

**EVALUATION OF EMISSION CHARACTERISTICS
DOWNSTREAM OF DIESEL OXIDATION
CATALYST TECHNOLOGY**

FINAL REPORT

CRC AVFL-3

By

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Prepared for

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AVFL Committee Summary

In response to the increasingly tight regulation of vehicular emissions, both North American and European markets will soon be serviced by light-duty diesel vehicles equipped with diesel oxidation catalysts (DOCs). There is a significant portion of the European market that will require only a DOC, and DOCs along with diesel particulate filters (DPFs) will play an important role in more complex after-treatment systems expected soon in the US. These systems, like their gasoline-based analogs, are quite effective in removing hydrocarbons and CO given the short residence time and low temperatures typical in diesel exhaust. However, little is currently known about the composition of both gas and particulate phases downstream of these devices.

Catalysts will alter the composition of diesel exhaust in several ways. First, the activity of the catalyst varies with the chemical species, so while the total amount of emissions decreases, the relative distribution of species is expected to change as well. Second, catalysts facilitate the conversion of chemical compounds such as hydrocarbons into other species such as CO₂; however, partial conversion is possible so the catalyst may generate partially oxidized material. The catalyst could also facilitate the partial oxidation of particulates, which will lead to a change in particulate size and composition. Formation of partially oxidized gaseous species is also possible when oxidizing particulates. Finally, catalysts may accumulate or store certain species under some conditions and release them under others, so it is possible under transient conditions for the concentration of a compound to increase as it passes through the catalyst.

In order to explore the nature of the exhaust downstream of a DOC, the CRC AVFL Committee funded project AVFL-3, "Evaluation of Emission Characteristics Downstream of Diesel Oxidation Catalyst Technology." This program has produced the initial public data on detailed gaseous and solid emissions downstream of a DOC as a function of catalyst loading under a range of engine conditions. As a reference, results with no catalyst (but similar back pressure) were also generated; the difference between these results and the DOC results may be used as a surrogate for the effect of the catalyst.

Emissions will vary with engine speed and load. Two standard test cycles, the FTP and the US06, were used to cover a wide range of transient and steady state conditions; three important steady state conditions were also tested to investigate light, moderate, and heavy loads in isolation. This investigation was aimed at future fuels and vehicles so we chose a low-sulfur fuel representative of that expected in 2007. We used a Mercedes OM611 engine, and three proprietary catalysts provided by the Manufacturers of Emissions Controls Association (MECA). The catalysts are all of the same advanced formulation, but applied at three different levels: 20, 70, and 120 g/ft² to represent light, moderate, and heavy precious metals loadings.

The results of this project are complex. As with many projects, new questions are raised as others are answered. Some of those answers are to be expected while others are unanticipated. As expected, levels of CO, and HC, are greatly reduced downstream of the catalyst. These emissions decrease with increased catalyst loading, but the improvement

is most pronounced going from no catalyst to a lightly-loaded catalyst, and least pronounced moving from a moderately-loaded catalyst to a heavily-loaded one. NO_x levels are essentially unaltered by the catalyst, as might be anticipated when using an oxidation catalyst. Particulate mass was reduced when a catalyst was present, except at high engine-load. Increased catalyst loading was primarily effective in reducing the mass of the organic-carbon fraction of the particulates, with little effect of catalyst loading on elemental carbon. In the high engine-load test, particulate mass actually increased with catalyst loading, an effect that might not be widely anticipated. In all tests, the bin at 0.09-0.17 microns dominated the particle-mass distribution.

Another somewhat unexpected outcome relates to the sulfur content of the particulates. While all the catalysts reduced the sulfur content of the particles relative to that observed with no catalyst, the lowest loading did the best job. Of course, this sulfur must leave the system eventually. The reader is warned to interpret with caution the apparent ten-fold increase in the sulfur content of particles formed in the presence of a DOC in the high load cycle. The most probable explanation of these results is that sulfur is stored on the catalyst in lighter load tests and released under the conditions of heavy load.

PNAs and toxics were greatly reduced by the presence of the catalyst, but they were not uniformly affected by catalyst loading. For some compounds, any amount of catalyst seemed to achieve equal removal from the exhaust stream; phenanthrene is an example. However, it should be noted that, in general, the light loading removed 99% of the PNAs. Others compounds, such as formaldehyde, benefited from increased catalyst loading in most cases.

To be a truly exhaustive study, a similar set of tests would be performed using the complete range of speeds and loads, plus warm-up transients, over a complete set of engine technologies and fuel compositions, preferably with several replicates of each technology, and minimal, or no disruption to the exhaust system. Such a study would be highly compelling but exceptionally expensive. Given that the present study is done with a modern engine over a wide range of conditions with low sulfur fuels representative of those anticipated in 2007, this work gives a good indication of the general trends expected in an exhaustive study of the topic.

Overall, the DOC greatly reduced the amount of most exhaust constituents with the notable exceptions of NO_x and methane. For some constituents, there was no effect of catalyst loading; while for others, there were monotonic but diminishing benefits associated with higher loadings. In a very few cases, the increased loading appears to increase emission of the constituent. Taken together, these data suggest there is a “knee” in the curve of efficacy vs. catalyst loading for this advanced catalyst formulation. The knee appears to fall at or below 70g/ft^2 .

Idle emissions and high load emissions from diesels have received extra scrutiny over the years. While light-duty diesels are not expected to spend extended time at idle, it is reassuring that even though exhaust temperatures tend to be rather low at idle, the DOC

performed well for hydrocarbons. PNAs were, in general, reduced by an order of magnitude under idle conditions while light compounds were not as well removed. However, CO oxidation was not effective at extended idle. Despite this fact, the CO emissions in the FTP and US06, which include time at idle, were not excessive with the moderate and heavy catalyst loadings. At high engine-load, HC, CO, and both light compounds and PNAs were all removed quite well; but, as noted above, particulates were not well removed, possibly due to a high elemental carbon content under these conditions.

In this testing, the DOC removed significant amounts of most diesel exhaust components, it did not lead to the formation of new species of concern, nor increase the amount of those already present, and it does not appear to have altered the size or number of particles in ways that might be deleterious when used with a DPF.

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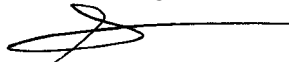
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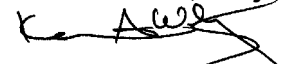
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Results and discussion given in this report relate only to the test items described in this report.

FOREWORD

This report covers testing conducted by the Department of Emissions Research of Southwest Research Institute® (SwRI®) for the Coordinating Research Council (CRC) Inc. The test program, authorized by contract number KCI-8-17085-00, was carried out between April 2002 and March 2003. The project was based on SwRI Proposal 08-29991 to CRC. The project was co-sponsored by the Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL). The overall program was identified within SwRI as Project 08-04471 and within CRC as Advanced Vehicle/Fuel/Lubricants-3 (AVFL-3). The project was monitored by Mr. Brent Bailey of CRC and overseen by the CRC AVFL committee and working group. The SwRI Project Leaders were Mr. Keith Shaw and Mr. Kevin Whitney. Dr. Barbara Zielinska and Ms. Nancy L. Peneff of Desert Research Institute (DRI) managed the extraction and chemical analysis of particulate and semi-volatile organic compound samples. Dr. Imad Khalek of SwRI designed and managed the particle sizing and counting portions of the programs. Testing was conducted under the supervision of Mr. Bill Olson.

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NOMENCLATURE

ASE	accelerated solvent extraction
AVFL	Advanced Vehicle/Fuel/Lubricant
°C	degrees centigrade
CFR	Code of Federal Regulations
cm	centimeter
cm ³	cubic centimeter
CO	carbon monoxide
CO ₂	carbon dioxide
COV	coefficient of variation
CPC	condensation particle counter
CRC	Coordinating Research Council
CVS	constant volume sampler
DFI	direct filter injection
DNPH	dinitrophenylhydrazine
DOC	diesel oxidation catalyst
DRI	Desert Research Institute
EC	elemental carbon
EDXRF	energy dispersive x-ray fluorescence
ELPI	electrical low pressure impactor
EPA	Environmental Protection Agency
FID	flame ionization detector
ft ³	cubic foot
FTP	Federal Test Procedure
°F	degrees Fahrenheit
g	gram
g/ft ³	grams per cubic foot
GC	gas chromatograph
g/hr	grams per hour
HC	hydrocarbon
HFID	heated flame ionization detector
hg	mercury
hp	horsepower
HPLC	high pressure liquid chromatograph
KHP	potassium hydrogen phthalate
lb	pound
L/min	liters per minute
mL	milliliters
MECA	Manufacturers of Emission Controls Association
mg	milligram
min	minute
mm	millimeter
MOUDI	Micro-Orifice Uniform Deposit Impactor™

NOMENCLATURE (CONT'D)

NH ₂	ammonia
NO _x	oxides of nitrogen
nm	nanometers
n-PAH	nitro-polynuclear aromatic hydrocarbons
OC	organic carbon
PAH	polynuclear aromatic hydrocarbons
PDP	positive displacement pump
PM	particulate matter
ppbC	parts per billion C ₁
ppm	parts per million
PUF/XAD	polyurethane foam/sample collection resin
rpm	revolutions per minute
sec	seconds
SIS	selected ion storage
SMPS	scanning mobility particle sizer
SO ₂	sulfur dioxide
SO ₃	sulfur trioxide
SRM	standard reference material
SS1	steady-state mode one
SS2	steady-state mode two
SS3	steady-state mode three
SVOC	semi-volatile organic carbon
SwRI [®]	Southwest Research Institute [®]
THC	total hydrocarbons
TIGF	Teflon-impregnated glass fiber
TOR	thermal optical reflectance
TSMDS	two-stage micro-dilution system
UDDS	Urban Dynamometer Driving Schedule
μL	microliters
μm	micrometers
UV	ultraviolet
VOF	volatile organic fraction
XRF	x-ray fluorescence
%	percent

EXECUTIVE SUMMARY

Diesel oxidation catalysts are becoming ever more commonplace on today's diesel-powered passenger vehicles. They are also likely to be used in conjunction with other advanced emissions reduction technologies in the near future in order to meet EPA Tier 2 emission regulations. It is, then, important to have an accurate characterization of the gaseous and particulate exhaust conditions that will be generated with a diesel oxidation catalyst (DOC) upstream of advanced technologies. This program sought to offer this characterization for three DOCs of precious metal loadings of 20, 70, and 120 g/ft³.

Each catalyst was first oven aged in an oxidizing atmosphere to mimic the activity of a moderately aged catalyst. The catalysts were then seasoned and stabilized on the test vehicle, a 1999 Mercedes Benz C220 CDI, prior to emissions testing. The emissions testing included total gaseous and particulate emissions, speciated gaseous emissions, particle number and sizing, and a host of particulate analyses that included metals, elemental and organic carbon, volatile organic fraction, and polynuclear-aromatic hydrocarbons. All analyses were conducted with the three DOCs and with the system that did not include a catalyst. Test cycles included the FTP-75, US06, and three steady-state modes using different engine loadings. The test fuel was a refinery run diesel containing 15 ppm sulfur.

Overall gaseous emissions were reduced when the precious metal loading of the DOC was increased. Because each system is only an oxidation catalyst, hydrocarbons (HC) and carbon monoxide (CO) emissions showed large reductions, while oxides of nitrogen (NO_x) emissions were unaffected by either catalyst loading or the presence of a catalyst. All the catalyzed systems dramatically reduced HC and CO emissions compared to the system without a catalyst. An example of this is given in Figure ES-1, which shows accumulated hydrocarbon emissions for each system during bags one and two of the FTP cycle. A brief summary of the measured gaseous and particulate emissions is shown in Table ES-1.

The presence of an oxidation catalyst was observed to have other effects on particulate chemistry. The total particulate mass was reduced, and the mass distribution of the particles was more centralized near 0.09-0.17 micrometers. The number of particles was substantially reduced over high load cycles such as the US06 and steady-state mode 1. Both elemental carbon and organic carbon emissions were significantly reduced. Sulfate emissions were increased, primarily during the highly loaded steady-state mode 1. The volatile organic fraction of the particulate was reduced.

Other particulate chemistry effects were observed with increasing precious metal loading of the DOC. Organic carbon emissions were reduced while elemental carbon emissions were similar. Particulate mass distributions were similar. Many speciated hydrocarbon emissions were reduced, though a diminishing returns effect was often observed when catalyst loading was increased beyond the 70 g/ft³ value. Trace element emissions were similar for each DOC.

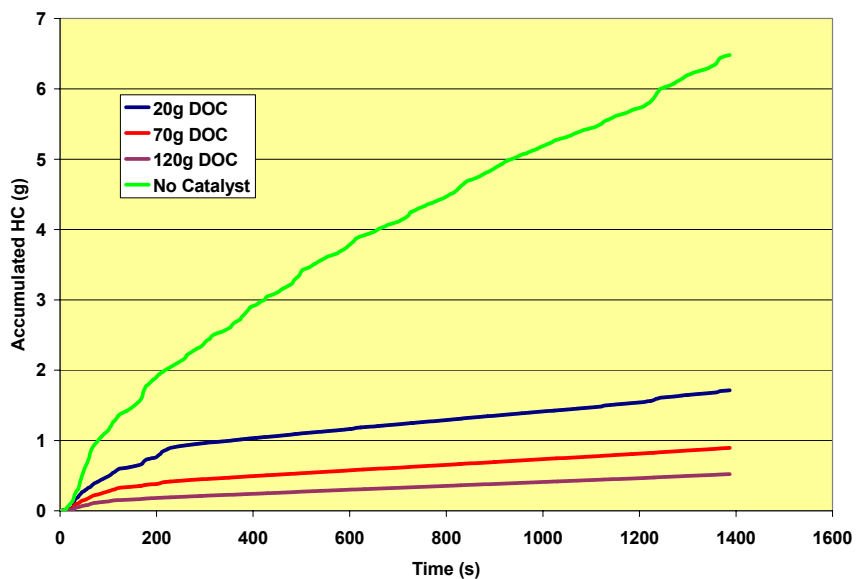


FIGURE ES-1. ACCUMULATED HYDROCARBON EMISSIONS DURING FTP BAGS 1 AND 2

TABLE ES-1. SUMMARY OF MEASURED GASEOUS AND PARTICULATE EMISSIONS

Emission	Catalyst	FTP (g/mi)	US06 (g/mi)	SS1 (g/hr)	SS2 (g/hr)	SS3 (g/hr)
THC	20 g/ft ³	0.066	0.00	0.00	0.01	0.54
	70 g/ft ³	0.026	0.00	0.00	0.00	0.42
	120 g/ft ³	0.015	0.00	0.00	0.00	0.37
	None	0.587	0.12	6.24	9.04	5.38
CO	20 g/ft ³	0.79	0.19	1.84	0.11	16.74
	70 g/ft ³	0.31	0.00	1.63	0.14	13.76
	120 g/ft ³	0.19	0.00	1.53	0.19	12.20
	None	3.07	1.58	33.78	73.15	16.70
NO _x	20 g/ft ³	0.74	1.43	255.4	16.6	7.1
	70 g/ft ³	0.76	1.45	257.3	17.0	6.9
	120 g/ft ³	0.80	1.48	265.4	18.2	6.9
	None	0.78	1.65	268.6	17.6	7.0
PM	20 g/ft ³	0.071	0.13	5.88	0.35	0.47
	70 g/ft ³	0.071	0.12	6.40	0.39	0.46
	120 g/ft ³	0.075	0.13	7.49	0.41	0.45
	None	0.157	0.21	6.64	1.44	0.86

The number of diesel oxidation catalysts in production will likely continue to increase as emissions standards become more stringent and diesel applications become more diverse. These data provide a foundation for understanding the impact that a DOC has on diesel emissions and help to frame its integration into more advanced diesel emission control devices.

I. INTRODUCTION

Diesel oxidation catalysts have moved from an emerging technology to one that is becoming commonplace on production diesel engines. In light of the continuing expansion of the use of these catalysts in many diverse diesel applications, a better understanding is needed of the effects that diesel oxidation catalysts have on the physical and chemical characteristics of particulate. DOCs are likely to be used in conjunction with other advanced emissions reduction technologies in the near future, and an accurate characterization of the exhaust conditions created by DOCs of different precious metal loadings are essential to refining these future low emission diesel vehicles.

This report contains the results of the evaluation of emissions characteristics downstream of diesel oxidation catalysts. The program was undertaken to assess the impact of diesel oxidation catalysts in altering the particulate and gaseous emissions characteristics of an advanced light-duty diesel engine. Test cycles, measurement techniques, and fuel specifications were coordinated with industry representatives through CRC.

Diesel oxidation catalysts with precious metal loadings of 20, 70, and 120 g/ft³ were evaluated on a 1999 Mercedes-Benz C220 and the emissions from each system were characterized in numerous ways. Vehicle emissions were also evaluated without a catalyst in place. These systems were evaluated using the FTP-75 and US06 transient cycles and three steady state modes with different engine loading settings. The fuel for this program was an advanced refinery-run diesel containing 15 ppm sulfur. Emissions measurements for each system included regulated gaseous emissions, speciated gaseous emissions, total particulate matter, particle number and sizing, volatile organic fraction and percent unburned oil fraction of particulate, polynuclear-aromatic hydrocarbons (PAHs) and nitro-PAHs, elemental and organic carbon fractions of particulate, metals, and extractable sulfate.

II. TECHNICAL APPROACH

A. Diesel Oxidation Catalysts

Exhaust emissions were evaluated for a 1999 Mercedes-Benz C220 CDI with three diesel catalysts and without a catalyst. The three diesel catalysts had three loadings of the same precious metal formula:

- low loading- 20 grams of precious metal per cubic foot of catalyst volume (g/ft³)
- medium loading- 70 g/ft³
- high loading- 120 g/ft³

The catalysts were supplied through the Manufacturers of Emissions Controls Association (MECA). They were thermally aged by the supplier by heating for 48 hours at 640°C in a ventilated (oxidizing) oven. This aging was done primarily to insure complete burn out of all the mat organic components (which would not be representative of components of diesel combustion exhaust), but also had the effect of stabilizing the oxidation performance of each catalyst formulation in preparation for testing. Each catalyst was then aged for 500 miles over the Urban Dynamometer Driving Schedule (UDDS), as specified in the *Code of Federal Regulations, Part 86, Appendix IV*, utilizing a mileage accumulation chassis dynamometer. The three catalysts were aged in succession to eliminate the need for additional vehicle mileage accumulation after the initiation of testing. The vehicle and fuel used for the mileage accumulation and testing are described in following subsections.

A spool piece with an adjustable butterfly valve was installed for testing without a catalyst. The butterfly valve was adjusted so that the system backpressure would mirror that of the 120 gram/ft³ catalyst tested just before the installation of the spool piece. The system backpressure plays an important role in the formation of particulate and NO_x emissions, so setting the spool piece to provide similar backpressure to one of the test catalysts was critical in making comparisons between the systems. Backpressure measurements at two load points are shown in Table 1. Figure 1 shows a picture of the spool piece installed on the vehicle.

TABLE 1. EXHAUST BACKPRESSURE IN INCHES OF MERCURY

System	2700 RPM, 20 in Hg boost	2700 RPM, Wide Open Throttle
120 gram catalyst	28.7 @ 389°C	50.5 @ 537°C
Spool Piece	28.2 @ 381°C	51.0 @ 529°C



FIGURE 1. SPOOL PIECE INSTALLED ON VEHICLE

B. Test Vehicle

A 1999 Mercedes-Benz C220 CDI equipped with a 2.2L OM611 diesel engine was provided by the U.S. Department of Energy to perform this project. This vehicle is manufactured for sale in Europe, and as such, is calibrated to meet ECE15/EUDC emission standards. The factory aftertreatment on this vehicle consisted of both a close-coupled diesel oxidation catalyst and an underbody catalyst. The four-valve-per-cylinder engine is turbocharged and intercooled, and includes a high pressure, common rail fuel injection system, exhaust gas recirculation, and intake port cut-off. The engine has a power output of 125 hp (nominal) at a rated speed of 4200 rpm. The vehicle was certified to applicable European standards. Table 2 gives additional details for the vehicle.

TABLE 2. VEHICLE SPECIFICATIONS

Parameter	Specification
Model Year	1999
Body Style	4-door sedan
Transmission	5-speed manual
Vehicle Odometer	14,763 miles at the start of testing
Tires	P195/65R15
Engine Type	2.2L I-4 intercooled turbo-diesel
Rated Power	125 hp @ 4,200 rpm
Fuel System	electronically-controlled, high pressure common rail with pilot injection

C. Test Fuels

The test fuel for this program was an advanced refinery-run diesel with a 15 ppm sulfur level. The fuel was manufactured by BP and referred to as BP15 diesel. Specifications for this fuel are shown in Table 3. These specifications were delivered to SwRI along with the fuel, and a more complete analysis is not available.

TABLE 3. FUEL SPECIFICATIONS

Specification	BP15 Value
Cetane Number	47.7
Density (lb/gal)	7.030
Carbon (%)	86.7%
Hydrogen (%)	13.3%
Oxygen (%)	0%

D. Driving Cycles

All catalysts were evaluated over a test sequence consisting of the chassis dynamometer portion of the Federal Test Procedure (FTP) for light-duty vehicles, the US06, and a custom three-mode steady-state sequence. The FTP was conducted as a cold-start test, while the US06 and the three-mode sequence were hot running tests and immediately followed the FTP. The duration, distance, and average speed of the transient cycles are given in Table 4 while the conditions of the three-mode steady-state tests are shown in Table 5.

TABLE 4. SUMMARY OF TRANSIENT DRIVING CYCLES

Test Cycle	Time (sec)	Distance (miles)	Avg. Speed (mph)
FTP	1,877	11.1	21
US06	600	8.0	48

TABLE 5. SUMMARY OF STEADY-STATE MODES

Test Cycle	Time (sec)	Engine RPM	Boost Level (mm Hg)
SS1	300	2600	20.2
SS2	1200	2000	2.0
SS3	1200	810 (idle)	0

Each catalyst was evaluated over nine replications of the test sequence. Exhaust samples for the determination of regulated gaseous emissions, total particulate, volatile organic fraction of PM, and sulfate fraction of PM were collected on a phase-by-phase basis over all tests. Hydrocarbon speciations were conducted during only two of the test days. All other samples were composited over three days of tests and collected for each driving cycle in order to accumulate more sample and improve analytical detection limits. These samples were collected in triplicate. Table 6 illustrates the sampling approach.

E. Chassis Dynamometer

The vehicle was operated on a Horiba light-duty 48-inch diameter single-roll chassis dynamometer. This dynamometer electrically simulates inertia weights up to 12,000 lbs over the FTP, and provides programmable road load simulation of up to 125 hp continuous at 65 mph (300 hp momentary duty at 65 mph).

SwRI followed methods obtained from EPA for developing “a”, “b”, and “c” chassis dynamometer coefficients using a Mears Model to calculate a road load curve for the vehicle. This model required coastdown data from drive and non-drive axles. Triplicate 65 to 15 mph coastdowns were conducted on each axle, and the average results were used as input for the Mears Model in order to calculate dynamometer “a”, “b”, and “c” coefficients. The chassis dynamometer settings used during this test program are given in Table 7.

F. CVS System and Particle Sampling Methodology

SwRI constant volume sampler (CVS) system No. 8 was used to dilute the exhaust and collect all necessary samples. This positive displacement pump (PDP) CVS system includes an 18-inch diameter by 16-foot stainless steel dilution tunnel for the collection of particulate samples. All dilution air was filtered prior to entering the CVS system. MSA Ultra™ filters were used to remove particles from the dilution air and charcoal filters were used to absorb background hydrocarbons. MSA Dustfoe™ Space Filters were used as backup filters to remove additional particles from the dilution air. This CVS was operated at a nominal flow rate of 600 cubic feet per minute (cfm). The average temperature in the dilution tunnel at the particulate sampling zone was 115°F during the standard FTP. The temperature of dilute exhaust at the face of the filter remained below 125°F during all testing.

TABLE 6. SAMPLING APPROACH

Test Matrix																						
Sampling and Approach	Emission	Run 1 of 3																				
		Day 1						Day 2						Day 3								
		FTP A			US	3-Mode A			FTP B			US	3-Mode B			FTP C			US	3-Mode C		
		B1	B2	B3	06 A	SS 1	SS 2	SS 3	B1	B2	B3	06 B	SS 1	SS 2	SS 3	B1	B2	B3	06 C	SS 1	SS 2	SS 3
- Horiba Dilute Bench - SwRI Bag Cart	HC, CO, NO _x , CO ₂	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
- SwRI Raw Cart	HC, CO, NO _x , CO ₂	continuous measurement during each test																				
- Bags - Impingers	Speciation ^a	x	x	x	x	x	x	x	x	x	x	x	x	x	/	/	/	/	/	/	/	
- Impingers	SO ₂	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
- 47-mm T60A20	Total PM DFI/GC Sulfate	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
- 47-mm Teflon	Metals	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5
- 47-mm Baked Quartz	Organic, Elemental Carbon	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5
- DRI 100-mm TIGF - 2-in PUF	PAHs	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5
- MOUDI	PM _{2.5} , PM ₁₀ , Mass Size Distribution	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5	Set 1			Set 2	Set 3	Set 4	Set 5
- ELPI	Count Size Distribution	continuous measurement during each test																				
- SMPS		continuous measurement using discrete ranges for each test																				
^a Speciation only conducted on the first two days of Run 1 with each system.																						

TABLE 7. CHASSIS DYNAMOMETER SETTINGS

ETW	3,500 lbs
“a” coeff.	10.43
“b” coeff.	0.1844
“c” coeff.	0.01714

Multi-sample probes were used in the dilution tunnel to facilitate the simultaneous collection of additional PM samples for subsequent analysis or measurement as follows:

- 47-mm fluorocarbon-coated glass fiber filter – determination of PM mass on a bag-by-bag basis, sulfate, volatile organic fraction (VOF) of particulate
- 47-mm Teflon filter – x-ray fluorescence (XRF) of elements
- 47-mm quartz filter – thermal optical reflectance (TOR) carbon
- 10-cm Teflon-impregnated glass fiber (TIGF) filter backed up by polyurethane foam/sample collection resin (PUF/XAD) – PAH and nitro-PAH analysis
- SMPS/ELPI – particle counts, number size distribution.

All total PM and SVOC samples, except for the 47-mm filters collected to determine bag-by-bag PM emission rates, sulfate fraction, and volatile organic fraction were shipped to DRI for subsequent processing and/or analysis. DRI provided information related to analyses conducted at their location. Each of the sampling systems mentioned above is discussed in more detail below.

1. Filter and PUF/XAD Sampling

All filters were weighed prior to and following sample collection to determine filter mass increases, using microbalances in weighing chambers maintained at 66 to 77°F and from 37 to 53 percent relative humidity. All filters were conditioned in the weighing chambers prior to weighing in accordance with the *Code of Federal Regulations* for light- and HD vehicles. Where integrated particulate samples were collected over multiple days, filters were stored in their holders in the weighing chambers when not in use. PUF/XAD traps used to collect integrated SVOC samples over multiple days were stored overnight at approximately -10°C. Following collection, all PM and semi-volatile organic carbon (SVOC) samples were stored at -10°C prior to shipment to DRI. Samples were shipped overnight to DRI in coolers packed with Blue Ice. Details of individual filter sampling and analytical methods are given below.

a. Determination of Total PM

Proportional total PM mass samples were collected from the dilution tunnel using preweighed 47-mm Pallflex T60A20 fluorocarbon-coated glass fiber filters. One primary filter and one backup filter were used for each sample.

b. Volatile Organic Fraction of Particulate

The determination of the volatile organic fraction (VOF) of particulate used approximately 25 percent of the same filter samples collected to determine total particulate mass emission rates on a phase-by-phase basis. The analysis was conducted using a gas chromatograph (GC) equipped with a uniquely designed direct filter injection (DFI) system and a flame ionization detector (FID). This analysis utilized a DB-1 GC column which is 15 meters long by 0.53 millimeter O.D. and has a film thickness of 1.5 microns.

For the DFI-GC analysis, a 25 percent pie shaped fraction of each particulate filter is cut and folded so that no particulate material is exposed. Next, the filter fraction is placed into the injector. The injector is subsequently placed into the cool zone of the DFI-GC inlet to allow any oxygen in the system to be purged without the loss of any sample. When all air (oxygen) has been purged from the system, the injector is inserted into the hot zone of the DFI-GC inlet where all volatile material is desorbed and deposited onto the 40°C column. The hot zone heating begins at 40°C and is ramped to 330°C at 8°C per second. As a standard, the same analysis is performed on a filter fraction to which a weighed amount of engine test oil has been deposited. From these boiling point separations (or distributions) the lubricating oil contribution to PM can also be analyzed mathematically by superimposing the chromatogram of the VOF of the test engine oil onto the chromatogram of the VOF of the PM sample.

c. Sulfate Fraction of Particulate

Sulfate was determined using approximately 75 percent of the same filter samples collected to determine total particulate mass emission rates on a phase-by-phase basis. Sulfuric acid collected on the filter is first converted to ammonium sulfate by exposure to ammonia vapor. The soluble sulfates are then leached from the filter with a measured volume of a 60 percent isopropyl alcohol / 40 percent water solution. A fixed volume of the sample extract is injected into a high pressure liquid chromatograph (HPLC) coupled to a conductivity detector. The sulfate is quantified by comparing the detector response to the response from an external sulfate standard.

d. XRF Determination of Elements

Total PM samples for analysis of elements by XRF were collected from the dilution tunnel using 47-mm Millipore Fluoropore PTFE membrane filters (0.45 µm pore size). These samples were shipped to DRI for analyses.

X-ray fluorescence (XRF) analysis was performed on the Teflon membrane filters for the following elements: Na, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Br, Rb, Sr, Y, Zr, Mo, Pd, Ag, Cd, In, Sn, Sb, Ba, La, Au, Hg, Tl, and Pb using a Kevex Corporation Model 700/8000 energy dispersive x-ray fluorescence (EDXRF) analyzer. The EDXRF analyzer uses a side-window, liquid-cooled, 60 keV, 3.3 milliamp rhodium anode x-ray tube and secondary fluorescers. Five separate XRF analyses were conducted on each sample to optimize the detection limits for the specified elements.

Three types of XRF standards were used for calibration, performance testing, and auditing: 1) vacuum-deposited thin-film elements and compounds (Micromatter, Deer Harbor, WAS); 2) polymer films; and 3) NIST thin-glass films. The vacuum deposit standards cover the largest number of elements and are used as calibration standards. The polymer film and NIST standards were used as quality control standards. NIST standards are the definitive standard reference material, but these are only available for the species Al, Ca, Co, Cu, Mn, and Si (SRM 1832) and Fe, Pb, K, Si, Ti, and Zn (SRM 1833). A separate Micromatter (Deer Harbor, WAS) thin-film standard was used to calibrate the system for each element.

e. Determination of Carbon by TOR

Total PM samples were collected using 47-mm Pallflex quartz filters for the determination of elemental and organic carbon by thermal/optical reflectance (TOR). To eliminate possible filter media contamination, filters were fired at 800°C for three hours prior to use. These samples were shipped to DRI for analyses.

The TOR method measures organic carbon (OC) and elemental carbon (EC). The TOR method is based on the principle that different types of carbon-containing particles are converted to gases under different temperature and oxidation conditions.

The TOR carbon analyzer consists of a thermal system and an optical system. The thermal system consists of a quartz tube placed inside a coiled heater. Current through the heater is controlled to attain and maintain pre-set temperatures for given time periods. A portion of a quartz filter is placed in the heating zone and heated to different temperatures under non-oxidizing and oxidizing atmospheres. The optical system consists of a He-Ne laser, a fiber optic transmitter and receiver, and a photocell. The filter deposit faces a quartz light tube so that the intensity of the reflected laser beam can be monitored throughout the analysis.

As the temperature increases from ambient (~25°C) to 550°C, organic compounds are volatilized from the filter in a non-oxidizing (He) atmosphere while elemental carbon is not oxidized. When oxygen is added to the helium at temperatures greater than 550°C, the elemental carbon burns and enters the sample stream. The evolved gases pass through an oxidizing bed of heated manganese dioxide where they are oxidized to carbon dioxide, then across a heated nickel catalyst, which reduces the carbon dioxide to methane. The methane is then quantified with a flame ionization detector (FID).

The system was calibrated by analyzing samples of known amounts of methane, carbon dioxide, and potassium hydrogen phthalate (KHP). The FID response was ratioed to a reference level of methane injected at the end of each sample analysis. Performance tests of the instrument calibration were conducted at the beginning and end of each day's operation. Intervening samples were re-analyzed when calibration changes of more than ~10% were found.

Known amounts of American Chemical Society certified reagent grade crystal sucrose and KHP were submitted to TOR as a verification of the organic carbon fractions. Fifteen different standards were used for each calibration. However, widely accepted primary standards for elemental and/or organic carbon are still lacking.

f. 10-cm TIGF / PUF/XAD Sampling for PAH and Nitro-PAH Analyses

For determination of particulate- and vapor-phase PAHs, samples were collected on 10-cm Teflon impregnated glass fiber filters followed by 2-inch diameter PUF/XAD traps. All sampling media were provided to SwRI by DRI. Samples were shipped to DRI for analyses.

1) Sampling Media Preparation

Prior to sampling, XAD-4 resin was rinsed with distilled water followed by methanol then distilled water. The XAD-4 was then Soxhlet extracted with methanol for 48 hours followed by Dionex Accelerated Solvent Extractor (ASE) with dichloromethane at 1500 PSI and 100°C. The cleaned resin was dried in a vacuum oven (-20 in Hg), heated to 50°C, and stored in sealed glass containers in a clean freezer. The 4" PUF plugs were washed with distilled water then Dionex ASE extracted at 1500 PSI and 100°C with acetone followed by 10% diethyl ether in hexane. The TIGF filters were cleaned by sonification in DCM for 20 minutes (solvent was replaced after 10 minutes) followed by 20-minute sonification in methanol (solvent was replaced after 10 minutes), then dried in a vacuum oven at 50°C, placed in aluminum foil and labeled. Each batch of precleaned XAD-4 resin and ~10% of precleaned TIGF filters and PUF plugs were checked for purity by solvent extraction and GC/MS analysis of the extracts. The PUF plugs and XAD-4 resins were assembled in glass cartridges (20 g of XAD between two PUF plugs), then the cartridges were wrapped in aluminum foil and stored in a clean freezer prior to shipment to the field. This cleaning protocol applies to the PUF and XAD used for both bioassay and chemical assay.

2) Extraction of Filters and PUF/XAD/PUF Cartridges for Chemical Analyses

For each sample, PUF/XAD/PUF cartridges and TIGF filters were extracted and analyzed separately. Prior to extraction, the following deuterated internal standards were added: naphthalene-d₈, biphenyl-d₁₀, acenaphthylene-d₈, phenanthrene-d₁₀, anthracene-d₁₀, chrysene-d₁₂, pyrene-d₁₀, benz[a]anthracene-d₁₂,

benzo[e]pyrene-d₁₂, benzo[a]pyrene-d₁₂, benzo[k]fluoranthene-d₁₂, coronene-d₁₂, benzo[g,h,i]perylene-d₁₂, 1-nitropyrene-d₉, 2-nitrobiphenyl-d₉, and cholestane-d₆. The PUF/XAD/PUF cartridges were Dionex ASE extracted at 1500 PSI and 100°C with acetone. The TIGF filter was Dionex ASE extracted at 1500 PSI and 100°C with DCM. This extraction method has been reported to yield high recovery of PAHs (Chuang et al., 1990) and nitro-PAHs (Atkinson et al., 1988). In order to account for the polar fraction of organic particulate matter, each filter was also sequentially extracted with acetone.

All extracts were then concentrated by rotary evaporation at 35°C under gentle vacuum to ~1 mL and filtered through 0.45 mm Acrodiscs (Gelman Scientific); the sample flask was rinsed twice with 1 mL of suitable solvent. Approximately 100 µL of acetonitrile was added to the extracts and DCM (or acetone) was evaporated under a gentle stream of nitrogen. The final sample volume was adjusted to 1 mL with acetonitrile for PUF/XAD/PUF extracts and 200 µL for TIGF filter extracts. This procedure has been tested by Atkinson et al. (1988).

Extracts were analyzed for PAHs, hopanes, and steranes by gas chromatography/mass spectrometry (GC/MS). For nitro-PAH analysis, approximately 500 µL of hexane was added to extracts and DCM (or acetone) was evaporated under a gentle stream of nitrogen. Samples were then cleaned by solid-phase extraction using superclean Aminopropyl (NH₂) cartridges (Waters 0.5g, 3 mL). Each cartridge was pre-conditioned twice with 3 mL of DCM followed by two 5 mL rinses of hexane. Five hundred µL of sample was added to each cartridge and sequentially eluted with 10 mL hexane/DCM (98 percent/2 percent), then 10 mL of hexane/DCM (80percent/20 percent). Two hundred fifty µL of extract was then further cleaned using an HPLC and Fraction Collector II (Waters) equipped with an Amino Cyano column (ES Industries, 5µ 60A 25cm X 9.6 mm). Cleaned extracts were then concentrated by rotary evaporation at 35°C under gentle vacuum to ~1 mL. Approximately 100 µL of acetonitrile was added to the extracts and evaporated under a gentle stream of nitrogen to final volume for GC/MS analysis.

3) Chemical Analyses for Organic Compounds

The filter and PUF/XAD/PUF extracts were analyzed by GC/MS using a Varian Star 3800CX GC equipped with an 8200CX or 8400CX autosampler and interfaced to a Varian Saturn 2000 Ion Trap. Injections (1 µL) were made in the splitless mode onto a J&W Scientific DB-5 (30mX0.25mmX0.25µm) 5 percent phenylmethylsilicone fused-silica capillary column. Identification and quantification of analytes were obtained by selected ion storage (SIS) technique by monitoring the molecular ion of each compound of interest and deuterated PAH added prior to extraction as internal standards.

Calibration curves for the GC/MS quantification were made for the molecular ion peaks of compounds of interest using the corresponding deuterated species (or the deuterated species most closely matched in volatility and retention characteristics) as internal standards. National Institute of Standards and Technology Standard Reference Material (SRM) 1647 (certified PAH) with the addition of deuterated internal standards and of those compounds not present in the SRM (i.e., hopanes, steranes, and nitro-PAH) were used to make calibration solutions. A four or six level

calibration was performed for each compound of interest and the calibration check (using median calibration standards) was run every 10 samples to check for accuracy of analyses. Extracts were archived after analysis.

g. PM_{2.5}, PM₁₀, and Particle Mass Size Distribution

Particle mass size distribution, as well as particulate mass fraction of PM_{2.5} and PM₁₀, was measured with a Model 100 Micro-Orifice Uniform Deposit Impactor™ (MOUDI)™ using appropriately-sized nozzle plates. The MOUDI is a cascade impactor which classifies particles based on their inertial ability to follow a streamline. It consists of 8 stages ranging from 18 µm down to 56 nm in particle aerodynamic diameter. Each stage consists of nozzles and a plate for particle deposition. Particles above a cut-off size deposit on each plate due to their inertia. Larger particles deposit on the initial stages and smaller particles, larger than the previous cut-off size, down to 0.056 µm, deposit on the final stages. Particles below 0.056 µm in aerodynamic diameter are not classified and are collected on a filter positioned downstream of the last stage. An aluminum foil or a filter is usually placed on the deposition plate for particle collection and subsequent analysis. The deposition plate/nozzle combination is designed to rotate to achieve near-uniform deposition of particles on each plate. This instrument requires careful handling of filters used for analysis. This is especially important when the mass deposited on the filter is less than 0.1 percent of its total mass. As an improvement to the MOUDI, a nano-MOUDI was also utilized to collect additional size-segregated samples. The nano-MOUDI operates in the same manner as the MOUDI, but covers cutpoints from 56 nm down to 10 nm.

2. Particle Sizing

Particle size and number were measured using an electrical low pressure impactor (ELPI), and a scanning mobility particle sizer (SMPS) which was configured for a single size mode of operation. Measurements were conducted simultaneously at the exit of the engine turbocharger (engine out) and at the tailpipe. All measurements were taken downstream of two-stage micro-dilution systems (TSMDS) coupled to the vehicle's exhaust system, as shown in Figures 2 and 3. The ELPI measured particles continuously on a second-by-second basis for all tests, covering a size range from 32 nm to 10,000 nm, during all tests. The SMPS was operated in one of three single size-modes during each test, resulting in triplicate measurements in each of the 10-nm, 20-nm, and 30-nm modes. The dilution ratio was determined by measuring NO_x concentrations in the exhaust and downstream of the each TSMDS. The nominal dilution ratio was about 81 for the two-stage dilution system, 9 for each stage of dilution.

The time shift between the two sample locations was determined using the two condensation particle counters (CPCs), one sampling at each location. Prior to starting a test vehicle, both CPCs were used to measure background particle concentrations at each sample location. Following the start of a test vehicle, a spike in particle concentration was recorded by both instruments. Time delays were determined by comparing the time of the vehicle start with the time at which the increase in particle concentration is recorded. This determination was made for each vehicle tested.



FIGURE 2. PARTICLE SIZE MEASUREMENT SETUP AT THE TAILPIPE



FIGURE 3. PARTICLE SIZE MEASUREMENT SETUP UPSTREAM OF DIESEL OXIDATION CATALYST

The SMPS measures particle size distributions and concentrations in the sub-0.5 μm size range. It covers a size range from 7 nm to 317 nm in a single scan. It consists of a neutralizer, a mobility section, a TSI Model 3025 CPC, and a computerized control and data acquisition system. Particles in the sample stream first pass through a Krypton 85 bipolar ion charger / neutralizer. This brings the particle charge distribution to a well defined level, essentially Boltzmann equilibrium. The aerosol then enters the annular mobility section close to the inner surface of the outer cylinder. Clean sheath air flows close to the central rod. When a voltage scan is applied to the rod, charged particles move in the radial direction inward or outward, depending on their polarity. Particles with the right polarity and electrical mobility exit through holes at the bottom of the central rod. These particles are then detected by the CPC.

The SMPS measures a number weighted size distribution based on the electrical mobility diameter. The size distribution may be integrated across the size range to determine the total number concentration. It may also be converted to a volume weighted distribution assuming spherical particles. This distribution may be integrated to determine total particle volume. Although natural gas exhaust particles are not necessarily spherical, the total volume determined in this manner is usually strongly correlated to the total mass concentration determined by traditional filtration methods. This instrument was originally designed for ambient level concentration of aerosol particles, so it can detect very low concentrations of particles.

The CPC detects particle numbers in the sub-2 μm diameter range. It consists of a saturator, condenser, particle sensor, and flowmeter and pump. The aerosol flow is first saturated with alcohol and then cooled in a condenser tube. The cooling process causes a supersaturation condition, resulting in condensation of alcohol onto the aerosol particles. The aerosol particles continue to grow by condensation until all particles have reached a size of approximately 8-10 μm in diameter. The droplets flow from the condenser tube into a particle sensing region. A laser light source is focused on a narrow volume in this region with a photodetector on the opposite side. The CPC operates in a single particle count mode by which light pulses generated by individual particles passing through the viewing volume are individually counted. This mode enables the instrument to measure very low particle number concentrations accurately.

The ELPI measures particle size distributions in real time. It works on the principle of particle charging, inertial separation, and electrical detection. At first the diluted exhaust sample, flowing at 10 lpm, is exposed to positive ions that are generated by a corona wire in the charger section of the instrument. The purpose of the charger section is to charge particles present in the diluted exhaust with positive ions. The diluted sample then enters an impactor section that consists of 12 stages packed in series, covering a size range from 10 μm down to 0.032 μm in aerodynamic particle diameter. Each stage consists of a nozzle and a plate for particle deposition. Particles above a cut-off size deposit on each plate due to their inertia. Large particles deposit on the initial stages and the smallest particles, bigger than the last cut-off size of 0.032 μm , deposit on the last stage. Particles below 0.032 μm in aerodynamic diameter are not detected with this instrument. Each plate is well insulated and connected to an electrometer. The electrometer reads the current generated by the positively charged particles deposited on

each plate, which is proportional to the number of particles collected. It is worth mentioning that not all particles are charged in the charger section of the instrument. A charge correction factor is applied to obtain a true particle concentration in each size range. The ELPI allows the measurement of the size distribution across the whole size range on a second-by-second basis. The ELPI is also sensitive to ambient level concentrations of particles.

G. Gaseous Emissions

1. Regulated

Dilute gaseous exhaust emissions were sampled and measured in a manner consistent with EPA protocols for light-duty vehicle emission testing as given in the *Code of Federal Regulations*. Proportional dilute exhaust gas samples were collected in Tedlar bags for analysis of carbon monoxide and carbon dioxide. Total hydrocarbons and oxides of nitrogen were measured continuously from the dilution tunnel. Exhaust constituents were analyzed as specified below.

Constituent	Analysis Method
Total Hydrocarbon	Heated Flame Ionization Detector
Carbon Monoxide	Non-Dispersive Infrared Analysis
Carbon Dioxide	Non-Dispersive Infrared Analysis
Oxides of Nitrogen	Chemiluminescent Analysis

In addition to the dilute exhaust samples, raw exhaust concentrations were recorded on a second-by-second basis for THC, CO, and NO_x prior to the close-coupled catalyst (engine-out) in order to assure consistent operation of the vehicle.

2. Speciation

Benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and nearly 190 other C₁ to C₁₂ hydrocarbons species were determined in a manner similar to the CRC Auto/Oil Phase II speciation methods. Three GC procedures and one HPLC procedure were used to identify and quantify specific compounds. A brief description of these procedures is given below.

a. C₁-C₄ Species

The first GC procedure allows the separation and determination of exhaust concentrations of C₁-C₄ individual hydrocarbon species, including methane; ethane; ethylene; acetylene; propane; propylene; propadiene; butane; trans-2-butene; 1-butene; 2-methylpropene; 2,2-dimethylpropane; propyne; 1,3-butadiene; 2-methylpropane; 1-butyne; and cis-2-butene. Bag samples are analyzed using a gas chromatograph equipped with an FID. The gas chromatograph system utilizes a Hewlett-Packard Model 5890 Series II GC with an FID, two pneumatically operated and electrically controlled valves, and two analytical columns. The carrier gas is helium. An external multiple component standard in zero air is used to quantify the results. Detection limits for the

procedure are on the order of 5 ppbC in dilute exhaust for all compounds.

b. C₅-C₁₂ Species

The second GC procedure provides separation and exhaust concentrations for more than 100 C₅-C₁₂ individual HC compounds. Bag samples are analyzed using a gas chromatograph equipped with an FID. The GC system utilizes a Hewlett-Packard Model 5890 Series II GC with an FID, a pneumatically operated and electrically controlled valve, and an analytical column. The carrier gas is helium. An external multiple component standard in zero air is used to quantify the results. Detection limits for the procedure are on the order of 10 ppbC in dilute exhaust for all compounds.

c. Benzene and Toluene

The third GC procedure uses a separate system configured similarly to those mentioned above to determine individual concentrations of benzene and toluene according to the CRC Auto/Oil Phase II Protocol. The limit of detection for these compounds is 5-10 ppbC.

d. Aldehydes and Ketones

An HPLC procedure is utilized for the analysis of aldehydes and ketones. Samples are collected by bubbling dilute exhaust at a nominal flowrate of 4 L/min through chilled glass impingers containing an acetonitrile solution of 2,4-DNPH and perchloric acid. For analysis, a portion of the acetonitrile solution is injected into a liquid chromatograph equipped with a UV detector. External standards of the aldehyde and ketone DNPH derivatives are used to quantify the results. Detection limits for this procedure are on the order of 0.005 ppm aldehyde or ketone in dilute exhaust.

