UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

JUN 0 7 2013

Mr. Graham Bacon
Senior Vice President
Enterprise Products Operating LLC
P.O. Box 4324
Point Comfort, TX 77210

RE: Completeness Determination for Enterprise Products Operating LLC
Greenhouse Gas Prevention of Significant Deterioration (PSD) Permit Application
Mont Belvieu Complex: Propane Dehydrogenation Unit

Dear Mr. Bacon:

The EPA has reviewed your Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) permit application, including supporting documentation, for Enterprise Products Operating LLC that was received by the EPA on December 19, 2012, and determined that your application is incomplete at this time. A list of the information needed from you so that the EPA can continue its completeness review is enclosed (see Enclosure). Please notify us if a complete response is not possible by June 21, 2013.

The requested information is necessary for EPA to develop a Statement of Basis and Rationale for the terms and conditions for any proposed permit. As we develop our preliminary determination, it may be necessary for EPA to request additional clarifying or supporting information. If the supporting information substantially changes the original scope of the permit application, an amendment or new application may be required.

The EPA may not issue a final permit without determining that: 1) there will be no effects on threatened or endangered species or their designated critical habitat, or 2) until it has completed consultation under Section 7(a)(2) of the Endangered Species Act (16 USC § 1536). In addition, the EPA must undergo consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 USC § 470f). As a reminder, NHPA implementing regulations require that EPA provide information to the public with an opportunity for participation in the Section 106 process. 36 CFR § 800.2(d). We received your Biological Assessment and Cultural Resources Reports on May 14, 2012 and appreciate your preparing this for our use in complying with these statutes.

If you have any questions regarding the review of you permit application, please contact Melanie Magee of my staff at (214) 665-7161or magee.melanie@epa.gov.

Sincerely yours,

Wren Stenger

Director
Multimedia Planning and
Permitting Division

Enclosure

ENCLOSURE
EPA Information Request
Enterprise Products Operating LLC
Mont Belvieu Complex: Propane Dehydrogenation Unit (PDH)
Application for Greenhouse Gas Prevention of Significant Deterioration Permit

1. The process description should follow the process flow diagram that is provided and identify all emission points that emit GHG emissions or have the potential to emit. Please revise the process description to include an explanation of equipment that is represented on the process flow diagram. The blocks that are used to represent several pieces of equipment make it difficult to understand the process. For example, the application mentions a "Product Splitter" on page 4-1 and "Deethanizer Off-gas" on page 5-1, but this equipment is not shown on the process flow diagram. Also, the process description does not include a description of both pieces of equipment. Instead of using one block to represent several pieces of equipment, please consider revising the process flow diagram to include the distillation columns, steam/solvent strippers, flash drums, fractionators, heaters, compressors, condensate knockout drums, de-oiler and tanks that are a part of the Product Purification, C4 Recovery, Regeneration Gas System, Hydrogen Recovery (PSA) Unit, and Propylene Refrigeration Systems. Also, please revise the process description to include a brief summary of the equipment's purpose in the production units. If possible, please include in the process equipment summary, design technologies utilized to increase the efficiency of plant operation in comparison to similar sources that do not use these technologies. Please include anticipated efficiency gains and the technical resources used to evaluate the design decisions. The process description should comport with the "Overall" and the "Waste Heat Boiler (WHB)" process flow diagrams. Also, please include any non-GHG sources, but please identify them as such, if it is an integral part of process and feeds a GHG source. It is suggested that additional pages be created and provided to EPA to represent the process to avoid overcrowding and confusion.

