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

Engine Research Cell 1

Dynamometer:
DC, 600 Hp Absorbing, 500 Hp Motoring, 2000 RPM Base Speed, 3000 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. Natural gas fuel capable, with fuel measurement by micromotion coriolis mass flowmeter.

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.

Combustion Instrumentation:
AVL Indimodul with IndiCom software. Up to 8 high-speed inputs (typically high-speed pressure transducers).

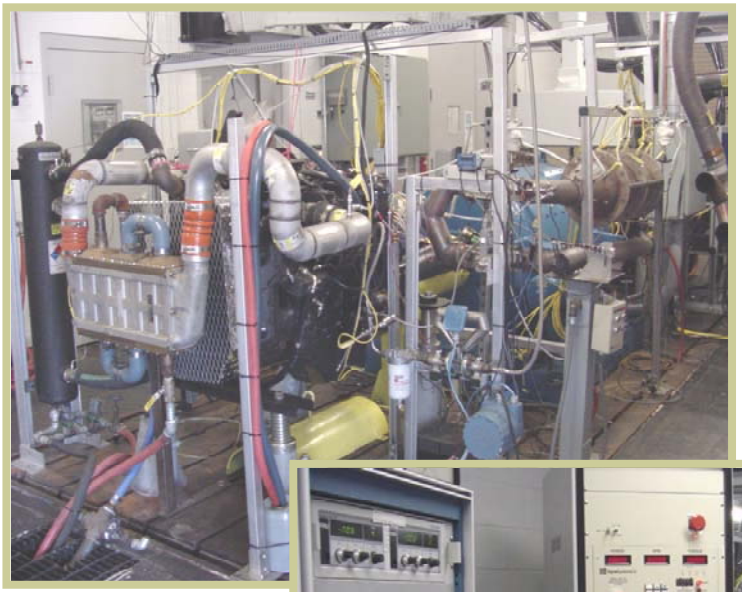
Emissions Instrumentation:
Micro-dilution tunnel is available for dilute samples including bags and filters.

2 main flow paths with standard instruments:

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

ECM/NGK Air/Fuel Ratio Meter

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 1. A DDC Series 60 engine supports a CRADA. The second engine is a natural gas fueled 2002 model 8.3L Cummins C Gas Plus.

Current Projects:

The DDC Series 60 engine supports a CRADA with DDC on engine combustion management. The Cummins natural gas engine supports lean NO_X trap (LNT) catalyst research efforts for lean burn natural gas engines. The topics of this effort include LNT storage capacities, regeneration efficiencies, and fuel penalties. Tailpipe NO_X emissions as low as 0.10 g/hp-hr have been achieved with the natural gas engine.

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