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

OCT 22 2013

Mr. Mathias Pastl
Head of Corporate Communications & Public Relations
Voestalpine Texas LLC
800 N. Shoreline Blvd, Suite 1600 S
Corpus Christi, Texas 78401

RE: Application Completeness Determination for Voestalpine Texas LLC
Greenhouse Gas Prevention of Significant Deterioration Permit
Direct Reduction Iron/Hot Briquette Iron Project

Dear Mr. Pastl:

The EPA has reviewed your Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) permit application, including supporting documentation, for Voestalpine Texas that was received by the EPA on February 5, 2013, 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 November 15, 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 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). If you have not already submitted the Biological Assessment and Cultural Resources Reports that you have agreed to prepare for EPA, we look forward to receiving these reports and continuing to work with you to comply with these statutes.

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

Sincerely yours,

Wren Stenger
Director
Multimedia Planning and
Permitting Division

Enclosure

ENCLOSURE

EPA Completeness Comments for Voestalpine Texas LLC
Application for Greenhouse Gas Prevention of Significant Deterioration Permit
Direct Reduction Iron/Hot Briquetted Iron Project

1. The process description does not appear to follow the process flow diagram that is provided, or identify all emission points with the associated emissions point number (EPN) that emit GHG emissions or have the potential to emit. On the process flow diagram there are several streams that have been identified as "CP". Please provide supplemental information that defines the meaning of this term. Please update the process flow diagram to include a representation of the equipment (compressor and mist eliminator) that is mentioned in the process description. The blocks that are used to represent several pieces of equipment make it difficult to understand the process. For example, on page 5 of the application it is stated that the spent reducing gas (top gas) exits the reduction zone of the reactor through the refractory lined top gas duct and enters the top gas scrubber to be cleaned and cooled. After scrubbing and cooling, approximately two-thirds of the clean top gas (now called process gas) flows through a second set of mist eliminators and then to the inlet of the first stage process gas compressor, followed by a second compressor. This equipment is not shown on the process flow diagram. It is suggested that Voestalpine revise the current process flow diagram by delineating further the equipment/components that comprise the reduction and reformer process. If Voestalpine finds it beneficial or necessary, it is suggested that additional pages be created and provided to EPA. For clarity purposes, it may be beneficial that Voestalpine provide additional pages for each separate process that refers to the original process flow diagram.

2. In addition to the previously mentioned comment, please provide supplemental information to the process flow diagram and/or process description:

   A. On page 2 of the application, in the "Iron Oxide Storage and Handling" section, it is stated that the oxide coating station enables feeding of coating directly to the charge hopper of the shaft furnace. Is the oxide coating directly fed to the furnace charge hopper shown on Figure 4? This addition does not appear to be shown on the process flow diagram. It is stated that the furnace feed conveyor discharges through a riffler to the charge hopper at the top of the shaft furnace. Please explain the purpose of the riffler. Is it a separate piece of equipment or is a part of the charge hopper? Also, it is stated that the oxide screening operation is two-fold in the storage and handling section and unusable material is discarded. Please provide supplemental information that explains where and how off-spec material is discarded. On page 3, the application states that the storage pile and associated operations are controlled with fugitive suppressants. Is this a continuous operation? Is it automated?
   B. On page 3 of the application, in the "Reduction Reactor" section, it is stated that the use of the small flow of inert seal gas into the furnace through the seal leg prevents the escape of furnace gases to the atmosphere, while still allowing the free flow of material by gravity into the furnace without the use of lockhoppers. Is there a benefit to GHG emission production or furnace operating efficiency that is afforded the furnace using the inert seal gas which eliminates the need to use lockhoppers? Also, it is stated that the reduction reactor is not directly vented to the atmosphere so it does not have a specific emission source associated with it. Seal gas is used to pressurize both the top and bottom of the reactor so that the system reducing gases do not vent to the atmosphere. The process flow diagram does not appear to show the connection between the top and bottom

seal with the seal system. Please update the process flow diagram to show the correct tie-ins. What is the proposed compliance strategy for ensuring that the seal system is properly functioning? What operating parameters will be monitored to ensure the seal system is maintaining a positive pressure seal around the reactor and reducing gases are not vented to the atmosphere?

C. Beginning on page 3, in the "Hot Discharge System" section, it states that material is discharged from the furnace via a dynamic seal leg and a hydraulically driven wiper bar. This section also discusses material discharge from the lower cone to the lower seal leg, the use of a burden feeder, surge hopper and several feed legs. Is this equipment located internal to the furnace or is it external separate pieces of equipment? If possible, please show this equipment on the process flow diagram.

