

Date: December 8, 2015
To: AIChE Ethylene Producers' Committee, Process Control Subcommittee
From: Sasha Vragolic
Subject: Minutes of October 22, 2015, Subcommittee Meeting

Location: Teleconference

Attendees:

Michael Chisholm	Shell
Swapnil Garge	ExxonMobil
Ken Jackson	DuPont
Peter Le	Schneider Electric
Mike Polasek	Eastman
Ken Praprost	ABB
Pete Traynor	Thermo Fisher Scientific
Javier Vasquez	KBR
Sasha Vragolic	FHR
Jim Wu	Lyondell Basell

Excused:

Satish Baliga	KBR
Jack Buehler	Shell
David Jones	KBR
Curtis Kelly	Schneider Electric
Mark Roffman	Chevron Phillips
Kiran Sheth	ExxonMobil
Justin Westmoreland	BASF

Absent:

Eddy Fontenot	Aspen Tech
Trent Hubbert	PAS
Rohit Kawathekar	AMT
Stuart Nield	Nova
Brian O'Rourke	Westlake
Sanjay Sharma	Honeywell
Marc Spravier	INEOS

Minutes (**Action Items are in Bold Text**):

- 1.) Sasha Vragolic called the meeting to order at 3:06pm.
- 2.) Sasha Vragolic read the Anti-Trust Statement of the EPC Bylaws.
- 3.) Sasha Vragolic called and recorded the roll. There were 10 attendees.
- 4.) Sasha Vragolic reviewed the list of potential papers with the subcommittee.
 - a. The panel discussion on maintenance issues of control systems is still a viable non-paper item for the 2016 EPC Process Control Session. Peter Le is still willing to generate an introductory presentation to start the discussion.

- b. During the meeting, Jim Wu reported that there was still hope that the Lyondell Basell paper would be submitted in time to include in the session.
- 5.) The next meeting was set for Thursday November 19th, 2015. It was to be a teleconference from 3pm to 5pm. The purpose of the meeting was to vote on the papers to include in the session. However, there were no papers to vote for. The only paper was the Lyondell paper but it was not approved for submission. Sasha Vragolic did receive a paper from the Environmental Subcommittee on CFD modeling of decoking. With only one paper to choose from, there was no point in having the next meeting. Therefore, Sasha cancelled the November 19th, 2015 meeting with an e-mail sent on November 17th. The content of the e-mail is shown below:

EPC Process Control Subcommittee,

I still need to send out meeting minutes from our last meeting, which I plan to do next week. At that meeting we had set this Thursday, 11/19 as our next meeting date. The purpose of the meeting was to vote on the papers to include in our session and the order in which they are to be presented. But, we didn't get any papers so there is no reason to meet. I think that our program is set. Since we didn't have any papers, I agreed to move our session to a slot on Monday morning. That is an abbreviated session. I asked the operations session to let us have their paper on CFD modelling of furnace decoking and they graciously agreed to do so. It is a paper from DOW. It looks like we will have about 40 minutes for that paper before the break and an hour after the break for our panel discussion on maintenance issues of control applications. The 40 minutes is too long for a paper but not long enough for two papers. I will forward to you the abstract of our only paper once I receive it.

Thank you,

Sasha

Since the e-mail, Sasha has received guidance for programming the session from the EPC Program Chairman. It makes more sense to have the Panel discussion first, followed by the paper. Therefore, that will be the order of the presentations. Our session will be on Monday morning. We will have the Welcome and Introductory remarks from 9:30 to 9:35am. The Panel discussion will be from 9:35 to 10:25am. We will have a break from 10:25 to 10:35am. The CFD modeling paper will be presented from 10:35 to 11:00am. A copy of the DOW CFD abstract is attached below.

Thanks,
Sasha Vragolic

A Computational Model to Simulate Decoking in Steam-Cracking Furnace Coils

**Shankhadeep Das^{a,*}, Liwei Li^a, Hirokazu Shibata^b, Georgios Bellos^b, Marcos Martinez^a,
Mark Siddoway^a**

^a *The Dow Chemical Company, Freeport, USA*

^b *The Dow Chemical Company, Terneuzen, Netherlands*

Steam cracking produces ethylene via non-catalytic high temperature pyrolysis of hydrocarbons inside coils in the furnace's radiant zone. During cracking, coke buildup on the coil's internal surfaces inhibits heat transfer. Ultimately, either a metal temperature limit or pressure drop increase necessitates periodic decoking of coils with steam/air mixture. To further understand the effect of process parameters on decoking, a 2D axisymmetric CFD (computational fluid dynamics) model has been developed to simulate decoking in steam-cracking furnace coils. The model accounts for both oxidation and steam gasification reaction kinetics and incorporates key process parameters and heat flux from a furnace. A multi-stage pseudo-transient numerical framework has been developed to simulate the decoke cycle of industrial furnaces in a computationally affordable manner. Furthermore, the numerical technique ensures mass conservation during various stages of decoking.