

# PetroSA



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# Introduction



- State-owned/managed commercially
- Mossgas established in 1987 to reduce South Africa's dependence on crude
- Over 12 years experience in producing FTD
- Petitioned DOE in 1999
- Petroleum Oil and Gas Corporation of South Africa (Pty) Limited - January 2002



# Methane Reformers



# Synthol Reactors



# 1999 Petition



	RFD 1	RFD 2	RFD 3
Density	0.8088	0.8066	0.8065
Aromatics	16.4	15.6	15.9
CN	53	49.4	49.3
PAH's	<0.1	<0.1	<0.1
Sulphur	<0.001	<0.001	<0.001



# FTD Definition



- Natural Gas Derived
- Environmentally friendly
- Diesel produced by selective catalytic synthesis of hydrocarbons from a synthesis gas containing hydrogen and carbon oxides using Fischer Tropsch technology, where said synthesis gas is derived from natural gas.



# Aromatic Specification



- PAH limit of  $<0.1$  % v/v
- PAH Reduction Benefits
  - Reduced PM Emissions
  - Reduced NOx Emissions
  - Reduced PAH Emissions
- Total Aromatic Specification of  $<10$  % v/v

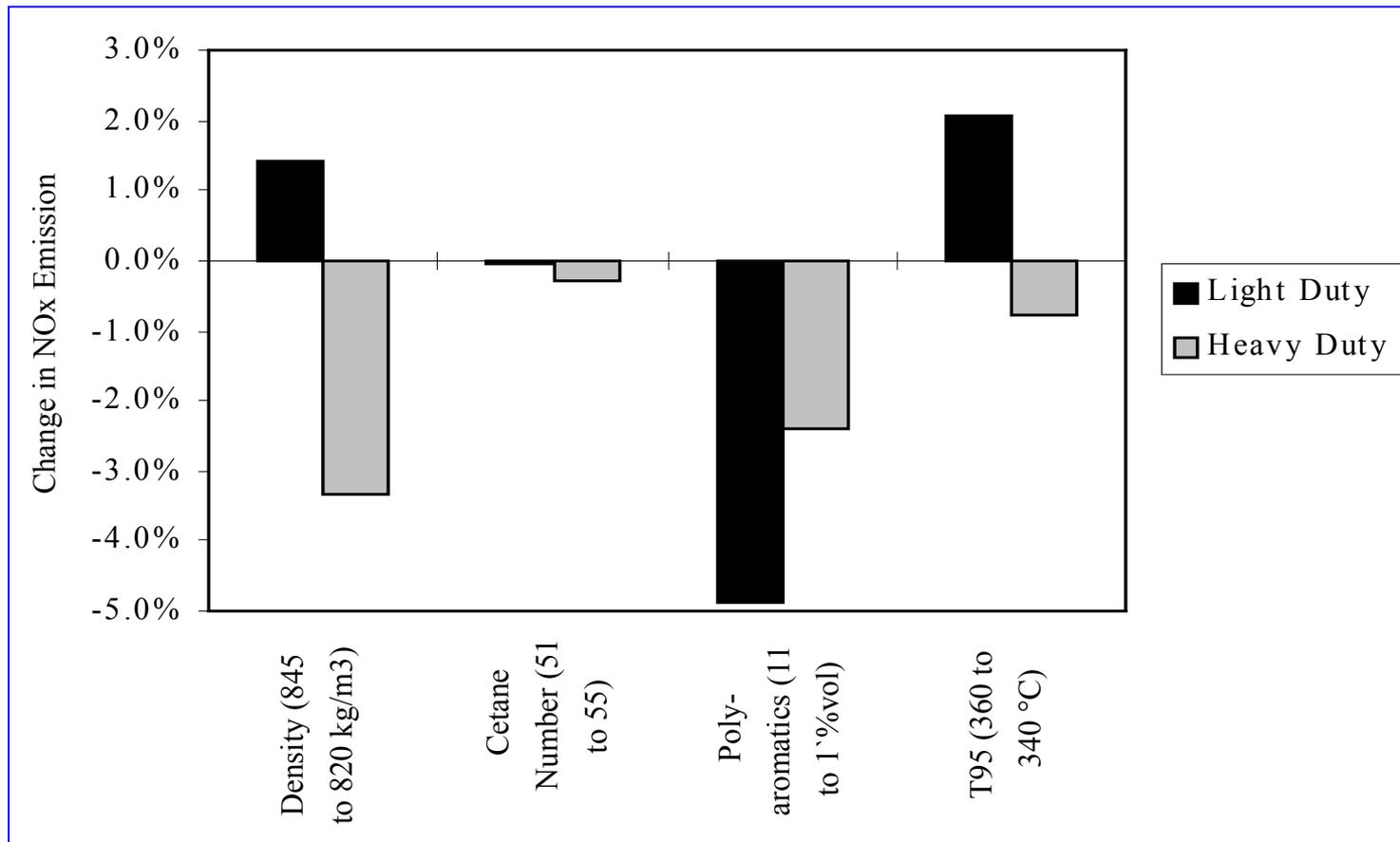
References:      CONCAWE Rep. 99/06/03  
                         World Wide Fuel Charter, April 2000



