

Invenergy Thermal Development, LLC

Ector County Energy Center

Prevention of Significant Deterioration Permit for Greenhouse Gas Emissions

PSD-TX-1366-GHG

**Summary of Revisions  
and  
Responses to Public Comments**

U.S. Environmental Protection Agency, Region 6

July 31, 2014

## Table of Contents

I.	Summary of the Formal Public Participation Process.....	Page 3
II.	EPA’s Responses to Public Comments.....	Page 4
III.	Revisions in Final Permit.....	Page 8
IV.	National Historic Preservation Act (NHPA).....	Page 12

## **I. Summary of the Formal Public Participation Process**

The U.S. Environmental Protection Agency, Region 6 (EPA) proposed to issue a Prevention of Significant Deterioration (PSD) permit to Invenergy Thermal Development, Ector County Energy Center on April 18, 2014. The public comment period on the draft permit began April 18, 2014 and was originally scheduled to close on May 19, 2014. EPA announced the public comment period through a public notice published in the *Odessa American* on April 18, 2014 and on Region 6's website. EPA also notified agencies and municipalities on April 18, 2014 in accordance with 40 CFR Part 124.

The Administrative Record for the draft permit was made available at EPA Region 6's office. EPA also made the draft permit, Statement of Basis and other supporting documentation available on Region 6's website, and at the Ector County Library in Odessa, Texas.

EPA's public notice for the draft permit also provided the public with notice of the public hearing, explaining that it was subject to cancellation if no requests for a hearing were received or if EPA determined that there was not a significant degree of public interest. During the comment period, EPA did not receive a written request for a public hearing on May 27, 2014 and the public meeting was cancelled on April 12, 2014. EPA received public comments on May 15, 2014 which we respond to below.

### **Update to Applicability Analysis**

On June 23, 2014, the United States Supreme Court issued a decision addressing the application of stationary source permitting requirements to greenhouse gases. *Utility Air Regulatory Group (UARG) v. Environmental Protection Agency* (EPA) (No. 12-1146). The Supreme Court said that the EPA may not treat greenhouse gases as an air pollutant for purposes of determining whether a source is a major source required to obtain a Prevention of Significant Deterioration (PSD) or Title V permit. However, the Court also said that the EPA could continue to require that PSD permits, otherwise required based on emissions of conventional pollutants, contain limitations on GHG emissions based on the application of Best Available Control Technology (BACT). Pending further EPA engagement in the ongoing judicial process before the District of Columbia Circuit Court of Appeals, the EPA is proceeding with this final permitting decision consistent with EPA's understanding of the Supreme Court's decision.

In this final permit decision, the EPA is continuing to apply the PSD BACT requirement to GHG emissions from Ector County Energy Center. This project is otherwise subject to PSD because it emits a regulated NSR pollutant other than GHG (specifically carbon monoxide, nitrogen oxides) above the major source thresholds. In addition, the proposed source emits or has the potential to emit 75,000 tons per year (tpy) or more of GHG on a carbon dioxide equivalent (CO<sub>2</sub>e) basis (*see* 40 C.F.R. § 52.21(b) (49)(iv); *PSD and Title V Permitting Guidance for Greenhouse Gases* (March 2011) at 12-13). [503,204 TPY CO<sub>2</sub>e] Since the Supreme Court recognized EPA's authority to limit application of BACT to sources that emit GHGs in greater than *de minimis* amounts, EPA believes it may apply the 75,000 tons per year threshold in existing regulations at this time to determine whether BACT applies to GHGs at this facility. Accordingly, this project

continues to require a PSD permit that includes limitations on GHG emissions based on application of BACT.

EPA Region 6 continues as a PSD permitting authority for GHG emissions in accordance with the provisions of the FIP that do not conflict with the Court's decision and thus remain in place. The Supreme Court's decision does not limit the authority and responsibility of Region 6 with regard to this particular permitting action. No other changes to the administrative record or Final Permit are warranted as a result of the recent Supreme Court decision.

## **II. EPA's Response to Public Comments**

This section summarizes the public comments received by EPA and provides our responses to the comments. EPA received 16 comments during the public comment period. All comments received were from the Permittee.

