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EVALUATION OF FPC-1® FUEL PERFORMANCE CATALYST

by

BROWARD COUNTY SCHOOL SYSTEM

Report Prepared by

UHI CORPORATION PROVO, UTAH, and INTERNAL COMBUSTION ENHANCEMENT, INC Tampa, Florida

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INTRODUCTION

FPC-1® is a combustion catalyst which, when added to liquid hydrocarbon fuels at a ratio of 1:5000, 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 the Broward County School System, UHI Corporation, and ICE, Inc., engineers, with and without FPC-1® added to the diesel fuel for a fleet of school buses. The fuel consumption determination procedure applied was the <u>Carbon Balance Exhaust Emission</u> <u>Test</u> 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.

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, CO₂, and O₂.

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).

A Monarch phototachometer to determine and control engine speed (rpm).

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

1

A hydrometer for fuel specific gravity (density) measurement.

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.

Ten buses made up the final test fleet. Table 1 in the Appendices summarizes the percent change in fuel consumption based upon the change in carbon flow rate in the exhaust.

DISCUSSION

1. Fuel Density

Fuel specific gravity (density) was lower during the treated fuel carbon balance test than the baseline fuel test, therefore, the fuel had a lower energy content during the treated test. The correction factor shown on the computer printouts in the Appendices adjusts the treated fuel density to that of the baseline.

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 found on Table 2 in the Appendices.

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.

CONCLUSIONS

1) The fuel consumption change determined by the carbon balance method ranged from a decrease of 3.70% to a decrease of 11.26%. The fleet averaged a 7.68% reduction in fuel consumed after FPC-1 fuel treatment and engine preconditioning.

2) Smoke density was reduced 18% after 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 and checked peridocally 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.

The carbon mass balance formulae are found on Figure 1 in the Appendices. For illustation purposes, a sample calculation is also included (Figure 2).

COMPUTER PRINTOUTS

1

Company Name:	Broward County Schools	Location	Twin Lakes, FL		Date:	10/28/94	
Test Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Navistar 444	Mile/Hrs	4533				
Equipment Type:	School Bus	ID #:	94130		Baro	29.95	
Fuel Sp. Gravity(SG	.843	Temp:					
4	N			12	Time:		
RPM	Exh Temp	Py Inch	CO	HC	CO2	02	
1800	194	0.6	0.0	4 1	2 1.49	18.1	
1800	206	0.6	0.0	5 1	2 1.48	18.2	
1800	217.8	0.6	0.0	5 1	<u> </u>	18.2	
1800	220.6	0.7	0.0	4 1	5 1.61	18.1	
1800	222.8	0.7	0.0	4 1	5 1.6	18	
1800	223.8	0.7	0.0	5 1	5 1.6	18.1	
1800	224	0.7	0.0	4 1	4 1.53	18.2	
1800	224.4	0.7	0.0	4 1	4 1.53	18.2	
1800	223.6	0.7	0.0	4 1	4 1.6	18.2	
					-		
1800	217.500	.660	.044	13.800	1.555	18.130	Mean
0	9.940	.052	.005	1.135	.052	.082	Std Dev
VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1	
1.38E-05	0.00044	.016	.181	28.975	402,143	848,892	
Company Name:	Broward County Schools	Location: Stack Diam:	Twin Lakes, FL	Inches	Test Date:	3/31/95	
Fnoine Tyne	Navistar 444	Mile/Hrs:	12463	meneo			
Eauinment Type	School Bus	ID #:	94130		Baro:	29.93	
Fuel Sp. Gravity:	.832	Temp:					
SG Corr Factor:	1.013				Time:	908	
8000000000 B 2 b 2 0 00000000000000000000		100 p.		88 8888 T 775 888			******
1800	EAU Feilip			4	2 1.71	17.0	
1800	227.8	0.6	0.0)4 1	2 1.61	17.8	
1800	230.2	0.55	0.0	3 1	2 1.61	17.8	
1800	233.4	0.55	0.0	03 1	.2 1.62	18	
1800	235	0.55	0.0	13 1	.2 1.61	17.8	
1800	235	0.55	0.0	13 1	3 1.63	17.2	
1800	235.2	0.55	0.0	14 1	3 1.56	18.4	
1800	235	0.6	0.0)3 1	3 1.55	18.3	
1800	234.6	0.6	0.0)3 1	3 1.56	18.1	
1000	251.0	0.0			1.00		
					-		
1805 000	222 260	570	033	12 400	1 502	17 050	Mean
15.8113883	2.489	.026	.005	.516	.033	.341	Std Dev
VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2	
1.24E-05	0.00033	.016	.180	28.973	395,942	909,532	
				which are a			
Performance factor ad	djusted for fuel density:		921,400	**% C	hange PF	` —	8.54

Company Name:	Broward County Schools	Location:	Twin Lakes, FL		Date:	10/28/94	
Test Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Navistar 444	Mile/Hrs	5752				
Equipment Type:	School Bus	ID #:	94129		Baro	29.95	
Fuel Sp. Gravity(SG	.842	Temp:					
					Time:		
RPM	Exh Temp	Py Inch	CO	HC	CO2	02	
1800	195.5	0.8	0.03	10	1.71	18	
1800	201.4	0.8	0.03	10	1.69	18.1	
1800	214.4	0.8	0.04	10	1.79	17.7	
1800	217.8	0.8	0.04	13	1.72	17.7	
1800	224.4	0.8	0.04	13	1.67	17.9	
1800	228.2	0.8	0.04	13	1.68	17.9	
1800	230	0.8	0.05	13	1.7	18	
1800	232.4	0.8	0.04	13	1.7	17.9	
1800	233	0.8	0.04	14	1.68	17.8	
1000.000	210 (R 0	000	020	10 111	1 =0.4	1= 000	
1800.000 1	219.678	.800	0.49	12.111	1.704 1	17.889	Mean
0	12 (51	000		1 (16	026	126	0.1 D
0	13.651	.000	.006	1.616	.036	.136	Std Dev
	13.651	.000	.006	1.616	.036	.136	Std Dev
0 VFHC	13.651 VFCO	.000 VFCO2	.006 VFO2	1.616 Mtw1	.036 pf1	.136 PF1	Std Dev
0 VFHC 1.21E-05	13.651 VFCO 0.000388889	.000 VFCO2	.006 VFO2 .179	1.616 Mtw1 28.989	.036 pf1 369,425	.136 PF1 709,452	Std Dev
0 VFHC 1.21E-05	13.651 VFCO 0.000388889	.000 VFCO2 .017	.006 VFO2 .179	1.616 Mtw1 28.989	036 pf1 369,425	.136 PF1 709,452	Std Dev
0 VFHC 1.21E-05	13.651 VFCO 0.000388889	.000 VFCO2 .017	.006 VFO2 .179	1.616 Mtw1 28.989	.036 pf1 369,425	.136 PF1 709,452	Std Dev
0 VFHC 1.21E-05	13.651 VFCO 0.000388889	.000 VFCO2 .017	.006 VFO2 .179	1.616 Mtw1 28.989	.036 pf1 369,425	.136 PF1 709,452	Std Dev
0 VFHC 1.21E-05	13.651 VFCO 0.000388889	.000 VFCO2 .017	.006 VFO2 .179	1.616 Mtw1 28.989	.036 pf1 369,425	.136 PF1 709,452	Std Dev
0 VFHC 1.21E-05 Company Name:	13.651 VFCO 0.000388889 Broward County Schools	.000 VFCO2 .017	.006 VFO2 .179 Twin Lakes, FL	1.616 Mtw1 28.989	.036 pf1 369,425 Test Date:	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name:	13.651 VFCO 0.000388889 Broward County Schools	.000 VFCO2 .017	.006 VFO2 .179 Twin Lakes, FL	1.616 Mtw1 28.989	.036 pf1 369,425 Test Date:	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion:	13.651 VFCO 0.000388889 Broward County Schools Treated	.000 VFCO2 .017 Location: Stack Diam:	.006 VFO2 .179 Twin Lakes, FL 4	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date:	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion:	13.651 VFCO 0.000388889 Broward County Schools Treated	.000 VFCO2 .017 Location: Stack Diam:	.006 VFO2 .179 Twin Lakes, FL 4	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date:	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type:	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs:	.006 VFO2 .179 Twin Lakes, FL 4 16332	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date:	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type:	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs:	.006 VFO2 .179 Twin Lakes, FL 4 16332	1.616 Mtw1 28.989 Inches	.036 pf1 369,425	.136 PF1 709,452 3/31/95	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro:	.136 PF1 709,452 3/31/95 29.93	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro:	.136 PF1 709,452 3/31/95 29.93	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity:	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro:	.136 PF1 709,452 3/31/95 29.93	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro:	.136 PF1 709,452 3/31/95 29.93 830	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro: Time:	.136 PF1 709,452 3/31/95 29.93 830	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp:	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro: Time:	.136 PF1 709,452 3/31/95 29.93 830 O2	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO	1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro: Time:	.136 PF1 709,452 3/31/95 29.93 830 02	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 217.6	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03	1.616 Mtw1 28.989 Inches HC 10	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.63	.136 PF1 709,452 3/31/95 29.93 830 02 17.6	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750 1800	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 217.6 237.4	.000 .000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03 0.03	Inches	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.63 1.75	.136 PF1 709,452 3/31/95 29.93 830 02 17.6 17.3 18 2	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750 1800	I3.651 13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 217.4 217.4 217.4 217.4 217.4 217.4 217.4 217.4	.000 .000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7 0.7 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03 0.03 0.04 0.04	Inches HC 10 1616 10 10 10 11 13	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.63 1.76	.136 PF1 709,452 3/31/95 29.93 830 02 17.6 17.3 18.2 18.4	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750 1800 1800	13.651 13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 217.6 237.4 238.4 241.4	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7 0.7 0.7 0.7 0.7 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03 0.03 0.04 0.04 0.04	Inches HC 10 1.616 Mtw1 28.989 Inches	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.76 1.76 1.76	.136 PF1 709,452 3/31/95 29.93 830 02 17.6 17.3 18.2 18.4 18.3	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750 1800 1800 1800	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 237.4 238.4 241.4 241.4	.000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7 0.7 0.7 0.7 0.7 0.7 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03 0.03 0.04 0.04 0.04	HC 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.76 1.76 1.75 1.75 1.75	.136 PF1 709,452 3/31/95 29.93 830 02 17.6 17.3 18.2 18.4 18.3 18.3	Std Dev
0 VFHC 1.21E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1750 1800 1800 1800 1800	13.651 VFCO 0.000388889 Broward County Schools Treated Navistar 444 School Bus .832 1.012 Exh Temp 214.4 237.4 238.4 241.4 241.4	.000 .000 VFCO2 .017 Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	.006 VFO2 .179 Twin Lakes, FL 4 16332 94129 CO 0.03 0.03 0.03 0.04 0.04 0.04 0.03 0.03	HC 1.616 Mtw1 28.989 Inches HC 10 10 14 13 10 10 10	.036 pf1 369,425 Test Date: Baro: Time: CO2 1.66 1.76 1.75 1.75 1.75 1.74	.136 PF1 709,452 3/31/95 29.93 830 02 17.6 17.3 18.2 18.4 18.3 18.3 18.3	Std Dev

