EVALUATION OF FPC-1® FUEL PERFORMANCE CATALYST

AT

COCA-COLA BOTTLING COMPANY OF NORTH TEXAS DALLAS, TEXAS

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October 11, 1994

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INTRODUCTION

FPC-1® is a combustion catalyst which, when added to liquid hydrocarbon fuels, improves the combustion reaction resulting in increased engine efficiency and reduced fuel consumption. The products of incomplete combustion are also positively affected.

Field and laboratory tests alike indicate a potential to reduce fuel consumption in diesel fleets in the range of 5% to 10%. Smoke and carbon monoxide emissions are typically reduced 15 to 30%. This report summarizes the results of controlled back-to-back field tests conducted by UHI Corporation, FPC Technology and Coca Cola Bottling Company of North Texas engineers and mechanics with and without FPC-1® added to the diesel fuel. The fuel consumption determination procedure applied was the Carbon Balance Exhaust Emission Test at a given engine load and speed. This same method also measures the exhaust concentrations of carbon monoxide and unburned hydrocarbons. Smoke testing was also conducted using the Bacharach Smokemeter method.

ENGINES TESTED

7 x Cummins NTC-300s
3 x Cat 3406Bs

TEST INSTRUMENTS

The equipment and instruments involved in the carbon balance test program were:

Sun Electric SGA-9000 non-dispersive, infrared analyzer (NDIR) for measuring the exhaust gas constituents, HC (unburned hydrocarbons as hexane gas), CO, CO_2 , and O_2.

Scott Specialty BAR 90 calibration gases for SGA-9000 internal calibration of the SGA-9000.

A Fluke Model 51 type "k" thermometer and wet/dry probe for measuring exhaust, fuel, and ambient temperature.

A Dwyer magnehelic and pitot tube for exhaust pressure differential measurement and exhaust air flow determination (CFM).

Monarch Phototachometer and magnetic tape to determine and control engine speed (rpm).

A Bacharach True-Spot smokespot meter to determine the density of exhaust smoke from diesel engines.

A hydrometer and flask for fuel specific gravity (density) measurement.

A Hewlett Packard Model 42S programmable calculator for the calculation of the engine performance factors.

A Snap On throttle control for setting and holding engine speed at a fixed rpm.

TEST PROCEDURE

Carbon Balance

The carbon balance technique for determining changes in fuel consumption has been recognized by the US Environment Protection Agency (EPA) since 1973 and is central to the EPA-Federal Test Procedures (FTP) and Highway Fuel Economy Test (HFET). The method relies upon the measurement of vehicle exhaust emissions to determine fuel consumption rather than direct measurement (volumetric or gravimetric) of fuel consumption.

The application of the carbon balance test method utilized in this study involves the measurement of exhaust gases of a stationary vehicle under steady-state engine conditions. The method produces a value of engine fuel consumption with FPC-1® relative to a baseline value established with the same vehicle.
Engine speed and load are duplicated from test to test, and measurements of carbon containing exhaust gases (CO_2, CO, HC), oxygen (O_2), exhaust and ambient temperature, and exhaust and ambient pressure are made. A minimum of five readings are taken for each of the above parameters after engine stabilization has taken place (rpm, and exhaust, oil, and water temperature have stabilized). The technical approach to the carbon balance method is detailed in the Appendices.

Fuel specific gravity or density is measured enabling corrections to be made to the final engine performance factors based upon the energy content of the fuel reaching the injectors.

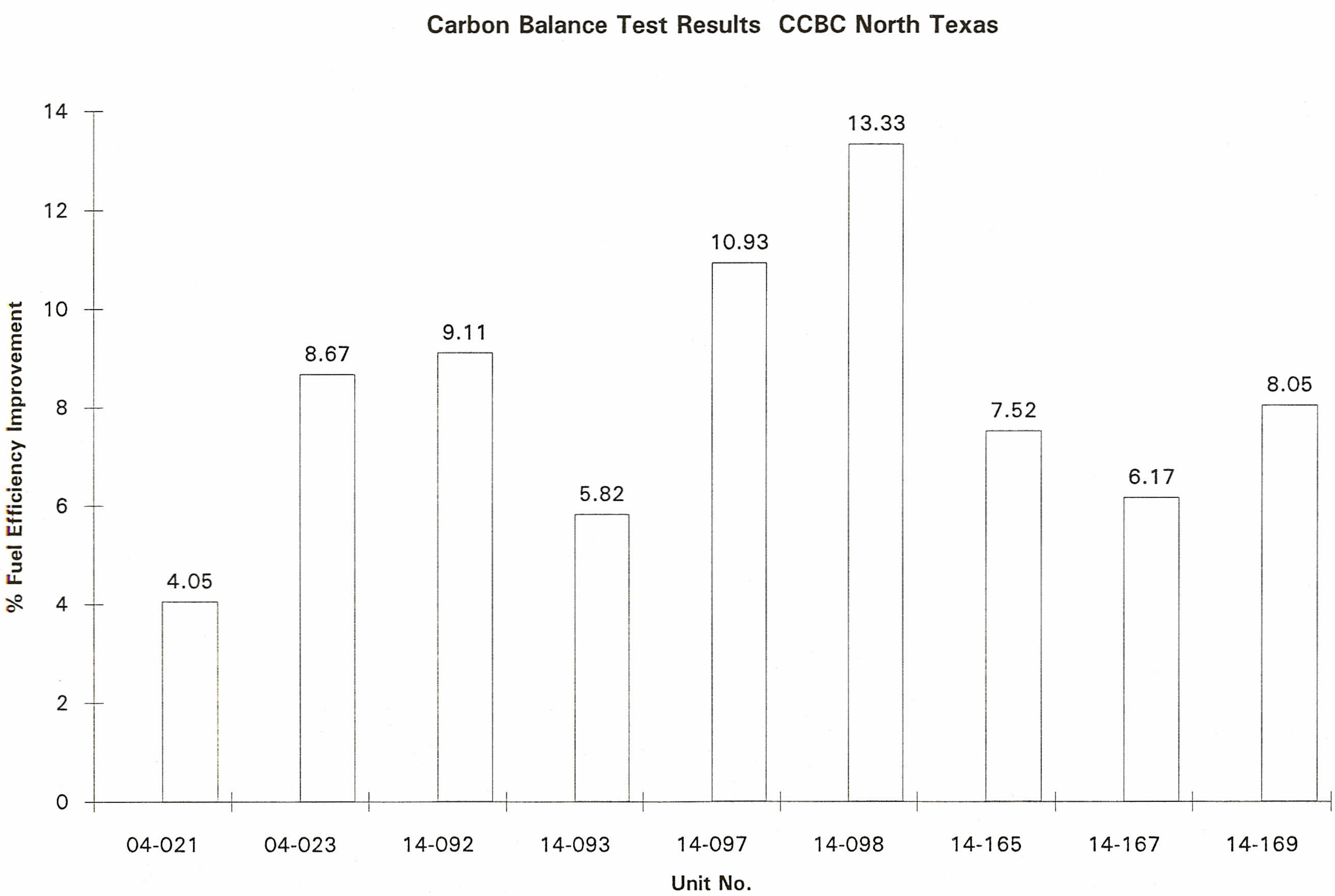
Smoke density was determined by drawing a fixed quantity of exhaust gases through a filter medium. The particulate's were collected onto the filter surface and the density determined by comparing the discoloration of the filter paper to a color calibrated scale.