1. The Permittee, requested an administrative change in the permit to change the name of the Permittee to Ector County Energy Center LLC, the project-specific subsidiary of Invenergy Thermal Development (the original applicant).

**EPA Response:** EPA accepts this change and has modified the final permit in two locations on Page 1.

2. The Permittee requested a correction to the cross references to Section II., Table 1, FWP-4; Section II. Table 1, SF6FUG; and Section II., Table 1, NGFUG to cross reference permit condition III.C, permit condition III.D, and permit condition III.E, respectively.

**EPA Response:** EPA accepts this change and has edited the cross references in the final permit accordingly. The BACT requirements in Table 1 now reflects the correct permit conditions.

3. The Permittee requested a correction to Section II., Table 1, Footnote 2 to edit the Global Warming Potential for N<sub>2</sub>O from 310 to 298.

**EPA Response:** EPA had an error in Footnote 2, in the Annual Emissions Table regarding the Global Warming Potential for N<sub>2</sub>O. EPA edited the N<sub>2</sub>O value to 298 in the final permit.

4. The Permittee requested that the following language be added Sections (III.A.2.a. and IIIA.2.b.of the permit) "MSS emission totals and MSS power generation totals are not included in this calculation. The first point at which compliance with this permit requirement will be demonstrated is after 2,500 hours of operation after the shakedown period has concluded."

**EPA Response:** EPA rejects this additional language because it is redundant, because Section III.A.2.d states that "a 12-month rolling basis which shall **not** include period of startup and shutdown". Additionally, the shakedown period is clearly discussed in Section V of the final permit.

5. Regarding Special Permit Condition III.A.2.d., the Permittee expressed a need for clarification regarding startup and shutdowns not being included in the 2,500 operational hours on a 12-month rolling average for each Combustion Turbine Generator (CTG).

**EPA Response:** EPA edited this condition in the final permit to exclude periods of startup and shutdown from the output-based BACT limits. Instead, EPA established a separate emission limitation of 21 tons of CO<sub>2</sub>e for each combined startup and shutdown event. EPA also established a duration limitation of 60 minutes for each combined start up and shutdown (*See* III.A.4.b, d and e). Finally, EPA limited the maximum heat input for each startup event to 1320 MMBtu/hr. These changes, in combination with the change to Section III.A.2.d. made it clear that startup and shutdown events are not included in the calculation of the output-based BACT limits that apply during normal operations.

6. The Permittee requested the following clarifying edits to Section III.A.3.b. “Permittee shall calculate the CH<sub>4</sub> and N<sub>2</sub>O emissions on a 12-month rolling average. Permittee shall determine compliance with the CH<sub>4</sub> and N<sub>2</sub>O emissions limits contained in Section II using the default CH<sub>4</sub> and N<sub>2</sub>O emission factors contained in Table C-2 of 40 CFR Part 98, fuel heat content factors updated monthly from fuel analysis, and the measured actual hourly heat input (HHV) fuel use.” These changes are requested based on the following rationale “As explained in permit condition III.A.2.a, heat input is not required to be directly measured, but rather calculated based on monthly fuel analysis. The proposed change ensures consistency on this compliance tracking procedure.”

**EPA Response:** EPA rejects this proposed change because the language is not consistent with other permits recently issued. Additionally, Section III.A.2.c. states that the HHV shall be calculated based on fuel use in any 2,500 operational hour rolling period. This requires that fuel use be measured on an hourly basis and then calculated for each combustion turbine. 40 C.F.R. § 98.33(C)(4) requires sources using Tier 4 calculation methodology to use equation C-10 for the calculation of CH<sub>4</sub> and N<sub>2</sub>O using the cumulative annual heat input which would be obtained from the data required in Special Condition III.A.2.c.

7. The Permittee requested that the following statement in Section III.A.3.h “Permittee shall measure and record the net energy output (MWh (net)) on an hourly basis” be removed from the permit.

**EPA Response:** EPA has revised Section III.A.3.h. to “**gross** energy output (MWh (**gross**)) on an hourly basis.” This condition is now consistent with other recently issued and proposed GHG PSD permits for simple-cycle combustion turbines being used for peaking power projects.

