³)
NO_2	Annual	6.3	25

The GLCmax represents the maximum predicted concentration over five years of meteorological data.

E. Additional Impacts Analysis

The applicant performed an Additional Impacts Analysis as part of the PSD AQA. The applicant conducted a growth analysis and determined that population will not significantly increase as a result of the proposed project. The applicant conducted a soils and vegetation analysis and determined that all evaluated criteria pollutant concentrations are below their respective secondary NAAQS. The applicant meets the Class II visibility analysis requirement by complying with the opacity requirements of 30 TAC 111. The Additional Impacts Analyses are reasonable and possible adverse impacts from this project are not expected.

The ADMT evaluated predicted concentrations from the proposed site to determine if emissions could adversely affect a Class I area. The nearest

Class I area, Big Bend National Park, is located approximately 680 km from the proposed site.

The H_2SO_4 24-hr maximum predicted concentration of 0.05 µg/m³ occurred approximately 185 meters from the fence line towards the southwest. The H_2SO_4 24-hr maximum predicted concentration occurring at the edge of the receptor grid, approximately 54 km from the proposed source, in the direction of the Big Bend National Park Class I area is 0.001 µg/m³. The Big Bend National Park Class I area is an additional 626 km from the edge of the receptor grid. Therefore, emissions of H_2SO_4 from the proposed project are not expected to adversely affect the Big Bend National Park Class I area.

The predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, and SO_2 for all averaging times, are all less than de minimis levels at a distance of approximately 1.6 km from the proposed source in the direction of Big Bend National Park Class I area. The Big Bend National Park Class I area is an additional 678.4 km from the location where the predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, and SO_2 for all averaging times are less than de minimis. Therefore, emissions from the proposed project are not expected to adversely affect the Big Bend National Park Class I area.

F. Minor Source NSR and Air Toxics analysis

Table 6. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	4.8	20.4
H_2SO_4	1-hr	0.36	1
H_2SO_4	24-hr	0.05	0.3

The justification for selecting the EPA's interim 1-hr SO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr SO_2 De Minimis level. As explained in EPA guidance memoranda[3], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr SO_2 NAAQS.

Table 7. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	1.37	7.8
SO_2	3-hr	2.53	25

[3] www.epa.gov/region07/air/nsr/nsrmemos/appws02.pdf

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	24-hr	0.6	5
SO_2	Annual	0.05	1

The 1-hr SO_2 GLCmax is based on the highest five-year average of the maximum predicted concentration determined for each receptor. The GLCmax for all other averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant reported the 3-hr SO_2 predicted concentration based on a weighted average of the maximum 3-hr predicted concentration under start-up conditions (weighted by 1/3) plus the maximum 3-hr predicted concentration under normal operating conditions (weighted by 2/3).

The applicant reported the 24-hr SO_2 predicted concentration based on a weighted average of the maximum 24-hr predicted concentration under start-up conditions (weighted by 1/24) plus the maximum 24-hr predicted concentration under normal operating conditions (weighted by 23/24).

Table 8. Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m³)	Background (µg/m³)	Total Conc. = [Background + GLCmax] (µg/m3)	Standard (µg/m³)
Pb	3-mo	0.0005	0.011	0.0115	0.15

The GLCmax represents the maximum 1-hr predicted concentration over five years of meteorological data. Using the maximum 1-hr predicted concentration is a conservative representation of the 3-month rolling average.

The applicant did not provided an evaluation of ambient background concentrations for lead. The ADMT reviewed lead monitoring data in Harris County and used the monitor with the highest lead concentration as a conservative representation of background concentrations for Wharton County. A background concentration for lead was obtained from the EPA AIRS monitor 482011034 located at 1262 ½ Mae Drive, Houston, Harris County. The highest 24-hr concentration from 2013 was used as a conservative representation of the 3-month rolling average. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 9. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	ESL (µg/m³)
acetaldehyde 75-07-0	1-hr	0.41	15
acetaldehyde 75-07-0	Annual	0.001	45
acrolein 107-02-8	1-hr	0.05	3.2
acrolein 107-02-8	Annual	0.0002	0.15
arsenic & inorganic cpds 7440-38-2	1-hr	3.23×10^{-5}	3
arsenic & inorganic cpds 7440-38-2	Annual	1.3×10^{-7}	0.067
benzene 71-43-2	1-hr	0.63	170
benzene 71-43-2	Annual	0.002	4.5
cadmium & compounds (as Cd) NA	1-hr	3.59×10^{-6}	0.1
chromium metal 7440-47-3	1-hr	0.01	3.6
chromium metal 7440-47-3	Annual	3.5×10^{-5}	0.041
formaldehyde 50-00-0	1-hr	0.64	15
formaldehyde 50-00-0	Annual	0.002	3.3
mercury, alkyls 7439-97-6	1-hr	7.21×10^{-6}	0.1
naphthalene 91-20-3	1-hr	0.07	200
naphthalene 91-20-3	Annual	0.0003	50
nickel, metal & cpds 7440-02-0	1-hr	0.001	0.33
nickel, metal & cpds 7440-02-0	Annual	4.17×10^{-6}	0.059
polycyclic aromatic HC's, particulate, <10% b(a)p, not otherwise classified NA	1-hr	0.13	0.5
propylene oxide 75-56-9	1-hr	2.54	70
selenium oxide 7446-08-4	1-hr	0.0002	2
toluene 108-88-3	1-hr	0.26	640

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	ESL (µg/m³)
toluene 108-88-3	Annual	0.001	1200
xylene mixture 1330-20-7	1-hr	0.18	350
xylene mixture 1330-20-7	Annual	0.001	180

The location of the GLCmax is not provided since the GLCmax are based on unit modeling. See section 3 for more details. The applicant did not provide a GLCni.

The annual ESL for acrolein reported in Table 9 was the ESL in effect at the time that the modeling analysis was conducted. The current ESLs are available from the Toxicology Division's website.

3. Model Used and Modeling Techniques

AERMOD (Version 12345) was used in a refined screening mode. For future modeling demonstrations, the latest version of AERMOD (Version 13350) should be used.

For the health effects and lead modeling demonstrations, a unitized emission rate of 1 g/s was used to predict a generic short-term and long-term impact for each source. The generic impact was multiplied by the proposed pollutant specific emission rates to calculate a maximum predicted concentration for each source. The maximum predicted concentration for each source was summed to get a total predicted concentration for each pollutant.

Two models of combustion turbines are being considered for the proposed site: the GE Frame 7FA and the Siemens 5000F. To determine the worst-case operating scenario, each of the proposed turbine types were modeled using a unitized emission rate of 1 g/s to predict a generic short-term and long-term impact for each load scenario. The applicant also modeled the short-term emissions associated with the turbines undergoing startup/shutdown operations along with the exhaust parameters associated with those operations as a separate modeling scenario. The generic impact was multiplied by the proposed pollutant specific emission rates to calculate a maximum predicted concentration for each load scenario. The worst-case load scenario for each pollutant and averaging time was used in all subsequent modeling demonstrations. The results presented above represent the results from the worst-case scenario.