All ten trucks made up the final test fleet. Table 1 below summarizes the percent change in fuel consumption.

Table 1:
Summary of Carbon Balance Fuel Consumption Changes

Unit	Engine	RPM	% Change Fuel Consumption
04-021	Cat 3406B	1750	- 4.05
04-023	Cat 3406B	1750	- 8.67
88S079494	Cat 3406B	1800	+ 3.21 *
14-092	NTC-300	1800	- 9.11
14-093	NTC-300	1800	- 5.82
14-097	NTC-300	1800	-10.93
14-098	NTC-300	1800	-13.33
14-165	NTC-300	1800	- 7.52
14-167	NTC-300	1900	- 6.17
14-169	NTC-300	1800	- 8.05
		FLEET AVERAGE:	**- 8.18**

* Anomaly not included in fleet average (see Discussion No. 3)


Carbon Balance Test Results CCBC North Texas
% Fuel Efficiency Improvement
14
12
10
8
6
4
2
0
4.05
8.67
9.11
5.82
10.93
13.33
7.52
6.17
8.05
04-021
04-023
14-092
14-093
14-097
14-098
14-165
14-167
14-169
Unit No.

DISCUSSION

1. Fuel Density

Diesel was taken from the fuel tank on each truck to determine the fuel density (fuel specific gravity) for the baseline and treated fuel test segments. The correction factor for each truck is shown on the computer printouts which also show the calculation of the baseline and FPC-1® treated fuel performance factors (or mass flow rates). The correction factor adjusts the energy content of the treated fuel to that of the baseline fuel.

2. The Effect of FPC-1® upon Smoke Density

Smoke density was determined using the Bacharach smoke spot method. The Bacharach True-Spot Smokemeter measures smoke density by drawing a specific volume of exhaust gas through a fine paper filter medium (5 micron) while the engine is operating at a fixed rpm and under steady-state engine conditions. The smoke particles are trapped on the surface of the filter paper as the exhaust gases are drawn through it forming a darkened area called a "smoke spot". The filter paper is then removed from the smoke tester and the smoke spot visually compared to a precoded smoke scale. A smoke number is then assigned to the smoke spot according to the darkness of the spot. The smoke number scale ranges from 0 to 9. Higher smoke numbers correspond to darker smoke spots, which correspond to a greater smoke density in the exhaust. The baseline and treated fuel smoke spot numbers are tabled below.

Table 2:

Comparison of Smoke Spot Numbers (SS#)

Unit No.	Base SS#	Treated SS#	% Change
04-021	7.5	7.5	00.0
04-023	6.5	6.5	00.0
*88S079494	5.0	6.5	+30.0
14-092	5.0	5.5	+10.0
14-093	8.0	6.0	-25.0
14-097	7.5	6.0	-20.0
14-098	7.0	6.0	-14.3
14-165	7.5	6.0	-20.0
14-167	7.5	6.0	-20.0
14-169	7.0	6.0	-14.3
		FLEET AVERAGE:	**- 11.5**

*** Possible anomaly, not included in fleet average**

A reduction in smoke is prime evidence of improved combustion (Germane, SAE Technical Paper # 831204). Further, reduced exhaust smoking has been shown to be one of first evidences that engine carbon residue and soot blowby into the motor oil are also being reduced (ibid). The reductions in exhaust smoke are logical extensions of improved combustion created by FPC-1®.

Dozens of tests with FPC-1® indicate engine smoking is reduced over time after fuel treatment. Table 3 shows typical smoke reductions in fleets having run the catalyst 10,000 to 20,000 miles between smoke spot tests (see Appendices, Smoke Testing). In some cases, smoke continues to decline for hundreds of hours after catalyst treatment (ibid).

The Coca-Cola fleet averaged approximately 5,000 miles of FPC-1® fuel treatment between test segments. As indicated by prior experience, this is not enough time to allow for complete engine conditioning and smoke reduction, especially in high mileage engines. This may explain why smoke reductions were not documented in the CAT 3406's as they were three of the highest mileage vehicles in the test fleet, i.e., 330,000 miles to 524,000 miles. It is almost certain that engine smoking will continue to decline in mechanically sound engines for several months to come.

A corresponding decline in soot accumulation in the motor oil should also be observed where regular oil analysis is done. Eventually, with continued FPC-1® use, engine cleanliness will be improved, including reduced injector coking and top groove fill in the ring zone areas.

3. Anomalies

The L-9000 is powered by a high mileage 3406B powered truck (524,000 miles). It is the only truck that did not respond favorably to the addition of FPC-1® . The data indicates both fuel consumption and engine smoke density increased after FPC-1® fuel treatment. This may simply be caused by the fact the engine is wearing out. FPC-1® cannot reverse the effects of engine wear or injector wear.

Additionally, in order for accurate test data to be collected, the test engines must be mechanically sound. Worn throttle controls, inaccurate tachometers, and misfiring injectors, for example, which are more likely to exist with older engines, might be responsible for the negative results for the L-9000.

Finally, the L-9000 is a statistical anomaly, and as such, should be eliminated from consideration. UHI has done so in the conclusions of this report.

4. Gasoline Powered Vehicles

Although not the subject of the Coca-Cola test, FPC-1® has been proven equally as effective in reducing fuel consumption in gasoline powered vehicles. Several EPA and Society of Automotive Engineers (SAE) studies show FPC-1® reduces fuel consumption an average 6% (see Appendices, Laboratory Tests in Gasoline Vehicles, Tables 4 and 5). Field studies agree. Table 6 shows the results of two field tests in equipment fleets that should be similar to that of Coca-Cola (ibid). These tests documented fuel savings of 6.24 to 7.99%.