8. The Permittee requested that the reference to TCEQ permit PSD TX 1366 be removed from Section III.A.3.h.

**EPA Response:** EPA removed the reference to the TCEQ permit because it is not necessary to meet the requirements of the GHG permit.

9. The Permittee expressed concern with the added 15 minutes for startup included in Section III.A.4.b.i., stating that “Once the turbine achieves low-NOx combustion mode, startup is complete, and it is not necessary or appropriate to add additional time. 15 minutes is typically added to startup times for CEMS-monitored systems. For fuel-consumption-based compliance, such as Ector County Energy Center intends to use, this is not required.”

**EPA Response:** EPA reviewed the language in the Statement of Basis (SOB) and it correctly states that “All startup and shutdowns are limited to 60 minutes in duration per event. A startup of each turbine is defined as the period that begins when there is a measurable fuel flow to the turbine and ends when the turbine reaches 60 percent capacity. A shutdown of each turbine is defined as the time period that begins when the combustion turbine drops out of normal operating low-NOx combustion mode (which equates to approximately 60 percent capacity) following an instruction to shut down, and ends when flame is no longer detected in the combustion turbine combustors. The ECEC project is proposing 500 startups/shutdowns in addition to 2,500 operation hours per year per turbine.” In accordance with the language in the SOB, EPA has removed the language regarding an additional 15 minutes for startup in Special Condition III.A.4.b.i. in the final permit.

10. In Section III.A.4.c.i, the Permittee expressed concern with the following language: “No more than one of the two simple-cycle turbine will undergo startup and/or shutdown in any 30 minute period, except simultaneous startups of multiple turbines within a 30 minute period may occur 52 times on a 12 month rolling basis.” The Permittee commented that “Ector County Energy Center’s turbines are capable of starting up in less than 30 minutes and shutting down simultaneously, and the peaking facility’s purpose is to respond as quickly as possible to changes in electricity demands. Startup and shutdown emissions are already appropriately restricted by limitations on the annual number and duration of the events. Because greenhouse gases are long-term pollutants, prohibitions on faster startup times and simultaneous shutdowns are not necessary and may actually increase annual emissions. Other draft and final GHG PSD permits recently issued by EPA Region 6 do not contain this limitation.”

**EPA Response:** Because the language regarding simultaneous startups is not applicable to the Ector County Energy Center. EPA removed the inadvertent language from Section III.A.4.c.i. in the final permit.

11. The Permittee requests that the language in Section III.A.4.g be changed from “periods of startup” to “periods of MSS”, commenting that “All MSS emissions should be excluded for this limitation, not only startup”.

**EPA Response:** EPA agrees and has edited the language in Section III.A.4.g. of the final permit to read “periods of startup and shutdown.”

12. The Permittee requested the following clarifying edits to Section III.B.2.b: “Permittee shall calculate the CH<sub>4</sub> and N<sub>2</sub>O emissions on a 12-month rolling average. Permittee shall determine compliance with the CH<sub>4</sub> and N<sub>2</sub>O emissions limits contained in Section II using the default CH<sub>4</sub> and N<sub>2</sub>O emission factors contained in Table C-2 of 40 CFR Part 98, fuel heat content factors updated monthly from fuel analysis, and the measured actual hourly heat input (HHV) fuel use.”

The Permittee commented that “As explained in permit condition III.A.2.b heat input is not required to be directly measured, but rather calculated based on monthly fuel analysis. The proposed change ensures consistency on this compliance tracking procedure.”

**EPA Response:** EPA rejects this proposed change because the language is not consistent with other permits recently issued. Additionally, Section III.A.2.c. states that the HHV for the combustion turbines shall be calculated based on fuel use in any 2,500 operational hour rolling period. This requirement does not apply to the dew point heater. Special Permit Condition III.B.2.a. requires CO<sub>2</sub> emissions to be calculated using the Tier 2 equation C-2a of 40 C.F.R. 98 Subpart C. This calculation requires the use of the annual average high heat value (HHV) of the fuel. The Permittee is required to calculate CH<sub>4</sub> and N<sub>2</sub>O emissions utilizing the Tier 2 equation C-9a in 40 C.F.R. § 98.33 (C)(2). This calculation requires the use of the HHV.

