

2008 6.4L Super Duty Overview



Service Engineering Operations

Agenda

- 2008 6.4L Super Duty Vehicle Overview
 - New Vehicle Features and Content
 - 6.4L Engine Highlights
- 6.4L Design Improvements
- New Fuels and Lubricant Requirements
- FCSD Extraordinary Launch Plans



New Vehicle Features

➤ New Exterior

- Cab, Fenders, Grill on Hood, Tailgate
- Optional Step Gate
- Optional Bed Extender
- Power Fold/Telescoping Mirrors
- F450 Pickup

➤ New Interior

- Navigation System/Satellite Radio
- Dual Zone Climate Control
- Adjustable Pedals
- Audio Input
- E-PATS Anti-theft





Service Engineering Operations











6.4L Engine Highlights

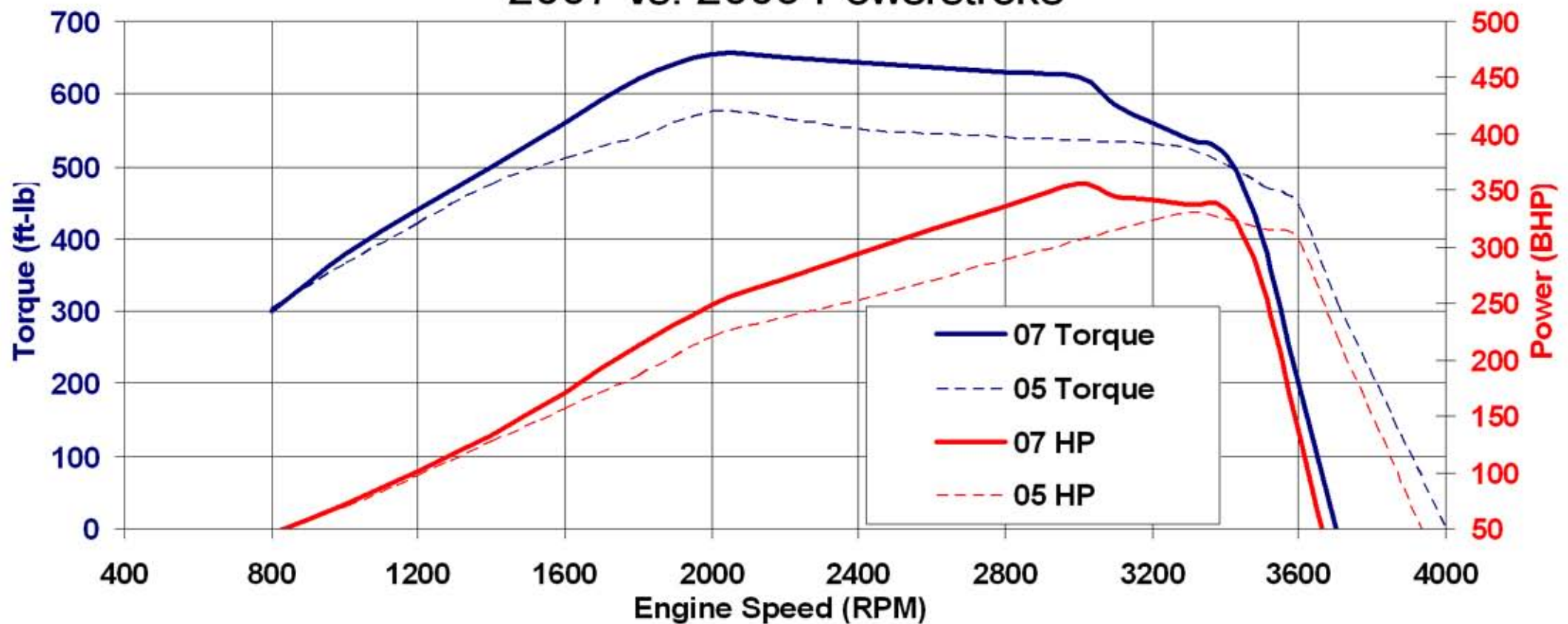
- Increased Horsepower and Torque
- Quieter Ride and Idling
- Meets 2007 Emissions Standards



Greater Power, Greater Torque



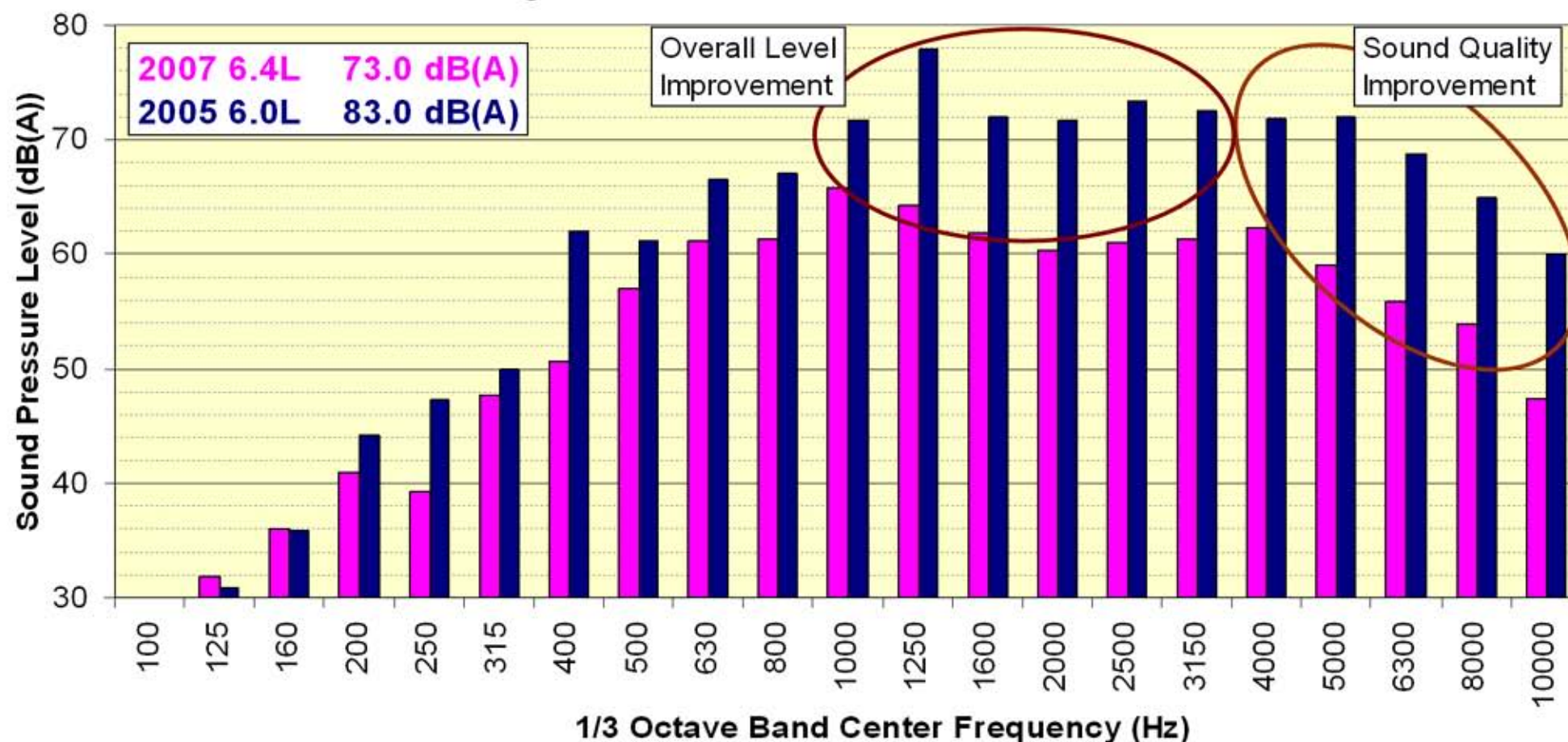
Power & Torque Comparison
2007 vs. 2005 Powerstroke