Each source was modeled in a separate source group to determine source culpability.

A. Land Use

Medium roughness and elevated terrain were used in the modeling analysis. These selections are consistent with the topographic map, DEMs, and aerial photography. The selection of medium roughness is reasonable.

B. Meteorological Data

Surface Station and ID: Sugarland, TX (Station #: 12977)
Upper Air Station and ID: Corpus Christi, TX (Station #: 12924)
Meteorological Dataset: 2006-2010
Profile Base Elevation: 25 meters

C. Receptor Grid

The grid modeled was sufficient in density and spatial coverage to capture representative maximum ground-level concentrations.

D. Building Wake Effects (Downwash)

Input data to Building Profile Input Program Prime (Version 04274) are consistent with the plot plan and modeling report.

4. Modeling Emissions Inventory

The modeled emission point source parameters and rates were consistent with the modeling report. The source characterization used to represent the sources was appropriate.

The NO_x to NO_2 conversion factors of 0.8 and 0.75 were applied to the modeled 1-hr and annual NO_x emission rates, respectively, which is consistent with guidance for combustion sources.

Proposed emissions from the turbine startup conditions were included in the annual modeling for SO_2, NO_2, PM_{10}, and $PM_{2.5}$. The modeled emission rates are based on 300 hours of start-up operations per year.

For the 1-hr NO_2 analysis, the applicant evaluated the emissions from the emergency diesel generator and fire pump diesel engine following EPA guidance on intermittent emissions. Annual average emissions rates were modeled and are based on 500 hours per year of operation for the emergency diesel generator and 300 hours per year of operation for the fire pump diesel engine. The evaluation for each source is a conservative representation of the proposed operating schedule (i.e. once per week for a 30 minute duration for each source).

For the other pollutants and averaging periods associated with the emergency diesel generator and fire pump diesel engine, the applicant modeled emission

rates that are based on the applicable averaging period. For short-term averaging periods, the modeled emission rates are based on one hour of operation within the period. For the long-term averaging period, the modeled emission rates are based on 500 hours of operation per year for the emergency diesel generator and 300 hours of operation per year for the fire pump diesel engine.

For all other sources, maximum allowable hourly emission rates were used for the short-term averaging time analyses, and annual average emission rates were used for the annual averaging time analyses.

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Compliance History Report

PUBLISHED Compliance History Report for CN604350280, RN106844137, Rating Year 2014 which includes Compliance History (CH) components from September 1, 2009, through August 31, 2014.

Customer, Respondent, or Owner/Operator:	CN604350280, Indeck Wharton, LLC	**Classification:** UNCLASSIFIED	**Rating:** -----
Regulated Entity:	RN106844137, INDECK WHARTON ENERGY CENTER	**Classification:** UNCLASSIFIED	**Rating:** -----
Complexity Points:	8	**Repeat Violator:** NO	
CH Group:	06 - Electric Power Generation		
Location:	WEST SIDE OF STATE ROUTE 71 3350 FEET SOUTH OF THE INTERSECTION OF ROUTE 71 AND COUNTY ROAD 424 IN DANEVANG ABOUT 0.50 MILE SOUTH OF THE CENTER OF DANEVANG WHARTON, TX, WHARTON COUNTY		
TCEQ Region:	REGION 12 - HOUSTON		

ID Number(s):
STORMWATER PERMIT TXR150011218
AIR NEW SOURCE PERMITS EPA PERMIT PSDTX1374
AIR NEW SOURCE PERMITS PERMIT 111724

Compliance History Period: September 01, 2009 to August 31, 2014 **Rating Year:** 2014 **Rating Date:** 09/01/2014

Date Compliance History Report Prepared: December 16, 2014

Agency Decision Requiring Compliance History: Permit - Issuance, renewal, amendment, modification, denial, suspension, or revocation of a permit.

Component Period Selected: September 01, 2009 to August 31, 2014

TCEQ Staff Member to Contact for Additional Information Regarding This Compliance History.

Name: Mr. Sean O'Brien **Phone:** (512) 239-1137

Site and Owner/Operator History:

1) Has the site been in existence and/or operation for the full five year compliance period? NO
2) Has there been a (known) change in ownership/operator of the site during the compliance period? NO
3) If **YES** for #2, who is the current owner/operator? N/A
4) If **YES** for #2, who was/were the prior owner(s)/operator(s)? N/A
5) If **YES**, when did the change(s) in owner or operator occur? N/A

Components (Multimedia) for the Site Are Listed in Sections A - J

A. Final Orders, court judgments, and consent decrees:
N/A

B. Criminal convictions:
N/A

C. Chronic excessive emissions events:
N/A

D. The approval dates of investigations (CCEDS Inv. Track. No.):
N/A

E. Written notices of violations (NOV) (CCEDS Inv. Track. No.):
A notice of violation represents a written allegation of a violation of a specific regulatory requirement from the commission to a regulated entity. A notice of violation is not a final enforcement action, nor proof that a violation has actually occurred.

N/A

F. Environmental audits:
N/A

G. Type of environmental management systems (EMSs):
N/A

H. Voluntary on-site compliance assessment dates:
N/A

I. Participation in a voluntary pollution reduction program:
N/A

J. Early compliance:
N/A

Sites Outside of Texas:
N/A

Emission Sources - Maximum Allowable Emission Rates

Permit Numbers 111724 and PSDTX1374

This table lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities, sources, and related activities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

Air Contaminants Data

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour (4)	TPY (5)
GT1	Turbine 1 (Siemens 5000F)	NOx	79.5	315.5
		NOx (SS)	89.0	-
		CO	21.5	297.5
		CO (SS)	495.6	-
		SO2	8.0	30.2
		VOC	3.1	35.7
		VOC (SS)	55.6	-
		PM10	9.7	37.6
		PM2.5	9.7	37.6
GT2	Turbine 2 (Siemens 5000F)	NOx	79.5	315.5
		NOx (SS)	89.0	-
		CO	21.5	297.5
		CO (SS)	495.6	-
		SO2	8.0	30.2
		VOC	3.1	35.7
		VOC (SS)	55.6	-
		PM10	9.7	37.6
		PM2.5	9.7	37.6

