UTC Project Information	
Project Title	Modeling Impacts of Cold Climates on Vehicle Emissions
University	Washington State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	CESTiCC Tier I UTC – UAF: 101413 USDOT: $40,000 WSU Dept. Civil and Environmental Engineering Matching: $20,000
Total Project Cost	$60,000
Agency ID or Contract Number	101413
Start and End Dates	May 16 2014- Dec. 31 2015
Brief Description of Research Project	This project relates to the research thrust area of 'environmental impact assessment,' specifically the impact of cold climates on vehicle exhaust emissions. Motor vehicles emit pollutants that are harmful to human. Emissions are thought to be elevated during engine cold starts. During winter, low-lying temperature inversion can trap vehicle emissions near the surface, leading to significantly elevated pollutant concentrations. Despite the importance, vehicle emissions data for cold climates are sparse and the accuracy of vehicle emissions model parameterizations for cold climates is not known. The goal of this project is to improve ability of EPA's MOtor Vehicle Emission Simulator (MOVES) model to simulate cold start emissions in cold climates.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	We will use the MOVES model for initial estimates of the contribution of emissions during cold starts to total vehicle emissions for Ada County, Idaho and Yakima County, Washington during January. As part of the NW-AIRQUEST, which is a consortium of over 20 clean air agencies, federal land managers and other air quality stakeholders in the Pacific Northwest (PNW), we have access to MOVES simulations results from the Idaho Department of Environmental Quality for several counties in the Pacific Northwest. We will use these results to evaluate MOVES' temperature-dependent parameterization with measurements from WSU's engine testing building. Emissions of CO, NO, NO_2, and selected volatile organic compounds (VOCs), such as formaldehyde, acetaldehyde, benzene, toluene, and and other aromatics will be evaluated.
Impacts/Benefit of Implementation (actual, not anticipated)	Climate and meteorological conditions have large impacts on transportation patterns and emissions. The expected benefit of the project is a more accurate assessment of how cold climate engine start emissions impact ambient concentrations of criteria pollutants Climate and meteorological conditions have large impacts on

	transportation patterns and emissions. The expected benefit of the project is a more accurate assessment of how cold climate engine start emissions impact ambient concentrations of criteria pollutants and air toxics that are harmful to human health. The study will improve the MOVES model ability to estimate vehicle emissions for cold climates that characterize wintertime in much of the western US.
Website	http://cem.uaf.edu/cesticc/research/projects/modeling-impacts-of-cold-climates-on-vehicle-emissions.aspx