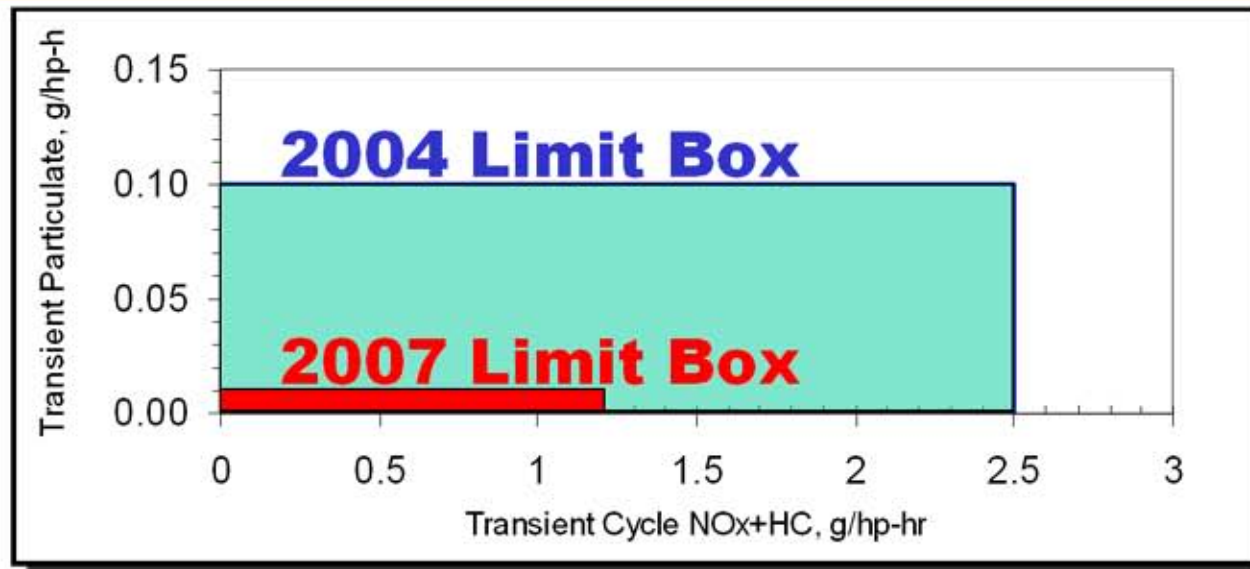
Quieter Ride, Quieter Idle



Engine Airborne Idle Noise Levels



New 2007 Emissions Regulations



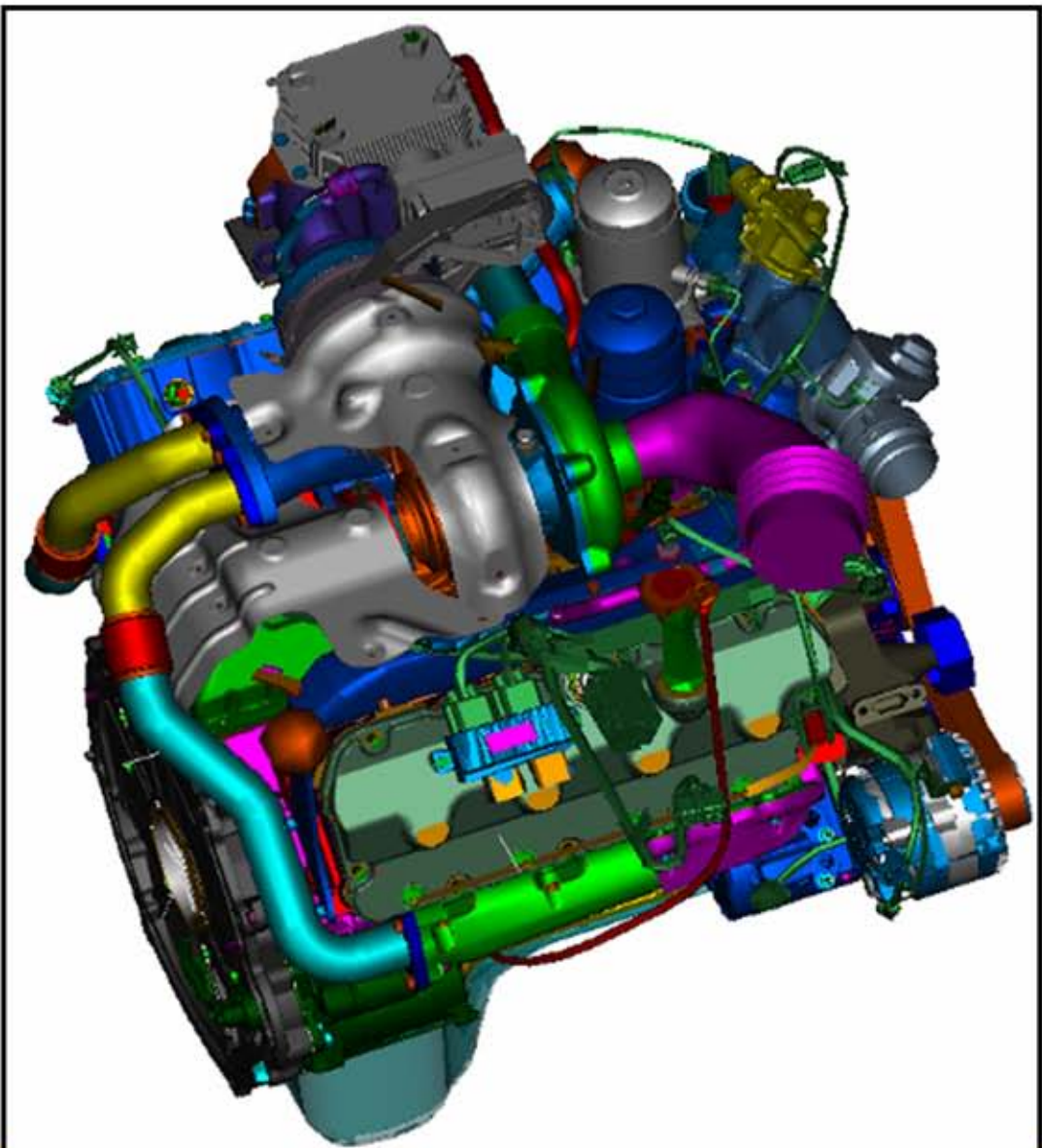
2007 Emissions level requires several advancements:

- Active Diesel Particulate Filter (DPF)
- Enhanced Exhaust Gas Recirculation (EGR)
- Advanced multi-shot injection control
- Increased turbocharger boost levels
- Enhanced engine structure



New Engine Highlights

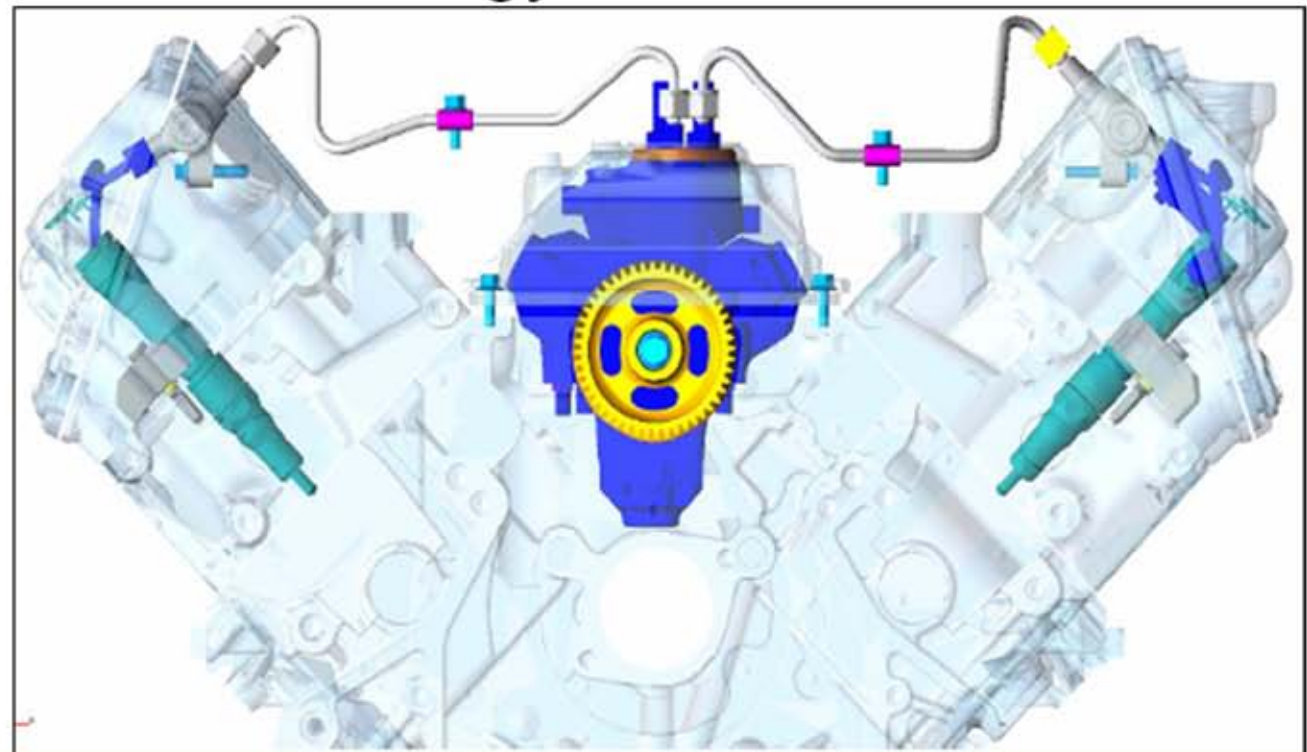
- Two turbochargers in series, one fixed low pressure turbo feeding a variable turbine high pressure turbo
- High Pressure Common Rail (HPCR) Injection System
- EGR System with dual coolers, and EGR oxidation catalyst