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Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour (4)	TPY (5)
GT3	Turbine 3 (Siemens 5000F)	NOx	79.5	315.5
		NOx (SS)	89.0	-
		CO	21.5	297.5
		CO (SS)	495.6	-
		SO2	8.0	30.2
		VOC	3.1	35.7
		VOC (SS)	55.6	-
		PM10	9.7	37.6
		PM2.5	9.7	37.6
GT1	Turbine 1 (GE 7FA)	NOx	69.0	269.6
		CO	33.0	207.5
		CO (SS)	186	-
		SO2	7.2	27.5
		VOC	3.3	19.1
		VOC (SS)	17.1	-
		PM10	9.3	37.0
		PM10 (SS)	10.7	-
		PM2.5	9.3	37.0
		PM2.5 (SS)	10.7	-

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Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour (4)	TPY (5)
GT2	Turbine 2 (GE 7FA)	NOx	69.0	269.6
		CO	33.0	207.5
		CO (SS)	186	-
		SO2	7.2	27.5
		VOC	3.3	19.1
		VOC (SS)	17.1	-
		PM10	9.3	37.0
		PM10 (SS)	10.7	-
		PM2.5	9.3	37.0
		PM2.5 (SS)	10.7	-
GT3	Turbine 3 (GE 7FA)	NOx	69.0	269.6
		CO	33.0	207.5
		CO (SS)	186	-
		SO2	7.2	27.5
		VOC	3.3	19.1
		VOC (SS)	17.1	-
		PM10	9.3	37.0
		PM10 (SS)	10.7	-
		PM2.5	9.3	37.0
		PM2.5 (SS)	10.7	-

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Emission Sources - Maximum Allowable Emission Rates

Emission Point No. (1)	Source Name (2)	Air Contaminant Name (3)	Emission Rates	
			lbs/hour (4)	TPY (5)
EDG	Diesel (Emergency generator)	NOx	9.2	2.29
		CO	5.02	1.25
		SO2	0.01	<0.01
		VOC	0.37	0.47
		PM	0.33	0.08
		PM10	0.33	0.08
		PM2.5	0.33	0.08
FP	Firepump	NOx	1.2	0.17
		CO	1.01	0.15
		SO2	<0.01	<0.01
		VOC	0.37	0.06
		PM	0.07	0.01
		PM10	0.07	0.01
		PM2.5	0.07	0.01
GH	Heater	NOx	0.28	0.48
		CO	0.12	0.21
		SO2	0.01	0.02
		VOC	0.02	0.04
		PM	0.02	0.03
		PM10	0.02	0.03
		PM2.5	0.02	0.03
FUG	Fugitives (6)	VOC	0.09	0.39

(1) Emission point identification - either specific equipment designation or emission point number from plot plan.

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Emission Sources - Maximum Allowable Emission Rates

(2) Specific point source name. For fugitive sources, use area name or fugitive source name.
(3) VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1
NO_x - total oxides of nitrogen
SO_2 - sulfur dioxide
PM - total particulate matter, suspended in the atmosphere, including PM_{10} and $PM_{2.5}$, as represented
PM_{10} - total particulate matter equal to or less than 10 microns in diameter, including $PM_{2.5}$, as represented
$PM_{2.5}$ - particulate matter equal to or less than 2.5 microns in diameter
CO - carbon monoxide
(4) Planned maintenance, startup, and shutdown (MSS) lbs/hour emissions for all pollutants are authorized even if not specifically identified as MSS.
(5) Compliance with annual emission limits (tons per year) is based on a 12 month rolling period. Annual emission rates for each source include planned MSS emissions.
(6) Emission rate is an estimate and is enforceable through compliance with the applicable special condition(s) and permit application representations.

Date: _____

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Special Conditions

Permit Numbers 111724 and PSDTX1374

1. This permit authorizes emissions only from those emission points listed in the attached table entitled "Emission Sources - Maximum Allowable Emission Rates" (MAERT), and the facilities covered by this permit are authorized to emit subject to the emission rate limits on that table and other operating conditions specified in this permit. In addition to the emissions from routine operations, this permit authorizes emissions from planned maintenance, startup, and shutdown (MSS) activities.

   If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

Federal Applicability

2. Affected facilities shall comply with applicable requirements of the U.S. Environmental Protection Agency (EPA) regulations on Standards of Performance for New Stationary Sources (NSPS), Title 40 Code of Federal Regulations (40 CFR) Part 60:

   A. Subpart A: General Provisions.

   B. Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

   C. Subpart KKKK: Standards of Performance for Stationary Combustion Turbines.

3. These facilities shall comply with applicable requirements of the EPA regulations on National Emission Standards for Hazardous Air Pollutants for Source Categories, 40 CFR Part 63:

   A. Subpart A: General Provisions.

   B. Subpart ZZZZ: National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Emission Standards and Operating Specifications

4. Emergency Engines.

   A. Emergency engines installed under this permit shall be of a type subject to the emission limits and work practices of 40 CFR Part 60 Subpart IIII.

   B. The emergency engines authorized in this permit, Emission Point Numbers (EPNs) EDG and FP, may only be fired with diesel fuel containing no more than 15 parts per million sulfur by weight.

      Upon request by the Executive Director of the Texas Commission on Environmental Quality (TCEQ) or any local air pollution control program having jurisdiction, the

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holder of this permit shall provide a sample and/or an analysis of the fuel or shall allow air pollution control agency representatives to obtain a sample for analysis.

C. Emergency engine (EPN EDG) is limited to no more than 500 hours per year of non-emergency operation. Firewater Pump

D. (EPN FP) is limited to no more than 26 hours per year of non-emergency operation. Each engine must be equipped with a non-resettable runtime meter.

5. Turbines.

A. Emissions from each combustion turbine generator (CTG), EPNs GT1, GT2, and GT3 shall not exceed the following concentrations in parts per million by volume, dry basis (ppmvd) at 15% oxygen (O_2) based on a rolling three-hour average, except during planned MSS:

(1) Option 1: Three Siemens SGT6-5000F CTGs, operating in simple cycle at a nominal combined 682 megawatts (MW) output:

(a) Nitrogen oxides (NO_x): 9 ppmvd.

(b) Carbon monoxide (CO): 4 ppmvd.

(2) Option 2: Three General Electric 7FA CTGs, operating in simple cycle at a nominal combined 643 MW output:

(a) NO_x: 9 ppmvd.

(b) CO: 9 ppmvd.

B. Fuel for the CTGs and the gas heater (EPN GH) shall be limited to pipeline-quality, sweet natural gas containing no more than 0.2 grain total sulfur per 100 dry standard cubic feet.

Upon request by representatives of the Texas Commission on Environmental Quality (TCEQ), EPA, or any local air pollution control program having jurisdiction, the permit holder shall provide a sample and/or an analysis of the fuel fired in the gas turbine or shall allow air pollution control agency representatives to obtain a sample for analysis.