3. Sulfur Dioxide

Sulfur dioxide was measured by bubbling the dilute exhaust at a nominal flowrate of 4 L/min through chilled glass impingers each containing 25 mL of a 3 percent aqueous solution of hydrogen peroxide. The hydrogen peroxide reacts with the sulfur dioxide to give sulfate ions which remain in the absorbing solution. For analysis, a portion of the hydrogen peroxide solution is injected into an ion chromatograph.

H. Fuel Economy

Fuel economy was calculated using a carbon balance method in a manner consistent with 40CFR§600.113-88.

III. DAILY TEST SCHEDULES

A significant amount of attention was given to vehicle operation and catalyst stabilization to ensure repeatable and accurate results during this program. Because so many types of unregulated emissions samples were taken, it was very important to make sure that the same test conditions and catalyst preparations were extended to each system tested in order to make the best possible comparisons between the systems.

Each catalyst was oven aged by the supplier for 48 hours at 640°C. The oven aging accomplished the thermal aging that the catalyst might see from several years of normal driving. The first step after receipt of each catalyst was mileage accumulation. Some amount of mileage was necessary in order to season the aged catalysts with diesel exhaust before they were tested. The vehicle was driven for 500 miles over the Urban Durability Driving Schedule (UDDS), see Section II.A., with each of the three catalysts to be tested. The supplier believed that this amount of mileage accumulation would properly season the catalysts for testing.

The actual test cycle included varying load levels from idle (SS3) to some high rpm and high load points such as the US06 and SS1. Because of the varying loads and temperatures, some particulate and catalyst stabilization was believed to be necessary before testing was to begin on each catalyst. It was agreed by the technical committee that the catalyst with the lowest loading (20 g/ft³) would be run over the complete test cycle on consecutive days following mileage accumulation to determine at what point its emissions would stabilize. This number of complete test cycles would then be run on each catalyst following mileage accumulation and before testing began.

Following mileage accumulation, the 20 g/ft³ DOC was tested over the full test sequence for seven consecutive days. The last three of those days included gaseous and particulate emissions measurements to compare the repeatability of the test catalyst to results previously measured with the vehicle's stock aftertreatment system. The coefficients of variation (COVs) for triplicate tests with both the test catalyst and the stock aftertreatment system are given in Table 8. The similarity of the two system's COVs suggests that the test system has indeed stabilized after the seven consecutive test sequences.

Particulate matter emissions were of specific concern for this program, as much of the analyses were focused on the chemical makeup and physical properties of the particulate produced. The PM emission rate COVs for both the test catalyst and the stock system over the course of the entire test sequence are shown in Figure 4. The stock system data displayed were from the March 2002 testing. Based on these data, it appears that the test catalyst has stable emissions following the 500 miles of service accumulation and seven repeat test sequences. Each catalyst was, therefore, subjected to seven consecutive cold test cycles before actual testing began.

TABLE 8. FTP COEFFICIENTS OF VARIATION ^a

Emission	Catalyst	Date	Bag 1	Bag 2	Bag 3
THC	Test Cat.	Apr-02	15%	< 1%	9%
	Stock	Mar-02	33%	< 1%	89%
	Stock	Feb-02	19%	< 1%	< 1%
CO	Test Cat.	Apr-02	5%	7%	13%
	Stock	Mar-02	20%	93%	38%
	Stock	Feb-02	8%	< 1%	< 1%
NO _x	Test Cat.	Apr-02	9%	5%	6%
	Stock	Mar-02	3%	5%	4%
	Stock	Feb-02	2%	8%	2%
PM	Test Cat.	Apr-02	2%	13%	4%
	Stock	Mar-02	5%	7%	3%
	Stock	Feb-02	10%	5%	13%
Fuel Economy	Test Cat.	Apr-02	2%	2%	3%
	Stock	Mar-02	3%	1%	1%
	Stock	Feb-02	1%	1%	1%

^a COV is the standard deviation divided by the mean, expressed as a percentage

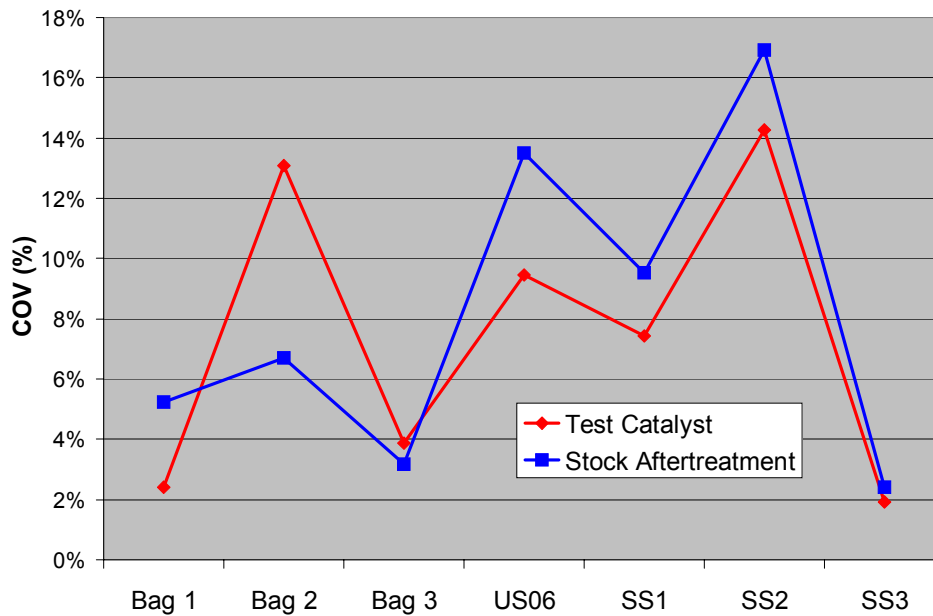


FIGURE 4. PARTICULATE MATTER COVs

Each catalyst was tested on nine consecutive days at roughly the same time each day. The consistency of the test procedure and time was another effort towards ensuring repeatable results from tests designed to run in triplicate. In addition, this procedure never subjected the vehicle or current filter samples to a storage period longer than one day during ongoing testing. Filter and sampling media were stored in either a laboratory freezer or atmospherically controlled chamber after sampling was completed. Many of the filters and other media for sampling unregulated emissions required more particulate for accurate measurement than could be sampled during one cycle. Because of this, the 2 inch PUFs / 100mm TIGF filters, Teflon filters, and quartz filters were sampled over the course of either two or three test days (depending on the rate of particulate accumulation of the filter). Each type of unregulated emission was to be sampled and analyzed in triplicate, so this required nine complete tests for each catalyzed system tested. Gaseous and particulate mass measurements were made for all tests. The system without a catalyst produced significantly more particulate matter for most of the test cycles and only required one test in order to accumulate sufficient mass for these particulate filters and PUFs. This system, then, was tested in triplicate over the complete test cycle.

The test sequence began with a cold-start FTP followed by a hot US06. The three-mode steady-states followed the US06, and each mode was allowed to stabilize for five minutes before measurements and samples were taken. In this way, the two transient cycles could be run together with only a short break to replace filter samples, while the steady-state cycles required more time due to the stabilization period. It was determined during particle sizing testing that the five minute stabilization was necessary to reach steady-state operation in the observed particle size and number for each mode. The vehicle was soaked overnight and the test sequence was repeated again the next day.

IV. RESULTS

A. Regulated Gaseous and Total Particulate Emissions

Regulated gaseous and total particulate exhaust emissions over the FTP and US06 are shown in Table 9 for all three test catalysts and the spool piece. The gaseous HC and CO emissions were reduced with increasing catalyst loading, and the effect was also fairly linear with catalyst loading. Table 10 displays the steady-state emissions results. Detailed emission results are available in Appendix A. The vehicle emissions with the spool piece inserted in place of an oxidation catalyst are significantly higher than any of the test catalysts for THC and CO, but not for NO_x . This change in emissions is expected for a vehicle equipped with an oxidation catalyst. Particularly interesting was the 160 percent to 340 percent increase in particulate matter emissions for most of the cycles with the absence of the catalyst. The exception to this PM increase was SS1, where a virtually identical PM mass was measured for the system with the spool piece compared to the catalyzed systems. SS1 is the steady-state point with the highest engine loading (turbo outlet temperatures were around 400°C), and it is possible that some sulfate formation was occurring with the catalyst on the vehicle. Additionally, it may also be possible that at this point the PM was primarily soot and not easily oxidized.

B. MOUDI

1. **FTP/US06**

Particle mass distribution data from the Micro-Orifice Uniform Deposit Impactor (MOUDI) were taken for each system tested. For the DOCs, each set of MOUDI filters was allowed to accumulate mass over three consecutive test days before the sets were weighed. With the nine tests for each catalyst, triplicate MOUDI data sets were generated for each test cycle. For the spool piece, triplicate samples were collected over a single test day each. All the figures showing MOUDI mass distributions include the error bars from the triplicate filter sets. Thus, the mass distribution results displayed are the average mass collected on a set of MOUDI filters over triplicate test sequences with the catalysts, and over a single test sequence with the spool piece. The distributions from the FTP and US06 transient tests are shown in Figures 5 through 12. Each distribution is centered around the 0.09-0.17 micrometer size bin. The US06 generated more mass over a shorter period of time due to its higher engine loading.

2. **Steady-State**

The MOUDI mass distributions for the steady-state cycles are shown in Figures 13 through 21. These distributions also center around the 0.09-0.17 micrometer size bin, but have some significant differences in some of the lesser-loaded bins. At SS1, the steady-state condition with the highest engine loading, the distribution shows a higher mass of particles in the 1.0-1.8 micrometer size bin relative to the surrounding bins. This local increase is mirrored in the US06 results and is likely the result of the higher engine loads during these two test sequences. The higher engine loading could be causing an

agglomeration of smaller particles, resulting in a local increase in particle mass for this size bin. The idle test condition, SS3, shows a higher mass of particles in the 3.1-6.2 micrometer size bin than any other bin except for the primary 0.09-0.17 micrometer section. Because SS3, the idle steady-state condition, has the lowest exhaust temperature of any test cycle, this increase in 3.1-6.2 micrometer particles could be the result of semi-volatile organic compounds (SVOCs) condensing in the exhaust.

TABLE 9. FTP AND US06 BAG EMISSIONS RESULTS ^a

Emission	Catalyst	Bag 1	Bag 2	Bag 3	Composite FTP	US06
THC, g/mi	20g DOC	0.21 ± 0.02	0.02 ± 0.01	0.04 ± 0.01	0.066 ± 0.006	0.00 ± 0.00
	70g DOC	0.12 ± 0.01	0.00 ± 0.00	0.00 ± 0.00	0.026 ± 0.003	0.00 ± 0.00
	120g DOC	0.07 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.015 ± 0.001	0.00 ± 0.00
	None	0.87 ± 0.07	0.61 ± 0.04	0.34 ± 0.02	0.587 ± 0.041	0.12 ± 0.01
CO, g/mi	20g DOC	2.01 ± 0.10	0.36 ± 0.06	0.71 ± 0.12	0.79 ± 0.05	0.19 ± 0.03
	70g DOC	1.32 ± 0.06	0.01 ± 0.01	0.13 ± 0.12	0.31 ± 0.03	0.00 ± 0.00
	120g DOC	0.84 ± 0.07	0.01 ± 0.01	0.02 ± 0.02	0.19 ± 0.01	0.00 ± 0.01
	None	3.84 ± 0.23	3.30 ± 0.40	2.50 ± 0.26	3.07 ± 0.17	1.58 ± 0.36
NO _x , g/mi	20g DOC	0.79 ± 0.07	0.66 ± 0.07	0.90 ± 0.06	0.74 ± 0.06	1.43 ± 0.06
	70g DOC	0.76 ± 0.03	0.66 ± 0.05	0.91 ± 0.04	0.76 ± 0.04	1.45 ± 0.04
	120g DOC	0.82 ± 0.04	0.70 ± 0.03	0.97 ± 0.05	0.80 ± 0.03	1.48 ± 0.02
	None	0.79 ± 0.00	0.68 ± 0.02	0.95 ± 0.05	0.78 ± 0.02	1.65 ± 0.17
PM, g/mi	20g DOC	0.11 ± 0.01	0.06 ± 0.01	0.07 ± 0.01	0.071 ± 0.006	0.13 ± 0.01
	70g DOC	0.10 ± 0.01	0.06 ± 0.01	0.07 ± 0.01	0.071 ± 0.003	0.12 ± 0.01
	120g DOC	0.11 ± 0.01	0.06 ± 0.00	0.07 ± 0.01	0.075 ± 0.005	0.13 ± 0.00
	None	0.28 ± 0.01	0.12 ± 0.01	0.13 ± 0.01	0.157 ± 0.006	0.21 ± 0.05
Fuel Economy, mpg	20g DOC	35.23 ± 0.20	35.93 ± 0.12	40.54 ± 0.30	36.97 ± 0.58	36.42 ± 0.10
	70g DOC	35.19 ± 0.09	35.24 ± 0.19	40.04 ± 0.13	36.45 ± 0.48	36.26 ± 0.10
	120g DOC	35.00 ± 0.13	35.52 ± 0.16	40.37 ± 0.14	36.78 ± 0.38	36.60 ± 0.08
	None	35.85 ± 0.01	35.64 ± 0.09	40.28 ± 0.18	36.87 ± 0.34	36.07 ± 0.32
^a Results are for nine tests, expressed as an average of all valid tests followed by standard deviation						

TABLE 10. STEADY-STATE EMISSIONS RESULTS^a

Emission	Catalyst	SS1	SS2	SS3
THC, g/hr	20g DOC	0.00 ± 0.00	0.01 ± 0.03	0.54 ± 0.27
	70g DOC	0.00 ± 0.00	0.00 ± 0.00	0.42 ± 0.22
	120g DOC	0.00 ± 0.00	0.00 ± 0.00	0.37 ± 0.22
	None	6.24 ± 0.19	9.04 ± 0.69	5.38 ± 0.13
CO, g/hr	20g DOC	1.84 ± 0.45	0.11 ± 0.15	16.74 ± 1.03
	70g DOC	1.63 ± 0.45	0.14 ± 0.09	13.76 ± 0.60
	120g DOC	1.53 ± 0.41	0.19 ± 0.16	12.20 ± 1.73
	None	33.78 ± 0.62	73.15 ± 2.83	16.70 ± 0.56
NO _x , g/hr	20g DOC	255.41 ± 8.74	16.65 ± 1.94	7.06 ± 0.81
	70g DOC	257.32 ± 6.12	17.03 ± 0.75	6.92 ± 0.23
	120g DOC	265.42 ± 9.19	18.17 ± 0.74	6.90 ± 0.21
	None	268.6 ± 2.66	17.62 ± 0.49	7.05 ± 0.31
PM, g/hr	20g DOC	5.88 ± 0.78	0.35 ± 0.03	0.47 ± 0.04
	70g DOC	6.40 ± 0.43	0.39 ± 0.04	0.46 ± 0.03
	120g DOC	7.49 ± 0.46	0.41 ± 0.04	0.45 ± 0.04
	None	6.64 ± 0.19	1.44 ± 0.03	0.86 ± 0.06

^a Results are for nine tests, expressed as an average of all valid tests followed by standard deviation

The SS2 results show a significant increase in accumulated mass for several size bins with the 70 g/ft³ DOC relative to the 20 g/ft³ DOC. The increase is seen in both the 0.31-0.54 micrometer size bin along with the bin representing particles of less than 0.01 micrometers. Each increase in mass is also accompanied by an increase in test-to-test variability, shown by the larger error bars.

The 120g DOC particle size distributions also center around the 0.09-0.17 micrometer size bin, but have some significant differences in some of the other size bins. For SS1, the dominant 0.09-0.17 peak that grew larger from the 20 gram DOC to the 70 gram DOC is now smaller with this most highly loaded catalyst, though surrounding size bins such as the 0.17-0.31 micrometer range have continued to become larger with increasing precious metal concentration. Most of the other size bins are quite similar for the two more highly loaded catalysts. The trend is reversed for SS2, the steady-state cycle with moderate engine loading. Here the 0.09-0.17 main peak has grown larger from the 70 gram DOC data while surrounding peaks have become smaller. Most notable are the decreases in the 0.31-0.54 micrometer size bin and the size bin representing particles smaller than 10 nanometers. For SS3 (idle), the distribution is very similar to what was seen with the lesser loaded catalysts, though it is producing less mass of particulate across all the size bins than the 70 gram DOC. This result mirrors the total particulate collected during SS3 for both of these catalysts, where the highly loaded 120 gram DOC test sequence resulted in marginally less particulate mass.

