

EPC Operations Committee Meeting Minutes

Time: 1:00 – 2:00pm

Date: 9-20-22

Location: virtual

Attendance:

Dan Euhus (Dow)

Russell Miller (Nova)

Joseph Lawrence (Motiva)

Bryan McVicker (ExxonMobil)

Samual Odewale (CP Chem)

John Pena (Shin-Tech)

Marty Shelton (Eastman)

Call-in (I didn't write down the correct name – if this was you please let me know!)

Agenda:

- Anti-Trust statement – Dan
- Membership updates
- Main Committee Updates
- Paper ideas/status
- Discussion of Chair/co-Chair roles for both subcommittee & Session – Volunteers?

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 any understanding or agreement, written or oral, formal or informal, express or implied, among competitors with regard to costs, prices or 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.”

Meeting Minutes

Membership:

Russell Miller (Nova) introduced himself. Welcome to the committee!

Main Committee updates:

- Initial call for papers closes in Oct., but fully expect it to be extended through end of the year. That said, the conference is in March this year, so fairly early. Time is short.
- John Pena to confirm whether Operations session will have the same time length as last year (spit across break with 6 papers total).

2023 Conference Paper Status

- Two abstracts in CONEX and one expected shortly
In CONEX:
- NOVA:

In the process of pressurizing a nitrogen (N₂)-filled pipeline with a higher-pressure supercritical ethylene (C₂) for commissioning or re-inventorying of a pipe section, the incoming C₂ flashes and mixes with N₂ as it moves down the pipe to either an open end (if venting is employed) or shut-in end while being pressurized. It is well known that when flashed C₂ is mixed with N₂, the mixture temperature drops significantly, which is known as auto-refrigeration cooling. These low temperatures of mixture can vary along the length of the pipe depending on the degree of mixing and local pressure. This is called the Critical Exposure Temperature (CET), which is always required to be above the pipe material minimum allowable temperature (MAT) curve during any process. Therefore, the calculation of CET is important during pressurizing nitrogen-filled pipelines with flashing C₂. According to a simplified approach that became the norm among engineers, the minimum temperature of flashing C₂ and nitrogen mixture at any pressure equals the saturation temperature of C₂ at its partial pressure in the mixture. This approach was applied categorically to all mixture compositions and became a misconception that this paper is attempting to clarify. What this misconception missed, is that adiabatic mixing was not imposed, hence energy conservation was violated for a range of C₂ mole fractions up to a certain threshold when the mixture is in the vapour phase. The present paper elaborates on the thermodynamics of the process via extensive Aspen HYSYS simulations from different initial conditions of both C₂ and N₂, and particularly the initial pressure and temperature of N₂ in relation to that of C₂, where the later would be undergoing isenthalpic throttling through the feed valve. All analyses were conducted on two pressuring/re-inventorying scenarios: first is a scenario where N₂ is vented at the other end of the pipe such that the re-inventorying is conducted under isobaric conditions, and the second when the system is shut-in, i.e. the re-inventorying is conducted under isochoric conditions with pressure rising to the filling C₂ pressure. The main contribution of the work is providing clear insight into the misconception and an approach to perform the pressuring/re-inventorying analysis while observing the fundamental thermodynamic and equilibrium principles.

- AMETEK:
- Thermal imaging devices are commonly used for periodic inspection and measurement on steam crackers, but less so for continuous thermal imaging and temperature data collection and analysis. Continuous monitoring and repeatable, reliable measurements allow operators to extend furnace runtime closer to the material limits. Automated detection of hot spots, together with temperature-controlled decoking, avoids accidental overheating of the coils, increasing their lifetime and reducing maintenance costs.

A pilot installation in Gelsenkirchen, Germany highlights some key advantages and considerations when implementing the technology. With real-time remaining coil lifetime prediction algorithms, software can predict the risk of coil rupture before it becomes a substantial risk, giving operators the insights they need to optimise replacement intervals while mitigating the risk of rupture.

- Direct to Sub-Committee:
- NOVA:
- Startup strategies, sequences and procedures were developed using an Operating Training Simulator (OTS) in preparation for starting up an olefins plant undergoing a significant revamp. The revamp involved the replacement of internals on numerous towers, re-wheel of compressors and a non-negligible amount of process integration. Most of those modifications being implemented during a major plant turnaround. This paper discussed the challenges of validating

the OTS with pre-turnaround operating data no longer reflecting the revamped unit and process design simulations. A significant portion of this work was conducted during COVID-19 restrictions and added on the complexity. Execution of the actual startup is also discussed and compared to the expected sequence.

- Exxon Mobil 2 papers – Hoping for approval in September
 - Safe Park for whole plant
 - Refinery gas recovery C2 splitter revamp
- Dow: Flare Gas Recovery start up. Hope for approval in September.
- High H2 Firing Round Table / Technology – Dan to contact Main Committee Representatives as possible round table?
 - Burners
 - Refractory
 - Heater designers
- Greg was not present – need to follow up on this idea: Greg also spoke about safely shutting down the core exchanges of the cold boxes allowing them to be brought back up gently. Best practices for increasing reliability.
- John Pena will discuss with Shintech about cold service hydrogen embrittlement vessel failure.
- A total of 7 or 8 potential papers would be good to have.

Link for the call for papers is: <https://aiche.confex.com/aiche/s23/cfp.cgi>

The official end date for Abstract submittal is October 25, 2022.

Please continue to pursue abstracts!

Other:

Samuel has volunteered to help with the committee leadership. Dan will discuss with him off-line.

Next meeting:

October 18, 2022 1:00pm Central time Dan to send out the meeting notice