C. Each CTG (EPNs GT1, GT2, and GT3) is limited to no more than 2,500 hours of operation per rolling 12-month period.

6. The opacity of emissions from EPN GT1, GT2, GT3, and GH shall not exceed five percent averaged over a six-minute period from each stack. This determination shall be made by first observing for visible emissions while each facility is in normal operation. Observations shall be made at least 15 feet and no more than 0.25 miles from the emission point(s). Up to three emissions points may be read concurrently, provided that all three emissions points are within a 70 degree viewing sector or angle in front of the observer such that the proper sun position (at the observer's back) can be maintained for all three emission points. If visible emissions are observed from an emission point, then the opacity shall be determined and documented within 24 hours for that emission point using

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40 CFR Part 60, Appendix A, Test Method 9. Observations shall be performed and recorded quarterly. If the opacity exceeds five percent, corrective action to eliminate the source of visible emissions shall be taken promptly and documented within one week of first observation.

Planned Maintenance, Startup, and Shutdown

7. The permit holder shall minimize emissions during planned MSS activities authorized by this permit by operating the facilities and associated air pollution control equipment in accordance with good air pollution control practices, safe operating practices, and protection of the facility.

8. Emissions during planned MSS activities for the CTGs shall be minimized by limiting the duration of the activities, and the applicable emissions monitoring system shall be kept in operation.

   A. A planned startup for each CTG shall not exceed thirty (30) minutes. A planned startup for each turbine is defined as follows:

      (1) Option 1 - Siemens SGT6-5000F: the period beginning when the turbine receives a "turbine start" signal and an initial flame detection signal is recorded in the plant's control system and ending when the turbine output reaches the minimum sustainable load.

      (2) Option 2 - General Electric 7FA: the period beginning when the turbine receives a "turbine start" signal and an initial flame detection signal is recorded in the plant's control system and ending when the turbine reaches the lean pre-mix operating mode.

   B. A planned shutdown for each CTG shall not exceed thirty (30) minutes. A planned shutdown for each turbine is defined as the period beginning when the turbine receives a "turbine stop" command and the generator output drops below the minimum stable load and ending when a flame detection signal is no longer recorded in the plant's control system.

   C. Maintenance activities for the CTGs shall be limited to combustion tuning/optimization maintenance activities, which include leak and operability checks (e.g., turbine over-speed tests, troubleshooting), balancing, and tuning activities that occur during seasonal tuning or after the completion of initial construction, a combustor change-out, a major repair, maintenance to a combustor, or other similar circumstances.

Initial Determination of Compliance

9. Sampling ports and platforms shall be incorporated into the design of all exhaust stacks according to the specifications set forth in the attachment entitled “Chapter 2, Stack Sampling Facilities.” Alternate sampling facility designs may be submitted for approval by the TCEQ Regional Director.

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10. The holder of this permit shall perform stack sampling and other testing as required to establish the actual quantities of air contaminants being emitted into the atmosphere from EPNs GT1, GT2, and GT3 to determine initial compliance with all emission limits established in this permit. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual and in accordance with the appropriate EPA Reference Methods to be determined during the pretest meeting.

    Fuel sampling using the methods and procedures of 40 CFR § 60.4415 may be conducted in lieu of stack sampling for sulfur dioxide (SO_2) or the permit holder may be exempted from fuel monitoring of SO_2 as provided under 40 CFR § 60.4365(a). If fuel sampling is used, compliance with New Source Performance Standards (NSPS) Subpart KKKK, SO_2 limits shall be based on 100 percent conversion of the sulfur in the fuel to SO_2. Any deviations from those procedures must be approved by the Executive Director of the TCEQ prior to sampling. The TCEQ Executive Director or his designated representative shall be afforded the opportunity to observe all such sampling.

    The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at his expense.

    A. The TCEQ Houston Regional Office shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

    B. The notice shall include:

        (1) Date for pretest meeting.

        (2) Date sampling will occur.

        (3) Name of firm conducting sampling.

        (4) Type of sampling equipment to be used.

        (5) Method or procedure to be used in sampling.

        (6) Procedure used to determine turbine loads during and after the sampling period.

    The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for submitting the test reports. A written proposed description of any deviation from sampling procedures specified in permit conditions, or the TCEQ or EPA sampling procedures shall be made available to the TCEQ prior to the pretest meeting. The TCEQ Regional Director shall approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Air, Air Permits Division. Test waivers and alternate or equivalent procedure proposals for NSPS testing which must have EPA approval shall be submitted to the EPA and copied to TCEQ Regional Director.

    C. Air contaminants and diluents to be sampled and analyzed from each stack include (but are not limited to) NO_x, CO, volatile organic compounds, SO_2, and O_2.

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D. Each CTG shall be tested at or above 90% of the maximum turbine load for the given atmospheric conditions at the time of testing. Each tested turbine load shall be identified in the sampling report. The permit holder shall present at the pretest meeting the manner in which stack sampling will be executed in order to demonstrate compliance with emission standards found in 40 CFR Part 60, Subpart KKKK, Table 1.

E. Sampling as required by this condition shall occur within 60 days after achieving the nominal power output at which the turbine will be operated, but no later than 180 days after initial start-up of the combustion turbine. Additional sampling may be required by TCEQ or EPA.

F. Within 60 days after the completion of the testing and sampling required herein, three copies of the sampling reports shall be distributed as follows:

(1) One copy to the TCEQ Houston Regional Office.

(2) One copy to the EPA Region 6 Office, Dallas.

Continuous Determination of Compliance

11. The permit holder shall install, calibrate, maintain, and operate continuous emissions monitoring systems (CEMS) to measure and record the concentrations of NO_x, CO, and diluent (O_2 or carbon dioxide [CO_2]) from EPNs GT1, GT2, and GT3.

A. The NO_x and diluent CEMS shall meet the design and performance specifications, pass the field tests, and meet the installation requirements and the data analysis and reporting requirements specified in the applicable performance specifications in 40 CFR Part 75, Appendices A and B. The requirements of 40 CFR Part 75, Appendices A and B are deemed an acceptable alternative to the performance specifications and quality assurance requirements of 40 CFR Part 60.

B. The CO CEMS shall meet the design and performance specifications, pass the field tests, and meet the installation requirements and the data analysis and reporting requirements specified in the applicable performance specifications in 40 CFR Part 60, Appendix B. The CEMS shall follow the monitoring requirements of 40 CFR § 60.13. The CEMS shall meet the appropriate quality assurance requirements specified in 40 CFR Part 60, Appendix F, Procedure 1. An equivalent quality-assurance method approved by the TCEQ may also be used. Successive quarterly audits shall occur at least two months apart.

C. The CEMS shall be zeroed and spanned daily, and corrective action taken when the 24-hour span drift exceeds two times the amounts specified in the applicable Performance Specification.

D. For full operating hours, the monitoring data must be reduced to hourly average values at least once every day, using a minimum of four approximately equally-spaced data points from each one-hour period. For hours in which calibration checks, zero and span adjustments, system breakdowns, or repairs occur, at least two

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valid data points separated by a minimum of 15 minutes (where the unit operates for more than one quadrant of an hour) will be sufficient to quality-assure the hour.

