

FINAL Minutes of August 8, 2019 Ethylene Producers' Environmental Sub-Committee Meeting
(August 8, 2019, Rev. 1)

Following are the minutes of the August 8, 2019 Ethylene Producers' Environmental Sub-Committee Meeting, held via teleconference with Walter Postula, Shell Global Solutions (US) Inc., as host.

Present: Rick Beletz, LyondellBasell
Ahmad Hamad, Siemens
Brandon Lithgoe, NOVA Chemicals
Andrés Muñoz Gandarillas, Neste
Arijit Pakrasi, Edge Engineering and Science
Jennifer Port, ExxonMobil Chemicals
Walter Postula, Shell Global Solutions (US) Inc.
Gerardo Ruiz-Mercado, US EPA (AIChE Environmental Division)
Mark Ulrich, Linde Engineering North America

Absent: Benjamin Burns, SASOL North America
David Elam, TRC Solutions
Ted Heron, The Catalyst Group
Jacob Hilbrich, ChevronPhillips
Brad Hopper, BASF
Patti Long, Eastman
Dan Lutz, Ineos
Jeffrey Seay, University of Kentucky (AIChE Environmental Division)
Mark Schmidt, Dow
Debalina Sengupta, Texas A&M (AIChE Environmental Division)
Dick Siegel, R&B Consulting Services (AIChE Environmental Division)
Edward Soliz Jr., SASOL North America
Gary Wojnowski, BASF
Russell Wozniak, Dow

The teleconference began at 9:00am with Walter Postula reading the Ethylene Producers' Committee (EPC) anti-trust statement:

No activity of the committee shall involve the exchange, collection, or dissemination of information among competitors for the purpose of bringing about or attempting to bring about an understanding or agreement, written or oral, formal or informal, express or implied, among competitors, with regard to costs, prices, pricing methods, terms or conditions of sale, distribution, production quotas or other limitations on either the timing or volume of production or sales, or allocation of territories or customers.

The meeting agenda was published in advance and is included below:

- 1) Reading of Anti-Trust Statement [9:02 AM]
- 2) Update on AIChE Environmental Division programming on "Waste Plastics to Chemicals" [9:05 AM]
- 3) Discussion of Potential Topics (list from first telecon is below) for Environmental Session [9:10 AM]
 - . Electro-oxidation, ZimCad, and/or activated carbon in waste water treatment (topic from Ahmad Hamad, Siemens)
 - a. Renewable naphtha/diesel as feedstock for producing bio-ethylene/-propylene (topic from Andrés Muñoz, Neste)

- b. Update to RTR/EMACT (one more time for Steve Smith?)
 - c. Zero flaring / Flare Management Plans
 - d. Update on SCR (NOx removal) operation
 - e. CEMS on furnaces
 - f. CO2 reduction
 - g. Rejected papers from 2019 session, both are Honeywell UOP
 - i. Smokeless Operation of Flares: Design and Physical Testing of Industrial Scale Flares
 - ii. Practical Low NOx Burner Retrofit Considerations for Ethylene Furnaces
- 4) Other potential topics? [9:40 AM]
 - 5) Review of Action Items [9:50 AM]
 - 6) Important Date Reminders
 - June 21, 2019 – Call for abstracts opens
 - November 22, 2019 – Call for abstracts closes
 - December 13, 2019 – Papers accepted or rejected
 - January 17, 2020 – Program goes live
 - March 6, 2020 – Paper submission closes
 - March 30 – April 2, 2020 – Spring Meeting – Houston, TX
 - 7) Adjourn [10:00 AM]

Interest in continuing to serve on EPC Environmental Subcommittee: Reminder given to please read minutes of June 13th meeting and respond to Walter Postula affirming commitment to serving on subcommittee.

Introduction of New Subcommittee Members: Ahmad and Andrés were welcomed to the subcommittee and they briefly introduced themselves. Those on the call introduced themselves to Ahmad and Andrés.

Update on AIChE Environmental Division programming on “Waste Plastics to Chemicals”: Per e-mail feedback from Jeff Seay, there is no dedicated session(s) planned for Spring 2020 (thinking to do so for Annual 2020). Planning a “virtual topical” for Spring 2020, where existing sessions are encouraged to focus on plastic.

Discussion of Potential Topics for Environmental Session: The following updates were provided based on the topics generated during the first subcommittee meeting.

- 1) Electro-oxidation, ZimCad, and/or activated carbon in waste water treatment (topic from Ahmad Hamad, Siemens) – abstract will be available
- 2) Renewable naphtha/diesel as feedstock for producing bio-ethylene/-propylene (topic from Andrés Muñoz, Neste) – abstract will be available
- 3) Update to RTR/EMACT – Rick confirmed that Steve Smith is interested in the “3peat” on this topic. Brandon indicated that EPA did forward proposal to OMB, indicating a good possibility it will be out by fall. Mark U. suggested that we again reserve a “double spot” in the session for Steve, was support for this on call.
- 4) Zero flaring / Flare Management Plans – Brandon has author and will ask them to tailor to olefins. Dave Elam indicated he was willing to submit abstract as well if Brandon was not able to get presenter/author. Rick suggested to hold separate panel discussion regarding Flares and consent decrees. Was interest on the call. Rick to bring idea to Main Committee.
- 5) Update on SCR (NOx removal) operation – Jake indicated (e-mail) that he asked within CPChem technical community regarding interest, has not heard back yet.
- 6) CEMS on furnaces – Brandon mentioned that it looks like EPA is not pushing, so may not be much interest. Dave Elam willing to submit abstract as well.

- 7) CO₂ reduction – no update, Brandon less hopeful we'll have something. Rick mentioned this is a big topic in Europe (electrification of furnaces). Maybe we wait a year on this topic. Rick will forward presentation on topic given by Linde (in Germany) to Mark U.
- 8) Rejected papers from 2019 session, both are Honeywell UOP – Brandon mentioned neither author was responsive in the previous cycle. Suggest we don't count on them for paper.

Date for Potential Face to Face: Mark U. informed us that there is an 80% chance he'll be in Germany on the previously agreed to date of October 10th. In-lieu of Linde agreeing to fly subcommittee to Germany for face-to-face, Mark suggested we move the date to the following subcommittee meeting (December 5th).

Review of Action Items: **Rick Beluetz** to bring subject of consent decree panel discussion to Main Committee to solicit support. **Rick Beleutz** and **Brandon Lithgoe** to summarize thoughts on topics for panel discussion and send to subcommittee to help in conversations with producing companies. **Brandon Lithgoe** to ask author/presenter of zero flaring/flare management plans to tailor to olefins. **Rick Beluetz** to forward presentation on CO₂ reduction from Linde (Germany) to Mark Ulrich. **Jake Hilbrich** will follow-up with CPChem technical willingness to share update on SCR operation. **All** to review list of potential topics and suggest additional topics (especially for those not on call). **All** (who have not done already) to respond to Walter affirming interest in continuing to serve on subcommittee.

Important Date Reminders: The dates provided in the agenda were reviewed.

Adjourn: The meeting/teleconference was closed at 9:35 am.