D. On page 4 of the application, in the "Hot Briquetting System" section, it is stated that off-specification product (remet) produced during plant start-up or process upset bypasses the briquette machines and is discharged through a bypass feed leg to the bypass discharge feeder and then to the hot briquetted iron (HBI) cooling system. Please show this bypass discharge feed on the process flow diagram. Also, this section includes an explanation of the dust collection system. It appears that this system has not been represented on the process flow diagram. Please update the process flow diagram to show the dust collection system.

E. On page 5 of the application, in the "Process Gas System" section, it is stated that after scrubbing and cooling, approximately two-thirds of the clean top gas (now called process gas) flows through a second set of mist eliminators and two compressors. Please provide design efficiency data for the compressors. After compression the process gas is mixed with natural gas and preheated to form the feed gas for the reformer. Please update the process flow diagram to show the compressor. Also, please label this process gas line that is fed to the reformer. What heat transfer fluid is used to preheat the process gas in the heat recovery system? Please provide supplemental information to the process description pertaining to the heat transfer fluid used in the heat recovery system. The process flow diagram indicates that in addition to the preheating of the process gas, the top gas fuel is also preheated. Is this correct? If so, please update the process description with this information. Also, the process description states that the top gas fuel - after it is mixed with a small amount of natural gas - is passed through a mist eliminator to remove water droplets before fueling the reformer burners. Please update the process flow diagram to show this mist eliminator.

F. On page 5 of the permit application, in the "Reformer" section, it is stated that natural gas-fired auxiliary burners maintain the reformer box temperature during plant idle conditions to minimize both restart time and thermal cycling of the reformer tubes. Are GHG emissions produced during these times? If so, have the GHG emissions been accounted for in the proposed GHG emission rates? How often will these plant idle conditions occur? Also, continuing on page 6 of the same section, it is stated that the flue gas exiting the reformer box via the flue gas headers flows to the heat recovery system where the waste heat is recovered. Please update the process flow diagram to show this heat recovery from the reformer flue gas.

G. On page 6 of the permit application, in the "Heat Recovery System" section, it is stated that the flue gas exits on both sides of the reformer and enters the parallel train heat recovery system. Each parallel system contains combustion air pre-heaters and feed gas pre-heaters. Please update the process flow diagram to show this heat recovery system as explained in the process description. Also, it is stated that the heat recovery system increases the reformer capacity and reduces the net plant energy consumption by approximately 25-30 % over the first generation designed in the 1960's. Please provide technical literature, resources and/or calculations to substantiate this energy consumption claim. Please provide supplemental technical data that includes the design efficiency of the combustion air and feed gas pre-heaters. What parameters will be monitored and recorded to ensure the pre-heaters are operating as designed? What is the proposed compliance strategy for the heat recovery system? If possible, please provide benchmark data that compares the energy consumption of Voestalpine's facility to similar sources, nationwide or international, in the direct reduction iron (DRI) industry.

H. On page 6 of the permit application, in the "Seal Gas and Purge Gas System" section, it is stated that inert seal gas for the plant, which is used primarily for sealing the top and bottom of the furnace, is provided by the seal gas generation system. This system takes hot reformer flue gas and cools it in the seal gas generation system. The seal gas cooler is a packed bed, direct contact type cooler which cools the reformer flue gas to near ambient temperature. Please provide supplemental information on the operation of the direct contact type cooler. What type of heat transfer fluid is used? Is cooling water the heat transfer fluid? If so, the process flow diagram does not show a cooling tower as part of the proposed project. Please update the process flow diagram to show the cooling tower. Will the cooling tower be a potential source for GHG emissions? Since CO2 emissions are associated with combustion pollutants and CH4 pollutant is associated with VOC pollutants, will the direct contact type cooler be a potential source for GHG emissions to enter the cooling water system? Are there other sources where cooling water is used for heat exchangers and due to a process leak GHG emission could potentially enter the cooling tower system? If Voestalpine 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 Voestalpine would implement as BACT. Part of the dry seal gas is compressed by the purge gas compressors and dried in a desiccant dryer. The dry purge gas is stored in tanks to be used for emergency plant shutdown situations and for small high pressure requirements during normal operation. The process flow diagram does not have a representation of the storage tanks. Please update the process flow diagram to show these tanks. Where will the storage tank vents be directed? If so, the combustion of the tank vapors might generate GHG emissions, therefore a BACT analysis should be developed for the tanks to be installed for the project. Please be sure to incorporate into the tank BACT analysis the factors that were considered for the design of the tanks. Please provide any other additional information for the tanks, including whether the applicant chose to have the tanks painted white or another color of high refractive index to reduce vapor production?