E. The valid hourly average data from the CEMS shall be used to determine compliance with the concentration limits of Special Condition No. 5.A and, in conjunction with the program required by Special Condition No. 13, the hourly emission rate limits in the MAERT. Only quality assured data from the CEMS shall be used to identify excess emissions. Periods where the missing data substitution procedures in subpart D of 40 CFR Part 75 are applied are to be reported as monitor downtime in the excess emissions and monitoring performance report required under § 60.7(c).

F. The CEMS shall be operational during 95 percent of the operating hours of the facility, exclusive of the time required for zero and span checks. If this operational criterion is not met for the reporting quarter, the holder of this permit shall develop and implement a monitor quality improvement plan. The monitor quality improvement plan shall be developed and submitted to the TCEQ Houston Regional Office for their approval within six months. The plan should address the downtime issues to improve availability and reliability.

G. A CEMS with downtime due to breakdown, malfunction, or repair of more than 10 percent of the facility operating time for any calendar year shall be considered as a defective CEMS and the CEMS shall be replaced within 2 weeks.

12. The permit holder shall install, calibrate, maintain, and operate a continuous monitoring system to monitor and record the average hourly natural gas consumption of each CTG. The permit holder shall comply with the applicable initial certification and ongoing quality assurance requirements of 40 CFR Part 75, Appendix D for each CTG.

13. The permit holder shall either measure, or develop a program to calculate, the total mass flow rate through the stacks to ensure continuous compliance with the NO_x and CO emission limitations specified in the MAERT. The permit holder shall calculate hourly mass emissions in pounds per hour using the measured or calculated exhaust flow rate and the measured concentrations of NO_x and CO from the CEMS required in Special Condition No. 11. The hourly data and calculated compliance averages will be stored and maintained in data system or electronic data storage media in a form suitable for inspection and available upon request in a format specified by TCEQ. Pounds per hour data from each CTG stack must be summed monthly to tons per rolling 12-month period and used to determine compliance with the annual emission limits in the MAERT. Records of this information shall also be available in a form suitable for inspection.

Recordkeeping Requirements

14. The following records, written or electronic, shall be maintained at the plant and shall be made available upon request by representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction.

A. A copy of this permit.

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B. Permit application dated June 18, 2013 and supplemental application information submitted.

C. A complete copy of the testing reports and records of the initial performance testing completed pursuant to Special Condition No. 10 to demonstrate initial compliance.

D. Stack sampling results for the most recent stack test (other than CEMS data) conducted on units authorized under this permit.

15. The following records, written or electronic, shall be maintained at the plant site on a five-year rolling basis and made readily available upon request by representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction.

A. Records of the sulfur content of the diesel fuel fired in the emergency engines. Fuel delivery receipts are an acceptable record.

B. Records of emergency engines (EPNs EDG and FP) hours of operation to show compliance with Special Condition No. 4.C including date, time, and duration of operation.

C. Records of each turbine's (EPNs GT1, GT2, and GT3) operating hours on a monthly and rolling 12-month basis to show compliance with Special Condition No. 5.C.

D. Records of visible emissions and opacity observations and any corrective actions taken as specified in Special Condition No. 6.

E. Records of turbine planned MSS activities pursuant to Special Condition No. 8, including the date, time, and duration of those activities, emissions from those activities, and periods when CEMS data have been excluded for purposes of demonstrating compliance with Special Condition No. 5.A.

F. Records of natural gas fuel usage, including calibration checks of the fuel flow monitoring system, to show compliance with Special Condition No. 12.

G. Records of NO_x, CO, and diluent CEMS emissions data to demonstrate compliance with the emission rates listed in the MAERT.

H. Raw data files of all CEMS data including calibration checks and adjustments and maintenance performed on these systems.

I. Records of emissions from the turbines kept on an hourly, monthly, and rolling 12-month basis to show compliance with the MAERT.

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Preliminary Determination Summary

Indeck Wharton, L.L.C.
Permit Numbers 111724 and PSDTX1374

I. Applicant

Indeck Wharton, L.L.C.
600 N Buffalo Grove Rd Ste 300
Buffalo Grove, IL 60089-2432

II. Project Location

Indeck Wharton Energy Center
Located on west side of State Route 71, 3350 feet south of the intersection of Route 71 and County Road 424 in Danevang, about 0.50 mile south of the center of Danevang
Wharton County
Danevang, Texas 77432

III. Project Description

Indeck Wharton, L.L.C. proposes to install three new natural gas fired combustion turbine generators (CTGs). The CTGs will either be the General Electric 7FA (~214 MW each) or the Siemens SGT6-5000F (~227 MW each), operating as peaking units in simple cycle mode.

IV. Emissions

The proposed facility will emit the following pollutants:

	Proposed Allowable Emission Rates (tpy)	
Air Contaminant	**GE 7FA Option**	**Siemens 5000F Option**
$PM/PM_{10}/PM_{2.5}$	111.1	112.9
VOC	58.3	108.1
NO_x	811.7	949.4
CO	624.1	894.1
SO_2	82.5	90.6

The emission factors used in the emission rate calculations for startup and shutdown (SS) activities were provided by the turbine and associated equipment vendors. Hourly and annual emission limitations are included on the Maximum Allowable Emission Rate Table (MAERT) separately if emissions were higher than non-SS emissions on an hourly basis.

V. Federal Applicability

The site is located in an attainment county (Wharton County, city of Danevang). The proposed source is a new major source at a greenfield site. The project was a major source for greenhouse gas emissions and therefore TCEQ is permitting any significant amounts of the other criteria pollutants. The project emissions for nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter, including particulate matter including particulate matter less than 10 microns and less than 2.5 microns in diameter ($PM/PM_{10}/PM_{2.5}$), volatile organic compounds (VOC), and sulfur dioxide (SO_2) were above the Prevention of Significant Deterioration (PSD) major modification significance level; therefore, PSD review was triggered for these pollutants and full modeling and impacts analyses were performed. The following chart illustrates the annual project emissions for each pollutant and whether this pollutant triggers PSD review. The chart is based on the highest emission rate of the two proposed CTG options. These totals include SS emissions.

Pollutant	Project Emissions (tpy)	Major Mod Trigger (tpy)	PSD Triggered Y/N
VOC	108.1	40	Y
NO_x	949.4	40	Y
SO_2	90.6	40	Y
CO	894.1	100	Y
PM	112.9	25	Y
PM_{10}	112.9	15	Y
$PM_{2.5}$	112.9	10	Y

VI. Control Technology Review

In addition to a review of control technology for steady state operations, the best available control technology (BACT) analysis includes startup and shutdown emissions and the numerical emission limits in the draft permit reflect this analysis. Although the units may not meet the ppm by volume dry (ppmvd) limits during startup and shutdown, they will meet the mass emission limits (pounds per hour and tons per year) unless a separate limit was established, and startup and shutdown events will be limited by Special Condition Nos. 7 and 8. Typical startup and shutdown of the turbine are conducted in accordance with manufacturer's recommendations to minimize emissions and maximize efficiencies.