# Comparison of Fuel Effects in EPEFE Fleets



CONCAWE Report No. 99/06/03



# Cetane Number



- Propose a Cetane Number minimum of 50
- 1992 DDC 6V-92TA
  - No ignition timing modifications
  - PM Reduction of 14.5 % over D2
  - NOx Reduction of 4 % over D2
- 1998 Navistar T444E Engine Dynamometer
  - No ignition timing modifications
  - PM reduction of 14.8 % over D2
  - NOx reduction of 10.1 % over D2

Reference: Catalysis Today 71 (2002) 437 - 445



# Significant Emission Reductions



- Both engine dynamometer and vehicle testing
- Both 2 and 4 stroke engines (different manufacturers)
- Over a range of engine technologies
- Over a range of various dynamometer testing cycles
- The presence or absence of catalytic exhaust gas aftertreatment devices.

Reference: Catalysis Today 71 (2002) 437 - 445



# Role of Sulphur



- Propose a sulphur specification minimum of 10 ppm m/m
- FTD greatest attributes
- Enabler of advanced catalytic exhaust treatment options
- To reduce crude based fuel sulphur to below 10 ppm as opposed to 15 ppm, will generate more greenhouse gases



# Additives



- Additives such as those required for lubricity enhancement must be allowed
- Such additives should be selected as not disadvantage any positive emission benefits and should contain no sulphur.
- Limited to 0.1% m/m of FTD



# Suggested FTD Specifications



TEST	METHOD	UNITS	SPEC
Cetane	ASTM D613		50 min
Sulphur Content	ASTM D5453	ppm m/m	10 max
Aromatics	IP 391	% v/v	10 max
PAH's	IP 391	% v/v	0.1 max
Lubricity	ASTM D2274	um	460 max



# Process Energy Limits



Support the proposed Process Energy Limit  
of  $<11.5$  mm Btu/bbl



# Toxicity - Biodegradability



- Low toxicity characteristics
  - 96-Hour bioassay *Leptocherus plumulosus*
  - 96-Hour bioassay *Mysidopsis Bahaia*
- Good biodegradability



# Other parameters



- Limit oxygenate content to 1 % max
- Suggest to use Cetane Number in place of hydrocarbon types
- CN will reflect paraffin content
  - Normal and iso-paraffin determinations will require GC-TOF-MS or GC x GC
  - Time consuming and expensive



# Balance of determinations



All fuel quality effects on fuel economy and greenhouse gas emissions should be considered on a “Well to Wheels” basis.



# Domestically produced



- World Trade Organization
- Propose that all GTL, both foreign and domestic, be treated as alternative fuels





# Building PetroSA to Last