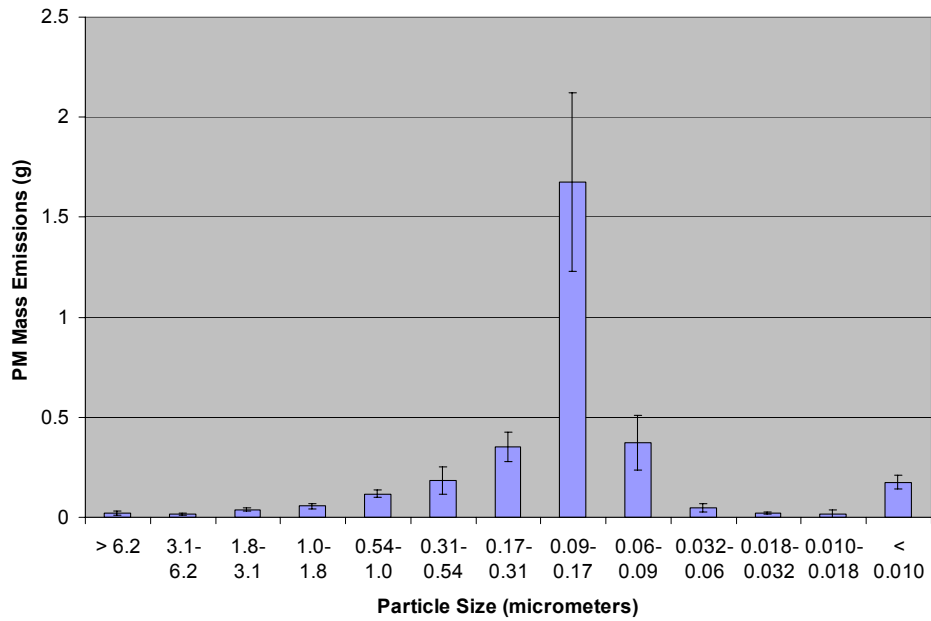


FIGURE 5. FTP MOUDI MASS DISTRIBUTION, 20 g/ft³ DOC

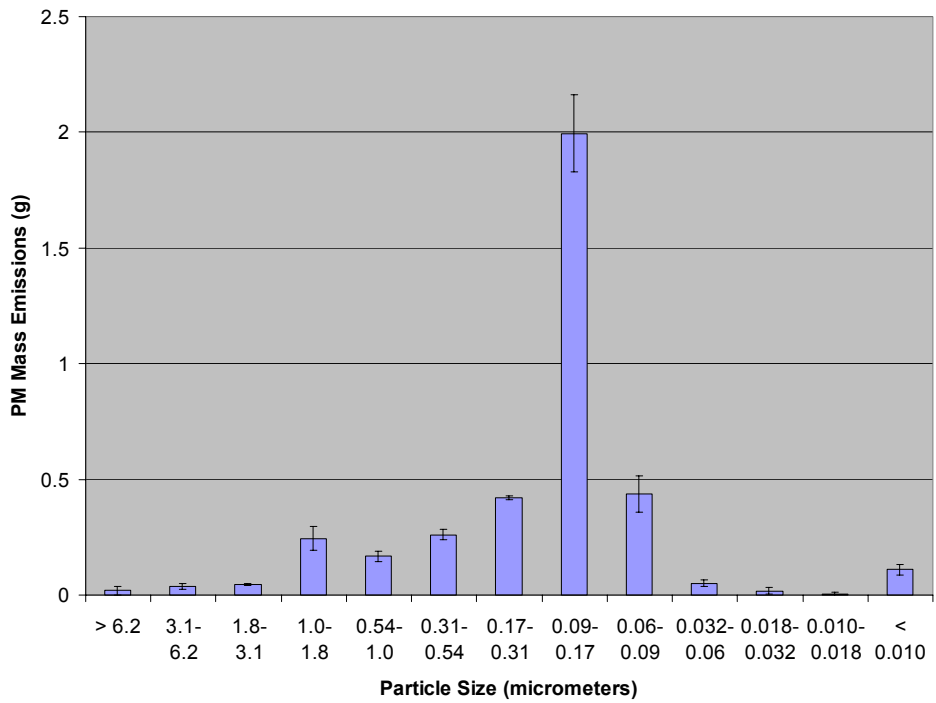


FIGURE 6. US06 MOUDI MASS DISTRIBUTION, 20 g/ft³ DOC

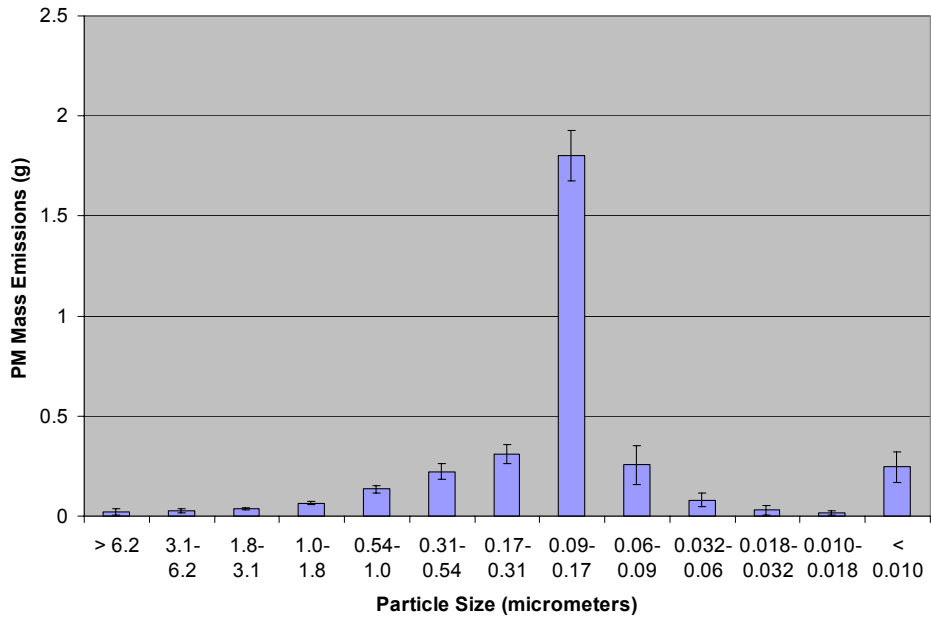


FIGURE 7. FTP MOUDI MASS DISTRIBUTION, 70 g/ft³ DOC

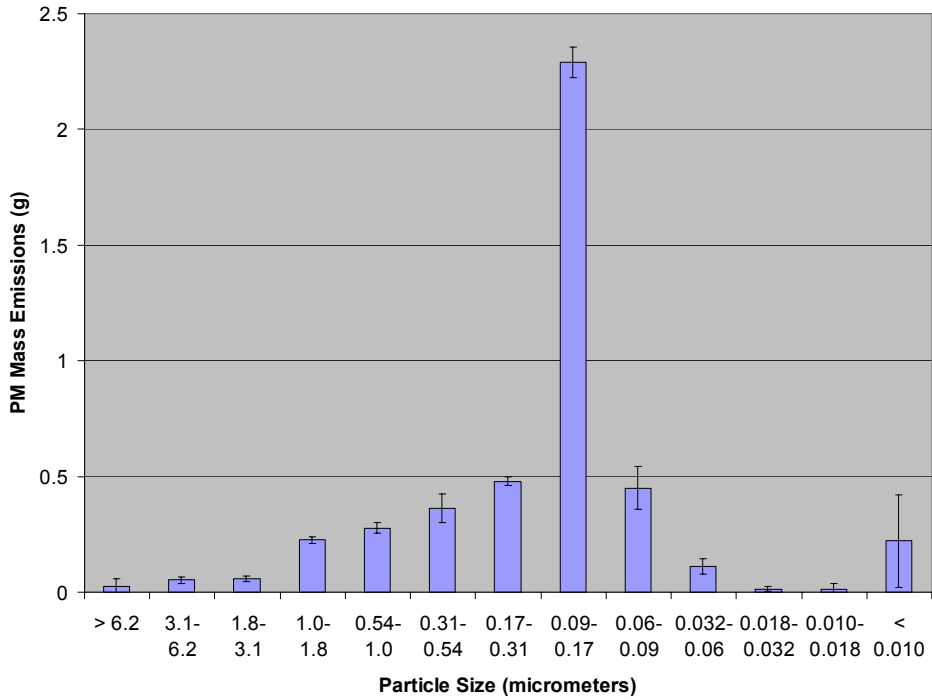


FIGURE 8. US06 MOUDI MASS DISTRIBUTION, 70 g/ft³ DOC

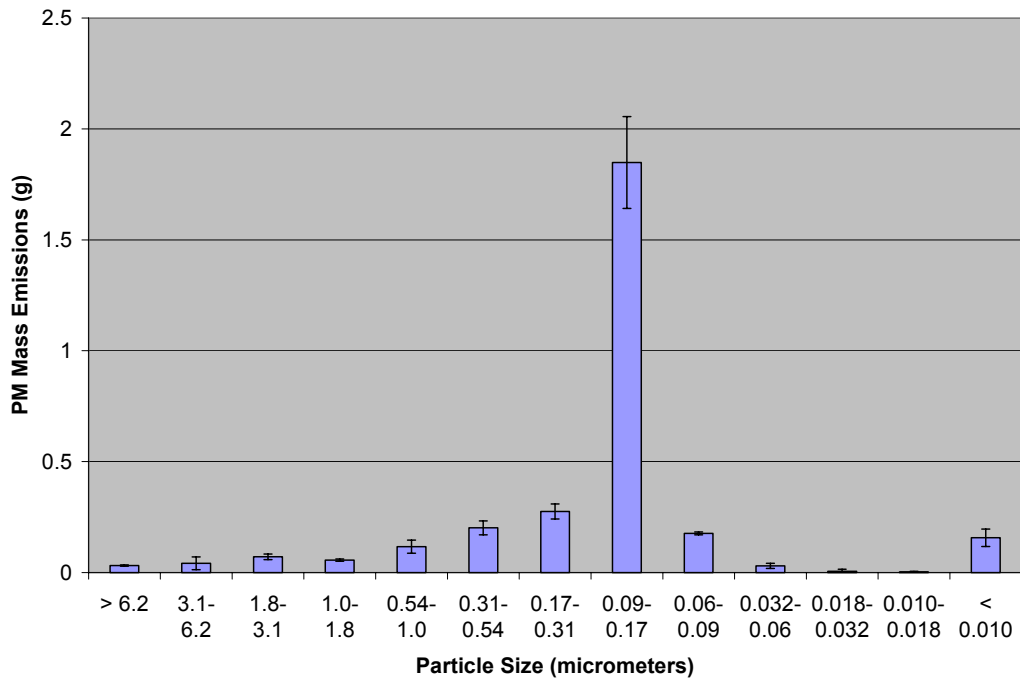


FIGURE 9. FTP MOUDI MASS DISTRIBUTION, 120 g/ft³ DOC

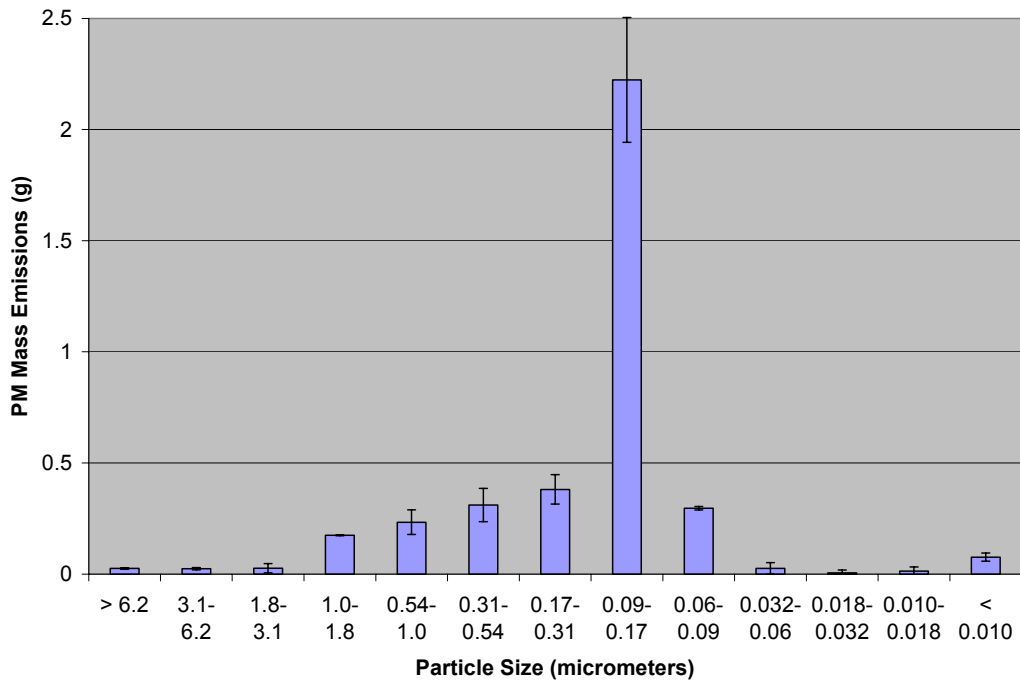


FIGURE 10. US06 MOUDI MASS DISTRIBUTION, 120 g/ft³ DOC

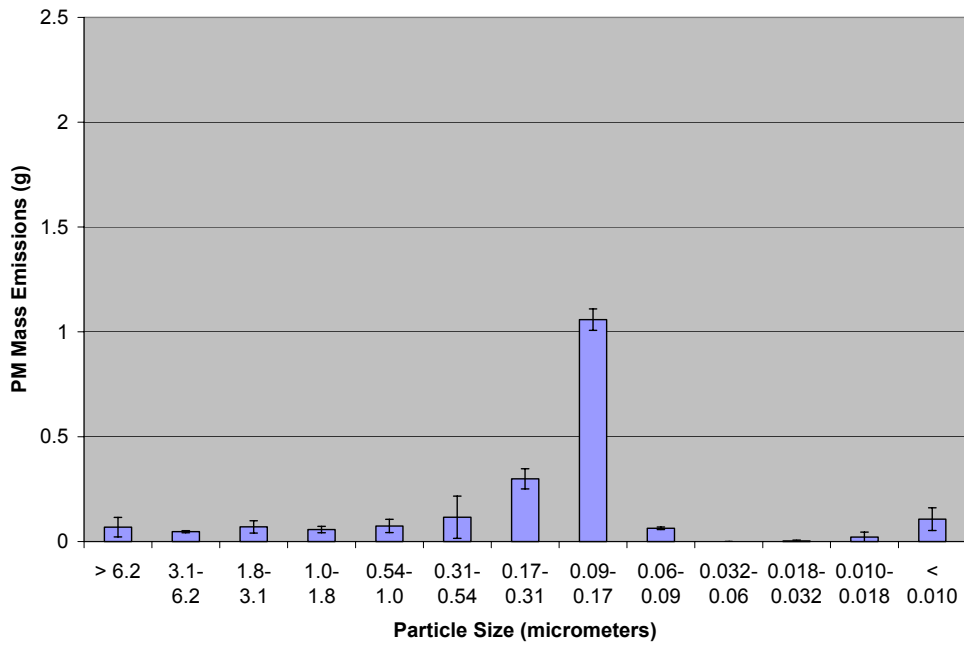


FIGURE 11. FTP MOUDI MASS DISTRIBUTION FOR A SINGLE TEST, NO CATALYST

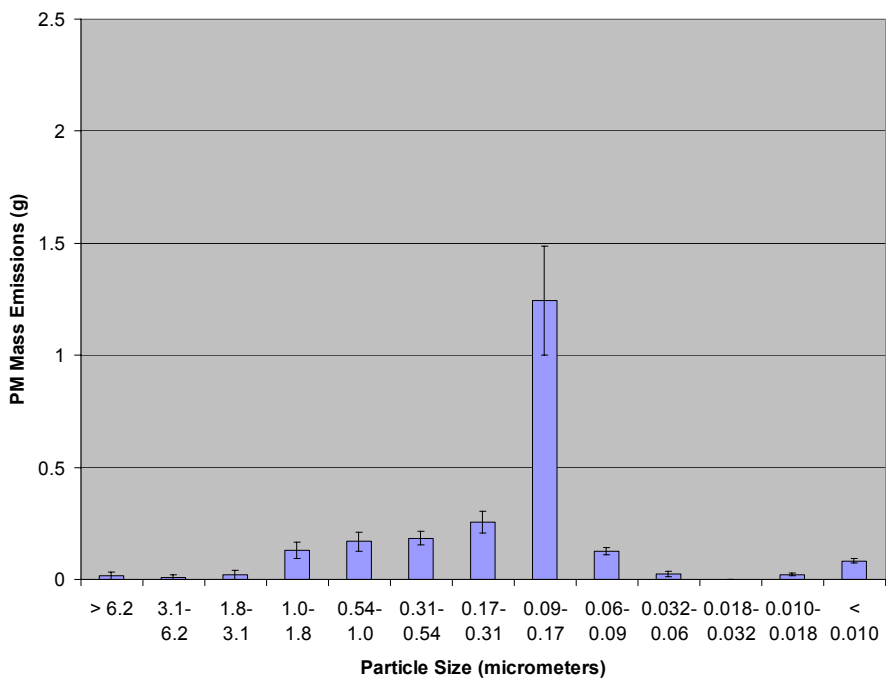


FIGURE 12. US06 MOUDI MASS DISTRIBUTION FOR A SINGLE TEST, NO CATALYST

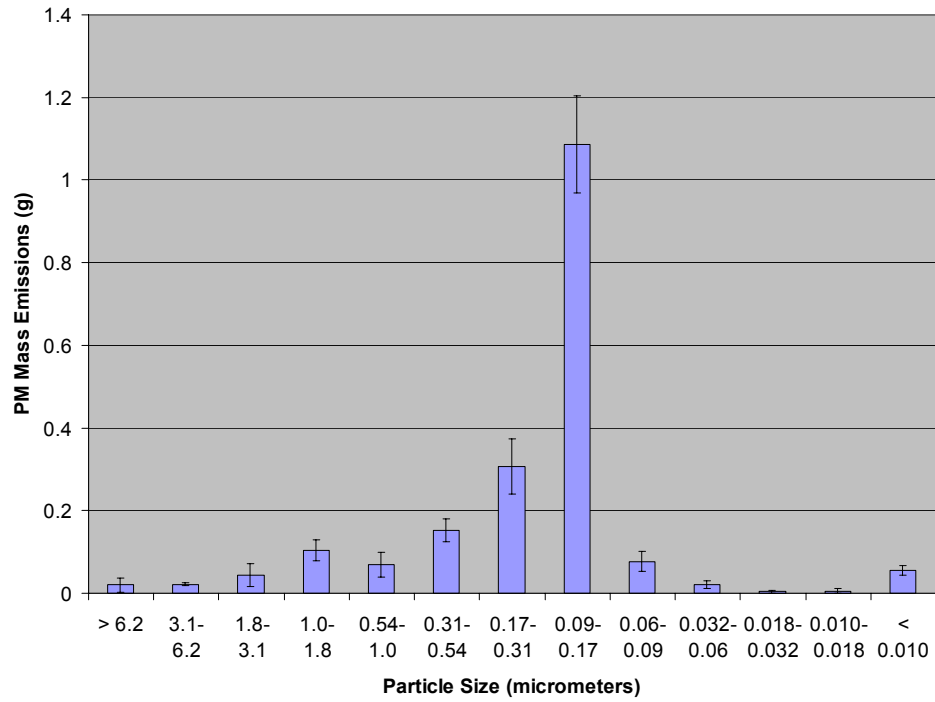


FIGURE 13. SS1 MOUDI MASS DISTRIBUTION, 20 g/ft³ DOC

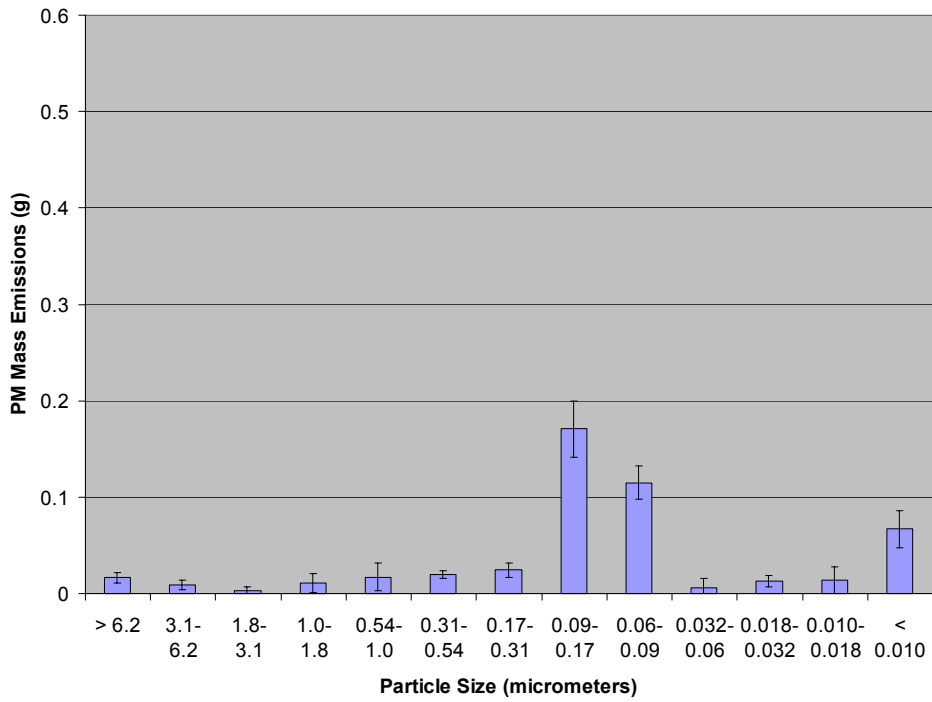


FIGURE 14. SS2 MOUDI MASS DISTRIBUTION, 20 g/ft³ DOC

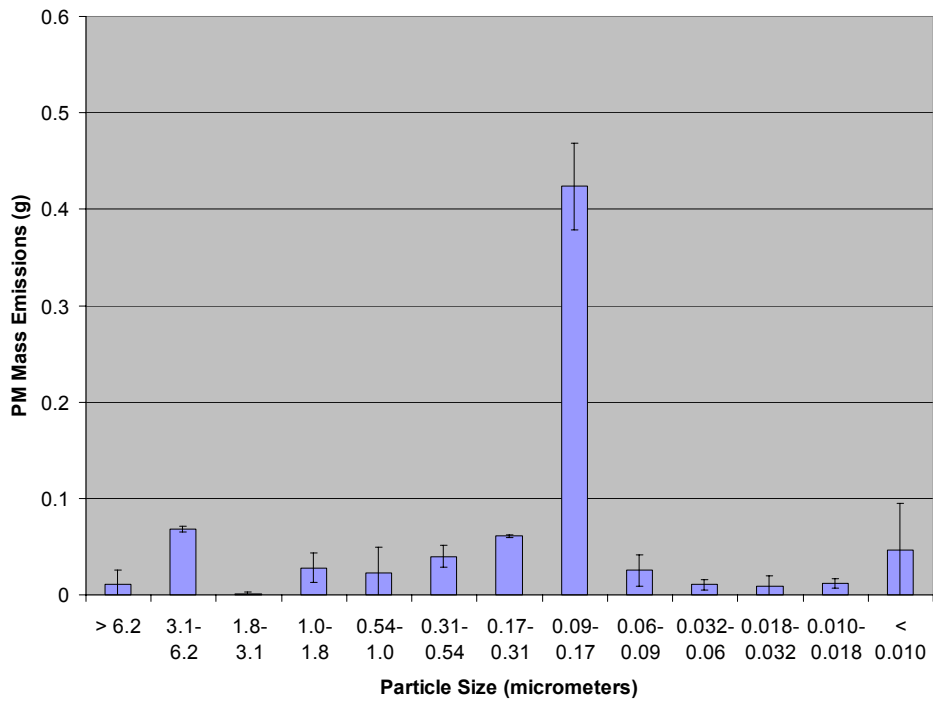


FIGURE 15. SS3 MOUDI MASS DISTRIBUTION, 20 g/ft³ DOC

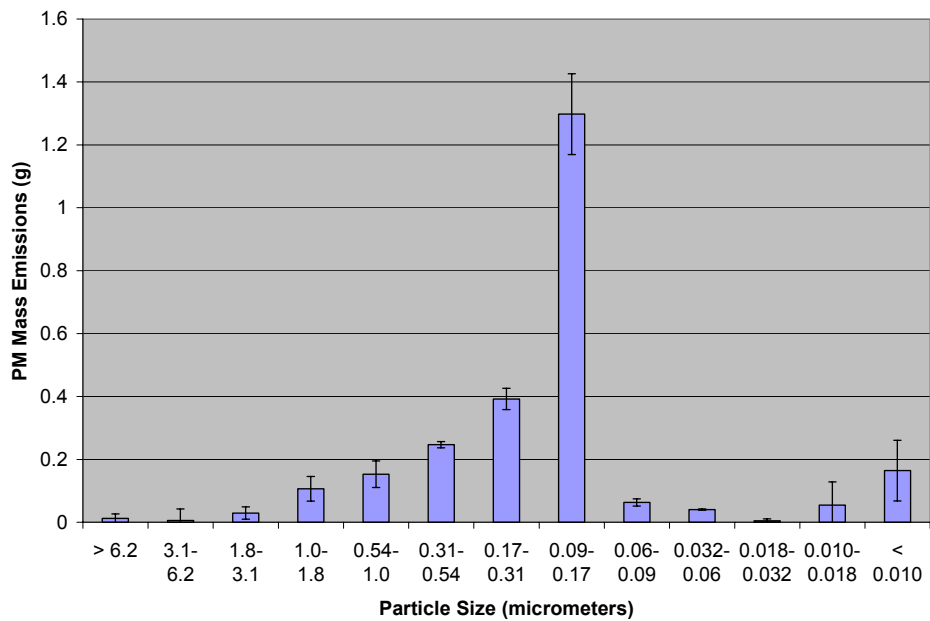


FIGURE 16. SS1 MOUDI MASS DISTRIBUTION, 70 g/ft³ DOC

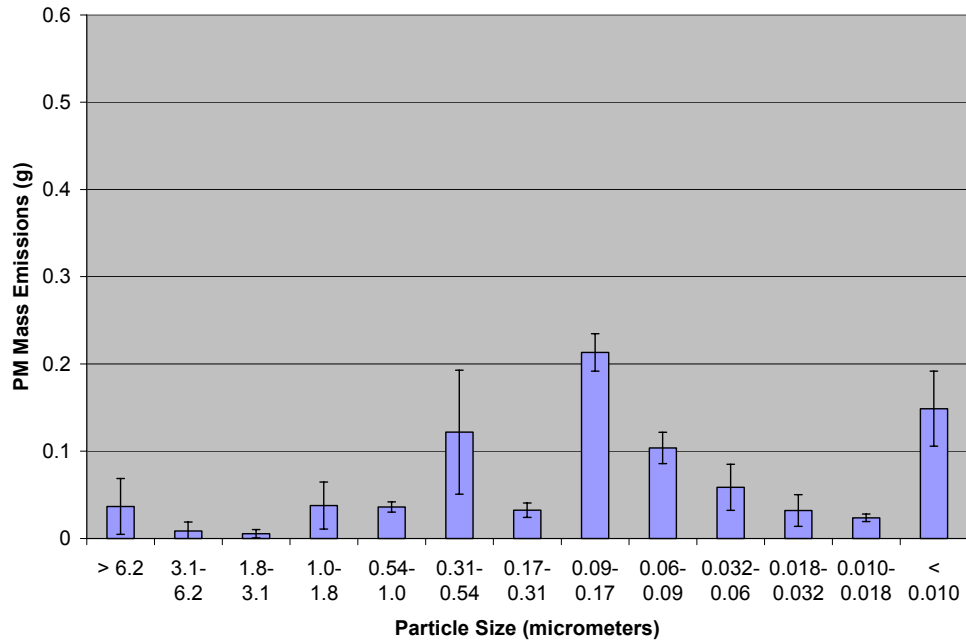


FIGURE 17. SS2 MOUDI MASS DISTRIBUTION, 70 g/ft³ DOC

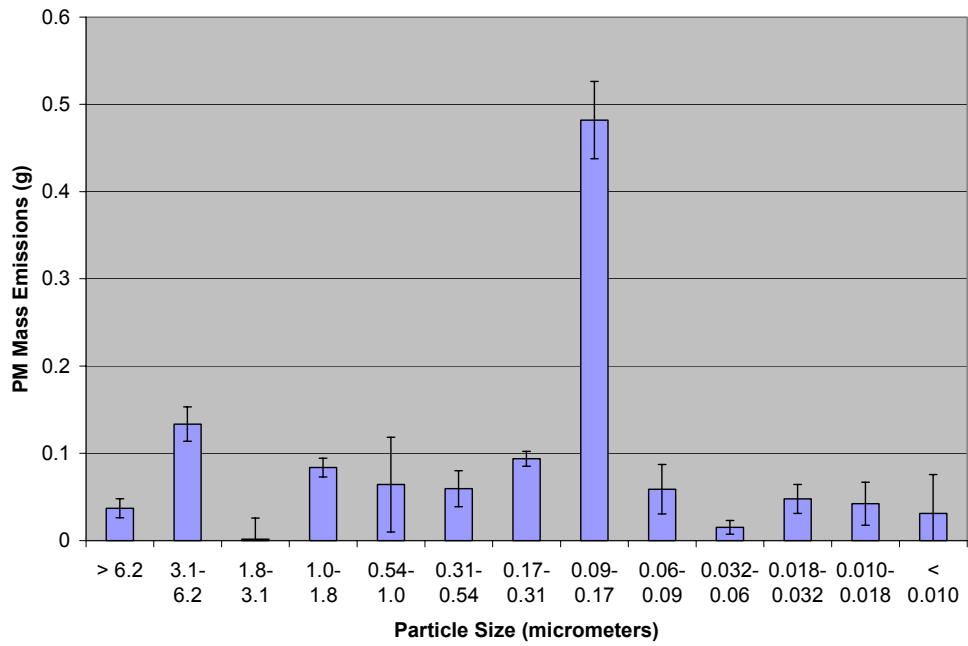


FIGURE 18. SS3 MOUDI MASS DISTRIBUTION, 70 g/ft³ DOC

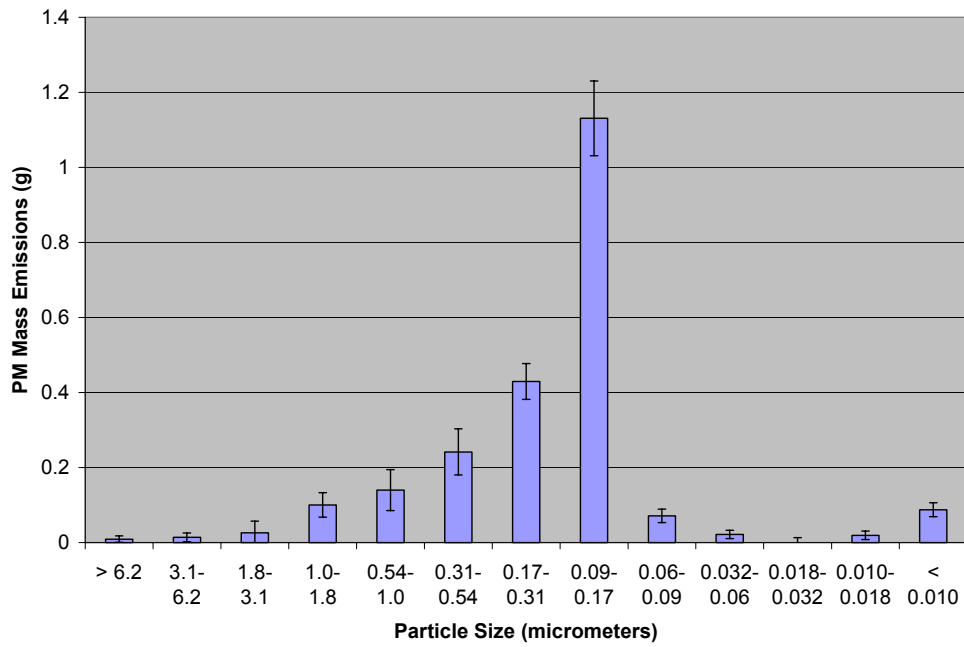


FIGURE 19. SS1 MOUDI MASS DISTRIBUTION, 120 g/ft³ DOC

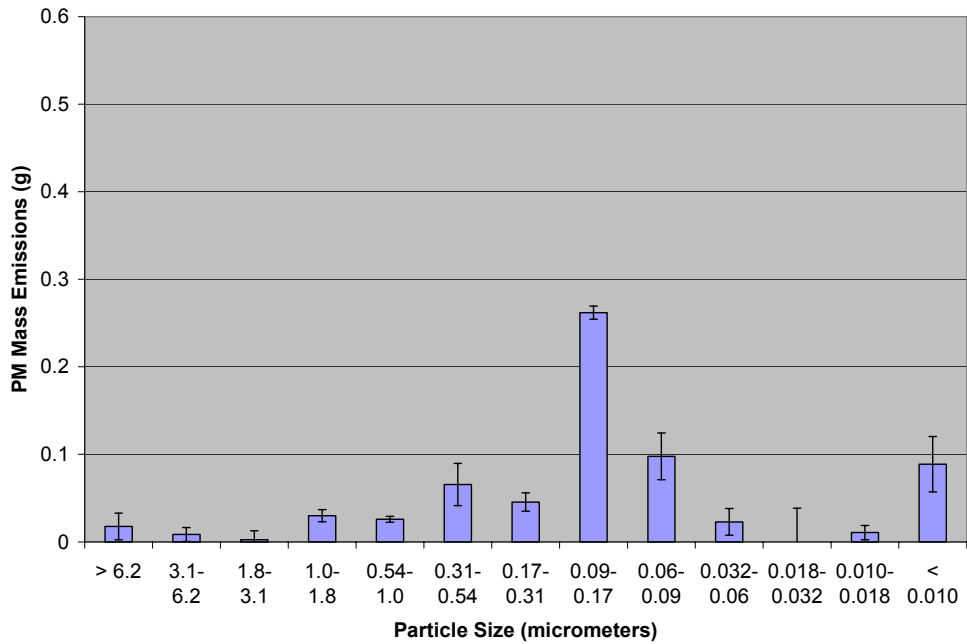


FIGURE 20. SS2 MOUDI MASS DISTRIBUTION, 120 g/ft³ DOC

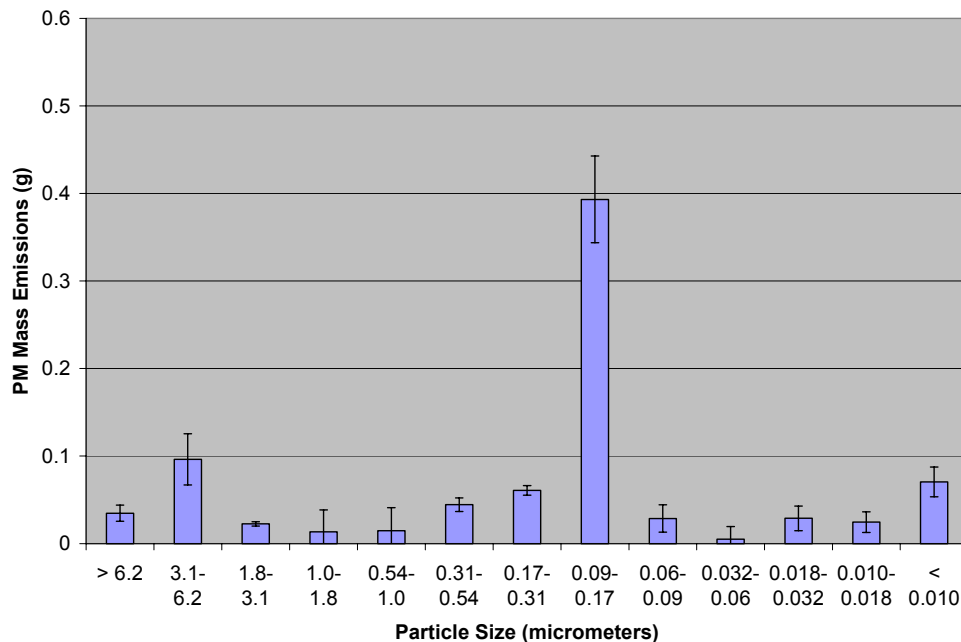


FIGURE 21. SS3 MOUDI MASS DISTRIBUTION, 120 g/ft³ DOC

The MOUDI mass distributions for the steady-state cycles from the system without a catalyst are shown in Figures 22, 23, and 24. For SS1, the distribution with no catalyst installed shows both a similar profile and similar bin masses as the catalyzed systems. The SS1 cycle makes similar amounts of particulate with or without the catalyst installed. At the higher engine loading of the cycle, this suggests much of the particulate produced is dry soot. The low amount of volatile particulate produced during this cycle means that the presence of a catalyst will not have a large effect on particulate emissions.

The SS2 distribution (Figure 23) shows the largest gains in bin mass of any reported cycle for the system with no catalyst. In one test cycle, this system produces bin masses that are similar to those generated by the catalyzed systems in three complete test cycles. This suggests that the particulate emissions for these bins are approximately three times as high without a DOC, and Table 10 shows that the total particulate emissions for the system without a catalyst are about 3.5 times higher. This moderately loaded cycle generates significantly more wet particulate than the highly loaded SS1, while still maintaining reasonable catalyst activity with a 260°C inlet temperature (Figure 25) on the catalyzed systems. Without the catalyst, the tailpipe emissions of all the particulate size bins are significantly increased. Under these conditions, the catalysts are effective in reducing volatiles.

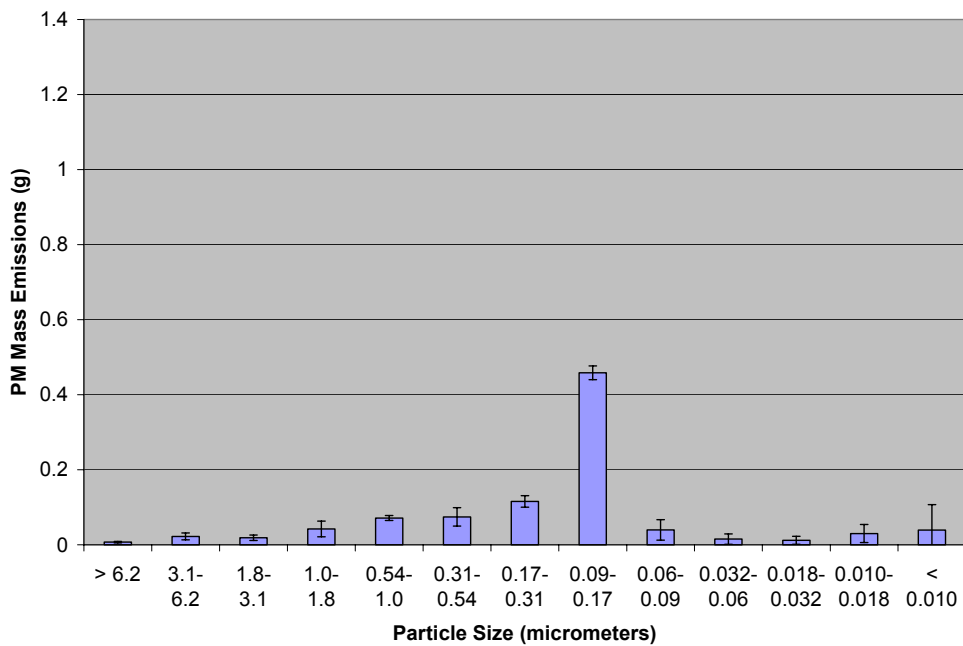


FIGURE 22. SS1 MOUDI MASS DISTRIBUTION FOR A SINGLE TEST, NO CATALYST

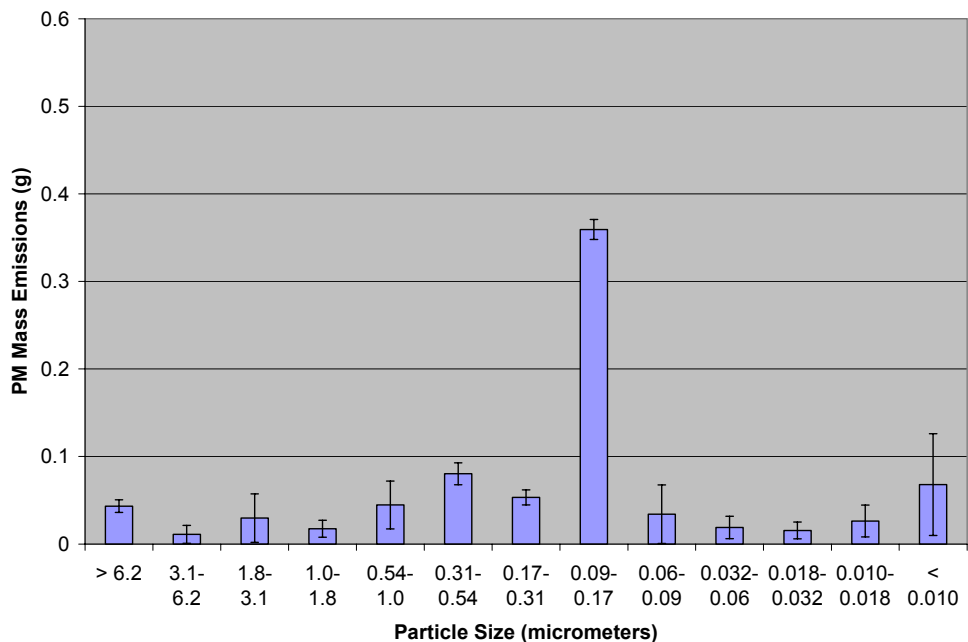


FIGURE 23. SS2 MOUDI MASS DISTRIBUTION FOR A SINGLE TEST, NO CATALYST

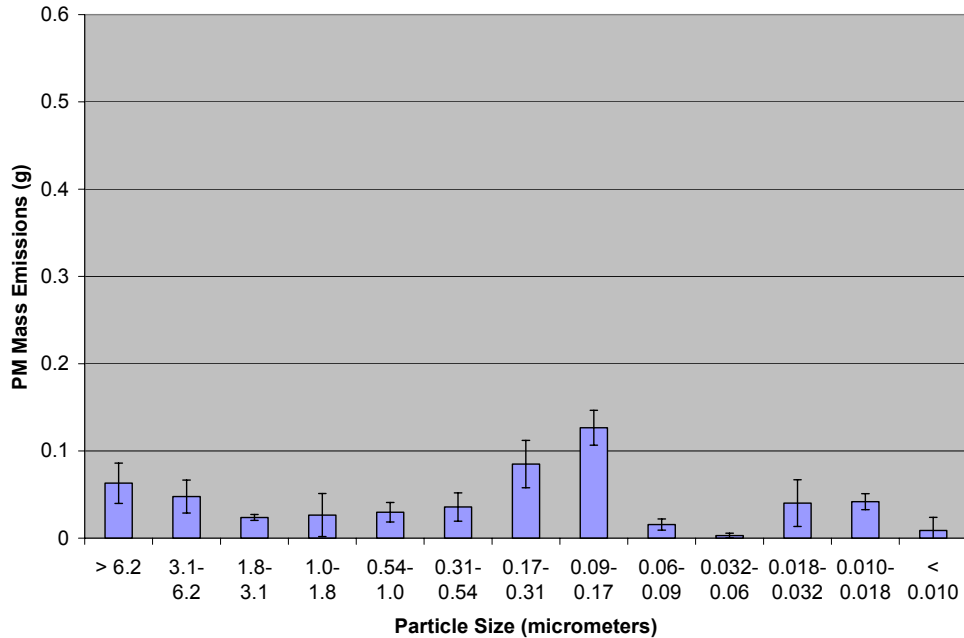


FIGURE 24. SS3 MOUDI MASS DISTRIBUTION FOR A SINGLE TEST, NO CATALYST

The distribution for the SS3 cycle (idle) is shown in Figure 24. This cycle also generates a significant fraction of wet particulate, but the low catalyst inlet temperatures (Figure 25) mean that the catalyzed systems do not have nearly the conversion efficiency seen in SS2. For this reason, the increase in particulate per test for the SS3 cycle is not as great as is seen in SS2. The MOUDI distribution for the SS3 cycle is also a lot flatter for the system without a catalyst, and the 0.09-0.17 micrometer peak is not nearly as dominant. Much of the increase in particulate seen in SS3 without the catalyst is not the result of an increase in the dominant size bin, but the increase in other bins resulting in this flatter distribution.

A comparison of the temperature of each steady-state cycle is shown in Figure 25. This diagram illustrates the turbo outlet (catalyst inlet) temperature for each of the three steady-state cycles and helps to explain how the nature of the particulate changes with each point.

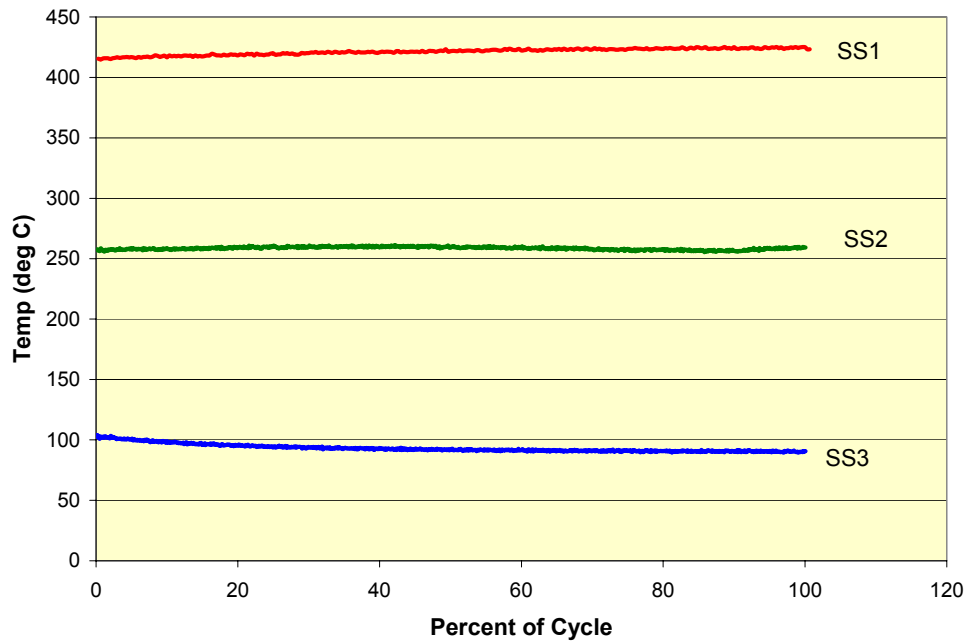


FIGURE 25. CATALYST INLET TEMPERATURE COMPARISON FOR STEADY-STATE CYCLES

3. Overall MOUDI Comparison

Comparisons between the three catalyzed systems and the system without a catalyst are shown in Figures 26 through 30. The mass amounts shown are for three tests of each cycle, so the values for the system without a catalyst are three times higher than those shown in the figures above. These comparison charts better illustrate the differences that each catalyst makes in particle mass and distribution compared to the system without a catalyst.

In order to verify the emission results determined with the MOUDI, the total mass collected on MOUDI foils over triplicate cycles with the 20g/ft³ DOC can be compared to the total particulate mass collected on the T60A20 47mm filters. The total masses collected using the MOUDI and 47mm T60A20 filters during triplicate FTP cycles are shown in Table 11. Table 12 lists the same comparison over the US06. This comparison was only done for the two transient cycles.

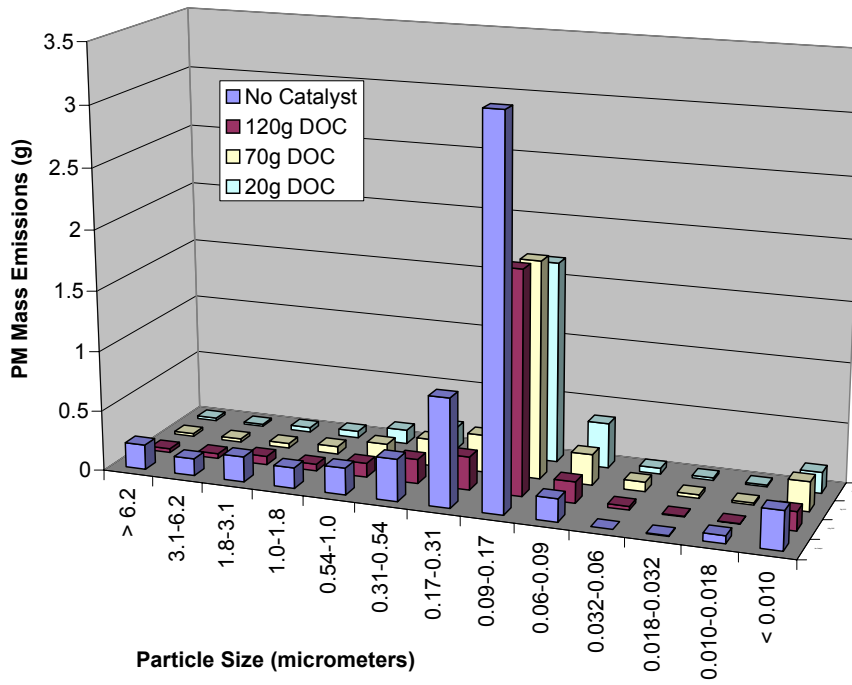


FIGURE 26. FTP MOUDI MASS PER 3 TESTS

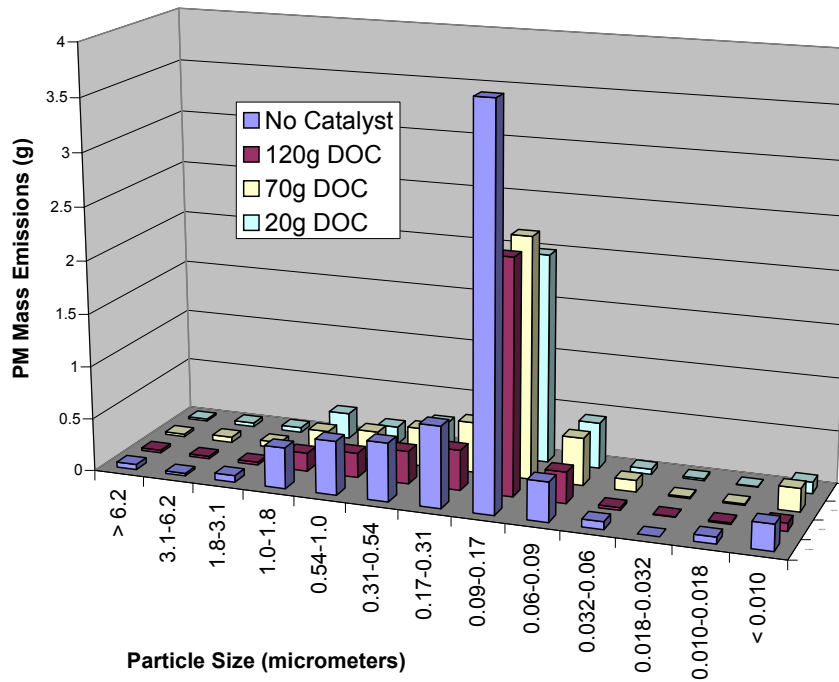


FIGURE 27. US06 MOUDI MASS PER 3 TESTS

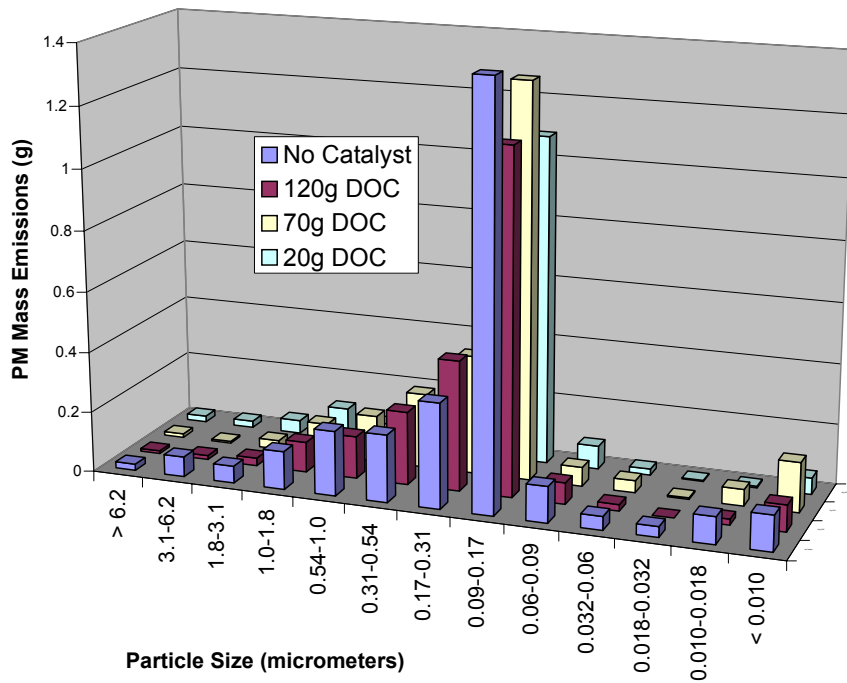


FIGURE 28. SS1 MOUDI MASS PER 3 TESTS

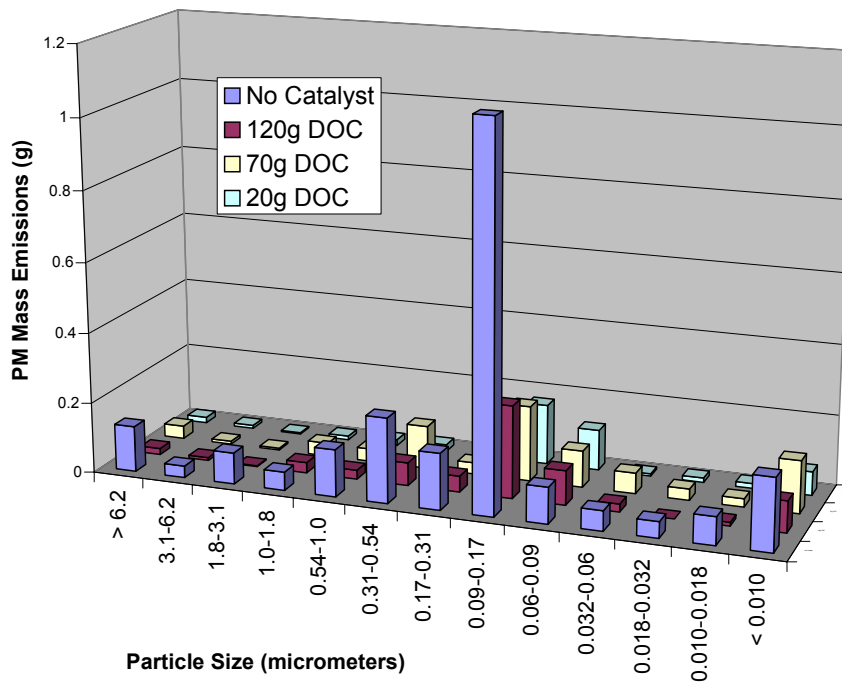


FIGURE 29. SS2 MOUDI MASS PER 3 TESTS

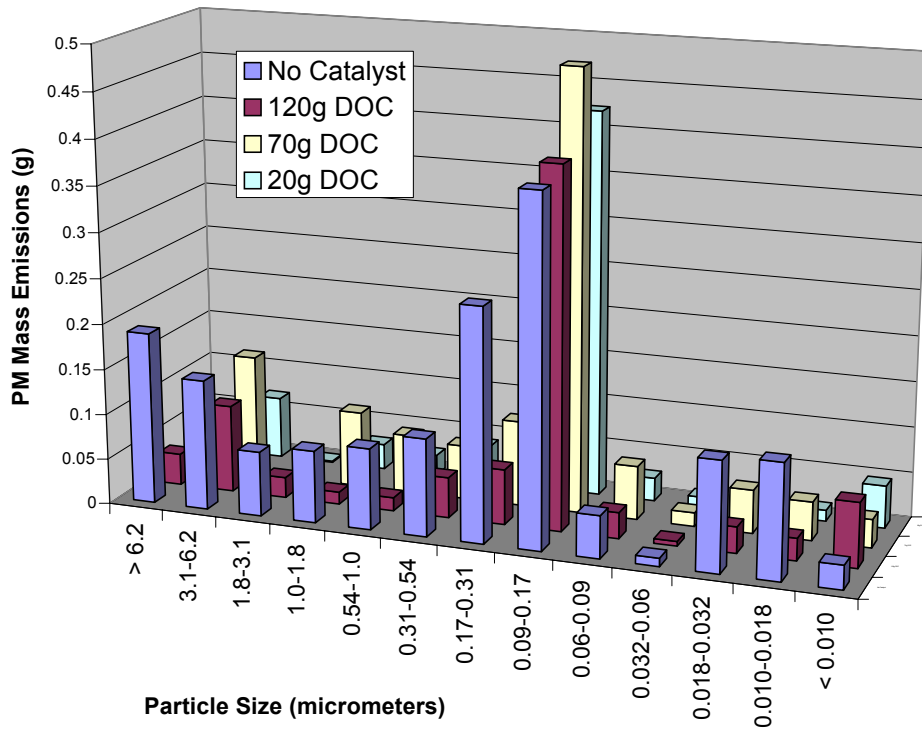


FIGURE 30. SS3 MOUDI MASS PER 3 TESTS

TABLE 11. COMPARISON OF MASS EMISSIONS MEASURED BY MOUDI AND 47mm FILTERS FOR THE FTP (20 g/ft³ DOC)

Test Set	Total MOUDI Mass (g)	Total 47mm Filter Mass (g)	Percent Difference
Set 1	2.31	2.53	(-)8.7%
Set 2	3.55	2.49	(+)43%
Set 3	3.42	2.77	(+)23%

TABLE 12. COMPARISON OF MASS EMISSIONS MEASURED BY MOUDI AND 47mm FILTERS FOR THE US06 (20 g/ft³ DOC)

Test Set	Total MOUDI Mass (g)	Total 47mm Filter Mass (g)	Percent Difference
Set 1	3.68	2.90	(+)27%
Set 2	3.81	3.14	(+)21%
Set 3	3.94	3.02	(+)30%

The MOUDI and 47mm sample systems have different media, dilution ratios, and collection temperatures, so some differences are expected; however, the general similarity between the two measurements lends some credibility to the MOUDI values shown in the figures above. There appears to be an offset between the two filter masses for most of the comparisons, however, and much of the variation in MOUDI total mass, especially for the FTP, is the result of variability in the 0.09-0.17 micrometer size bin. This bin accounts for much of the total mass of each MOUDI set.

C. Particle Number and Sizing

Particle number and size measurements were performed during three repeats of the test sequence, which included the FTP and US06 driving cycles and steady-state runs at 45 mph (SS1), 22 mph (SS2), and idle (SS3). The ELPI measured particles continuously on a second-by-second basis, covering a size range from 32 nm to 10,000 nm during all three tests. The SMPS measured one size during each test sequence, either 10 nm, 20 nm, or 30 nm.

The particle sizing results for the 20g/ft³ DOC are shown in Figures 31 through 35. These display the particle number-weighted size distributions at the tailpipe and upstream of the DOC for the FTP, US06, SS1, SS2, and SS3, respectively. Generally, the distributions are monomodal in shape with slightly higher particle number for the tailpipe emissions compared to the upstream of DOC. This is especially true for the size range below 80 nm, particularly during the US06, SS1, and SS2.

Figure 36 shows the geometric number mean diameter measured at the tailpipe and upstream of DOC for all test runs with the 20g/ft³ DOC. Generally, the number mean diameter measured at the tailpipe was lower than upstream of DOC, particularly for the high temperature conditions like the US06, SS1, and SS2, where nanoparticles are expected to form due to catalytic activity converting SO₂ to SO₃. Figure 37 shows a comparison of the total number of particles emitted during each drive cycle. Generally, tailpipe emissions were 20 to 75 percent higher than upstream of the DOC, depending on the driving conditions. The greatest increase was observed during SS2, followed by the US06. The highest number of emissions were for the US06 at 70 million part./cm³, followed by the FTP and SS1 each at about 30 million part./cm³, and SS2 and SS3 at about 10 to 20 million part./cm³ each. The error bars are only shown on the steady-state cycles because each transient test was made once at a single size bin. The fact that the steady-state points were run for an extended amount of time under a constant engine load is what enables error numbers to be generated for that cycle from only one test.

Figures 38 through 42 show the particle number-weighted size distributions at the tailpipe and upstream of the 70g/ft³ DOC for the FTP, US06, SS1, SS2, and SS3, respectively. Generally, the distributions are monomodal in shape with slightly lower particle number for the tailpipe emissions compared to the upstream of DOC. This is especially apparent for the size range below 42 nm, except for SS2.

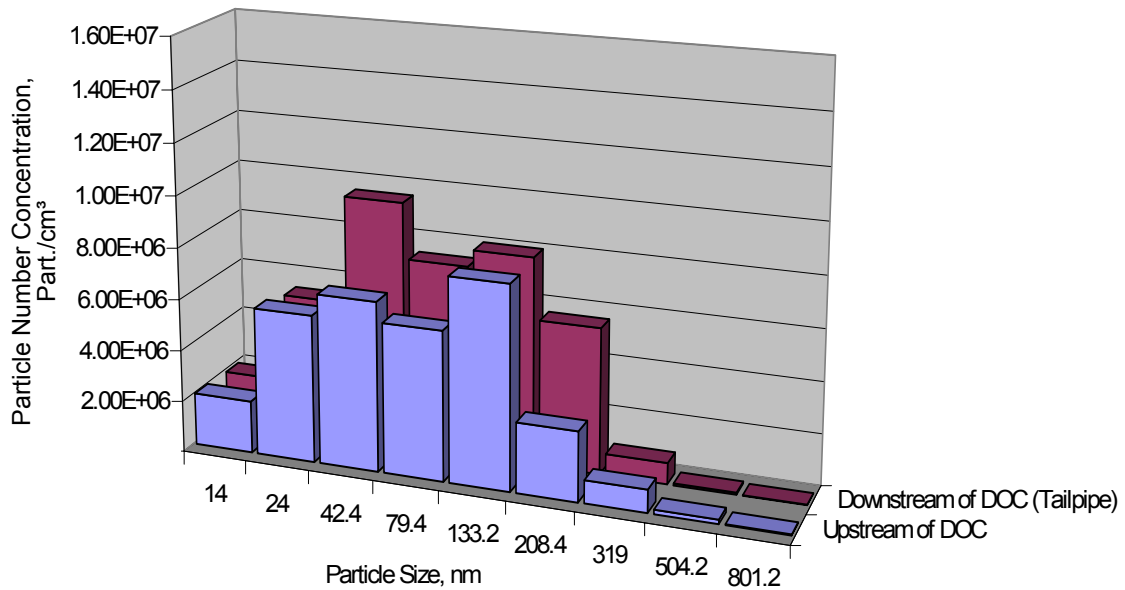


FIGURE 31. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE FTP, 20 g/ft³ DOC

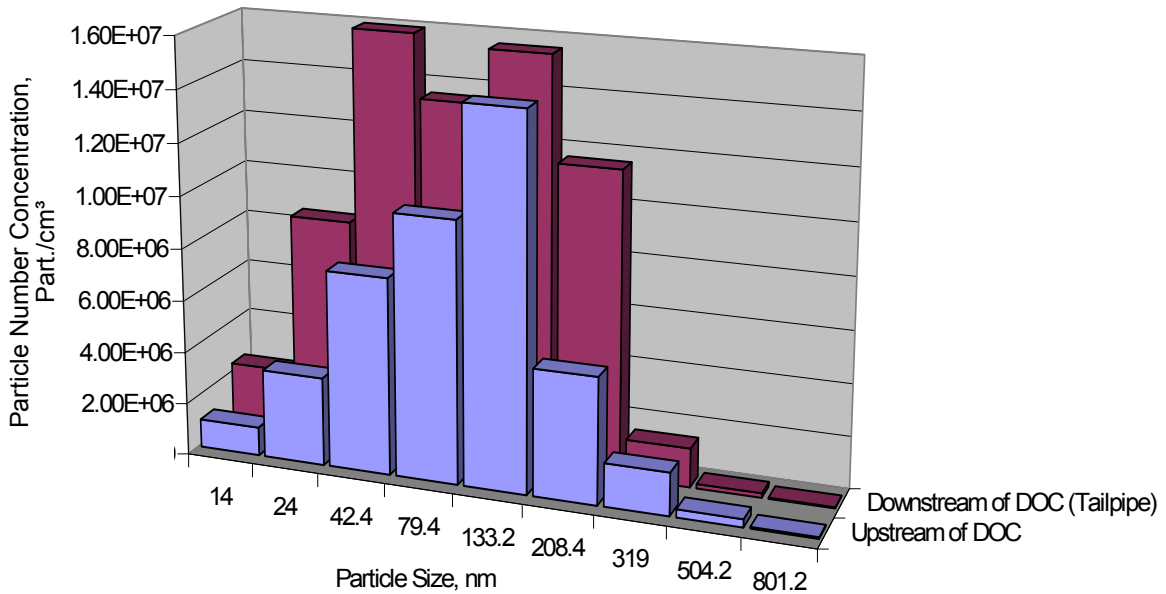


FIGURE 32. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE US06, 20 g/ft³ DOC

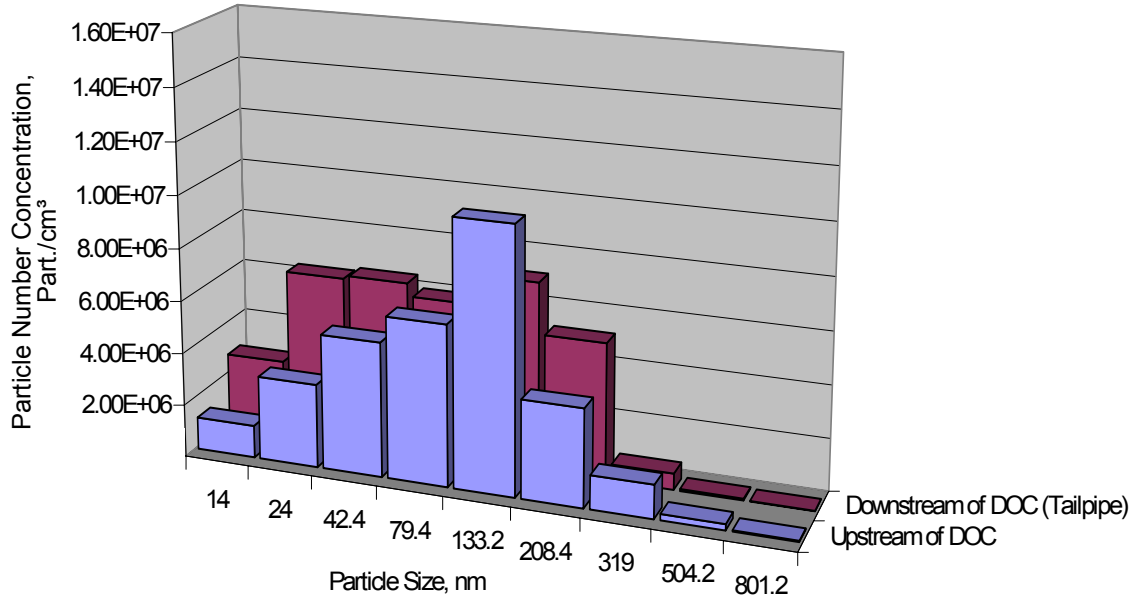


FIGURE 33. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR SS1, 20 g/ft³ DOC

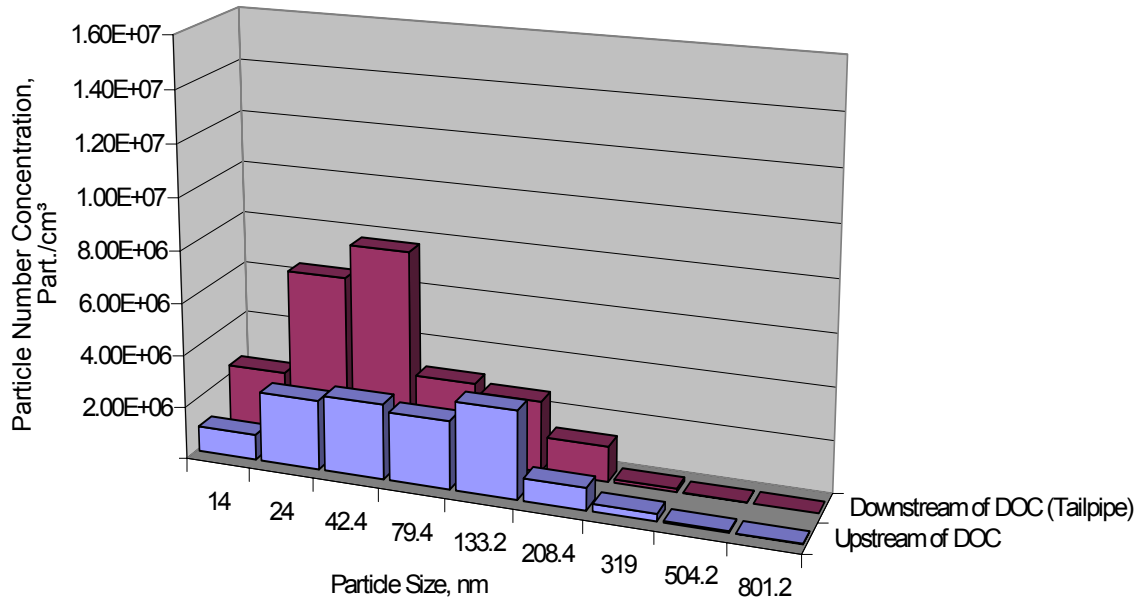


FIGURE 34. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR SS2, 20 g/ft³ DOC

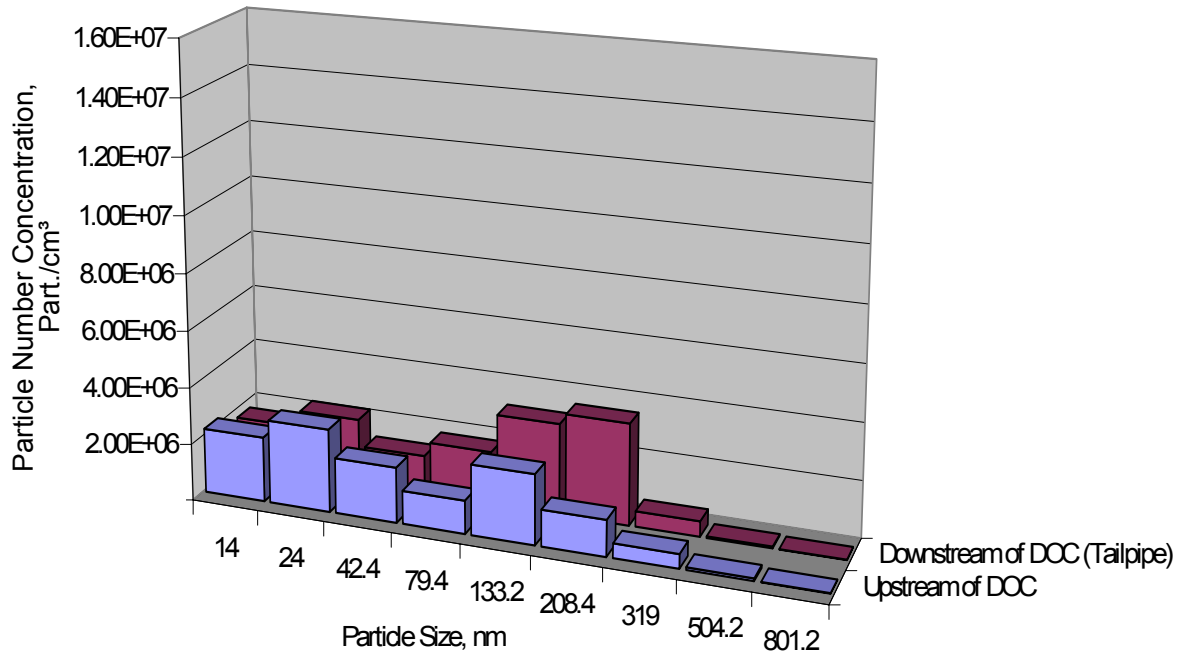


FIGURE 35. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR SS3, 20 g/ft³ DOC

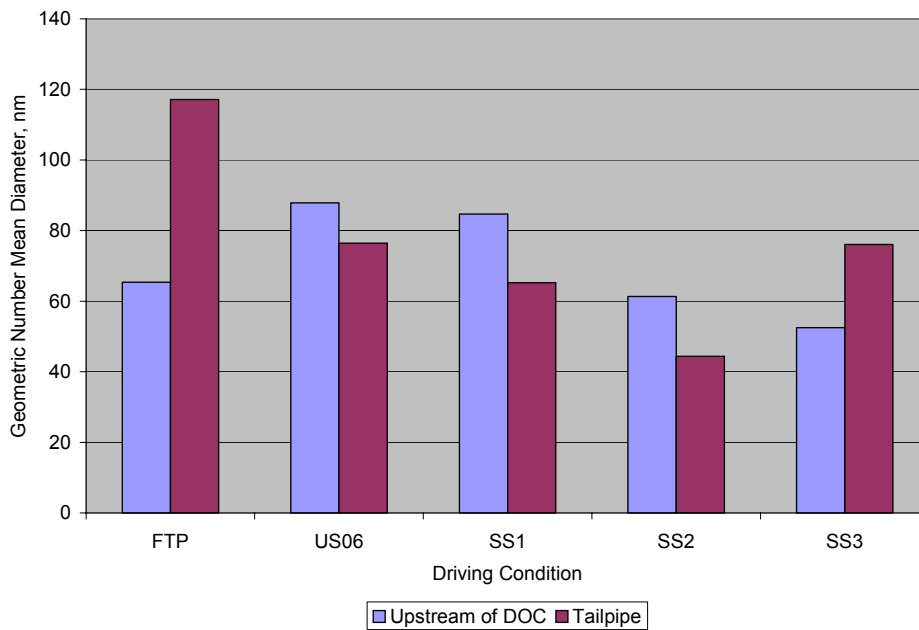


FIGURE 36. GEOMETRIC NUMBER MEAN DIAMETER, 20 g/ft³ DOC

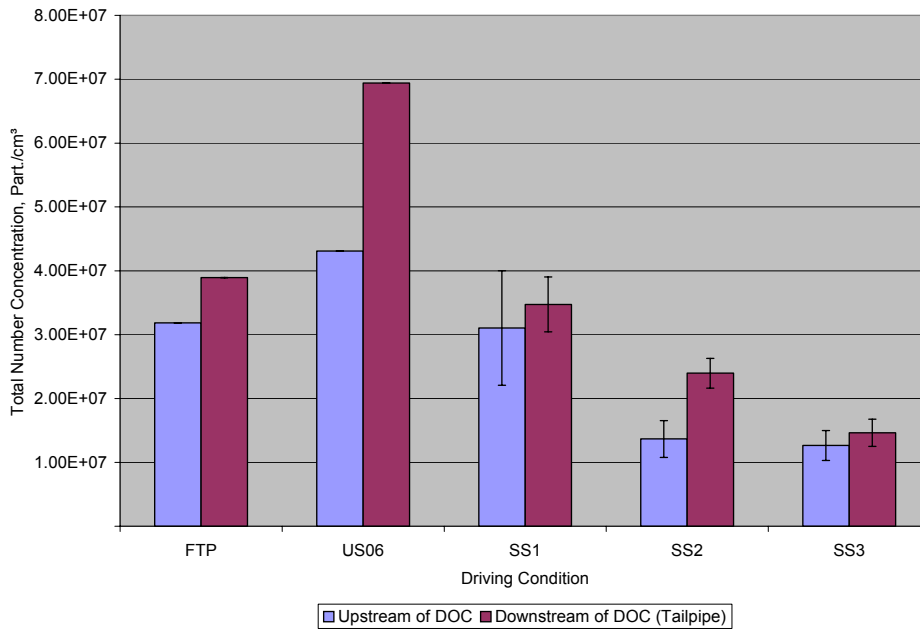


FIGURE 37. TOTAL EXHAUST NUMBER CONCENTRATIONS, 20 g/ft³ DOC

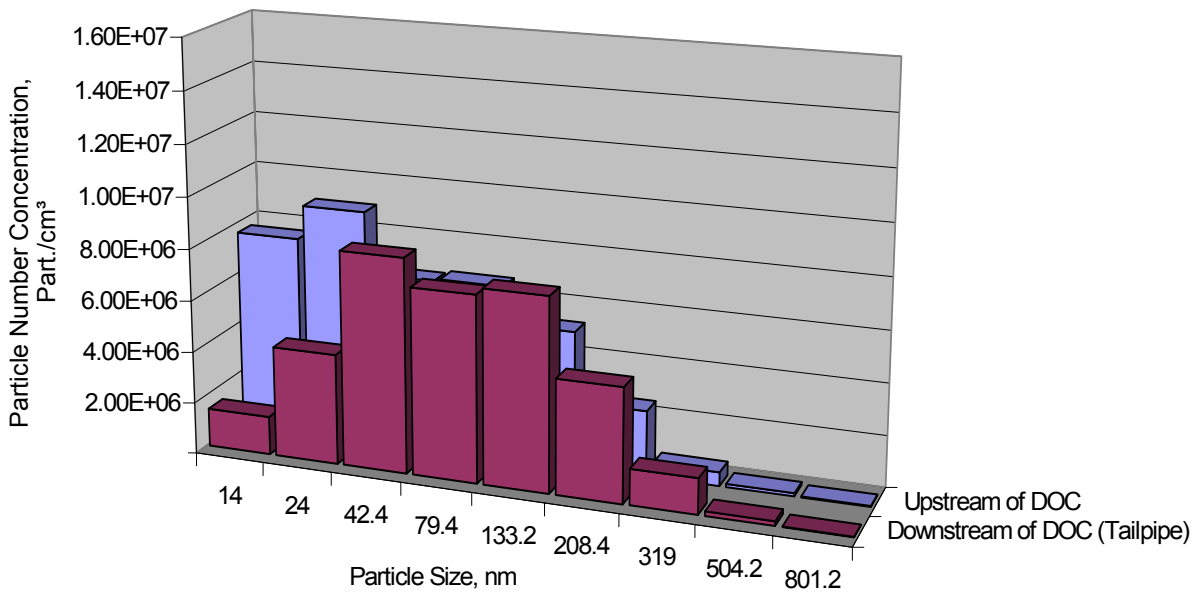


FIGURE 38. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE FTP DRIVING CYCLE, 70 g/ft³ DOC