1800

1800

1795.000

15.8113883

VFHC

1.14E-05

Performance factor adjusted for fuel density:

244.2

244.6

236.260

10.926

VFCO

0.00033

0.7

0.75

.705

.016

VFCO2

.017

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

.033

.005

VFO2

.180

772,015

0.03

0.03

12

12

11.400

1.578

Mtw2

28.994

1.69

1.69

1.715

.046

pf2

368,606

**% Change PF=

18.1

18.2

Mean

Std Dev

8.82

%

17.980

.377

PF2

762,954

Company Name:	Broward County Schools	Location:	Twin Lakes, FL		Date:	10/28/94	
Test Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Cummins B	Mile/Hrs	39855				
Equipment Type:	School Bus	ID #:	334		Baro	29.95	
Fuel Sp. Gravity(SG	.840	Temp:					
					Time:		
RPM	Exh Temp	Realinging	CO	HC	C(02	02	
1800	229.6	0.5	0.04	9	1.77	17.7	
1800	233.2	0.5	0.04	10	1.77	17.7	
1800	235	0.5	0.04	10	1.77	17.7	
1800	236.8	0.5	0.04	10	1.76	17.8	
1800	238.4	0.5	0.04	10	1.73	17.7	
1800	239.8	0.5	0.04	10	1.74	17.8	
1000	259.0	0.5	0.01	10	1.74	17.0	
					├		├ ────┤
1800.000	235 0/3	500	040	0.857	1 757	17 7/3	Mean
1000.000	3.616	.000	.000	.378	.014	.053	Std Dev
v	5.010		.000		.014	.000	Sta Dev
VFHC	VECO	VECO2	VFO2	Mtw1	nf1	PF1	
0.96E.06	0.0004	018	177	28 001	259 720	001 775	
9.80E-00	0.0004	.018	.1//	26.991	556,729	001,775	
Company Name:	Broward County Schools	Location:	Twin Lakes, FL		Test Date:	3/31/95	
Test Portion:	Treated	Stack Diam:	4	Inches			
Engine Type:	Cummins B	Mile/Hrs:	47396				
Equipment Type	School Bus	ID #:	334		Baro:	29.90	
Fuel Sp. Gravity:	.825	Temp:					
SG Corr Factor:	1.018				Time:	1355	
							-
RPM	Exh Temp	Py Inch	CO	HC	CO2	02	
1800	244.2	0.45	0.04	10	1.82	17.5	
1800	248.2	0.45	0.04	10	1.82	17.5	
1800	250	0.45	0.04	10	1.82	17.5	
1800	254.2	0.4	0.04	10	1.81	17.6	
1800	255	0.4	0.04	10	1.79	17.6	
1800	234.8	0.4	0.04	10	1.79	17.5	├ ────┤
1800	256.6	0.4	0.04	10	1 81	17.0	
1000	250.0	0.1	0.01	10	1.01	11.0	
			2				
1800.000	252 475	410	040	10 125	1 800	17 550	Mean
0	4.525	.026	.000	.354	.012	.053	Std Dev
L	-1.545			1	1014		15.4 207
VFHC	VECO	VECO2	VFO2	Mtw?	nf2	PF2	
	0.0004	010	176	78 002	348 774	946.026	
1.01E-05	0.0004	.018	.170	20.772	540,724	240,920	
				**0 01	once DE		0.21
Performance factor a	djusted for fuel density:		963,835	~~% CI	lange PF	=	9.31 9