I. On page 6 of the application, in the "Bottom Seal Gas System" section, it is stated that the furnace bottom seal gas system consists of a compressor, a dilution hood, a dust collection scrubber, a fan, and a stack to supply and exhaust seal gas for sealing the bottom of the shaft furnace. Is the "Bottom Seal Gas System" a part of the same seal gas system that is discussed in the previous section on page 6 (Seal Gas and Purge Gas System) or is it a different system? If so, please update the process flow diagram to show the different seal gas systems that exist for the top of the furnace and the bottom of the furnace. Please indicate the process line tie-ins on the process flow diagram to the seal gas system that provides seal gas to the top seal of the furnace. Please provide a supplemental process diagram that delineates the different sections to the seal gas system. Is the previously mentioned seal gas stack directed to the flare? If so, has this been accounted for in the emission calculations for the flare? If not, where is the stack exhaust directed? What is the design efficiency of the equipment that comprises the seal gas system (i.e., compressor, scrubber, fan, dilution hood)? What is the proposed compliance strategy for the seal gas system? What parameters will be monitored and recorded to ensure this system is operating according to design? How will on-site personnel determine if the system(s) is working properly?

J. On page 7 of the application, in the "Inert Gas System" section, it is stated that an inert gas system supplies seal gas for the plant in the event that the reformer combustion system is not in operation. This system consists of an inert gas generator where natural gas and air are burned at close to the stoichiometric ratio so that the product of combustion yields a suitable inert gas with very low oxygen content. This generator doesn't appear to be represented on the process flow diagram. Is this a potential GHG emission source? If so, please update the process flow diagram to show generator with associated EPN, as well as, providing supplemental emission calculations. Please provide a 5-step BACT analysis for this generator. Please provide the design efficiency for the generator. How will this system be monitored and controlled? In the event that seal gas is interrupted due to the reformer combustion system not operating, is the switch to inert gas automated? Is there continuous monitoring of certain operating parameters that alert on-site personnel to system problems? What is the proposed compliance strategy for this inert gas system? What parameters are monitored and recorded to ensure the mechanism that triggers the switch is operating and will operate properly? Is there a preventative maintenance schedule on these process controllers? Please update the process flow diagram to show the inert gas system and tie-ins to the seal gas system.

K. On page 7 of the permit application, in the "Machinery and Process Cooling Water System" section, it states that the water system consists of a machinery cooling water circuit and a process cooling water circuit. Please provide a separate process flow diagram that depicts both systems. The machinery cooling water is a closed circuit that supplies cooling water to all indirect coolers such as burden feeders, rotating equipment lubrication oil, heat exchangers, etc. Please provide supplemental information on the operation and design efficiency of the burden feeders proposed for the project and how cooling water is utilized. The process cooling water circuit supplies cooling water to the direct contact coolers and the process users, such as the top gas scrubber and the dust collection systems. It also provides the cooling water for the machinery cooling water heat exchangers. The process cooling water system consists of a sump, circulation pumps, process water cooling towers, and a clarifier system. Is it possible for GHG emissions to be present in the process water cooling towers due to process equipment leaks into the system or CO_2 entrainment?

L. Please update the process flow diagram by including the emergency generator and fire pump with the associated emission point number (EPN). Please provide design efficiency data for the emergency generator.

3. On page 2 of the permit application, it is stated an important quality of the reducing gas is the reductant/oxidant ratio, or "gas quality." The quality is a measure of the potential for the gas to reduce iron oxide and is a ratio of reductants to oxidants contained in the gas:

$$\text{Quality} = \text{reductant/oxidant ratio} = \text{moles } (H_2 + CO) / \text{moles } (H_2O + CO_2)$$

Experience has found that the optimum gas quality for hot, fresh reducing gas should be 10 or higher. Also, to obtain essentially complete reduction, the quality of the spent reducing gas exiting the process should be at least 2. What operating parameters are controlled to ensure the gas quality is maintained at optimum levels? Another important property of the reducing gas is the H_2/CO ratio. Control of the H_2/CO ratio affords thermally balanced reduction reactions since reduction with carbon monoxide is exothermic, and reduction with hydrogen is endothermic. That is, the heat required by the hydrogen reaction is balanced by the heat supplied by the carbon monoxide reaction. Therefore, proper reduction temperatures can be maintained without significant additional heat input from fuel combustion. The typical H_2/CO ratio produced by the reformer is about 1.55:1. What is the proposed compliance strategy for the H_2/CO ratio? What parameters are monitored and controlled to maintain the optimum H_2/CO ratio for fuel usage efficiency?

