APT Fuels Clean Air at Port of Los Angeles

Helping to save the planet - one drop at a time

MEPEC 2011

1ST Middle East Process Engineering Conference & Exhibition 2011

APT Project – Port of LA

- **APT Project – Three Operational Phases:**
  1. **Emulsified Biodiesel Fuels Screening**
  2. **Dynamometer-engine Emissions Testing**
  3. **Top-handlers – Waterfront Operations**

Note: Engine emissions testing and waterfront ops accomplished with and without doc unit installation

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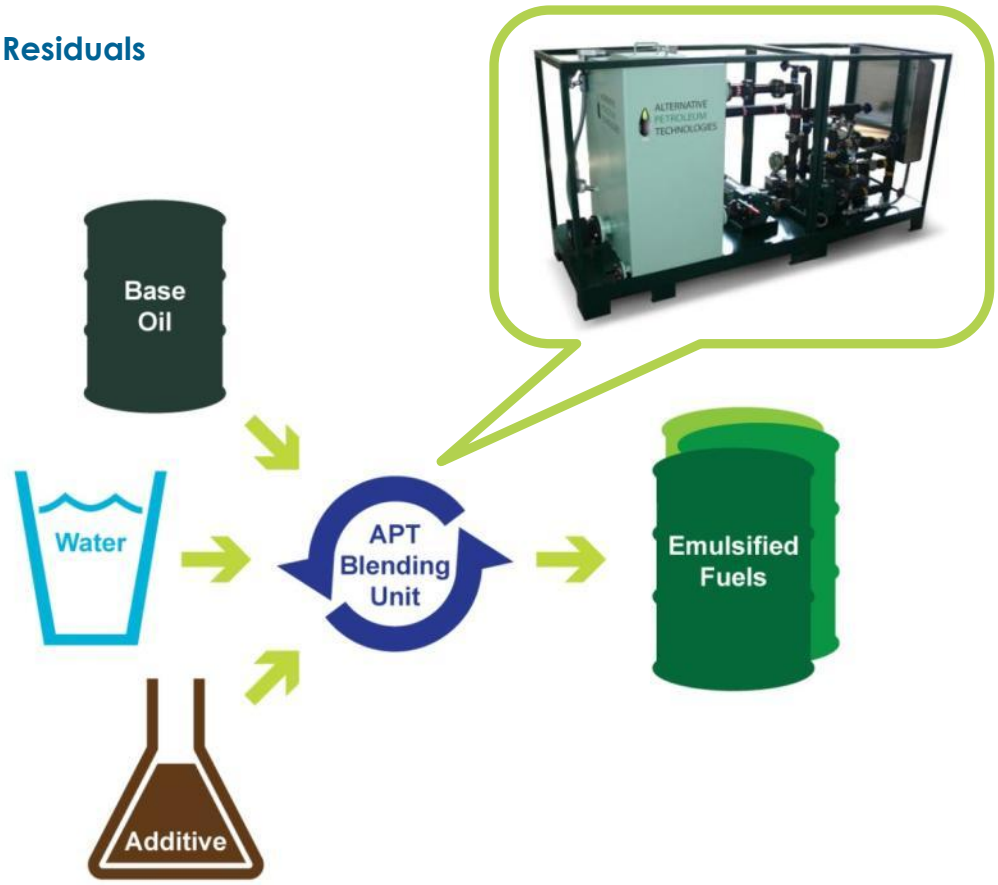
What are Emulsified Fuels?