As part of the BACT review process, the Texas Commission on Environmental Quality (TCEQ) evaluates information from the Environmental Protection Agency's (EPA's) RACT/BACT/LAER Clearinghouse (RBLC), on-going permitting in Texas and other states, and the TCEQ's continuing review of emissions control developments.

CTGs

Nitrogen Oxides (NO_x):
Each CTG is gas fired and equipped with dry low-NO_x burners (DLN) to control NO_x emissions to 9 ppmvd at 15% O_2 during steady state operations. DLN is a combustion zone technology that pre-mixes fuel and air to reduce thermal NO_x formation without the need for water or steam injection. Since the CTGs are each limited to 2500 hours per year of operation, based on a rolling 12-month period, installing a selective catalytic reduction unit (SCR) would not be economically reasonable. Recently issued permits in Texas for peaking turbines include Tradinghouse (issued 2/7/14), Guadalupe Power Partners (issued 10/2/2013) and DeCordova (8/29/2013). The permits have a NO_x concentration limit of 9 ppmvd at 15% O_2. Therefore, the use of DLN to control NO_x emissions to 9 ppmvd at 15% O_2 is consistent with recently issued permits for similar facilities and is BACT for the CTGs.

Carbon Monoxide (CO):
With DLN (designed to increase oxidation of CO to CO_2) and operating the CTGs according to good combustion practices, CO emissions will be controlled to 4 ppmvd at 15% O_2 during steady state operations for the Siemens 5000F option and 9 ppmvd at 15% O_2 for the GE 7FA option. Since the CTGs are restricted to the annual operating hours specified in the paragraph above for NO_x, installing an oxidation catalyst would not be economically feasible. Recently issued peaking turbine permit in Texas have been issued at 9 ppmvd at 15% O_2. Therefore, the use of DLN and good combustion practices to control CO emissions to 9 ppmvd at 15% O_2 is consistent with recently issued permits for similar facilities and is BACT for the CTGs.

Volatile Organic Compounds (VOCs):
Through maintenance of optimum combustion conditions and practices and firing the CTGs with pipeline-quality natural gas, VOC emissions will be controlled to 1.4 ppmvd at 15% O_2 during steady state operations for the Siemens 5000F option and 1.0 ppmvd at 15% O_2 GE 7FA option. This meets BACT.

Particulate Matter ($PM/PM_{10}/PM_{2.5}$):
The CTGs will be fired with pipeline-quality natural gas. Pipeline-quality natural gas has very low ash and sulfur contents. This meets BACT.

Sulfur Compounds (SO_2/H_2SO_4):
Emissions of SO_2 and H_2SO_4 from the CTGs will occur from the oxidation of sulfur in the natural gas during combustion, with the majority of the sulfur converted to SO_2 and a small fraction converting to H_2SO_4. The CTGs will be fired with pipeline-quality natural gas with a sulfur content not exceeding 0.2 grain sulfur per 100 dry standard cubic feet, which will minimize the formation of SO_2 and H_2SO_4. This meets BACT.

Turbine Planned Maintenance, Startup, and Shutdown (MSS):
During periods of planned MSS, control devices and process equipment are operated outside the optimal range they were designed to work most effectively, and it is technically infeasible to meet the primary BACT emission rates.

Therefore, secondary BACT limits are necessary during these periods to minimize emissions. BACT will be achieved by minimizing the duration of the MSS events (consistent with standard operating procedures) to minimize the amount of time the equipment is outside the optimal performance mode and meeting the emission limitations on the MAERT.

Also, planned MSS activities must be performed using good air pollution control practices and safe operating practices to minimize emissions.

Gas Line Heater

A small 3.0 MMBtu/hr natural gas-fired gas line heater is also proposed. Given the nature and quantity of emissions, no control is BACT.

Emergency Engines

An emergency generator and a firewater pump are proposed. BACT will be achieved through the installation of an engine which meets the requirements of 40 CFR 60, Subpart IIII. The engines will fire ultra low sulfur diesel fuel, containing no more than 15 parts per million (ppm) sulfur by weight. The emergency generator is limited to 500 hours of non-emergency operation per year. The firewater pump is limited to 26 hours per year of non-emergency operation per year.

Fugitive Emissions

The fugitive emissions include VOC from the natural gas fuel lines (EPN FUG). Given the nature and quantity of the emissions, no control is BACT.

VII. Air Quality Analysis

The air quality analysis (AQA) is acceptable for all review types and pollutants, as supplemented by the ADMT. The results are summarized below.

A. De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The De Minimis analysis modeling results for 24-hr and annual PM_{10}, 24-hr and annual $PM_{2.5}$ (NAAQS and Increment), and 1-hr and 8-hr CO indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr NO_2 De Minimis level. As explained in EPA guidance memoranda[1], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 NAAQS.

The applicant provided an evaluation of ambient $PM_{2.5}$ monitoring data, consistent with draft EPA guidance for $PM_{2.5}$[2], for using the $PM_{2.5}$ De Minimis levels. If monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the $PM_{2.5}$ De Minimis level, then the proposed project with predicted impacts below the De Minimis level would not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and does not require a full impacts analysis. See the discussion below in the air quality monitoring section for additional information on the evaluation of ambient $PM_{2.5}$ monitoring data.

While the De Minimis levels for both the NAAQS and increment are identical for $PM_{2.5}$ in the table below, the procedures to determine significance (that is, predicted concentrations to compare to the De Minimis levels) are different. This difference occurs because the NAAQS for $PM_{2.5}$ are statistically-based, but the corresponding increments are exceedance-based.

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[1] www.epa.gov/nsr/documents/20100629no2guidance.pdf
[2] www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (µg/m³)

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
PM_{10}	24-hr	1.19	5
PM_{10}	Annual	0.1	1
$PM_{2.5}$ (NAAQS)	24-hr	0.66	1.2
$PM_{2.5}$ (NAAQS)	Annual	0.1	0.3
$PM_{2.5}$ (Increment)	24-hr	1.19	1.2
$PM_{2.5}$ (Increment)	Annual	0.1	0.3
NO_2	1-hr	19.3	7.5
NO_2	Annual	1.8	1
CO	1-hr	363	2000
CO	8-hr	65.5	500

The 24-hr and annual $PM_{2.5}$ (NAAQS) and the 1-hr NO_2 GLCmax are based on the highest five-year averages of the maximum predicted concentrations determined for each receptor. The GLCmax for all other pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant reported the 8-hr CO predicted concentration based on a weighted average of the maximum 8-hr predicted concentration under start-up conditions (weighted by 1/8) plus the maximum 8-hr predicted concentration under normal operating conditions (weighted by 7/8).

