| | |
|---|---|
| **From:** | Nelwyn Mohrmann |
| **To:** | Wilson, Aimee |
| **Cc:** | Jan Day (jan.day@celanese.com); Duffie, Ashley B., Celanese/US |
| **Subject:** | Celanese Methanol GHG Permit - Application Updates |
| **Date:** | Monday, April 15, 2013 8:29:39 PM |
| **Attachments:** | Celanese GHG April Emission Summary.xlsx |

Dear Aimee,

Per our discussion last week, Celanese has made a few minor design changes and re-evaluated the emissions from the GHG sources. This has resulted in some changes to the calculations/estimations contained in the application update submitted 12/19/2012. Please note that the emissions represented in the permit application are for normal operation and do not include any additional shakedown emissions from the first 180 days of operation. Below is a summary of changes to the application:

- EPN REFORM: Celanese has updated the calculations to represent additional possible operating scenarios and permit for the worst case emissions. As such, the reformer's estimated flow rates have been updated and resulted in an increase in emissions (~ 34,700 tpy CO2e). Please see the attached table for a detailed summary of emission increases.
- EPN MEOHFLR: Celanese has updated the calculations to represent additional possible operating scenarios and permit for the worst case emissions. Regulatory compliance options for the flare are still being evaluated. Since the flare may be applicable to a minimum BTU heating value, Celanese has updated the flare emissions to include a supplemental natural gas stream. In addition, the flare calculations have been updated to reflect up to 500 hrs/year of MSS emissions. This is to account for variability in startup and shutdown conditions that may occur with a new unit. Changes to the estimated flow to the flare have resulted in an in increase in emissions ( ~ 204 tpy CO2e). Please see the attached table for a detailed summary of emission increases.
- EPN MEOHENG (previously MEOHGEN): Celanese requests the emergency generator EPN be changed to MEOHENG to stay consistent with the NSR permit application. In addition, it has been determined that a smaller engine may be used to meet the needs of the plant. The emissions represented are the maximum expected.
- EPN 55T43ST: The existing scrubber (55T43ST) will be replaced. Therefore the EPN is being changed to T9801ST. This will not have any impact to GHG emissions.
- CCS Analysis: Cost analysis in sections 3.3.4.1 and 3.3.4.5 are being updated to reflect a 30-year life of the unit (previously assumed 10). This change is to be consistent with a proposed NSR permit condition that 30 years worth of DERCs be set aside to offset emissions from the project. This results in a change to the annualized costs from $176.61/ton to $135.21/ton CO2e.
- It was determined the site will not use the superheated steam to run a steam turbine to generate electricity (see page 3-8) of the December 2012 application. An updated application will be provided to you at a later date. This will not result in an increase of GHG emissions.

In response to your question on Reformer BACT, Celanese is proposing an output-based limit of 33 MMBTU/tonne MeOH (30 MMBtu/ton MeOH) in lieu of a thermal efficiency. Celanese believes this will provided a better indication of performance of the overall reformer process. The combined reforming process uses a primary and secondary reformer to produce methanol, rather than a single reformer. Based upon its design with other similar proven Methanol producing processes, this one will generate fewer GHG emissions. By monitoring the heat demand per amount of product produced, Celanese can determine whether both reformers are operating the most efficiently and within design parameters. Celanese is also proposing a limit of 350F in the stack gas during normal operation. This temperature is based on the operational design of the reformer and will be monitored to assure that BACT is continuously applied.

Celanese is currently working to determine the CCS costs in relation to the Methanol unit's project costs, per your request. They hope to complete this analysis complete within the next couple of days.

In addition, as you suggested, we are currently reviewing Equistar's permit conditions. There is one item on startup that we would like to discuss, and we will let you know if we identify anything else from that permit that we should discuss. With respect to the requirement below, we would like to confirm EPA's understanding of "startup" in relation to when a notification is required and any subsequent testing. Per 40 CFR 60.2, "Startup means the setting in operation of an affected facility for any purpose". However, in EPA's *Industrial Manual for Clarification on Startup in Source Categories Affected by New Source Performance Standards*, startup for fossil fuel fired steam generators is defined as the first time steam is produced by the boiler and used for the purpose it was designed (pg 8). We would appreciate clarification on whether startup will be defined as first day of fuel to the reformer or the first day Methanol is generated by the unit.

> PERMIT NOTIFICATION REQUIREMENTS (pg 3) - …notify the EPA Region 6… of the actual date of initial startup, as defined in 60.2, postmarked within 15 days of such date.

Please do not hesitate to contact Jan Day or myself with any questions you may have. Thank you for your time and consideration in this matter.