- **Emulsified Fuels contain microscopic water droplets that are encased by an emulsion surfactant and remain in stable suspension within petroleum products:**
  - **Diesel Oils, Fuel Oils,**
  - **Biodiesel Fuels, Residuals**



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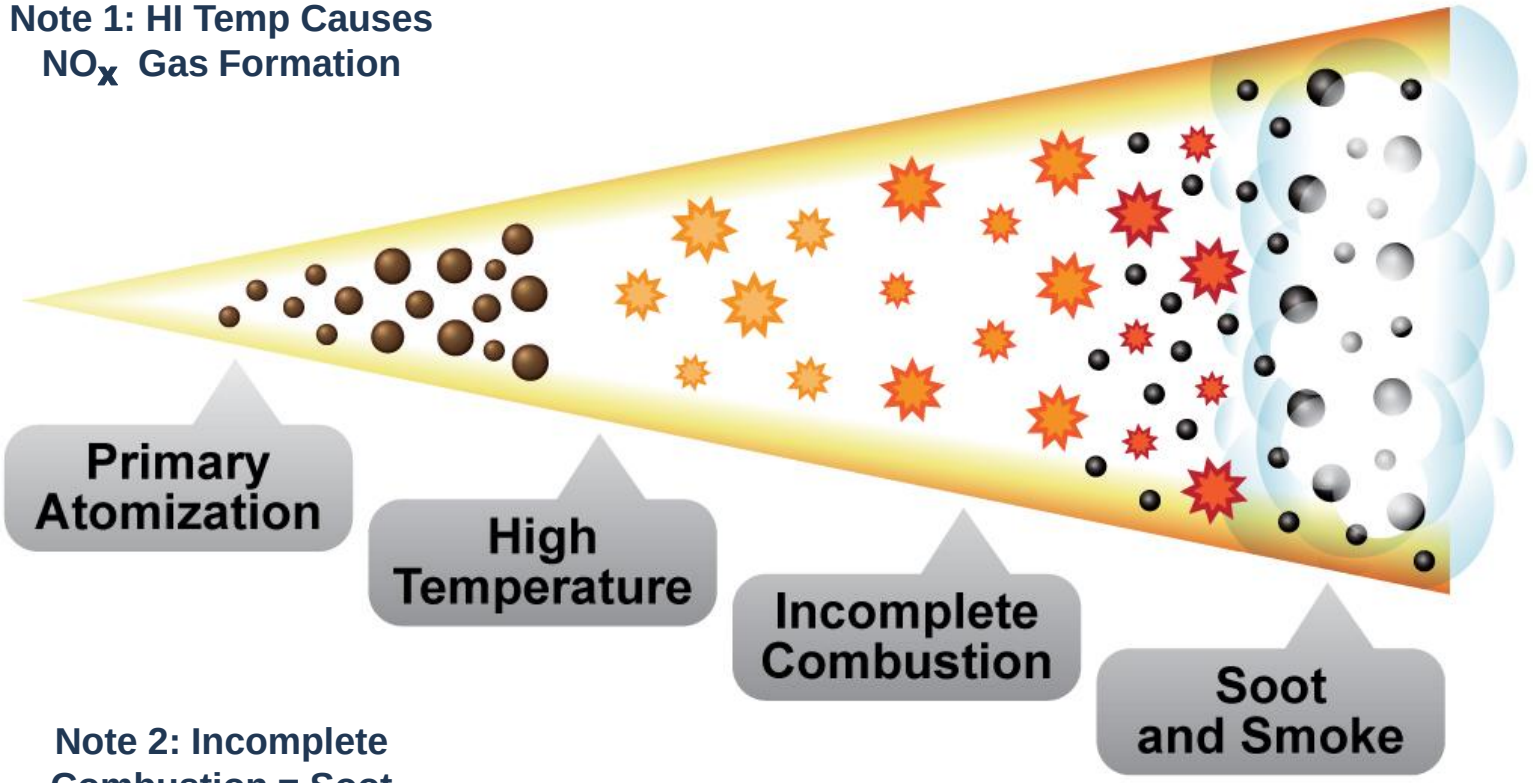
How do Fuels Burn?