2. In addition to the previous comment, please supplement the PDH Unit "Overall" and /or "WHB" process flow diagrams with the following information:

   A. A representation of all ten PDH reactors along with the emission point identification numbers (EPNs) should be shown on the process flow diagram. Also, indicate how the reactors will connect to the production unit.
   B. On page 1-1 of the permit application, it indicates the new facilities in the PDH Unit will include:
      - Ten parallel catalytic reactors that convert propane feed to propylene,
      - One Reactor Charge Heater,
      - One Regeneration Air Heater,
      - One Waste Heat Boiler with duct firing capability,
      - Two Auxiliary Boilers,
      - Two Regeneration Air Compressors,
      - Two Regeneration Air Combustion Turbines,

- Cooling tower,
- Hydrogen Recovery (PSA) Unit,
- Ancillary tanks,
- Emergency pump engines,
- Process flare, and
- Wastewater treatment facilities.

However, the "Overall" and/or "WHB" process flow diagrams do show the following from this list: ancillary tanks, emergency pump engines, wastewater treatment facilities, two regeneration air compressors, and fugitive and/or natural gas leak emissions. Please supplement the "Overall" and/or "WHB" process flow diagrams to include these facilities and the equipment involved along with their associated EPNs. Please identify as GHG or non-GHG emission sources. Please provide supplemental data to the process description to summarize the purpose of the facilities and the function of its equipment.

C. On Table 2F, the EPN: HR15.101 is given for "Combustion Unit Cap". However, on the Overall process flow diagram EPN: HR15.101 (Charge Heater) is shown as an emission source coming from the block labeled "Feed Vaporization /Preheat". Please clarify the inconsistency. Also, where does the emission source originate from that is identified as EPN: HR15.101 (Charge Heater) on the "Overall" process flow diagram? Does the EPN represent an exhaust directed to or from the Charge Heater? The Charge Heater is not shown as a piece of equipment on the process flow diagram and it is not described in the process description. Please supplement the "Overall" process flow diagram and process description by including the Charge Heater and the correct EPN.

D. EPA understands and appreciates that the purpose of the "WHB" process flow diagram is to provide a closer look at the WHB's internal operation. However, it is important that there is continuity between the "Overall" and the "WHB" process flow diagrams and the process description. For example, it is not clear from the process description or the "Overall" process flow diagram where the WHB is located in the proposed PDH process. Is the WHB located in what is identified as the Regeneration Gas System on the "Overall" process flow diagram? Is the EPN: DW37.101 that is identified coming from the Regeneration Gas System, the same EPN: DW37.101 leaving the WHB on the "WHB" process flow diagram. It is also not clear if the Regeneration Air Heater shown on the "WHB" process flow diagram is part of the Regeneration Gas System shown on the "Overall" process flow diagram. There is a solid feed line that is unlabeled going directly from the Regeneration Air Heater to the Reactors on the "WHB" process flow diagram. There is a feed line labeled "Regen Air" going to the Reactors on the Overall process flow diagram. This feed line is shown not connected to any equipment or process. It is unclear from both diagrams, if these are the same feed lines. Please make this distinction on the "Overall" and "WHB" process flow diagrams. Are the Gas Turbines GT26.101A and GT26.101B shown on the "WHB" process flow diagram a part the Regeneration Gas System shown on the "Overall" process flow diagram? Please label the exhaust from Gas Turbines GT26.101A and GT26.101B on the "WHB" process flow diagram with an EPN. The exhaust from Gas Turbines GT26.101A and GT26.101B is currently labeled as "Bypass Vents". Will it be the same EPN on the "Overall" process diagram labeled as "GT.101A/B Gas Turbine Bypass Stacks"? Please ensure that all EPNs

are consistently labeled on both diagrams and correspond to the Emission Summary tables provided in the application.

E. On page 4-1 of the permit application, there is a brief discussion on the proposed PDH process that operates on a cyclic basis. In one complete cycle, hydrocarbon vapors are dehydrogenated; the reactor is then purged with steam and blown with air to reheat the catalyst and burn off the small amount of coke that is deposited on the catalyst during the reaction cycle. The "Overall" and/or the "WHB" process flow diagrams do not indicate steam feed to the reactors. Is the "Regen Air" that is indicated on the "Overall" process flow diagram, the same air previously mentioned used along with the steam to reheat the catalyst in the reactor? Please supplement the process description with details of the Regeneration Gas System that explains the purpose of the system for PDH production, the equipment involved, and associated feed and product streams. Please match the process description to both the "Overall" and the "WHB" process flow diagrams with the supplemental details. Please ensure that this is also done for the for the entire PDH process.