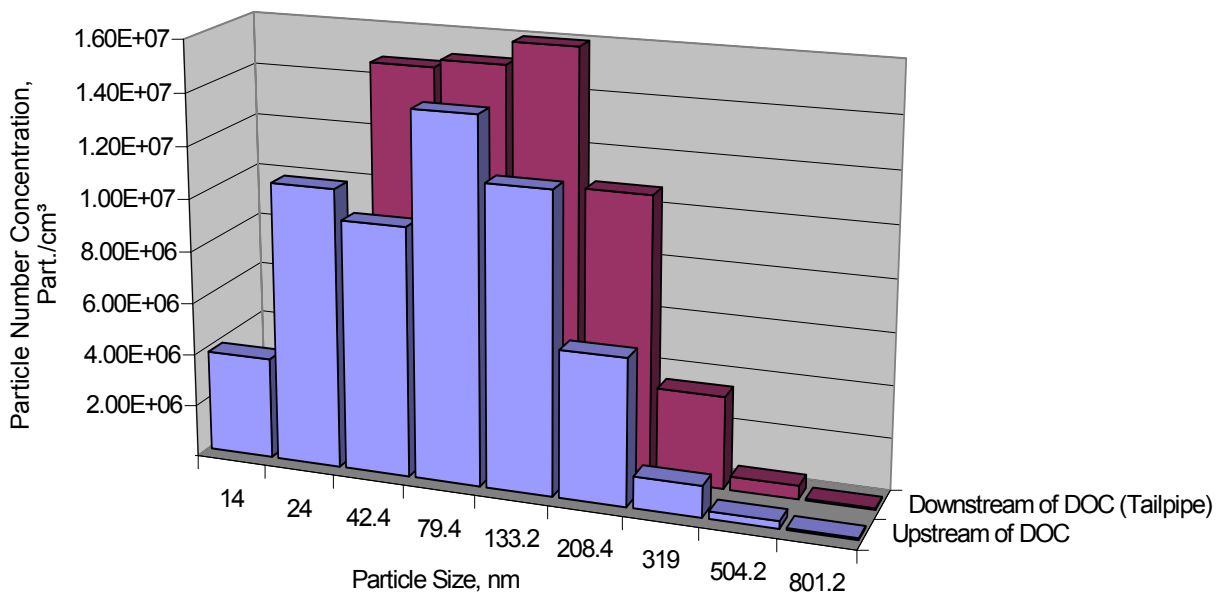


FIGURE 39. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE US06 DRIVING CYCLE, 70 g/ft³ DOC

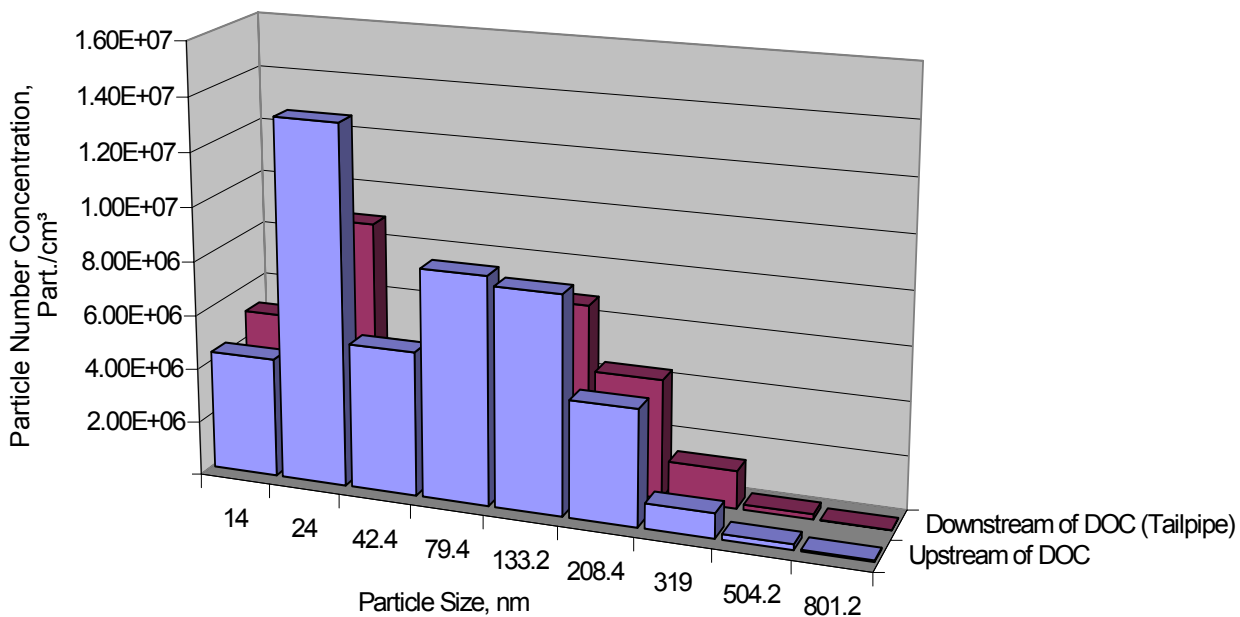


FIGURE 40. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS1 STEADY-STATE RUN, 70 g/ft³ DOC

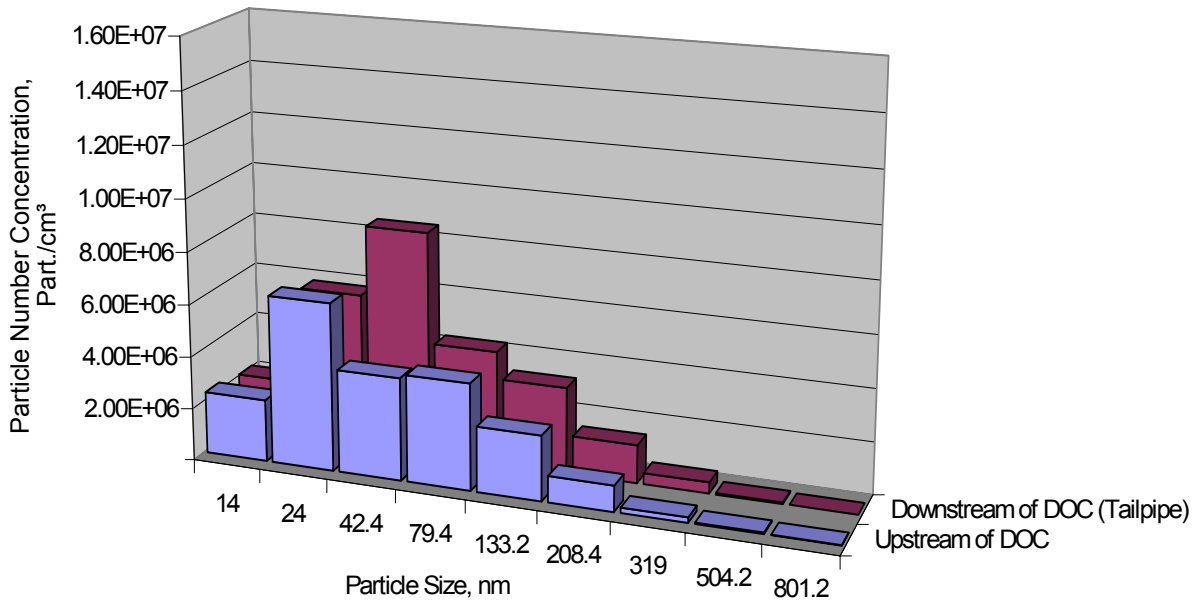


FIGURE 41. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS2 STEADY-STATE RUN, 70 g/ft³ DOC

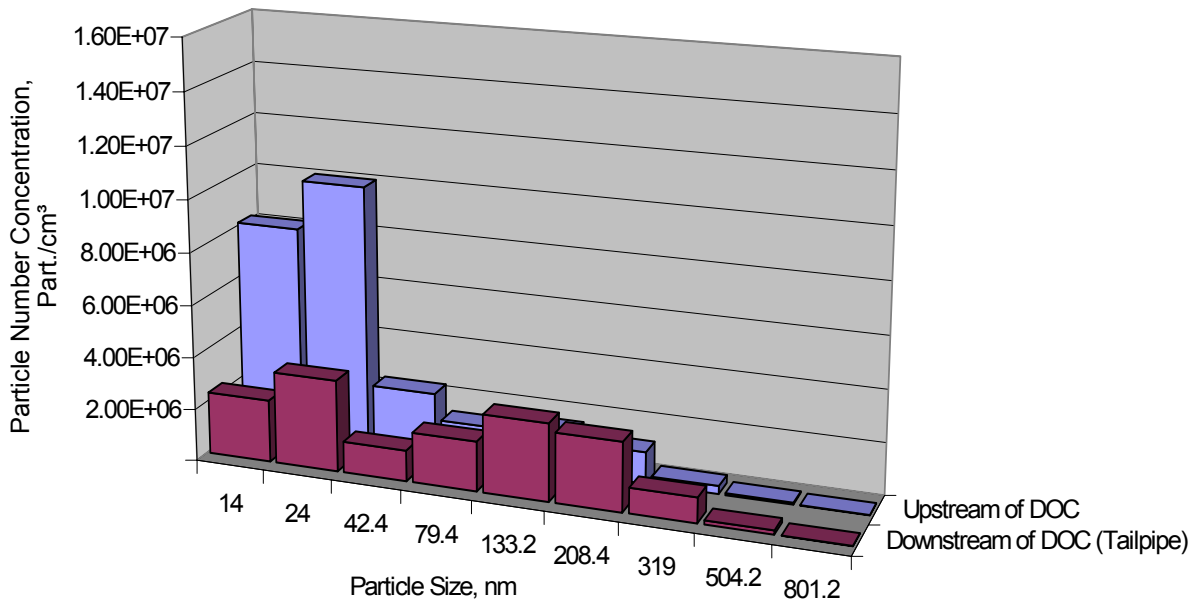


FIGURE 42. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS3 STEADY-STATE RUN, 70 g/ft³ DOC

Figure 43 shows the geometric number mean diameter measured at the tailpipe and upstream of the DOC for all test runs with the 70g/ft³ DOC. Generally, the number mean diameter of the tailpipe size distribution was higher than the size distribution upstream of the DOC. Figure 44 shows a comparison of the total number of particles emitted. Generally, tailpipe total number emissions were comparable to the upstream of DOC emissions. The highest number emission was for the US06 at about 70 million part./cm³, followed by the SS1 and FTP at about 35 to 40 million part./cm³, then the SS2 and SS3 at about 10 to 20 million part./cm³.

It is important to note that the tailpipe number emissions and size distributions with the 70g/ft³ catalyst are similar to the tailpipe emissions tested with the 20g/ft³ DOC. It is also important to note, however, that the nanoparticle emissions upstream of the DOC, particularly in the 14 nm and 24 nm size bins, were about 3 to 5 times higher during these experiments than the previous tests. It is known that the formation of nanoparticles during dilution and cooling of engine exhaust is a highly nonlinear process. Nanoparticles are mainly composed of small sulfuric acid nuclei, unburned and partially burned fuel, and lube oil. Changes in dilution ratio, dilution temperature, or engine running history could trigger or suppress the formation of these volatile particles. Thus, it is not surprising to see variability in the nanoparticle bins, especially when comparing engine out data that was taken weeks or months apart. The catalysts tested, however, have seemed to suppress the growth of nanoparticles due to the removal of volatile material by catalyst oxidation.

Figures 45 through 49 show the particle number-weighted size distributions at the tailpipe and upstream of the 120g/ft³ DOC for the FTP, US06, SS1, SS2, and SS3, respectively. Generally, the distributions are monomodal in shape, except for the SS1 tailpipe measurement. Here the distribution was bimodal in nature with modes at 24 nm and 133 nm. The particle number for the tailpipe emissions was higher compared to the upstream of DOC, especially for the size range below 42 nm, particularly for the US06, SS1, and SS2 driving conditions. For the FTP, the particle distribution downstream of DOC was similar to the distribution upstream of DOC, but with more particles downstream than upstream of DOC, across the size range from 42 nm to 208 nm. This trend did not occur with the 20g/ft³ or 70g/ft³ DOCs, and it was not clear why it occurred with this catalyst.

Figure 50 shows the geometric number mean diameter for all test runs at the tailpipe and upstream of the 120 g/ft³ DOC. The number mean diameter of the tailpipe size distribution was lower than the upstream of DOC size distribution for the US06 and SS1 due to the presence of nanoparticles that biased the number mean diameter to smaller particles. Figure 51 shows a comparison of the total number of particles emitted. Generally tailpipe total number emissions were higher than the upstream DOC emissions. The highest number emission was for the US06 at about 80 million part./cm³, followed by the FTP and SS1 at about 45 and approximately 25 million part./cm³, respectively, and then by the SS2 and SS3 between 15 and 25 million part./cm³.

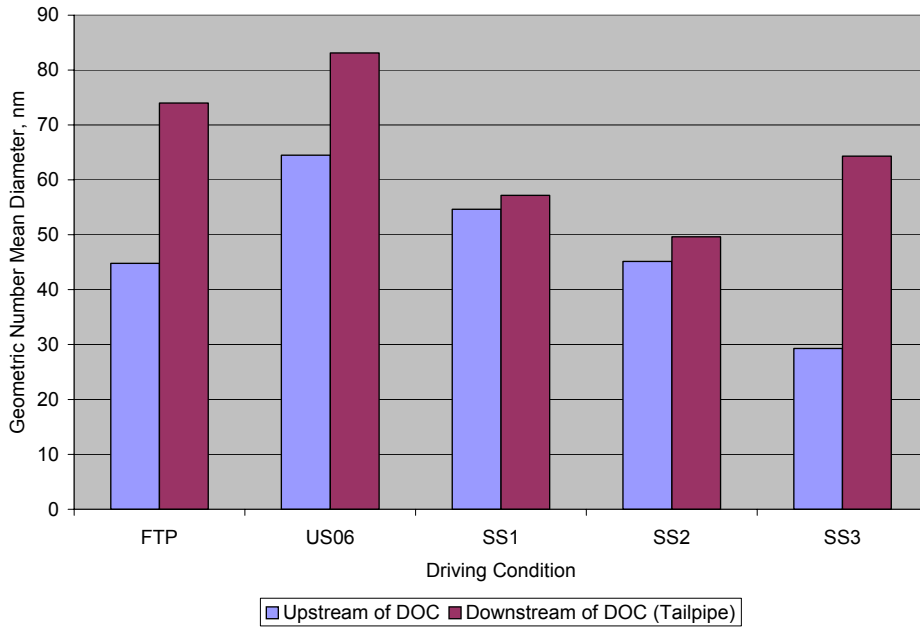


FIGURE 43. GEOMETRIC NUMBER MEAN DIAMETER, 70 g/ft³ DOC

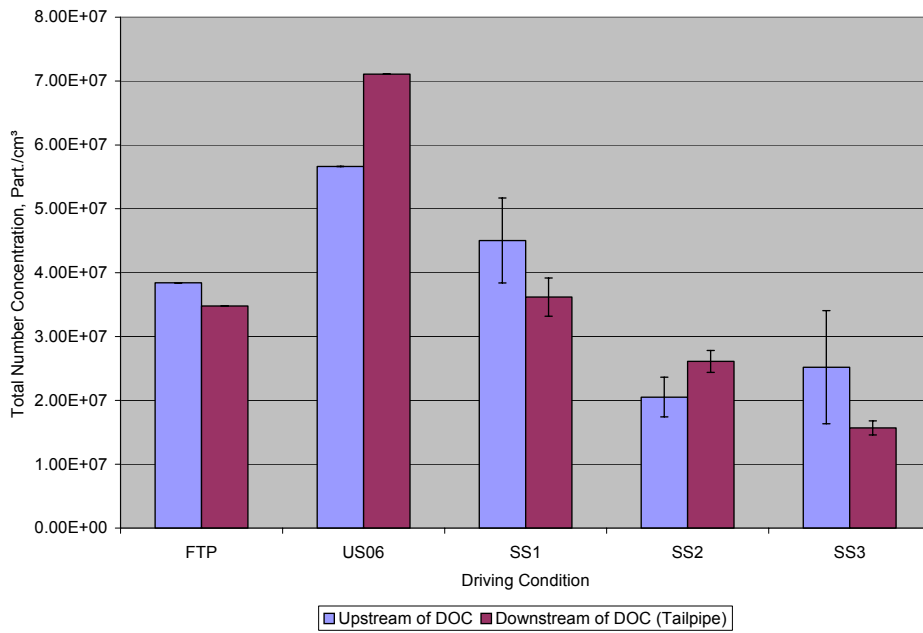


FIGURE 44. TOTAL EXHAUST NUMBER CONCENTRATIONS, 70 g/ft³ DOC

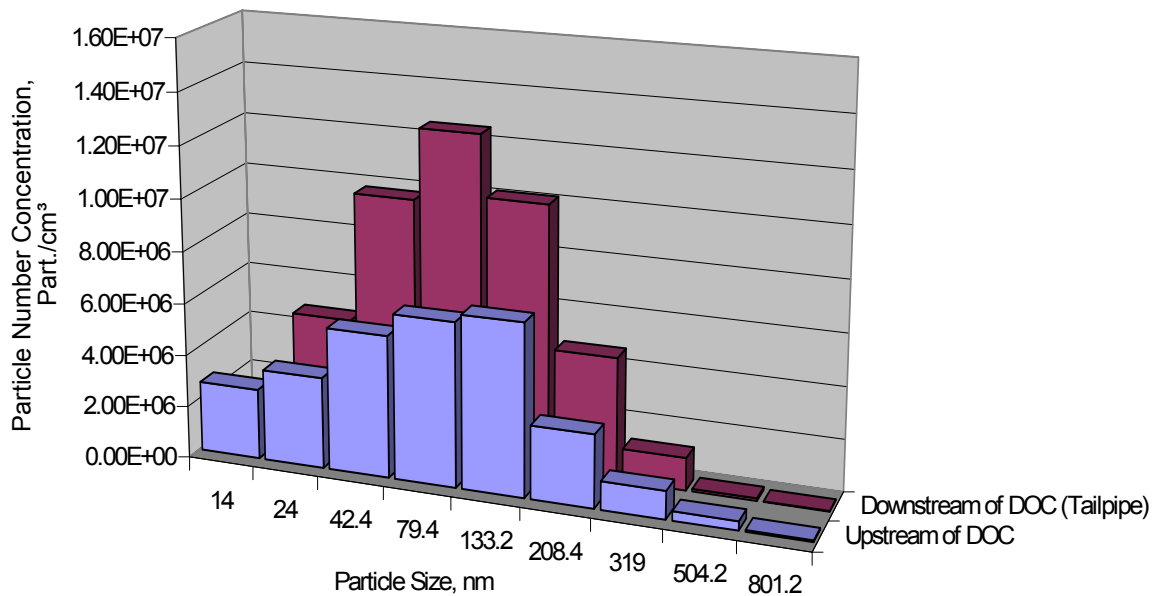


FIGURE 45. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE FTP DRIVING CYCLE, 120 g/ft³ DOC

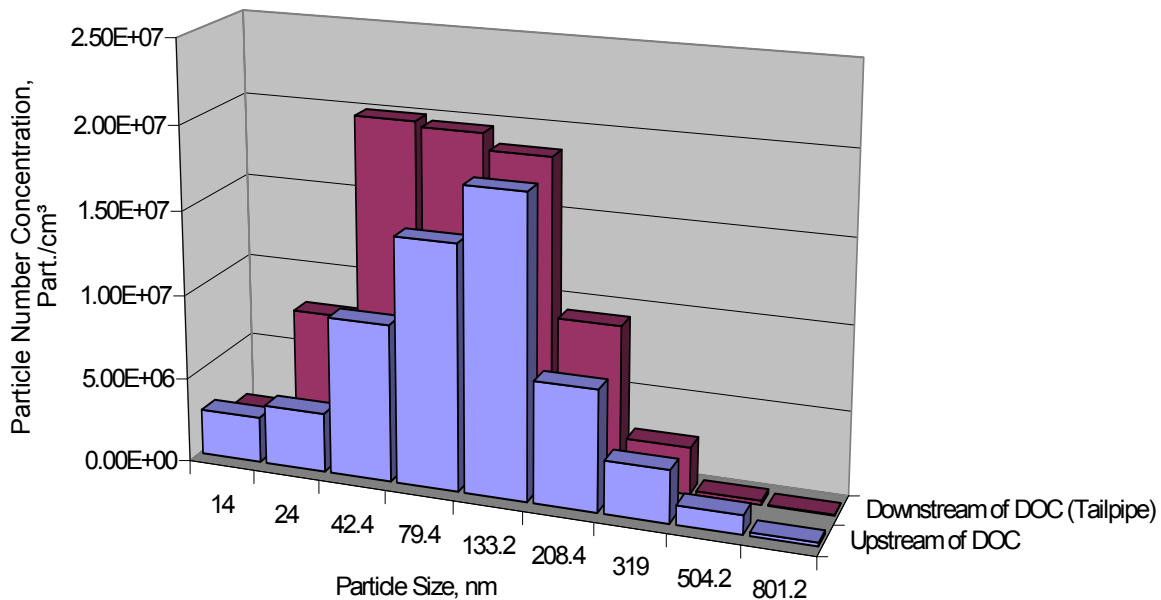


FIGURE 46. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE US06 DRIVING CYCLE, 120 g/ft³ DOC

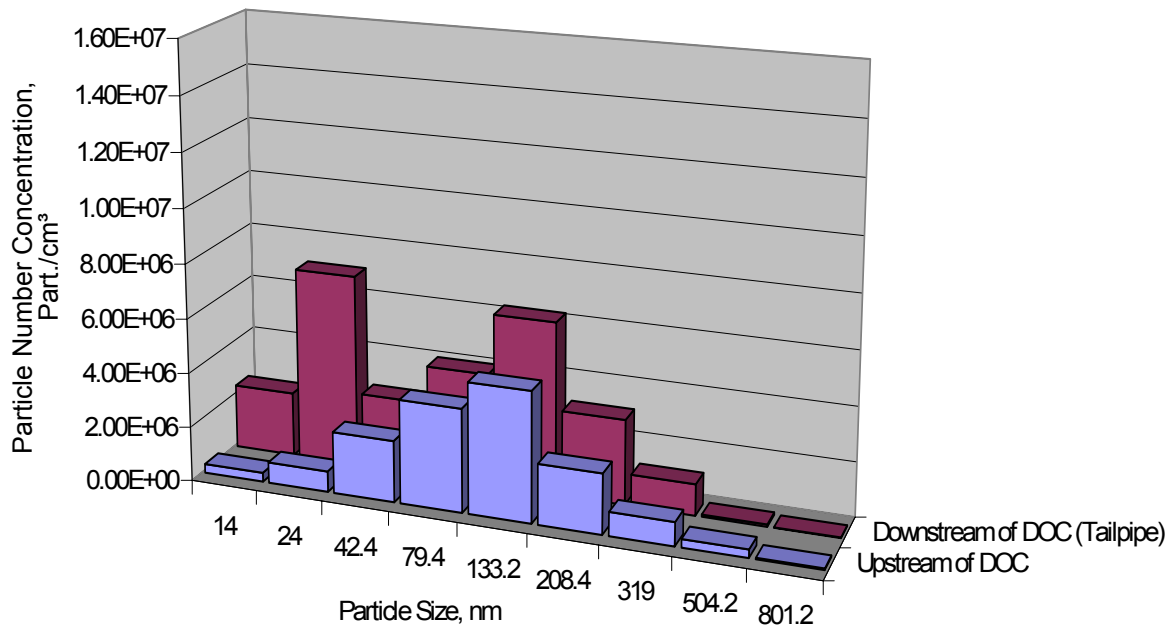


FIGURE 47. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS1 STEADY-STATE RUN, 120 g/ft³ DOC

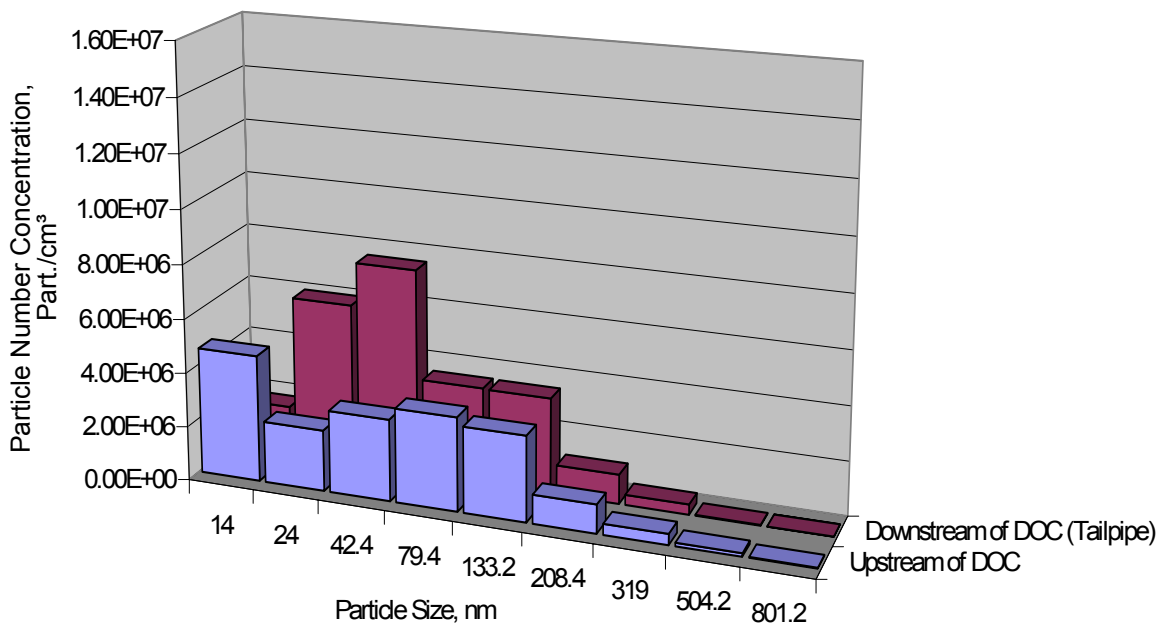


FIGURE 48. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS2 STEADY-STATE RUN, 120 g/ft³ DOC

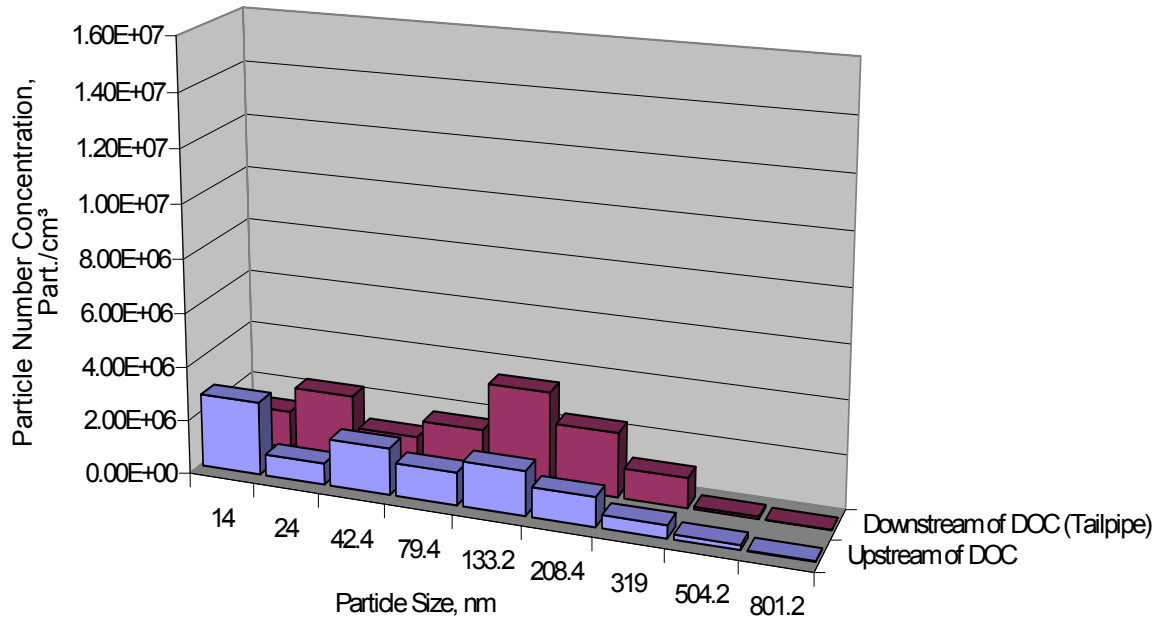


FIGURE 49. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS3 STEADY-STATE RUN, 120 g/ft³ DOC

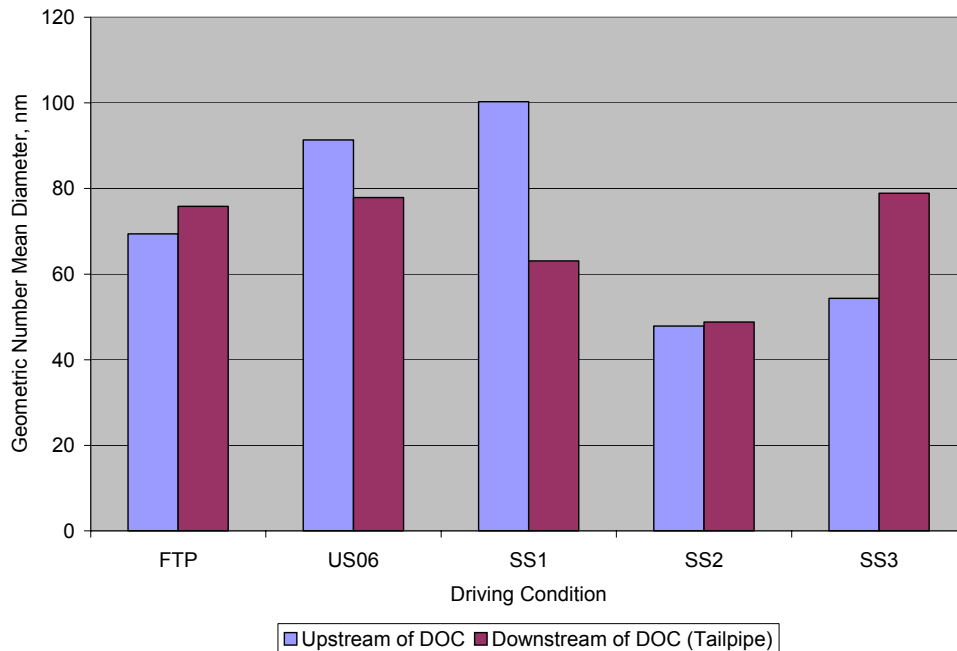


FIGURE 50. GEOMETRIC NUMBER MEAN DIAMETER, 120 g/ft³ DOC

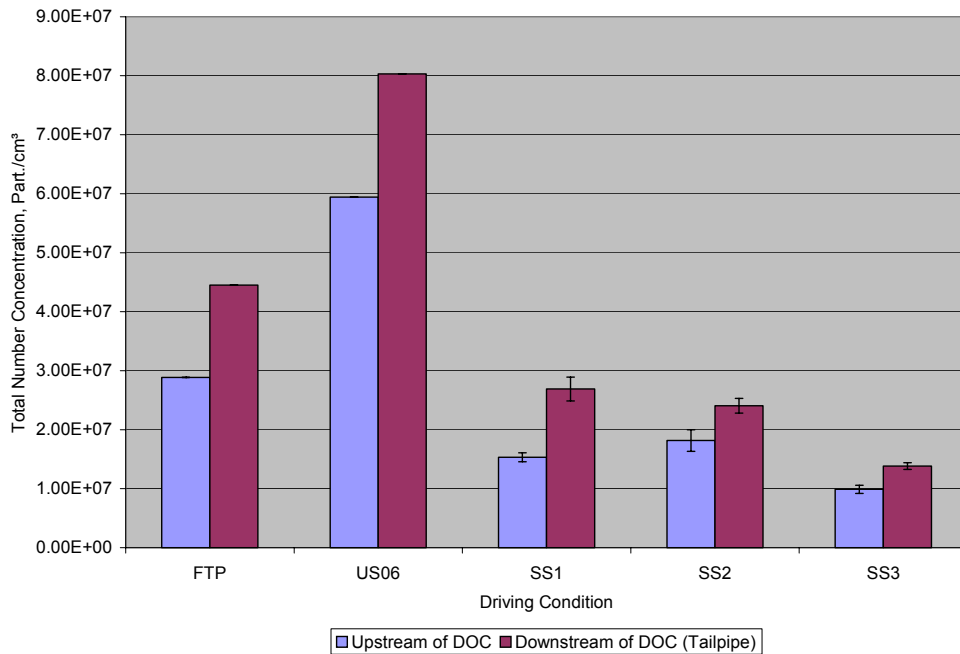


FIGURE 51. TOTAL EXHAUST NUMBER CONCENTRATIONS, 120 g/ft³ DOC

The catalysts tested seemed to have a comparable effect on total number emissions and the size distributions. The variability observed in the initial setup experiments was found to be on the order of 20 percent to 40 percent.

Particle sizing data were also taken for the exhaust system without a catalyst in place. The general characteristics of the particle size distribution for measurements taken at the engine-out and tailpipe positions were similar, but with more nanoparticles for the engine out location. Figures 52 through 56 show the particle number-weighted size distributions for the engine out and tailpipe emissions of the FTP, US06, SS1, SS2, and SS3, respectively. Generally, the distributions were bimodal in nature with one mode around 133 nm and another mode in the nanoparticle size range below 42 nm. For engine-out measurements, the number of particles in the 24-nm and 14-nm particle size bins were generally a factor of two higher than the number of particles of the same sizes measured at the tailpipe position. For the rest of the particle sizes, the number concentrations were similar. This suggests that the vehicle exhaust system from the outlet of the turbocharger to tailpipe helped in reducing nanoparticles. Typically, the exhaust temperature at the tailpipe was about 150°C lower than the exhaust temperature at the engine-out location. Such temperature reductions may have enhanced the adsorption of volatile material onto existing solid particles in the exhaust, or onto the internal surface of the exhaust system between the engine and the tailpipe. In such a scenario, the amount of volatile material available for nucleation and growth at tailpipe is diminished, resulting in less nanoparticles at the tailpipe in comparison to the engine out.

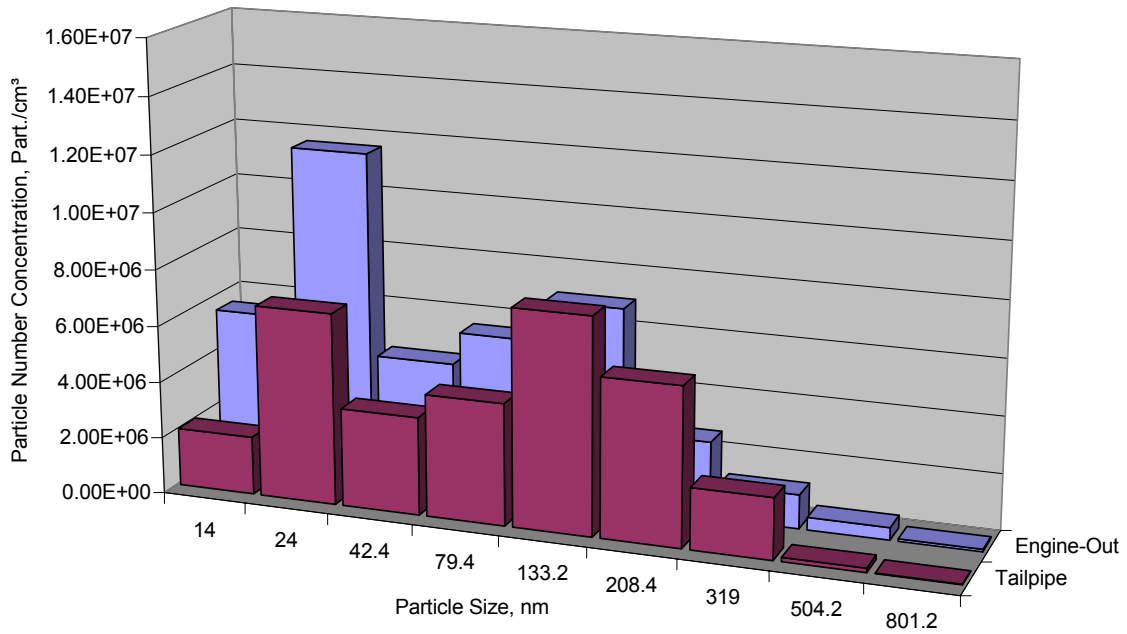


FIGURE 52. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE FTP DRIVING CYCLE, NO DOC

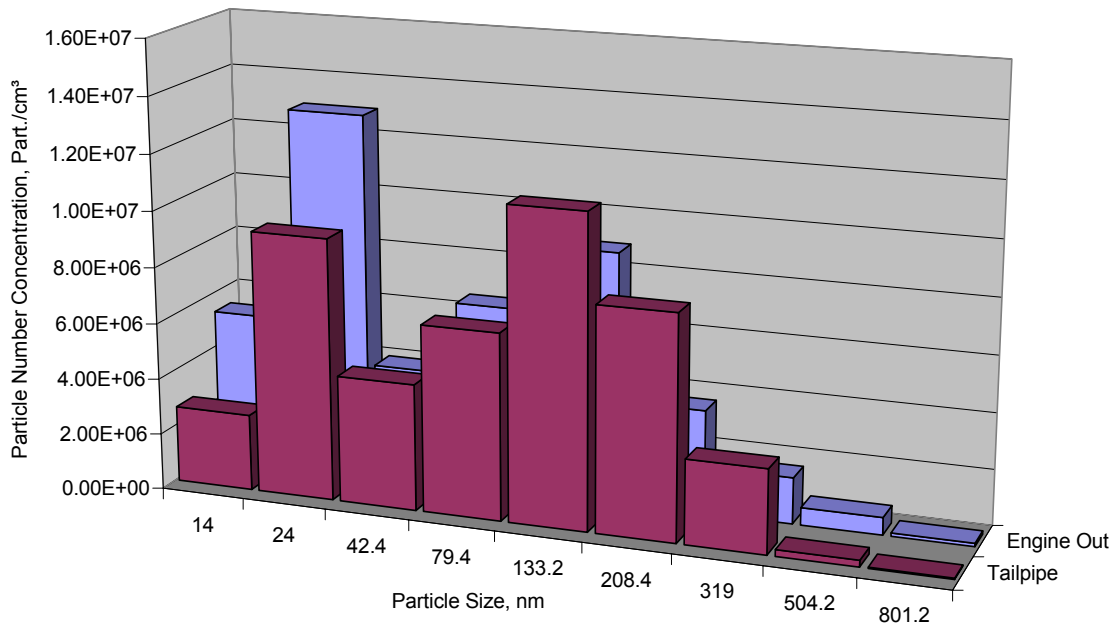


FIGURE 53. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE US06 DRIVING CYCLE, NO DOC

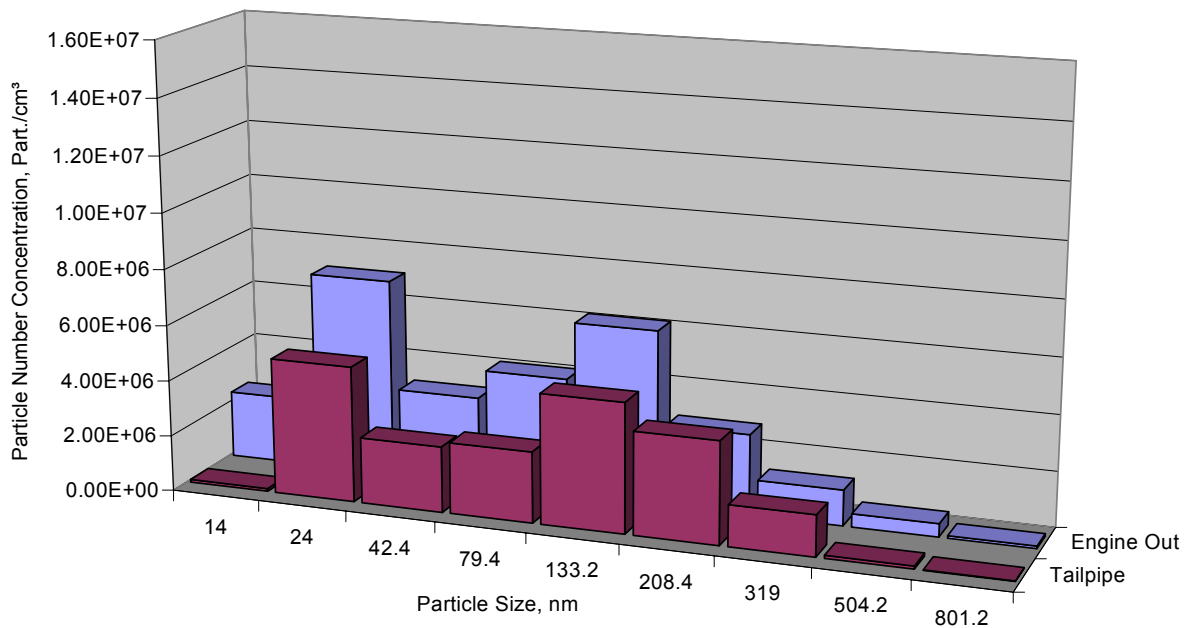


FIGURE 54. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS1 STEADY-STATE RUN, NO DOC

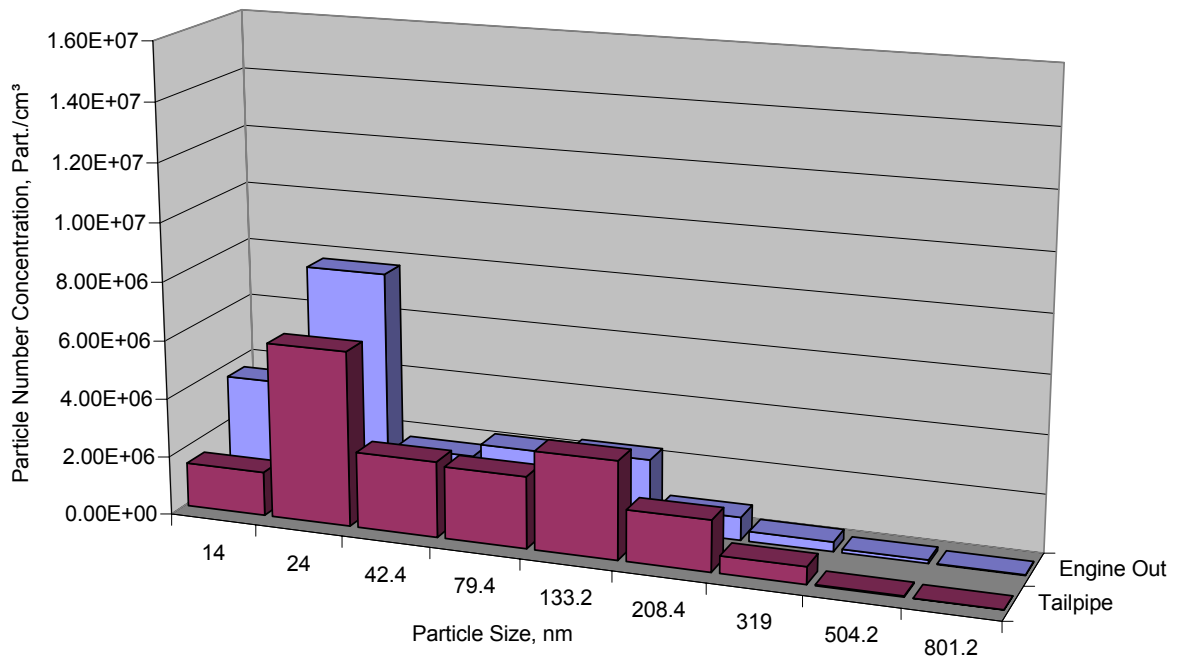


FIGURE 55. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS2 STEADY-STATE RUN, NO DOC

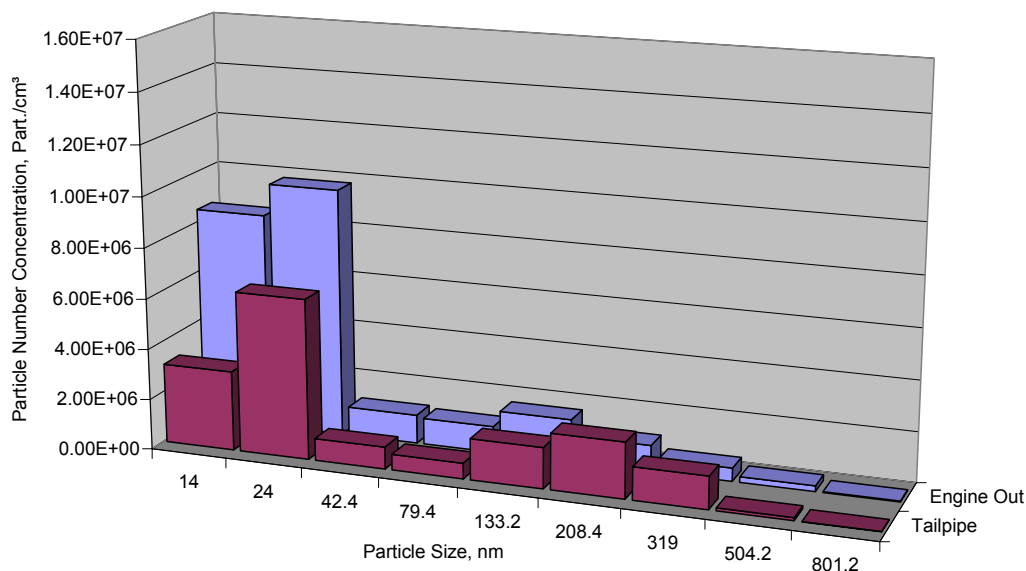


FIGURE 56. AVERAGE PARTICLE NUMBER-WEIGHTED SIZE DISTRIBUTION FOR THE SS3 STEADY-STATE RUN, NO DOC

Figure 57 shows the geometric number mean diameter determined at the engine-out and tailpipe locations without a catalyst installed. The overall number mean diameter of the engine-out size distributions were lower than the tailpipe size distributions. This was mostly due to the contribution of nanoparticles to engine-out measurements, which shifted the number mean diameter to a smaller size. Figure 58 shows a comparison of the total number of particles emitted. Generally engine-out total number emissions were 20 to 30 percent higher than the tailpipe emissions, due to the higher nanoparticles. It also appears that the number emissions measured at the tailpipe location are 30 to 40 percent lower over the US06 and SS1 compared to the catalyzed systems, which might also be an indication of sulfate formation.

