Scope of Work

1. Researchers at the Utah State University (USU) and National Center for Automotive Science and Technology at Weber State University (NCAST) will collaborate to assess the emission differences between engine cold starts, hot starts, and continuous idling. We will also be looking to answer whether cold start emissions are higher in a colder environment as well as how long a catalytic converter is able to remain at an optimal temperature during winter and summer conditions after the engine is shut off. Planned test protocols will include:
    - Cold start: both static (idle until equilibrated) and dynamic (a cold start followed immediately by simulated drive cycle on a dynamometer) – emissions will be monitored until an observed equilibrium is approached (i.e. asymptotic)
    - Hot start: performing a drive cycle until the engine and catalytic converter have reached nominal operating temperatures, followed by an engine shut off and restart after pre-determined time increments (e.g. 5 min, 10 min, etc.)
    - Idle: after warm up/drive cycle, monitor vehicle emissions under continuous idle for 5-15 minutes
2. Instrumentation will be compiled and readied in summer of 2014, and data collection will begin during late fall and continue through winter, spring, and potentially early summer of 2015.
    - NO_x, HCs, and CO (carbon monoxide) concentrations will be monitored with an Autologic 5-Gas Analyzer (or equivalents). Supporting data will also be recorded including system temperatures, flow rates, RPMs, and drive cycle conditions using manufacturer specific and/or generic scantools. Vehicles will be tested under load using a laboratory grade transient chassis dynamometer.
    - Vehicles being tested will represent the current Wasatch Front and Cache County fleets.