Best Regards,

**Nelwyn Mohrmann** Title V Permitting and Compliance, Regulatory Compliance, NSR Permitting
SAGE Environmental Consulting, L.P.
*Friendly Service, No Surprises®*
North Austin office
O: 512-258-8500, x1115
F: 512-258-7522
C: 512-569-6718

sageenvironmental.com

Changes relative to 12/19/2012 are **bolded**.

| EPN | December 2012 | | | | April Update | | | | Difference | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO2 | CH4 | N2O | CO2E | CO2 | CH4 | N2O | CO2E | CO2 | CH4 | N2O | CO2E |
| REFORM | 498,128 | 10 | 0.98 | 498,639 | **532,787** | **11** | **1.05** | **533,334** | 34,659 | 1 | 0 | 34,695 |
| MEOHFLR | 991 | 7 | 0.06 | 1162 | **1092** | **12** | **0.07** | **1366** | 101 | 5 | 0 | 204 |
| MEOHMSS | 0 | 0.02 | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 |
| MEOHFUG | 3 | 10 | 0 | 213 | 3 | 10 | 0 | 213 | 0 | 0 | 0 | 0 |
| MEOHGEN | 33 | 0.0014 | 0.00027 | 33 | 33 | 0.0014 | 0.00027 | 33 | 0 | 0 | 0 | 0 |
| MEOHMT | 12 | 0 | 0 | 12 | 12 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| Total | 499,167 | 27.02 | 1.04 | 500,059 | 533,927 | 32.54 | 1.12 | 534,958 | 34,760 | 6 | 0 | 34,899 |

| | |
|---|---|
| **From:** | Nelwyn Mohrmann |
| **To:** | Wilson, Aimee |
| **Cc:** | Day, Jan L., Celanese/US |
| **Subject:** | RE: More Questions on Celanese GHG Application |
| **Date:** | Wednesday, May 01, 2013 9:29:36 AM |

Aimee,

The cooling tower that will be used by the Methanol process will be a indirect contact cooling tower. Four of the control technologies you have listed do not apply for the Celanese application: Low cycles of concentration, Acid and Blowdown control, Pretreatment of make-up water, and once through seawater cooling. None of these methods will reduce the VOC/Methane from the cooling tower due to possible leaks in the heat exchange system. The remaining option you have listed is air cooling. Celanese has already implemented the utilization of air coolers where possible to increase the heat removal and energy efficiencies of the unit. The air coolers are restrained in the amount of cooling they are able to provide based on the cooling medium (i.e. ambient air). Therefore, a cooling tower will be used in order to lower process temperatures to needed process conditions. Unlike air coolers, evaporative cooling (i.e. water in a cooling tower) is able to reduce process temperatures down to ambient conditions. Therefore, utilizing air coolers in lieu of a cooling tower is technically infeasible for the remaining cooling required for this process. Below is the 5-step top-down BACT analysis for the cooling tower.

**Step 1 - Identify Control Technology**

The following technologies were identified as potentially available for the cooling towers that will be newly constructed as part of the project:

1. Air Cooling - Process of using an air cooling system (such as fin-fans) rather an evaporative cooling system to reduce process temperatures.
2. Water Cooling Tower (Evaporative Cooling) Monitoring and Repair – A program to detect and repair process leaks into the cooling water system.

**Step 2 - Eliminate Technically Infeasible Options**

Air coolers are restrained in the amount of cooling they are able to provide based on the cooling medium (i.e. ambient air). The temperatures needed for methanol unit operation cannot be reached by using air coolers. Therefore, this technology is technically infeasible for this application. A water cooling tower monitoring and repair program is technically feasible.

**Step 3 - Rank Remaining Control Technologies**

Implementation of a cooling tower leak monitoring and repair system is ranked at the top of the list as the only technically feasible control option available for the new cooling tower.

**Step 4- Tow-Down Evaluation of Control Options**

There are no known energy or environmental impacts that would influence the GHG BACT selection process that would eliminate the remaining control option.

**Step 5 – Select BACT**

Celanese is proposing to implement a cooling tower leak monitoring and repair program that utilizes the monitoring and repair requirements of 40 CFR Part 63, Subpart F (HON MACT). TOC will be substituted for HAP when utilizing the HON MACT to determine if a GHG leak is present.

Please let me know if you have any other questions and/or concerns.

Best Regards,

**Nelwyn Mohrmann** **Title V Permitting and Compliance, Regulatory Compliance, NSR Permitting**
**SAGE ENVIRONMENTAL CONSULTING, L.P.**
*Friendly Service, No Surprises* ®
**North Austin office**
**O: 512-258-8500, x1115**
**F: 512-258-7522**
**C: 512-569-6718**

SAGEENVIRONMENTAL.COM

---

**From:** Wilson, Aimee [mailto:Wilson.Aimee@epa.gov]
**Sent:** Monday, April 29, 2013 10:57 AM
**To:** Nelwyn Mohrmann
**Cc:** Day, Jan L., Celanese/US
**Subject:** RE: More Questions on Celanese GHG Application

One more item-

I just realized that I do not have a BACT analysis for the cooling tower, or much information on it. We did however discuss the monitoring for it under 40 CFR Part 63 Subpart F.