D. Elemental Carbon/Organic Carbon

The elemental carbon and organic carbon (EC/OC) results, as determined by Thermal/Optical Reflectance (TOR), are shown in Table 13. These analyses were performed by DRI, and the complete EC/OC results broken down by temperature fraction are available in Appendix B. Organic carbon is defined as the carbon evolved from a filter punch in an Helium atmosphere, while elemental carbon is defined as carbon evolved under an Helium/Oxygen atmosphere. The total carbon is simply the sum of the two measurements. Organic carbon tends to trend downward with additional catalyst loading for almost every measurement listed, while elemental carbon shows little trending with varying DOC precious metal. It can be noted that in some cases, such as the 20g SS1 results, the uncertainty of the total carbon is less than the uncertainty for either the elemental or organic carbon. This seems unusual in a statistical sense, but is the result of individual variations in the elemental carbon and organic carbon varying in opposite directions for the triplicate results. So while there is moderate variation in the individual measurements, the sum remains relatively constant.

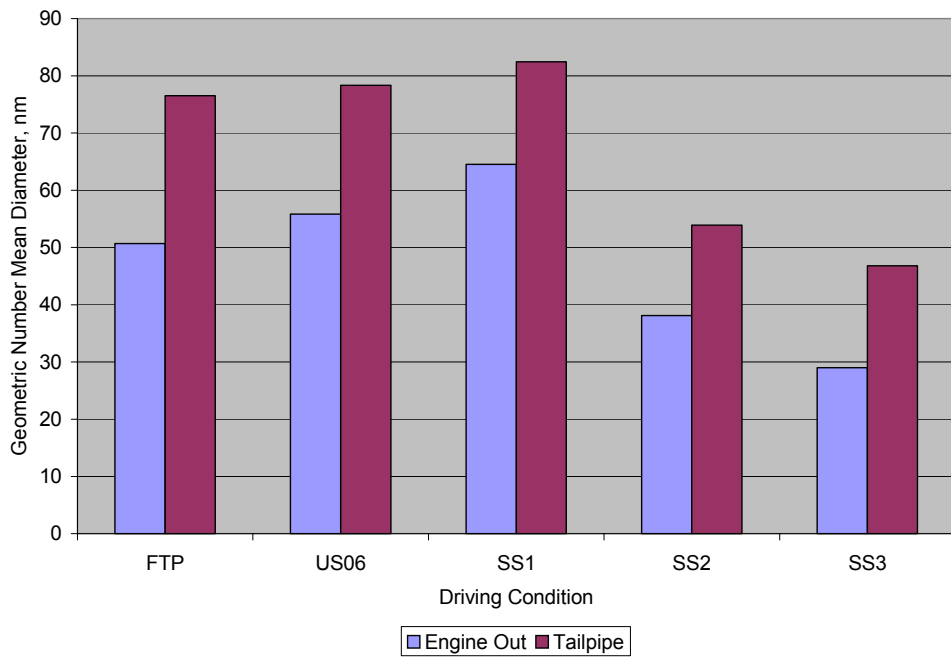


FIGURE 57. GEOMETRIC NUMBER MEAN DIAMETER, NO CATALYST

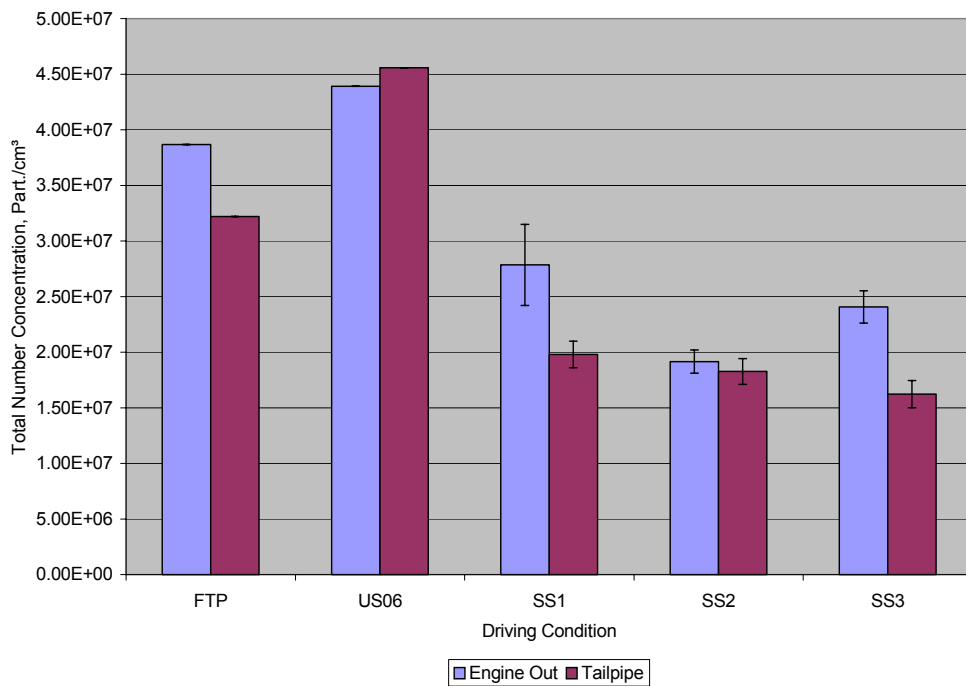


FIGURE 58. TOTAL EXHAUST NUMBER CONCENTRATIONS, NO CATALYST

TABLE 13. EC/OC Results

Catalyst	Cycle	Organic Carbon ^a	Elemental Carbon ^a	Total Carbon ^a
20g DOC	FTP, mg/mi	12.24 ± 3.17	64.41 ± 1.27	76.65 ± 1.96
	US06, mg/mi	14.21 ± 1.66	128.33 ± 8.36	142.53 ± 7.15
	SS1, mg/hr	1018.75 ± 64.93	4299.22 ± 78.04	5317.97 ± 14.88
	SS2, mg/hr	79.40 ± 2.06	332.87 ± 36.88	412.27 ± 38.33
	SS3, mg/hr	87.58 ± 5.97	475.41 ± 21.24	562.96 ± 23.74
70g DOC	FTP, mg/mi	11.02 ± 1.21	66.43 ± 5.67	77.46 ± 5.91
	US06, mg/mi	12.68 ± 0.38	125.06 ± 9.01	137.74 ± 9.21
	SS1, mg/hr	614.75 ± 145.87	4610.96 ± 130.88	5225.71 ± 126.13
	SS2, mg/hr	100.92 ± 36.55	326.24 ± 75.10	427.14 ± 38.75
	SS3, mg/hr	81.13 ± 20.92	486.47 ± 18.17	567.63 ± 13.13
120g DOC	FTP, mg/mi	9.60 ± 0.40	66.89 ± 3.19	76.49 ± 3.59
	US06, mg/mi	8.47 ± 1.80	134.93 ± 4.38	143.40 ± 2.83
	SS1, mg/hr	546.57 ± 272.53	4755.25 ± 337.46	5301.83 ± 560.73
	SS2, mg/hr	72.02 ± 22.79	399.51 ± 56.01	471.53 ± 50.00
	SS3, mg/hr	62.10 ± 3.14	494.26 ± 43.41	556.31 ± 43.31
No Catalyst	FTP, mg/mi	83.47 ± 2.94	91.36 ± 3.78	174.82 ± 6.71
	US06, mg/mi	71.72 ± 9.46	164.84 ± 33.48	236.56 ± 42.94
	SS1, mg/hr	2654.26 ± 51.96	5653.02 ± 229.23	8307.28 ± 177.64
	SS2, mg/hr	1078.80 ± 47.76	431.43 ± 5.71	1510.30 ± 53.19
	SS3, mg/hr	462.78 ± 16.95	543.60 ± 22.79	1006.30 ± 33.72
^a Each measurement represents an average followed by a standard deviation for triplicate samples				

E. Chemical Element Analysis

Chemical elements were analyzed from particulate taken on 47mm Teflon filters. Table 14 lists the transient results for the eight elements with the lowest average coefficients of variation (COVs). Elements with the lowest COVs represent the most predominant species observed in the particulate samples. Each of these metals had an average COV of less than 60 percent. Because triplicate samples were taken and analyzed for each test cycle, low COV numbers indicate that the measured value for a specific element on the filter is more likely to be valid. For nearly every element analyzed, selected filters had relatively high mass amounts for that particular element. If this relatively high amount could not be verified on other filters from the same test cycle and catalyst, the COV for that particular element is likely to be quite high. This relatively high amount is then assumed to be a measurement anomaly. Values predominantly near the detection limits with only sporadic outliers are thus not likely to be included in the summary table. If a simple average was used to determine mass emission measurements, these outliers could influence the result enough to make unusual elements appear to be present for some modes and catalysts.

Most of the elements that have low COV's are either engine wear metals, or they are contained in the fuel or oil. Sulfur is present in the fuel, aluminum and iron are likely from engine wear, and calcium, phosphorus, zinc, and magnesium are part of the oil's additive package. The complete results for all elements are included in Appendix C. The uncertainty values listed represent the standard deviation from triplicate measurements taken for each catalyst. Little to no trending was observed for most elements with respect to catalyst loading.

The elements data for the steady-state cycles are shown in Table 15. SS1 consistently generated more of these trace elements than the other two steady state cycles. Sulfur emissions dominate the other elements, primarily due to sulfate release during SS1.

F. Extractable Sulfate

Table 16 shows the results of the sulfate analysis of collected particulate from each test cycle. The sulfate production with this 15 ppm diesel fuel is minimal for nearly every test cycle except SS1. The SS1 test is the only cycle to exceed 400°C catalyst inlet temperature and create the conditions necessary for significant sulfate formation in an oxidation catalyst. As such, the sulfate mass emissions are over 100 times higher for SS1 than for the other steady state modes in the program. The SS1 results show the expected trend of higher sulfate levels with increased precious metal loading. It is important to note that for the more typical engine operation observed in the FTP, catalyst loading did not have an effect on sulfate formation. A small effect was observed in the more highly loaded US06. The system with no catalyst was found to make only a fraction the sulfate of any of the catalyzed systems during SS1.

TABLE 14. TRANSIENT ELEMENTS DATA (mg per mile)^a

Catalyst	Cycle	Magnesium	Aluminum	Silicon	Phosphorus	Sulfur	Calcium	Iron	Zinc
20g DOC	FTP	0.034 ± 0.010	0.020 ± 0.022	0.068 ± 0.010	0.012 ± 0.010	0.079 ± 0.013	0.036 ± 0.007	0.067 ± 0.031	0.042 ± 0.007
	US06	0.129 ± 0.041	0.022 ± 0.015	0.122 ± 0.043	0.038 ± 0.020	0.266 ± 0.077	0.093 ± 0.016	0.293 ± 0.088	0.100 ± 0.009
70g DOC	FTP	0.104 ± 0.034	0.022 ± 0.004	0.193 ± 0.013	0.006 ± 0.001	0.086 ± 0.021	0.035 ± 0.004	0.033 ± 0.017	0.032 ± 0.001
	US06	0.191 ± 0.058	0.049 ± 0.024	0.509 ± 0.091	0.038 ± 0.007	0.393 ± 0.057	0.095 ± 0.008	0.248 ± 0.039	0.110 ± 0.007
120g DOC	FTP	0.062 ± 0.053	0.015 ± 0.015	0.051 ± 0.015	0.020 ± 0.016	0.145 ± 0.094	0.043 ± 0.023	0.101 ± 0.130	0.039 ± 0.017
	US06	0.087 ± 0.108	0.019 ± 0.017	0.077 ± 0.019	0.033 ± 0.005	0.341 ± 0.072	0.077 ± 0.011	0.116 ± 0.041	0.082 ± 0.013
No Catalyst	FTP	0.334 ± 0.296	0.104 ± 0.085	0.087 ± 0.017	0.028 ± 0.005	0.134 ± 0.051	0.042 ± 0.013	0.121 ± 0.021	0.039 ± 0.009
	US06	0.226 ± 0.200	0.198 ± 0.144	0.204 ± 0.069	0.066 ± 0.036	0.400 ± 0.277	0.113 ± 0.071	0.487 ± 0.382	0.097 ± 0.029

^a - values are reported as an average followed by a standard deviation for each triplicate sample

TABLE 15. STEADY-STATE ELEMENTS DATA (mg per hour)^a

Catalyst	SS Mode	Magnesium	Aluminum	Silicon	Phosphorus	Sulfur	Calcium	Iron	Zinc
20g DOC	SS1	5.063 ± 5.576	2.061 ± 1.329	1.247 ± 0.881	3.141 ± 0.434	183.843 ± 38.379	3.716 ± 0.381	5.478 ± 1.535	4.711 ± 0.391
	SS2	2.581 ± 1.870	1.087 ± 0.325	1.104 ± 0.456	0.107 ± 0.082	1.145 ± 0.038	0.456 ± 0.061	1.446 ± 2.298	0.326 ± 0.029
	SS3	1.053 ± 0.480	1.519 ± 0.649	0.980 ± 0.181	0.170 ± 0.148	0.776 ± 0.041	0.157 ± 0.050	0.150 ± 0.045	0.174 ± 0.023
70g DOC	SS1	10.506 ± 3.451	1.084 ± 0.341	9.703 ± 0.840	1.159 ± 0.916	157.259 ± 28.172	3.503 ± 0.478	4.958 ± 2.345	4.029 ± 0.371
	SS2	1.057 ± 0.417	0.487 ± 0.005	1.587 ± 0.508	0.109 ± 0.042	1.414 ± 1.011	0.461 ± 0.187	0.148 ± 0.053	0.326 ± 0.083
	SS3	1.195 ± 0.769	0.767 ± 0.269	2.120 ± 0.489	0.122 ± 0.155	1.196 ± 0.220	0.550 ± 0.474	0.129 ± 0.017	0.126 ± 0.014
120g DOC	SS1	5.931 ± 2.332	2.461 ± 1.122	1.371 ± 0.645	2.815 ± 0.725	167.847 ± 36.795	2.957 ± 0.473	3.719 ± 2.452	3.584 ± 0.534
	SS2	1.137 ± 0.804	0.588 ± 0.468	0.555 ± 0.290	0.075 ± 0.035	1.515 ± 0.414	0.705 ± 0.648	0.153 ± 0.077	0.304 ± 0.016
	SS3	0.658 ± 0.443	0.357 ± 0.242	0.653 ± 0.121	0.107 ± 0.072	1.336 ± 0.232	0.304 ± 0.096	0.226 ± 0.233	0.116 ± 0.012
No Catalyst	SS1	39.592 ± 15.016	10.841 ± 6.833	8.170 ± 5.951	0.000 ± 0.000	21.709 ± 6.152	2.315 ± 0.225	3.598 ± 0.979	2.531 ± 0.404
	SS2	14.759 ± 2.541	4.936 ± 0.787	2.649 ± 0.213	0.736 ± 0.528	1.508 ± 0.393	0.093 ± 0.112	0.200 ± 0.070	0.412 ± 0.135
	SS3	7.907 ± 5.398	4.240 ± 1.924	2.370 ± 1.675	0.707 ± 0.411	1.656 ± 0.487	0.537 ± 0.235	0.351 ± 0.085	0.094 ± 0.096

^a - values are reported as an average followed by a standard deviation for each triplicate sample

TABLE 16. DRY SULFATE RESULTS ^a

Test Cycle	Unit	20 gram DOC	70 gram DOC	120 gram DOC	No Catalyst
FTP Bag 1	mg/mile	0.26 ± 0.10	0.11 ± 0.09	0.36 ± 0.12	0.22 ± 0.24
FTP Bag 2	mg/mile	0.46 ± 0.17	0.37 ± 0.22	0.27 ± 0.29	0.34 ± 0.41
FTP Bag 3	mg/mile	0.22 ± 0.12	0.18 ± 0.06	0.27 ± 0.21	0.33 ± 0.52
US06	mg/mile	0.34 ± 0.07	0.24 ± 0.09	0.14 ± 0.13	0.10 ± 0.05
SS1	mg/hour	807 ± 207	1008 ± 170	1483 ± 260	65 ± 31
SS2	mg/hour	2.1 ± 1.0	2.1 ± 2.9	4.5 ± 7.8	5.5 ± 2.8
SS3	mg/hour	1.8 ± 1.5	1.0 ± 0.6	5.6 ± 6.2	10.6 ± 9.8

^a Results shown are taken from 9 tests for each catalyst, 3 tests for the system without a catalyst

It is important to stress that a total sulfur balance cannot be performed on this system because of the way the steady state cycles were run. Each steady state cycle was allowed to stabilize at its load point for approximately five minutes before any measurements or samples were taken. This stabilization was particularly important to ensure proper repeatability of the particle sizing measurements. However, because the vehicle was operated at different load points without sampling through the filters, it is likely that sulfur accumulated on the catalyst during the lower loaded steady state points (SS2, SS3) and was released in the form of sulfate during SS1 as the engine was stabilized. Neither the fuel consumed nor the sulfur released during this period was measured and, therefore, cannot be added to a potential mass balance.

In addition, some of the sulfate levels measured are in excess of what would be theoretically possible from the elemental sulfur masses shown in the trace elements section. While the catalyzed systems show this discrepancy, the measured sulfur and sulfate levels are in good agreement for the system without a catalyst. This suggests that there could be some sulfuric acid formation occurring with the oxidation catalysts that is not detected during the elemental sulfur analysis.

G. Direct Filter Injection / Gas Chromatography

Particulate material taken on 47mm filters was analyzed using direct filter injection / gas chromatography. This analysis yields both volatile organic fraction (VOF) data as well as the percent of VOF that is unburned oil. Triplicate samples were analyzed for each measurement point reported. The transient results for the FTP and US06 are shown in Table 17.

TABLE 17. TRANSIENT DFI/GC RESULTS

Catalyst	Cycle	VOF (% of total PM) ^a	Unburned Oil (% of VOF) ^a	Unburned Oil (% of total PM) ^a
20g DOC	FTP Bag 1	7.0 ± 1.6	49 ± 13	3.4 ± 1.2
	FTP Bag 2	7.9 ± 2.1	33 ± 6	2.6 ± 0.8
	FTP Bag 3	6.6 ± 2.1	22 ± 5	1.5 ± 0.6
	US06	2.6 ± 0.7	16 ± 7	0.4 ± 0.2
70g DOC	FTP Bag 1	5.3 ± 0.6	54 ± 4	2.9 ± 0.4
	FTP Bag 2	4.7 ± 0.7	40 ± 6	1.9 ± 0.4
	FTP Bag 3	5.3 ± 0.4	27 ± 4	1.4 ± 0.2
	US06	2.5 ± 0.2	19 ± 3	0.5 ± 0.1
120g DOC	FTP Bag 1	4.9 ± 0.9	57 ± 12	2.8 ± 0.8
	FTP Bag 2	5.1 ± 2.4	42 ± 15	2.1 ± 1.2
	FTP Bag 3	4.4 ± 1.4	25 ± 5	1.1 ± 0.4
	US06	2.0 ± 0.5	19 ± 7	0.4 ± 0.2
No Catalyst	FTP Bag 1	> 22 ^b	> 41 ^b	> 9 ^b
	FTP Bag 2	18 ± 3	54 ± 8	9.8 ± 2.2
	FTP Bag 3	9 ± 5	58 ± 1	5.4 ± 3.0
	US06	> 12 ^b	N/A ^b	N/A ^b
^a Each measurement represents an average followed by a standard deviation for triplicate samples ^b Multiple samples were over-ranged, so standard deviations or averages are not available in every case				

On average, the VOF and percent unburned oil results are similar for the levels of DOC precious metal loading, though there appears to be a slight downward trend in VOF with increased catalyst loading. This trend does not appear to be statistically significant, however. Both the VOF and percent unburned oil are generally highest in Bag 1 of the FTP where the engine and catalyst are both cold at the start of the cycle. Under cold conditions, catalyst conversion efficiency is the lowest, and oil slip past the rings and valve seats is likely to be highest. These parts expand as the engine warms up to create a better seal, so the percent unburned oil is lower for the later phases of the FTP. The system without a catalyst had numerous samples that over-ranged the analyzers on the settings used for this program. Consequently, some data for this system are unavailable. Both the first bag of the FTP and the US06 likely have much higher VOF and percent unburned oil than what is reported in the Table 18 because each over-ranged measurement represents a value higher than what is listed in the table.

Table 18 lists the VOF and percent unburned oil results for the three steady-state modes. The VOF and unburned oil values are noticeably higher for the system without a catalyst than for any of the catalyzed systems. Because all the steady-state measurements were taken when the engine was fully warm, the hot DOC was effective in oxidizing much of the engine-out volatile components. The measurements for the system without a catalyst suffered from the same over-ranging problems that the transient results displayed. The overall results are similar for each steady-state cycle on a particular catalyst, indicating that engine loading does not play a large role in either VOF or unburned oil emissions when the engine and catalyst are fully warm.

TABLE 18. STEADY-STATE DFI/GC RESULTS

Catalyst	Steady-State Mode	VOF (% of total PM) ^a	Unburned Oil (% of VOF) ^a	Unburned Oil (% of total PM) ^a
20g DOC	SS1	2.1 ± 1.5	29 ± 3	0.6 ± 0.4
	SS2	11.4 ± 3.0	23 ± 10	2.6 ± 1.4
	SS3	6.0 ± 0.5	25 ± 3	1.5 ± 0.2
70g DOC	SS1	2.4 ± 0.4	35 ± 3	0.8 ± 0.2
	SS2	7.4 ± 1.5	27 ± 4	2.0 ± 0.5
	SS3	7.4 ± 1.5	27 ± 2	2.0 ± 0.4
120g DOC	SS1	1.7 ± 0.6	38 ± 12	0.7 ± 0.3
	SS2	8.0 ± 3.4	32 ± 1	2.6 ± 1.1
	SS3	4.4 ± 4.0	35 ± 9	1.5 ± 1.4
No Catalyst	SS1	12.1 ± 5.5	> 77 ^b	> 9 ^b
	SS2	> 29.5 ^b	N/A ^b	N/A ^b
	SS3	15.0 ± 4.1	52 ± 15	7.8 ± 3.1
^a Each measurement represents an average followed by a standard deviation for triplicate samples ^b Multiple samples were over-ranged, so standard deviation or average may not be available				

H. Hydrocarbon Speciation

Speciated emissions from bag samples are shown in Tables 19 through 22. Tables 19 and 20 list the speciated emissions from transient testing (broken up by bag for the FTP) while Tables 21 and 22 display the speciated emissions results from steady-state testing. Eight compounds were selected for inclusion in these tables for reporting based on the magnitude of their response across the tested systems. The complete list of speciated emissions for all catalysts and test cycles can be found in Appendix D. Blank spaces in each table represent a compound that was not detected.

TABLE 19. SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			FTP Composite, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg
METHANE	28.9	22.7	25.8	15.3	19.7	17.5	11.7	10.0	10.8	17.1	17.6	17.4	1.6	5.0	3.3				354.0	216.0	285.0	225.0	147.0	186.0
ETHANE	2.4	3.6	3.0	1.8	3.4	2.6	1.3	1.9	1.6	1.8	3.0	2.4	0.4	0.0	0.2				38.8	43.5	41.2	26.6	4.8	15.7
ETHYLENE	61.2	72.0	66.6	16.2	16.6	16.4	17.7	18.6	18.1	25.9	28.8	27.3	0.4		0.2	9.9		4.9				593.3	586.8	590.0
PROPYLENE	16.8	21.2	19.0	3.1	3.4	3.3	3.3	3.8	3.5	6.0	7.2	6.6										149.2	179.7	164.4
ACETYLENE	11.2	14.3	12.7	0.9	0.4	0.7		0.6	0.3	2.8	3.4	3.1				52.7		26.3				117.9	141.5	129.7
BENZENE	7.7	8.2	8.0		0.7	0.3	1.2	1.1	1.2	1.9	2.4	2.1				7.2		3.6				35.1	44.8	39.9
FORMALDEHYDE	37.0	34.7	35.8	10.8	8.1	9.5	11.8	11.2	11.5	16.5	14.6	15.5	0.7	0.4	0.5	31.7	33.6	32.6	9.2		4.6	389.7	551.0	470.4
ACETALDEHYDE	31.2	29.4	30.3	1.8	1.7	1.7	3.4	3.9	3.7	8.3	8.1	8.2	0.1	0.2	0.1	2.9	25.2	14.0		1.6	0.8	167.8	248.9	208.3

Blanks denote compounds not detected, value of 0.0 is used to determine average.

TABLE 20. SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			FTP Composite, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg
METHANE	29.1	27.2	28.2	16.2	10.3	13.3	13.2	13.9	13.5	18.0	14.8	16.4	3.7	5.7	4.7	48.0		24.0	261.0	444.0	352.5	153.0	105.0	129.0
ETHANE	0.7		0.4		1.2	0.6		2.1	1.1	0.2	1.2	0.7	0.3	0.3	0.3	22.5	38.4	30.4	30.5	22.4	26.5	5.6	16.0	10.8
ETHYLENE	53.2	48.3	50.7		0.1	0.1	3.2	1.7	2.4	11.8	10.6	11.2		0.2	0.1	57.4	5.3	31.3		4.7	2.4	540.0	430.0	485.0
PROPYLENE	14.5	12.8	13.7				2.1	0.3	1.2	3.6	2.7	3.2										112.2	101.5	106.9
ACETYLENE		7.0	3.5	0.6	0.3	0.5	0.7	0.1	0.4	0.5	1.6	1.1										30.3	52.8	41.6
BENZENE	2.8	3.1	3.0							0.6	0.7	0.6					31.4	15.7				27.3	37.7	32.5
FORMALDEHYDE	32.2	24.3	28.2	0.2	0.1	0.1	0.8	0.4	0.6	7.0	5.2	6.1	0.4	0.1	0.2	4.2	73.9	39.1	7.8		3.9	382.3	380.6	381.5
ACETALDEHYDE	19.9	14.2	17.1	0.6		0.3	0.5		0.2	4.6	2.9	3.7	0.4		0.2	24.0		12.0	11.1	0.0	5.6	188.4	171.3	179.9

Blanks denote compounds not detected, value of 0.0 is used to determine average.

TABLE 21. SPECIATION DATA FOR 120G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			FTP Composite, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg
METHANE	21.0	27.3	24.2	11.9	16.9	14.4	9.7	18.7	14.2	13.2	19.6	16.4	2.0	4.7	3.4				345.0	210.0	277.5	144.0	159.0	151.5
ETHANE	2.3	2.3	2.3	1.3	1.7	1.5	0.9	0.8	0.8	1.4	1.6	1.5	0.2	0.3	0.2					11.1	5.6	20.4	11.7	16.1
ETHYLENE	39.9	37.5	38.7		0.3	0.1		0.1	0.1	8.2	7.9	8.1	0.0	2.4	1.2	60.9	1.6	31.3				557.4	518.6	538.0
PROPYLENE	10.6	10.6	10.6							2.2	2.2	2.2		0.1	0.1								128.4	64.2
ACETYLENE	5.5	4.8	5.2	0.3		0.2		0.1	0.0	1.3	1.0	1.2		0.2	0.1	0.6	6.2	3.4				132.5	42.2	87.3
BENZENE	2.9	2.6	2.7							0.6	0.5	0.6	0.7	0.1	0.4							48.3	49.2	48.8
FORMALDEHYDE	24.6	24.3	24.4	0.3	0.5	0.4	0.0	0.2	0.1	5.2	5.3	5.3	0.2	0.2	0.2	22.2	22.2	22.2	123.0	0.9	61.9	434.5	520.9	477.7
ACETALDEHYDE	8.3	9.8	9.0	0.1		0.1	0.1		0.0	1.8	2.0	1.9	0.1	0.1	0.1	17.3	17.3	17.3	117.0		58.5	236.5	241.7	239.1

Blanks denote compounds not detected, value of 0.0 is used to determine average.

TABLE 22. SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			FTP Composite, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg	Test 1	Test 2	Avg
METHANE	21.5	26.3	23.9	17.7	13.1	15.4	9.9	10.8	10.3	16.4	15.2	15.8	2.2	3.4	2.8				438.0	342.0	390.0		87.0	43.5
ETHANE	2.5	3.1	2.8	2.9	1.7	2.3	1.1	1.1	1.1	2.3	1.8	2.1	0.5	0.3	0.4	65.9		33.0				39.5		19.7
ETHYLENE	91.0	106.4	98.7	69.3	76.3	72.8	47.8	46.5	47.1	67.9	74.4	71.1	14.5	14.2	14.3	721.2	675.8	698.5	1680.8	1499.9	1590.4	578.0	581.4	579.7
PROPYLENE	27.1	32.0	29.6	15.1	21.4	18.2	10.3	13.3	11.8	16.2	21.4	18.8	4.5	3.6	4.0	293.3	223.2	258.2	410.4	348.4	379.4	199.6	184.7	192.2
ACETYLENE	20.7	20.3	20.5	14.4	14.3	14.3	10.2	9.2	9.7	14.5	14.1	14.3	3.6	3.6	3.6	102.7	115.3	109.0	379.1	323.6	351.3	121.6	114.3	118.0
BENZENE	9.6	10.6	10.1	5.9	6.7	6.3	3.7	4.3	4.0	6.0	6.9	6.5	1.6	2.1	1.9	56.3	75.9	66.1	136.7	129.6	133.1	41.1	53.8	47.5
FORMALDEHYDE	95.5	102.9	99.2	70.7	76.1	73.4	40.5	45.1	42.8	67.6	73.2	70.4	14.5	13.4	13.9	840.2	820.5	830.3	999.4	918.2	958.8	592.7	624.8	608.7
ACETALDEHYDE	47.1	44.9	46.0	30.1	30.8	30.4	17.3	17.3	17.3	30.1	30.0	30.0	5.5	5.0	5.2	321.9	298.0	309.9	474.6	427.2	450.9	240.3	250.0	245.2

Blanks denote compounds not detected, value of 0.0 is used to determine average.

A graphical representation of the speciated emissions is shown in Figures 59-63. The most prevalent light ends found in the bag results were methane, ethane, ethylene, propylene, and acetylene. These compounds constituted the bulk of the speciated emissions for the catalyzed systems. Benzene was found in moderate quantities as well, with toluene having substantially less mass in each bag and representing the next most abundant aromatic compound. Carbonyl compounds such as formaldehyde and acetaldehyde were also observed to be present in samples from the catalyzed systems. Most of these compounds, however, were found primarily in Bag 1 of the FTP and steady-state 3 (SS3). Both of these cycles have catalyst bed and inlet temperatures that are low enough to significantly reduce the catalyst's conversion efficiency. Bag 1 of the FTP has low temperatures because it is conducted from a cold start while SS3 has very low turbo outlet temperatures due to prolonged idling. Ethylene, formaldehyde, and propylene emissions were reduced during the FTP with additional catalyst loading. Methane was the only light end to be found in substantial amounts in all samples with the exception of SS1. The occurrences of methane is not surprising, as it is one of the more difficult hydrocarbons to oxidize with a DOC.

The system without a catalyst had similar methane emissions to some of the catalyzed systems, but had significantly higher emissions for nearly every other hydrocarbon. Many hydrocarbons that had no measurable emissions for the catalyzed systems had substantial mass amounts in the samples from the system without a catalyst. Most notably, heavier aldehydes and ketones had substantial mass amounts present in the samples where there were none for the catalyzed systems.

I. Polynuclear Aromatic Hydrocarbons

Polynuclear aromatic hydrocarbon (PAH) emissions were determined in triplicate for each test system from the analysis of samples collected on 2 inch PUF / 100mm TIGF filters. The results for eight PAH compounds with the lowest average coefficients of variation are shown in Table 23. Complete PAH results are available in Appendix E. There are some unusual trends among the catalyzed systems. An example would be the trend of increasing mass of naphthalene seen in nearly each test cycle for increasing catalyst loading level. The trend, especially for cycles such as the FTP, seems to be significant based on the standard deviations of the triplicate measurements. Little trend is seen for many of the other PAHs as a function of catalyst loading. PAH levels for the system without a catalyst are greater than an order of magnitude higher than for any catalyzed system for most of the PAH compounds. A graphical representation of the results is shown in Figures 64-68.

Results of the nitro-PAH analysis revealed n-PAH levels at or near the detection limit for most compounds. For this reason, the n-PAH results are shown only in Appendix F. On the whole, n-PAH emission levels were very low compared to the measured PAH levels.

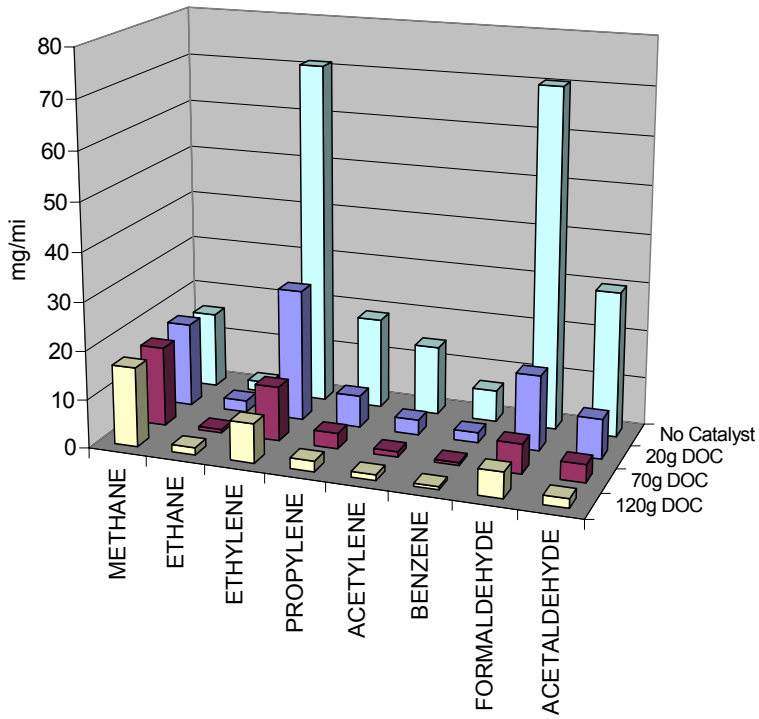


FIGURE 59. SPECIATED HYDROCARBONS - FTP

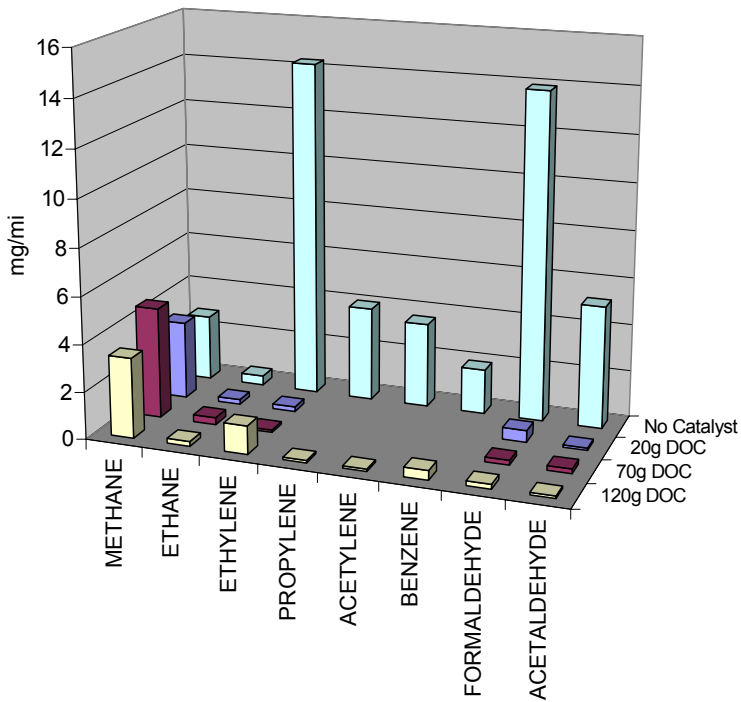


FIGURE 60. SPECIATED HYDROCARBONS - US06

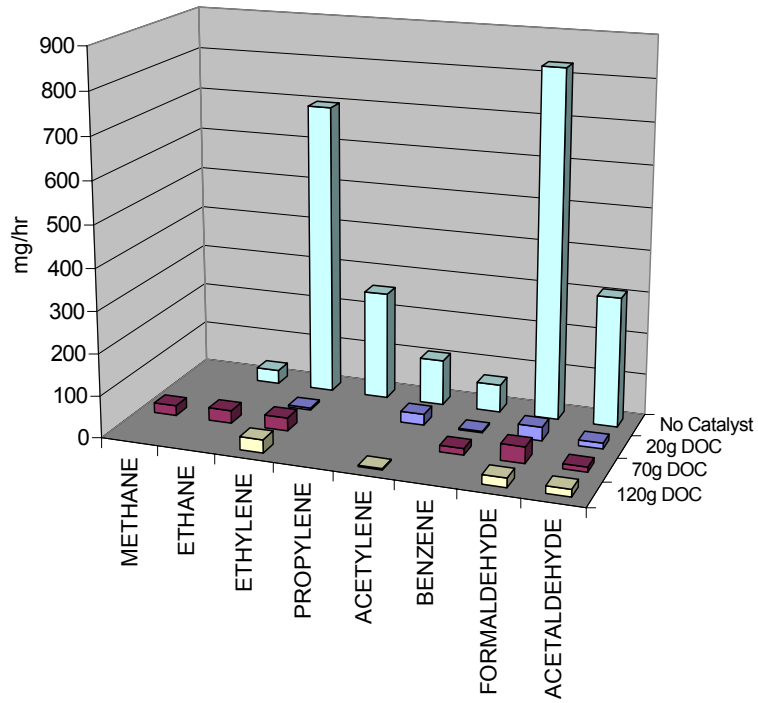


FIGURE 61. SPECIATED HYDROCARBONS - SS1

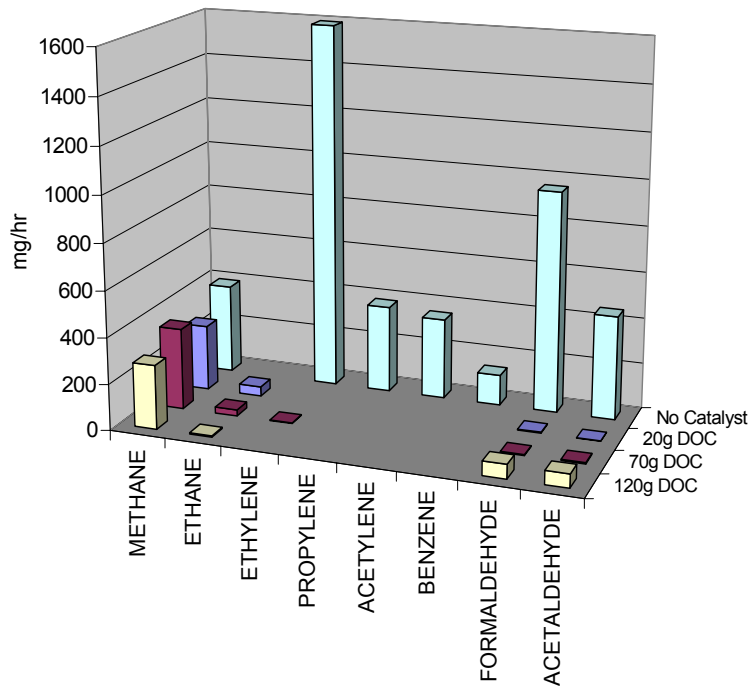


FIGURE 62. SPECIATED HYDROCARBONS - SS2

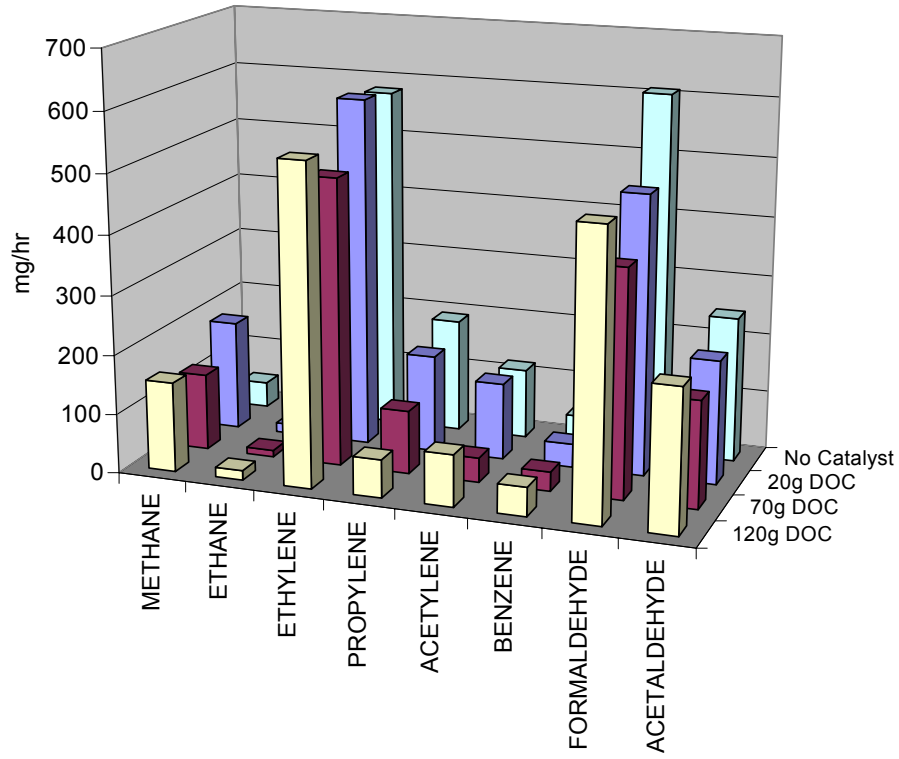


FIGURE 63. SPECIATED HYDROCARBONS - SS3

TABLE 23. POLYNUCLEAR AROMATIC HYDROCARBON RESULTS ^a

Catalyst	Cycle	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	1,3+1,6+1,7 Dimethylnaphthalene	Fluorene	Phenathrene	2-Methylphenanthrene	Anthraquinone
1 -> 3 20g DOC	FTP, µg/mi	12 ± 11	14 ± 15	6 ± 6	11 ± 10	1 ± 1	9 ± 3	3 ± 2	4 ± 5
	US06, µg/mi	30 ± 21	21 ± 10	4 ± 5	5 ± 2	7 ± 5	9 ± 4	1 ± 0	2 ± 1
	SS1, µg/hr	461 ± 798	1511 ± 1979	189 ± 179	568 ± 585	369 ± 318	265 ± 72	90 ± 42	121 ± 24
	SS2, µg/hr	861 ± 771	306 ± 250	135 ± 125	198 ± 157	138 ± 109	71 ± 31	18 ± 3	21 ± 16
	SS3, µg/hr	700 ± 477	386 ± 193	125 ± 101	141 ± 125	83 ± 73	6 ± 6	2 ± 3	14 ± 12
4 -> 6, 70g DOC	FTP, µg/mi	55 ± 10	26 ± 2	13 ± 1	16 ± 1	9 ± 0	10 ± 1	3 ± 0	1 ± 0
	US06, µg/mi	34 ± 3	21 ± 3	6 ± 1	17 ± 5	6 ± 2	4 ± 1	1 ± 0	1 ± 0
	SS1, µg/hr	1262 ± 254	571 ± 205	243 ± 100	497 ± 194	398 ± 159	229 ± 151	55 ± 44	59 ± 12
	SS2, µg/hr	921 ± 72	334 ± 49	154 ± 34	227 ± 64	150 ± 35	90 ± 27	15 ± 5	10 ± 2
	SS3, µg/hr	650 ± 5	282 ± 58	115 ± 6	119 ± 43	92 ± 35	33 ± 20	6 ± 4	8 ± 2
7 -> 9, 120g DOC	FTP, µg/mi	64 ± 8	15 ± 3	8 ± 1	10 ± 1	7 ± 2	8 ± 1	2 ± 1	10
	US06, µg/mi	42 ± 5	12 ± 1	2 ± 1	5 ± 2	5 ± 0	4 ± 0	1 ± 0	1 ± 0
	SS1, µg/hr	1982 ± 893	668 ± 390	170 ± 28	309 ± 272	268 ± 207	319 ± 149	183 ± 237	125 ± 124
	SS2, µg/hr	1289 ± 254	300 ± 72	125 ± 46	191 ± 37	110 ± 90	86 ± 17	18 ± 6	8 ± 1
	SS3, µg/hr	907 ± 155	219 ± 52	99 ± 43	98 ± 87	112 ± 19	52 ± 32	10 ± 2	6 ± 2
10 -> 12, no catalyst	FTP, µg/mi	1999 ± 171	120 ± 188	876 ± 98	927 ± 117	94 ± 15	139 ± 10	47 ± 7	9 ± 1
	US06, µg/mi	472 ± 70	227 ± 34	179 ± 31	208 ± 47	22 ± 1	57 ± 8	21 ± 2	10 ± 1
	SS1, µg/hr	14004 ± 1603	8223 ± 1054	6033 ± 831	7075 ± 957	1038 ± 527	3968 ± 1252	1064 ± 438	601 ± 47
	SS2, µg/hr	22138 ± 15085	12512 ± 6115	9292 ± 4364	10214 ± 4604	829 ± 576	1358 ± 1080	513 ± 471	310 ± 392
	SS3, µg/hr	14497 ± 3796	8245 ± 2206	6338 ± 1943	6891 ± 2260	921 ± 204	693 ± 261	125 ± 74	31 ± 6

^a Values are an average followed by a standard deviation for triplicate samples.