Quieter Ride, Quieter Idle

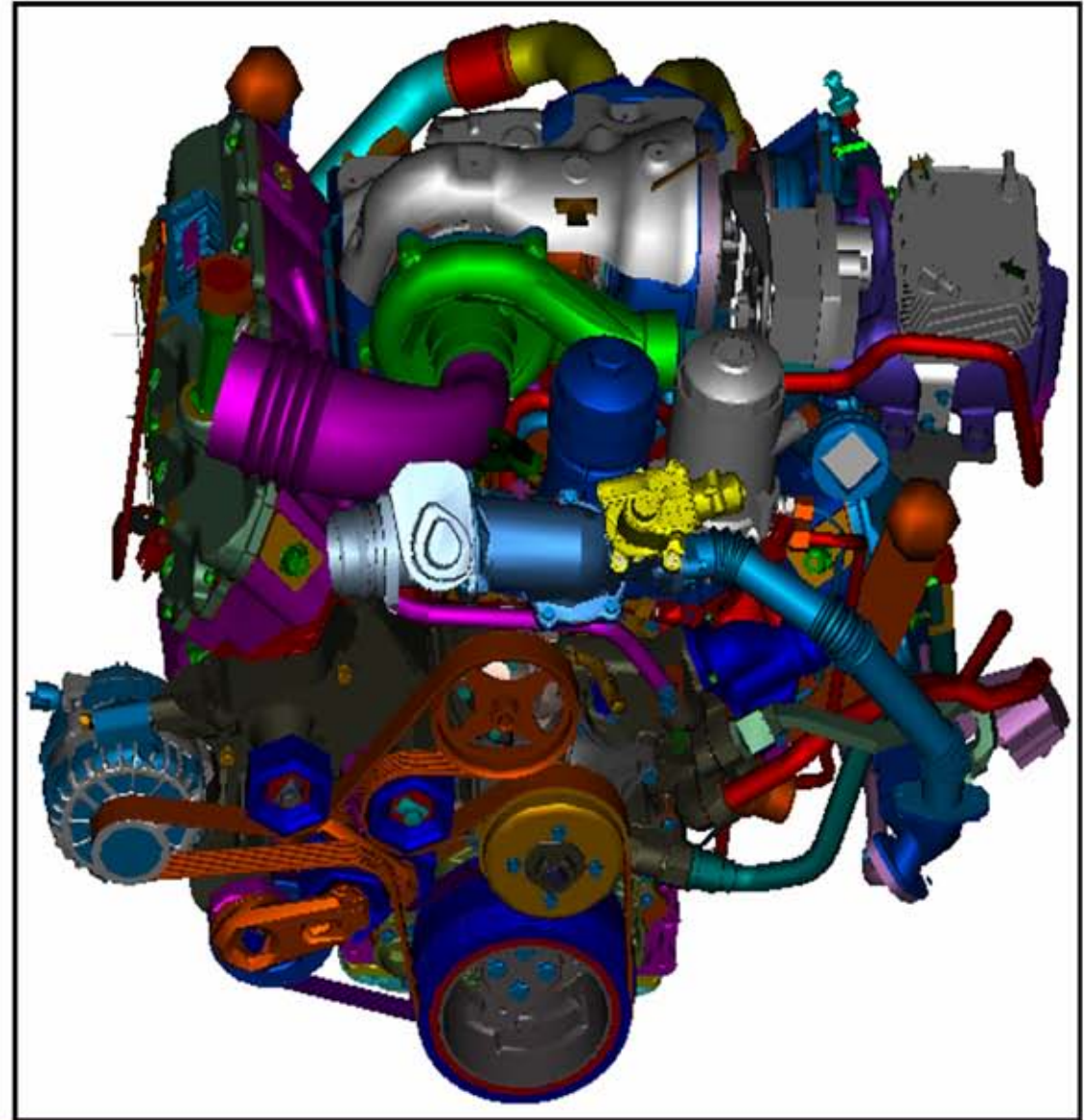


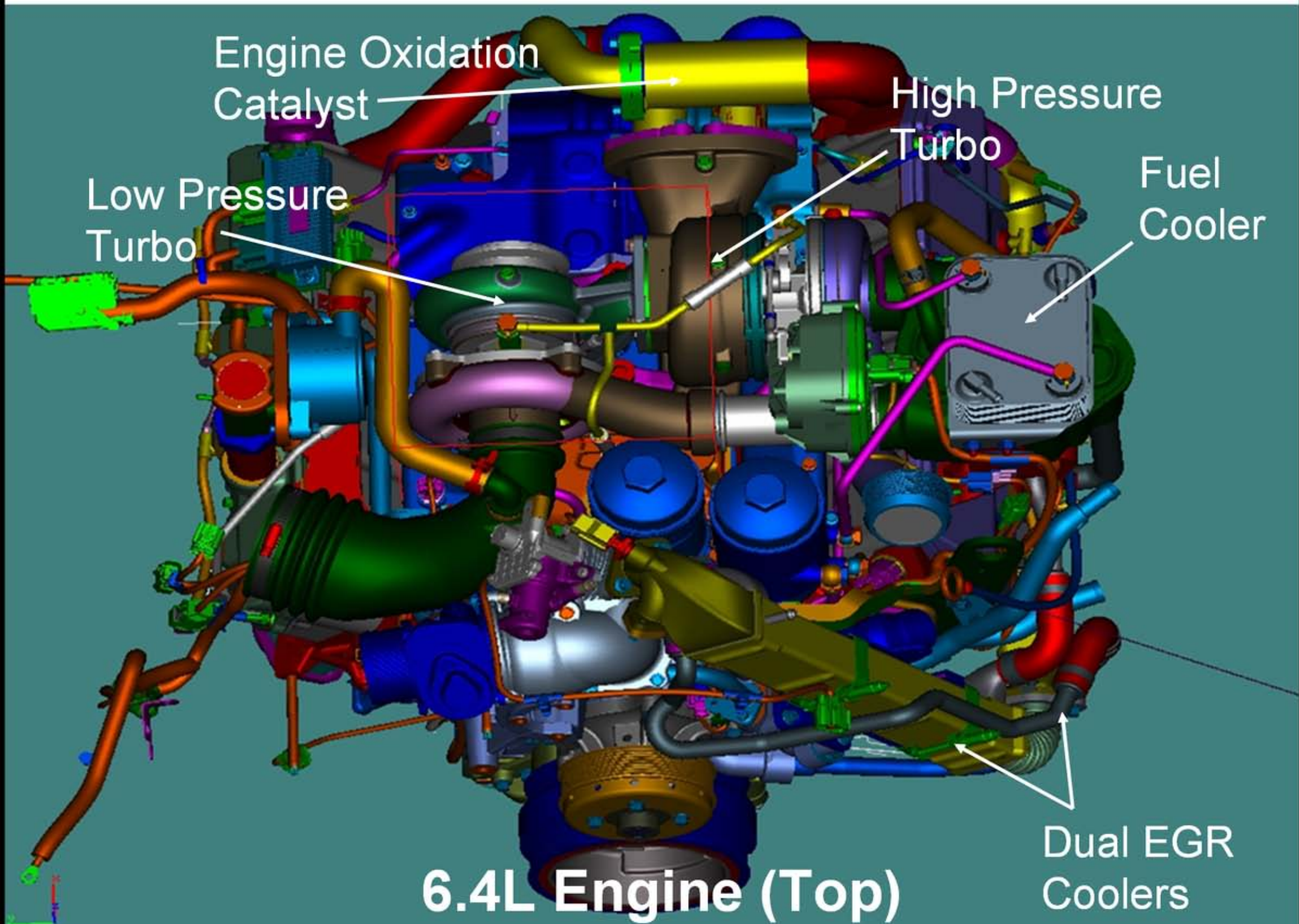
- Enhanced Fuel Injection System
 - Injectors located inside valve cover for quieter ride and quieter idle
 - Piezo Injector Actuation Technology
 - Allows for multiple injections
 - Improves combustion for quieter operation