Can you please provide a BACT analysis for the cooling towers?

What type of cooling tower is it? Direct contact, non-contact, etc.?
Did Celanese consider different control technologies such as

- Low cycles of concentration
- Acid and blowdown control
- Pretreatment of makeup water
- Once through seawater cooling
- Air cooling

Thanks,
Aimee

---

**From:** Nelwyn Mohrmann [mailto:nelwyn.mohrmann@sageenvironmental.com]
**Sent:** Friday, April 26, 2013 3:15 PM
**To:** Wilson, Aimee
**Cc:** Day, Jan L., Celanese/US

**Subject:** RE: More Questions on Celanese GHG Application

Aimee,

Below are Celanese's responses to your questions from yesterday.

For the TCEQ non-GHG applications for what pollutants is PSD and NNSR review being triggered? – Celanese will trigger CO, PM10, PM2.5 and NOx for PSD and VOC and NOx for NNSR.

Are the tank emissions that are routed to the Tank Farm vent scrubber (55T43) VOCs? - Yes, tank emissions that will be routed to the scrubber (new EPN: T9801ST) are VOCs and will not contain GHG emissions. Please note that there are no loading emissions routed to the scrubber.

Are the loading emissions that are controlled by a 3rd party come from a common loading rack? Or is it from several points? Is there an EPN associated with this activity? Is the 3rd party used one company or do you use several? – Celanese operates loading facilities for their production units as well as for one onsite 3rd party. On-site Methanol loading emissions are only coming from the Celanese loading facilities. The loading rack vent headers are routed to the 3rd party's stationary combustion devices (i.e. non-portable/ non-temporary). Celanese will not have any GHG EPNs associated with methanol loading from the Celanese facility.

How much less GHG emissions will result from the selection of the combined reforming design over Design A, B, and C? The table below lists the estimated amount of CO2e avoided by selecting Design D.

| | Natural gas consumption (MMBtu/tonne MeOH) | Estimated CO2e Avoided (tpy) |
|---|---|---|
| Design A | 37 | 434,537 |
| Design B | 34.5 | 217,269 |
| Design C | 32.5 | 43,454 |
| Design D | 32 | Base case |

Example calculation: Estimated CO2e avoided, Design D vs Design A

Est. CO2e Avoided = (37 MMBtu/tonne – 32 MMBtu/tonne) x 3,700 tonnes/day x 1.10 tons/tonne x (53.02 kg CO2/MMBtu + 21 x 1.0x10-03 kg CH4/MMBtu + 310 x 1.0x10-04 kg N2O/MMBtu) x 2.204622622 lbs/kg x 365 days/yr / 2,000 lbs/ton

Est. CO2e Avoided = 5 MMBtu/tonne x 3,700 tonnes/day x 1.10 tons/tonne x 53.072 kg CO2e/MMBtu x 2.204622622 lbs/kg x 365 days/yr / 2,000 lbs/ton

Est. CO2e Avoided = 434,537 tons/yr

Note that the example calculation uses the CO2 emissions factor for Natural gas (53.02 kg/MMBtu) from Table C-1 of 40 CFR 98 Subpart C and the CH4 and N2O emissions factors for Natural gas (1.0x10-03 kg/MMBtu and 1.0 x 10-04 kg/MMBtu, respectively) from Table C-2 of 40 CFR 98

Subpart C and the GWPs for CH4 and N2O (21 and 310, respectively) from Table A-1 of 40 CFR 98 Subpart A.

Please let us know if you have any other questions or need further clarification.

Best Regards,

**Nelwyn Mohrmann** **Title V Permitting and Compliance, Regulatory Compliance, NSR Permitting**
**SAGE ENVIRONMENTAL CONSULTING, L.P.**
*Friendly Service, No Surprises*®
**North Austin office**
**O: 512-258-8500, x1115**
**F: 512-258-7522**
**C: 512-569-6718**

SAGEENVIRONMENTAL.COM

---

**From:** Wilson, Aimee [mailto:Wilson.Aimee@epa.gov]
**Sent:** Thursday, April 25, 2013 11:21 AM
**To:** Nelwyn Mohrmann; Jan Day (jan.day@celanese.com)
**Subject:** More Questions on Celanese GHG Application

Ladies, I have a few more questions.

For the TCEQ non-GHG applications for what pollutants is PSD and NNSR review being triggered?

Are the tank emissions that are routed to the Tank Farm vent scrubber (55T43) VOCs? Are the loading emissions that are controlled by a 3rd party come from a common loading rack? Or is it from several points? Is there an EPN associated with this activity? Is the 3rd party used one company or do you use several?

How much less GHG emissions will result from the selection of the combined reforming design over Design A, B, and C?

Thanks,
Aimee