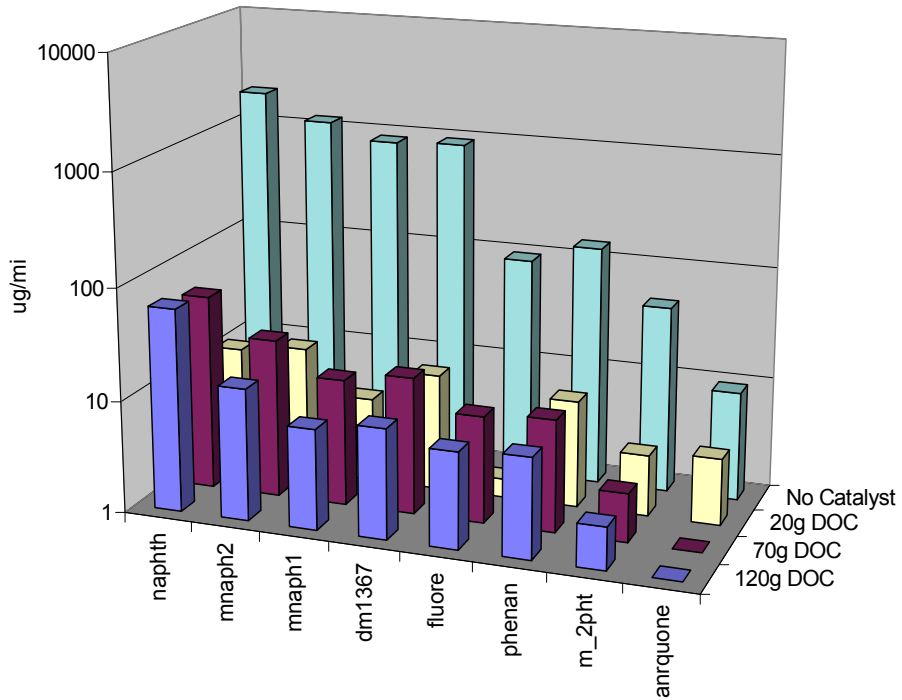


FIGURE 64. POLYNUCLEAR AROMATIC HYDROCARBONS - FTP

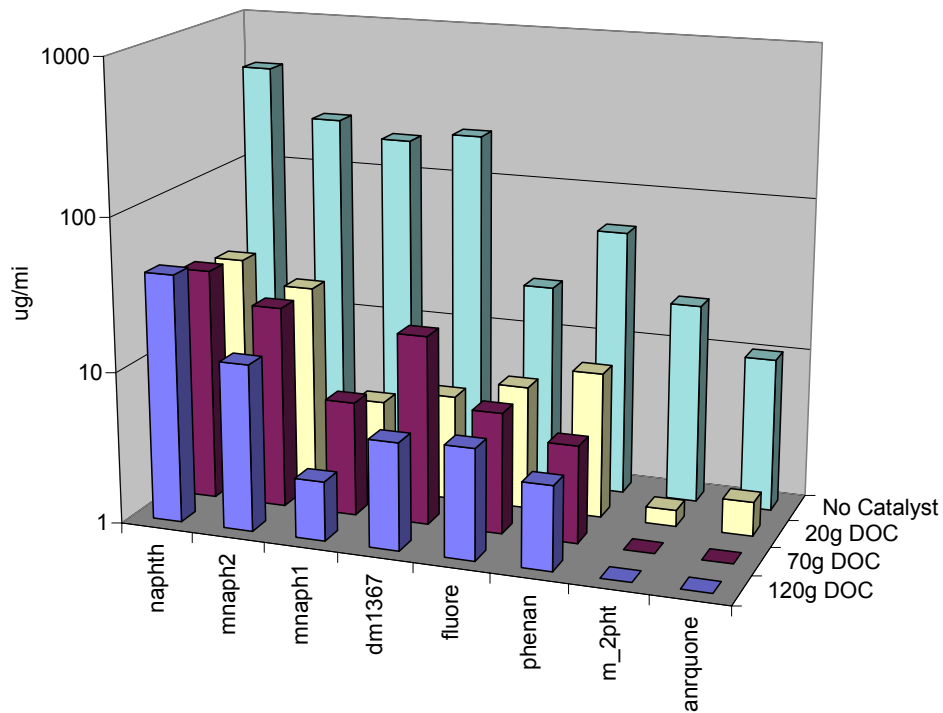


FIGURE 65. POLYNUCLEAR AROMATIC HYDROCARBONS - US06

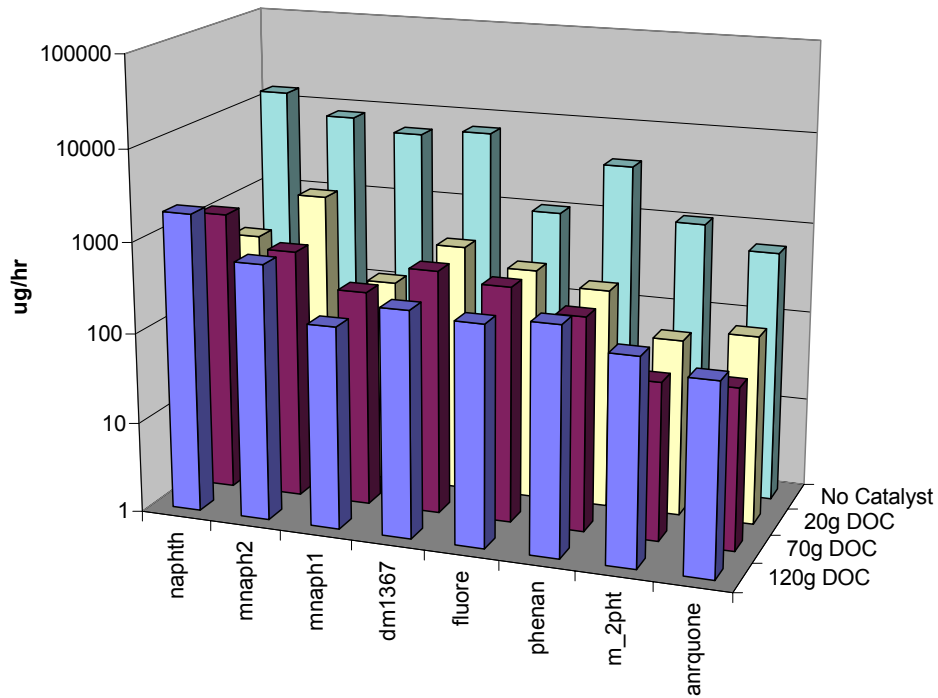


FIGURE 66. POLYNUCLEAR AROMATIC HYDROCARBONS - SS1

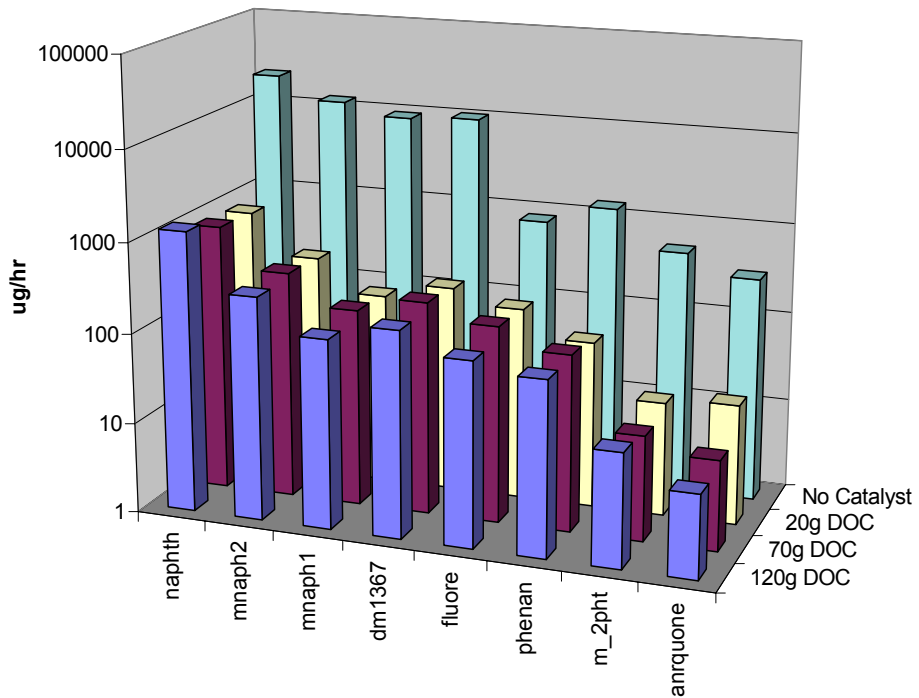


FIGURE 67. POLYNUCLEAR AROMATIC HYDROCARBONS - SS3

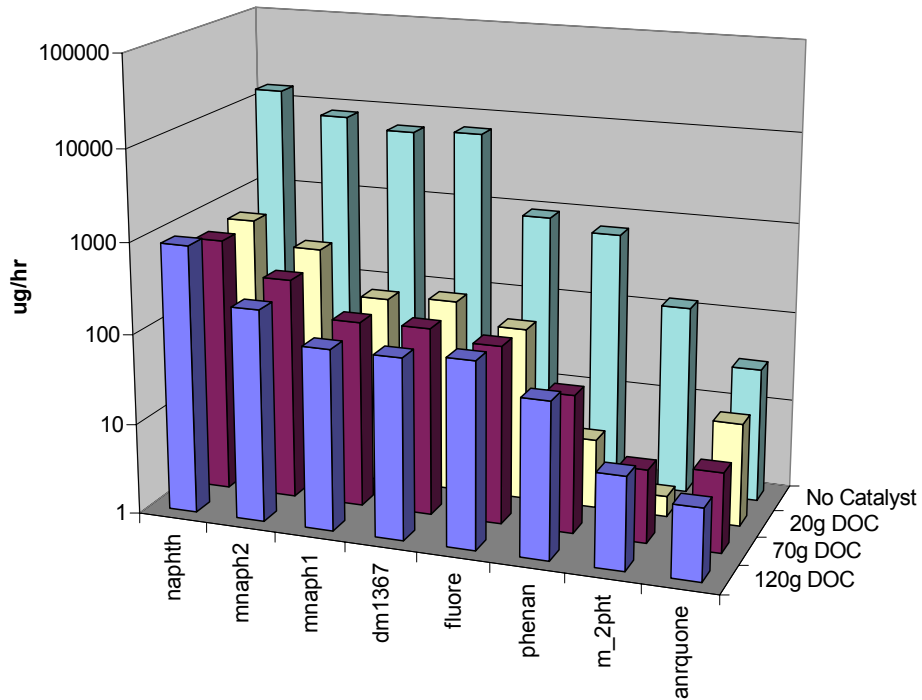


FIGURE 68. POLYNUCLEAR AROMATIC HYDROCARBONS - SS3

J. Sulfur Dioxide

Sulfur dioxide emissions were measured using impingers filled with a hydrogen peroxide solution. The measured emission levels, however, were generally found to be random and of little use in tracking sulfur emissions. Even the SO₂ levels measured from the system without a catalyst, which would have been expected to be the most stable, were not consistent or near anticipated levels. Because the results did not show any measure of repeatability for the tested cycles, they were not included in this report.

V. SUMMARY

Many emissions characteristics of a modern diesel engine with an installed oxidation catalyst have been discussed in this report. This section will summarize some of the effects that have been observed both in terms of catalyst loading level and the presence or absence of the diesel oxidation catalyst.

The following were observed with increasing catalyst loading.

- Decreasing cold (FTP Bag 1) and low load (SS3) hydrocarbon and CO emissions. Effect is relatively linear with catalyst loading.
- No substantial effect on NO_x, particulate matter mass, or fuel economy.
- Similar particulate mass distributions.
- 5-10 million more particles per cubic centimeter over the FTP and US06 cycles.
- Decreasing organic carbon emissions. Little change in elemental carbon emissions.
- Little change in trace element emissions.
- Increasing sulfate emissions, primarily during SS1.
- Volatile Organic Fraction (VOF) slightly reduced while unburned oil (as a percentage of VOF) slightly increased. Neither trend may be significant given the standard deviations observed.
- Light-end compounds (ethylene, propylene) and dominant aldehydes (formaldehyde, acetaldehyde) were reduced. Some diminishing returns seen with higher catalyst loading. Methane emissions were not significantly affected.
- Some polynuclear aromatic hydrocarbons emissions (such as fluoranthene) trended downward with increased catalyst loading while others (such as naphthalene) trended upward. Little trending was observed for most.

The catalyzed systems were observed to have the following characteristics with respect to the system without a catalyst.

- For the FTP, hydrocarbons were reduced by 85-96%, CO was reduced by 70-92%, and particulate matter mass was reduced by roughly 57%.
- No change was observed for NO_x emissions or fuel economy.

- There was less particulate mass and a more centralized mass distribution near 0.09-0.17 micrometers. The particulate matter mass distribution for the system without a catalyst was much flatter.
- Often increased number of particles over the US06 and SS1.
- Significant reductions in both elemental carbon and organic carbon emissions.
- Reductions in certain trace elements such as magnesium and aluminum. Measured sulfate emissions from particulate were substantially higher, primarily during SS1.
- Substantially reduced volatile organic fraction of particulate. The differences are difficult to quantify because the results for the system without a catalyst tended to over range the instrument.
- Aldehydes and ketones were reduced in both mass and measurable numbers of compounds. Most light end hydrocarbon compounds were also reduced in both mass and number of compounds measured. Methane emissions were largely unaffected.

APPENDIX A

GASEOUS AND PARTICULATE TEST RESULTS

VEHICLE NUMBER 220	TEST CRC-20-T1-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/24/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 14763 MILES (23753 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.09 IN HG (738.9 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	869.4	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.93 (6.32)	3.66 (5.88)
BLOWER FLOW RATE SCFM (SCMM)	610.9 (17.30)	610.0 (17.28)	606.6 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.91 (.03)	.88 (.03)
TOTAL FLOW SCF (SCM)	5149. (145.8)	8853. (250.7)	5114. (144.8)

HC SAMPLE METER/RANGE/PPM (BAG)	12.2/ 9/ 12.16	4.0/ 9/ 4.03	4.9/ 9/ 4.89
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55	3.5/ 2/ 3.55	3.4/ 2/ 3.45
CO SAMPLE METER/RANGE/PPM	45.2/ 12/ 44.05	4.5/ 12/ 4.24	19.6/ 12/ 18.80
CO BCKGRD METER/RANGE/PPM	.7/ 12/ .66	.1/ 12/ .09	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	54.1/ 11/ .4183	39.5/ 11/ .2821	50.1/ 11/ .3785
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/ .0438	7.1/ 11/ .0451	7.0/ 11/ .0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/ 9/ 9.71	5.4/ 9/ 5.36	12.0/ 9/ 12.00
NOX BCKGRD METER/RANGE/PPM	.5/ 1/ .13	.2/ 1/ .05	.2/ 1/ .05

DILUTION FACTOR	31.96	47.87	35.56
HC CONCENTRATION PPM	8.72	.56	1.54
CO CONCENTRATION PPM	42.26	4.05	18.14
CO2 CONCENTRATION PCT	.3758	.2379	.3353
NOX CONCENTRATION PPM	9.59	5.31	11.95

HC MASS GRAMS	.732	.080	.128
CO MASS GRAMS	7.174	1.182	3.058
CO2 MASS GRAMS	1003.37	1092.16	889.13
NOX MASS GRAMS	2.601	2.477	3.218
PM MASS GRAMS	.394	.261	.259
FUEL MASS KG	.320	.344	.281
FUEL ECONOMY MPG (L/100KM)	36.27 (6.49)	36.34 (6.47)	41.41 (5.68)

3-BAG COMPOSITE RESULTS

HC	G/MI	.062
CO	G/MI	.794
NOX	G/MI	.717
PM	G/MI	.076
FUEL ECONOMY MPG (L/100KM)		37.62 (6.25)

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VEHICLE NUMBER 220	TEST CRC-20-T2-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/25/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 14821 MILES (23846 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.24 IN HG (742.7 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .978
 RELATIVE HUMIDITY 60.4 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	870.1	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.64 (5.85)	3.93 (6.33)	3.63 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	614.1 (17.39)	613.4 (17.37)	608.9 (17.24)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)	.92 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5176. (146.6)	8909. (252.3)	5134. (145.4)

HC SAMPLE METER/RANGE/PPM (BAG)	11.4/ 9/ 11.35	3.6/ 9/ 3.60	4.3/ 9/ 4.32
HC BCKGRD METER/RANGE/PPM	3.3/ 2/ 3.34	3.2/ 2/ 3.24	3.3/ 2/ 3.34
CO SAMPLE METER/RANGE/PPM	43.9/ 12/ 42.76	4.4/ 12/ 4.14	12.1/ 12/ 11.51
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.3/ 12/ .28	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	53.8/ 11/ .4153	38.9/ 11/ .2770	49.1/ 11/ .3689
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413	6.7/ 11/ .0425	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.3/ 9/ 10.32	5.5/ 9/ 5.51	11.5/ 9/ 11.48
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	32.21	48.76	36.56
HC CONCENTRATION PPM	8.11	.42	1.07
CO CONCENTRATION PPM	41.32	3.77	10.94
CO2 CONCENTRATION PCT	.3753	.2353	.3281
NOX CONCENTRATION PPM	10.29	5.48	11.46

HC MASS GRAMS	.684	.061	.089
CO MASS GRAMS	7.050	1.108	1.852
CO2 MASS GRAMS	1007.12	1087.13	873.58
NOX MASS GRAMS	2.821	2.586	3.116
PM MASS GRAMS	.382	.246	.234
FUEL MASS KG	.321	.343	.276
FUEL ECONOMY MPG (L/100KM)	36.09 (6.52)	36.61 (6.43)	41.98 (5.60)

3-BAG COMPOSITE RESULTS

HC	G/MI	.054		
CO	G/MI	.686		
NOX	G/MI	.737		
PM	G/MI	.072		
FUEL ECONOMY MPG (L/100KM)		37.87 (6.21)		

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VEHICLE NUMBER 220	TEST CRC-20-T3-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/26/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 14878 MILES (23938 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.14 IN HG (740.2 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .987
 RELATIVE HUMIDITY 64.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.1	869.4	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.981/.984	.980/.984
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.90 (6.28)	3.61 (5.82)
BLOWER FLOW RATE SCFM (SCMM)	607.0 (17.19)	609.0 (17.25)	607.2 (17.20)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)	.90 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5118. (144.9)	8837. (250.3)	5119. (145.0)

HC SAMPLE METER/RANGE/PPM (BAG)	11.2/ 9/ 11.24	4.0/ 9/ 4.01	5.1/ 9/ 5.14
HC BCKGRD METER/RANGE/PPM	3.4/ 2/ 3.45	3.4/ 2/ 3.45	3.4/ 2/ 3.45
CO SAMPLE METER/RANGE/PPM	42.9/ 12/ 41.76	6.8/ 12/ 6.43	17.9/ 12/ 17.14
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .56	.6/ 12/ .56	20.3/ 12/ 19.48
CO2 SAMPLE METER/RANGE/PCT	55.0/ 11/ .4275	39.4/ 11/ .2813	50.0/ 11/ .3776
CO2 BCKGRD METER/RANGE/PCT	7.0/ 11/ .0445	6.9/ 11/ .0438	7.0/ 11/ .0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.1/ 9/ 10.10	5.1/ 9/ 5.14	11.8/ 9/ 11.83
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.1/ 1/ .03	.2/ 1/ .05

DILUTION FACTOR	31.30	47.98	35.67
HC CONCENTRATION PPM	7.90	.64	1.79
CO CONCENTRATION PPM	40.03	5.72	N/A
CO2 CONCENTRATION PCT	.3845	.2383	.3343
NOX CONCENTRATION PPM	10.05	5.11	11.78

HC MASS GRAMS	.659	.092	.150
CO MASS GRAMS	6.753	1.667	N/A
CO2 MASS GRAMS	1020.18	1092.07	887.46
NOX MASS GRAMS	2.748	2.414	3.224
PM MASS GRAMS	.360	.186	.210
FUEL MASS KG	.325	.345	.279
FUEL ECONOMY MPG (L/100KM)	35.49 (6.63)	36.10 (6.52)	41.24 (5.70)

3-BAG COMPOSITE RESULTS

HC	G/MI	.061	
CO	G/MI	N/A	
NOX	G/MI	.723	
PM	G/MI	.061	
FUEL ECONOMY MPG (L/100KM)		37.29 (6.31)	

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VEHICLE NUMBER 220	TEST CRC-20-T4-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/27/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 14939 MILES (24036 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.95 IN HG (735.3 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .961
 RELATIVE HUMIDITY 56.6 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.4	869.5	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985	.982/.985	.981/.985
MEASURED DISTANCE MILES (KM)	3.65 (5.88)	3.93 (6.32)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMM)	606.1 (17.17)	605.7 (17.15)	603.1 (17.08)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)	.90 (.03)	.89 (.03)
TOTAL FLOW SCF (SCM)	5113. (144.8)	8790. (249.0)	5085. (144.0)

HC SAMPLE METER/RANGE/PPM (BAG)	11.8/ 9/ 11.77	4.0/ 9/ 3.98	4.9/ 9/ 4.92
HC BCKGRD METER/RANGE/PPM	3.4/ 2/ 3.45	3.5/ 2/ 3.55	3.5/ 2/ 3.55
CO SAMPLE METER/RANGE/PPM	46.0/ 12/ 44.84	4.6/ 12/ 4.33	17.8/ 12/ 17.04
CO BCKGRD METER/RANGE/PPM	.7/ 12/ .66	1.0/ 12/ .94	1.0/ 12/ .94
CO2 SAMPLE METER/RANGE/PCT	55.7/ 11/ .4348	39.8/ 11/ .2847	50.3/ 11/ .3805
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425	6.7/ 11/ .0425	6.8/ 11/ .0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.6/ 9/ 9.55	4.4/ 9/ 4.42	10.6/ 9/ 10.58
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.2/ 1/ .05

DILUTION FACTOR	30.76	47.44	35.40
HC CONCENTRATION PPM	8.43	.51	1.48
CO CONCENTRATION PPM	43.03	3.33	15.71
CO2 CONCENTRATION PCT	.3936	.2430	.3385
NOX CONCENTRATION PPM	9.53	4.39	10.54

HC MASS GRAMS	.703	.073	.122
CO MASS GRAMS	7.253	.965	2.635
CO2 MASS GRAMS	1043.51	1107.72	892.59
NOX MASS GRAMS	2.535	2.009	2.788
PM MASS GRAMS	.376	.233	.245
FUEL MASS KG	.333	.349	.282
FUEL ECONOMY MPG (L/100KM)	35.02 (6.72)	35.86 (6.56)	40.98 (5.74)

3-BAG COMPOSITE RESULTS

HC	G/MI	.059
CO	G/MI	.738
NOX	G/MI	.620
PM	G/MI	.071
FUEL ECONOMY MPG (L/100KM)		36.99 (6.36)

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VEHICLE NUMBER 220	TEST CRC-20-T5-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/28/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 14495 MILES (23322 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .994
 RELATIVE HUMIDITY 61.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.1	869.7	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.981/.983	.980/.983
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.91 (6.29)	3.61 (5.81)
BLOWER FLOW RATE SCFM (SCMM)	610.4 (17.29)	609.5 (17.26)	606.4 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.92 (.03)	.89 (.03)
TOTAL FLOW SCF (SCM)	5146. (145.7)	8848. (250.6)	5111. (144.7)

HC SAMPLE METER/RANGE/PPM (BAG)	12.1/ 9/ 12.06	4.1/ 9/ 4.10	5.3/ 9/ 5.31
HC BCKGRD METER/RANGE/PPM	3.1/ 2/ 3.14	3.1/ 2/ 3.14	3.2/ 2/ 3.24
CO SAMPLE METER/RANGE/PPM	45.9/ 12/ 44.74	4.6/ 12/ 4.33	17.5/ 12/ 16.75
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19	.1/ 12/ .09	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	54.8/ 11/ .4255	39.2/ 11/ .2796	50.5/ 11/ .3824
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.6/ 11/ .0419	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.7/ 9/ 10.72	6.1/ 9/ 6.14	12.5/ 9/ 12.52
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	31.42	48.31	35.22
HC CONCENTRATION PPM	9.02	1.03	2.16
CO CONCENTRATION PPM	43.32	4.14	16.03
CO2 CONCENTRATION PCT	.3849	.2385	.3417
NOX CONCENTRATION PPM	10.67	6.11	12.50

HC MASS GRAMS	.757	.148	.180
CO MASS GRAMS	7.350	1.207	2.701
CO2 MASS GRAMS	1027.07	1094.22	905.57
NOX MASS GRAMS	2.957	2.912	3.440
PM MASS GRAMS	.371	.222	.229
FUEL MASS KG	.328	.345	.287
FUEL ECONOMY MPG (L/100KM)	35.33 (6.66)	36.11 (6.52)	40.19 (5.85)

3-BAG COMPOSITE RESULTS

HC	G/MI	.076	
CO	G/MI	.784	
NOX	G/MI	.816	
PM	G/MI	.068	
FUEL ECONOMY MPG (L/100KM)		37.00 (6.36)	

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VEHICLE NUMBER 220	TEST CRC-20-T6-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/29/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15052 MILES (24218 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. 1.002
 RELATIVE HUMIDITY 64.5 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	505.0	869.9	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.63 (5.85)	3.93 (6.32)	3.60 (5.79)
BLOWER FLOW RATE SCFM (SCMM)	610.8 (17.30)	610.0 (17.28)	606.4 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)	1.06 (.03)	1.03 (.03)
TOTAL FLOW SCF (SCM)	5149. (145.8)	8860. (250.9)	5115. (144.9)

HC SAMPLE METER/RANGE/PPM (BAG)	12.7/ 9/ 12.72	4.3/ 9/ 4.31	5.4/ 9/ 5.43
HC BCKGRD METER/RANGE/PPM	3.7/ 2/ 3.75	3.8/ 2/ 3.85	3.9/ 2/ 3.95
CO SAMPLE METER/RANGE/PPM	42.6/ 12/ 41.47	6.2/ 12/ 5.86	17.1/ 12/ 16.36
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.3/ 12/ .28	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	55.6/ 11/ .4337	39.9/ 11/ .2855	50.5/ 11/ .3824
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/ .0432	6.9/ 11/ .0438	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.9/ 9/ 9.87	5.5/ 9/ 5.48	11.7/ 9/ 11.66
NOX BCKGRD METER/RANGE/PPM	.5/ 1/ .13	.3/ 1/ .08	.2/ 1/ .05
CH4 SAMPLE PPM (1.170)	2.72	2.10	2.15
CH4 BCKGRD PPM	1.70	1.78	1.76

DILUTION FACTOR	30.85	47.28	35.22
HC CONCENTRATION PPM	9.10	.54	1.59
CO CONCENTRATION PPM	39.99	5.43	15.63
CO2 CONCENTRATION PCT	.3920	.2426	.3398
NOX CONCENTRATION PPM	9.75	5.41	11.62
CH4 CONCENTRATION PPM	1.08	.36	.43
NMHC CONCENTRATION PPM	7.84	.12	1.08

HC MASS GRAMS	.763	.079	.133
CO MASS GRAMS	6.790	1.587	2.636
CO2 MASS GRAMS	1046.47	1114.58	901.25
NOX MASS GRAMS	2.724	2.601	3.224
PM MASS GRAMS	.358	.216	.239
CH4 MASS GRAMS	.105	.060	.042
NMHC MASS GRAMS (FID)	.658	.018	.090
FUEL MASS KG	.333	.352	.285
FUEL ECONOMY MPG (L/100KM)	34.74 (6.77)	35.60 (6.61)	40.27 (5.84)

3-BAG COMPOSITE RESULTS

HC G/MI	.064	CH4 G/MI	.017
CO G/MI	.796	NMHC G/MI	.047
NOX G/MI	.744		
PM G/MI	.067		
FUEL ECONOMY MPG (L/100KM)	36.61 (6.43)		

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VEHICLE NUMBER 220	TEST CRC-20-T7-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/30/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15108 MILES (24308 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.01 IN HG (736.9 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. 1.019
 RELATIVE HUMIDITY 65.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.8	869.5	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.982	.980/.982	.979/.982
MEASURED DISTANCE MILES (KM)	3.62 (5.82)	3.86 (6.21)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMM)	608.5 (17.23)	607.6 (17.21)	605.0 (17.14)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.91 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5127. (145.2)	8819. (249.8)	5100. (144.4)

HC SAMPLE METER/RANGE/PPM (BAG)	14.2/ 9/ 14.21	4.1/ 9/ 4.08	4.8/ 9/ 4.82
HC BCKGRD METER/RANGE/PPM	3.6/ 2/ 3.65	3.7/ 2/ 3.75	3.6/ 2/ 3.65
CO SAMPLE METER/RANGE/PPM	48.9/ 12/ 47.72	5.2/ 12/ 4.90	17.9/ 12/ 17.14
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.5/ 12/ .47	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	56.5/ 11/ .4431	39.1/ 11/ .2787	50.8/ 11/ .3854
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.6/ 11/ .0419	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	12.1/ 9/ 12.07	4.9/ 9/ 4.89	12.1/ 9/ 12.05
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.2/ 1/ .05	.2/ 1/ .05

DILUTION FACTOR	30.15	48.44	34.95
HC CONCENTRATION PPM	10.68	.40	1.28
CO CONCENTRATION PPM	46.05	4.33	16.48
CO2 CONCENTRATION PCT	.4026	.2377	.3447
NOX CONCENTRATION PPM	11.97	4.84	12.00

HC MASS GRAMS	.893	.058	.106
CO MASS GRAMS	7.784	1.258	2.770
CO2 MASS GRAMS	1070.30	1086.76	911.33
NOX MASS GRAMS	3.387	2.357	3.377
PM MASS GRAMS	.533	.238	.277
FUEL MASS KG	.342	.343	.288
FUEL ECONOMY MPG (L/100KM)	33.79 (6.96)	35.91 (6.55)	40.03 (5.88)

3-BAG COMPOSITE RESULTS

HC	G/MI	.067
CO	G/MI	.827
NOX	G/MI	.767
PM	G/MI	.084
FUEL ECONOMY MPG (L/100KM)		36.53 (6.44)

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VEHICLE NUMBER 220	TEST CRC-20-T8-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 1/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15166 MILES (24402 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.86 IN HG (733.0 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. 1.005
 RELATIVE HUMIDITY 64.6 PCT.

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	869.9	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.80 (6.12)	3.60 (5.79)
BLOWER FLOW RATE SCFM (SCMM)	606.2 (17.17)	605.1 (17.14)	601.6 (17.04)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)	1.05 (.03)	1.03 (.03)
TOTAL FLOW SCF (SCM)	5111. (144.7)	8788. (248.9)	5073. (143.7)

HC SAMPLE METER/RANGE/PPM (BAG)	14.7/ 9/ 14.70	5.1/ 9/ 5.09	6.4/ 9/ 6.39
HC BCKGRD METER/RANGE/PPM	4.2/ 2/ 4.25	4.7/ 2/ 4.76	5.1/ 2/ 5.16
CO SAMPLE METER/RANGE/PPM	49.5/ 12/ 48.32	6.2/ 12/ 5.86	19.5/ 12/ 18.70
CO BCKGRD METER/RANGE/PPM	1.0/ 12/ .94	1.0/ 12/ .94	.9/ 12/ .84
CO2 SAMPLE METER/RANGE/PCT	55.2/ 11/ .4296	39.3/ 11/ .2804	50.6/ 11/ .3834
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/ .0438	7.1/ 11/ .0451	7.0/ 11/ .0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.6/ 9/ 10.58	6.0/ 9/ 6.02	11.9/ 9/ 11.93
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.1/ 1/ .03
CH4 SAMPLE PPM (1.170)	2.53	1.99	1.88
CH4 BCKGRD PPM	1.73	1.57	1.55

DILUTION FACTOR	31.09	48.12	35.11
HC CONCENTRATION PPM	10.58	.43	1.38
CO CONCENTRATION PPM	46.03	4.80	17.37
CO2 CONCENTRATION PCT	.3872	.2362	.3402
NOX CONCENTRATION PPM	10.55	5.99	11.91
CH4 CONCENTRATION PPM	.85	.45	.37
NMHC CONCENTRATION PPM	9.59	-.11	.94

HC MASS GRAMS	.881	.061	.114
CO MASS GRAMS	7.756	1.392	2.906
CO2 MASS GRAMS	1025.98	1076.44	894.88
NOX MASS GRAMS	2.937	2.869	3.290
PM MASS GRAMS	.415	.212	.242
CH4 MASS GRAMS	.082	.075	.036
NMHC MASS GRAMS (FID)	.799	.000	.078
FUEL MASS KG	.328	.340	.283
FUEL ECONOMY MPG (L/100KM)	35.26 (6.67)	35.73 (6.58)	40.55 (5.80)

3-BAG COMPOSITE RESULTS

HC	G/MI	.068		CH4	G/MI	.018
CO	G/MI	.860		NMHC	G/MI	.052
NOX	G/MI	.810				
PM	G/MI	.071				
FUEL ECONOMY MPG (L/100KM)		36.88 (6.38)				

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VEHICLE NUMBER 220	TEST CRC-20-T9-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 2/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15225 MILES (24497 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.85 IN HG (732.8 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. 1.021
 RELATIVE HUMIDITY 65.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.1	870.0	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.982	.979/.982	.978/.982
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.89 (6.26)	3.60 (5.79)
BLOWER FLOW RATE SCFM (SCMM)	604.2 (17.11)	603.2 (17.08)	599.5 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)	.92 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5094. (144.3)	8760. (248.1)	5057. (143.2)

HC SAMPLE METER/RANGE/PPM (BAG)	13.4/ 9/ 13.42	4.4/ 9/ 4.41	5.5/ 9/ 5.54
HC BCKGRD METER/RANGE/PPM	3.9/ 2/ 3.95	3.9/ 2/ 3.95	3.9/ 2/ 3.95
CO SAMPLE METER/RANGE/PPM	47.0/ 12/ 45.83	6.0/ 12/ 5.67	13.0/ 12/ 12.38
CO BCKGRD METER/RANGE/PPM	.9/ 12/ .84	1.3/ 12/ 1.22	.9/ 12/ .84
CO2 SAMPLE METER/RANGE/PCT	55.3/ 11/ .4306	40.3/ 11/ .2890	52.8/ 11/ .4052
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425	6.8/ 11/ .0432	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.2/ 9/ 10.17	5.7/ 9/ 5.67	12.5/ 9/ 12.47
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.0/ 1/ .00	.0/ 1/ .00

DILUTION FACTOR	31.04	46.71	33.29
HC CONCENTRATION PPM	9.59	.55	1.71
CO CONCENTRATION PPM	43.69	4.35	11.23
CO2 CONCENTRATION PCT	.3895	.2467	.3626
NOX CONCENTRATION PPM	10.15	5.67	12.47

HC MASS GRAMS	.797	.078	.141
CO MASS GRAMS	7.338	1.256	1.872
CO2 MASS GRAMS	1028.63	1120.63	950.93
NOX MASS GRAMS	2.858	2.745	3.488
PM MASS GRAMS	.377	.229	.245
FUEL MASS KG	.328	.353	.300
FUEL ECONOMY MPG (L/100KM)	35.07 (6.71)	35.10 (6.70)	38.22 (6.15)

3-BAG COMPOSITE RESULTS

HC	G/MI	.067	
CO	G/MI	.731	
NOX	G/MI	.796	
PM	G/MI	.071	
FUEL ECONOMY MPG (L/100KM)		35.91 (6.55)	

VEHICLE NUMBER 220	TEST CRC-70-T1-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 25718 MILES (41380 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.16 IN HG (740.7 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .971
RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.9	869.9	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.65 (5.88)	3.92 (6.30)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	612.0 (17.33)	610.4 (17.29)	606.9 (17.19)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)	.93 (.03)	.88 (.02)
TOTAL FLOW SCF (SCM)	5158. (146.1)	8864. (251.0)	5117. (144.9)

HC SAMPLE METER/RANGE/PPM (BAG)	.0/ 9/ .00	3.5/ 9/ 3.48	3.8/ 9/ 3.79
HC BCKGRD METER/RANGE/PPM	3.6/ 2/ 3.65	3.6/ 2/ 3.65	3.6/ 2/ 3.65
CO SAMPLE METER/RANGE/PPM	28.2/ 12/ 27.23	.7/ 12/ .66	6.5/ 12/ 6.14
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	1.0/ 12/ .94	.6/ 12/ .56
CO2 SAMPLE METER/RANGE/PCT	55.3/ 11/ .4306	39.7/ 11/ .2838	50.8/ 11/ .3854
CO2 BCKGRD METER/RANGE/PCT	7.2/ 11/ .0458	7.2/ 11/ .0458	7.1/ 11/ .0451
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	.0/ 9/ .00	4.9/ 9/ 4.94	11.5/ 9/ 11.45
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	31.26	47.65	35.06
HC CONCENTRATION PPM	N/A	-.09	.24
CO CONCENTRATION PPM	26.24	-.26	5.45
CO2 CONCENTRATION PCT	.3863	.2390	.3415
NOX CONCENTRATION PPM	N/A	4.92	11.43

HC MASS GRAMS	N/A	.000	.020
CO MASS GRAMS	4.462	.000	.919
CO2 MASS GRAMS	1033.15	1098.50	906.02
NOX MASS GRAMS	N/A	2.294	3.076
PM MASS GRAMS	.417	.289	.258
FUEL MASS KG	.327	.346	.286
FUEL ECONOMY MPG (L/100KM)	35.59 (6.61)	36.14 (6.51)	40.61 (5.79)

3-BAG COMPOSITE RESULTS

HC	G/MI	N/A
CO	G/MI	.323
NOX	G/MI	N/A
PM	G/MI	.081
FUEL ECONOMY MPG (L/100KM)		37.18 (6.33)

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VEHICLE NUMBER 220	TEST CRC-70-T2-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15774 MILES (25380 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .988
 RELATIVE HUMIDITY 64.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	870.8	504.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.981/.984	.980/.984
MEASURED DISTANCE MILES (KM)	3.64 (5.85)	3.95 (6.36)	3.65 (5.87)
BLOWER FLOW RATE SCFM (SCMM)	608.7 (17.24)	607.6 (17.21)	603.3 (17.08)
GAS METER FLOW RATE SCFM (SCMM)	1.01 (.03)	1.06 (.03)	1.04 (.03)
TOTAL FLOW SCF (SCM)	5131. (145.3)	8834. (250.2)	5078. (143.8)

HC SAMPLE METER/RANGE/PPM (BAG)	9.3/ 9/ 9.27	4.7/ 9/ 4.68	5.0/ 9/ 4.97
HC BCKGRD METER/RANGE/PPM	4.7/ 2/ 4.76	5.4/ 2/ 5.46	5.5/ 2/ 5.57
CO SAMPLE METER/RANGE/PPM	30.4/ 12/ 29.40	.5/ 12/ .47	7.9/ 12/ 7.48
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.4/ 12/ .37	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	55.0/ 11/ .4275	39.7/ 11/ .2838	51.1/ 11/ .3883
CO2 BCKGRD METER/RANGE/PCT	7.0/ 11/ .0445	7.0/ 11/ .0445	7.0/ 11/ .0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.0/ 9/ 9.98	5.2/ 9/ 5.24	12.3/ 9/ 12.34
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.2/ 1/ .05	.2/ 1/ .05
CH4 SAMPLE PPM (1.170)	3.00	2.39	2.38
CH4 BCKGRD PPM	1.98	2.05	1.93

DILUTION FACTOR	31.41	47.64	34.78
HC CONCENTRATION PPM	4.67	.67	.43
CO CONCENTRATION PPM	28.29	.10	7.00
CO2 CONCENTRATION PCT	.3845	.2403	.3451
NOX CONCENTRATION PPM	9.93	5.20	12.29
CH4 CONCENTRATION PPM	1.09	.38	.50
NMHC CONCENTRATION PPM	3.39	-1.12	-1.02

HC MASS GRAMS	.390	.000	.000
CO MASS GRAMS	4.785	.028	1.172
CO2 MASS GRAMS	1022.93	1100.63	908.65
NOX MASS GRAMS	2.729	2.457	3.342
PM MASS GRAMS	N/A	.234	.273
CH4 MASS GRAMS	.106	.064	.048
NMHC MASS GRAMS (FID)	.284	.000	.000
FUEL MASS KG	.325	.346	.287
FUEL ECONOMY MPG (L/100KM)	35.72 (6.59)	36.37 (6.47)	40.58 (5.80)

3-BAG COMPOSITE RESULTS

HC	G/MI	.022	CH4	G/MI	.018
CO	G/MI	.363	NMHC	G/MI	.016
NOX	G/MI	.729			
PM	G/MI	N/A			
FUEL ECONOMY MPG (L/100KM)		37.32 (6.30)			

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VEHICLE NUMBER 220	TEST CRC-70-T3-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15829 MILES (25468 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.98 IN HG (736.1 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .948
 RELATIVE HUMIDITY 56.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.8	870.0	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.986	.983/.986	.982/.986
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.92 (6.31)	3.64 (5.86)
BLOWER FLOW RATE SCFM (SCMM)	607.5 (17.21)	606.3 (17.17)	602.7 (17.07)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)	.90 (.03)	.86 (.02)
TOTAL FLOW SCF (SCM)	5119. (145.0)	8804. (249.3)	5083. (143.9)

HC SAMPLE METER/RANGE/PPM (BAG)	8.9/ 9/ 8.94	3.7/ 9/ 3.69	3.9/ 9/ 3.94
HC BCKGRD METER/RANGE/PPM	3.9/ 2/ 3.95	3.9/ 2/ 3.95	3.8/ 2/ 3.85
CO SAMPLE METER/RANGE/PPM	30.5/ 12/ 29.50	1.3/ 12/ 1.22	5.7/ 12/ 5.38
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .56	.9/ 12/ .84	.5/ 12/ .47
CO2 SAMPLE METER/RANGE/PCT	55.7/ 11/ .4348	39.9/ 11/ .2855	51.3/ 11/ .3903
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425	6.7/ 11/ .0425	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.6/ 9/ 10.64	5.3/ 9/ 5.32	12.4/ 9/ 12.44
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	30.89	47.35	34.62
HC CONCENTRATION PPM	5.12	-.17	.20
CO CONCENTRATION PPM	28.19	.38	4.80
CO2 CONCENTRATION PCT	.3936	.2439	.3496
NOX CONCENTRATION PPM	10.60	5.30	12.42

HC MASS GRAMS	.427	.000	.017
CO MASS GRAMS	4.757	.110	.804
CO2 MASS GRAMS	1044.69	1113.38	921.23
NOX MASS GRAMS	2.785	2.394	3.240
PM MASS GRAMS	.353	.243	.299
FUEL MASS KG	.332	.350	.290
FUEL ECONOMY MPG (L/100KM)	35.04 (6.71)	35.69 (6.59)	40.03 (5.88)

3-BAG COMPOSITE RESULTS

HC	G/MI	.026	
CO	G/MI	.345	
NOX	G/MI	.719	
PM	G/MI	.075	
FUEL ECONOMY MPG (L/100KM)		36.68 (6.41)	

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VEHICLE NUMBER 220	TEST CRC-70-T4-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15884 MILES (25557 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.27 IN HG (743.5 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .950
 RELATIVE HUMIDITY 53.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	869.5	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.985	.983/.985	.982/.985
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.92 (6.30)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMM)	612.6 (17.35)	613.2 (17.37)	609.2 (17.25)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.91 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5164. (146.2)	8899. (252.0)	5138. (145.5)

HC SAMPLE METER/RANGE/PPM (BAG)	8.7/ 9/ 8.65	3.3/ 9/ 3.33	3.6/ 9/ 3.56
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55	3.5/ 2/ 3.55	3.7/ 2/ 3.75
CO SAMPLE METER/RANGE/PPM	31.5/ 12/ 30.48	.5/ 12/ .47	1.4/ 12/ 1.31
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.3/ 12/ .28	1.0/ 12/ .94
CO2 SAMPLE METER/RANGE/PCT	55.3/ 11/ .4306	39.9/ 11/ .2855	50.5/ 11/ .3824
CO2 BCKGRD METER/RANGE/PCT	6.3/ 11/ .0400	6.4/ 11/ .0406	6.3/ 11/ .0400
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.2/ 9/ 10.19	5.5/ 9/ 5.49	12.5/ 9/ 12.47
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.2/ 1/ .05	.1/ 1/ .03

DILUTION FACTOR	31.18	47.37	35.37
HC CONCENTRATION PPM	5.22	-.15	-.08
CO CONCENTRATION PPM	29.44	.19	.39
CO2 CONCENTRATION PCT	.3919	.2458	.3436
NOX CONCENTRATION PPM	10.14	5.44	12.44

HC MASS GRAMS	.439	.000	.000
CO MASS GRAMS	5.013	.055	.065
CO2 MASS GRAMS	1049.39	1134.10	915.34
NOX MASS GRAMS	2.694	2.489	3.288
PM MASS GRAMS	.368	.234	.223
FUEL MASS KG	.333	.357	.288
FUEL ECONOMY MPG (L/100KM)	34.84 (6.75)	34.97 (6.73)	40.14 (5.86)

3-BAG COMPOSITE RESULTS

HC	G/MI	.025	
CO	G/MI	.298	
NOX	G/MI	.732	
PM	G/MI	.069	
FUEL ECONOMY MPG (L/100KM)		36.26 (6.49)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T5-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15941 MILES (25649 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.34 IN HG (745.2 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .912
 RELATIVE HUMIDITY 45.7 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.5	869.8	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.988	.985/.988	.984/.988
MEASURED DISTANCE MILES (KM)	3.63 (5.83)	3.91 (6.29)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	618.7 (17.52)	618.2 (17.51)	613.9 (17.39)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.92 (.03)	.89 (.03)
TOTAL FLOW SCF (SCM)	5209. (147.5)	8975. (254.2)	5177. (146.6)

HC SAMPLE METER/RANGE/PPM (BAG)	8.2/ 9/ 8.17	3.2/ 9/ 3.21	3.1/ 9/ 3.08
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55	3.4/ 2/ 3.45	3.4/ 2/ 3.45
CO SAMPLE METER/RANGE/PPM	30.4/ 12/ 29.40	.4/ 12/ .37	1.0/ 12/ .94
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37	.4/ 12/ .37	.6/ 12/ .56
CO2 SAMPLE METER/RANGE/PCT	54.6/ 11/ .4234	39.5/ 11/ .2821	50.5/ 11/ .3824
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413	6.5/ 11/ .0413	6.4/ 11/ .0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.3/ 9/ 10.29	5.7/ 9/ 5.73	4.9/ 9/ 4.86
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.4/ 1/ .10	.3/ 1/ .08