The applicant provided an evaluation of secondary $PM_{2.5}$ impacts that considers modeling results of the directly emitted $PM_{2.5}$ emissions, ambient background monitoring data representative for the project site, and proposed allowable emission rates of SO_2 and NO_x:

- Modeling results from the directly emitted $PM_{2.5}$ emissions are less than the De Minimis levels.
- Adding the modeling results from the directly emitted $PM_{2.5}$ emissions to representative background concentrations gives total concentrations well below the NAAQS.

- The proposed emissions of SO_2 are less than the Significant Emission Rate (SER) of 40 tons per year (tpy) and would not be expected to result in significant secondary formation of $PM_{2.5}$.
- The proposed emissions of NO_x are greater than the NO_x SER (40 tpy). Secondary $PM_{2.5}$ formation occurs as a result of chemical transformations that occur in the atmosphere gradually over time and only a portion of the NO_x emissions would be affected. Furthermore, secondary $PM_{2.5}$ formation from NO_x is unlikely to overlap in space or time with nearby maximum primary $PM_{2.5}$ impacts associated with the project sources.

In addition, the applicant determined that the Dona Park monitor (EPA AIRS monitor 483550034) is a representative monitor of the project site and considered a review conducted by the ADMT of available $PM_{2.5}$ speciation data to support the conclusions regarding secondary formation of $PM_{2.5}$. Over an eight-year period, on average, ammonium nitrate makes up 5.5 percent of the total 24-hr concentration and 3.4 percent of the total annual concentration. On average, over the last eight years of monitoring data, the maximum 24-hr and annual ammonium nitrate concentrations are 1.4 $\mu g/m^3$ and 0.3 $\mu g/m^3$, respectively. Given that the proposed NO_x emissions are a small fraction of the NO_x emissions in the air shed, and that the ambient monitoring data shows relatively small fractions of ammonium nitrate, secondary PM2.5 formation from the proposed NOx emissions would be expected to be considerably smaller than the monitored concentration of nitrates. The monitoring information supports the applicant's conclusion that the secondary $PM_{2.5}$ formation would not be expected to cause a NAAQS or Increment exceedance.

B. Air Quality Monitoring

The De Minimis analysis modeling results indicate that 24-hr PM_{10}, annual NO_2, and 8-hr CO are below their respective monitoring significance levels.

Table 2. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Significance ($\mu g/m^3$)
PM_{10}	24-hr	1.19	10
NO_2	Annual	1.8	14
CO	8-hr	65.5	575

The GLCmax for all pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant evaluated ambient $PM_{2.5}$ monitoring data to satisfy the requirements for the pre-application air quality analysis. Background concentrations for $PM_{2.5}$ were obtained from the EPA AIRS monitor 480290059 located at 14620 Laguna Road, San Antonio, Bexar County. The applicant used a three-year average (2010-2012) of the 98th percentile of the annual distribution of the 24-hr concentrations for the 24-hr value (23 µg/m3). The applicant used a three-year average (2010-2012) of the annual mean concentrations for the annual value (9.3 µg/m3). The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 kilometers (km) of the project site and monitor location.

C. National Ambient Air Quality Standards (NAAQS) Analysis

The De Minimis analysis modeling results indicate that 1-hr and annual NO_2 exceed the respective de minimis concentrations and require a full impacts analysis. The full NAAQS modeling results indicate the total predicted concentrations will not result in an exceedance of the NAAQS.

Table 3. Total Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m3)	Background (µg/m3)	Total Conc. = [Background + GLCmax] (µg/m3)	Standard (µg/m3)
NO_2	1-hr	135.6	37.7	173.3	188
NO_2	Annual	6.3	15.2	21.5	100

The 1-hr NO_2 GLCmax is the highest five-year average of the 98th percentile of the annual distribution of the daily maximum 1-hr predicted concentrations. The annual NO_2 GLCmax represents the maximum predicted concentration over five years of meteorological data.

The applicant reported the 1-hr NO_2 predicted concentration incorrectly. The ADMT supplemented this value based on the modeling output files.

Background concentrations for NO_2 were obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. The three-year average (2010-2012) of the 98th

percentile of the annual distribution of the daily maximum 1-hr concentrations was used for the 1-hr value and the highest annual concentration from three years (2010-2012) was used for the annual value. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 4. PSD Ambient Air Quality Analysis for Ozone

Pollutant	Monitor	Averaging Time	Background (ppb)	Standard (ppb)
O_3	480391016	8-hr	72	75

A background concentration for ozone was obtained from the EPA AIRS monitor 480391016 located at 109b Brazoria Highway 332 West, Lake Jackson, Brazoria County. A three-year average (2010-2012) of the annual fourth highest daily maximum 8-hr concentrations was used in the analysis. The ADMT reviewed monitoring data from 2013 and determined that the overall conclusions would not change. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

EPA Region 6 has previously recommended a conservative analysis based on the NO_2 modeling to estimate the potential impacts on ozone levels. Considering that it takes time for the NO_2 emissions to react to generate ozone, an evaluation of maximum estimated NO_2 concentrations at a distance of 10-to-11 km downwind from the project source could be used to estimate the potential ozone impacts. EPA Region 6 has recommended that emission sources would have an average ozone yield of up to 2-3 ozone molecules per NO_2 molecule. The applicant used AERMOD to calculate a maximum 8-hr NO_x concentration for normal operations and startup operations at a distance of 10 km. The maximum 8-hr NO_x concentration of 0.44 parts per billion (ppb) at a distance of 10 km is based on one hour of startup operations and seven hours of normal operations in an eight hour duration. Assuming 90% conversion of NO_x to NO_2 and an ozone yield of three ozone molecules per molecule of NO_2, the 8-hr maximum predicted increase of ozone would be 1.3 ppb. Adding 1.3 ppb to the 8-hr ozone background of 72 ppb will result in a total 8-hr ozone concentration less than the 8-hr ozone NAAQS of 75 ppb.

D. Increment Analysis

The De Minimis analysis modeling results indicate that annual NO_2 exceeds the de minimis concentration and requires a PSD increment analysis.

Table 5 .Results for PSD Increment Analysis

Pollutant	Averaging Time	GLCmax (µg/m³)	Increment (µg/m³)
NO_2	Annual	6.3	25

The GLCmax represents the maximum predicted concentration over five years of meteorological data.

E. Additional Impacts Analysis

The applicant performed an Additional Impacts Analysis as part of the PSD AQA. The applicant conducted a growth analysis and determined that population will not significantly increase as a result of the proposed project. The applicant conducted a soils and vegetation analysis and determined that all evaluated criteria pollutant concentrations are below their respective secondary NAAQS. The applicant meets the Class II visibility analysis requirement by complying with the opacity requirements of 30 TAC 111. The Additional Impacts Analyses are reasonable and possible adverse impacts from this project are not expected.