Tett Portfort: Baseline Mark 2000; 4 Inches Explore 2000: Naviatr 7.3 Mile 2001; 16.2729 Paulymout Type: School Bus D.F. 64.5 Bury 2005; Paulymout Type: School Bus D.F. 64.5 Bury 2005; Pauly 2006; 3.44 Temp: Time: Time: RPM Exbl. Temp: Temp: Time: RPM Exbl. Temp: Temp: Temp: RPM Exbl. Temp: Temp: Temp: RPM Exbl. Temp: Temp: Temp: RPM Exbl. Temp: Temp: Temp: 1770 192 0.8 0.01 2.021 17.5 1770 192 0.8 0.026 17.5 <t< th=""><th>Company Name:</th><th>Broward County Schools</th><th>Location:</th><th>Twin Lakes, FL</th><th></th><th>Date:</th><th>10/28/94</th><th></th></t<>	Company Name:	Broward County Schools	Location:	Twin Lakes, FL		Date:	10/28/94	
Brancher Type: Navisur 7.3 Micritty 10272 Equipment: Type: School Bus D.6 645 Baro 20.5 tat Sp: Gravity(SO 844 Tentp: Tent Tent 1750 1958 0.6 0.02 0.02 0.02 1.97 1.75 1750 1958 0.68 0.03 5 2.04 1.74 1770 1924 0.8 0.03 5 2.04 1.74 1770 1924 0.8 0.03 4 2.04 1.74 1770 1924 0.8 0.03 4 2.04 1.74 1770 1924 0.8 0.02 5 2.03 1.7.4 1770 1924 0.8 0.03 4 2.04 1.74 1770 1928.60 1.026 1.055 2.03 1.7.4 1770 1928.60 0.0026 1.75 D.02 1.065 2.03 Stattor Treated	Test Portion:	Baseline	Stack Diam.	4	Inches			
Right present Type: School Bus D.9 /r 645 Bare 29.5 Start Sp. Greening (SG) .644 Tenty:: The: The Start Sp. Greening (SG) .644 Tenty:: The: Transmission Start Sp. Greening (SG) .640 0.02 2 0.01 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.92 0.8 0.03 5 2.04 1.7.6 1.7	Engine Type:	Navistar 7.3	Mile/Hrs	162729				
Tents 34 Tents Transmission Tents Tents Tents Tents	Equipment Type:	School Bus	ID #:	645		Baro	29.95	
RPM Exh Temp PV such CO IIC CO2 O2 1750 198. 0.8 0.02 2 1.94 17.8 1770 191.6 0.8 0.03 5 2.04 17.4 1770 192.2 0.8 0.03 5 2.04 17.4 1770 192.4 0.8 0.03 5 2.04 17.4 1770 192.4 0.8 0.03 4 2.04 17.6 1770 193.6 0.8 0.03 5 2.04 17.6 1770 193.2 0.8 0.02 5 2.03 17.4 1770 193.2 0.8 0.02 5 2.03 17.5 1766.000 192.860 .800 .026 4.300 2.022 17.540 Mcan 8.432740427 2.042 .000 .005 1.059 .066 .184 Std Dzv VHIC VFCO VFCO2 VFO2	Fuel Sp. Gravity(SG	.844	Temp:			Time:		
1750 198.2 0.8 0.02 2 1.94 178 1750 190.6 0.8 0.02 3 1.97 179 1770 192.4 0.8 0.03 5 2.04 17.4 1770 192.4 0.8 0.03 4 2.04 17.4 1770 192.4 0.8 0.03 4 2.04 17.6 1770 193.6 0.8 0.03 4 2.04 17.6 1770 193.6 0.8 0.02 5 2.03 17.4 1770 193.8 0.8 0.02 5 2.04 17.4 1770 192.0.8 0.00 1.059 0.36 1.84 5d Dev 1760.000 192.860 .800 .026 4.300 2.022 17.540 Mean 8.43270427 2.042 .000 .005 1.1659 0.366 1.84 5d Dev VFHC VFCO VFCO2 VFO2 </td <td>RPM</td> <td>Divisi kentin</td> <td>BRAINGIN</td> <td>CO</td> <td></td> <td></td> <td>02200</td> <td></td>	RPM	Divisi kentin	BRAINGIN	CO			02200	
1750 190.8 0.8 0.02 3 1.97 17.9 1770 191.6 0.8 0.03 5 2.04 17.4 1770 192.2 0.8 0.03 5 2.04 17.4 1770 192.8 0.8 0.03 5 2.04 17.4 1770 192.8 0.8 0.03 4 2.04 17.4 1770 193.2 0.8 0.03 4 2.04 17.4 1770 193.2 0.8 0.03 5 2.04 17.4 1770 193.2 0.8 0.03 5 2.04 17.4 1770 193.6 0.8 0.03 5 2.03 17.5 1770 192.400 3.026 4.300 2.021 17.5 0.336 1.84 Sid Dev VFRC VFCO VFCO2 VFO2 Mtw1 pf1 Pf1 4.30E-06 0.00026 .020 .175 29.025 315.840 594.459 Treated Suek Di	1750	198.2	0.8	0.02	2	1.94	17.8	
1770 191.6 0.8 0.03 5 2.04 17.4 1770 192.4 0.8 0.03 5 2.04 17.4 1770 192.8 0.8 0.03 5 2.04 17.6 1770 192.8 0.8 0.02 5 2.03 17.4 1770 193.2 0.8 0.02 5 2.03 17.4 1770 192.8.60 8.0.02 5 2.03 17.4 1770 192.8.60 .000 .026 4.300 2.05 17.5 1766.000 192.860 .000 .026 4.300 2.035 1.84 Sid Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 20.35 315,840 594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test of the Hermis: 169715 Equipment Type School Bus ID # 645 Baro: 29.93 <	1750	190.8	0.8	0.02	3	1.97	17.9	
1770 192.2 0.8 0.03 \$ 2.05 17.4 1770 192.8 0.8 0.03 4 2.04 17.4 1770 192.8 0.8 0.03 4 2.04 17.6 1770 192.8 0.8 0.02 \$ 2.03 17.4 1770 191.8 0.8 0.02 \$ 2.03 17.4 1770 192.860 .800 .026 4.300 2.022 17.5 1770 192.860 .800 .026 4.300 2.021 17.5 1770 192.860 .800 .026 4.300 2.022 17.5 1766.000 192.860 .800 .026 4.300 2.022 17.5 1766.000 192.860 .900 .905 1.059 .936 .184 Nd Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315.840 594.459 Company Name: Broward County Schools Lo	1770	191.6	0.8	0.03	5	2.04	17.4	
17/0 192.4 0.8 0.03 5 2.04 17.4 1770 193.6 0.8 0.03 4 2.04 17.6 1770 193.2 0.8 0.02 5 2.03 17.4 1770 193.2 0.8 0.02 5 2.04 17.4 1770 193.2 0.8 0.03 5 2.03 17.4 1770 193.2 0.8 0.03 5 2.03 17.4 1770 192.860 .800 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.059 .036 .184 Isd Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315.840 594.459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Contrain: Treated Stack Diam: 4 Inches Enginment Type School Bus	1770	192.2	0.8	0.03	5	2.05	17.4	
1710 1723 0.03 4 2.04 17.6 1770 193.2 0.8 0.02 3 2.03 17.4 1770 193.2 0.8 0.02 3 2.04 17.4 1770 192 0.8 0.03 5 2.03 17.4 1770 192 0.8 0.03 5 2.03 17.4 1770 192 0.8 0.03 5 2.03 17.5 1766.000 192.860 .900 .005 1.059 .036 .184 Sad Dev VFHC VFCO VFCO2 VFO2 Mtw1 pfl PF1 4.30E-06 0.00026 .020 .175 29.025 315,840 594,459 Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mtle/Hrs: 169715 169.8 29.93 Fuel Sp. Gravity: .330 Temp: 945 17.8 17.8 17.8	1770	192.4	0.8	0.03	5	2.04	17.4	
1770 1932 0.0 17.4 17.4 1770 191.8 0.8 0.02 \$ 2.04 17.4 1770 191.8 0.8 0.03 \$ 2.03 17.4 1770 192 0.8 0.03 \$ 2.04 17.4 1770 192 0.8 0.03 \$ 2.03 17.5 1766.000 192.860 .800 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.659 .0.56 .184 Sid Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315,840 594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Pyre: Navistar 7.3 Mile/Hrs: 169715 165 Daro: 29.93 Fuel Sp. Gravity: .830 </td <td>1770</td> <td>192.8</td> <td>0.8</td> <td>0.03</td> <td>4</td> <td>2.04</td> <td>17.6</td> <td></td>	1770	192.8	0.8	0.03	4	2.04	17.6	
1770 191.8 0.8 0.02 3 2.04 17.4 1770 192 0.8 0.03 3 2.04 17.4 1770 192 0.8 0.03 3 2.04 17.4 1770 192 0.8 0.03 3 2.05 17.5 1766.000 192.860 .500 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.059 .036 .184 3rd Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E.06 0.00026 .020 .175 29.025 315.840 594.459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 5 Equipment Type School Bus D #: 645 Baro: 29.93 Fiel Sp. Gravity: .530	1770	193.0	0.8	0.03	4	2.04	17.0	
1770 192 0.8 0.03 5 2.03 17.5 1766.000 192.860 .800 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.059 .036 .184 Std Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315.840 594.459 Company Name: Broward County Schools Zocation: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus D #: 645 Baro: 29.93 So Corr Factor: 1.017 Time: 945 945 17.8 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3 17.3	1770	191.8	0.8	0.02	5	2.03	17.4	
I766.000 192.860 .800 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.059 .036 .184 Std Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315,840 594,459 Broward County Schools Lacation: Twin Lakes, FL Test Date: 3/31/95 Broward County Schools Lacation: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus D #: 645 Baro: 29.93 SG Corr Factor: 1.017 Time: 945 Tr35 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 2.09 17.4	1770	192	0.8	0.03	5	2.03	17.5	
1766.000 192.860 .800 .026 4.300 2.022 17.540 Mean 8.432740427 2.042 .000 .005 1.059 .036 .184 Std Dev VFHC VFCO VFCO2 .020 .175 29.025 .315,840 .594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: .3/31/95 Test Portion: Treated Stack Diam: 4 Inches								
1000.000 192.800 .300 .020 4.300 2.022 17.840 Niean 8.432740427 2.042 .000 .005 1.059 .036 1.184 Sci Dev VFHC VFCO VFCO VFC2 Mtw1 pf1 PF1 4.30E-06 0.00026 .020 .175 29.025 315,840 594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp: SG Corr Factor: 1.017 Time: 945 Time: 945 RPM Exh Temp Pv. Inch CO HC CO2 O2 Int.8 1735 199.8 0.75 0.02 4 1.95 17.8 Int.2 1755	1766.000	103.840	800	026	4 200	2.022	17 540	
Occupant Description Description <thdescription< th=""> <thdescription< th=""> <t< td=""><td>1766.000 8 432740427</td><td>2 042</td><td>.800</td><td>.026</td><td>4.300</td><td>2.022</td><td>17.540</td><td>Mean Std Dov</td></t<></thdescription<></thdescription<>	1766.000 8 432740427	2 042	.800	.026	4.300	2.022	17.540	Mean Std Dov
VFHC 4.30E-06 VFCO 0.0026 VFCO .020 VFO2 .175 Mtw1 29.025 pf1 315,840 PF1 594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 29.93 Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: 830 Temp: 945 945 Mites 1.017 Time: 945 RPM Esh Temp Pv Inch CO HC CO2 O2 1735 199.8 0.75 0.02 4 1.95 17.8 1735 203.4 0.7 0.02 4 2.09 17.3 1755 203.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.4 1797 </td <td>0.432/4042/</td> <td>2.072</td> <td>.000</td> <td>.003</td> <td>1.039</td> <td>.030</td> <td>.104</td> <td>Sid Dev</td>	0.432/4042/	2.072	.000	.003	1.039	.030	.104	Sid Dev
A.30E-06 0.00026 .020 .175 29.025 315,840 594,459 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bas ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp: .945 RPM Exh Temp Pv Inch CO HC CO2 O2 .02 1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1735 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.09 17.4 1797 206.6 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 3 2.1 17.4 1797 206.	VFHC	VFCO	VFCO2	VFO2	Mtw1	nf1	PF1	
4.302-00 0.30020 1.020 1.13 29.023 313,040 394,439 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Sack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp:	4 20E 06	0.00026	020	175	20.025	215 840	504 450	
Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp:	Company Name:	Broward County Schools	Locanon:	Twin Lakes, FL		Test Date:	3/31/95	
Engine Type: Navistar 7.3 Mile/Hrs: 169715 Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp:	Test Portion:	Treated	Stack Diam:	4	Inches			
Equipment Type School Bus ID #: 645 Baro: 29.93 Fuel Sp. Gravity: .830 Temp: .945 SG Corr Factor: 1.017 Time: .945 RPM Exh Temp Pv Inch CO HC CO2 O2 1735 199.8 0.75 0.02 4 1.95 17.8 1735 203.4 0.7 0.02 4 2.09 17.4 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.09 17.4 1797 206.6 0.7 0.02 3 2.1 17.2 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02	Engine Type:	Navistar 7.3	Mile/Hrs:	169715				
Fuel Sp. Gravity: .830 Temp: 945 SG Corr Factor: 1.017 Time: 945 RPM Exh Temp Pv Inch CO HC CO2 O2 1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1735 203.4 0.7 0.02 2 0.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 3 2.1 17.4 1797 206.4 0.7 0.02 5 2.00 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02	Equipment Type	School Bus						
RPM Exh Temp Px Inch CO HC CO2 O2 1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1755 203.4 0.7 0.02 2 2.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 3 2.1 17.2 1797 206.6 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.061 17.422 1797 206.4 0.7 0.02 3.778 2.061 17.422	Fuel Sp. Gravity:		ID #:	645		Baro:	29.93	
RPM Exh Temp Pv Inch CO HC CO2 O2 1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1735 203.4 0.7 0.02 2 2.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 3.778 2.061 17.422	SG Corr Factor:	.830	ID #: Temp:	645		Baro:	29.93	
1735 199.8 0.75 0.02 4 1.95 17.8 1735 199.8 0.75 0.02 4 1.95 17.8 1755 203.4 0.7 0.02 2 2.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.2 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 3.778 2.061 17.422 1772.556 204.156 .711 .020 3.778 2.061 17.42		.830 1.017	ID #: Temp:	645		Baro: Time:	29.93 945	
1735 199.8 0.75 0.02 4 1.95 17.8 1755 203.4 0.7 0.02 2 2.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 3.778 2.061 17.422 1772.556 204.156 .711 .020 3.778 2.061 17.422	RPM	.830 1.017 Exh Temp	ID #: Temp: Pv Inch	645 CO	HC	Baro: Time:	29.93 945 O2	
1755 203.4 0.7 0.02 2 2.09 17.3 1755 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.2 1797 206.8 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 3.778 2.061 17.422 1772.556 204.156 .711 .020 3.778 2.061 17.422 27.34552574 2.832 .022 .000 .972 .064	RPM 1735	.830 1.017 Exh Temp 199.8	ID #: Temp: Pv Inch 0.75	645 CO 0.02	HC 4	Baro: Time: CO2 1.95	29.93 945 02 17.8	
1735 203.4 0.7 0.02 4 2.09 17.4 1785 204.4 0.7 0.02 4 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.2 1797 206.8 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev YFHC VFCO VFCO2 VFO	RPM 1735 1735	.830 1.017 Exh Temp 199.8 199.8	ID #: Temp: Pv Inch 0.75 0.75	645	HC 4 4	Baro: Time: CO2 1.95 1.95	29.93 945 02 17.8 17.8	
1.00 2.11 17.2 1797 206.6 0.7 0.02 3 2.1 17.2 1797 206.8 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 .7.	RPM 1735 1735 1755	.830 1.017 Exh Temp 199.8 199.8 203.4 203.4	ID #: Temp: Py Inch 0.75 0.75 0.75	645 CO 0.02 0.02 0.02	HC 4 4 2	Baro: Time: CO2 1.95 1.95 2.09 2.00	29.93 945 02 17.8 17.8 17.3 17.4	
1797 206.8 0.7 0.02 3 2.1 17.3 1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 204.156 .711 .020 3.778 2.061 17.422 Mean 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev 0.0002 <t< td=""><td>RPM 1735 1735 1755 1755 1785</td><td>.830 1.017 Exh Temp 199.8 199.8 203.4 203.4 203.4</td><td>ID #: Temp: Py Inch 0.75 0.75 0.75 0.7 0.7</td><td>645 CO 0.02 0.02 0.02 0.02 0.02 0.02</td><td>HC 4 4 2 4 4</td><td>Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11</td><td>29.93 945 02 17.8 17.8 17.3 17.4</td><td></td></t<>	RPM 1735 1735 1755 1755 1785	.830 1.017 Exh Temp 199.8 199.8 203.4 203.4 203.4	ID #: Temp: Py Inch 0.75 0.75 0.75 0.7 0.7	645 CO 0.02 0.02 0.02 0.02 0.02 0.02	HC 4 4 2 4 4	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11	29.93 945 02 17.8 17.8 17.3 17.4	
1797 206.8 0.7 0.02 5 2.09 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1797 206.4 0.7 0.02 5 2.07 17.4 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 3.78E-06 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: 636,149 **% Change PF = 7.01	RPM 1735 1735 1755 1755 1755 1785 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6	ID #: Temp: Pv Inch 0.75 0.75 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	HC 4 2 4 4 4 3	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.09 2.11 2.1	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2	
1797 206.4 0.7 0.02 5 2.07 17.4 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 3.78E-06 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: 636,149 **% Change PF = 7.01	RPM 1735 1735 1755 1755 1755 1785 1797 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6 206.8	ID #: Temp: Py Inch 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	HC 4 2 4 4 4 3 3	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.09 2.11 2.1 2.1	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3	
Image: Non-State in the image:	RPM 1735 1735 1755 1755 1755 1785 1797 1797 1797 1797 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6 206.8 206.8	ID #: Temp: Pv Inch 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.0	HC 4 4 2 4 4 2 4 4 3 3 3 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.09 2.11 2.1 2.1 2.09 2.09	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4	
1772.556 204.156 .711 .020 3.778 2.061 17.422 Mean 27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 3.78E-06 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: 636,149 **% Change PF = 7.01	RPM 1735 1735 1755 1755 1755 1785 1797 1797 1797 1797 1797 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.8	ID #: Temp: Py Inch 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	HC 4 2 4 4 3 3 3 5 5 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.09 2.11 2.1 2.1 2.1 2.0 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4	
27.34552574 2.832 .022 .000 .972 .064 .228 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 $3.78E-06$ 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: $636,149$ **% Change PF = 7.01	RPM 1735 1735 1755 1755 1755 1785 1797 1797 1797 1797 1797 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.8	ID #: Temp: Pv Inch 0.75 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.0	HC 4 4 2 4 4 3 3 3 5 5 5 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.11 2.11 2.11 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4	
VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 3.78E-06 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: 636,149 Image: Change PF = 1000 7.01	RPM 1735 1735 1755 1755 1755 1785 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.8 206.4	ID #: Temp: Pv Inch 0.75 0.75 0.75 0.77 0.7 0.7 0.7 0.7 0.7 0.7 0.	645	HC 4 4 4 4 3 3 5 5 5 5 3.778	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.11 2.11 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.3 17.4 17.4 17.4 17.4 17.4 2 17.422	
3.78E-06 0.0002 .021 .174 29.027 310,888 625,769 Performance factor adjusted for fuel density: 636,149 $[**\%$ Change PF = 7.01	RPM 1735 1735 1755 1755 1785 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797	.830 1.017 Exh Temp 199.8 199.8 203.4 203.4 204.4 204.4 206.6 206.8 206.8 206.4 206.4 206.4 206.4 206.4	ID #: Temp: Pv Inch 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.0	HC 4 4 2 4 4 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.1 2.1 2.09 2.07 2.07 2.07 2.061 .064	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4 17.4 17.4 2 17.422 .228	Mean Std Dev
Performance factor adjusted for fuel density: 636,149	RPM 1735 1735 1755 1755 1755 1785 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 1797 VFHC	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.4	ID #: Temp: Pv Inch 0.75 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.00 0.02 0.02 0.00 0.02 0.0	HC 4 4 4 4 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.11 2.11 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4 17.4 17.4 2 17.422 .228 PF2	Mean Std Dev
Performance factor adjusted for fuel density: 636,149	RPM 1735 1735 1755 1755 1755 1777 1797 <	.830 1.017 Exh Temp 199.8 203.4 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.8 206.4	ID #: Temp: Pv Inch 0.75 0.75 0.75 0.77 0.7 0.7 0.7 0.7 0.7 0.7 0.	645 CO 0.02 0.0	HC 4 4 4 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.11 2.11 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4 17.4 17.4 2 17.422 .228 PF2 625 760	Mean Std Dev
	RPM 1735 1735 1755 1755 1755 1777 1797 1707 1707 1707 1707 1707 1707 1707 <	.830 1.017 Exh Temp 199.8 199.8 203.4 203.4 203.4 204.4 206.6 206.8 206.8 206.8 206.4 	ID #: Temp: Pv Inch 0.75 0.75 0.75 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	645 CO 0.02 0.0	HC 4 4 4 3 3 5 5 5 3.778 .972 Mtw2 29.027	Baro: Time: CO2 1.95 1.95 2.09 2.09 2.11 2.11 2.11 2.09 2.07 	29.93 945 02 17.8 17.8 17.3 17.4 17.2 17.2 17.3 17.4 17.4 17.4 17.4 17.4 2 17.422 .228 PF2 625,769	Mean Std Dev

