

# Faster Freight Cleaner Air

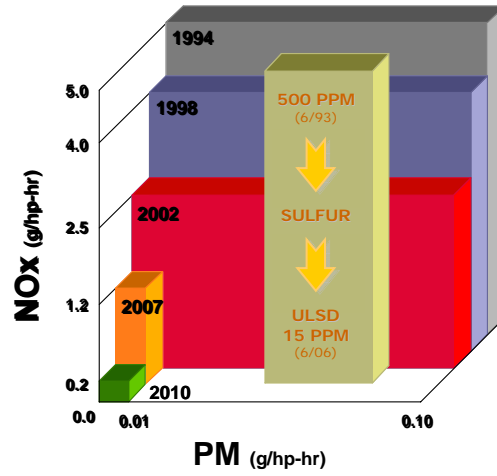
Gregg Wallinder  
May 16, 2007



## Agenda

- 2007 On Highway Review
- Off Highway Retrofit
- Natural Gas Alternative

## EPA Standards Have Evolved



3

1984

2002



=



4

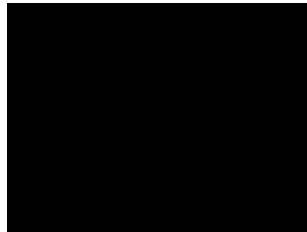
2007

1984



5

2007 ISX

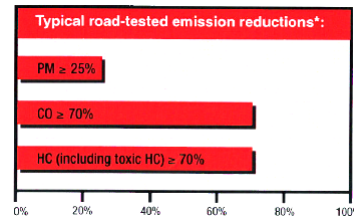


6

## Diesel Oxidation Catalyst (DOC)

### ■ Overview

- No monitoring equipment required
- No maintenance required
- Form, fit, function replacement of existing muffler – no major exhaust system modifications required
- Acceptable fuel sulfur content dependant upon design



7

## Diesel Oxidation Catalyst (DOC)

### ■ Substrate Design (catalyst brick)

- Flow through design

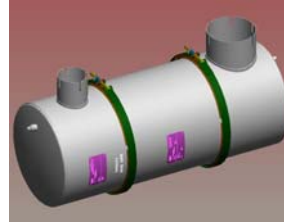


8

## Off-Road Standard Line

### 22 Interchangeable Inlets/Outlets

- Inlet and Outlet sections are identical
- Two configurations - End in/out & Side in/out
- Ø3.0", Ø4.0", and Ø5.0" tube sizing for each catalyst body diameter

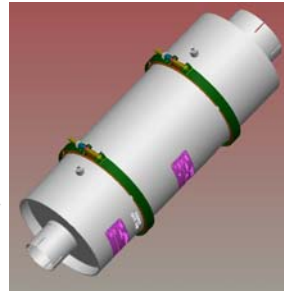


### 4 Catalyst Sections

- Ceramic Substrates
- 7.5", 8.5", 10", & 11" body diameters
- 40-370 hp range

### Minimized Length

- 23.2" – 26.0" (590 mm – 662mm), depending on configuration

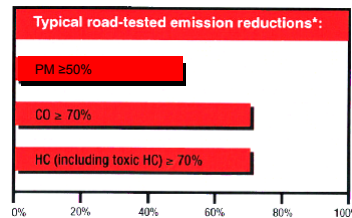


9

## Partial Flow Filter (Metallic substrate)

### ▪ Overview

- No monitoring equipment required
- No maintenance required
- Sound attenuating device- minor modifications may be required for installation
- Fuel requirements vary by device type



10

## Partial Flow Filter (Metallic substrate)

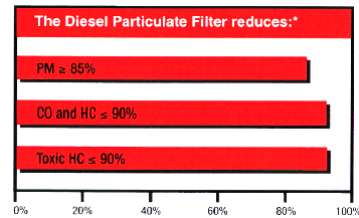
- Substrate Design
  - Tortured path flow



11

## Diesel Particulate Filter (DPF)

- Overview
  - Monitoring equipment required – hardware & software training provided to insure product success
  - Maintenance required – service interval varies with duty cycle and application
  - S-15 (ULSD) fuel required

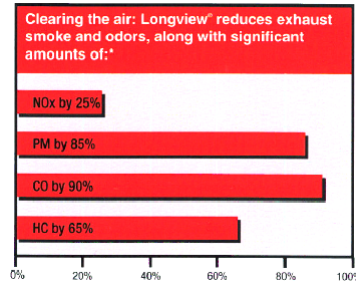


12

## Lean NOx Catalyst

### Overview

- Monitor-Logger-Controller (MLC) equipment required; controls the diesel fuel injection to reduce NOx
- Maintenance required- service interval varies with duty cycle and application
- S-15 (ULSD) fuel required



13

## Why Natural Gas Engines for Buses & Trucks?

### Emissions Leadership

- Meet 2010 EPA Emissions in 2007

EVERY  
ALTERNATIVE.



ISL G

### Economic Benefits

- Continued reliability improvement
- Improved Efficiency
- Greatest benefits in high fuel use applications

### Energy Security

- Reduced reliance on imported oil
- Pathway to hydrogen

14

# ISL G Applications/OEMs

REFUSE



URBAN TRANSIT



VOCATIONAL



FUTURE

