TNChE Asia 2023 Conference

Energy COP

Presenter Bio data & Abstract

Name : **Mr.Kevin McAllister**

Company : **Lummus Technology**

Current Position : **Technology Specialist**

Working Experience : **21 years**

Presentation Topic : **Hydrogen and Ammonia: Zero Carbon Fuels for Steam Crackers**

Kevin McAllister is a Technology Specialist with a Lummus Technology who has 21 years' of industry experience and specialises in the design of ethylene cracking heaters. From a process design perspective, he has worked on a variety of grassroot, expansion and revamp heater projects from feasibility studies through to detailed engineering throughout the US, Europe and Asia, and has provided site support for furnace commissioning, start-ups and licensed equipment performance tests. From a technology development perspective, he has been involved with several decarbonisation initiatives to reduce the environmental impacts from ethylene cracking heaters. Kevin is a Chartered Chemical Engineer based in the United Kingdom and holds a Masters degree in Chemical Engineering from Imperial College and an MBA from Loughborough University, UK."

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Presenter Bio data & Abstract

Name : **Mr.Mike Henneke**

Company : **John Zink**

Current Position : **Licensed professional engineer**

Working Experience : **35 years**

Presentation Topic : **Hydrogen and Ammonia: Zero Carbon Fuels for Steam Crackers**

Mike Henneke is the Global Computational Fluid Dynamics Director for Koch Engineered Solutions. Mike has 35 years of experience in engineering consulting and CFD for combustion systems. He leads a global team of engineers in optimizing burner systems for a variety of different petrochemical applications and developing digital solutions for benefit petrochemical plants. He has authored or co-authored more than 30 articles and book chapters. Mike led John Zink's participation in the EU-funded IMPROOF project. He is a co-inventor on one patent for a burner system. Mike is a licensed professional engineer in the state of Oklahoma. He holds a Ph. D. degree in Mechanical Engineering from the University of Texas and an MBA from Oklahoma State University.

Presentation Abstract :

The majority of the emissions from steam crackers are from combustion of hydrocarbon fuel that is obtained from the process as methane-rich offgas. While the offgas contains some byproduct hydrogen,

for most crackers the combustion of methane provides most of the required energy input. One of the methods to eliminate the carbon dioxide (CO2) emissions from steam cracking heaters is to use an alternate fuel source that does not contain any hydrocarbons. If this fuel source is obtainable, either now or in the near future, then making provisions to fire this fuel in the cracking heaters is an attractive option for ethylene producers to lower or potentially eliminate their CO2 emissions. This option offers a drastic reduction in CO2 emissions with relatively minor modifications in the ethylene plant, which should be weighed against other CO2 reduction options that involve fundamental changes to the recovery section and require a significant import of electricity.

Two carbon-free fuel sources that are currently being considered by the industry are hydrogen and ammonia. Both fuels produce zero CO2 but have vastly different characteristics that present unique challenges for the cracking heater design. This paper will discuss the impact of switching to hydrogen or ammonia on burner design and heater performance as well as the current status of this technology.