Company Name:	Broward County Schools	Location	Twin Lakes, FL		Date:	10/28/94	
Test Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Navistar DT 360	Mile/Hrs	66468				
Equipment Type:	School Bus	ID #:	302		Baro	29.95	
Fuel Sp. Gravity(SG	.840	Temp:			Time		
					Lunc.		
RPM	Exhiltemp	Ryanight	CO	HC	CO2	02	
1800	232	0.4	0.02	12	1.91	17.6	
1800	240.6	0.4	0.02	13	1.9	17.7	
1800	243.6	0.4	0.02	13	1.9	17.7	
1800	240	0.4	0.02	10	1.93	17.7	
1800	251.0	0.4	0.03	14	1.92	17.7	
1800	250.2	0.4	0.03	14	1.93	17.5	
1800	260.2	0.4	0.03	14	1.94	17.3	
1800	259.2	0.4	0.03	14	1.94	17.6	
1800	258.4	0.4	0.03	14	1.95	17.7	
1800.000	251.200	.400	.026	13.000	1.925	17.640	Mean
0	9.847	.000	.005	1.333	.017	.084	Std Dev
	TITCO	TIEGOA	VID00		04	-	
VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1	
1.30E-05	0.00026	.019	.176	29.014	330,452	918,045	
Fest Portion:	Treated	Stack Diam:	4	Inches			
Ingine Type:	Navistar DT 360	Mile/Hrs:	74801				
Equipment Type	School Bus	ID #:	302		Baro:	29.90	
and Sn Gravity.	826	Temn.					
G Corr Factor:	1.017	teng.			Time:	1250	
RPM	Exh Temp	Py Inch.	СО	НС	CO2	02	
1800	266.6	0.35	0.04	22	1.83	17.3	
1800	267.6	0.4	0.03	22	1.82	17.4	
1800	267.4	0.4	0.03	18	1.82	17.7	
1800	265.6	0.4	0.03	18	1.82	17.7	
1800	265.8	0.45	0.03		1.82	17.7	
1800	266.4	0.4	0.03	21	1.84	17.5	
1800	267.4	0.4	0.03	21	1.83	17.3	
1800.000	266.975	.400	.033	20.625	1.830	17.525	Mean
0	1.108	.027	.005	1.685	.012	.158	Std Dev
					100000		
VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2	
2.06E-05	0.000325	.018	.175	28.995	344,953	968,090	
				F			
erformance factor ad	ljusted for fuel density:		984,225	**% Ch	nange PF	=	7.21
VFHC 2.06E-05	VFCO 0.000325	VFCO2 .018	VFO2 .175	Mtw2 28.995	pf2 344,953	PF2 968,090	
Performance factor ac	ljusted for fuel density:		984,225	**% Cł	nange PF		7.21

