Office of Hazardous Materials Safety
Research and Development Projects Under Consideration

Project Title	Type	Project Summary/Expected Deliverable
Rapid Identification of Crude Oil Properties	Classification/STEP Program	Demonstrate a low cost colorimetric indicator array with associated image processing and data analysis software that can rapidly extract important properties of hazardous flammable liquids, including vapor pressure, initial boiling point, flash point, corrosiveness and sulfur content the volatility profile, and determine the associated transportation hazards (e.g. packaging group). Phase I, laboratory development/proof of concept, will be funded with $300K of FY13-15 funds.
Risk Management Frame (RMF)	Classification/STEP Program	Expand commodity flow analysis and study. Analyze the data collected on flammable liquid transport and expand research to additional energy products.
Gelation of Crude Oil	Classification/STEP Program	Research into the ability to "gel" crude oil during transport
Development of Metal Foams	Classification/STEP Program	Research the properties of metal foam and their possible application in the bulk transport of crude oil or LNG Performance Characteristics of Metallic Foam - Research into new materials that can be utilized in bulk transport of crude oil or LNG (Coordinated program with FRA)
Combustion experiments and modeling (Collaborative work with DOE)	Classification/STEP Program	Determining hazard profiles of different crude oils. Project includes pool fire and fireball experiments to determine burn rates, flame geometry, surface emissive power, and heat transfer to engulfed objects.
Critical property determination/Test method identification (Collaborative work with DOE)	Classification/STEP Program	Determining properties to utilize in identifying different types of crude oil and selection of appropriate test methods. Utilizing the hazard profiles determined in previous phase of program, determining what property or set of properties best identifies differing levels of hazard associated with crude oil and selecting test methods that would be most appropriate for measuring various types of crude oils
Sampling method evaluation (Collaborative work with DOE)	Classification/STEP Program	Determination of what sampling techniques are adequate based on required information above related to test methods and criticality of component retention. Analysis of different sampling techniques needed for capturing representative samples of crude oil for conducting tests identified above
Modeling of Current Standards for Selecting Pressure Vessel Steels to Transport Hydrogen Bearing Gases	LNG	Review, evaluate and assess the current laboratory test methods used to specify steels for the construction of pressure vessels that are listed in 49 CFR. Results will support standard development which would be used in design of bulk LNG packaging. (Phase I was funded with $250K of FY13-15 funds) Test Methods for Evaluating Steel Containers Used to Transport Energy Products. (Hydrogen Embrittlement) (Coordinated program with FRA)
Research on Philadelphia Incident: Integrity Assessments of LPG/LNG	LNG	Failure of propane cylinder. Root cause analysis to be used in LNG package design project.

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Metallic Packaging and Devices		
Design and Testing of Composite Overwrapped Pressure Vessel (COPV) for LNG/CNG (Coordinated program with FRA)	LNG	Research the design and performance requirements for expanding the use of composite overwrapped pressure vessels for the bulk transport of LNG/CNG.
Metallic Packaging Design Used in H2/CNG/LNG Service (Coordinated program with FRA)	LNG	Research the design and performance requirements for expanding the use of metallic package designs for the bulk transport of hydrogen, LNG and CNG.
Nondestructive Testing (NDT) for Quality Control and Requalification of COPV - CNG/H2 (Coordinated program with FRA)	LNG	Research the expansion and standardization of non-destructive test and evaluation methods to requalify tanks and cylinders used to transport hazardous materials
Crashworthiness Analysis Of IM (ISO) Tanks (Coordinated program with FRA)	LNG	Project being scoped and developed in cooperation with FRA. Details and budget not yet available.
Fire Testing and Modeling of Tanks and Tank Cars (Coordinated program with FRA)	LNG	Project being scoped and developed in cooperation with FRA. Details and budget not yet available.
Safety Assessment of Transporting LNG in IM Portable Tanks (LNG Program) (Coordinated program with FRA)	LNG	Project being scoped and developed in cooperation with FRA. Details and budget not yet available.

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Transportation Impacts Associated with Small-Scale Natural Gas Liquefaction Facilities	Discretionary	Fully consider and evaluate the risks associated with the transportation of LNG originating from small-scale liquefaction facilities. Focus on package identification, communication, preparedness, and response (see Note below).
Emergency Response Guidebook Support Development and maintenance of modeling used for TIH material in ERG	Discretionary	Development and maintenance of modeling used for TIH material in ERG. Expand reactivity testing from top six TIH materials in transport to top 20 in transport. This will allow complete update of TIH tables in the ERG (support 2020 edition).
Research and Development on Emerging Technology (IDIQ Program)	Discretionary	Estimate of annual funding required to test, investigate, analyze, emerging trends associated with the packaging and transport of hazardous materials. ($400K of FY14-16 funding originated this effort)
Research on Princeton Incident Involving Operation and Requalification of O2 Cylinders	Discretionary	Conduct root cause analyze and develop recommended solutions for three O2 cylinders which failed in normal operation. OSHA will provide data on two failures that it has investigated and PHMSA funded the analysis of one failed cylinder ($80K of FY14 to 16 funding)
Development of HM-ACCESS-Electronic Hazard Communication System	Discretionary	Once pilot test is completed and report to Congress submitted, PHMSA and Volpe will discuss, plan PHASE II of project.
ERG – 2020 Orange Section Improvements	Discretionary	Validation/Verification/Update of the response guides of the ERG (support 2020 edition). Development of an expanded, improved Emergency Response application for smart phones.
Novelty Fireworks	Discretionary	Improve classification consistency and potentially improve the harmonization of national/international classification of display fireworks and certain consumer fireworks novelty devices.
Black Powder Equivalency Testing	Discretionary	Develop/establish a test that could be used by PHMSA inspectors in the field or lab to measure and compare explosive characteristics of convention black powder (formulations of potassium nitrate, charcoal and sulfur) to more modern formulations of black powder see today (potassium perchlorate, charcoal and sulfur).
Non bulk package testing	Discretionary	Conduct performance oriented package tests to better understand package performance and support regulatory development efforts.