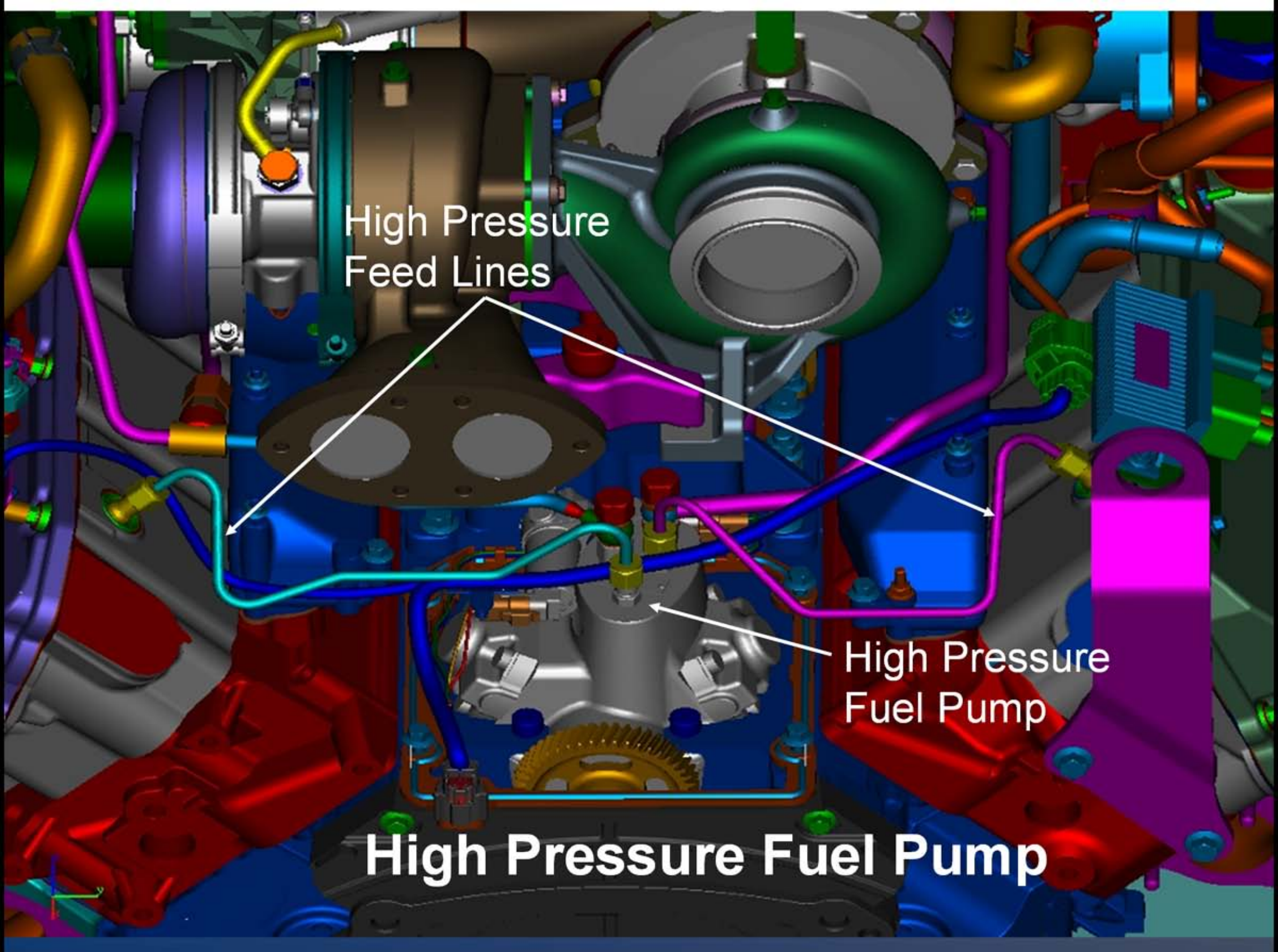


New Engine Highlights

- Improved cooling system
 - Upsized water pump
 - New fuel cooling circuit
 - Increased cooling fan capacity
- Diesel Particulate Filter (DPF)





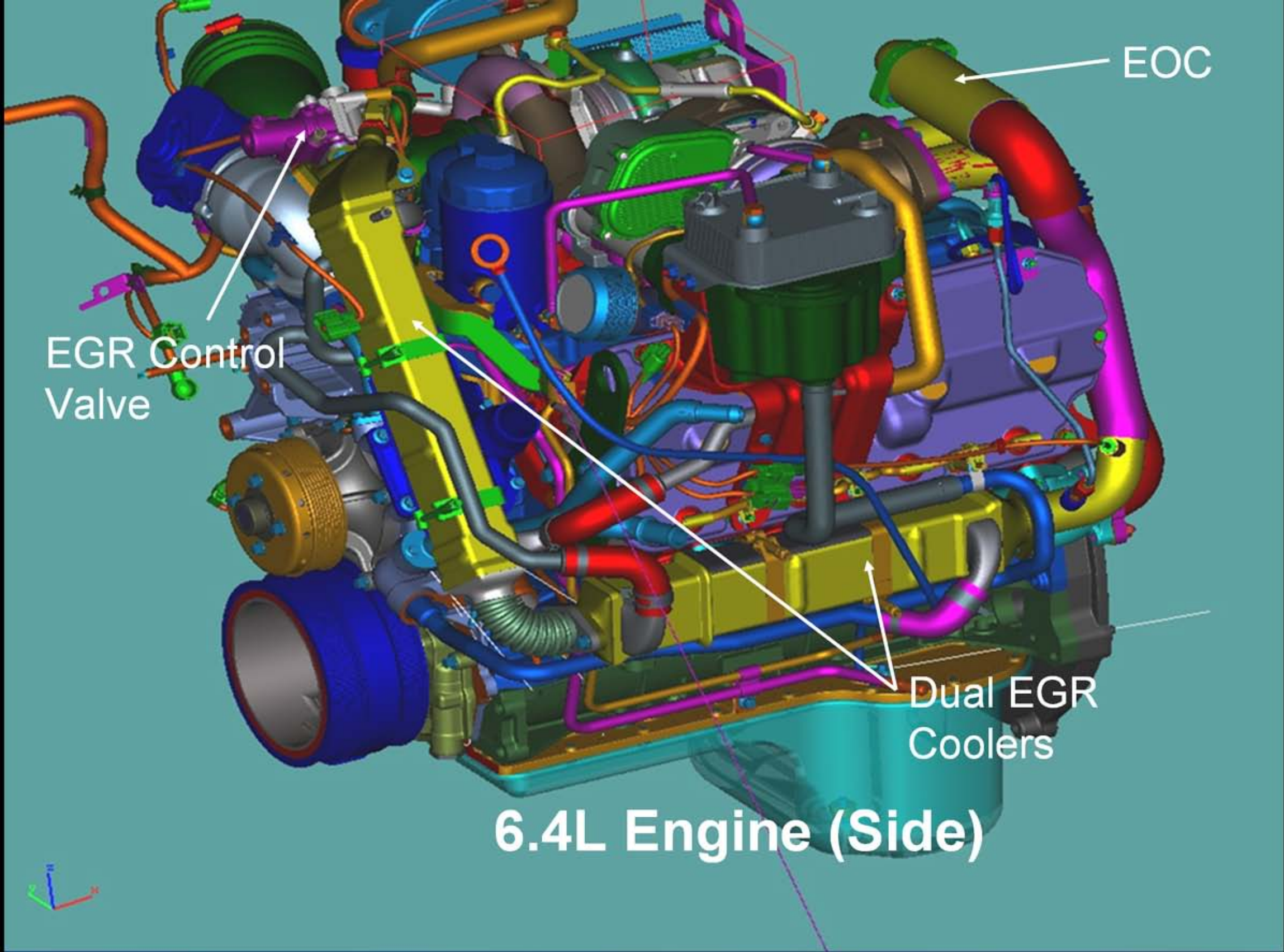


A detailed 3D CAD model of an engine's high-pressure fuel system. The model features a central high-pressure fuel pump (silver) with a yellow gear at the bottom. It is connected to various high-pressure feed lines (blue and red) that lead to the fuel injectors. A large green component, likely a turbocharger, is visible at the top. The engine block is shown in red, and the cylinder head is blue. The text 'High Pressure Feed Lines' is positioned at the top, with white arrows pointing to the blue and red lines. The text 'High Pressure Fuel Pump' appears twice: once in the middle right with an arrow pointing to the silver pump, and once at the bottom with a larger font. The model is highly detailed, showing various bolts, seals, and fluid passages.