CONCLUSIONS

1) With the anomalies removed from the sample, the fuel consumption change determined by the carbon balance method ranged from - 4.05 to - 13.33%. The fleet averaged a 8.18% reduction in fuel consumed after FPC-1® fuel treatment.

2) Smoke density, with anomalies removed, was reduced approximately 11.0%. After sufficient engine conditioning smoke density reduction should average in the range of 15-35% based on extensive prior field tests.

3) Laboratory and field studies alike prove FPC-1® is equally as effective in reducing fuel consumption in gasoline engines as diesel engines.

4) Although baseline levels were quite low to begin with, carbon monoxide (CO) and unburned hydrocarbons (HC) were reduced 13.64% and 3.8%, respectively. Once again, the change is somewhat lower than typical, and may also have been affected by low mileage with FPC-1® treated fuel.

APPENDICES

CARBON BALANCE METHOD TECHNICAL APPROACH:

All test instruments were calibrated and zeroed prior to both baseline and treated fuel data collection. The SGA-9000 NDIR exhaust gas analyzer was internally calibrated using Scott Calibration Gases (BAR 90 Gases), and a leak test on the sampling hose and connections was performed. The same procedure was repeated after each test segment to determine any instrument drift.

Each vehicle's engine was brought up to operating temperature at a set rpm and allowed to stabilize as indicated by the engine water and exhaust temperature, and exhaust pressure. No exhaust gas measurements were made until each engine had stabilized at the rpm selected for the test. Engine rpm was set using the dash mounted tachometer (with the exception of shovel's #1 and #4) and checked periodically to prevent any change in engine speed during the data collection period. # 2 diesel was used exclusively throughout the evaluation. Fuel specific gravity (density) and temperature were also taken.

The baseline fuel consumption test consisted of a minimum of five sets of measurements of CO_2, CO, HC, O_2, and exhaust temperature and pressure made at 90 second intervals. Each engine was tested in the same manner. Engine rpm were also recorded at approximately 90 second intervals.

After the baseline test the fuel storage tanks were treated with FPC-1® at the recommended level of 1 oz. of catalyst to 40 gallons of fuel (1:5000 volume ratio). Each succeeding fuel shipment was also treated with FPC-1®. The equipment was operated on treated fuel until the final test was run.

During the two test segments, an internal self-calibration of the exhaust analyzer was performed after every two sets of measurements to correct instrument drift, if any.

From the exhaust gas concentrations of $C0_2$ CO, HC, and O_2 measured during the test, the average molecular weight of these gases, and the temperature and volumetric flow rate of the exhaust stream, the mass flow rate of the fuel to the engine (rate of fuel consumption) may be expressed as a engine "performance factor" which relates the fuel consumption of the treated fuel to the baseline. The calculations are based on the assumption that engine operating conditions are essentially the same throughout the test. Engines with known mechanical problems or having undergone repairs affecting fuel consumption are removed from the sample.

A sample calculation is found in Figure 2.

Figure 1
CARBON MASS BALANCE FORMULAE

ASSUMPTIONS: $C_{12}H_{26}$ and SG = 0.82
Time is constant
Load is constant

DATA:

Mwt = Molecular Weight
pf1 = Calculated Performance Factor (Baseline)
pf2 = Calculated Performance Factor (Treated)
PF1 = Performance Factor (adjusted for Baseline exhaust mass)
PF2 = Performance Factor (adjusted for Treated exhaust mass)
CFM = Volumetric Flow Rate of the Exhaust
SG = Specific Gravity of the Fuel
VF = Volume Fraction
d = Exhaust stack diameter in inches
Pv = Velocity pressure in inches of H_20
P_B = Barometric pressure in inches of mercury
Te = Exhaust temperature ^oF

VFHC = "reading" ÷ 1,000,000
VFCO = "reading" ÷ 100
$VFCO_2$ = "reading" ÷ 100
VFO_2 = "reading" ÷ 100

EQUATIONS:

Mwt =

$$(VFHC)(86)+(VFCO)(28)+(VFCO_2)(44)+(VFO_2)(32)+[(1-VFHC-VFCO-VFCO_2-VFO_2)(28)]$$

pf1 or pf2 =

$$\frac{3099.6 \times Mwt}{86(VFHC)+13.89(VFCO)+13.89(VFCO_2)}$$

CFM =

$$\frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

PF1 or PF2 =

$$\frac{pf \times (Te+460)}{CFM}$$

FUEL ECONOMY:
PERCENT INCREASE (OR DECREASE)

$$\frac{PF2 - PF1}{PF1} \times 100$$

Figure 2.

SAMPLE CALCULATION FOR THE CARBON MASS BALANCE

BASELINE:

Equation 1 (Volume Fractions)

VFHC = 13.20/1,000,000
= 0.0000132

VFCO = 0.017/100
= 0.00017

$VFCO_2$ = 1.937/100
= 0.01937

VFO_2 = 17.10/100
= 0.171

Equation 2 (Molecular Weight)

$$Mwt1 = (0.0000132)(86)+(0.00017)(28)+(0.01937)(44)+(0.171)(32) + [(1-0.0000132-0.00017-0.01937-0.171)(28)]$$

$$Mwt1 = 28.995$$

Equation 3 (Calculated Performance Factor)

$$pf1 = \frac{3099.6 \times 28.995}{86(0.0000132)+13.89(0.00017)+13.89(0.01937)}$$

$$pf1 = 329{,}809$$

Equation 4 (CFM Calculations)

$$CFM = \frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

d =Exhaust stack diameter in inches
Pv =Velocity pressure in inches of H_20
P_B =Barometric pressure in inches of mercury
Te =Exhaust temperature ^{O}F

$$CFM = \frac{(10/2)^2\pi}{144}\left(1096.2\sqrt{\frac{.80}{1.325(30.00/313.100+460)}}\right)$$

CFM = 2358.37

Equation 5 (Corrected Performance Factor)

$$PF1 = \frac{329{,}809(313.1 \text{ deg F} + 460)}{2358.37 \text{ CFM}}$$

PF1 = 108,115

TREATED:

Equation 1 (Volume Fractions)

VFHC = 14.6/1,000,000
= 0.0000146

VFCO = .013/100
= 0.00013

$VFCO_2$ = 1.826/100
= 0.01826

VFO_2 = 17.17/100
= 0.1717

Equation 2 (Molecular Weight)