Company Name: B	Froward County Schools	Location	Twin Lakes, FL		Date:	10/28/94	
Fest Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Cummins B Series	Mile/Hrs	46357				
Equipment Type:	School Bus	ID #:	310		Baro	29.95	
⁷ uel Sp. Gravity(SG	.844	Temp:			Time:		
DDM	Exh Torm		CO	8		(a)	
2700	259.8	0.8	0.0	4 10	1 9	17.7	
2700	266.8	0.8	0.0	4 10	1.91	17.6	
2700	274	0.9	0.0	4 10	1.83	17.9	
2700	271.4	0.9	0.0	4 10	1.83	17.9	
2700	270	0.8	0.0	$\frac{4}{4}$ 10	1.89	17.8	
2700	278.4	0.8	0.0	4 10	1.92	17.8	
2700.000	270.771	.829	.040	10.000	1.884	17.786	Mean
0	6.105	.049	.000	.000	.038	.107	Std Dev
	VFCO	VFCO2	VFO2	Mtw1 29.013	pf1 335 344	PF1	
VFHC 1.00E-05 Company Name: E	Broward County Schools	Location:	Twin Lakes, FL		Test Date:	3/31/95	
VFHC 1.00E-05 Company Name: E Test Portion:	Broward County Schools Treated	Location: Stack Diam:	Twin Lakes, FL	Inches	Test Date:	3/31/95	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type:	Broward County Schools Treated Cummins B Series	Location: Stack Diam: Mile/Hrs:	Twin Lakes, FL 4 57823	Inches	Test Date:	3/31/95	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type	Broward County Schools Treated Cummins B Series School Bus	Location: Stack Diam: Mile/Hrs: ID #:	Twin Lakes, FL 4 57823 310	Inches	Test Date: Baro:	3/31/95 29.90	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	Broward County Schools Treated Cummins B Series School Bus .824 1.024	Location: Stack Diam: Mile/Hrs: ID #: Temp:	Twin Lakes, FL 4 57823 310	Inches	Test Date: Baro: Time:	3/31/95 29.90 1318	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch	Twin Lakes, FL 4 57823 310 CO	Inches	Test Date: Baro: Time: CO2	3/31/95 29.90 1318 Q2	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9	Twin Lakes, FL 4 57823 310 CO 0.0	Inches HC 4 12	Test Date: Baro: Time: CO2 1.96	3/31/95 29.90 1318 Q2 17.2	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2700 2700 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.9 0.75	Twin Lakes, FL 4 57823 310 CO 0.0	Inches 4 4 4 4 4 4 4 4 4	Test Date: Baro: Time: CO2 1.96 1.96	3/31/95 29.90 1318 02 17.2 17.2	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2700 2700 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274 8	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9 0.75 0.75 0.75	Twin Lakes, FL 4 57823 310 CO 0.0 0.0	Inches HC 4 12 4 13 4 12 4 12	Test Date: Baro: Time: CO2 1.96 1.96 1.96	3/31/95 29.90 1318 02 17.2 17.2 17.2	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2700 2700 2700 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 274.8	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9 0.75 0.75 0.75 0.75	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Inches HC 4 12 4 13 4 12 4 12 4 10 4 10 4 10	Test Date: Baro: Time: CO2 1.96 1.96 1.96 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.2 17.3 17.2	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2700 2700 2700 2700 2700 2700 2700 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 275.6	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.9 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches In	Test Date: Baro: Time: CO2 1.96 1.96 1.96 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.2 17.3 17.2 17.3	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 274.8 275.6 272.8	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9 0.75 0.7	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches HC 4 12 4 12 4 12 4 12 4 13 4 12 4 13 4 13 4 13 4 13 4 13	Test Date: Baro: Time: CO2 1.96 1.96 1.96 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.3 17.2 17.3 17.4	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 274.8 275.6 272.8 273.4	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.9 0.75 0.7	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches HC 4 12 4 13 4 12 4 13 4 10 4 10	Test Date: Baro: Time: CO2 1.96 1.96 1.96 1.97 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.3 17.2 17.3 17.4 17.4	
VFHC 1.00E-05 Company Name: E Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 275.6 273.4	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.77 0.7 0.7 0.7 0.7 0.7 0.7	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches In	Test Date: Baro: Time: CO2 1.96 1.96 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.3 17.4 17.4 17.4 17.4 17.4	
VFHC 1.00E-05 Company Name: E Test Portion: E Engine Type: E Equipment Type E Fuel Sp. Gravity: SG Corr Factor: SG Corr Factor: 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700 2700	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 275.6 272.8 273.4 273.800 1.278	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.9 0.75 0.77 0.74 0.68	Twin Lakes, FL 4 57823 310 CCO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches In	Test Date: Baro: Time: CO2 1.96 1.96 1.97 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.3 17.2 17.3 17.4 17.4 17.4 17.4 17.275 .089	Mean Std Dev
VFHC 1.00E-05 Company Name: E Test Portion: E Engine Type: E Equipment Type E Fuel Sp. Gravity: SG Corr Factor: RPM 2700 2700 200 200 200 200 200 200	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 274.8 274.8 273.4 273.4 273.800 1.278	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.9 0.75 0.76 0.77 0.76 0.77 0.77 0.76 0.76 0.77 0.76 0.77 0.77 0.77 0.76 0.77 0.76 0.77 0.77 0.76 0.77 0.76 0.77 0.78 0.7	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches In	Test Date: Baro: Time: CO2 1.96 1.96 1.97 1.97 1.97 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.3 17.2 17.3 17.4 17.4 17.4 17.4 17.4 17.275 .089	Mean Std Dev
VFHC 1.00E-05 Company Name: E Test Portion: E Engine Type: E Equipment Type E Fuel Sp. Gravity: SG Corr Factor: 2700 2700 2700 200 200 200 200 200 200<	Broward County Schools Treated Cummins B Series School Bus .824 1.024 Exh Temp 271.6 273.4 274.8 274.8 274.8 274.8 273.4 273.4 VFCO 0.0004	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.9 0.75 0.76 0.77 0.76 0.76 0.76 0.77 0.76 0.76 0.76 0.76 0.76 0.76 0.77 0.77 0.76 0.76 0.77 0.76 0.77 0.76 0.76 0.77 0.77 0.76 0.77 0.76 0.77 0.76 0.77 0.77 0.76 0.77 0.76 0.77 0.77 0.77 0.76 0.77 0.77 0.77 0.76 0.77 0.77 0.76 0.77 0.77 0.77 0.77 0.76 0.77 0.77 0.77 0.77 0.76 0.77 0.76 0.77 0.77 0.77 0.77 0.77 0.77 0.77 0.77 0.77 0.77 0.76 0.77 0.77 0.77 0.76 0.77 0.76 0.7	Twin Lakes, FL 4 57823 310 CO 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Inches In	Test Date: Baro: Time: CO2 1.96 1.96 1.97 1.97 1.97 1.97 1.97 1.97 1.97 1.97	3/31/95 29.90 1318 02 17.2 17.2 17.3 17.2 17.3 17.4 17.4 17.4 17.4 17.4 17.4 17.2 17.2 17.3 17.2 17.3 17.4 17.4 17.4 17.4 17.4 17.4 17.4 17.4	Mean Std Dev