13. The Permittee requests that the date reference in Section III.B.2.b be changed to the published date of November 29, 2013 (74 FR 71904).

**EPA Response:** EPA referenced an older published document and revised this reference in the final permit to reflect the correct citation.

14. The Permittee suggests modifying the language in Section III.E.b. to state that “AVO monitoring shall be performed daily on days when personnel are onsite.”

**EPA Response:** EPA rejects this proposed change because daily AVO monitoring conditions have been required by EPA Region 6 as BACT in other recently proposed and issued PSD permits for other simple-cycle combustion projects.

15. In Sections III.E.c. and III.E.d., the Permittee suggests removing the language referring to remote sensing, noting that “remote sensing equipment is not proposed at Ector County Energy Center, so relevant requirements should be removed”.

**EPA Response:** EPA has removed the language referencing remote sensing in the final permit and instead rely on language requiring daily AVO monitoring.

16. The Permittee requests that Section VI.A.1. be clarified to read “The CO<sub>2</sub> hourly average emission rate determined by the three runs at or above 90% of maximum load **multiplied** by **2,500** hours, **for each turbine**.” The Permittee states that this “Clarification is to add what appeared to be a missing word in order to explain how the calculation should be done. In addition, the number of operating hours has been corrected to be consistent with the per-turbine operating hour limitation.”

**EPA Response:** EPA made this edit in the final permit to clarify the correct calculation for each turbine.

### III. Final Revisions to the Permit

Several changes were made in the Final Permit to address editorial issues, provide clarification and reflect the change from the original applicant to the project’s current owner. These changes are specifically made on Page 1.

Pages 1, 3, 4, 9, 10, 12, 13, 14, 15, 16, and 17 - A typographical error was corrected throughout the permit to spell Permittee correctly.

Pages 1 and 2– Invenergy Thermal Development LLC was changed to Ector County Energy Center LLC based on a change in ownership to the project specific subsidiary of Invenergy Thermal Development. This change was made in multiple places at the company’s request.

PERMITTEE: ~~Invenergy Thermal Development~~ **Ector County Energy Center**, LLC

Pursuant to the provisions of the Clean Air Act (CAA), Subchapter I, Part C (42 U.S.C. Section 7470, *et. Seq.*), and the Code of Federal Regulations (CFR) Title 40, Section 52.21, and the Federal Implementation Plan at 40 CFR § 52.2305 (effective May 1, 2011 and published at 76 FR 25178), the U.S. Environmental Protection Agency, Region 6 is issuing a *Prevention of Significant Deterioration* (PSD) permit to ~~Invenergy Thermal Development~~ **Ector County Energy Center** LLC (ECEC) for Greenhouse Gas (GHG) emissions.

Page 6-7 Section II, Table 1 was revised as follows:

**Table 1. Annual Emission Limit – GE 7FA.03 CT**

FIN	EPN	Description	GHG Mass Basis		TPY CO <sub>2e</sub> <sup>1,2</sup>	BACT Requirements
				TPY		
CTG-1 CTG-2	CTG-1 CTG-2	Natural Gas Fired-Simple Cycle Turbine	CO <sub>2</sub>	239,420 <sup>3</sup>	239,649 <sup>3</sup>	- BACT limit of 1,393 lb CO <sub>2</sub> /MW-hr (gross) on a 2,500 operational hour rolling basis, rolling daily, each turbine. -Not to exceed 2,500 hours of operation on a 12-month rolling basis per turbine. -See permit condition III.A.2.a. through d.
			CH <sub>4</sub>	4.4 <sup>3</sup>		
			N <sub>2</sub> O	0.4 <sup>3</sup>		
CTG-1 CTG-2	CTG-1 CTG-2	Natural Gas Fired-Simple Cycle Turbine – MSS <sup>4</sup>	CO <sub>2</sub>	10,500 <sup>4</sup>	10,502 <sup>4</sup>	-Each event limited to 21 tons CO <sub>2e</sub> . -Limit of 500 events on a 12-month rolling total. -Maximum heat input during startup limited to 1,320 MMBtu/hr.
			CH <sub>4</sub>	0.06 <sup>4</sup>		
			N <sub>2</sub> O	No Numerical Limit Established <sup>5</sup>		