Mwt2 $= (0.0000146)(86)+(0.00013)(28)+(0.01826)(44)+(0.1717)(32) + [(1-0.0000146-0.00013-0.01826-0.1717)(28)]$

Mwt2 $= 28.980$

Equation 3 (Calculated Performance Factor)

$$pf2 = \frac{3099.6 \times 28.980}{86(0.0000146)+13.89(0.00013)+13.89(0.01826)}$$

pf2 $= 349{,}927$

Equation 4 (CFM Calculations)

$$CFM = \frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

d =Exhaust stack diameter in inches
Pv =Velocity pressure in inches of H_20
P_B =Barometric pressure in inches of mercury
Te =Exhaust temperature ^0F

$$CFM = \frac{(10/2)^2\pi}{144}\left(1096.2\sqrt{\frac{.775}{1.325(29.86/309.02+460)}}\right)$$

CFM $= 2320.51$

Equation 5 (Corrected Performance Factor)

$$PF2 = \frac{349{,}927(309.02 \text{ deg F} + 460)}{2320.51 \text{ CFM}}$$

$= 115{,}966$

Fuel Specific Gravity Correction Factor

Baseline Fuel Specific Gravity - Treated Fuel Specific Gravity/Baseline Fuel Specific Gravity +1

.840-.837/.840+1=1.0036

PF2 = 115,966 x Specific Gravity Correction

PF2 = 115,966 x 1.0036

PF2 = 116,384

Equation 6 (Percent Change in Engine Performance Factor:)

$$\% \text{ Change PF} = \frac{\text{PF2 - PF1}}{\text{PF1}} \times 100$$

% Change PF = [(116,384 - 108,115)/108,115](100)

= +7.65

Note: A positive change in PF equates to a reduction in fuel consumption.

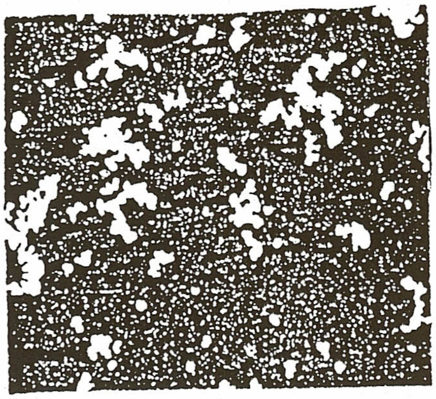
SMOKE TESTING

Table 3. Smoke Reductions in Truck Fleets

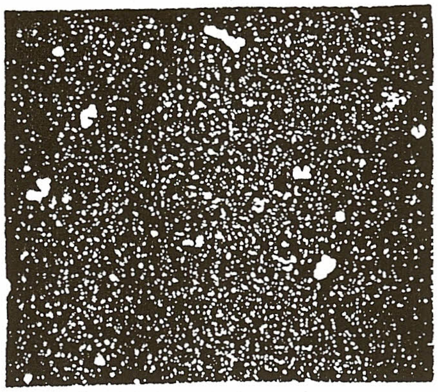
Company	FPC-1® Treated Miles	FPC-1® Treated Hours	Smoke Reduction
CCBC No. Texas	*5,000*		*11.5*
FMC		500	16.0
JRS/SC		700	15.0
DTC	15,000		17.0
JRS/TK	15,000		23.0+ (1)
MGV		1,000+	33.0
MKUR		1,000+	38.5
DLO		1,000+	22.0

(1) The baseline smoke numbers on several units were much darker than the highest index number on the chart (9.0) and therefore the percentage reduction after treatment with FPC-1® was understated for those units.

PHOTOGRAPHIC DEMONSTRATION OF SOOT,
PARTICULATE AND CARBON REDUCTION
USING FERROUS PICRATE



Photograph 1
Particulate emissions
from diesel exhaust
without FTC
(130×10^9 particulates
per cubic foot)



Photograph 2
Particulate emissions
from diesel exhaust
with FTC
(30×10^9 particulates
per cubic foot)

Photographs 1 and 2 illustrate differences in particulate emissions with and without ferrous picrate treatment respectively.

Soot Emission Trials At A Tasmanian Underground Mine

The observations of improved combustion are further supported by other measurements showing that soot (smoke spot) emissions are also reduced by ferrous picrate fuel treatment. Soot and carbon deposits are not simple unburned fuel fragments but rather comprise a new product actually manufactured as a result of the natural combustion sequence going wrong. This product often includes oil and fuel contaminants which form abrasive compounds.

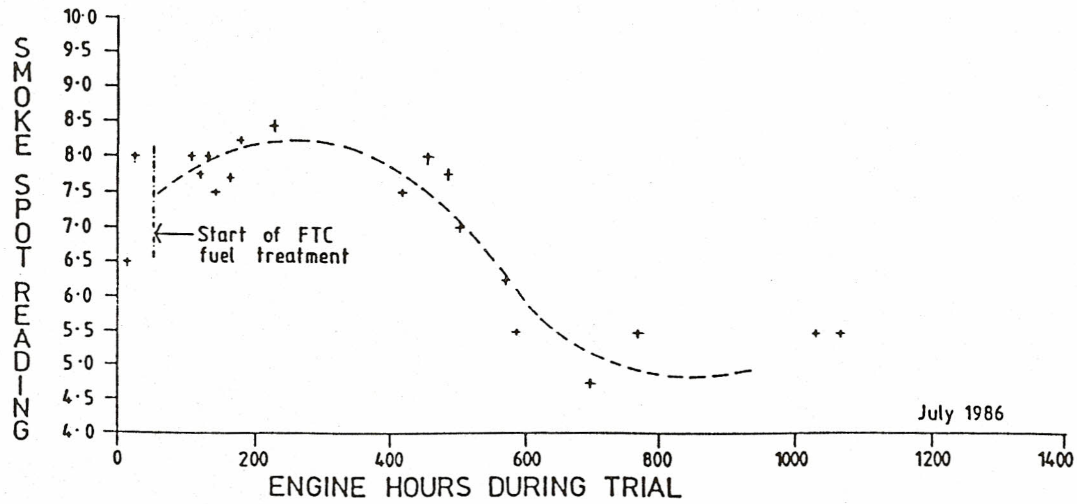


Figure 5 - Bacharach Smoke Emission Trial on a Caterpillar 3408 Engine

Figure 5 illustrates soot emissions over time measured by standard Bacharach smoke spot tests of exhaust from a Caterpillar 3408 engine after treatment with ferrous picrate combustion catalyst. For the first 100 operating hours after the commencement of fuel treatment the soot levels appear to increase. By 400 hours the level is reducing and by 700 hours into fuel treatment the soot level is about two-thirds of the original values.