The ADMT evaluated predicted concentrations from the proposed site to determine if emissions could adversely affect a Class I area. The nearest Class I area, Big Bend National Park, is located approximately 680 km from the proposed site.

The H_2SO_4 24-hr maximum predicted concentration of 0.05 µg/m³ occurred approximately 185 meters from the fence line towards the southwest. The H_2SO_4 24-hr maximum predicted concentration occurring at the edge of the receptor grid, approximately 54 km from the proposed source, in the direction of the Big Bend National Park Class I area is 0.001 µg/m³. The Big Bend National Park Class I area is an additional 626 km from the edge of the receptor grid. Therefore, emissions of H_2SO_4 from the proposed project are not expected to adversely affect the Big Bend National Park Class I area.

The predicted concentrations of PM_{10}, $PM_{2.5}$, NO_2, and SO_2 for all averaging times, are all less than de minimis levels at a distance of approximately 1.6 km from the proposed source in the direction of Big Bend National Park Class I area. The Big Bend National Park Class I area is an additional 678.4 km from the location where the predicted concentrations of PM_{10}, $PM_{2.5}$,

NO_2, and SO_2 for all averaging times are less than de minimis. Therefore, emissions from the proposed project are not expected to adversely affect the Big Bend National Park Class I area.

F. Minor Source NSR and Air Toxics Review

Table 6. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	4.8	20.4
H_2SO_4	1-hr	0.36	1
H_2SO_4	24-hr	0.05	0.3

The justification for selecting the EPA's interim 1-hr SO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr SO_2 De Minimis level. As explained in EPA guidance memoranda[3], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr SO_2 NAAQS.

Table 7. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m³)	De Minimis (µg/m³)
SO_2	1-hr	1.37	7.8
SO_2	3-hr	2.53	25
SO_2	24-hr	0.6	5
SO_2	Annual	0.05	1

The 1-hr SO_2 GLCmax is based on the highest five-year average of the maximum predicted concentration determined for each receptor. The GLCmax for all other averaging times represent the maximum predicted concentrations over five years of meteorological data.

The applicant reported the 3-hr SO_2 predicted concentration based on a weighted average of the maximum 3-hr predicted concentration under start-up conditions (weighted by 1/3) plus the maximum 3-hr predicted concentration under normal operating conditions (weighted by 2/3).

[3] www.epa.gov/region07/air/nsr/nsrmemos/appws02.pdf

The applicant reported the 24-hr SO_2 predicted concentration based on a weighted average of the maximum 24-hr predicted concentration under start-up conditions (weighted by 1/24) plus the maximum 24-hr predicted concentration under normal operating conditions (weighted by 23/24).

Table 8. Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m3)	Background (µg/m3)	Total Conc. = [Background + GLCmax] (µg/m3)	Standard (µg/m3)
Pb	3-mo	0.0005	0.011	0.0115	0.15

The GLCmax represents the maximum 1-hr predicted concentration over five years of meteorological data. Using the maximum 1-hr predicted concentration is a conservative representation of the 3-month rolling average.

The applicant did not provided an evaluation of ambient background concentrations for lead. The ADMT reviewed lead monitoring data in Harris County and used the monitor with the highest lead concentration as a conservative representation of background concentrations for Wharton County. A background concentration for lead was obtained from the EPA AIRS monitor 482011034 located at 1262 ½ Mae Drive, Houston, Harris County. The highest 24-hr concentration from 2013 was used as a conservative representation of the 3-month rolling average. The use of this monitor is reasonable based on a comparison of county-wide emissions, population, and a quantitative analysis of source emissions located within 10 km of the project site and monitor location.

Table 9. Minor NSR Site-wide Modeling Results for Health Effects

Pollutant & CAS#	Averaging Time	GLCmax (µg/m3)	ESL (µg/m3)
acetaldehyde 75-07-0	1-hr	0.41	15
acetaldehyde 75-07-0	Annual	0.001	45
acrolein 107-02-8	1-hr	0.05	3.2
acrolein 107-02-8	Annual	0.0002	0.15
arsenic & inorganic cpds 7440-38-2	1-hr	3.23×10^{-5}	3

Pollutant & CAS#	Averaging Time	GLCmax (µg/m³)	ESL (µg/m³)
arsenic & inorganic cpds 7440-38-2	Annual	1.3×10^{-7}	0.067
benzene 71-43-2	1-hr	0.63	170
benzene 71-43-2	Annual	0.002	4.5
cadmium & compounds (as Cd) NA	1-hr	3.59×10^{-6}	0.1
chromium metal 7440-47-3	1-hr	0.01	3.6
chromium metal 7440-47-3	Annual	3.5×10^{-5}	0.041
formaldehyde 50-00-0	1-hr	0.64	15
formaldehyde 50-00-0	Annual	0.002	3.3
mercury, alkyls 7439-97-6	1-hr	7.21×10^{-6}	0.1
naphthalene 91-20-3	1-hr	0.07	200
naphthalene 91-20-3	Annual	0.0003	50
nickel, metal & cpds 7440-02-0	1-hr	0.001	0.33
nickel, metal & cpds 7440-02-0	Annual	4.17×10^{-6}	0.059
polycyclic aromatic HC's, particulate, <10% b(a)p, not otherwise classified NA	1-hr	0.13	0.5
propylene oxide 75-56-9	1-hr	2.54	70
selenium oxide 7446-08-4	1-hr	0.0002	2
toluene 108-88-3	1-hr	0.26	640
toluene 108-88-3	Annual	0.001	1200
xylene mixture 1330-20-7	1-hr	0.18	350
xylene mixture 1330-20-7	Annual	0.001	180

The location of the GLCmax is not provided since the GLCmax are based on unit modeling. See section 3 for more details. The applicant did not provide a GLCni.

The annual ESL for acrolein reported in Table 9 was the ESL in effect at the time that the modeling analysis was conducted. The current ESLs are available from the Toxicology Division's website.

VIII. Conclusion

Indeck Wharton, L.L.C. has demonstrated that this project meets all applicable rules, regulations and requirements of the Texas and Federal Clean Air Acts. The proposed facilities and controls represent BACT. The modeling analysis indicates that the proposed project will not violate the NAAQS, cause an exceedance of the increment, or have any adverse impacts on soils, vegetation, or Class I Areas. In addition, the modeling predicted no exceedance of ESLs at all receptors for non-criteria contaminants evaluated.

The Executive Director of the TCEQ proposes a preliminary determination of issuance of this permit for Indeck Wharton, L.L.C. to construct the Indeck Wharton Energy Center as proposed.