OAK RIDGE NATIONAL LABORATORY
FUELS, ENGINES, AND EMISSIONS RESEARCH CENTER
A U.S. DEPARTMENT OF ENERGY NATIONAL USER FACILITY.

Engine Research Cell 3

Dynamometer:
DC, 300 Absorbing, 285 Motoring, 2500 RPM Base Speed, 5000 RPM Maximum Speed

Dyno and Throttle Controllers:
Dyn-Loc IV Dyno Control
DTC-1 Throttle Control

Data and Control System:
Dyne-Systems Companion with Cell-Assistant Software

- Temperatures (32 pre-wired)
- Pressures (16 pre-wired)
- 24 digital inputs/outputs
- 8 analog inputs, 8 analog outputs
- Timer/Counter Inputs

Fuel Control:
Day-tanks plus in-ground fuel feed for commonly-used fuels. Fuel flow measurement and handling using a positive-displacement fuel metering system.

Combustion Air Control:
Engine intake air conditioned to maintain desired temperature and humidity. (Maximum air flow is 2000 CFM.) Engine air consumption is measured with Meriam laminar-flow elements.

Reductant Injection:
Spray-injection systems for introducing reductants into the exhaust have been developed for use in this cell. One system is automated for intermittent sprays (useful for LNT regeneration).

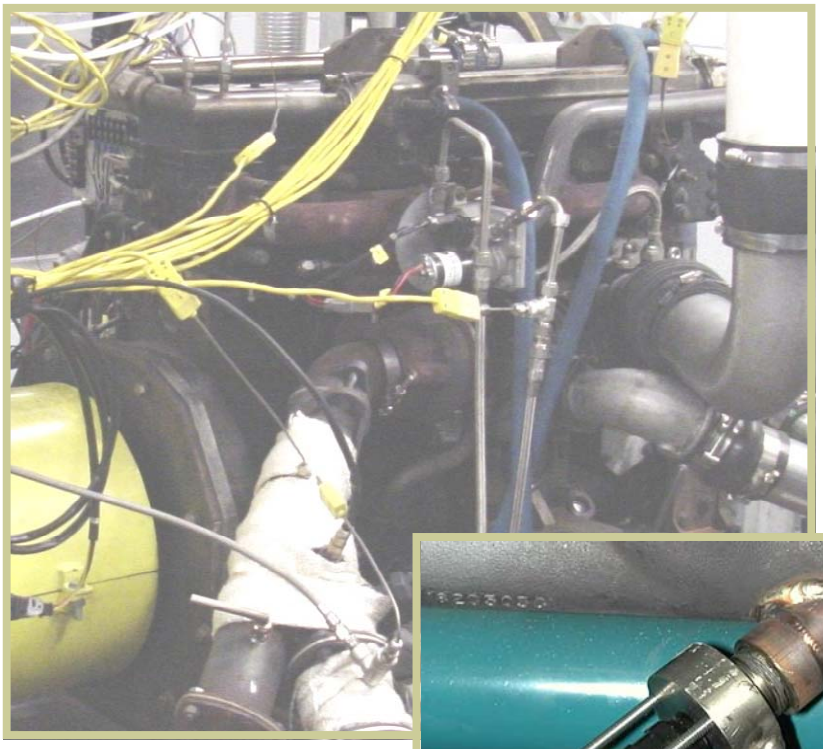
Emissions Instrumentation:
Micro-dilution tunnel is available for dilute samples including bags and filters.

2 main flow paths with standard instruments:

- Heated Chemiluminescence (NO_X)
- Heated Flame Ionization (HCs)
- Non-dispersive Infrared (CO, CO_2)
- Paramagnetic (O_2)

ETAS-LA3 Lambda Meters
NGK NOx sensors

More advanced instrumentation is included in a pool shared among engine cells. (FTIR, TEOM, SMPS, GC-MS, etc.)



Currently Installed Engines:

Two engines are currently installed in Cell 3. One is a Cummins 1999, 5.9 L ISB diesel engine with non-commercial cooled EGR, including a controllable EGR valve. This engine is used for alternative fuels, HC-SCR and other exhaust aftertreatment research . The second engine is a Navistar T444E and is being used in a Cooperative Research and Development Agreement.

Current Projects:

Research projects associated with both engines are on-going. The topics of these efforts include fuel-borne/fuel derived reductants for hydrocarbon selective catalytic reduction, and lean NOx trap characterization and regeneration strategies. Past work has included urea SCR, and detailed examination of non-regulated emissions from aftertreatment systems. An portion of past fuel-borne reductant work is embodied in SAE paper number 2003-01-3244 .

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