Changes in Soot Ingestion in Lubricating Oil at a North Queensland Open Cut Minesite

Field experience has demonstrated that reduced engine soot levels lead to a reduction of soot in lubricating oil and reduced engine wear rates. Figure 6 on Page 10 graphically shows the response to ferrous picrate catalyst treatment in a Cummins KTA38 engine from a fleet of coal haulers.

A study of used lubricating oil analysis involving a fleet of these units has quantified reductions in engine wear rates due to a cleaner fuel burn and reduced accumulation of soot in the oil.

The wear rate in Fig. 6 on Page 10 is expressed as parts per million per hour and has been corrected for lubricating oil consumption. This unit showed a wear reduction of 18%, reduced black smoke emissions and a 63% reduction in lubricating oil consumption.

LABORATORY TESTS WITH GASOLINE VEHICLES

TABLE 4
SUMMARY OF EPA GASOLINE DRIVING CYCLE FUEL ECONOMY
AND EMISSIONS EVALUATION WITH FUEL ADDITIVE

Vehicle	Test	Percent Change from Baseline			
		MPG	HC	CO	NOx
*Ply TC3	FTP	+5.9	+ 4.7	- 8.1	- 7.1
*Ply TC3	Hot '74	+6.6	-16.0	-47.9	-13.6
*Ply TC3	HFET	+3.3	+25.6	-27.4	- 2.8
*Olds	FTP	+3.0	- 5.5	+ 2.9	- 2.6
*Olds	Hot '74	+3.7	-27.1	-21.5	+ 7.4
*Olds	HFET	+2.8	-31.6	-20.8	+ 5.1
+Chev	LA-4	+4.9	- 1.3	- 8.1	+ 2.0
+Chev	HFET	+2.6			
AVERAGE:		+4.10	- 7.31	-18.70	- 1.66

* Data from ATL
\+ Data from SCI

TABLE 5
SUMMARY OF SAE ROAD TESTS CONDUCTED WITH FUEL ADDITIVE

		Percent Change from Baseline	
Vehicle	Test	Miles per Gallon	Demerits
Chev	SAE-Surburban	+6.7	
Chev	SAE-Interstate	+7.9	
Chev	CRC-Driveability		- 31
AVERAGE:		+7.3	- 31

TABLE 6

Summary of Two Gasoline Field Carbon Balance Tests

Company	Date	Engine	RPM	% Change Fuel Consumption
Memphis Cablevision	12/27/93	Ford	2400	- 2.68
		Ford	2500	- 9.81
		Ford	3500	- 6.47
		Ford	2500	- 9.21
		Dodge	2400	- 11.79
			Fleet Average:	**- 7.99%**

Note: The above vehicles included a Ford Explorer, a Ford Escort, a Ford Econoline, a Ford Pickup, and a Dodge MiniVan.

Company	Date	Engine	RPM	% Change Fuel Consumption
Occidental Chemical Corporation	8/23/93	Chev 5.7L	2120	- 5.55
		Chev 5.7L	2100	- 2.12
		Chev 5.7L	2050	- 6.96
		Chev 5.7L	2000	- 10.32
			Fleet Average:	**- 6.24%**

Note: Fleet of Chevrolet Pickups.

References

1) Germane, G.J.,"Effect of a Ferrous Picrate on Fuel Economy and Exhaust Emissions of Gasoline Automobiles During EPA Driving Cycles.", from tests conducted at Automotive Testing Laboratories, Inc.

2) Carlson, R.R., "The Effect of a Ferrous Picrate Fuel Additive on Emissions and Fuel Economy in Gasoline Automobiles", System Control Inc., Environmental Engineering Division.

3) Customer trials for smoke density determination in the United States and Australia.

COMPUTER PRINTOUTS

Company Name:	Coca Cola Bottling	*Location*	Dallas	*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5 Inches		
Engine Type:	CAT 3406B	*Mile/Hrs*	518982		
Equipment Type:	Aeromax L-9000	*ID #:*	88S079494	*Baro*	29.95
Fuel Sp. Gravity(SG	.837	*Temp:*	95.4	*Time:*	1735

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	321.4	1.5	0.03	10	1.53	18.2	
1800	320.8	1.5	0.03	10	1.53	18.2	
1800	327	1.5	0.03	10	1.53	18.3	
1800	325.6	1.5	0.03	10	1.53	18.3	
1800	331.4	1.5	0.03	10	1.53	18.2	
1800	327.2	1.5	0.03	10	1.53	18.2	
1800	**325.567**	**1.500**	**.030**	**10.000**	**1.530**	**18.233**	Mean
0	**3.971**	**.000**	**.000**	**.000**	**.000**	**.052**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.00E-05	0.0003	.015	.182	28.975	393,163	379,392

Company Name:	Coca Cola Bottling	*Location:*	Dallas	*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5 Inches		
Engine Type:	CAT 3406B	*Mile/Hrs:*	524342		
Equipment Type	Aeromax L-9000	*ID #:*	88S079494	*Baro:*	29.83
Fuel Sp. Gravity:	.842	*Temp:*	81.2		
SG Corr Factor:	.994			*Time:*	935

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	346	1.45	0.03	8	1.66	18	
1800	347.2	1.45	0.03	8	1.64	18	
1800	357.2	1.4	0.03	9	1.64	18.1	
1800	348.8	1.4	0.04	9	1.64	18	
1800	354.8	1.4	0.03	9	1.63	18	
1800	359.2	1.4	0.03	8	1.65	18.1	
1800.000	**352.200**	**1.417**	**.032**	**8.500**	**1.643**	**18.033**	Mean
0	**5.581**	**.026**	**.004**	**.548**	**.010**	**.052**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
8.50E-06	0.000316667	.016	.180	28.985	366,609	369,401

Performance factor adjusted for fuel density: 367,195

****% Change PF= -3.21 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas		*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5	Inches		
Engine Type:	NTC - 300	*Mile/Hrs*	265573			
Equipment Type:	Ford 9000	*ID #:*	14-092		*Baro*	29.95
Fuel Sp. Gravity(SG	.839	*Temp:*	91.6			
					Time:	1705