- **Traditional Fuels Combustion**

Note 1: HI Temp Causes NO_x Gas Formation



Note 2: Incomplete Combustion = Soot

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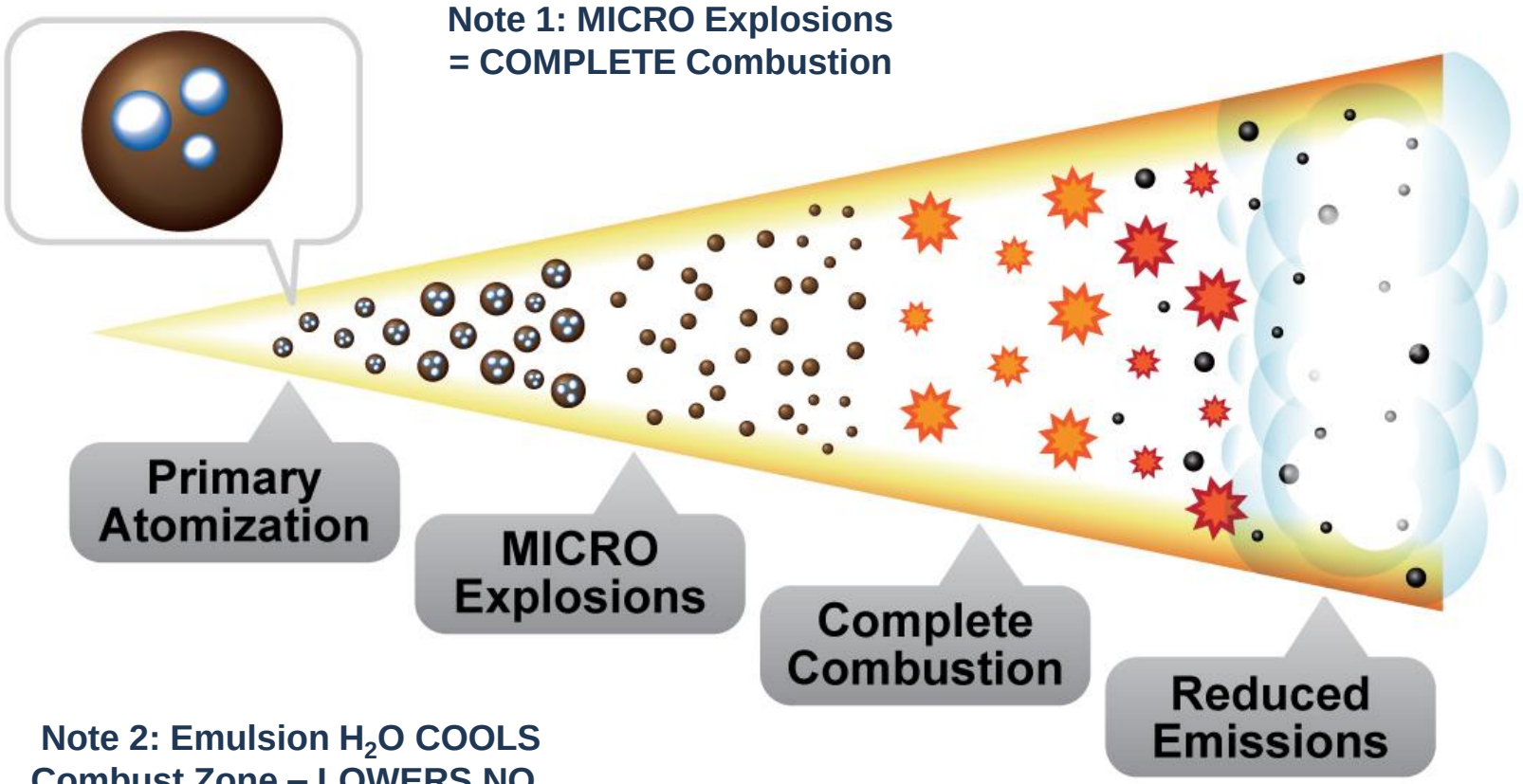
How do Fuels Burn?