F. In Section 5 entitled "Emission Rate Basis" on page 5-3, it is stated that CO_2 emissions will be produced during periodic oxidation of the coke that builds up on the catalyst and these emissions are part of the "Reactor Regeneration Effluent" that is a contributor to the combined WHB stack exhaust. Please supplement the "Overall" and "WHB" process flow diagrams adding this stream. It is important that all process inlet and outlet streams are identified, labeled and referenced consistently throughout application.

G. On the WHB diagram there is a block identified as "Reactor EVAC Ejector Exhaust". Please supplement the process description with an explanation of this part of the process. The "WHB" process flow diagram identifies an outlet stream from this block labeled as "Air, VOC". Currently the "WHB" process flow diagram does not indicate any inlet streams to the "Reactor EVAC Ejector Exhaust" block? Is this correct? Please supplement the "Overall" and "WHB" process flow diagrams.

H. Please revise the "Overall" and "WHB" process flow diagrams to add supplemental information regarding the fuel gas feed lines. The fuel feed lines are currently labeled as "Fuel Gas". Please include where the fuel gas originates from as it is described in the process description, e.g., Deethanizer Offgas, PSA Tail gas, LTRU Offgas. Also, identify when import gas, i.e., natural gas and ethane, is used as a supplemental fuel.

I. In Section 5 on page 5-2, it states that "LTRU Offgas" can be burned in the Regeneration Air Heater and WHB Duct Burners. What is the meaning of the acronym "LTRU"? The process description does not include a description of this vessel nor is it included on the "Overall" and "WHB" process flow diagrams. Please provide supplemental information regarding this equipment, its purpose in the PDH process and where is it located in the process.

J. Please provide supplemental information on the "Overall" and "WHB" process flow diagrams to show the source for the vent streams that are directed to the flare. From what source(s) do the vents originate? Currently this is labeled as "Miscellaneous Vents from Process" on the inlet vent stream to the flare.

3. The "Overall" process flow diagram indicates a cooling tower will be utilized. Will the cooling towers be a GHG emission source? Are there heat exchangers located in the PDH process that if

a leak of process gas should occur, this would allow GHG emission into the cooling water system? If so please include the emission point identification number and emission calculations for the cooling tower. Typically CO_2 emissions are associated with combustion pollutants and CH_4 pollutant is associated with VOC pollutants, therefore if Enterprise feels that such streams do not have GHG pollutants an explanation is required. If there is a possibility for GHG emissions, please supplement the BACT analysis with an evaluation of leak repair and monitoring technologies and a proposal of what Enterprise would implement as BACT.

4. Please provide supplemental data that includes production output, gross heat rate and percent efficiency for the regeneration combustion turbine models currently being considered. Please provide comparative data for similarly designed combustion turbines that have been recently permitted by air permitting authorities nationwide (this information may be represented graphically in load/efficiency curves).

5. Will the combustion turbines vent to a common stack? Will the combustion turbines operate interchangeably – only one at a given time? What is your proposed monitoring for this "Bypass Vent" stack?

6. On page 4-1 of the permit application, it states that "operating conditions are selected to optimize the relationships among selectivity, conversion, and energy consumption." It is not clear what this statement means. Please provide supplemental information that explains the terms used and how it relates to the production of propylene and the GHG emissions that are created in the process. Please provide supplemental information that explains the proposed operating conditions that will be utilized in the PDH process. What operating parameters will be monitored and recorded to ensure these operating conditions are met and maintained? Will there be alarms alerting on-site personnel to operating problems? Will there be continuous monitoring? Please provide an explanation as to why the specific operating conditions and parameters were chosen to determine process optimization or production efficiency.