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	336.4	1.35	0.02	14	1.93	17.7	
1800	337	1.35	0.02	15	1.93	17.8	
1800	339.6	1.35	0.02	14	1.95	17.7	
1800	340.6	1.35	0.02	14	1.94	17.7	
1800	340.4	1.35	0.02	15	1.94	17.7	
1800	340.2	1.35	0.02	13	1.96	17.6	
1800	340.4	1.35	0.02	13	1.95	17.7	
1800	340.6	1.35	0.02	14	1.96	17.7	
1800.000	**339.400**	**1.350**	**.020**	**14.000**	**1.945**	**17.700**	Mean
0	**1.704**	**.000**	**.000**	**.756**	**.012**	**.053**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.40E-05	0.0002	.019	.177	29.020	312,475	320,627

Company Name:	Coca Cola Bottling	*Location:*	Dallas		*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5	Inches		
Engine Type:	NTC - 300	*Mile/Hrs:*	272505			
Equipment Type	Ford 9000	*ID #:*	14-092		*Baro:*	29.81
Fuel Sp. Gravity:	.839	*Temp:*	94.4			
SG Corr Factor:	1.000				*Time:*	1510

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	336.4	1.25	0.02	13	1.84	17.3	
1800	336.8	1.25	0.02	13	1.86	17.4	
1800	335.6	1.25	0.01	14	1.84	17.5	
1800	335.4	1.25	0.01	13	1.84	17.3	
1800	336.2	1.25	0.01	14	1.84	17.4	
1800	337.4	1.25	0.02	13	1.86	17.4	
1800.000	**336.300**	**1.250**	**.015**	**13.333**	**1.847**	**17.383**	Mean
0	**.746**	**.000**	**.005**	**.516**	**.010**	**.075**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.33E-05	0.00015	.018	.174	28.992	329,488	349,844

Performance factor adjusted for fuel density: 349,844

****% Change PF= 9.11 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coke Cola Bottling	*Location*	Dallas		*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5	Inches		
Engine Type:	CAT 3406B	*Mile/Hrs*	324744			
Equipment Type:	International	*ID #:*	04-023		*Baro*	29.97
Fuel Sp. Gravity(SG	.841	*Temp:*	88.6			
					Time:	1640

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1750 Full Throttle	307.8	1.4	0.03	9	1.54	18.3	
1750 Full Throttle	307	1.4	0.03	9	1.53	18.3	
1750 Full Throttle	307	1.4	0.03	9	1.53	18.3	
1750 Full Throttle	307.2	1.4	0.03	7	1.54	18.2	
1750 Full Throttle	307.2	1.4	0.03	9	1.53	18.3	
1750 Full Throttle	307.4	1.4	0.03	9	1.54	18.3	
#DIV/0!	**307.267**	**1.400**	**.030**	**8.667**	**1.535**	**18.283**	Mean
#DIV/0!	**.301**	**.000**	**.000**	**.816**	**.005**	**.041**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
8.67E-06	0.0003	.015	.183	28.977	392,162	387,248

Company Name:	Coke Cola Bottling	*Location:*	Dallas		*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5	Inches		
Engine Type:	CAT 3406B	*Mile/Hrs:*	330014			
Equipment Type	International	*ID #:*	04-023		*Baro:*	29.77
Fuel Sp. Gravity:	.839	*Temp:*	98			
SG Corr Factor:	1.002				*Time:*	1710

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1750 Full Throttle	318.2	1.3	0.03	6	1.47	18.4	
1750 Full Throttle	317	1.3	0.03	7	1.48	18.4	
1750 Full Throttle	320.4	1.3	0.03	7	1.48	18.4	
1750 Full Throttle	319.2	1.3	0.03	6	1.48	18.5	
1750 Full Throttle	318	1.3	0.03	7	1.46	18.5	
1750 Full Throttle	318.8	1.3	0.03	6	1.48	18.4	
#DIV/0!	**318.600**	**1.300**	**.030**	**6.500**	**1.475**	**18.433**	Mean
#DIV/0!	**1.159**	**.000**	**.000**	**.548**	**.008**	**.052**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
6.50E-06	0.0003	.015	.184	28.974	408,062	419,828

Performance factor adjusted for fuel density: 420,827

****% Change PF= 8.67 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas	*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5 Inches		
Engine Type:	CAT 3406B	*Mile/Hrs*	349677		
Equipment Type:	International	*ID #:*	04-021	*Baro*	29.97
Fuel Sp. Gravity(SG	.841	*Temp:*	89.8		
				Time:	1615

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1750 Full Throttle	315.6	1.3	0.04	9	1.55	18.2	
1750 Full Throttle	315.6	1.3	0.04	9	1.55	18.2	
1750 Full Throttle	316	1.3	0.04	9	1.55	18.2	
1750 Full Throttle	316.2	1.3	0.04	9	1.55	18.2	
1750 Full Throttle	320.8	1.3	0.04	9	1.56	18.2	
1750 Full Throttle	319.8	1.3	0.04	9	1.55	18.2	
#DIV/0!	**317.333**	**1.300**	**.040**	**9.000**	**1.552**	**18.200**	Mean
#DIV/0!	**2.331**	**.000**	**.000**	**.000**	**.004**	**.000**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
9.00E-06	0.0004	.016	.182	28.977	385,554	397,678

Company Name:	Coca Cola Bottling	*Location:*	Dallas	*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5 Inches		
Engine Type:	CAT 3406B	*Mile/Hrs:*	355708		
Equipment Type	International	*ID #:*	04-021	*Baro:*	29.85
Fuel Sp. Gravity:	.842	*Temp:*	81		
SG Corr Factor:	.999			*Time:*	1100

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1750	323.4	1.25	0.03	8	1.55	18	
1750	324	1.2	0.03	8	1.55	18	
1750	324.2	1.2	0.03	8	1.55	18.2	
1750	323.6	1.2	0.03	8	1.55	18.2	
1750	327	1.2	0.03	8	1.55	18.1	
1750	323.8	1.25	0.03	9	1.55	18.1	
1750	323.8	1.25	0.03	9	1.55	18.1	
1750	318.6	1.2	0.03	9	1.56	18.1	
1750.000	**323.550**	**1.219**	**.030**	**8.375**	**1.551**	**18.100**	Mean
0	**2.305**	**.026**	**.000**	**.518**	**.004**	**.076**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
8.38E-06	0.0003	.016	.181	28.973	388,128	414,280

Performance factor adjusted for fuel density: 413,788

****% Change PF= 4.05 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas	*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5 Inches		
Engine Type:	NTC - 300	*Mile/Hrs*	314830		
Equipment Type:	Ford 9000	*ID #:*	14-097	*Baro*	29.98
Fuel Sp. Gravity(SG	.838	*Temp:*	88.88	*Time:*	1545