DILUTION FACTOR	31.71	47.95	35.38
HC CONCENTRATION PPM	4.73	-.16	-.27
CO CONCENTRATION PPM	28.37	.01	.38
CO2 CONCENTRATION PCT	.3835	.2417	.3430
NOX CONCENTRATION PPM	10.19	5.63	N/A

HC MASS GRAMS	.402	.000	.000
CO MASS GRAMS	4.873	.002	.065
CO2 MASS GRAMS	1035.77	1124.90	920.56
NOX MASS GRAMS	2.624	2.499	N/A
PM MASS GRAMS	.354	.233	.209
FUEL MASS KG	.329	.354	.290
FUEL ECONOMY MPG (L/100KM)	35.17 (6.69)	35.22 (6.68)	40.04 (5.88)

3-BAG COMPOSITE RESULTS

HC	G/MI	.023
CO	G/MI	.283
NOX	G/MI	N/A
PM	G/MI	.067
FUEL ECONOMY MPG (L/100KM)		36.44 (6.46)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T6-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/20/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 15997 MILES (25739 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.32 IN HG (744.7 MM HG) DRY BULB TEMPERATURE 73.00F (22.80C) NOX HUMIDITY C.F. .962
 RELATIVE HUMIDITY 53.8 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	503.0	870.4	504.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985	.982/.985	.981/.985
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.89 (6.26)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMM)	614.6 (17.41)	614.6 (17.41)	610.2 (17.28)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)	.94 (.03)	.88 (.02)
TOTAL FLOW SCF (SCM)	5160. (146.1)	8929. (252.9)	5135. (145.4)

HC SAMPLE METER/RANGE/PPM (BAG)	8.0/ 9/ 7.98	3.4/ 9/ 3.42	3.6/ 9/ 3.65
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55	3.5/ 2/ 3.55	3.4/ 2/ 3.45
CO SAMPLE METER/RANGE/PPM	29.6/ 12/ 28.61	.6/ 12/ .56	2.4/ 12/ 2.25
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.5/ 12/ .47	.9/ 12/ .84
CO2 SAMPLE METER/RANGE/PCT	54.9/ 11/ .4265	40.0/ 11/ .2864	50.5/ 11/ .3824
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413	6.5/ 11/ .0413	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.6/ 9/ 9.63	5.7/ 9/ 5.66	12.0/ 9/ 11.95
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.0/ 1/ .00	.0/ 1/ .00

DILUTION FACTOR	31.49	47.23	35.36
HC CONCENTRATION PPM	4.55	.05	.30
CO CONCENTRATION PPM	27.61	.10	1.39
CO2 CONCENTRATION PCT	.3866	.2460	.3423
NOX CONCENTRATION PPM	9.58	5.66	11.95

HC MASS GRAMS	.383	.000	.025
CO MASS GRAMS	4.697	.029	.236
CO2 MASS GRAMS	1034.11	1139.00	911.50
NOX MASS GRAMS	2.575	2.633	3.198
PM MASS GRAMS	.391	.218	.219
FUEL MASS KG	.328	.358	.287
FUEL ECONOMY MPG (L/100KM)	35.18 (6.69)	34.62 (6.79)	40.24 (5.85)

3-BAG COMPOSITE RESULTS

HC	G/MI	.024	
CO	G/MI	.291	
NOX	G/MI	.740	
PM	G/MI	.068	
FUEL ECONOMY MPG (L/100KM)		36.16 (6.51)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T7-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/21/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16054 MILES (25830 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.27 IN HG (743.5 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .970
 RELATIVE HUMIDITY 57.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.2	870.2	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.60 (5.80)	3.87 (6.23)	3.60 (5.80)
BLOWER FLOW RATE SCFM (SCMM)	614.7 (17.41)	613.6 (17.38)	610.1 (17.28)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)	1.06 (.03)	1.04 (.03)
TOTAL FLOW SCF (SCM)	5184. (146.8)	8915. (252.5)	5144. (145.7)

HC SAMPLE METER/RANGE/PPM (BAG)	9.4/ 9/ 9.43	4.6/ 9/ 4.58	4.9/ 9/ 4.94
HC BCKGRD METER/RANGE/PPM	4.5/ 2/ 4.56	5.4/ 2/ 5.46	6.1/ 2/ 6.17
CO SAMPLE METER/RANGE/PPM	32.2/ 12/ 31.18	1.2/ 12/ 1.12	5.6/ 12/ 5.28
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37	1.2/ 12/ 1.12	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	54.4/ 11/ .4214	39.6/ 11/ .2830	50.4/ 11/ .3815
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413	6.5/ 11/ .0413	6.4/ 11/ .0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.1/ 9/ 10.06	5.5/ 9/ 5.50	11.9/ 9/ 11.89
NOX BCKGRD METER/RANGE/PPM	.0/ 1/ .00	.0/ 1/ .00	.0/ 1/ .00
CH4 SAMPLE PPM (1.170)	3.01	2.59	2.46
CH4 BCKGRD PPM	2.07	2.40	2.00

DILUTION FACTOR	31.85	47.78	35.42
HC CONCENTRATION PPM	5.02	-.77	-1.06
CO CONCENTRATION PPM	29.99	.02	4.97
CO2 CONCENTRATION PCT	.3814	.2426	.3420
NOX CONCENTRATION PPM	10.06	5.50	11.89
CH4 CONCENTRATION PPM	1.00	.24	.51
NMHC CONCENTRATION PPM	3.85	-1.05	-1.66

HC MASS GRAMS	.424	.000	.000
CO MASS GRAMS	5.127	.005	.843
CO2 MASS GRAMS	1025.24	1121.24	912.13
NOX MASS GRAMS	2.739	2.577	3.214
PM MASS GRAMS	.381	N/A	.257
CH4 MASS GRAMS	.098	.040	.050
NMHC MASS GRAMS (FID)	.325	.000	.000
FUEL MASS KG	.326	.353	.287
FUEL ECONOMY MPG (L/100KM)	35.29 (6.67)	35.00 (6.72)	39.97 (5.89)

3-BAG COMPOSITE RESULTS

HC	G/MI	.024	CH4	G/MI	.015
CO	G/MI	.360	NMHC	G/MI	.019
NOX	G/MI	.747			
PM	G/MI	N/A			
FUEL ECONOMY MPG (L/100KM)		36.33 (6.48)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T8-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/22/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16108 MILES (25917 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.15 IN HG (740.4 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .951
 RELATIVE HUMIDITY 53.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.6	869.8	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.985	.983/.985	.982/.985
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.86 (6.22)	3.58 (5.75)
BLOWER FLOW RATE SCFM (SCMM)	609.9 (17.27)	610.3 (17.28)	606.1 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.91 (.03)	.94 (.03)
TOTAL FLOW SCF (SCM)	5137. (145.5)	8860. (250.9)	5111. (144.8)

HC SAMPLE METER/RANGE/PPM (BAG)	8.8/ 9/ 8.77	3.7/ 9/ 3.72	4.0/ 9/ 3.99
HC BCKGRD METER/RANGE/PPM	3.6/ 2/ 3.65	3.6/ 2/ 3.65	3.6/ 2/ 3.65
CO SAMPLE METER/RANGE/PPM	30.9/ 12/ 29.89	1.0/ 12/ .94	1.7/ 12/ 1.59
CO BCKGRD METER/RANGE/PPM	.9/ 12/ .84	.9/ 12/ .84	1.5/ 12/ 1.41
CO2 SAMPLE METER/RANGE/PCT	55.0/ 11/ .4275	40.0/ 11/ .2864	51.1/ 11/ .3883
CO2 BCKGRD METER/RANGE/PCT	6.4/ 11/ .0406	6.6/ 11/ .0419	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	11.1/ 9/ 11.15	6.3/ 9/ 6.27	13.1/ 9/ 13.13
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	31.40	47.22	34.83
HC CONCENTRATION PPM	5.23	.15	.45
CO CONCENTRATION PPM	28.33	.10	.21
CO2 CONCENTRATION PCT	.3882	.2454	.3482
NOX CONCENTRATION PPM	11.08	6.25	13.11

HC MASS GRAMS	.438	.022	.037
CO MASS GRAMS	4.798	.031	.036
CO2 MASS GRAMS	1033.94	1127.26	922.86
NOX MASS GRAMS	2.931	2.853	3.452
PM MASS GRAMS	.392	.216	.210
FUEL MASS KG	.328	.355	.291
FUEL ECONOMY MPG (L/100KM)	35.08 (6.71)	34.72 (6.78)	39.25 (5.99)

3-BAG COMPOSITE RESULTS

HC	G/MI	.031	
CO	G/MI	.283	
NOX	G/MI	.816	
PM	G/MI	.068	
FUEL ECONOMY MPG (L/100KM)		35.96 (6.54)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T9-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/23/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16164 MILES (26007 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. 1.017
 RELATIVE HUMIDITY 65.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.9	869.9	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.982	.979/.982	.979/.982
MEASURED DISTANCE MILES (KM)	3.61 (5.82)	3.91 (6.29)	3.60 (5.79)
BLOWER FLOW RATE SCFM (SCMM)	609.6 (17.27)	608.8 (17.24)	605.1 (17.14)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.91 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5138. (145.5)	8840. (250.3)	5102. (144.5)

HC SAMPLE METER/RANGE/PPM (BAG)	9.0/ 9/ 9.05	3.6/ 9/ 3.62	4.0/ 9/ 4.02
HC BCKGRD METER/RANGE/PPM	3.8/ 2/ 3.85	3.8/ 2/ 3.85	3.9/ 2/ 3.95
CO SAMPLE METER/RANGE/PPM	31.0/ 12/ 29.99	.5/ 12/ .47	1.8/ 12/ 1.69
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .56	.2/ 12/ .19	.8/ 12/ .75
CO2 SAMPLE METER/RANGE/PCT	55.5/ 11/ .4327	40.6/ 11/ .2916	51.2/ 11/ .3893
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.5/ 11/ .0413	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.1/ 9/ 10.06	5.8/ 9/ 5.83	12.6/ 9/ 12.60
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.0/ 1/ .00

DILUTION FACTOR	31.03	46.39	34.74
HC CONCENTRATION PPM	5.32	-.14	.19
CO CONCENTRATION PPM	28.58	.28	.93
CO2 CONCENTRATION PCT	.3922	.2512	.3492
NOX CONCENTRATION PPM	10.04	5.80	12.60

HC MASS GRAMS	.446	.000	.016
CO MASS GRAMS	4.841	.081	.156
CO2 MASS GRAMS	1044.61	1151.32	923.87
NOX MASS GRAMS	2.841	2.825	3.542
PM MASS GRAMS	.387	.210	.210
FUEL MASS KG	.332	.362	.291
FUEL ECONOMY MPG (L/100KM)	34.76 (6.77)	34.38 (6.84)	39.46 (5.96)

3-BAG COMPOSITE RESULTS

HC	G/MI	.027
CO	G/MI	.299
NOX	G/MI	.807
PM	G/MI	.066
FUEL ECONOMY MPG (L/100KM)		35.75 (6.58)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T1-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16787 MILES (27010 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .953
 RELATIVE HUMIDITY 53.3 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	486.7	869.8	504.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985	.983/.985	.982/.985
MEASURED DISTANCE MILES (KM)	3.59 (5.78)	3.88 (6.24)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMM)	605.1 (17.14)	606.2 (17.17)	602.3 (17.06)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.92 (.03)	.88 (.02)
TOTAL FLOW SCF (SCM)	4915. (139.2)	8802. (249.3)	5076. (143.7)

HC SAMPLE METER/RANGE/PPM (BAG)	6.6/ 9/ 6.61	3.0/ 9/ 2.99	3.2/ 9/ 3.24
HC BCKGRD METER/RANGE/PPM	3.4/ 2/ 3.45	3.4/ 2/ 3.45	3.5/ 2/ 3.55
CO SAMPLE METER/RANGE/PPM	15.2/ 12/ 14.51	.2/ 12/ .19	1.4/ 12/ 1.31
CO BCKGRD METER/RANGE/PPM	.6/ 12/ .56	.2/ 12/ .19	1.0/ 12/ .94
CO2 SAMPLE METER/RANGE/PCT	57.3/ 11/ .4516	39.8/ 11/ .2847	50.8/ 11/ .3854
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.5/ 11/ .0413	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.6/ 9/ 10.64	5.6/ 9/ 5.63	12.7/ 9/ 12.72
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.2/ 1/ .05	.2/ 1/ .05

DILUTION FACTOR	29.86	47.52	35.11
HC CONCENTRATION PPM	N/A	-.38	-.20
CO CONCENTRATION PPM	N/A	.00	.39
CO2 CONCENTRATION PCT	N/A	.2443	.3453
NOX CONCENTRATION PPM	N/A	5.58	12.68

HC MASS GRAMS	N/A	.000	.000
CO MASS GRAMS	N/A	.001	.065
CO2 MASS GRAMS	N/A	1114.85	908.65
NOX MASS GRAMS	N/A	2.533	3.320
PM MASS GRAMS	N/A	.244	.237
FUEL MASS KG	N/A	.351	.286
FUEL ECONOMY MPG (L/100KM)	N/A (N/A)	35.26 (6.67)	40.31 (5.84)

3-BAG COMPOSITE RESULTS

HC	G/MI	N/A
CO	G/MI	N/A
NOX	G/MI	N/A
PM	G/MI	N/A
FUEL ECONOMY MPG (L/100KM)		N/A (N/A)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T2-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/12/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16844 MILES (27101 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.04 IN HG (737.6 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .981
 RELATIVE HUMIDITY 60.5 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.8	870.1	514.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.981/.984	.980/.984
MEASURED DISTANCE MILES (KM)	3.60 (5.79)	3.88 (6.24)	3.58 (5.76)
BLOWER FLOW RATE SCFM (SCMM)	609.4 (17.26)	608.7 (17.24)	605.1 (17.14)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.92 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5135. (145.4)	8840. (250.4)	5197. (147.2)

HC SAMPLE METER/RANGE/PPM (BAG)	7.3/ 9/ 7.32	3.1/ 9/ 3.11	3.2/ 9/ 3.24
HC BCKGRD METER/RANGE/PPM	1.7/ 2/ 1.72	1.6/ 2/ 1.62	1.6/ 2/ 1.62
CO SAMPLE METER/RANGE/PPM	21.2/ 12/ 20.36	.8/ 12/ .75	.2/ 12/ .19
CO BCKGRD METER/RANGE/PPM	.8/ 12/ .75	.4/ 12/ .37	.6/ 12/ .56
CO2 SAMPLE METER/RANGE/PCT	55.7/ 11/ .4348	39.4/ 11/ .2813	49.9/ 11/ .3766
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.8/ 11/ .0432	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.8/ 9/ 10.81	5.6/ 9/ 5.63	12.6/ 9/ 12.64
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.3/ 1/ .08	.3/ 1/ .08

DILUTION FACTOR	30.96	48.09	35.93
HC CONCENTRATION PPM	5.66	1.52	1.66
CO CONCENTRATION PPM	19.08	.37	-.35
CO2 CONCENTRATION PCT	.3942	.2390	.3352
NOX CONCENTRATION PPM	10.74	5.55	12.57

HC MASS GRAMS	.473	.218	.141
CO MASS GRAMS	3.231	.108	.000
CO2 MASS GRAMS	1049.61	1095.37	903.28
NOX MASS GRAMS	2.928	2.607	3.469
PM MASS GRAMS	.379	.248	.255
FUEL MASS KG	.332	.345	.284
FUEL ECONOMY MPG (L/100KM)	34.51 (6.82)	35.82 (6.57)	40.10 (5.87)

3-BAG COMPOSITE RESULTS

HC	G/MI	.067
CO	G/MI	.200
NOX	G/MI	.783
PM	G/MI	.075
FUEL ECONOMY MPG (L/100KM)		36.65 (6.42)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T3-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/13/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16898 MILES (27188 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.01 IN HG (736.9 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .973
 RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	504.9	869.1	505.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.60 (5.80)	3.88 (6.25)	3.62 (5.82)
BLOWER FLOW RATE SCFM (SCMM)	608.1 (17.22)	607.5 (17.20)	603.6 (17.09)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.90 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5124. (145.1)	8812. (249.6)	5091. (144.2)

HC SAMPLE METER/RANGE/PPM (BAG)	6.8/ 9/ 6.80	3.5/ 9/ 3.51	3.6/ 9/ 3.60
HC BCKGRD METER/RANGE/PPM	4.1/ 2/ 4.15	3.9/ 2/ 3.95	3.8/ 2/ 3.85
CO SAMPLE METER/RANGE/PPM	18.2/ 12/ 17.43	.4/ 12/ .37	1.2/ 12/ 1.12
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37	.6/ 12/ .56	.6/ 12/ .56
CO2 SAMPLE METER/RANGE/PCT	55.7/ 11/ .4348	40.0/ 11/ .2864	51.2/ 11/ .3893
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/ .0432	6.8/ 11/ .0432	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.7/ 9/ 10.67	5.8/ 9/ 5.78	12.2/ 9/ 12.22
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.3/ 1/ .08	.3/ 1/ .08

DILUTION FACTOR	30.98	47.23	34.75
HC CONCENTRATION PPM	2.78	-.36	-.14
CO CONCENTRATION PPM	16.61	-.17	.56
CO2 CONCENTRATION PCT	.3930	.2441	.3480
NOX CONCENTRATION PPM	10.60	5.70	12.15

HC MASS GRAMS	.232	.000	.000
CO MASS GRAMS	2.806	.000	.094
CO2 MASS GRAMS	1044.14	1115.45	918.54
NOX MASS GRAMS	2.864	2.649	3.260
PM MASS GRAMS	.351	.249	.265
FUEL MASS KG	.330	.351	.289
FUEL ECONOMY MPG (L/100KM)	34.80 (6.76)	35.26 (6.67)	39.92 (5.89)

3-BAG COMPOSITE RESULTS

HC	G/MI	.013
CO	G/MI	.168
NOX	G/MI	.766
PM	G/MI	.073
FUEL ECONOMY MPG (L/100KM)		36.36 (6.47)

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 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T4-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/14/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 16955 MILES (27280 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .987
 RELATIVE HUMIDITY 64.0 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.6	870.1	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.981/.984	.980/.984
MEASURED DISTANCE MILES (KM)	3.57 (5.75)	3.88 (6.24)	3.59 (5.78)
BLOWER FLOW RATE SCFM (SCMM)	609.3 (17.26)	610.0 (17.28)	606.8 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)	1.07 (.03)	1.05 (.03)
TOTAL FLOW SCF (SCM)	5133. (145.4)	8862. (251.0)	5118. (144.9)

HC SAMPLE METER/RANGE/PPM (BAG)	7.9/ 9/ 7.92	4.4/ 9/ 4.41	4.6/ 9/ 4.60
HC BCKGRD METER/RANGE/PPM	4.7/ 2/ 4.76	5.1/ 2/ 5.16	4.9/ 2/ 4.96
CO SAMPLE METER/RANGE/PPM	21.6/ 12/ 20.75	.6/ 12/ .56	.9/ 12/ .84
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.5/ 12/ .47	.5/ 12/ .47
CO2 SAMPLE METER/RANGE/PCT	55.5/ 11/ .4327	39.7/ 11/ .2838	50.8/ 11/ .3854
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425	6.9/ 11/ .0438	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	11.5/ 9/ 11.47	6.2/ 9/ 6.22	13.2/ 9/ 13.16
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10	.3/ 1/ .08	.4/ 1/ .10
CH4 SAMPLE PPM (1.220)	2.81	2.38	2.27
CH4 BCKGRD PPM	2.11	2.15	1.97

DILUTION FACTOR	31.10	47.65	35.10
HC CONCENTRATION PPM	3.31	-.64	-.22
CO CONCENTRATION PPM	19.89	.10	.37
CO2 CONCENTRATION PCT	.3915	.2409	.3428
NOX CONCENTRATION PPM	11.37	6.15	13.06
CH4 CONCENTRATION PPM	.78	.27	.36
NMHC CONCENTRATION PPM	2.37	-.98	-.66

HC MASS GRAMS	.277	.000	.000
CO MASS GRAMS	3.365	.029	.063
CO2 MASS GRAMS	1042.01	1106.98	909.55
NOX MASS GRAMS	3.121	2.915	3.574
PM MASS GRAMS	.494	.235	.314
CH4 MASS GRAMS	.075	.046	.035
NMHC MASS GRAMS (FID)	.198	.000	.000
FUEL MASS KG	.330	.348	.286
FUEL ECONOMY MPG (L/100KM)	34.53 (6.81)	35.49 (6.63)	40.01 (5.88)

3-BAG COMPOSITE RESULTS

HC	G/MI	.016	CH4	G/MI	.013
CO	G/MI	.203	NMHC	G/MI	.011
NOX	G/MI	.844			
PM	G/MI	.084			
FUEL ECONOMY MPG (L/100KM)		36.45 (6.45)			

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VEHICLE NUMBER 220	TEST CRC-120-T5-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17012 MILES (27372 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .979
 RELATIVE HUMIDITY 60.5 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.8	870.2	505.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.981/.984	.980/.984
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.91 (6.29)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	610.8 (17.30)	609.9 (17.27)	605.8 (17.16)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.92 (.03)	.88 (.02)
TOTAL FLOW SCF (SCM)	5146. (145.7)	8860. (250.9)	5109. (144.7)

HC SAMPLE METER/RANGE/PPM (BAG)	7.2/ 9/ 7.23	3.5/ 9/ 3.52	3.7/ 9/ 3.70
HC BCKGRD METER/RANGE/PPM	4.4/ 2/ 4.46	4.3/ 2/ 4.35	4.2/ 2/ 4.25
CO SAMPLE METER/RANGE/PPM	19.5/ 12/ 18.70	.8/ 12/ .75	.8/ 12/ .75
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28	.3/ 12/ .28	.8/ 12/ .75
CO2 SAMPLE METER/RANGE/PCT	54.9/ 11/ .4265	38.8/ 11/ .2762	50.4/ 11/ .3815
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.5/ 11/ .0413	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.5/ 9/ 10.51	5.7/ 9/ 5.72	13.0/ 9/ 12.98
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.5/ 1/ .13	.3/ 1/ .08

DILUTION FACTOR	31.57	48.97	35.47
HC CONCENTRATION PPM	2.92	-.75	-.43
CO CONCENTRATION PPM	17.92	.46	.02
CO2 CONCENTRATION PCT	.3859	.2357	.3414
NOX CONCENTRATION PPM	10.37	5.60	12.91

HC MASS GRAMS	.245	.000	.000
CO MASS GRAMS	3.040	.135	.003
CO2 MASS GRAMS	1029.72	1082.96	904.27
NOX MASS GRAMS	2.830	2.630	3.498
PM MASS GRAMS	.413	.240	.278
FUEL MASS KG	.326	.341	.285
FUEL ECONOMY MPG (L/100KM)	35.64 (6.60)	36.55 (6.44)	40.74 (5.77)

3-BAG COMPOSITE RESULTS

HC	G/MI	.014
CO	G/MI	.191
NOX	G/MI	.774
PM	G/MI	.076
FUEL ECONOMY MPG (L/100KM)		37.45 (6.28)

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 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T6-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17067 MILES (27460 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .973
 RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT (0-505 SEC.)	STABILIZED (505-1372 SEC.)	HOT TRANSIENT (0- 505 SEC.)
RUN TIME SECONDS	503.7	869.9	504.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.89 (6.26)	3.61 (5.82)
BLOWER FLOW RATE SCFM (SCMM)	608.9 (17.24)	607.6 (17.21)	603.4 (17.09)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)	.91 (.03)	.86 (.02)
TOTAL FLOW SCF (SCM)	5119. (145.0)	8822. (249.8)	5084. (144.0)

HC SAMPLE METER/RANGE/PPM (BAG)	6.8/ 9/ 6.84	3.2/ 9/ 3.15	3.4/ 9/ 3.37
HC BCKGRD METER/RANGE/PPM	3.8/ 2/ 3.85	4.1/ 2/ 4.15	4.1/ 2/ 4.15
CO SAMPLE METER/RANGE/PPM	19.2/ 12/ 18.41	.4/ 12/ .37	.8/ 12/ .75
CO BCKGRD METER/RANGE/PPM	.5/ 12/ .47	.2/ 12/ .19	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	55.0/ 11/ .4275	39.3/ 11/ .2804	50.4/ 11/ .3815
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413	6.5/ 11/ .0413	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	11.1/ 9/ 11.13	5.8/ 9/ 5.79	12.8/ 9/ 12.75
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08	.3/ 1/ .08	.3/ 1/ .08

DILUTION FACTOR	31.50	48.24	35.47
HC CONCENTRATION PPM	3.12	-.91	-.67
CO CONCENTRATION PPM	17.47	.19	.55
CO2 CONCENTRATION PCT	.3876	.2400	.3414
NOX CONCENTRATION PPM	11.05	5.72	12.68

HC MASS GRAMS	.260	.000	.000
CO MASS GRAMS	2.949	.054	.092
CO2 MASS GRAMS	1028.64	1097.84	899.80
NOX MASS GRAMS	2.982	2.659	3.398
PM MASS GRAMS	.396	.223	.300
FUEL MASS KG	.325	.346	.283
FUEL ECONOMY MPG (L/100KM)	35.55 (6.62)	35.91 (6.55)	40.70 (5.78)

3-BAG COMPOSITE RESULTS

HC	G/MI	.015	
CO	G/MI	.183	
NOX	G/MI	.783	
PM	G/MI	.075	
FUEL ECONOMY MPG (L/100KM)		37.06 (6.35)	

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 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T7-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17125 MILES (27554 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG) DRY BULB TEMPERATURE 74.00F (23.30C) NOX HUMIDITY C.F. 1.002
 RELATIVE HUMIDITY 58.2 PCT.

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.7	870.2	505.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.65 (5.87)	3.91 (6.29)	3.64 (5.85)
BLOWER FLOW RATE SCFM (SCMM)	608.0 (17.22)	607.4 (17.20)	602.4 (17.06)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)	.95 (.03)	.88 (.02)
TOTAL FLOW SCF (SCM)	5122. (145.0)	8823. (249.9)	5080. (143.9)

HC SAMPLE METER/RANGE/PPM (BAG)	6.8/ 9/ 6.82	3.5/ 9/ 3.53	3.8/ 9/ 3.77
HC BCKGRD METER/RANGE/PPM	4.1/ 2/ 4.15	4.0/ 2/ 4.05	4.1/ 2/ 4.15
CO SAMPLE METER/RANGE/PPM	17.4/ 12/ 16.65	.6/ 12/ .56	.8/ 12/ .75
CO BCKGRD METER/RANGE/PPM	.7/ 12/ .66	.6/ 12/ .56	.8/ 12/ .75
CO2 SAMPLE METER/RANGE/PCT	56.3/ 11/ .4410	40.2/ 11/ .2881	51.7/ 11/ .3942
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.7/ 11/ .0425	6.8/ 11/ .0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	11.5/ 9/ 11.48	6.3/ 9/ 6.27	13.8/ 9/ 13.82
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03	.1/ 1/ .03	.1/ 1/ .03

DILUTION FACTOR	30.55	46.94	34.32
HC CONCENTRATION PPM	2.80	N/A	-.26
CO CONCENTRATION PPM	15.58	N/A	.02
CO2 CONCENTRATION PCT	.4005	N/A	.3523
NOX CONCENTRATION PPM	11.46	N/A	13.79

HC MASS GRAMS	.234	N/A	.000
CO MASS GRAMS	2.630	N/A	.003
CO2 MASS GRAMS	1063.61	N/A	927.87
NOX MASS GRAMS	3.186	N/A	3.804
PM MASS GRAMS	.365	N/A	.205
FUEL MASS KG	.336	N/A	.292
FUEL ECONOMY MPG (L/100KM)	34.57 (6.80)	N/A (N/A)	39.73 (5.92)

3-BAG COMPOSITE RESULTS

HC	G/MI	N/A	
CO	G/MI	N/A	
NOX	G/MI	N/A	
PM	G/MI	N/A	
FUEL ECONOMY MPG (L/100KM)		N/A (N/A)	

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 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T8-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17182 MILES (27645 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.01 IN HG (736.9 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. 1.003
 RELATIVE HUMIDITY 64.5 PCT.

	1	2	3
BAG NUMBER			
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.7	870.1	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.62 (5.83)	3.91 (6.29)	3.63 (5.83)
BLOWER FLOW RATE SCFM (SCMM)	607.1 (17.19)	606.4 (17.17)	603.6 (17.10)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)	1.06 (.03)	1.04 (.03)
TOTAL FLOW SCF (SCM)	5116. (144.9)	8809. (249.5)	5090. (144.2)

HC SAMPLE METER/RANGE/PPM (BAG)	8.5/ 9/ 8.52	5.3/ 9/ 5.34	5.6/ 9/ 5.57
HC BCKGRD METER/RANGE/PPM	5.6/ 2/ 5.67	6.2/ 2/ 6.27	5.9/ 2/ 5.97
CO SAMPLE METER/RANGE/PPM	21.2/ 12/ 20.36	.2/ 12/ .19	2.1/ 12/ 1.97
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19	.3/ 12/ .28	1.3/ 12/ 1.22
CO2 SAMPLE METER/RANGE/PCT	55.5/ 11/ .4327	40.0/ 11/ .2864	50.7/ 11/ .3844
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.6/ 11/ .0419	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.3/ 9/ 10.30	5.9/ 9/ 5.88	13.1/ 9/ 13.13
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.2/ 1/ .05	.1/ 1/ .03
CH4 SAMPLE PPM (1.220)	3.25	2.64	2.75
CH4 BCKGRD PPM	2.30	2.29	2.09

DILUTION FACTOR	31.10	47.21	35.17
HC CONCENTRATION PPM	3.04	-.80	-.23
CO CONCENTRATION PPM	19.59	-.09	.76
CO2 CONCENTRATION PCT	.3921	.2454	.3430
NOX CONCENTRATION PPM	10.25	5.83	13.10
CH4 CONCENTRATION PPM	1.02	.40	.71
NMHC CONCENTRATION PPM	1.79	-1.29	-1.10

HC MASS GRAMS	.253	.000	.000
CO MASS GRAMS	3.304	.000	.127
CO2 MASS GRAMS	1040.16	1120.75	905.42
NOX MASS GRAMS	2.848	2.792	3.624
PM MASS GRAMS	.378	.226	.289
CH4 MASS GRAMS	.099	.066	.068
NMHC MASS GRAMS (FID)	.149	.000	.000
FUEL MASS KG	.329	.353	.285
FUEL ECONOMY MPG (L/100KM)	35.07 (6.71)	35.31 (6.66)	40.57 (5.80)

3-BAG COMPOSITE RESULTS

HC	G/MI	.014		CH4	G/MI	.020
CO	G/MI	.198		NMHC	G/MI	.009
NOX	G/MI	.808				
PM	G/MI	.073				
FUEL ECONOMY MPG (L/100KM)		36.60 (6.43)				

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T9-FTP	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17240 MILES (27739 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.06 IN HG (738.1 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. 1.035
 RELATIVE HUMIDITY 72.5 PCT.

	1	2	3
BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.8	869.8	504.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.981	.979/.981	.978/.981
MEASURED DISTANCE MILES (KM)	3.64 (5.86)	3.91 (6.29)	3.61 (5.80)
BLOWER FLOW RATE SCFM (SCMM)	606.2 (17.17)	606.4 (17.17)	603.6 (17.10)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)	.91 (.03)	.89 (.03)
TOTAL FLOW SCF (SCM)	5107. (144.6)	8805. (249.3)	5085. (144.0)

HC SAMPLE METER/RANGE/PPM (BAG)	7.3/ 9/ 7.35	3.4/ 9/ 3.44	3.6/ 9/ 3.60
HC BCKGRD METER/RANGE/PPM	4.3/ 2/ 4.35	4.3/ 2/ 4.35	4.2/ 2/ 4.25
CO SAMPLE METER/RANGE/PPM	21.2/ 12/ 20.36	.8/ 12/ .75	2.2/ 12/ 2.07
CO BCKGRD METER/RANGE/PPM	.8/ 12/ .75	.9/ 12/ .84	1.1/ 12/ 1.03
CO2 SAMPLE METER/RANGE/PCT	55.5/ 11/ .4327	39.9/ 11/ .2855	50.0/ 11/ .3776
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419	6.6/ 11/ .0419	6.8/ 11/ .0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.5/ 9/ 10.46	5.7/ 9/ 5.74	12.8/ 9/ 12.77
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.1/ 1/ .03	.3/ 1/ .08

DILUTION FACTOR	31.11	47.37	35.82
HC CONCENTRATION PPM	3.13	-.82	-.53
CO CONCENTRATION PPM	19.01	-.08	1.02
CO2 CONCENTRATION PCT	.3921	.2445	.3356
NOX CONCENTRATION PPM	10.41	5.71	12.70

HC MASS GRAMS	.261	.000	.000
CO MASS GRAMS	3.201	.000	.172
CO2 MASS GRAMS	1038.48	1116.28	884.81
NOX MASS GRAMS	2.979	2.818	3.618
PM MASS GRAMS	.378	.222	.230
FUEL MASS KG	.329	.351	.279
FUEL ECONOMY MPG (L/100KM)	35.34 (6.66)	35.49 (6.63)	41.27 (5.70)

3-BAG COMPOSITE RESULTS

HC	G/MI	.015	
CO	G/MI	.195	
NOX	G/MI	.818	
PM	G/MI	.068	
FUEL ECONOMY MPG (L/100KM)		36.92 (6.37)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T1-FT	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/ 9/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17411 MILES (28014 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. 1.008
 RELATIVE HUMIDITY 68.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.8	871.3	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.89 (6.27)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMM)	610.0 (17.28)	609.4 (17.26)	606.3 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)	1.06 (.03)	1.04 (.03)
TOTAL FLOW SCF (SCM)	5141. (145.6)	8865. (251.1)	5113. (144.8)

HC SAMPLE METER/RANGE/PPM (BAG)	39.2/ 9/ 39.18	20.1/ 9/ 20.13	18.4/ 9/ 18.42
HC BCKGRD METER/RANGE/PPM	4.1/ 2/ 4.15	4.5/ 2/ 4.56	4.4/ 2/ 4.46
CO SAMPLE METER/RANGE/PPM	79.6/ 12/ 78.83	41.9/ 12/ 40.77	51.9/ 12/ 50.71
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19	.3/ 12/ .28	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	53.9/ 11/ .4163	39.2/ 11/ .2796	51.0/ 11/ .3873
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/ .0432	6.7/ 11/ .0425	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.2/ 9/ 10.23	5.6/ 9/ 5.63	13.0/ 9/ 13.04
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.3/ 1/ .08	.3/ 1/ .08
CH4 SAMPLE PPM (1.220)	2.99	2.57	2.48
CH4 BCKGRD PPM	2.26	2.21	2.17

DILUTION FACTOR	31.66	47.44	34.38
HC CONCENTRATION PPM	35.16	15.67	14.09
CO CONCENTRATION PPM	76.29	39.39	48.86
CO2 CONCENTRATION PCT	.3744	.2379	.3448
NOX CONCENTRATION PPM	10.18	5.56	12.97
CH4 CONCENTRATION PPM	.80	.41	.38
NMHC CONCENTRATION PPM	34.18	15.17	13.63

HC MASS GRAMS	2.946	2.264	1.174
CO MASS GRAMS	12.930	11.511	8.237
CO2 MASS GRAMS	998.06	1093.51	913.94
NOX MASS GRAMS	2.858	2.691	3.622
PM MASS GRAMS	.989	.483	.438
CH4 MASS GRAMS	.078	.069	.036
NMHC MASS GRAMS (FID)	2.864	2.192	1.136
FUEL MASS KG	.323	.352	.293
FUEL ECONOMY MPG (L/100KM)	35.80 (6.57)	35.27 (6.67)	39.53 (5.95)

3-BAG COMPOSITE RESULTS

HC	G/MI	.558		CH4	G/MI	.016
CO	G/MI	2.892		NMHC	G/MI	.541
NOX	G/MI	.795				
PM	G/MI	.154				
FUEL ECONOMY MPG (L/100KM)		36.48 (6.45)				

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T2-FT	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/10/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17465 MILES (28101 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.22 IN HG (742.2 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. 1.008
 RELATIVE HUMIDITY 68.2 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	504.9	869.9	505.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983	.980/.983	.979/.983
MEASURED DISTANCE MILES (KM)	3.63 (5.84)	3.91 (6.30)	3.63 (5.84)
BLOWER FLOW RATE SCFM (SCMM)	614.2 (17.39)	613.5 (17.37)	607.5 (17.21)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)	.93 (.03)	.87 (.02)
TOTAL FLOW SCF (SCM)	5176. (146.6)	8908. (252.3)	5121. (145.0)

HC SAMPLE METER/RANGE/PPM (BAG)	4.9/ 9/ 4.91	3.3/ 9/ 3.27	18.2/ 9/ 18.18
HC BCKGRD METER/RANGE/PPM	3.6/ 2/ 3.65	3.9/ 2/ 3.95	3.9/ 2/ 3.95
CO SAMPLE METER/RANGE/PPM	86.2/ 12/ 85.81	45.3/ 12/ 44.15	63.3/ 12/ 62.13
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19	.7/ 12/ .66	.7/ 12/ .66
CO2 SAMPLE METER/RANGE/PCT	53.8/ 11/ .4153	39.0/ 11/ .2779	49.6/ 11/ .3737
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/ .0432	6.8/ 11/ .0432	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	64.3/ 9/ 64.28	91.9/ 9/ 91.88	12.3/ 9/ 12.30
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05	.2/ 1/ .05	.1/ 1/ .03

DILUTION FACTOR	31.94	47.95	35.50
HC CONCENTRATION PPM	N/A	N/A	14.34
CO CONCENTRATION PPM	83.07	42.31	59.70
CO2 CONCENTRATION PCT	.3734	.2356	.3324
NOX CONCENTRATION PPM	N/A	N/A	12.28

HC MASS GRAMS	N/A	N/A	1.197
CO MASS GRAMS	14.175	12.426	10.079
CO2 MASS GRAMS	1002.08	1088.04	882.44
NOX MASS GRAMS	N/A	N/A	3.432
PM MASS GRAMS	1.036	.495	.523
FUEL MASS KG	.323	.349	.284
FUEL ECONOMY MPG (L/100KM)	35.87 (6.56)	35.80 (6.57)	40.78 (5.77)

3-BAG COMPOSITE RESULTS

HC	G/MI	N/A		
CO	G/MI	3.217		
NOX	G/MI	N/A		
PM	G/MI	.164		
FUEL ECONOMY MPG (L/100KM)		37.09 (6.34)		

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 3-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T3-FT	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	FTP
ODOMETER 17521 MILES (28191 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .978
 RELATIVE HUMIDITY 60.4 PCT.

BAG NUMBER	1	2	3
BAG DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT
	(0-505 SEC.)	(505-1372 SEC.)	(0- 505 SEC.)
RUN TIME SECONDS	505.0	871.0	505.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984	.982/.984	.981/.984
MEASURED DISTANCE MILES (KM)	3.61 (5.81)	3.88 (6.24)	3.62 (5.83)
BLOWER FLOW RATE SCFM (SCMM)	611.9 (17.33)	610.8 (17.30)	607.0 (17.19)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)	1.07 (.03)	1.05 (.03)
TOTAL FLOW SCF (SCM)	5159. (146.1)	8882. (251.5)	5118. (145.0)

HC SAMPLE METER/RANGE/PPM (BAG)	43.8/ 9/ 43.76	22.4/ 9/ 22.35	21.0/ 9/ 20.97
HC BCKGRD METER/RANGE/PPM	4.5/ 2/ 4.56	5.4/ 2/ 5.46	5.6/ 2/ 5.67
CO SAMPLE METER/RANGE/PPM	88.4/ 12/ 88.18	43.9/ 12/ 42.76	55.6/ 12/ 54.40
CO BCKGRD METER/RANGE/PPM	.5/ 12/ .47	.4/ 12/ .37	.9/ 12/ .84
CO2 SAMPLE METER/RANGE/PCT	53.5/ 11/ .4122	38.7/ 11/ .2753	50.1/ 11/ .3785
CO2 BCKGRD METER/RANGE/PCT	7.0/ 11/ .0445	6.9/ 11/ .0438	7.1/ 11/ .0451
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.7/ 9/ 10.65	5.7/ 9/ 5.69	12.2/ 9/ 12.18
NOX BCKGRD METER/RANGE/PPM	.6/ 1/ .15	.6/ 1/ .15	.4/ 1/ .10
CH4 SAMPLE PPM (1.220)	2.97	2.31	2.42
CH4 BCKGRD PPM	2.06	2.05	2.07

DILUTION FACTOR	31.86	48.09	35.10
HC CONCENTRATION PPM	39.34	17.00	15.47
CO CONCENTRATION PPM	85.32	41.34	52.15
CO2 CONCENTRATION PCT	.3691	.2324	.3347
NOX CONCENTRATION PPM	10.51	5.54	12.08
CH4 CONCENTRATION PPM	.97	.30	.41
NMHC CONCENTRATION PPM	38.16	16.63	14.97

HC MASS GRAMS	3.308	2.461	1.290
CO MASS GRAMS	14.513	12.105	8.800
CO2 MASS GRAMS	987.41	1070.25	888.25
NOX MASS GRAMS	2.873	2.607	3.276
PM MASS GRAMS	1.036	.436	.457
CH4 MASS GRAMS	.095	.051	.039
NMHC MASS GRAMS (FID)	3.208	2.408	1.249
FUEL MASS KG	.321	.345	.285
FUEL ECONOMY MPG (L/100KM)	35.86 (6.56)	35.84 (6.56)	40.52 (5.81)

3-BAG COMPOSITE RESULTS

HC	G/MI	.616	CH4	G/MI	.015
CO	G/MI	3.115	NMHC	G/MI	.600
NOX	G/MI	.761			
PM	G/MI	.152			
FUEL ECONOMY MPG (L/100KM)		37.05 (6.35)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T1-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/24/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 14781 MILES (23782 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.07 IN HG (738.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .973
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	8.05 (12.95)
BLOWER FLOW RATE SCFM (SCMM)	605.4 (17.14)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6064. (171.7)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.08
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	2.9/	12/	2.73
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	81.6/	11/	.7531
CO2 BCKGRD METER/RANGE/PCT	7.0/	11/	.0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	35.8/	9/	35.77
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	17.97
HC CONCENTRATION PPM	-.18
CO CONCENTRATION PPM	2.46
CO2 CONCENTRATION PCT	.7111
NOX CONCENTRATION PPM	35.67

HC MASS GRAMS	.000
CO MASS GRAMS	.492
CO2 MASS GRAMS	2236.05
NOX MASS GRAMS	11.396
PM MASS GRAMS	.976
FUEL MASS KG	.704
FUEL ECONOMY MPG (L/100KM)	36.44 (6.45)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.061	
NOX	G/MI	1.416	
PM	G/MI	.121	
FUEL ECONOMY MPG (L/100KM)		36.44 (6.45)	

COMPUTER PROGRAM LDT 2.7-R

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
1-BAG EPA FTP VEHICLE EMISSION RESULTS

PROJECT NO. 08-4471-040

VEHICLE NUMBER	220	TEST CRC-20-T2-US06	DIESEL	EM-4495-F
VEHICLE MODEL	99 MERCEDES BENZ	DATE 4/25/2002	RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE	2.2 L (134 CID)-4	DYNO 7	BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION	M5	ACTUAL ROAD LOAD	8.12 HP (6.06 KW)	US06
ODOMETER	14838 MILES (23874 KM)	TEST WEIGHT	3500 LBS (1587 KG)	

BAROMETER	29.19 IN HG (741.4 MM HG)	DRY BULB TEMPERATURE	71.00F (21.70C)	NOX HUMIDITY C.F.	.979
RELATIVE HUMIDITY	60.4 PCT.				