4. On page 15 and 16 of the application Voestalpine included tables that list "possible" energy efficiency design improvements that can reduce fuel consumption and electricity usage. Please provide supplemental information detailing the anticipated percent efficiency gains and/or reduced GHG production with the implementation of the design attributes that "will" be employed by Voestalpine from the tables provided. Also, provide a copy of any technical resources used to evaluate the design decisions for the Voestalpine facility and any benchmark comparison data of similar sources existing nationally or internationally, that may have been utilized in the design selection strategy. Please provide technical resources, literature and calculations to substantiate the claimed efficiencies.

5. Beginning on page 17 of the permit application, it states that the DRI process results in far lower CO2 emissions than conventional methods (compared to a blast furnace or other traditional approach). The main reason given for this reduction is that a DRI plant uses natural gas as a fuel instead of coke. In addition, on page 18 of the application, it is stated that the most common technologies used for natural gas-based DRI production are Midrex and HYL III and at this time, Voestalpine has not selected a reformer supplier. Brief summaries of the Midrex DR and HYL DR processes were included in the application. Also, Voestalpine did provide EPA supplemental information dated February 1, 2013 that states the Midrex and HYL processes are technologically and economically similar and that there are only plant-specific differences. It is not clear which technology will be used by Voestalpine for the proposed project. Please provide supplemental information that informs EPA of Voestalpine's intent. Did Voestalpine perform a technical assessment that evaluates the two technologies of reformer-based DR to the reformer-less DR? Please provide supplemental information that includes this technical assessment. If possible, please provide any data that compares actual energy efficiency (fuel consumption and electricity consumption), actual GHG emissions and non-GHG emissions from the two technologies, and the technical resources that were used to perform the evaluation. Are there unique reasons to Voestalpine for choosing one technology instead of another or selecting design options that aren't inherently more efficient or lower polluting than another (i.e., available feedstock, customer product purity specification)? If so, please provide detailed discussions on Voestalpine's business purpose and objectives that affected design selections. If applicable, include a discussion on where GHG control strategies affect emissions of other regulated pollutants.

6. Beginning on page 24 of the application, Table 4-4 is a summary of the proposed GHG BACT determinations for Voestalpine. The proposed BACT facility-wide emission limit is 1,814,144 tons/year. The proposed BACT emission limit for the reformer main flue ejector stack is no more than 13 MMBtu (decatherms) of natural gas/tonne HBI. Compliance for the reformer main flue stack is based on total natural gas consumption divided by total production (including regular and off spec DRI product) of the facility on a 12-month rolling total. In addition, the seal gas vent and the hot pressure relief vent (flare) are both included in the proposed limit of 13 MMBtu (decatherms)/tonne HBI produced. Please update the proposed emission limit by providing all

emission calculations in short tons. Please provide any supplemental calculations that show how the proposed emissions will be calculated to determine compliance. What formulas will be used? What measurement indicators will be used? (i.e., natural gas flow for feed and fuel, flare vent flow, seal gas vent flow, weight scales for feed, product and off-spec product). Will these measurements be monitored and recorded continuously? The proposed emission limit is based on what design HBI production for the facility? Please provide the calculations and a basis for the rationale used to derive the proposed BACT limit. Also, the table identifies each emission source along with a source number. Please update the process flow diagram by identifying the emission sources listed and include the associated EPN.

7. On page 28 of the permit application, it is stated that one means of reducing natural gas consumption is to remove the oxygen that is being freed from the iron oxide ore from the process gas loop of the reducing gas. This oxygen, in the form of CO_2 and water vapor, inhibits the reaction of CO and H_2 with the oxygen of the ore when either or both are present at high levels. While some CO_2 and water vapor are necessary in the reactions of the reformer, the removal of excess CO_2 and water vapor in the system will improve overall efficiency. Current DRI process designs release CO_2 and water vapor from the process gas loop by off-taking a stream of spent reducing gas (prior to recycle back to the reformer) and using this stream as fuel in the reformer. Is there a difference in the amount of CO_2 produced in the furnaces of the two DR technologies (reformer-based vs. reformer-less) which results in more or less excess CO_2 that needs to be removed via some type of process gas recycle loop that ultimately improves the performance of the furnace operation?

