

US EPA ARCHIVE DOCUMENT

Chevron Phillips Chemical Company LP – Cedar Bayou Plant, New Ethylene Unit

In December 2011, Chevron Phillips submitted a GHG permit application to EPA Region 6 requesting authorization of eight new ethylene cracking furnaces with a maximum capacity of 500 MMBtu/hr, each. The application proposes energy efficient design, low carbon fuels and good combustion practices as BACT.

FPC TX is proposing the same or similar BACT design and operation options as Chevron Phillips. In addition, as specifically described in Step 5, FPC TX is also proposing an energy efficiency-based numeric BACT limit which establishes an enforceable limit for GHG emissions from the cracking furnaces.

6.3 BACT FOR DECOKING VENTS

6.3.1 Step 1: Identify All Available Control Technologies

Decoking is a process of removing coke deposits from the interior of process tubes in the furnace. This is a combustion process with CO and CO₂ being a product of that combustion. The gases are emitted via a drum that is used to remove particulates.

Coke accumulates in the furnace tubes and reduces heat transfer efficiency so minimizing coke formation is optimal for energy efficiency of the furnace and maximum ethylene yield in addition to reducing the required frequency of decoking events. There are no available technologies that have been applied to furnace decoke drums to control CO₂ emissions. As described specifically in Section 6.2.1, proper design and operation of the furnaces to minimize coke formation/frequency of decoking events is the only technically feasible means of minimizing GHG emissions.

FPC TX proposes to limit the frequency of furnace decoking for all Olefins 3 furnaces to no more than 168 events (all furnaces) per rolling-12 month period, which is the basis for the decoking emission calculations presented in Section 4. This proposed permit limit does not include decoking events related to emergency shutdowns or unforeseen, unplanned maintenance events.

6.3.2 Step 2: Eliminate Technically Infeasible Options

No BACT options are being eliminated in this step.

6.3.3 Step 3: Rank Remaining Control Technologies

No BACT options are being eliminated in this step.

6.3.4 Step 4: Evaluate Most Effective Controls and Document Results

No BACT options are being eliminated in this step.

6.3.5 Step 5: Select BACT

Minimizing the formation of coke on the furnace tubes through proper furnace design and operation (as specifically described in Section 6.2) is BACT for Greenhouse Gas emissions. FPC TX proposes a numeric BACT limit of 168 decoking events per rolling 12-month period (for all Olefins 3 furnaces). This proposed permit limit does not include decoking events related to emergency shutdowns or unforeseen, unplanned maintenance events. FPC TX proposes to monitor the frequency of decoking events using operational records.

FPC TX performed a search of the EPA's RACT/BACT/LAER Clearinghouse for decoking and found no entries which address BACT for GHG emissions. Although not listed in the RACT/BACT/LAER Clearinghouse, a GHG BACT analysis was performed by other GHG permit applications submitted to EPA Region 6. A discussion of FPC TX's proposed BACT as compared to those projects is provided below.

BASF FINA - NAFTA Region Olefins Complex

The BASF permit lists a GHG BACT limit for furnace decoking of 13 times on a rolling 12-month basis. FPC TX's proposed BACT limit for furnace decoking of 168 times per rolling 12-month period or all furnaces is essentially equivalent to an average of 12 decoking events per furnaces

(9 total), which is less than the value listed in the BASF FINA permit. As such, the proposed energy efficiency-based numeric BACT limit that is equal or better than this similar source.

Equistar Channelview Olefins I and II Expansions

The Equistar permit applications propose proper furnace design and operation to limit coke as BACT for decoking emissions. FPC TX is proposing BACT that is similar to, or the same as the one proposed by Equistar and is providing a specific description of proposed furnace design and operation (Section 6.2). As specifically described in Step 5, FPC TX is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from furnace decoking.

Equistar La Porte – Olefins Expansion

The Equistar permit application proposes proper furnace design and operation to limit coke formation as BACT. The application also mentions limiting excess oxygen, however a numeric BACT limit and associated monitoring were not proposed. FPC TX is proposing BACT that is similar to, or the same as the one proposed by Equistar and is providing a specific description of proposed furnace design and operation (Section 6.2). As specifically described in Step 5, FPC TX is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from furnace decoking.

ExxonMobil Baytown Olefins Plant

The ExxonMobil permit application proposes proper furnace design and operation to minimize coke formation and limiting air during decoking as BACT for decoking emissions. FPC TX is proposing BACT that is similar to, or the same as the one proposed by ExxonMobil and is providing a specific description of proposed furnace design and operation (Section 6.2); however, FPC TX is not proposing a limitation on air during furnace decoking. FPC TX is, instead, proposing an enforceable numeric BACT limit (described in Step 5) which establishes an enforceable limit for GHG emissions from furnace decoking.

INEOS USA LLC – Olefins Expansion

The INEOS permit lists a numeric GHG BACT limit for the duration of decoking of 420 hours per 12-month period to be demonstrated by monitoring the actual duration of decoking events. FPC

TX's proposed BACT limit of 168 events per year (all furnaces) is comparable to the proposed INEOS BACT. As such, FPC TX's decoking operations will meet a numeric BACT limit that is comparable to this similar source.

Chevron Phillips Chemical Company LP – Cedar Bayou Plant, New Ethylene Unit

The ChevronPhillips application proposes good furnace operation and design to limit coke formation as BACT. FPC TX is proposing the same or similar BACT as ChevronPhillips and is providing a specific description of proposed furnace design and operation (Section 6.2). As described in Step 5, FPC TX is also proposing a numeric BACT limit which establishes an enforceable limit for GHG emissions from furnace decoking.

6.4 BACT FOR MAPD REGENERATION VENT

6.4.1 Step 1: Identify All Available Control Technologies

CCS technology as an add-on control for the MAPD regeneration vent was considered, however given the extremely intermittent nature of this vent (few regeneration cycles per year), it was not considered to be a technically feasible candidate CCS source.

There are no other applicable technologies for controlling GHG emissions from the MAPD regeneration vent. The MAPD regeneration vent's CO₂e emissions (estimated at less than 30 tpy) represent less than 0.001% of the project's GHG emissions; therefore, this source is an inherently low-emitting GHG emission source. As such, FPC TX is not proposing a numeric energy efficiency-based limit for this source.

6.4.2 Step 2: Eliminate Technically Infeasible Options

The MAPD regeneration vent is intermittent and is not a technically feasible candidate source for CCS technology (detailed CCS technology BACT evaluation provided in Appendix C). No other GHG BACT options are being eliminated.

6.4.3 Step 3: Rank Remaining Control Technologies

FPC TX is not eliminating any of the available BACT options; therefore, ranking is not required.