FIN	EPN	Description	GHG Mass Basis		TPY CO <sub>2</sub> e <sup>1,2</sup>	BACT Requirements
				TPY		
DPT HTR-3	DPT HTR-3	Natural Gas-Fired Dew-Point Heater	CO <sub>2</sub>	2,630	2,631	-Not to exceed 5,000 hours per year on a 12-month rolling basis
			CH <sub>4</sub>	0.05		
			N <sub>2</sub> O	No Numerical Limit Established <sup>5</sup>		
FWP-4	FWP-4	Firewater Pump Engine	CO <sub>2</sub>	5.44	5	- Not to exceed 100 hours of non-emergency operation on a 12-month rolling basis - Use of Good Combustion Practices. See permit condition III. <b>BC</b> .
			CH <sub>4</sub>	No Numerical Limit Established <sup>5</sup>		
			N <sub>2</sub> O	No Numerical Limit Established <sup>5</sup>		
SF6FUG	SF6-FUG	Fugitive SF <sub>6</sub> Circuit Breaker Emissions	SF <sub>6</sub>	No Numerical Limit Established <sup>6</sup>	No Numerical Limit Established <sup>6</sup>	Work Practices. See permit condition III. <b>CD</b> .
NGFUG	NG-FUG	Components Fugitive Leak Emissions	CH <sub>4</sub>	No Numerical Limit Established <sup>7</sup>	No Numerical Limit Established <sup>7</sup>	Implementation of AVO Program. See permit condition III. <b>DE</b> .
<b>Totals<sup>8</sup></b>			CO <sub>2</sub>	502,475	<b>503,204</b> <b>CO<sub>2</sub>e</b>	
			CH <sub>4</sub>	19		
			N <sub>2</sub> O	0.8		
			SF <sub>6</sub>	.0006		

1. The TPY emission limits specified in this table are not to be exceeded for this facility and include emissions from the facility during all operations and include MSS activities.
2. Global Warming Potentials (GWP): CO<sub>2</sub>=1, CH<sub>4</sub> = 25, N<sub>2</sub>O = ~~310~~**298**, SF<sub>6</sub>=22,800
3. The GHG Mass Basis TPY limit and the CO<sub>2</sub>e TPY limit for the natural gas fired simple cycle turbines applies to each turbine and is not a combined limit.
4. The GHG Mass Basis TPY limit and the CO<sub>2</sub>e TPY limit for the natural gas fired simple cycle turbines – MSS includes emissions associated with gaseous fuel venting of the fuel lines during a turbine shutdown or maintenance and applies to each turbine and is not a combined limit.
5. These values indicated as “No Numerical Limit Established” are less than 0.01 TPY with appropriate rounding. The emission limit will be a design/work practice standard as specified in the permit.
6. Fugitive Leak Emissions from SF6-FUG are estimated to be 0.0006 TPY SF<sub>6</sub> and 13.7 TPY CO<sub>2</sub>e. In lieu of an emission limit, the emissions will be limited by implementing a design/work practice standard as specified in the permit.

7. Fugitive Leak Emissions from NG-FUG are estimated to be 0.134TPY CO<sub>2</sub>, 10.08 TPY CH<sub>4</sub>, and 252.25 TPY CO<sub>2</sub>e. In lieu of an emission limit, the emissions will be limited by implementing a design/work practice standard as specified in the permit.
8. Total emissions include the PTE for fugitive emissions. Totals are given for informational purposes only and do not constitute emission limits.

These change were made to correct for errors in the permit. See EPA Response to Public Comments numbers 2 and 3.

Page 8 – Section III.A.2.d. was revised as follows:

“Each turbine (EPNs CTG-1 and CTG-2) is limited to 2,500 operational hours on a 12-month rolling basis which shall not include periods of startup and shutdown.”