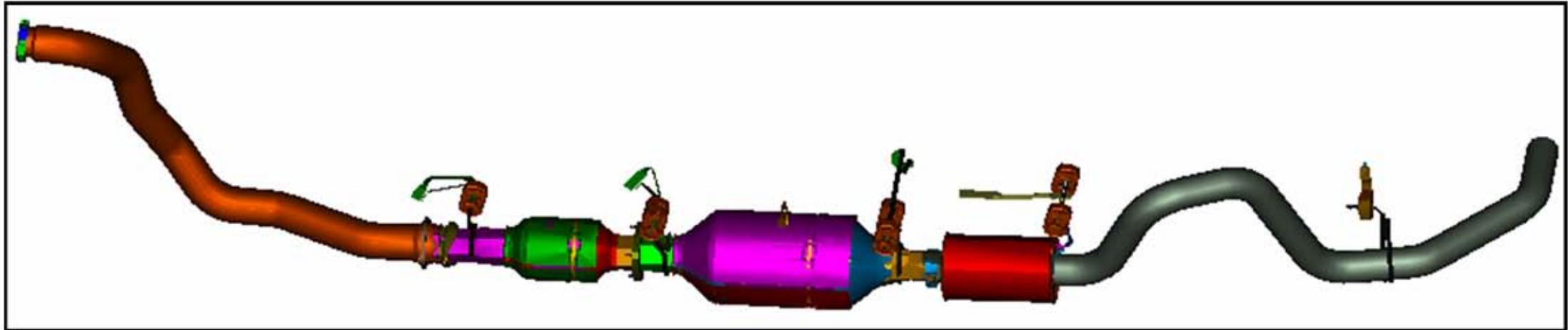
High Pressure
Feed Lines

High Pressure
Fuel Pump

High Pressure Fuel Pump



Exhaust Aftertreatment



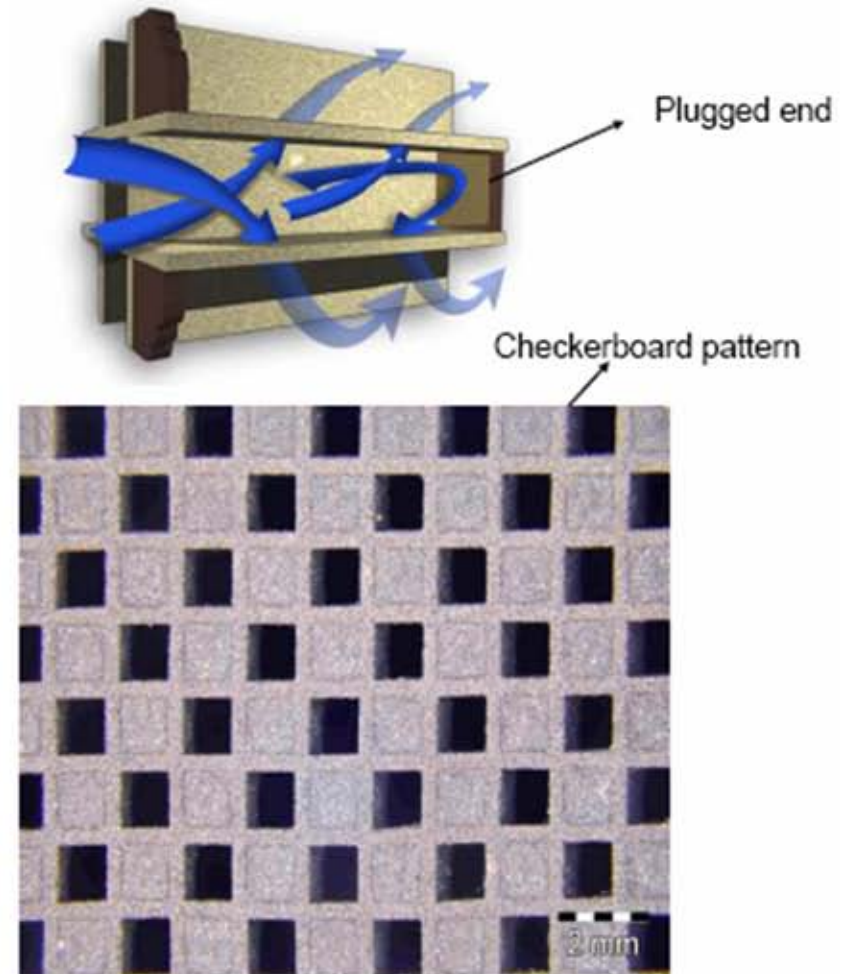
- Downpipe
- Diesel Oxidation Catalyst (DOC)
- Active Diesel Particulate Filter (DPF)
- Resonator
- Tailpipe



Diesel Fuel

Diesel Particulate Filter (DPF)

- Filter with precise porosity and alternate plugged canals
- Traps the soot and ash
- Soot causes high exhaust back pressure and operational problems when not regenerated
- Diesel soot requires a temperature of 550°C to burn
 - Will not burn at normal diesel exhaust temp (200 – 300°C)
 - Passive regeneration
 - Active regeneration