Tert Portfor: Baseline Nark Dateri, 4 Index Stagine Dyper, Narkatar DT 300 Mile/HTri Baseline All Baseline 20.5 Stagine of Dyper, School Bus DP, Markatar DT 300 Term Deres 20.5 Stagine of Dyper, School Bus DP, Markatar Term Deres 20.5 Nard Sp. Ormstry SD .30 Term Term Term Term Nard Sp. Ormstry SD .30 CO 0.2 1.77 1.79 1.79 1800 .255 0.5 0.02 1.71 1.79 1.79 1.79 1800 .255 0.5 0.02 1.71 1.78 1.79 1.79 1800 .255 0.5 0.02 1.71 1.78 1.78 1.79 1.79 1800 .256 0.5 0.02 1.71 1.78 1.78 1.79 1800 .256 0.5 0.02 1.78 7.887 Meen 1800 .256 .05 .002 1.78 7.887 Meen			2022/2022/2022/2022/2022	, ,		Dutt	10/28/94	
Single Type: Navisur DT 30 Mille/Mrs. Single Type: School Ba D.2 A1 Bare 20.5 Sub Sp. Greenity(SG 30 Term: Term: Term: The Sp. Greenity(SG 30 Term: Term: Term: The Sp. Greenity(SG 30 Term: Term: The Sp. Greenity(SG 30 Term: Term: The Sp. Greenity(SG 30 Term: Term: The Sp. Greenity Sc. Sp. Gr	est Portion:	Baseline	Stack Diam.	4	Inches			
Segurine 1.7996 School Bu D.8 A1 Jame 29.5 tud Sp. Genoity(SC 3.0 Temp: Tem Tem The Sp. Genoity(SC S.0 0.02 1.1 T.7 Total The Sp. Genoity School 255 0.5 0.02 1.1 Tem Tem The Sp. Genoity School 254.6 0.5 0.02 1.1 Tem Tem The Sp. Genoity School 201 1.3.11 1.78 17.86 Tem The Sp. Genoity School 201 1.13 1.178 17.86 Maine The Sp. Genoity School 201 1.13 1.178 1.180 1.180 1.180 The Sthe Temp:	Engine Type:	Navistar DT 360	Mile/Hrs					
	Equipment Type:	School Bus	ID #:	471		Baro	29.95	
RPM Exh Temp PV fach CO HC CO2 02 1800 217.8 0.5 0.02 12 1.77 17.9 1800 255.6 0.5 0.02 15 1.79 17.9 1800 255.6 0.5 0.02 13 1.77 17.9 1800 254.8 0.5 0.02 13 1.77 17.9 1800 254.6 0.5 0.02 14 1.78 17.8 1800 254.6 0.5 0.02 14 1.78 17.9 1800 254.6 0.5 0.02 14 1.78 17.9 1800 254.6 0.5 0.02 13.111 1.782 17.9 1800 250.600 .500 .020 13.111 1.782 1.79 1800 250.600 .500 .020 13.111 1.782 1.7567 11800 26.002 .018 .179 29.001 357	Fuel Sp. Gravity(SG	.830	Temp:			Time:		
1800 217.8 0.5 0.02 12 1.77 17.9 1800 225.6 0.5 0.62 14 1.77 17.9 1800 255.8 0.5 0.02 13 1.77 17.9 1800 255.8 0.5 0.02 13 1.78 17.9 1800 255.4 0.5 0.02 13 1.78 17.8 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 14 1.78 17.7 1800 250.600 500 .002 13 1.78 17.8 1800.000 250.600 500 .020 13.11 1.78 17.8 1.179 2.001 357,423 887.767 1.31E4 .008 .087 VFHC VFCO VFCO2 VFO2 Mtw1 pf1	RPM	Exh Temp	Pylinch	CO	HC	002	02	
1800 222 0.5 0.02 14 1.79 17.8 1800 255 0.5 0.02 15 1.79 17.8 1800 255.4 0.5 0.02 13 1.77 17.9 1800 255.4 0.5 0.02 12 1.77 17.9 1800 254.6 0.5 0.02 12 1.78 17.8 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 13 11 1.78 17.8 1800 256.600 .000 1.054 .005 .087 Nd Dev VFHC VFCO VFCO2 VFO2 Mtwl pf1 <td>1800</td> <td>217.8</td> <td>0.5</td> <td>0</td> <td>.02</td> <td>12 1.77</td> <td>17.9</td> <td></td>	1800	217.8	0.5	0	.02	12 1.77	17.9	
1800 25.8 0.5 0.02 15 1.79 17.8 1800 25.6 0.5 0.02 13 1.77 17.9 1800 25.6 0.5 0.02 12 1.79 18 1800 25.6 0.5 0.02 12 1.79 18 1800 25.4 0.5 0.02 14 1.78 17.78 1800 25.4 0.5 0.02 14 1.79 17.9 1800 25.6.00 .500 0.02 14 1.79 17.9 1800 25.6.00 .500 .020 13.111 1.782 17.867 1800.000 250.600 .500 .020 13.111 1.782 17.867 1.31E-05 0.002 .018 .179 29.001 357,423 887,67 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31.95 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31.95 Conter Signe Type:	1800	252.6	0.5	0	.02	14 1.79	17.9	
1800 255 0.5 0.02 13 1.78 17.9 1800 254.8 0.5 0.02 13 1.77 17.9 1800 254.6 0.5 0.02 14 1.78 17.8 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 12 1.79 17.9 1800 256.600 .500 .020 13.111 1.78 17.86 1800.000 250.600 .500 .020 13.5111 1.78 17.86 131E.05 0.002 .018 .179 29.001 357,423 887,767 Campany Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Ferder Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/Hrs: 229.93 1215 <	1800	255.8	0.5	0	.02	15 1.79	17.8	
1800 254.8 0.5 0.02 13 1.77 17.9 1800 254.6 0.5 0.02 12 1.78 17.7 1800 254.6 0.5 0.02 12 1.78 17.7 1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 12 1.79 17.9 1800 250.600 .500 .020 13.111 1.78 17.87 1800.000 250.600 .500 .020 1.054 .008 .087 131E.05 0.0002 .018 .179 29.01 357,423 .87,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test of Stack Diam: 4 Inches Engine Type School Bus ID # .471 Baro: 29.93 Euclipment Type School Bus ID # .471 Baro: 1215 RPM Exh Temp Pr Inch CO HC CO2 O2<	1800	255	0.5	0	.02	13 1.78	17.9	
1800 255.4 0.5 0.02 12 1.79 18 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 12 1.79 17.9 1800 250.600 .500 0.02 13.111 1.78 17.6 1800.000 250.600 .500 .020 13.111 1.782 17.867 Mean 1 1.31E-05 0.0002 .018 .179 29.001 357.423 887.767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Treated Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/IIre: 229.69 12 1.77 12.5 SG Corr Factor: 1.005 Time: 1215 1215 12.6 12 1.77 1.7 18	1800	254.8	0.5	0	.02	13 1.77	17.9	
1800 254.6 0.5 0.02 13 1.7.8 17.8 1800 254.6 0.5 0.02 14 1.7.8 17.7 1800 254.6 0.5 0.02 12 1.7.9 17.3 1800 254.6 0.5 0.02 12 1.7.9 17.3 1800.000 250.600 .500 .020 13.111 1.7.82 17.867 Mean 0 12.332 .000 .000 1.054 .008 .087 Nd Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 .9F1 Company Name: Broward County Schools Löcation: Twin Lakes, FL Test Date: 3/31/95 Equipment Type School Bus D#: .471 Baro: 29.93 Equipment Type School Bus D#: .471 Baro: 29.93 Exh Temp Pv Inch CO QQ 17 17.7 1800 264.2 0.45 0.02 17 1.7	1800	255.4	0.5	0	.02	12 1.79	18	
1800 254.8 0.5 0.02 14 1.78 17.7 1800 254.6 0.5 0.02 12 1.79 17.3 1800 254.6 0.02 12 1.79 17.3 1800 250.600 .500 0.02 13.111 1.782 17.867 Mean 0 12.332 .000 .000 1.054 .008 .087 Sid Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 1.31E-05 0.0002 .018 .179 29.001 357.423 887.767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Texted Stack Diam: 4 Inches Engineeit Type School Bus ID #: .471 Baro: 29.93 Faul Sp. Gravity: .826 Temp: School Bus ID #: 11 1.72 17.7 1800 .264.2 0.45 0.02 17 1.71 17.7 1800 .265.2 <td>1800</td> <td>254.6</td> <td>0.5</td> <td>0</td> <td>.02</td> <td>13 1.78</td> <td>17.8</td> <td></td>	1800	254.6	0.5	0	.02	13 1.78	17.8	
1800 254.6 0.5 0.02 12 1.79 17.9 1800 254.6 0.5 0.02 12 1.79 17.9 1800.000 250.600 .500 0.020 13.111 1.782 17.867 Mean 0 12.332 000 .000 1.054 0.87 Sid Dev VFHC VFCO VFCO2 0.18 .179 29.001 357,423 887,767 Company Name: Broward County Schools Löcation: Twin Lakes, FL Test Date: 3/31/95 Feed Partion: Treated Stäck Diam: 4 Inches 1215 Equipment Type: Navistar DT 360 Mile/Hrs: 229.93 1215 17.7 1800 264.2 0.45 0.02 17 1.7.7 17.7 1800 264.2 0.45 0.02 17 1.7.7 17.7 1800 260.2 0.45 0.02 17 1.7.1 17.7 1800 260.2	1800	254.8	0.5	0	.02	14 1.78	17.7	
Ison.000 250.600 .500 .020 13.111 1.782 17.867 Mean 0 12.332 .000 .000 1.054 .008 .087 Std Dev VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 1.31E-05 0.0002 .018 .179 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Partion: Treated Stack Diam: 4 Inches 1215 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 RPM Exh Temp Pv inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 260.2 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17	1800	254.6	0.5	0	.02	12 1.79	17.9	
1800.000 250.600 .500 .020 13.111 1.782 17.867 Mean 0 12.332 .000 .000 1.054 .008 .087 Std Dev VFHC VFCO VFCO2 .018 .179 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 178 Engine Type: Navistar DT 360 Mile/IIrs: 22969 29.93 29.93 Fuel Sp. Gravity: .826 Temp: 1215 17.7 1215 RPM Exh Temp Pv Inch CO HC CO 29.93 SG Corr Factor: 1.005 Time: 1215 17.7 17.7 1800 264.2 0.45 0.02 17 1.7.7 1800 260.9 0.4 0.02 17 1.7.1 1800 260.9 0.4 0.02		5						
0 12.332 .000 .000 1.054 .008 .087 Std Dev VFHC VFCO VFCO VFCO2 VFO2 Mtw1 pf1 PF1 1.31E-05 0.0002 .018 .179 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 3/31/95 Equipment Type: Navistar DT 360 Mile/IIrs: 22969 29.93 1215 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 260.9 0.45 0.02 17 1.71 17.8 1800 260.0 0.45 0.02	1800.000	250.600	.500	.020	13.111	1.782	17.867	Mean
VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 1.31E-05 0.0002 .018 .179 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Treated Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/IIrs: 22969 29.93 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 5 1215 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 260.9 0.45 0.02 17 1.71 17.8 1800 260.0 0.45 0.02 17 1.71 17.7 1800 260.0 0.45 0.02 17 1.71 17.8 1800 260.4 0.45 0.02 17 1.71 17.8	0	12.332	.000	.000	1.054	.008	.087	Std Dev
VFHC VFCO VFCO2 VFO2 Mtw1 pf1 PF1 1.31E-05 0.0002 0.18 1.79 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches 3/31/95 Equipment Type: Navistar DT 360 Mtle/IIrs: 22969 29.93 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 1215 RPM Exh Temp Pv Inch CO HC CO2 Q2 1800 264.2 0.45 0.02 17 1.77 17.7 1800 260.9 0.4 0.02 17 1.77 17.8 1800 260.2 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17 1.72 17.8 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								
1.31E-05 0.0002 .018 .179 29.001 357,423 887,767 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/IIrs: 22969 Equipment Type School Bus D#: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 Time: 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.77 17.7 1800 2651 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.445 0.02 17 1.71 17.6 1800 260.4 0.45 0.02 17 1.72 17.7 1	VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1	
Linkon 0.0002 .013 .113 .113 25.001 351,423 687,107 Company Name: Broward County Schools Location: Twin Lakes, FL Test Date: 3/31/95 Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/IIrs: 22969 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 261 0.45 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.72 17.8 1800	1 31E 05	0.0002	018	170	20.001	257 122	 007 767	
Test Portion: Treated Stack Diam: 4 Inches Engine Type: Navistar DT 360 Mile/IIrs: 22969 Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.71 17.6 1800 260.9 0.45 0.02 17 1.72 17.7 1800 260.9 0.45 0.02 17 1.71 17.6 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 261.213 .444 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								
Engine Type: Navistar DT 360 Mile/Hrs: 22969 Equipment Type School Bus D #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: .1005 Time: 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800.000 </th <th>Company Name:</th> <th>Broward County Schools</th> <th>Location:</th> <th>Twin Lakes, FL</th> <th></th> <th>Test Date:</th> <th>3/31/95</th> <th></th>	Company Name:	Broward County Schools	Location:	Twin Lakes, FL		Test Date:	3/31/95	
Equipment Type School Bus ID #: 471 Baro: 29.93 Fuel Sp. Gravity: .826 Temp: 1215 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725	Company Name: Fest Portion:	Broward County Schools Treated	Location: Stack Diam:	Twin Lakes, FL 4	Inches	Test Date:	3/31/95	
Fuel Sp. Gravity: .826 Temp: 1.005 Time: 1215 SG Corr Factor: 1.005 Time: 1215 RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 2661 0.45 0.02 17 1.71 17.7 1800 269.2 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.7 1800 261.213 .444 .020 17.000 1.716 17.725 Mean	Company Name: Fest Portion: Engine Type:	Broward County Schools Treated Navistar DT 360	Location: Stack Diam: Mile/Hrs:	Twin Lakes, FL 4 22969	Inches	Test Date:	3/31/95	
RPM Exh Temp Pv Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 261 0.45 0.02 17 1.71 17.7 1800 259.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000	Company Name: Fest Portion: Engine Type: Equipment Type	Broward County Schools Treated Navistar DT 360 School Bus	Location: Stack Diam: Mile/Hrs: ID #:	Twin Lakes, FL 4 22969 471	Inches	Test Date: Baro:	3/31/95 29.93	
RPM Exh Temp PV Inch CO HC CO2 O2 1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 261 0.45 0.02 17 1.71 17.7 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.71 17.8 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.7 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: EG Corr Factor:	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005	Location: Stack Diam: Mile/Hrs: ID #: Temp:	Twin Lakes, FL 4 22969 471	Inches	Test Date: Baro: Time:	3/31/95 29.93 1215	
1800 264.2 0.45 0.02 17 1.72 17.7 1800 264.2 0.45 0.02 17 1.72 17.7 1800 261 0.45 0.02 17 1.71 17.7 1800 261 0.45 0.02 17 1.71 17.7 1800 259.2 0.45 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005	Location: Stack Diam: Mile/Hrs: ID #: Temp:	Twin Lakes, FL 4 22969 471	Inches	Test Date: Baro: Time:	3/31/95 29.93 1215	
1800 264.2 0.45 0.02 17 1.72 17.7 1800 261 0.45 0.02 17 1.71 17.7 1800 259.2 0.45 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev .017 .177 28.985	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: EG Corr Factor: RPM	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch	Twin Lakes, FL 4 22969 471	Inches	Test Date: Baro: Time: CO2	3/31/95 29.93 1215 O2	
1800 261 0.45 0.02 17 1.71 17.7 1800 259.2 0.45 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev Performance factor adjusted for fuel density: 987,727 Mtw2 pf2 PF2 11.26	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: EG Corr Factor: RPM 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45	Twin Lakes, FL 4 22969 471 • • • • • • • • • • • • • • • • • • •	Inches	Test Date: Baro: Time: CO2 17 1.72	3/31/95 29.93 1215 O2 17.7	
1800 259.2 0.45 0.02 17 1.71 17.8 1800 260.9 0.4 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev Performance factor adjusted for fuel density: 987,727 987,727 **% Change PF = 11.26	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: EG Corr Factor: RPM 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0	Inches .02 .02	Test Date: Baro: Time: CO2 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7	
1800 260.9 0.4 0.02 17 1.71 17.6 1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 .28.985 370,205 982,990	Company Name: Vest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0	Inches In	Test Date: Baro: Time: 17 1.72 17 1.72 17 1.71	3/31/95 29.93 1215 O2 17.7 17.7 17.7	
1800 260.2 0.45 0.02 17 1.72 17.8 1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 261.213 .444 .020 17.000 1.716 17.725 Mean 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990	Company Name: Pest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0	Inches HIC .02 .02 .02 .02 .02	Test Date: Baro: Time: 17 1.72 17 1.71 17 1.71	3/31/95 29.93 1215 O2 17.7 17.7 17.7 17.8	
1800 260.4 0.45 0.02 17 1.72 17.7 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 259.6 0.45 0.02 17 1.72 17.8 1800 17 1.72 17.8 17.8 17.8 1800.000 261.213 .444 .020 17.000 1.716 17.725 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 1800.000 261.213 .444 .020 17.000 1.015 100 1.005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990 Performance factor adjusted for fuel density: 987,727 **% Change PF = 11.26	Company Name: Pest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 264.2 264.2 264.2 264.2 264.2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches HC .02 .02 .02 .02 .02 .02 .02 .02	Test Date: Baro: Time: 7 1.72 17 1.72 17 1.71 17 1.71 17 1.71	3/31/95 29.93 1215 O2 17.7 17.7 17.7 17.8 17.6	
1800 259.6 0.45 0.02 17 1.72 17.8 1800 17 1.72 17.8 17.8 17.8 1800 17 1.72 17.8 17.8 1800 17 1.72 17.8 17.8 1800.000 261.213 .444 .020 17.000 1.716 17.725 1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 1800.000 261.213 .444 .020 17.000 1.015 1000 .005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990 Performance factor adjusted for fuel density: 987,727 **% Change PF = 11.26	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 261.2 259.2 260.9 260.9	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches HC .02 .02 .02 .02 .02 .02 .02 .02	Test Date: Baro: Time: 17 1.72 17 1.71 17 1.71 17 1.71 17 1.71	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8	
1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches HC .02 .02 .02 .02 .02 .02 .02 .02	Test Date: Baro: Time: 711 1.72 17 1.72 17 1.71 17 1.71 17 1.71 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.6 17.8	
1800.000 261.213 .444 .020 17.000 1.716 17.725 Mean 0 1.939 .018 .000 .000 .005 .071 Std Dev VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990	Company Name: Pest Portion: Engine Type: Equipment Type Ge Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 261.2 259.2 260.9 260.2 260.4 259.6	Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches In	Test Date: Baro: Time: 77 1.72 17 1.72 17 1.71 17 1.71 17 1.71 17 1.72 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.6 17.8	
VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990	Company Name: Fest Portion: Engine Type: Equipment Type Get Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 266.2 260.9 260.9 260.2 260.4 259.6	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches In	Test Date: Baro: Time: 77 1.72 17 1.72 17 1.71 17 1.71 17 1.72 17 1.72 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.7 17.8 17.6 17.8 17.7	
VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 266.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches In	Test Date: Baro: Time: 7 1.72 7 1.72 7 1.71 17 1.71 17 1.71 17 1.72 17 1.72 17 1.72 17 1.72 17 1.72 17 1.72 17 1.72 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.7 17.8	
VFHC VFCO VFCO2 VFO2 Mtw2 pf2 PF2 1.70E-05 0.0002 .017 .177 28.985 370,205 982,990 Performance factor adjusted for fuel density: 987,727 Image: Marco of the sector of the sect	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 180 18	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches Inches Inches Inches	Test Date: Baro: Time: T	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.7 17.8 17.7 17.8	Mean Std Dev
VILL VICO	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 180 18	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 264.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches Inches HC .02 .02 .02 .02 .02 .02 .02 .02 .02 .0	Test Date: Baro: Time: T	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8	Mean Std Dev
Performance factor adjusted for fuel density: $987,727$ **% Change PF = 11.26	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 180 18	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches HC .02 .02 .02 .02 .02 .02 .02 .02 .02 .02	Test Date: Baro: Time: T	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.7	Mean Std Dev
Performance factor adjusted for fuel density: 987,727	Company Name: Fest Portion: Singine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 180 18	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 261.2 260.9 260.2 260.4 259.6 260.4 259.6 260.4 259.6 260.4 259.6 260.4 259.6 260.4 259.6 260.2 260.4 259.6 260.2 260.4 259.6 260.2 260.4 259.6 260.2 260.4 259.6 260.2 260.4 259.6 260.4 250.6 260.4 250.6 260.4 250.6 260.4 260.4 250.6 260.4 2	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches HC .02 .02 .02 .02 .02 .02 .02 .02 .02 .02	Test Date: Baro: Time: Time: CO2 17 1.72 17 1.72 17 1.71 17 1.71 17 1.72 17 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.7	Mean Std Dev
Performance factor adjusted for fuel density: 987,727 **% Change PF = 11.26	Company Name: Fest Portion: Singine Type: Squipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 0 VFHC 1.70E-05	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 264.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches Inches Inches Inches Inches Inches Inch	Test Date: Baro: Time: 77 1.72 77 1.72 77 1.72 77 1.71 77 1.71 77 1.72 77 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.6 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.7	Mean Std Dev
	Company Name: Fest Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1	Broward County Schools Treated Navistar DT 360 School Bus .826 1.005 Exh Temp 264.2 264.2 264.2 264.2 260.9 260.2 260.4 259.6 	Location: Stack Diam: Mile/Hrs: ID #: Temp: Py Inch 0.45 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.	Twin Lakes, FL 4 22969 471 CO 0 0 0 0 0 0 0 0 0 0 0 0 0	Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches Inches	Test Date: Baro: Time: 777 1.72 77 1.72 77 1.72 77 1.72 77 1.72 77 1.71 77 1.72 77 1.72	3/31/95 29.93 1215 O2 17.7 17.7 17.8 17.6 17.8 17.6 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.8 17.7 17.7	Mean Std Dev

