1. Agrium’s application contained a MS Excel spreadsheet for BACT cost estimates titled *Attachment C BACT Appendix B Cost Estmates.xlsx,* which has two sheets for estimating the costs of an oxidation catalyst on the combined turbines emissions units (EUs) 55a through 59a with their respective waste heat boilers EUs 50 through 54, as well as the package boilers EUs 44a, 48a, and 49a. In these spreadsheets, Agrium lists a reagent pump requiring 1,000 kW of electricity to run for each turbine/waste heat boiler pair and package boiler. Please explain this process if the inclusion of the reagent pump was not an error.

Discussion: Agrium’s previous application for AQ0083CPT06 did not include reagent pumps in the oxidation catalyst cost estimates, nor has any other application for an oxidation catalyst that the Department has recently reviewed. What type of reagent is being used for this oxidation catalyst and at what flowrate is it injected into the catalyst bed? What are the costs associated with purchasing and disposing of this reagent? What device is powering these pumps? Please provide the vendor data for the oxidation catalyst systems and their respective reagent pumps.

Agrium KNO Response: Agrium’s initial application for AQ0083CPT06 had included BACT cost analyses which specifically listed reagent pumps. In September 2014, in response to an information request from ADEC, Agrium resubmitted the cost analyses to reflect standard EPA design calculation cost equations. While drafting the cost analyses submitted as part of the 2019 PSD permit application, the initial AQ0083CPT06 application submittal’s cost spreadsheets were revised to reflect the proposed changes at the facility. This was done in error since the September 2014 cost analyses should have been used as the starting point for these revised cost analyses. We would like to provide the attached revised cost analyses which reflect the standard EPA design calculation cost equations. The US EPA Cost Control Manual was used to estimate equipment costs and specific vendor quotes were not obtained as part of these revised analyses. The attached “CAT Ox Cost Analyses” spreadsheet includes the updated cost analyses for catalytic oxidizer control of CO and VOC emissions from the waste heat boilers/turbines and package boilers, as well as an analysis for the primary reformer. Because the cost analyses have been revised, Agrium has revised the BACT analysis performed for the 2019 PSD permit application to include the revised $/ton cost effectiveness values. Catalytic oxidation is still determined to be not cost effective for controlling CO and/or VOC emissions from the package boilers and the waste heat boilers/turbines.

1. Please provide a BACT analysis for an oxidation catalyst to control CO emissions from the primary reformer EU 12.

Discussion: The Department has identified a stationary source in the RBLC (Emberclear Gas to Liquids, RBLC ID No. MS-0092) with a steam methane reformer using an oxidation catalyst to control CO emissions down to 5 ppmv at 3% oxygen. Therefore, a BACT analysis must be provided for your reformer.

Agrium KNO Response: A BACT analysis has been included as an attachment to this email as requested for the Primary Reformer. Analyses were performed for both CO and VOC since RBLC ID No. MS-0092 also contained a BACT limit of 5 ppmv at 3% oxygen for VOC through the use of the oxidation catalyst. The BACT analyses conclude that the use of an oxidation catalyst is not cost effective for either CO or VOC. The proposed BACT limits for CO and VOC remain unchanged from the BACT limits which were permitted in AQ0083CPT06.

1. The Department has calculated higher NOx and NH3 emissions from flaring events based on ammonia throughput from a previously provided information request response (attached). Please verify the accuracy of these assumptions.

Discussion: Agrium’s application contained an excel spreadsheet for emission calculations titled *Attachment B Emission Calculations.xlsx.* In this spreadsheet Agrium has calculated NOx emissions for the small and emergency flares EUs 22 and 23, resulting from NH3 throughput during flaring events. The Department has recalculated these NOx and NH3 emissions in the attached spreadsheet (tabs 22 and 23) using the NH3 throughput and NOx emission rates from the previously mentioned information request response from Agrium, and the previous BACT limit for the flares of 168 hours each per 12 consecutive month period.

Agrium KNO Response: The emission calculations provided to ADEC in February 2014 as part of the initial application’s Addendum #3 had the breakdown of planned flaring events that was used throughout the permit process to characterize flaring emissions. This references a 1.8 lb NOx/1000 lb NH3 vendor-provided emission factor, which was used consistently throughout the permit process to characterize NOx emissions from the flares. A copy of this document is attached. We have concluded that the 1% assumption which was referenced in the September 11, 2014 e-mail is incorrect and continue to believe that the 1.8 lb NOx/ 1,000 lb NH3 vendor emission factor correctly characterizes the expected emissions from the start-up, shutdown, and maintenance venting (flaring) events. Agrium has updated the annual emission calculations for flaring events to reflect the BACT limit on flaring of 168 hours per year. The updated emission calculations are included as an attachment to this emailed response. The annual ton/yr NOx and NH3 emissions from stacks 22 and 23 were updated to reflect the maximum hourly emission rates at the 168 hours per year BACT operating limit that was contained in the PSD permit. Agrium believes that this calculation overstates potential annual emissions associated with flaring events, as the maximum hourly emission rate used in this calculation is associated with a planned flaring event that is expected to occur for only three hours once every four years. Hourly emission rates remain unchanged as a result of these updates. A summary of the updated annual PTE is provided in the table below.

|  |
| --- |
| **SSM Venting Emissions @ 168 Hrs/Yr** |
|  | **Stack 22 (Tons/Yr)** | **Stack 23****(Tons/Yr)** |
| 2019 PSD Application NOx PTE | 0.011 | 0.08 |
| Updated NOx PTE | 0.181 | 4.54 |
|  |
| 2019 PSD Application NH3 PTE | 0.03 | 0.23 |
| Updated NH3 PTE | 0.50 | 12.60 |

Enclosures:

CAT Ox Cost Analyses Spreadsheets (Revised)

Attachment C BACT (Revised)

Primary Reformer BACT Analysis

John Zink Flare Emissions Data

Attachment B Emissions Calculations (Revised)