



Contribution ID: 373

Type: **Contributed Oral Presentation**

Total Hydrocarbon Accumulation in Liquid Oxygen Storage Systems

Tuesday, June 30, 2015 5:00PM (15 minutes)

Rocket propulsion testing depends, to a large extent, on the quality of liquid oxygen to ensure reliable system performance. Impurities within liquid oxygen may not only degrade test article combustion performance, but in sufficiently high concentrations could react with oxygen or cause an ignition in facility systems. Combustible contaminants in liquid oxygen can be classified as “total hydrocarbons,” or THC. Minimizing the concentration of these THCs, measured as methane, is important in delivering consistent quality liquid oxygen and minimizing the potential for contaminant ignition. Discussed are various methods of THC analysis, mechanisms that can potentially lead to accumulation of THCs in liquid oxygen systems, and methods for mitigating the rise of THCs in liquid oxygen systems. A case study of liquid oxygen systems at Stennis Space Center (SSC) will be discussed. THC levels have recently varied widely in liquid oxygen systems at SSC as well as in the commodity received from the supplier. The measured THC levels in the storage tanks generally increased over time and often exceeded the specified requirement limits. A comprehensive study of THC accumulation was commissioned to 1) assess the differences between the vendor and the SSC liquid oxygen sampling techniques, analytical instrumentation, and sampling procedures; and 2) review historical THC data coupled with a greater frequency of THC monitoring and analysis of trends. A campaign is currently underway using a specially instrumented 49,000 liter tank to monitor THC distribution within the tank, variation over time, and potential mitigation methods.

Primary author: Dr MENEGHELLI, Barry (VENCORE - Kennedy Space Center)

Co-authors: Mr HEBERT, Bartt (NASA - Stennis Space Center); Mr DIRSCHKA, Eric (NASA - Kennedy Space Center); Dr ROSS, Harold (NASA - Stennis Space Center); Ms OBREGON, Rosa (NASA - Stennis Space Center)

Presenter: Dr MENEGHELLI, Barry (VENCORE - Kennedy Space Center)

Session Classification: C2OrG - Hydrogen and Other Systems

Track Classification: CEC-02 - Large-Scale Systems, Facilities, and Testing