- **Emulsified Fuels Combustion**



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Past Applications of Emulsified Fuels

- Transport Sector – Diesel Engines
  - CARB (2003) Verified Emissions Performance for Diesel Oil Emulsion Fuels:
    - NO_X Emissions ↓ 15%
    - PM Emissions ↓ 53%
  - With Diesel Engine Tuning :
    - NO_X Emissions ↓ **48%**
    - PM Emissions ↓ **83%**

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APT Project – Phase 1

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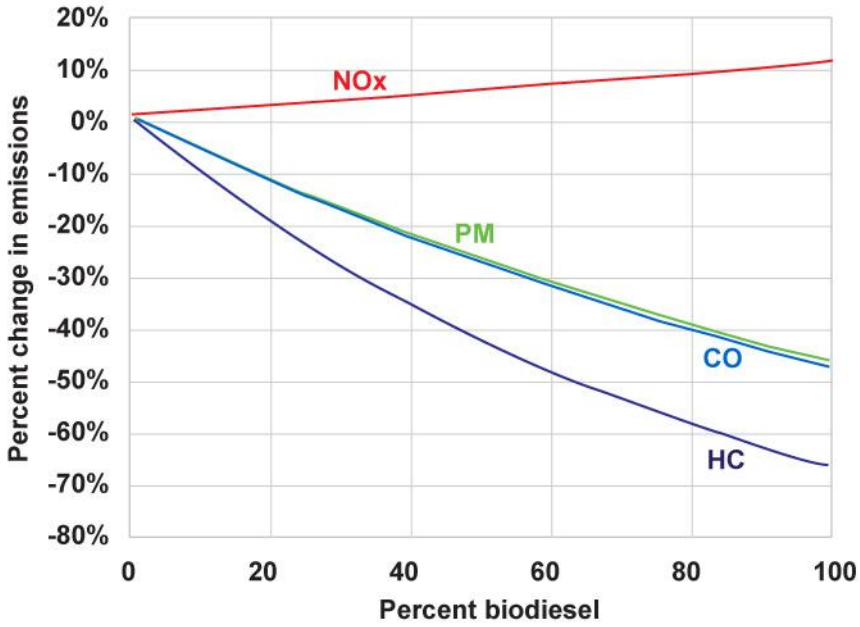
APT Project – Phase 1



USEPA Report 420-P-02-00 October 2002

Regular Biodiesel Fuels increase NO_X Emissions

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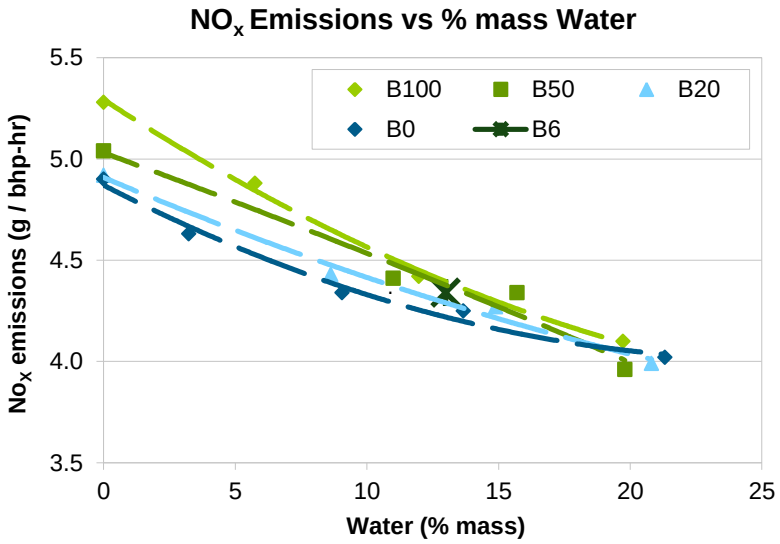
APT Project – Phase 1