Company Name: 1	Broward County Schools	Location	Twin Lakes, FL			Date:	10/28/94	
Test Portion:	Baseline	Stack Diam.	4	J	Inches			
Engine Type:	Navistar DT 360	Mile/Hrs	11039					
Equipment Type:	School Bus	ID #:	488			Baro	29.95	
Fuel Sp. Gravity(SG	.845	Temp:				Time:		
RPM	Exh Temn		C0		116		69	
1800	229.6	0.4	0.	.02	10	1.74	17.8	
1800	235.4	0.4	0.	.02	12	1.73	17.8	
1800	240.2	0.4	0.	.02	13	1.74	17.9	
1800	242.8	0.4	0.	.02	12	1.85	17.7	
1800	244.2	0.4	0.	.02	13	1.85	17.7	
1800	245.6	0.4	0.	.02	12	1.8/	17.6	
1800	247.2	0.4	0.	02	13	1.8	17.8	
1800	248.4	0.4	0.	.02	12	1.89	17.8	
1800	249.4	0.4	0.	.02	12	1.88	17.8	
1800.000	243.120	.400	.020	+	12.200	1.817	17,770	Mean
0	6.413	.000	.000		.919	.061	.082	Std Dev
		a						
VFHC	VFCO	VFCO2	VFO2		Mtw1	pf1	PF1	
1.22E-05	0.0002	.018	.178		29.002	350,818	969,071	
Test Portion:	Treated	Stack Diam:	4]	Inches		5151175	
Engine Type:	Navistar DT 360	Mile/Hrs:	21464					
Equipment Type	School Bus	ID #:	488			Baro:	29.93	
Fuel Sp. Gravity:	.828	Temp:						
SG Corr Factor:	1.020					Time:		
RPM	Exh Temp	Py Inch	CO		HC	CO2	02	
1800	251.8	0.35	0.	.02	19	1.74	17.9	
1800	252.4	0.35	0.	.02	19	1.73	17.9	
1800	252.4	0.4	0.	.02	21	1.74	17.9	
1800	253	0.4	0.	.02	21	1.76	17.8	
1800	254.6	0.4	0.	02	18	1.79	17.8	
1800	255.4	0.4	0.	.02	18	1.79	17.8	
1800	233.4	0.4	0.	.02	10	1.19	17.0	
								0
1800.000	253.571	.386	.020		19.143	1.763	17.843	Mean
0	1.525	.024	.000		1.345	.027	.053	Std Dev
VEILO	VECO	VECO	VEA3		M+?	n £ 7	DEO	
VTHU	VFCU	VrcO2	VFU2			p12	rr2	
1.91E-05	0.0002	.018	.178		28.997	360,463	1,021,153	
				ſ	****~~~~~			a 40
Performance factor ad	justed for fuel density:		1.041.697		**% Ch	ange PF	=	7.49

Company Name: Test Portion:	Broward County Schools Baseline	Location Stack Diam.	Twin Lakes, FL 4	Inches	Date:	10/28/94	
Engine Type:	Cummins B	Mile/Hrs	30375				
Equipment Type:	School Bus	ID #:	350		Baro	29.95	
Fuel Sp. Gravity(SG	.843	Temp:			Time:		
RPM	Exh Temp	Py Inch	CO	HC	CO2	02	
1800	241.2	0.5	0.04	12	1.6	17.9	
1800	244	0.5	0.04	13	1.59	17.9	
1800	244.8	0.5	0.04	12	1.52	18.1	
1800	250.8	0.5	0.04	12	1.5	18.1	
1800	250.4	0.5	0.04	10	1.79	17.9	
1800	250.4	0.5	0.04	12	1.66	18.1	
1800	251.2	0.5	0.04	14	1.65	18	
1800	250.8	0.5	0.04	14	1.64	17.9	~
1800	250.2	0.5	0.04	10	1.03	17.9	
1800	230	0.5	0.04	10	1.70	17.7	
		· ·					
1800.000	248.380	.500	.040	11.900	1.634	17.950	Mean
1800.000 0	248.380 3.610	.500	.040	11.900 1.524	1.634 .091	17.950 .127	Mean Std Dev
1800.000 0 VFHC 1.19E-05	248.380 3.610 VFCO 0.0004	.500 .000 VFCO2 .016	.040 .000 VFO2 .180	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569	17.950 .127 PF1 953,701	Mean Std Dev
1800.000 0 VFHC 1.19E-05	248.380 3.610 VFCO 0.0004 Broward County Schools	.500 .000 VFCO2 .016	.040 .000 VFO2 .180 Twin Lakes, FL	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569 Test Date:	17.950 .127 PF1 953,701 3/31/95	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion:	248.380 3.610 VFCO 0.0004 Broward County Schools Treated	.500 .000 VFCO2 .016 Location: Stack Diam:	.040 .000 VFO2 .180 Twin Lakes, FL	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569 Test Date:	17.950 .127 PF1 953,701 3/31/95	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type:	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs:	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569 Test Date:	17.950 .127 PF1 953,701 3/31/95	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #:	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569 Test Date: Baro:	17.950 .127 PF1 953,701 3/31/95 29.93	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus .824 1.023	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #: Temp:	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350	11.900 1.524 Mtw1 28.980	1.634 .091 pf1 384,569 Test Date: Baro: Time:	17.950 .127 PF1 953,701 3/31/95 29.93	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus .824 1.023 Exh Temp	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350	11.900 1.524 Mtw1 28.980 Inches	1.634 .091 pf1 384,569 Test Date: Baro: Time:	17.950 .127 PF1 953,701 3/31/95 29.93	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1815	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus .824 1.023 Exh Temp 252.4	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350 CO	11.900 1.524 Mtw1 28.980 Inches HC	1.634 .091 pf1 384,569 Test Date: Baro: Time: CO2 1.69	17.950 .127 PF1 953,701 3/31/95 29.93 02 17.5	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1815 1810	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus .824 1.023 Exh Temp 252.4 253.2	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350 CO 0.04 0.04	11.900 1.524 Mtw1 28.980 Inches HC 17 17	1.634 .091 pf1 384,569 Test Date: Baro: Time: CO2 1.69 1.69	17.950 .127 PF1 953,701 3/31/95 29.93 29.93 02 17.5 17.5	Mean Std Dev
1800.000 0 VFHC 1.19E-05 Company Name: Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1815 1810 1810	248.380 3.610 VFCO 0.0004 Broward County Schools Treated Cummins B School Bus .824 1.023 Exh Temp 252.4 253.2 254.4	.500 .000 VFCO2 .016 Location: Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4	.040 .000 VFO2 .180 Twin Lakes, FL 4 38248 350 CO 0.04 0.04 0.04	11.900 1.524 Mtw1 28.980 Inches HC 17 17 14	1.634 .091 pf1 384,569 Test Date: Baro: Time: CO2 1.69 1.69 1.69	17.950 .127 PF1 953,701 3/31/95 29.93 29.93 02 17.5 17.5 17.8	Mean Std Dev