Tailpipe Emissions Comparison

6.0L Tailpipe

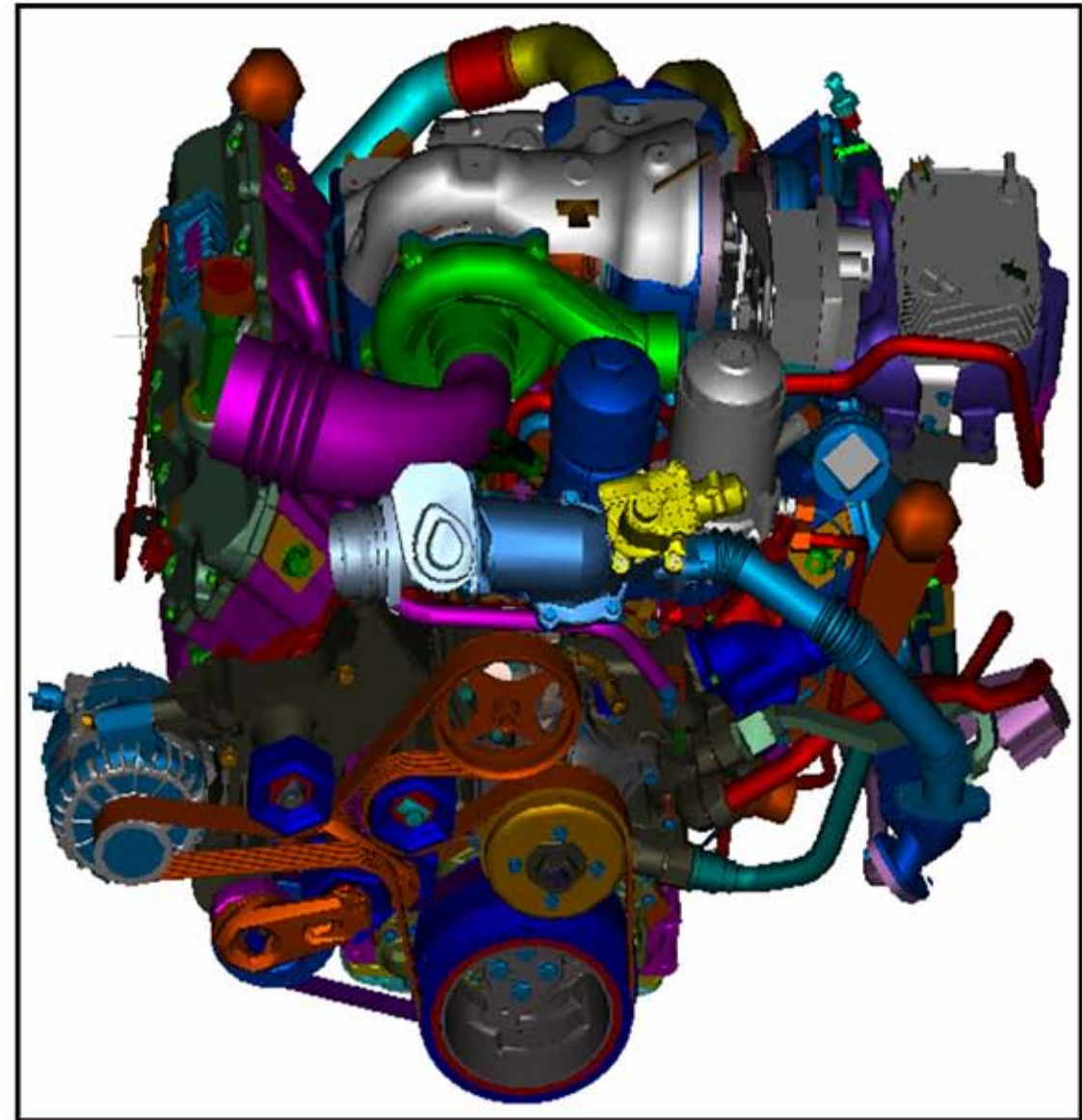


6.4L Tailpipe



Cost of Ownership Improvements

- 10,000 mile oil change interval
- 20,000 mile fuel filter change interval
- 120K+ Diesel Particulate Filter Service Interval



6.4L Design Improvements



Turbocharger Improvements

➤ Corrosion

- ✓ High Nickel cast iron in turbine housing to reduce onset of corrosion.
- ✓ New VGT mechanism design significantly more robust in presence of corrosion.

➤ Coking

- ✓ Optimized design of shaft seals and compressor wheel to ensure positive pressure across seals in all operating conditions.
- ✓ Improved oil separation system with high separation efficiency.

➤ VGT Actuator Hydraulic Contamination

- ✓ Electronically controlled Actuator to completely eliminate VGT failures due to contamination.



Fuel Injection Improvements

- Introduced industry standard piezo-electric High Pressure Common Rail (HPCR) fuel injection system
 - ✓ Eliminates Stiction leading to cold misfires
 - ✓ Improves Cold driveability – injection timing independent of oil viscosity
 - ✓ Eliminates Broken injectors due to clogged fuel filters/fuel starvation
 - ✓ Reduces Combustion noise w/full range multiple injections
- Extensive testing for durability
 - ✓ Hot fuel, hot environment, low lubricity fuels, high water content, overload, cavitation, run dry. etc.
 - ✓ Resulted in significant number of testing failures that have been addressed.



EGR System Improvements

➤ EGR Valve

- ✓ Added Dual Poppet EGR Valve with High Force DC Motor

Design will significantly reduce the occurrence of stuck EGR valve failures (DC motor force is 400N compared to 20N in the 6.0L)

➤ EGR System Fouling

- ✓ Added Dual EGR Coolers
- ✓ Added EGR Oxidation Catalyst (EOC)

Reduces heavy hydrocarbon lacquer by converting it to dry soot, minimizing EGR cooler fouling & valve deposits

