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DIFFICULTY OF MEASURING EMISSIONS FROM HEAVY DUTY ENGINES EQUIPPED WITH SCR AND DPF

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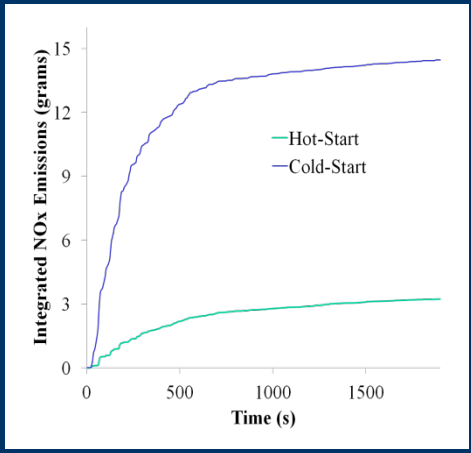
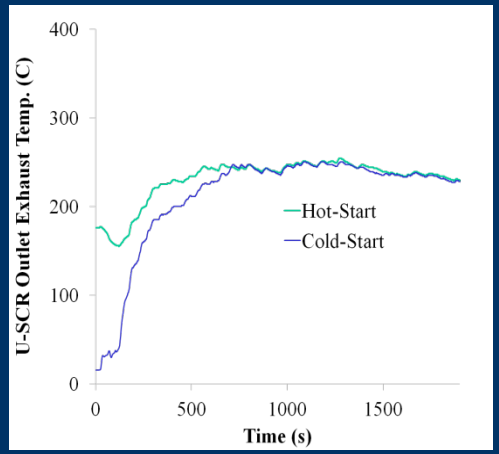
Overview

Problem:
An increase in test-to-test variability in emissions and fuel consumption from modern vehicles equipped with advanced engine controls and active exhaust aftertreatment systems such as selective catalytic reduction (SCR) and diesel particulate filters(DPF).

	Warmup	Regeneration		Hot/Typical	
	Test #1	Test #2	Test #3	Test #4	Test #5
Fuel Economy (mpg)	5.718	4.684	4.145	5.669	5.573
CO_2 (g/mile)	1774	2166	2448	1790	1821
NO_X (g/mile)	5.256	7.527	7.847	5.401	5.296
PM (g/mile)	0.008803	1.77	1.197	0.01439	0.01247

DPF regeneration occurred during portions of the second and third test and resulted in significantly reduced fuel economy, increased NOx emissions, and PM emissions two orders of magnitude higher than during non-regeneration tests[2].





Test-to-test variability in NOx emissions as a result of temperature dependence of urea SCR.

Conclusion:
In reference to legacy Heavy Duty Vehicles, emissions and fuel use are less closely related to immediate engine load than was the case without the use of aftertreatments