EMULSIFIED BIODIESEL FUELS

NEUTRALIZE NO_X EMISSIONS

SWRI RPT 03.13948 – SEPT 2008

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APT Project – Phase 2

- **APT Project – Three Operational Phases:**
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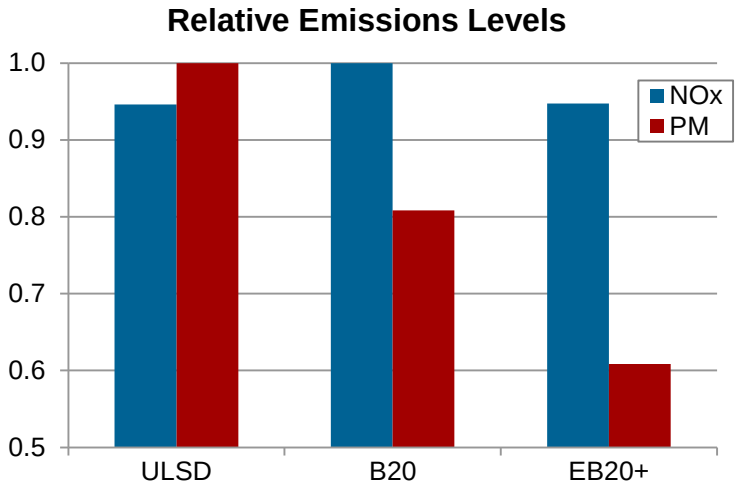
APT Project – Phase 2



Emulsified Biofuels Neutralize NO_X Emissions

And Reduce Particulate Matter (PM) Emissions

(Olson Ecologic Report – Oct 2009)

ULSD-Diesel Fuel **B20-Biodiesel Fuel**

EB20+ = Emulsified B20 + Diesel OXY CAT (doc)

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APT Project – Phase 3

- **Application of Emulsified Biodiesel (EB20) Fuel**
- **Waterfront Operations – Ports America Company**

Top handler on EB20 Fuel at Port of LA

PORTS AMERICA
GLOBAL REACH. LOCAL RESULTS.

Date: January 26, 2011

From: Ken Pope
Area Equipment Manager
Port s of America
2050 John S. Gibson Boulevard
San Pedro, California 90731

To: Port of Los Angeles

Ref: Agreement No. E6535 between The City of Los Angeles and Alternative Petroleum technologies, Inc.

To whom it may concern,

From September 2, 2010 to January 21, 2011, Ports America used Alternative Petroleum Technologies emulsified biodiesel fuel on Top Handlers. During the trial period (4 months) the operators did not report any operational issues with the fuel and its use in the top Handlers.

Kenton R. Pope

Area Equipment Services MGR.

Ports America

2001 John S. Gibson Blvd.

San Pedro, Ca. 90731

Phone 310/519/2341

FAX 310/732/5509

kenpope@portsamerica.com
www.portsamerica.com

Note: "Did Not Report ANY Operational Issues"

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APT Project – Phase 3

- **CO_2 Emissions Reductions**

Carbon Dioxide (CO_2) Emissions Table
1. The actual EBIOD fuel consumption for 3 top handlers during 118 days of activity was 12,300 GAL Entering this value of fuel usage into the NBB computer model gives CO_2 reduction of **36,485 L**
2. Annualized EBIOD fuel consumption for 3 top handlers is: 12,300 x (365/118) = 38,047 GAL Entering this value of fuel usage into the NBB computer model gives CO_2 reduction of **112,857 LBS**
3. Annualized EBIOD fuel consumption for 100 top handlers is: 38,047 x (33) = 1,255,538 GAL Entering this value of fuel usage into the NBB computer model gives CO_2 reduction of **3,724,228 LBS**

Note: CO_2 reductions demonstrated here can be realized along with reductions in NO_X & PM emissions. (http://www.Biodiesel.Org/tools/calculator/default.Aspx?Aspxautodetectcookiesupport=1)

Note: CO_2 Emissions Reductions Plus NO_X Neutrality Plus PM Emissions Down the "Triple Crown" Fuel Technology!

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Summary of Emulsified Fuel Technology

- **EFT presents a significant opportunity to fully utilize hydrocarbon fuels – in all "flavors" – to their maximum operational potential without contributing to harmful gaseous (NO_X) & particulate matter (PM) emission levels.**
- **EFT is an enabling technology with significant potential for economic operations in:**
  - Commercial, industrial boilers
  - Engines – trains, trucks, ports
  - Electric power plants

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