This change was made to correct for an error (See EPA Response to Public Comments numbers 4 and 5).

Page 9 – Section III.A.3.h – The language was changed as follows:

“Permittee shall measure and record the ~~net~~ gross energy output (MWh (~~net~~ gross)) on an hourly basis.”

This change was made at the company’s request. See EPA Response to Public Comment number 7.

Page 9 – Section III.A.3.i – The language was changed as follows:

“On or before the date of initial performance test required by 40 CFR 60.8 and thereafter, Permittee shall install, and continuously operate, and maintain the combustion turbines so emissions are at or below the emissions limits specified in this permit ~~and TCEQ permit PSD-TX 1366~~”.

This change was made at the company’s request. See EPA Response to Public Comment number 8.

Page 10 – Section III.A.4.b.i – The language was changed as follows:

“A startup of each turbine is defined as the period that begins when fuel flow is initiated in the combustion turbine as indicated by flame detection and ends when the normal operating low-NOx combustion mode is achieved (which equals to approximately 60% combustion turbine load) ~~plus 15 minutes. A startup time is limited to 60 minutes per event.~~”

The permit was edited to include the clarification about startup and shutdown to be consistent with Section III.A.2.d. See EPA Response to Public Comment number 9.

Page 10 – Section III.A.4.b.ii – The language was changed as follows:

“A shutdown of each turbine is defined as the time period that begins when the combustion turbine drops out of normal operating low-NO<sub>x</sub> combustion mode (which equates to approximately 60% combustion turbine load) following an instruction to shut down, and ends when flame is no longer detected in the combustion turbine combustors. ~~A shutdown is limited to 60 minutes per event.~~”

The permit was edited to include the clarification about startup and shutdown to be consistent with Section III.A.2.d.

Page 10 - Section III.A.4.c.i. – The following was removed from the final permit.

~~“No more than one of the two simple cycle turbines will undergo startup and/or shutdown in any 30 minute period, except that simultaneous startups of multiple turbines within a 30 minute period may occur 52 times on a 12-month rolling basis”~~

This change was made at the company’s request. See EPA Response to Public Comment number 10. The following conditions were renumbered accordingly as a result of this change.

Page 10 - Section III.A.4.g – The language was changed as follows:

“The BACT emission limitations in Special Condition III.A.2.a do not include periods of startup and shutdown.”

The permit was edited to include clarification about startup and shutdown to be consistent with Section III.A.2.d. See EPA Response to Public Comment number 11.

Page 11 - Section III.B.2.c - The language was changed as follows:

“Permittee shall calculate the CO<sub>2e</sub> emissions on a 12-month rolling basis, based on the procedures and Global Warming Potential (GWP) contained in Greenhouse Gas Regulations, 40 CFR Part 98, Subpart A, Table A-1, ~~as published on October 30, 2009 (74 FR 56395) November 29, 2013 (74 FR 71904).~~”

This change was made at the company’s request. See EPA Response to Public Comment number 13.

Page 12 and 13 – Section III.E.d and Section III.E.e were revised as follows:

d. Any component found to be leaking during ~~remote sensing or~~ AVO monitoring shall be repaired within 15 days.

e. Records of the annual ~~remote sensing results~~ and daily AVO monitoring results shall be maintained on site.

The language pertaining to remote sensing is removed, but the requirement for daily AVO monitoring by personnel onsite is retained in the Final Permit. This change was made at the company’s request. See EPA Response to Public Comment number 15.

Page 15 – Section VI.A.1 – The language was changed as follows:

“The CO<sub>2</sub> hourly average emission rate determined by the three runs at or above 90% of maximum load multiplied by ~~5,000~~ 2,500 hours, for each turbine”

This change was made at the company’s request. See EPA Response to Public Comment number 16.

#### **IV. National Historic Preservation Act (NHPA)**

On April 16, 2014, EPA sent a letter to the State Historic Preservation Officer (SHPO) requesting concurrence on EPA findings for Invenergy Thermal Development’s cultural survey. The SHPO sent a letter with concurrence to the EPA on April 28, 2014.