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	336	1.45	0.02	10	1.94	17.7	
1800	336.4	1.45	0.02	10	1.94	17.7	
1800	336.4	1.45	0.02	10	1.94	17.7	
1800	336.6	1.45	0.02	10	1.93	17.8	
1800	337	1.45	0.02	10	1.93	17.8	
1800	337.6	1.45	0.02	10	1.94	17.7	
1800.000	**336.667**	**1.450**	**.020**	**10.000**	**1.937**	**17.733**	Mean
0	**.561**	**.000**	**.000**	**.000**	**.005**	**.052**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.00E-05	0.0002	.019	.177	29.020	314,207	310,711

Company Name:	Coca Cola Bottling	*Location:*	Dallas	*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5 Inches		
Engine Type:	NTC - 300	*Mile/Hrs:*	318068		
Equipment Type	Ford 9000	*ID #:*	14-097	*Baro:*	29.84
Fuel Sp. Gravity:	.837	*Temp:*	92.8		
SG Corr Factor:	1.001			*Time:*	1330

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	326	1.3	0.02	10	1.83	17.6	
1800	329.4	1.35	0.02	10	1.82	17.7	
1800	330.8	1.35	0.01	10	1.79	17.6	
1800	331.8	1.35	0.01	9	1.83	17.7	
1800	332	1.35	0.01	10	1.8	17.7	
1800	332.2	1.35	0.01	8	1.82	17.7	
1800	333	1.35	0.01	8	1.79	17.8	
1800	333	1.35	0.01	8	1.8	17.7	
1800.000	**331.025**	**1.344**	**.013**	**9.125**	**1.810**	**17.688**	Mean
0	**2.351**	**.018**	**.005**	**.991**	**.017**	**.064**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
9.13E-06	0.000125	.018	.177	28.998	337,103	344,246

Performance factor adjusted for fuel density: 344,656

****% Change PF= 10.93 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	Location	Dallas		Date:	7/11/94
Test Portion:	Baseline	Stack Diam.	5	Inches		
Engine Type:	NTC-300	Mile/Hrs	290200			
Equipment Type:	International	ID #:	14-169		Baro	29.98
Fuel Sp. Gravity(SG	.835	Temp:	105.2			
					Time:	1520

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	334.2	1.4	0.02	12	1.65	18.1	
1800	335.8	1.4	0.02	12	1.64	18.1	
1800	337	1.4	0.02	14	1.64	18.1	
1800	337.4	1.4	0.02	14	1.64	18.2	
1800	337.4	1.4	0.02	10	1.64	18.1	
1800	337.6	1.4	0.02	10	1.64	18.1	
1800.000	**336.567**	**1.400**	**.020**	**12.000**	**1.642**	**18.117**	Mean
0	**1.329**	**.000**	**.000**	**1.789**	**.004**	**.041**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.20E-05	0.0002	.016	.181	28.988	369,086	371,417

Company Name:	Coca Cola Bottling	Location:	Dallas		Test Date:	10/3/94
Test Portion:	Treated	Stack Diam:	5	Inches		
Engine Type:	NTC-300	Mile/Hrs:	295442			
Equipment Type	International	ID #:	14-169		Baro:	29.85
Fuel Sp. Gravity:	.835	Temp:	100			
SG Corr Factor:	1.000				Time:	1140

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	329.2	1.3	0.02	13	1.58	18.1	
1800	334.4	1.3	0.02	13	1.58	18.1	
1800	335	1.3	0.02	12	1.57	18.1	
1800	332.2	1.3	0.02	13	1.56	1.81	
1800	334.6	1.3	0.02	13	1.56	18	
1800	334.4	1.3	0.02	10	1.56	18	
1800	333.6	1.3	0.02	10	1.55	18.1	
1800	334.8	1.3	0.02	13	1.55	18.1	
1800.000	**333.525**	**1.300**	**.020**	**12.125**	**1.564**	**16.039**	Mean
0	**1.962**	**.000**	**.000**	**1.356**	**.012**	**5.749**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.21E-05	0.0002	.016	.160	28.892	385,861	401,312

Performance factor adjusted for fuel density: 401,312

****% Change PF= 8.05 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas	*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5 Inches		
Engine Type:	NTC-300	*Mile/Hrs*	75208		
Equipment Type:	Ford	*ID #:*	14-098	*Baro*	29.99
Fuel Sp. Gravity(SG	.840	*Temp:*	89.6		
				Time:	1455

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	339.8	1.4	0.01	5	1.98	17.7	
1800	339.4	1.4	0.01	5	1.97	17.7	
1800	340.2	1.4	0.01	6	1.96	17.8	
1800	339.4	1.4	0.01	5	1.97	17.8	
1800	338.8	1.4	0.01	6	1.96	17.7	
1800	339	1.4	0.01	5	1.96	17.7	
1800.000	339.433	1.400	.010	5.333	1.967	17.733	Mean
0	.513	.000	.000	.516	.008	.052	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.33E-06	0.0001	.020	.177	29.024	311,556	314,140

Company Name:	Coca Cola Bottling	*Location:*	Dallas	*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5 Inches		
Engine Type:	NTC-300	*Mile/Hrs:*	80413		
Equipment Type	Ford	*ID #:*	14-098	*Baro:*	29.84
Fuel Sp. Gravity:	.839	*Temp:*	91.6		
SG Corr Factor:	1.001			*Time:*	1300

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	330	1.3	0.01	8	1.83	17.7	
1800	330	1.25	0.01	8	1.82	17.7	
1800	330.8	1.25	0.01	9	1.83	17.8	
1800	330.6	1.25	0.01	9	1.81	17.8	
1800	331.4	1.25	0.01	9	1.8	17.8	
1800	331.6	1.25	0.01	10	1.84	17.7	
1800	332	1.25	0.01	10	1.8	17.7	
1800	332.4	1.25	0.01	10	1.79	17.7	
1800.000	331.100	1.256	.010	9.125	1.815	17.738	Mean
0	.894	.018	.000	.835	.018	.052	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
9.13E-06	0.0001	.018	.177	29.000	336,675	355,597

Performance factor adjusted for fuel density: 356,021

****% Change PF= 13.33 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Coca Cola Bottling	*Location*	Dallas	*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5 Inches		
Engine Type:	NTC-300	*Mile/Hrs*	363297		
Equipment Type:	Ford	*ID #:*	14-093	*Baro*	29.99
Fuel Sp. Gravity(SG	.840	*Temp:*	88.6	*Time:*	1420