7. On page 4-1 of the permit application, it states that the low temperature recovery area, product purification, and refrigeration systems have been integrated to optimize energy efficiency. The designs contains:

    - Cascade propylene and ethylene refrigeration system
    - A high efficiency cold box design that minimizes equipment count and refrigerant compressor power demand
    - A low pressure Deethanizer that eliminates the need for feed pumps
    - A low pressure Product Splitter integrated with the propylene refrigeration system

    Please provide supplemental technical benchmark data that compares the design selections to be employed to a similar or existing source in the industry, and/or please provide supplemental information detailing the anticipated percent efficiency gains and/or reduced GHG production with the implementation of the above design attributes. Also, provide a copy of any technical

resources used to evaluate the design decisions for this part of the PDH facility and any benchmark comparison data that may have been utilized for the design selection.

8. In addition to the proposed GHG emission limits for the individual units, on page 5-1 of the permit application, Enterprise has proposed an overall combustion unit cap. The proposed combustion cap is to encompass the Reactor Charge Heater, the WHB Stack (which includes the emissions from Gas Combustion Turbines, Regeneration Air Heater, Reactor VOC, Coke Burn and WHB Duct Burners, and the Auxiliary Boilers). EPA typically will issue an output-based BACT emission limit (e.g., lb CO2/ton propylene) or a combination of an output- and input-based limit, where feasible and appropriate. For the individual units under consideration for this project, please propose an output-based, combination of an output- and input based limit or efficiency-based limits for each combustion unit included in the proposed combustion cap. Please provide an analysis that substantiates any reasons for infeasibility of a numerical emission limitation or an efficiency based limit for individual emission units. For the emission sources where numerical emission limitations are infeasible, please propose an operating work practice standard that can be practically enforceable

9. Beginning on page 6-2 of the permit application, it is indicated throughout the BACT analysis for the certain proposed equipment (Reactor Charge Heater, Regeneration Air Heater along with duct burners, Waste Heat Boiler along with duct burners, Auxiliary Boiler, Regeneration Air Combustion Turbines, and Emergency Pump Engines) that design technologies (e.g., efficient burners, state-of-art refractory, and good combustion control) to be employed will achieve the highest thermal efficiencies, thereby minimizing GHG emissions. Please provide supplemental manufacturer's data for the proposed equipment. Were other designs evaluated for this project? If so, please provide supplemental information that includes the comparison data that was used to assess the operation, performance, and efficiency of the chosen equipment. If available, please provide benchmark comparison data of similar existing sources that have been permitted by air-permitting authorities nationwide.

10. Beginning on page 6-8, the proposed BACT for the Reactor Charge Heater, Regeneration Air Heater, WHB, and Auxiliary Boilers states that the cleaning of burner tips and convection tubes will be performed on an "as-needed" basis. Please provide supplemental detail data pertaining to how the need for this maintenance will be ascertained. What is the proposed monitoring strategy?

11. On page 6-20 of the permit application, it is stated that the proposed BACT for the flares includes: 1) flaring minimization through good engineering design and good operating practices and 2) proper operation of the flare by using flow and composition monitors to accurately determine the optimum amount of natural gas required to maintain VOC destruction. Please provide specific details of the operating practices that will be utilized to minimize venting to the flares (e.g., equipment clearing practices). If available, please provide comparison data of Enterprise's vent stream reductions to the flare to similar sources that employ different operating

practices. Also, please provide supplemental information on how the flow and composition monitors will be used determine natural gas requirements for optimal flare operation.

12. The "WHB" process flow diagram indicates the add-on pollution control devices to be employed by the WHB will include selective catalytic reduction (SCR) and oxidation catalyst. How will the operation of the add-on technologies affect the operation of the WHB and thereby affect the production of GHG emissions? Please supplement the application with detailed information on the SCR and oxidation catalyst pollution control technologies to be utilized and the affect on the operation of the WHB and the amount of GHG emissions that are produced.