Technical Highlights for January 2012

Oak Ridge National Laboratory (ORNL) Attends and Provides Input on Potential Advanced Research Projects Agency-Energy (ARPA-E) on Natural Gas (NG) Vehicles

John Thomas attended the ARPA-E NG Vehicle Technologies Workshop, January 26, 2012, in Houston, Texas. He was an active participant in the morning Engines & Fuel Systems breakout session and the afternoon Commercial Vehicles (medium and heavy duty) breakout session.

ORNL Continues Long Standing Technical Relationship with Cummins

ORNL Fuels, Engines, and Emissions Research Center (FEERC) staff members Bill Partridge and Josh Pihl traveled to Cummins, Inc., on December 8–9, 2011 to discuss recent progress on a Cooperative Research and Development Agreement (CRADA) and SuperTruck partnership. Dr. Partridge and Mr. Pihl presented on recent findings related to selective catalytic reduction (SCR) catalyst chemistry and separate soot oxidation research. These presentations were attended by Cummins staff across multiple business units. The CRADA research has yielded new-to-science and technology insights regarding SCR catalyst ammonia utilization and inhibition, which are relevant to catalyst modeling, design, control, and performance. A detailed Review & Planning meeting for the emissions CRADA section was held with a more focused participant group. Dr. Partridge had separate meetings with corresponding Cummins partners to review the SuperTruck partnership and plan details for an upcoming measurement campaign in the Combustion Uniformity CRADA section; that January 2012 campaign will focus on assessing the performance of a development EGR (exhaust gas recirculation) mixer. In addition, there was a separate meeting with ORNL Corporate Fellow, Dr. Stuart Daw, participating via phone to discuss developing partnership opportunities. Via such fruitful interactions, this Cummins-ORNL partnership is working to broadly advance the Department of Energy (DOE) objectives.

ORNL Team Supports Cummins' Product Development

ORNL FEERC staff members Maggie Connatser, Jim Parks, and Bill Partridge provided on-site assistance to Cummins Inc. related to achieving a time-critical product-development milestone. The work was performed on-site at the Cummins Columbus Engine plant during the week of December 5-9 and involved the application of technologies developed as part of a DOE Vehicle Technologies funded CRADA. This specific support was performed outside of the CRADA as a work-for-others agreement, and is a good example of DOE investment forming the foundation for new successes in enabling technologies to meet DOE efficiency, cost, and durability goals. The Cummins lead for this activity was Ryo Fuchinoue, Technical Specialist, Performance and Emission Development - 5.0L V8 Cummins, Inc.

ORNL to Evaluate Alternative Engine Design Technology for the DOE

FEERC staff have been asked by the DOE to evaluate a split-cycle engine design developed by the Scuderi Group. The Scuderi Group has been working with Southwest Research Institute (SwRI) in San Antonio, TX for many years to transition this concept from a design to prototype hardware. Drs. Robert Wagner and Dean Edwards traveled to SwRI with the DOE to meet with the Scuderi Group and SwRI engineers.

Executive Director of GM Global Research and Development Visits ORNL

Dr. Gary Smyth visited ORNL to learn more about the ORNL Sustainable Transportation Program as well as serve on the Scientific Advisory Committee for the Energy and Environmental Sciences Directorate. His visit included a tour of the FEERC as well as follow-on discussions of ORNL technologies and research of importance to GM.

FEERC Researcher Delivers Invited Presentation at the Car Training Institute (CTI) Exhaust Systems Conference in Germany

ORNL presented research results on hydrocarbon fouling of Selective Catalytic Reduction catalysts at the CTI Exhaust Systems Conference in Stuttgart, Germany on January 24–25, 2012. The results focused on the unique hydrocarbon species produced by the advanced combustion technique, premixed charge compression ignition (PCCI), which greatly reduces nitrogen oxide (NO_X) and particulate matter emissions but tends to produce higher hydrocarbon emissions. The interactions of these hydrocarbons with SCR catalysts are important to understand so that durable cost-effective catalyst systems can be developed for these fuel-efficient combustion techniques.

FEERC Participates in Society of Automotive Engineers (SAE) Government/Industry Meeting

Several FEERC and Oak Ridge National Laboratory (ORNL) staff organized and chaired sessions technical sessions as well as contributed invited presentations at the SAE Government/Industry Meeting in January. Session topics included Electric Vehicles, Biofuels, and EISA compliance, greenhouse gas rules and fuel economy, and global perspectives on transportation.

FEERC Researcher Presents at Combined Heat and Power Conference and Trade Show

Scott Curran presented at the Combined Heat and Power Conference and was subsequently invited to write an article based on this work for *Cogeneration & On-Site Power Production* magazine:

> S. J. Curran, T. J. Theiss, M. Bunce, and D. Stinton, "GHG Regulation as a Driver for CHP," presented at the Combined Heat and Power Conference and Trade Show, Houston, Texas, October 17–19, 2011.

FEERC Researcher gave Invited Presentation for ORNL Center for Bioenergy Sustainability Forum

FEERC researcher Scott Curran was invited to give a presentation for the ORNL Center for Bioenergy Sustainability Forum. The presentation focused on the effects that renewable fuels have on advanced combustion modes, namely reactivity controlled compression ignition (RCCI). RCCI uses two fuels at once meaning it has the ability to run on biofuels replacements for gasoline-like and diesel-like fuels.