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	331.6	1.45	0.01	9	1.82	18	
1800	331.2	1.45	0.01	10	1.8	18.1	
1800	332.8	1.45	0.01	9	1.83	17.9	
1800	333	1.45	0.01	9	1.83	17.9	
1800	334.2	1.45	0.01	9	1.83	17.9	
1800	334.6	1.45	0.01	9	1.82	17.9	
1800.000	**332.900**	**1.450**	**.010**	**9.167**	**1.822**	**17.950**	Mean
0	**1.355**	**.000**	**.000**	**.408**	**.012**	**.084**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
9.17E-06	0.0001	.018	.180	29.010	335,559	331,096

Company Name:	Coca Cola Bottling	*Location:*	Dallas	*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5 Inches		
Engine Type:	NTC-300	*Mile/Hrs:*	369313		
Equipment Type	Ford	*ID #:*	14-093	*Baro:*	29.84
Fuel Sp. Gravity:	.845	*Temp:*	80.8		
SG Corr Factor:	.994			*Time:*	1025

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	330.4	1.3	0.01	10	1.79	17.8	
1800	333.2	1.3	0.01	9	1.79	17.8	
1800	331.8	1.3	0.01	8	1.81	17.8	
1800	333.6	1.3	0.01	9	1.84	17.8	
1800	333.8	1.3	0.01	8	1.8	17.8	
1800	332	1.3	0.01	8	1.79	17.8	
1800	330	1.3	0.01	8	1.79	17.8	
1800	330.8	1.3	0.01	8	1.8	17.8	
1800.000	**331.950**	**1.300**	**.010**	**8.500**	**1.801**	**17.800**	Mean
0	**1.476**	**.000**	**.000**	**.756**	**.017**	**.000**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
8.50E-06	0.0001	.018	.178	29.001	339,300	352,478

Performance factor adjusted for fuel density: 350,380

****% Change PF= 5.82 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas		*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5	Inches		
Engine Type:	NTC-300	*Mile/Hrs*	317614			
Equipment Type:	International	*ID #:*	14-165		*Baro*	30.00
Fuel Sp. Gravity(SG	.839	*Temp:*	95			
					Time:	1350

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	345.4	1.35	0.02	8	1.79	18	
1800	347.4	1.35	0.02	8	1.79	18	
1800	349.2	1.35	0.02	8	1.77	18	
1800	350.6	1.35	0.02	8	1.75	18	
1800	352.2	1.35	0.02	8	1.75	17.9	
1800	353.2	1.35	0.02	8	1.75	17.9	
1800	354	1.35	0.02	8	1.75	18	
1800	353.2	1.35	0.02	8	1.75	18	
1800.000	**350.650**	**1.350**	**.020**	**8.000**	**1.763**	**17.975**	Mean
0	**3.091**	**.000**	**.000**	**.000**	**.018**	**.046**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
8.00E-06	0.0002	.018	.180	29.001	344,827	356,601

Company Name:	Coca Cola Bottling	*Location:*	Dallas		*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5	Inches		
Engine Type:	NTC-300	*Mile/Hrs:*	322587			
Equipment Type	International	*ID #:*	14-165		*Baro:*	29.76
Fuel Sp. Gravity:	.835	*Temp:*	99.8			
SG Corr Factor:	1.005				*Time:*	1815

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1800	355	1.25	0.01	8	1.7	17.8	
1800	355.2	1.25	0.01	8	1.7	17.8	
1800	355.2	1.3	0.01	8	1.69	17.9	
1800	355.6	1.3	0.01	9	1.69	17.9	
1800	355.4	1.3	0.01	8	1.69	17.9	
1800	355.4	1.3	0.01	8	1.69	17.9	
1800	355.6	1.3	0.01	9	1.69	17.9	
1800	355.2	1.3	0.01	8	1.69	17.9	
1800.000	**355.325**	**1.288**	**.010**	**8.250**	**1.693**	**17.875**	Mean
0	**.212**	**.023**	**.000**	**.463**	**.005**	**.046**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
8.25E-06	0.0001	.017	.179	28.986	360,759	381,589

Performance factor adjusted for fuel density: 383,409

****% Change PF= 7.52 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

Company Name:	Coca Cola Bottling	*Location*	Dallas		*Date:*	7/11/94
Test Portion:	Baseline	*Stack Diam.*	5	Inches		
Engine Type:	NTC-300	*Mile/Hrs*	319783			
Equipment Type:	International	*ID #:*	14-167		*Baro*	30.02
Fuel Sp. Gravity(SG	.837	*Temp:*	98.4			
					Time:	1245

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1900	342.8	1.35	0.02	12	1.72	18.1	
1900	343.6	1.35	0.02	12	1.71	18.1	
1900	343.6	1.35	0.02	12	1.7	18.1	
1900	344	1.35	0.02	12	1.7	18	
1900	344.6	1.35	0.02	12	1.7	18	
1900	344.6	1.35	0.02	12	1.7	18	
1900.000	343.867	1.350	.020	12.000	1.705	18.050	Mean
0	.689	.000	.000	.000	.008	.055	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.20E-05	0.0002	.017	.181	28.995	355,687	366,412

Company Name:	Coca Cola Bottling	*Location:*	Dallas		*Test Date:*	10/3/94
Test Portion:	Treated	*Stack Diam:*	5	Inches		
Engine Type:	NTC-300	*Mile/Hrs:*	324903			
Equipment Type	International	*ID #:*	14-167		*Baro:*	29.76
Fuel Sp. Gravity:	.833	*Temp:*	106			
SG Corr Factor:	1.005				*Time:*	1840

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1900	346.4	1.3	0.02	10	1.65	17.9	
1900	351	1.3	0.02	10	1.65	17.9	
1900	352	1.3	0.02	13	1.64	17.9	
1900	352.4	1.3	0.02	10	1.64	17.9	
1900	352.6	1.3	0.02	10	1.64	18	
1900	352	1.3	0.02	10	1.65	17.9	
1900	351.8	1.3	0.02	12	1.64	17.9	
1900	351.6	1.3	0.02	10	1.64	17.9	
1900.000	351.225	1.300	.020	10.625	1.644	17.913	Mean
0	2.010	.000	.000	1.188	.005	.035	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.06E-05	0.0002	.016	.179	28.980	368,720	387,154

Performance factor adjusted for fuel density: 389,004

****% Change PF= 6.17 %**

***** A positive change in PF equates to a reduction in fuel consumption.***

RAW DATA WORK SHEETS