256

254.6

255.4

255.4

0.45

0.45

0.4

0.4

.425

.027

VFCO2

.017

1800

1800

1800

1805.000

6.454972244

VFHC

1.45E-05

Performance factor adjusted for fuel density:

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

254.425

1.207

VFCO

0.0004

Twin Lakes, FL

0.04

0.04

0.04

0.04

.040

.000

VFO2

.177

1,022,222

12

12

15

15

14.500

1.927

Mtw2

28.978

1.72

1.72

1.69

1.69

1.698

.014

pf2

370,201

**% Change PF=

17.7

17.7

17.6

17.5

Mean

Std Dev

7.18

17.650

.151

PF2

999,691

Test Portion:	Baseline	Stack Diam.	4	Inches			
Engine Type:	Navistar DT 360	Mile/Hrs	11772				
Equipment Type:	School Bus	ID #:	486		Baro	29.95	
Fuel Sp. Gravity(SG	.840	Temp:			Time:		

		888.d8	66	- FLC	0000/2000	02	
1800	242.6	0.5	0.02	10	1.84	17.6	
1800	254.2	0.5	0.02	10	1.82	17.5	
1800	257	0.5	0.02	10	1.74	18	
1800	262.6	0.5	0.02	12	1.72	17.9	
1800	263.4	0.5	0.02	12	1.81	17.9	-
1800	264	0.5	0.02	12	1.81	17.8	
1800	264.6	0.5	0.02	10	1.81	17.9	
1800	265.6	0.5	0.02	10	1.86	17.8	
1800	267	0.5	0.02	10	1.86	17.8	
1800	267	0.5	0.02	10	1.78	17.9	
1800.000	260.800	.500	.020	10.600	1.805	17.810	Mean
0	7.629	.000	.000	.966	.047	.152	Std Dev
VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1	
1.06E-05	0.0002	.018	.178	29.002	353,307	883,821	
Test Portion:	Treated	Stack Diam:	4	Inches			
Test Portion: Engine Type:	Treated Navistar DT 360	Stack Diam: Mile/Hrs:	4 22253	Inches			
Test Portion: Engine Type: Equipment Type	Treated Navistar DT 360 School Bus	Stack Diam: Mile/Hrs: ID #:	4 22253 486	Inches	Baro:	29.93	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor:	Treated Navistar DT 360 School Bus .828 1.014	Stack Diam: Mile/Hrs: ID #: Temp:	4 22253 486	Inches	Baro: Time:	29.93 1047	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch	4 22253 486 CO	Inches HC	Baro: Time: CO2	29.93 1047 02	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4	4 22253 486 CO 0.02	Inches HC 18	Baro: Time: CO2 1.91	29.93 1047 02 17.6	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 266	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4	4 22253 486 CO 0.02 0.02	Inches HC 18 18	Baro: Time: CO2 1.91 1.91	29.93 1047 02 17.6 17.6	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 266 265.4	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02	Inches HC 18 18 17	Baro: Time: CO2 1.91 1.91 1.91	29.93 1047 02 17.6 17.6 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 266 265.4 267.2	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02	Inches HC 18 18 17 18	Baro: Time: CO2 1.91 1.91 1.91 1.91	29.93 1047 02 17.6 17.6 17.7 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 266 265.4 267.2 267.2 267.6	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02	Inches HC 18 18 17 18 17 18 17	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.91 1.93	29.93 1047 02 17.6 17.6 17.7 17.7 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 266 265.4 267.2 267.6 267.6 267.6 267.6	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 17 18 17 18 17	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.93 1.91	29.93 1047 02 17.6 17.6 17.7 17.7 17.6 17.6	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 180	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 265.4 267.2 267.6 267.2 267.6 264.8 263.2	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 17 18 17 18 18 18 18	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.93 1.91 1.91 1.91	29.93 1047 02 17.6 17.6 17.7 17.7 17.6 17.6 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 265.4 267.2 267.6 264.8 263.2 264.8	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 17 18 17 18 18 17 18 21	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.93 1.91 1.91 1.92	29.93 1047 02 17.6 17.6 17.7 17.7 17.6 17.6 17.7 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 267.2 267.2 267.6 264.8 263.2	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	HC 18 18 17 18 17 18 17 18 21	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.93 1.91 1.91 1.91 1.91 1.92	29.93 1047 O2 17.6 17.6 17.7 17.7 17.6 17.6 17.7 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 267.2 267.6 264.8 263.2 264.8	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 18 17 18 17 18 17 18 21	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.91 1.91 1.91 1.91 1.92 	29.93 1047 O2 17.6 17.6 17.6 17.7 17.7 17.6 17.6 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 267.6 264.8 263.2 264.8	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 17 18 17 18 17 18 18 18 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Baro: Time: CO2 1.91 1.91 1.91 1.93 1.91 1.91 1.92 	29.93 1047 02 17.6 17.6 17.6 17.6 17.6 17.7 17.7	
Test Portion: Engine Type: Equipment Type Fuel Sp. Gravity: SG Corr Factor: RPM 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800	Treated Navistar DT 360 School Bus .828 1.014 Exh Temp 266 265.4 267.6 264.8 263.2 264.8	Stack Diam: Mile/Hrs: ID #: Temp: Pv Inch 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	4 22253 486 CO 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.0	Inches HC 18 18 17 18 17 18 18 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Baro: Time: CO2 1.91 1.91 1.91 1.91 1.91 1.91 1.92 	29.93 1047 02 17.6 17.6 17.6 17.6 17.6 17.7 17.7	

VFCO2 VFHC **VFCO** VFO2 Mtw2 pf2 PF2 .019 29.013 1.81E-05 0.0002 .177 332,812 926,409 **% Change PF = 6.32 939,644

.020

.000

.406

.018

Performance factor adjusted for fuel density:

265.625

1.412

1800.000

0

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

1.914

.007

17.650

.053

Mean

Std Dev

18.125

1.246

			% Change
Unit	Engine	RPM	Fuel Consumption
			*
302	Navistar DT 360	1800	- 7.21
310	Cummins B Series	2700	- 3.70
334	Cummins B Series	1800	- 9.31
350	Cummins B Series	1800	- 7.18
471	Navistar DT 360	1800	- 11.26
486	Navistar DT 360	1800	- 6.32
488	Navistar DT 360	1800	- 7.49
645	Navistar 7.3	1750	- 7.01
94129	Navistar 444	1800	- 8.82
94130	Navistar 444	1800	- 8.54

Table 1: Summary of Carbon Balance Fuel Consumption Changes

Average:

- 7.68

Table 2:Comparison of Smoke Spot Numbers

Unit No.	Base SS#	Treated SS#	% Change
302	3	2.5	- 17%
310	3.5	2	- 43%
334	3.5	3	- 14%
350	3	3.5	17%
471	4	4	
486	5	3.5	- 30%
488	3.5	3	- 14%
645	8	6	- 25%
94129	2.5	2	- 20%
94130	2.5	2	- 20%
Average:			- 18%

Figure 1 CARBON MASS BALANCE FORMULAE

ASSUMPTIONS:	$C_{12}H_{26}$ and SG = 0.82	
	Time is constant	
	Load is constant	
DATA:	$\begin{array}{llllllllllllllllllllllllllllllllllll$	
EQUATIONS:		
Mwt =	(VFHC)(86) + (VFCO)(28) + (VFCO ₂)(44) + (VFO ₂)(32) + [(1- VFHC-VFCO-VFCO ₂ -VFO ₂)(28)]	
pf1 or pf2 =	<u>3099.6 x Mwt</u> 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 =	<u>pf x (Te+460)</u> CFM	
FUEL ECONOMY: PERCENT INCREASE (OR DEC	$\frac{PF2 - PF1}{PF1} \times 100$	

Figure 2.

SAMPLE CALCULATION FOR THE CARBON MASS BALANCE

BASELINE:

Equation 1	(Volume	Fractions)
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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	=	3099.6 x 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
$$H_20$$

=Barometric pressure in inches of mercury $\mathbf{P}_{\mathbf{B}}$

Te =Exhaust temperature ^oF

- -

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	=	329,809(313.1 deg F + 460)
		2358.37 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 =
$$3099.6 \times 28.980$$

86(0.0000146)+13.89(0.00013)+13.89(0.01826)

Equation 4 (CFM Calculations)

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

$$Pv = Velocity pressure in inches of H_20$$

=Barometric pressure in inches of mercury =Exhaust temperature ^oF $\mathbf{P}_{\mathbf{B}}$

Te

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

2320.51 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

 $PF2 = 115,966 \times 1.0036$

PF2 = 116,384

Equation 6 (Percent Change in Engine Performance Factor:)

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

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

= +7.65

RAW DATA WORK SHEETS