8. On page 32 of the permit application, Table 4-6 presents approximate costs for construction and operation of a post-combustion carbon capture and sequestration system at Voestalpine. The estimated cost to install, operate and maintain CCS is $142.3 million per year at the Voestalpine facility at $87 per tonne of CO_2 controlled. The supporting calculations that were used to derive this estimate were not included in the application. Please provide the site-specific parameters that were used to evaluate and eliminate CCS from consideration. This material should contain detailed information on the quantity and concentration of CO_2 that is in the waste stream and the specific equipment to be used. This site-specific cost calculations should include, but are not limited to, size and distance of pipeline to be installed, pumps, compressors, the amine solution to be used and the equipment necessary to employ the chosen post-combustion technology. Please include cost of construction, operation and maintenance, cost per ton of CO_2 removed by the technologies evaluated and include the feasibility and cost analysis for storage or transportation for these options. Please discuss in detail any site specific safety or environmental impacts associated with such a removal system. The heading in Table 4-6 indicates that cost numbers are "$/ton of CO_2 controlled"; however at the bottom of page 32, a cost of "$87 per tonne of CO_2 controlled" is given. Please ensure that all calculations, including emission calculations, are done in short tons.

9. On page 37 of the permit application, the proposed BACT for the reformer main flue ejector stack is the energy integration through the combustion of spent reducing gas, combined with natural gas combustion for supplemental energy needs. In addition, beginning on page 35 of the permit, it is stated that natural gas is only needed to supplement approximately 40% of the total energy input to the reformer. Please provide supplemental supporting design calculations that were used to derive this percentage, including technical resources and literature. What is the proposed compliance strategy for this proposed BACT? What are the proposed monitoring and recordkeeping requirements to ensure compliance?

10. Voestalpine did not propose to implement a fugitive emission monitoring program for piping components. Please provide supplemental data to the 5-step BACT analysis for fugitives that include a comprehensive evaluation of the technologies considered to reduce fugitive emissions and a basis for elimination, or information detailing why fugitive emissions will not be emitted from this project. The technologies could include, but are not limited to, the following:
    - Installing leakless technology components to eliminate fugitive emission sources;
    - Implementing an alternative monitoring program using a remote sensing technology such as infrared camera monitoring;
    - Designing and constructing facilities with high quality components and materials of construction compatible with the process known as the Enhanced LDAR standards;
    - Monitoring of flanges for leaks;
    - Using a lower leak detection level for components; and
    - Implementing an audio/visual/olfactory (AVO) monitoring program for compounds.

    The BACT analysis should include for the proposed monitoring program a compliance strategy. (i.e., frequencies of inspections, maintenance repair strategy, recordkeeping, etc.).

11. On page 41 of the permit application, the proposed BACT for the flare is good combustion practices, proper maintenance and use of clean fuel, installation of a natural gas flare tip, periodic fuel sampling and analysis where composition could vary. Please provide supplemental data that discusses the design of the flare, i.e., percent combustion efficiency, specific monitoring and recordkeeping strategy, maintenance schedule, etc. What will be frequency of the sampling of fuel to determine quality? Will it be computer controlled? If so, will there be manual overrides? If possible, please provide benchmark comparison data of the new flare system to similar or existing flares in the DRI industry. What will the visible emissions monitoring entail? How often will visible emissions observations be conducted?

12. On page 42 of the permit application, the BACT analysis for the seal gas vent states that in order to prevent the reducing gas from escaping the furnace, a higher pressure gas called seal gas is applied at both the charging and discharging opening. The seal gas is allowed to escape the furnace while the reducing gas is retained. Due to the higher seal gas pressure, a portion is also entrained into the reactor and combined with the spent reducing gas which travels back to the reformer. This seal gas is a small amount of cooled flue gas from the reformer combustion side, and primarily consists of atmospheric nitrogen, CO_2 and water vapor. Where is this seal gas allowed to escape? Is it re-captured back into the seal gas system or does it emit to atmosphere? If so, has this amount of CO_2 that is allowed to escape accounted for in the emission calculations? Is this seal system common to both DRI technologies?

13. The emission calculations for the emergency generator located in Appendix A doesn't appear to include CO_2e emissions. Please explain the omission.

14. On page 24 of the permit application, the proposed GHG annual emission rates for the Voestalpine is 1,814,144 tons/year. However, the total annual CO_2e emissions on page 4 of 9 of the Form PI-1 are given as 1,811,862 tons per year. Please provide an emission summary table of the emission sources, associated EPNs, the emissions for each source and the total annual emissions proposed for the Voestalpine project.