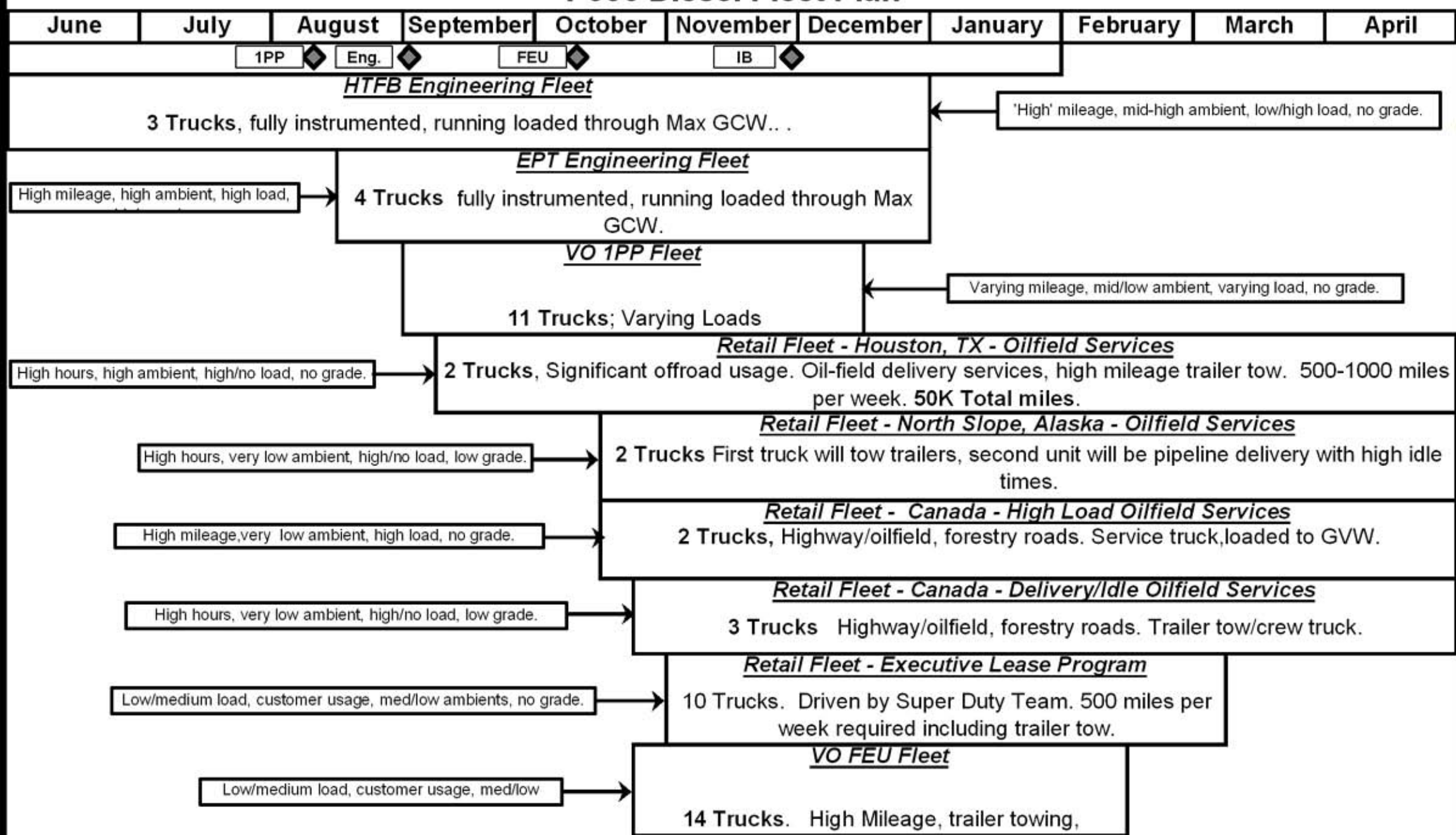


Electrical System

- Engine harness designed by supplier--not by ITEC
- Harness fully complies with Ford's Design Guide
- All connectors have positive locking design and are compatible with the measured engine vibration profile
- Gold and tin pins and solder material used in high temp environments
- Shields and convolutes were added as needed for temperature and vibration robustness
- Harness routing and retention designed to eliminate all potential chaffing conditions.



P356 Diesel Fleet Plan



Total Mileage Goal: 1000000+



Service Engineering Operations

New Fuel and Lubricant Requirements



Service Engineering Operations

Diesel Fuel

- Low Sulfur Diesel Fuel
 - Currently available
 - 500 PPM maximum sulfur
- Ultra Low Sulfur Diesel
 - Available beginning September 1, 2006
 - 15 PPM maximum sulfur
 - Will generally replace Low Sulfur Diesel Fuel



Diesel Fuel

Labels Required Beginning June 1, 2006

LOW SULFUR HIGHWAY DIESEL FUEL (500 ppm Sulfur Maximum)

WARNING

Federal law **prohibits** use in model year 2007 and later highway vehicles and engines.

Its use may damage these vehicles and engines.

NON-HIGHWAY DIESEL FUEL (May Exceed 500 ppm Sulfur)

WARNING

Federal law **prohibits** use in highway vehicles or engines.

Its use may damage these vehicles and engines.

ULTRA-LOW SULFUR HIGHWAY DIESEL FUEL (15 ppm Sulfur Maximum)

Required for use in all model year 2007 and later highway diesel vehicles and engines.

Recommended for use in all diesel vehicles and engines.

• <http://www.clean-diesel.org/>



Service Engineering Operations

Diesel Fuel

- 2003 - 2007 Model Year 6.0L Diesel Engines
 - Low Sulfur or Ultra Low Sulfur are acceptable
- 2008 Model Year 6.4L Diesel Engine
 - Requires Ultra Low Sulfur Diesel
 - Label on instrument panel & fuel filler door indicates "Ultra Low Sulfur Diesel Fuel Required"



Diesel Fuel

Biodiesel

➤ Acceptable Biodiesel

- Chemically converted from vegetable oils or animal fats (For example - soy bean).
- B-5 (5% maximum biodiesel) is acceptable in Ford engines

➤ Unacceptable “Biodiesel”

- Raw vegetable oils/animal fats, cooking oil or recycled greases, it should not be used.
 - It is unstable (i.e. gels / gums up even at high temperatures)



Diesel Engine Oil

- New Diesel Engine Oil
 - New Specification API CJ-4
 - Supports Lower Emission Engines
 - Is Backwards Compatible on 7.3L and 6.0L
 - Required For 6.4L
 - Will be available Nov-Dec 2006



FCSD Extraordinary Launch Plans



Service Engineering Operations

FCSD Pre-Launch Initiatives

- Vehicle Diagnostics in dealer at OKTS
 - Ensure proper diagnostic routines & repair procedures are available for all new engine systems/components
 - Five **new** diesel engine diagnostics
 - VGT turbocharger
 - EGR system
 - High fuel pressure system
 - Low fuel pressure system
 - IDS induced DPF manual regen



FCSD Pre-Launch Initiatives

- Electronic Service Publications will be available on PTS website - 12/29/06
- Essential Special Service Tools in Dealer at OK-to-Buy
- 98% + Service Parts on Shelf at OK-to-Buy
- Developing Digital Picture Library on PTS for repair verification
- Assigned full time FCSD representation to launch team to ensure Customer & Dealer needs are met



FCSD Pre-Launch Initiatives

➤ Technical Service Training will be available @ Ok-to-Buy

➤ Web-Based Training

- 6.4L Description & Operation
- Cab-off Procedure
- Required within 90 days of Launch to maintain Diesel Certification



6.4L Classroom Training

- 5,000 trained techs by end of first quarter 2007
- Approximately 2,500 techs can be trained per month
- Required within 1 year of Launch to maintain Diesel Certification



Customer Awareness Initiatives

➤ Diesel Engine Operation Awareness

➤ Diesel Engine Maintenance DVD

- Included with Owners Guide

➤ Quick Reference Guide (QRG)

➤ Diesel Engine Scheduled Maintenance

- Better defined “Severe Duty” maintenance (i.e.; bio diesel, towing, idle conditions, cold weather operation, etc.)



Comprehensive Communication Strategy

- Sales Consultant Training
 - Face to Face training overview
 - 35 City Tour, ½ session
 - October – December 2006
 - Covers new vehicle content and technologies
 - Certification Testing/Training
 - Fordstar Course will be available in December, 2006
- Service Advisor Training
 - Web-based training course with emphasis on Maintenance
 - Updated “Diesel Essentials” Course
 - May be required for Certification (under Investigation)
- Fleet Training
- Oil Distributor Education on CJ-4 oils
- FSE Technical Training
- FCSD Field Personnel “Dealer Cascade” Training
- CRC Representative Training



Comprehensive Communication Strategy

- Comprehensive New Model Electronic Dealer Communication Bulletin – December 2006
- Updated Online Resources with new 6.4L Diesel technologies and Maintenance Requirements
 - Powerstroke Central - PTS
 - Geniuneservice.com
 - Fleet.ford.com
 - Powerstrokediesel.com
- Investigating a Customer “Play to Win” program
 - Tests customer’s awareness of diesel maintenance



FCSD Post-Launch Initiatives

- Capture technician feedback on vehicle quality and FCSD concerns quickly
- Quickly react to quality and Customer concerns
 - Update Power Stroke Central with unique 6.4L pages to assist technicians with obtaining latest information
 - Assign “SWAT” team to handle quality concerns
 - Conduct 6.4L Specific Fordstar Dealer Roundtable Broadcasts
- FSE/FQE field support of concern identification
 - CQIS on every vehicle concern
 - 48 hour response on TARs



FCSD Post-Launch Initiatives

- Prioritize all SSM/TSB/OASIS message processing
- Utilize High Mileage Fleets for early concern identification
- Prioritize New Model Parts Hotline for dealer parts/catalog inquiries







INTERNATIONAL

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