



U.S. Department
of Transportation
Federal Railroad
Administration



OFFICE OF RESEARCH & DEVELOPMENT

Federal Railroad Administration Natural Gas Safety and Efficiency Research Overview

**West Coast Collaborative Partnership Meeting
September 4, 2014
San Francisco, CA**

MELISSA SHURLAND

Program Manager

Office of Research and Development

Federal Railroad Administration

Overview

- Natural Gas Locomotive Research Goals
- Natural Gas Safety Research Projects
- Summary
- Questions



Natural Gas Locomotive Research Goals

- Develop knowledge base about the technology in support to the FRA Office of Safety in their review of natural gas fueled locomotives
- Support the rail industry as specifications for next generation of natural gas fuel tender are developed

Natural Gas Safety Assessment for Locomotive Applications

- Evaluation of the industry FMEA or natural gas locomotives
- Identification of the types of failures of natural gas systems with potential for significant impact
- Survey other related industry for methodologies and tools for evaluation of safety assessment

Evaluation of Tri-axial Displacement and Acceleration of Natural Gas Locomotive-Tender Connections

- Measure the displacement and acceleration of interconnection cables and hoses
- Determine the required operating ranges for locomotive-tender interconnections

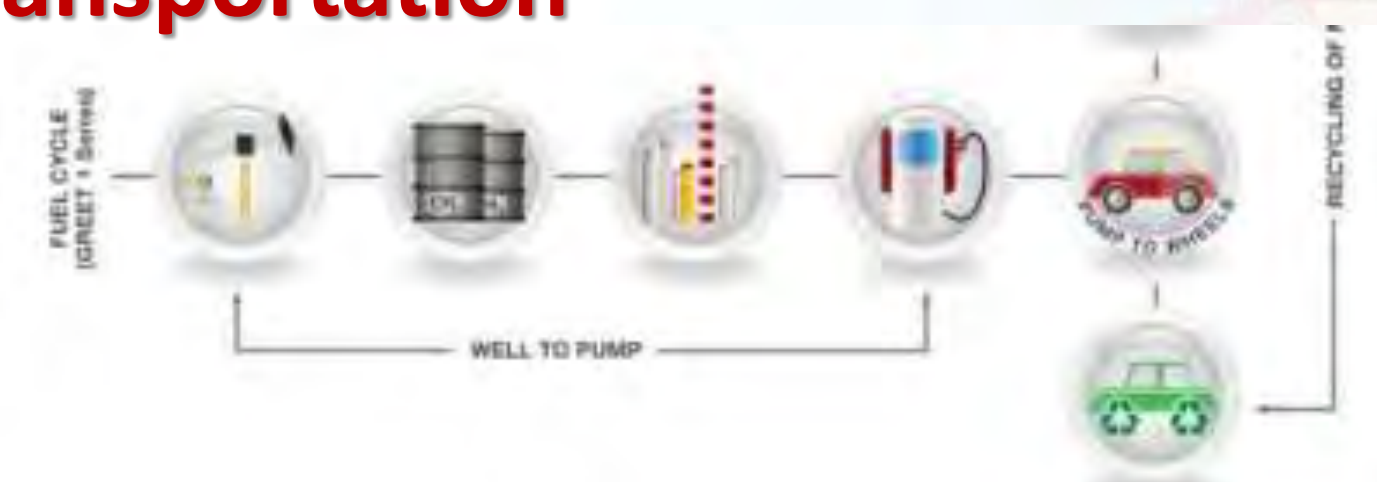


Crashworthiness of Natural Gas Locomotive Storage Equipment

- Structural Analysis of LNG tenders (legacy equipment)
 - Buff load
 - Side impact load
 - Head and shield performance
- Support to the railroad industry in developing analysis scenarios for the next generation of tender cars



REET Model Simulation for Lifecycle Efficiency and Emissions of Rail Transportation



- Development of a rail component in the Greenhouse gases, Regulated Emissions, and Energy use in Transportation (REET) Model
- Simulation of emissions and efficiency of natural gas locomotive (CNG, LNG, DME vs. diesel fuel)

Investigation of an Anti-knock Index and Hydrocarbon Emissions of Natural Gas Blends

- Development of a non-proprietary knock index for locomotive natural gas fuel standard
- Mitigate engine knock
- Optimization of combustion of blended fuel in locomotive engines
- Ensure lower hydrocarbon emissions

Summary

- Projects focus on research, development and demonstration of technologies to improve safety, efficiency and emissions of rail transportation
- Natural gas research is conducted in cooperation with the FRA Office of Railroad Safety and the railroad industry

Thank You

Any Questions?

Melissa Shurland
Program Manager

Rail Energy, Environment, Engine (Rail E3) Technology Research
Rolling Stock Research Division

Office of Research and Development

202-493-1316

melissa.shurland@dot.gov