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	8.00 (12.88)
BLOWER FLOW RATE SCFM (SCMM)	607.7 (17.21)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	6089. (172.5)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/ 9/ 3.05
HC BCKGRD METER/RANGE/PPM	3.2/ 2/ 3.24
CO SAMPLE METER/RANGE/PPM	2.2/ 12/ 2.07
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	80.5/ 11/ .7375
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/ .0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	34.7/ 9/ 34.69
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05

DILUTION FACTOR	18.35
HC CONCENTRATION PPM	-.02
CO CONCENTRATION PPM	1.74
CO2 CONCENTRATION PCT	.6967
NOX CONCENTRATION PPM	34.64

HC MASS GRAMS	.000
CO MASS GRAMS	.348
CO2 MASS GRAMS	2199.59
NOX MASS GRAMS	11.178
PM MASS GRAMS	.969
FUEL MASS KG	.692
FUEL ECONOMY MPG (L/100KM)	36.85 (6.38)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.044	
NOX	G/MI	1.397	
PM	G/MI	.121	
FUEL ECONOMY	MPG (L/100KM)	36.85	(6.38)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T3-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/26/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 14896 MILES (23967 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.14 IN HG (740.2 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.9777/.984
MEASURED DISTANCE MILES (KM)	8.02 (12.90)
BLOWER FLOW RATE SCFM (SCMM)	606.8 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6074. (172.0)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	3.04
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	5.3/	12/	5.00
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	81.5/	11/	.7517
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.4/	9/	36.40
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.00
HC CONCENTRATION PPM	-.12
CO CONCENTRATION PPM	4.65
CO2 CONCENTRATION PCT	.7109
NOX CONCENTRATION PPM	36.35

HC MASS GRAMS	.000
CO MASS GRAMS	.931
CO2 MASS GRAMS	2239.00
NOX MASS GRAMS	11.801
PM MASS GRAMS	.956
FUEL MASS KG	.705
FUEL ECONOMY MPG (L/100KM)	36.26 (6.49)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.116	
NOX	G/MI	1.472	
PM	G/MI	.119	
FUEL ECONOMY MPG (L/100KM)		36.26 (6.49)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T4-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/27/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 14957 MILES (24065 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.93 IN HG (734.8 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .961
RELATIVE HUMIDITY 56.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.985
MEASURED DISTANCE MILES (KM)	8.02 (12.91)
BLOWER FLOW RATE SCFM (SCMM)	602.1 (17.05)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	6034. (170.9)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.13
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	6.4/	12/	6.05
CO BCKGRD METER/RANGE/PPM	.9/	12/	.84
CO2 SAMPLE METER/RANGE/PCT	81.3/	11/	.7489
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	34.1/	9/	34.06
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.07
HC CONCENTRATION PPM	-.12
CO CONCENTRATION PPM	5.07
CO2 CONCENTRATION PCT	.7081
NOX CONCENTRATION PPM	34.01

HC MASS GRAMS	.000
CO MASS GRAMS	1.008
CO2 MASS GRAMS	2215.06
NOX MASS GRAMS	10.683
PM MASS GRAMS	1.088
FUEL MASS KG	.698
FUEL ECONOMY MPG (L/100KM)	36.66 (6.42)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.126	
NOX	G/MI	1.332	
PM	G/MI	.136	
FUEL ECONOMY MPG (L/100KM)		36.66 (6.42)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T5-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/28/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15013 MILES (24155 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .994
RELATIVE HUMIDITY 61.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.01 (12.89)
BLOWER FLOW RATE SCFM (SCMM)	605.0 (17.13)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6064. (171.7)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/	9/	2.93
HC BCKGRD METER/RANGE/PPM	3.2/	2/	3.24
CO SAMPLE METER/RANGE/PPM	5.6/	12/	5.28
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.0/	11/	.7446
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	34.3/	9/	34.26
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	18.17
HC CONCENTRATION PPM	-.13
CO CONCENTRATION PPM	4.85
CO2 CONCENTRATION PCT	.7056
NOX CONCENTRATION PPM	34.19

HC MASS GRAMS	.000
CO MASS GRAMS	.969
CO2 MASS GRAMS	2218.39
NOX MASS GRAMS	11.158
PM MASS GRAMS	1.000
FUEL MASS KG	.699
FUEL ECONOMY MPG (L/100KM)	36.58 (6.43)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.121	
NOX	G/MI	1.392	
PM	G/MI	.125	
FUEL ECONOMY MPG (L/100KM)		36.58 (6.43)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T6-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/29/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15070 MILES (24247 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.002
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.03 (12.92)
BLOWER FLOW RATE SCFM (SCMM)	603.1 (17.08)
GAS METER FLOW RATE SCFM (SCMM)	1.01 (.03)
TOTAL FLOW SCF (SCM)	6045. (171.2)

HC SAMPLE METER/RANGE/PPM (BAG)	3.4/	9/	3.43
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	4.4/	12/	4.14
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	82.6/	11/	.7675
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	35.3/	9/	35.34
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.170)			1.80
CH4 BCKGRD PPM			1.78

DILUTION FACTOR	17.63
HC CONCENTRATION PPM	-.29
CO CONCENTRATION PPM	3.82
CO2 CONCENTRATION PCT	.7262
NOX CONCENTRATION PPM	35.27
CH4 CONCENTRATION PPM	.11
NMHC CONCENTRATION PPM	-.43

HC MASS GRAMS	.000
CO MASS GRAMS	.762
CO2 MASS GRAMS	2276.22
NOX MASS GRAMS	11.566
PM MASS GRAMS	1.049
CH4 MASS GRAMS	.013
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.717
FUEL ECONOMY MPG (L/100KM)	35.71 (6.59)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.002
CO	G/MI	.095	NMHC	G/MI	.000
NOX	G/MI	1.441			
PM	G/MI	.131			
FUEL ECONOMY MPG (L/100KM)		35.71 (6.59)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T7-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/30/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15125 MILES (24336 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.019
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.975/.982
MEASURED DISTANCE MILES (KM)	8.00 (12.87)
BLOWER FLOW RATE SCFM (SCMM)	600.3 (17.00)
GAS METER FLOW RATE SCFM (SCMM)	.00 (.00)
TOTAL FLOW SCF (SCM)	6004. (170.0)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/	9/	2.75
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	5.1/	12/	4.81
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	82.0/	11/	.7589
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	.0/	9/	.00
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	17.83
HC CONCENTRATION PPM	N/A
CO CONCENTRATION PPM	N/A
CO2 CONCENTRATION PCT	N/A
NOX CONCENTRATION PPM	N/A

HC MASS GRAMS	N/A
CO MASS GRAMS	N/A
CO2 MASS GRAMS	N/A
NOX MASS GRAMS	N/A
PM MASS GRAMS	NA
FUEL MASS KG	NA
FUEL ECONOMY MPG (L/100KM)	N/A (N/A)

1-BAG COMPOSITE RESULTS

HC	G/MI	N/A	
CO	G/MI	N/A	
NOX	G/MI	N/A	
PM	G/MI	N/A	
FUEL ECONOMY MPG (L/100KM)		N/A	(N/A)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T8-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 1/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15184 MILES (24431 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.86 IN HG (733.0 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.005
RELATIVE HUMIDITY 64.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.02 (12.90)
BLOWER FLOW RATE SCFM (SCMM)	597.6 (16.92)
GAS METER FLOW RATE SCFM (SCMM)	1.00 (.03)
TOTAL FLOW SCF (SCM)	5987. (169.6)

HC SAMPLE METER/RANGE/PPM (BAG)	4.1/	9/	4.08
HC BCKGRD METER/RANGE/PPM	4.8/	2/	4.86
CO SAMPLE METER/RANGE/PPM	2.8/	12/	2.63
CO BCKGRD METER/RANGE/PPM	.5/	12/	.47
CO2 SAMPLE METER/RANGE/PCT	81.7/	11/	.7546
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.0/	9/	35.95
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.170)			1.78
CH4 BCKGRD PPM			1.51

DILUTION FACTOR	17.94
HC CONCENTRATION PPM	-.51
CO CONCENTRATION PPM	2.11
CO2 CONCENTRATION PCT	.7132
NOX CONCENTRATION PPM	35.88
CH4 CONCENTRATION PPM	.35
NMHC CONCENTRATION PPM	-.92

HC MASS GRAMS	.000
CO MASS GRAMS	.416
CO2 MASS GRAMS	2213.95
NOX MASS GRAMS	11.697
PM MASS GRAMS	1.008
CH4 MASS GRAMS	.040
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.697
FUEL ECONOMY MPG (L/100KM)	36.67 (6.42)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.005
CO	G/MI	.052	NMHC	G/MI	.000
NOX	G/MI	1.459			
PM	G/MI	.126			
FUEL ECONOMY MPG (L/100KM)		36.67 (6.42)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T9-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 2/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15243 MILES (24525 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.86 IN HG (733.0 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.021
RELATIVE HUMIDITY 65.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.975/.982
MEASURED DISTANCE MILES (KM)	8.00 (12.87)
BLOWER FLOW RATE SCFM (SCMM)	596.1 (16.88)
GAS METER FLOW RATE SCFM (SCMM)	.84 (.02)
TOTAL FLOW SCF (SCM)	5971. (169.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.27
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	3.8/	12/	3.58
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	82.4/	11/	.7646
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.8/	9/	36.80
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	17.70
HC CONCENTRATION PPM	-.27
CO CONCENTRATION PPM	2.76
CO2 CONCENTRATION PCT	.7239
NOX CONCENTRATION PPM	36.78

HC MASS GRAMS	.000
CO MASS GRAMS	.543
CO2 MASS GRAMS	2240.97
NOX MASS GRAMS	12.143
PM MASS GRAMS	1.004
FUEL MASS KG	.706
FUEL ECONOMY MPG (L/100KM)	36.16 (6.51)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.068	
NOX	G/MI	1.518	
PM	G/MI	.126	
FUEL ECONOMY MPG (L/100KM)		36.16 (6.51)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T1-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15736 MILES (25319 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.14 IN HG (740.2 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.984
MEASURED DISTANCE MILES (KM)	8.04 (12.94)
BLOWER FLOW RATE SCFM (SCMM)	606.5 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6075. (172.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	3.04
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.1/	11/	.7460
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.2/	9/	36.21
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.15
HC CONCENTRATION PPM	-.22
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.7046
NOX CONCENTRATION PPM	36.16

HC MASS GRAMS	.000
CO MASS GRAMS	.020
CO2 MASS GRAMS	2219.51
NOX MASS GRAMS	11.562
PM MASS GRAMS	1.006
FUEL MASS KG	.699
FUEL ECONOMY MPG (L/100KM)	36.70 (6.41)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.003	
NOX	G/MI	1.438	
PM	G/MI	.125	
FUEL ECONOMY MPG (L/100KM)		36.70	(6.41)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T2-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15792 MILES (25409 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .988
RELATIVE HUMIDITY 64.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	8.08 (13.00)
BLOWER FLOW RATE SCFM (SCMM)	602.6 (17.06)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	6036. (170.9)

HC SAMPLE METER/RANGE/PPM (BAG)	4.1/	9/	4.12
HC BCKGRD METER/RANGE/PPM	5.3/	2/	5.36
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.5/	11/	.7517
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.5/	9/	36.54
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.170)			2.13
CH4 BCKGRD PPM			1.98

DILUTION FACTOR	18.01
HC CONCENTRATION PPM	-.95
CO CONCENTRATION PPM	-.08
CO2 CONCENTRATION PCT	.7103
NOX CONCENTRATION PPM	36.47
CH4 CONCENTRATION PPM	.27
NMHC CONCENTRATION PPM	-1.26

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2222.92
NOX MASS GRAMS	11.784
PM MASS GRAMS	1.059
CH4 MASS GRAMS	.030
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.700
FUEL ECONOMY MPG (L/100KM)	36.83 (6.39)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.004
CO	G/MI	.000	NMHC	G/MI	.000
NOX	G/MI	1.458			
PM	G/MI	.131			
FUEL ECONOMY MPG (L/100KM)		36.83 (6.39)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T3-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15847 MILES (25497 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.97 IN HG (735.8 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .948
RELATIVE HUMIDITY 56.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.986
MEASURED DISTANCE MILES (KM)	8.07 (12.98)
BLOWER FLOW RATE SCFM (SCMM)	600.2 (17.00)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	6013. (170.3)

HC SAMPLE METER/RANGE/PPM (BAG)	3.2/	9/	3.24
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	.7/	12/	.66
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	83.1/	11/	.7748
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.9/	9/	36.87
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	17.47
HC CONCENTRATION PPM	-.10
CO CONCENTRATION PPM	.29
CO2 CONCENTRATION PCT	.7353
NOX CONCENTRATION PPM	36.83

HC MASS GRAMS	.000
CO MASS GRAMS	.057
CO2 MASS GRAMS	2292.21
NOX MASS GRAMS	11.370
PM MASS GRAMS	.802
FUEL MASS KG	.721
FUEL ECONOMY MPG (L/100KM)	35.66 (6.60)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.007	
NOX	G/MI	1.409	
PM	G/MI	.099	
FUEL ECONOMY MPG (L/100KM)		35.66 (6.60)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T4-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15901 MILES (25584 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.28 IN HG (743.7 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .950
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.985
MEASURED DISTANCE MILES (KM)	8.05 (12.94)
BLOWER FLOW RATE SCFM (SCMM)	606.8 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6078. (172.1)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/	9/	2.76
HC BCKGRD METER/RANGE/PPM	3.8/	2/	3.85
CO SAMPLE METER/RANGE/PPM	.6/	12/	.56
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	81.6/	11/	.7531
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.6/	9/	36.58
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	17.98
HC CONCENTRATION PPM	-.87
CO CONCENTRATION PPM	-.15
CO2 CONCENTRATION PCT	.7148
NOX CONCENTRATION PPM	36.56

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2252.61
NOX MASS GRAMS	11.430
PM MASS GRAMS	1.048
FUEL MASS KG	.709
FUEL ECONOMY MPG (L/100KM)	36.18 (6.50)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	1.421	
PM	G/MI	.130	
FUEL ECONOMY MPG (L/100KM)		36.18	(6.50)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T5-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15959 MILES (25678 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.35 IN HG (745.5 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .912
RELATIVE HUMIDITY 45.7 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.988
MEASURED DISTANCE MILES (KM)	8.02 (12.90)
BLOWER FLOW RATE SCFM (SCMM)	610.1 (17.28)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	6109. (173.0)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.69
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	.8/	12/	.75
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.0/	11/	.7446
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	38.4/	9/	38.42
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.18
HC CONCENTRATION PPM	-.56
CO CONCENTRATION PPM	.47
CO2 CONCENTRATION PCT	.7062
NOX CONCENTRATION PPM	38.37

HC MASS GRAMS	.000
CO MASS GRAMS	.094
CO2 MASS GRAMS	2236.76
NOX MASS GRAMS	11.581
PM MASS GRAMS	.969
FUEL MASS KG	.704
FUEL ECONOMY MPG (L/100KM)	36.32 (6.48)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.012	
NOX	G/MI	1.444	
PM	G/MI	.121	
FUEL ECONOMY MPG (L/100KM)		36.32 (6.48)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T6-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/20/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16015 MILES (25768 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.31 IN HG (744.5 MM HG)	DRY BULB TEMPERATURE 73.00F (22.80C)	NOX HUMIDITY C.F. .962
RELATIVE HUMIDITY 53.8 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.985
MEASURED DISTANCE MILES (KM)	8.03 (12.92)
BLOWER FLOW RATE SCFM (SCMM)	609.5 (17.26)
GAS METER FLOW RATE SCFM (SCMM)	.84 (.02)
TOTAL FLOW SCF (SCM)	6105. (172.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/	9/	2.94
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	.3/	12/	.28
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	81.2/	11/	.7474
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	37.0/	9/	37.00
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	18.11
HC CONCENTRATION PPM	-.31
CO CONCENTRATION PPM	-.08
CO2 CONCENTRATION PCT	.7091
NOX CONCENTRATION PPM	36.97

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2244.51
NOX MASS GRAMS	11.763
PM MASS GRAMS	1.015
FUEL MASS KG	.706
FUEL ECONOMY MPG (L/100KM)	36.23 (6.49)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	1.465	
PM	G/MI	.126	
FUEL ECONOMY MPG (L/100KM)		36.23 (6.49)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T7-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/21/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16071 MILES (25858 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.27 IN HG (743.5 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .970
RELATIVE HUMIDITY 57.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.984
MEASURED DISTANCE MILES (KM)	8.01 (12.89)
BLOWER FLOW RATE SCFM (SCMM)	607.2 (17.20)
GAS METER FLOW RATE SCFM (SCMM)	1.01 (.03)
TOTAL FLOW SCF (SCM)	6083. (172.3)

HC SAMPLE METER/RANGE/PPM (BAG)	4.3/ 9/ 4.25
HC BCKGRD METER/RANGE/PPM	5.1/ 2/ 5.16
CO SAMPLE METER/RANGE/PPM	.6/ 12/ .56
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	81.5/ 11/ .7517
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.0/ 9/ 36.01
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03
CH4 SAMPLE PPM (1.170)	2.29
CH4 BCKGRD PPM	2.00

DILUTION FACTOR	18.01
HC CONCENTRATION PPM	-.62
CO CONCENTRATION PPM	.20
CO2 CONCENTRATION PCT	.7121
NOX CONCENTRATION PPM	35.98
CH4 CONCENTRATION PPM	.40
NMHC CONCENTRATION PPM	-1.09

HC MASS GRAMS	.000
CO MASS GRAMS	.039
CO2 MASS GRAMS	2246.19
NOX MASS GRAMS	11.500
PM MASS GRAMS	1.148
CH4 MASS GRAMS	.046
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.707
FUEL ECONOMY MPG (L/100KM)	36.13 (6.51)

1-BAG COMPOSITE RESULTS

HC G/MI .000	CH4 G/MI .006
CO G/MI .005	NMHC G/MI .000
NOX G/MI 1.435	
PM G/MI .143	
FUEL ECONOMY MPG (L/100KM) 36.13 (6.51)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T8-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/22/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16126 MILES (25946 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .951
 RELATIVE HUMIDITY 53.2 PCT.

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.985
MEASURED DISTANCE MILES (KM)	7.98 (12.84)
BLOWER FLOW RATE SCFM (SCMM)	606.0 (17.16)
GAS METER FLOW RATE SCFM (SCMM)	.84 (.02)
TOTAL FLOW SCF (SCM)	6068. (171.9)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/ 9/ 3.03
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55
CO SAMPLE METER/RANGE/PPM	1.2/ 12/ 1.12
CO BCKGRD METER/RANGE/PPM	.9/ 12/ .84
CO2 SAMPLE METER/RANGE/PCT	81.4/ 11/ .7503
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.6/ 9/ 36.60
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08

DILUTION FACTOR	18.04
HC CONCENTRATION PPM	-.32
CO CONCENTRATION PPM	.31
CO2 CONCENTRATION PCT	.7107
NOX CONCENTRATION PPM	36.53

HC MASS GRAMS	.000
CO MASS GRAMS	.061
CO2 MASS GRAMS	2236.07
NOX MASS GRAMS	11.424
PM MASS GRAMS	.927
FUEL MASS KG	.704
FUEL ECONOMY MPG (L/100KM)	36.16 (6.51)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000
CO	G/MI	.008
NOX	G/MI	1.431
PM	G/MI	.116
FUEL ECONOMY MPG (L/100KM)		36.16 (6.51)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T9-US06	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/23/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16182 MILES (26036 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.018
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.975/.982
MEASURED DISTANCE MILES (KM)	7.95 (12.79)
BLOWER FLOW RATE SCFM (SCMM)	604.2 (17.11)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	6051. (171.4)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.10
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	1.0/	12/	.94
CO BCKGRD METER/RANGE/PPM	1.1/	12/	1.03
CO2 SAMPLE METER/RANGE/PCT	81.4/	11/	.7503
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	37.0/	9/	36.99
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	18.04
HC CONCENTRATION PPM	-.44
CO CONCENTRATION PPM	-.05
CO2 CONCENTRATION PCT	.7113
NOX CONCENTRATION PPM	36.97

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2231.63
NOX MASS GRAMS	12.328
PM MASS GRAMS	.995
FUEL MASS KG	.702
FUEL ECONOMY MPG (L/100KM)	36.08 (6.52)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	1.551	
PM	G/MI	.125	
FUEL ECONOMY MPG (L/100KM)		36.08	(6.52)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T1-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16803 MILES (27036 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .953
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.985
MEASURED DISTANCE MILES (KM)	7.99 (12.85)
BLOWER FLOW RATE SCFM (SCMM)	598.3 (16.94)
GAS METER FLOW RATE SCFM (SCMM)	.82 (.02)
TOTAL FLOW SCF (SCM)	5990. (169.7)

HC SAMPLE METER/RANGE/PPM (BAG)	1.8/	9/	1.82
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.1/	12/	.09
CO2 SAMPLE METER/RANGE/PCT	81.2/	11/	.7474
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.5/	9/	3.53
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.12
HC CONCENTRATION PPM	-1.34
CO CONCENTRATION PPM	.09
CO2 CONCENTRATION PCT	.7078
NOX CONCENTRATION PPM	N/A

HC MASS GRAMS	.000
CO MASS GRAMS	.019
CO2 MASS GRAMS	2198.57
NOX MASS GRAMS	N/A
PM MASS GRAMS	1.041
FUEL MASS KG	.692
FUEL ECONOMY MPG (L/100KM)	36.81 (6.39)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.002	
NOX	G/MI	N/A	
PM	G/MI	.130	
FUEL ECONOMY MPG (L/100KM)			36.81 (6.39)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T2-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/12/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16861 MILES (27129 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .981
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	7.97 (12.83)
BLOWER FLOW RATE SCFM (SCMM)	602.6 (17.07)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6033. (170.8)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.62
HC BCKGRD METER/RANGE/PPM	1.7/	2/	1.72
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	80.9/	11/	.7432
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.7/	9/	36.70
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.22
HC CONCENTRATION PPM	.99
CO CONCENTRATION PPM	.01
CO2 CONCENTRATION PCT	.7036
NOX CONCENTRATION PPM	36.65

HC MASS GRAMS	.097
CO MASS GRAMS	.003
CO2 MASS GRAMS	2200.65
NOX MASS GRAMS	11.744
PM MASS GRAMS	1.014
FUEL MASS KG	.693
FUEL ECONOMY MPG (L/100KM)	36.69 (6.41)

1-BAG COMPOSITE RESULTS

HC	G/MI	.012	
CO	G/MI	.000	
NOX	G/MI	1.473	
PM	G/MI	.127	
FUEL ECONOMY MPG (L/100KM)		36.69 (6.41)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T3-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/13/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16916 MILES (27217 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.01 IN HG (736.9 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .973
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	7.98 (12.85)
BLOWER FLOW RATE SCFM (SCMM)	599.3 (16.97)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6003. (170.0)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.32
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	81.8/	11/	.7560
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	37.0/	9/	37.05
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	17.91
HC CONCENTRATION PPM	-.22
CO CONCENTRATION PPM	-.17
CO2 CONCENTRATION PCT	.7152
NOX CONCENTRATION PPM	36.98

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2226.21
NOX MASS GRAMS	11.702
PM MASS GRAMS	1.037
FUEL MASS KG	.701
FUEL ECONOMY MPG (L/100KM)	36.34 (6.47)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	1.466	
PM	G/MI	.130	
FUEL ECONOMY MPG (L/100KM)		36.34 (6.47)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T4-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/14/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16973 MILES (27309 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.9777/.984
MEASURED DISTANCE MILES (KM)	7.99 (12.86)
BLOWER FLOW RATE SCFM (SCMM)	605.6 (17.15)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	6068. (171.8)

HC SAMPLE METER/RANGE/PPM (BAG)	4.2/ 9/	4.23
HC BCKGRD METER/RANGE/PPM	5.0/ 2/	5.06
CO SAMPLE METER/RANGE/PPM	.4/ 12/	.37
CO BCKGRD METER/RANGE/PPM	.4/ 12/	.37
CO2 SAMPLE METER/RANGE/PCT	80.4/ 11/	.7361
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.4/ 9/	36.38
NOX BCKGRD METER/RANGE/PPM	.3/ 1/	.08
CH4 SAMPLE PPM (1.220)		2.12
CH4 BCKGRD PPM		2.09

DILUTION FACTOR	18.39
HC CONCENTRATION PPM	-.56
CO CONCENTRATION PPM	.01
CO2 CONCENTRATION PCT	.6959
NOX CONCENTRATION PPM	36.31
CH4 CONCENTRATION PPM	.14
NMHC CONCENTRATION PPM	-.74

HC MASS GRAMS	.000
CO MASS GRAMS	.003
CO2 MASS GRAMS	2189.18
NOX MASS GRAMS	11.780
PM MASS GRAMS	1.060
CH4 MASS GRAMS	.016
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.689
FUEL ECONOMY MPG (L/100KM)	36.98 (6.36)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.002
CO	G/MI	.000	NMHC	G/MI	.000
NOX	G/MI	1.474			
PM	G/MI	.133			
FUEL ECONOMY MPG (L/100KM)		36.98 (6.36)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T5-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17030 MILES (27401 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	8.01 (12.88)
BLOWER FLOW RATE SCFM (SCMM)	603.2 (17.08)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6041. (171.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.09
HC BCKGRD METER/RANGE/PPM	3.8/	2/	3.85
CO SAMPLE METER/RANGE/PPM	1.1/	12/	1.03
CO BCKGRD METER/RANGE/PPM	.9/	12/	.84
CO2 SAMPLE METER/RANGE/PCT	81.0/	11/	.7446
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.8/	9/	36.82
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.18
HC CONCENTRATION PPM	-.55
CO CONCENTRATION PPM	.21
CO2 CONCENTRATION PCT	.7056
NOX CONCENTRATION PPM	36.77

HC MASS GRAMS	.000
CO MASS GRAMS	.043
CO2 MASS GRAMS	2210.21
NOX MASS GRAMS	11.783
PM MASS GRAMS	1.030
FUEL MASS KG	.696
FUEL ECONOMY MPG (L/100KM)	36.70 (6.41)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.005	
NOX	G/MI	1.472	
PM	G/MI	.129	
FUEL ECONOMY MPG (L/100KM)		36.70	(6.41)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T6-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17085 MILES (27489 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.9777/.984
MEASURED DISTANCE MILES (KM)	8.01 (12.89)
BLOWER FLOW RATE SCFM (SCMM)	600.9 (17.02)
GAS METER FLOW RATE SCFM (SCMM)	.84 (.02)
TOTAL FLOW SCF (SCM)	6016. (170.4)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	3.00
HC BCKGRD METER/RANGE/PPM	4.1/	2/	4.15
CO SAMPLE METER/RANGE/PPM	1.0/	12/	.94
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	82.0/	11/	.7589
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	38.5/	9/	38.47
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	17.84
HC CONCENTRATION PPM	-.92
CO CONCENTRATION PPM	.65
CO2 CONCENTRATION PCT	.7199
NOX CONCENTRATION PPM	38.42

HC MASS GRAMS	.000	
CO MASS GRAMS	.128	
CO2 MASS GRAMS	2245.54	
NOX MASS GRAMS	12.187	
PM MASS GRAMS	1.036	
FUEL MASS KG	.707	
FUEL ECONOMY MPG (L/100KM)	36.13 (6.51)	

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.016	
NOX	G/MI	1.522	
PM	G/MI	.129	
FUEL ECONOMY MPG (L/100KM)		36.13 (6.51)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T7-USO	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17142 MILES (27581 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 74.00F (23.30C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 58.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	7.99 (12.86)
BLOWER FLOW RATE SCFM (SCMM)	598.9 (16.96)
GAS METER FLOW RATE SCFM (SCMM)	.84 (.02)
TOTAL FLOW SCF (SCM)	5998. (169.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.0/	9/	2.04
HC BCKGRD METER/RANGE/PPM	4.0/	2/	4.05
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.9/	11/	.7574
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	18.5/	9/	18.50
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	17.88
HC CONCENTRATION PPM	-1.78
CO CONCENTRATION PPM	-.08
CO2 CONCENTRATION PCT	.7161
NOX CONCENTRATION PPM	N/A

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2226.90
NOX MASS GRAMS	N/A
PM MASS GRAMS	1.047
FUEL MASS KG	.701
FUEL ECONOMY MPG (L/100KM)	36.37 (6.47)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	N/A	
PM	G/MI	.131	
FUEL ECONOMY MPG (L/100KM)			36.37 (6.47)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T8-USO	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17199 MILES (27673 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.04 (12.94)
BLOWER FLOW RATE SCFM (SCMM)	600.8 (17.02)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	6017. (170.4)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/ 9/	4.57
HC BCKGRD METER/RANGE/PPM	6.0/ 2/	6.07
CO SAMPLE METER/RANGE/PPM	.7/ 12/	.66
CO BCKGRD METER/RANGE/PPM	.4/ 12/	.37
CO2 SAMPLE METER/RANGE/PCT	81.3/ 11/	.7489
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.4/ 9/	36.42
NOX BCKGRD METER/RANGE/PPM	.1/ 1/	.03
CH4 SAMPLE PPM (1.220)		2.40
CH4 BCKGRD PPM		2.19

DILUTION FACTOR	18.08
HC CONCENTRATION PPM	-1.17
CO CONCENTRATION PPM	.29
CO2 CONCENTRATION PCT	.7081
NOX CONCENTRATION PPM	36.40
CH4 CONCENTRATION PPM	.33
NMHC CONCENTRATION PPM	-1.57

HC MASS GRAMS	.000
CO MASS GRAMS	.057
CO2 MASS GRAMS	2209.11
NOX MASS GRAMS	11.899
PM MASS GRAMS	1.054
CH4 MASS GRAMS	.038
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.695
FUEL ECONOMY MPG (L/100KM)	36.88 (6.38)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.005
CO	G/MI	.007	NMHC	G/MI	.000
NOX	G/MI	1.480			
PM	G/MI	.131			
FUEL ECONOMY MPG (L/100KM)		36.88 (6.38)			

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 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T9-USO	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17257 MILES (27766 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.07 IN HG (738.4 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.034
RELATIVE HUMIDITY 72.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.974/.981
MEASURED DISTANCE MILES (KM)	8.03 (12.92)
BLOWER FLOW RATE SCFM (SCMM)	600.7 (17.01)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6017. (170.4)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.32
HC BCKGRD METER/RANGE/PPM	4.1/	2/	4.15
CO SAMPLE METER/RANGE/PPM	.7/	12/	.66
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	81.8/	11/	.7560
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	35.6/	9/	35.62
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	17.91
HC CONCENTRATION PPM	-.60
CO CONCENTRATION PPM	-.06
CO2 CONCENTRATION PCT	.7146
NOX CONCENTRATION PPM	35.53

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2229.33
NOX MASS GRAMS	11.976
PM MASS GRAMS	1.118
FUEL MASS KG	.702
FUEL ECONOMY MPG (L/100KM)	36.49 (6.45)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	1.491	
PM	G/MI	.139	
FUEL ECONOMY MPG (L/100KM)		36.49 (6.45)	

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 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T1-US	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/ 9/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17428 MILES (28041 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.21 IN HG (741.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.01 (12.89)
BLOWER FLOW RATE SCFM (SCMM)	605.4 (17.15)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)
TOTAL FLOW SCF (SCM)	6065. (171.8)

HC SAMPLE METER/RANGE/PPM (BAG)	13.5/	9/	13.50
HC BCKGRD METER/RANGE/PPM	4.4/	2/	4.46
CO SAMPLE METER/RANGE/PPM	51.8/	12/	50.61
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	82.2/	11/	.7617
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	39.2/	9/	39.22
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10
CH4 SAMPLE PPM (1.220)			2.13
CH4 BCKGRD PPM			2.09

DILUTION FACTOR	17.64
HC CONCENTRATION PPM	9.30
CO CONCENTRATION PPM	48.41
CO2 CONCENTRATION PCT	.7216
NOX CONCENTRATION PPM	39.13
CH4 CONCENTRATION PPM	.16
NMHC CONCENTRATION PPM	9.10

HC MASS GRAMS	.919
CO MASS GRAMS	9.680
CO2 MASS GRAMS	2269.09
NOX MASS GRAMS	12.959
PM MASS GRAMS	1.432
CH4 MASS GRAMS	.018
NMHC MASS GRAMS (FID)	.900
FUEL MASS KG	.720
FUEL ECONOMY MPG (L/100KM)	35.48 (6.63)

1-BAG COMPOSITE RESULTS

HC	G/MI	.115		CH4	G/MI	.002
CO	G/MI	1.209		NMHC	G/MI	.112
NOX	G/MI	1.618				
PM	G/MI	.179				
FUEL ECONOMY MPG (L/100KM)		35.48 (6.63)				

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T2-US	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/10/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17483 MILES (28130 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.21 IN HG (741.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.976/.983
MEASURED DISTANCE MILES (KM)	8.05 (12.95)
BLOWER FLOW RATE SCFM (SCMM)	716.7 (20.30)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	7174. (203.2)

HC SAMPLE METER/RANGE/PPM (BAG)	13.2/	9/	13.16
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	69.2/	12/	68.11
CO BCKGRD METER/RANGE/PPM	.6/	12/	.56
CO2 SAMPLE METER/RANGE/PCT	81.8/	11/	.7560
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	37.6/	9/	37.62
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	17.73
HC CONCENTRATION PPM	9.43
CO CONCENTRATION PPM	65.11
CO2 CONCENTRATION PCT	.7152
NOX CONCENTRATION PPM	37.57

HC MASS GRAMS	1.103
CO MASS GRAMS	15.400
CO2 MASS GRAMS	2660.59
NOX MASS GRAMS	14.720
PM MASS GRAMS	1.950
FUEL MASS KG	.846
FUEL ECONOMY MPG (L/100KM)	30.34 (7.75)

1-BAG COMPOSITE RESULTS

HC	G/MI	.137	
CO	G/MI	1.913	
NOX	G/MI	1.829	
PM	G/MI	.242	
FUEL ECONOMY MPG (L/100KM)		30.34 (7.75)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T3-US	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 17539 MILES (28220 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .978
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	600.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	8.21 (13.20)
BLOWER FLOW RATE SCFM (SCMM)	602.0 (17.05)
GAS METER FLOW RATE SCFM (SCMM)	1.00 (.03)
TOTAL FLOW SCF (SCM)	6030. (170.8)

HC SAMPLE METER/RANGE/PPM (BAG)	14.4/	9/	14.42
HC BCKGRD METER/RANGE/PPM	4.9/	2/	4.96
CO SAMPLE METER/RANGE/PPM	68.3/	12/	67.19
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.1/	11/	.7460
CO2 BCKGRD METER/RANGE/PCT	7.0/	11/	.0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	37.6/	9/	37.63
NOX BCKGRD METER/RANGE/PPM	.7/	1/	.18
CH4 SAMPLE PPM (1.220)			2.11
CH4 BCKGRD PPM			1.97

DILUTION FACTOR	17.97
HC CONCENTRATION PPM	9.74
CO CONCENTRATION PPM	64.66
CO2 CONCENTRATION PCT	.7040
NOX CONCENTRATION PPM	37.47
CH4 CONCENTRATION PPM	.25
NMHC CONCENTRATION PPM	9.44

HC MASS GRAMS	.957
CO MASS GRAMS	12.855
CO2 MASS GRAMS	2201.06
NOX MASS GRAMS	11.972
PM MASS GRAMS	1.690
CH4 MASS GRAMS	.028
NMHC MASS GRAMS (FID)	.928
FUEL MASS KG	.700
FUEL ECONOMY MPG (L/100KM)	37.38 (6.29)

1-BAG COMPOSITE RESULTS

HC	G/MI	.117	CH4	G/MI	.003
CO	G/MI	1.567	NMHC	G/MI	.113
NOX	G/MI	1.459			
PM	G/MI	.206			
FUEL ECONOMY MPG (L/100KM)		37.38 (6.29)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T1-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/24/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 14799 MILES (23811 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.05 IN HG (737.9 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .973
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	592.3 (16.77)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2967. (84.0)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.63
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	1.8/	12/	1.69
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	82.2/	3/	1.6277
CO2 BCKGRD METER/RANGE/PCT	2.9/	3/	.0491
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	130.65
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	8.32
HC CONCENTRATION PPM	-.40
CO CONCENTRATION PPM	1.36
CO2 CONCENTRATION PCT	1.5845
NOX CONCENTRATION PPM	130.52

HC MASS GRAMS	.000
CO MASS GRAMS	.133
CO2 MASS GRAMS	2437.57
NOX MASS GRAMS	20.405
PM MASS GRAMS	.438
FUEL MASS KG	.767
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T2-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/25/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 14857 MILES (23904 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.21 IN HG (741.9 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .978
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	299.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.4 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2980. (84.4)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.58
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	1.8/	12/	1.69
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	81.0/	3/	1.5991
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	132.86
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	8.47
HC CONCENTRATION PPM	-.72
CO CONCENTRATION PPM	1.44
CO2 CONCENTRATION PCT	1.5588
NOX CONCENTRATION PPM	132.77

HC MASS GRAMS	.000
CO MASS GRAMS	.142
CO2 MASS GRAMS	2408.79
NOX MASS GRAMS	20.965
PM MASS GRAMS	.431
FUEL MASS KG	.758
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T3-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/26/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 14916 MILES (23999 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.0 (16.88)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	2988. (84.6)

HC SAMPLE METER/RANGE/PPM (BAG)	2.5/	9/	2.55
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	1.4/	12/	1.31
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.9/	3/	1.6205
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	136.13
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	8.36
HC CONCENTRATION PPM	-.40
CO CONCENTRATION PPM	1.00
CO2 CONCENTRATION PCT	1.5803
NOX CONCENTRATION PPM	136.05

HC MASS GRAMS	.000
CO MASS GRAMS	.099
CO2 MASS GRAMS	2448.55
NOX MASS GRAMS	21.731
PM MASS GRAMS	.447
FUEL MASS KG	.771
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T4-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/27/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 14973 MILES (24091 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.92 IN HG (734.6 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .961
RELATIVE HUMIDITY 56.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	299.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	592.6 (16.78)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2966. (84.0)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.59
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	2.9/	12/	2.73
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	82.8/	3/	1.6421
CO2 BCKGRD METER/RANGE/PCT	2.8/	3/	.0474
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	130.95
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	8.25
HC CONCENTRATION PPM	-.34
CO CONCENTRATION PPM	2.35
CO2 CONCENTRATION PCT	1.6005
NOX CONCENTRATION PPM	130.81

HC MASS GRAMS	.000
CO MASS GRAMS	.230
CO2 MASS GRAMS	2461.69
NOX MASS GRAMS	20.204
PM MASS GRAMS	.583
FUEL MASS KG	.775
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T5-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/28/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15029 MILES (24181 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .994
RELATIVE HUMIDITY 61.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	302.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.1 (17.00)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	3034. (85.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.5/	9/	2.47
HC BCKGRD METER/RANGE/PPM	3.2/	2/	3.24
CO SAMPLE METER/RANGE/PPM	2.0/	12/	1.88
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	81.8/	3/	1.6181
CO2 BCKGRD METER/RANGE/PCT	2.8/	3/	.0474
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	128.07
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	8.37
HC CONCENTRATION PPM	-.39
CO CONCENTRATION PPM	1.54
CO2 CONCENTRATION PCT	1.5764
NOX CONCENTRATION PPM	128.02

HC MASS GRAMS	.000
CO MASS GRAMS	.154
CO2 MASS GRAMS	2479.85
NOX MASS GRAMS	20.907
PM MASS GRAMS	.390
FUEL MASS KG	.781
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T6-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/29/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15086 MILES (24273 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.002
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	597.4 (16.92)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	2992. (84.7)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	2.98
HC BCKGRD METER/RANGE/PPM	4.2/	2/	4.25
CO SAMPLE METER/RANGE/PPM	1.9/	12/	1.78
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	83.4/	3/	1.6566
CO2 BCKGRD METER/RANGE/PCT	2.8/	3/	.0474
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	132.57
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13
CH4 SAMPLE PPM (1.170)			1.35
CH4 BCKGRD PPM			1.70

DILUTION FACTOR	8.17
HC CONCENTRATION PPM	-.75
CO CONCENTRATION PPM	1.53
CO2 CONCENTRATION PCT	1.6150
NOX CONCENTRATION PPM	132.46
CH4 CONCENTRATION PPM	-.14
NMHC CONCENTRATION PPM	-.75

HC MASS GRAMS	.000
CO MASS GRAMS	.151
CO2 MASS GRAMS	2505.41
NOX MASS GRAMS	21.501
PM MASS GRAMS	.554
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.789
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T7-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/30/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15144 MILES (24366 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.019
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.4 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	2988. (84.6)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	2.96
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	2.4/	12/	2.25
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	83.2/	3/	1.6517
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	135.76
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	8.20
HC CONCENTRATION PPM	-.24
CO CONCENTRATION PPM	1.81
CO2 CONCENTRATION PCT	1.6116
NOX CONCENTRATION PPM	135.70

HC MASS GRAMS	.000
CO MASS GRAMS	.179
CO2 MASS GRAMS	2497.28
NOX MASS GRAMS	22.381
PM MASS GRAMS	.518
FUEL MASS KG	.786
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T8-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 1/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15203 MILES (24461 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.86 IN HG (733.0 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.005
RELATIVE HUMIDITY 64.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	592.4 (16.78)
GAS METER FLOW RATE SCFM (SCMM)	1.01 (.03)
TOTAL FLOW SCF (SCM)	2970. (84.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.2/	9/	3.24
HC BCKGRD METER/RANGE/PPM	4.5/	2/	4.56
CO SAMPLE METER/RANGE/PPM	2.5/	12/	2.35
CO BCKGRD METER/RANGE/PPM	.6/	12/	.56
CO2 SAMPLE METER/RANGE/PCT	83.4/	3/	1.6566
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	136.48
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05
CH4 SAMPLE PPM (1.170)			1.34
CH4 BCKGRD PPM			1.63

DILUTION FACTOR	8.17
HC CONCENTRATION PPM	-.76
CO CONCENTRATION PPM	1.74
CO2 CONCENTRATION PCT	1.6165
NOX CONCENTRATION PPM	136.44
CH4 CONCENTRATION PPM	-.09
NMHC CONCENTRATION PPM	-.76

HC MASS GRAMS	.000
CO MASS GRAMS	.171
CO2 MASS GRAMS	2489.33
NOX MASS GRAMS	22.066
PM MASS GRAMS	.519
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.784
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T9-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 2/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15261 MILES (24554 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.86 IN HG (733.0 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.021
RELATIVE HUMIDITY 65.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.967/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.5 (16.81)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	2975. (84.2)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.74
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	2.2/	12/	2.07
CO BCKGRD METER/RANGE/PPM	.9/	12/	.84
CO2 SAMPLE METER/RANGE/PCT	83.4/	3/	1.6566
CO2 BCKGRD METER/RANGE/PCT	3.1/	3/	.0525
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	130.13
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	8.17
HC CONCENTRATION PPM	-.55
CO CONCENTRATION PPM	1.23
CO2 CONCENTRATION PCT	1.6105
NOX CONCENTRATION PPM	130.08

HC MASS GRAMS	.000
CO MASS GRAMS	.121
CO2 MASS GRAMS	2484.12
NOX MASS GRAMS	21.400
PM MASS GRAMS	.531
FUEL MASS KG	.782
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T1-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15753 MILES (25346 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	592.8 (16.79)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.03)
TOTAL FLOW SCF (SCM)	2973. (84.2)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.57
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	1.9/	12/	1.78
CO BCKGRD METER/RANGE/PPM	.5/	12/	.47
CO2 SAMPLE METER/RANGE/PCT	83.1/	3/	1.6493
CO2 BCKGRD METER/RANGE/PCT	3.0/	3/	.0508
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	139.75
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13

DILUTION FACTOR	8.21
HC CONCENTRATION PPM	-.36
CO CONCENTRATION PPM	1.29
CO2 CONCENTRATION PCT	1.6047
NOX CONCENTRATION PPM	139.64

HC MASS GRAMS	.000
CO MASS GRAMS	.127
CO2 MASS GRAMS	2474.04
NOX MASS GRAMS	21.855
PM MASS GRAMS	.567
FUEL MASS KG	.779
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T2-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15801 MILES (25423 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.04 IN HG (737.6 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .988
RELATIVE HUMIDITY 64.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	591.3 (16.75)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	2966. (84.0)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.31
HC BCKGRD METER/RANGE/PPM	5.0/	2/	5.06
CO SAMPLE METER/RANGE/PPM	1.4/	12/	1.31
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	83.5/	3/	1.6590
CO2 BCKGRD METER/RANGE/PCT	3.2/	3/	.0542
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	136.05
NOX BCKGRD METER/RANGE/PPM	.8/	1/	.20
CH4 SAMPLE PPM (1.170)			1.80
CH4 BCKGRD PPM			1.96

DILUTION FACTOR	8.16
HC CONCENTRATION PPM	-1.13
CO CONCENTRATION PPM	.92
CO2 CONCENTRATION PCT	1.6114
NOX CONCENTRATION PPM	135.88
CH4 CONCENTRATION PPM	.08
NMHC CONCENTRATION PPM	-1.22

HC MASS GRAMS	.000
CO MASS GRAMS	.090
CO2 MASS GRAMS	2477.94
NOX MASS GRAMS	21.567
PM MASS GRAMS	.550
CH4 MASS GRAMS	.004
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.780
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T3-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15863 MILES (25523 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.97 IN HG (735.8 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .948
RELATIVE HUMIDITY 56.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.986
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	588.6 (16.67)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2951. (83.6)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/	9/	2.79
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	2.4/	12/	2.25
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	85.1/	3/	1.6979
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	146.89
NOX BCKGRD METER/RANGE/PPM	.7/	1/	.18

DILUTION FACTOR	7.97
HC CONCENTRATION PPM	-.40
CO CONCENTRATION PPM	1.90
CO2 CONCENTRATION PCT	1.6580
NOX CONCENTRATION PPM	146.73

HC MASS GRAMS	.000
CO MASS GRAMS	.185
CO2 MASS GRAMS	2537.00
NOX MASS GRAMS	22.237
PM MASS GRAMS	.591
FUEL MASS KG	.799
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T4-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 15917 MILES (25610 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.26 IN HG (743.2 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .950
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.3 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2988. (84.6)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.35
HC BCKGRD METER/RANGE/PPM	5.8/	2/	5.87
CO SAMPLE METER/RANGE/PPM	1.6/	12/	1.50
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	82.5/	3/	1.6349
CO2 BCKGRD METER/RANGE/PCT	2.6/	3/	.0440
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	137.60
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	8.28
HC CONCENTRATION PPM	-1.81
CO CONCENTRATION PPM	1.19
CO2 CONCENTRATION PCT	1.5962
NOX CONCENTRATION PPM	137.54

HC MASS GRAMS	.000
CO MASS GRAMS	.117
CO2 MASS GRAMS	2472.96
NOX MASS GRAMS	21.142
PM MASS GRAMS	.547
FUEL MASS KG	.778
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T5-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 15979 MILES (25710 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.36 IN HG (745.7 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .912
RELATIVE HUMIDITY 45.7 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.973/.988
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.4 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	3004. (85.1)

HC SAMPLE METER/RANGE/PPM (BAG)	2.4/	9/	2.41
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	2.5/	12/	2.35
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	83.2/	3/	1.6517
CO2 BCKGRD METER/RANGE/PCT	2.5/	3/	.0423
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	144.64
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	8.20
HC CONCENTRATION PPM	-.61
CO CONCENTRATION PPM	2.00
CO2 CONCENTRATION PCT	1.6146
NOX CONCENTRATION PPM	144.57

HC MASS GRAMS	.000
CO MASS GRAMS	.198
CO2 MASS GRAMS	2515.20
NOX MASS GRAMS	21.457
PM MASS GRAMS	.524
FUEL MASS KG	.792
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T6-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/20/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16032 MILES (25795 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.31 IN HG (744.5 MM HG)	DRY BULB TEMPERATURE 73.00F (22.80C)	NOX HUMIDITY C.F. .962
RELATIVE HUMIDITY 53.8 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	598.1 (16.94)
GAS METER FLOW RATE SCFM (SCMM)	.91 (.03)
TOTAL FLOW SCF (SCM)	2998. (84.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.65
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	1.7/	12/	1.59
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	81.3/	3/	1.6062
CO2 BCKGRD METER/RANGE/PCT	2.5/	3/	.0423
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	134.09
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	8.43
HC CONCENTRATION PPM	-.29
CO CONCENTRATION PPM	1.36
CO2 CONCENTRATION PCT	1.5690
NOX CONCENTRATION PPM	134.06

HC MASS GRAMS	.000
CO MASS GRAMS	.134
CO2 MASS GRAMS	2439.09
NOX MASS GRAMS	20.945
PM MASS GRAMS	.483
FUEL MASS KG	.768
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T7-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/21/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16087 MILES (25883 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.27 IN HG (743.5 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .970
RELATIVE HUMIDITY 57.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.4 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	2988. (84.6)

HC SAMPLE METER/RANGE/PPM (BAG)	4.1/	9/	4.06
HC BCKGRD METER/RANGE/PPM	5.4/	2/	5.46
CO SAMPLE METER/RANGE/PPM	1.3/	12/	1.22
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	82.9/	3/	1.6445
CO2 BCKGRD METER/RANGE/PCT	2.6/	3/	.0440
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	135.15
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05
CH4 SAMPLE PPM (1.170)			1.85
CH4 BCKGRD PPM			2.27

DILUTION FACTOR	8.23
HC CONCENTRATION PPM	-.74
CO CONCENTRATION PPM	1.00
CO2 CONCENTRATION PCT	1.6059
NOX CONCENTRATION PPM	135.11
CH4 CONCENTRATION PPM	-.15
NMHC CONCENTRATION PPM	-.74

HC MASS GRAMS	.000
CO MASS GRAMS	.098
CO2 MASS GRAMS	2487.97
NOX MASS GRAMS	21.209
PM MASS GRAMS	.543
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.783
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T8-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/22/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16142 MILES (25972 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.12 IN HG (739.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .952
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.971/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.7 (16.81)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2974. (84.2)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/	9/	2.76
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	2.9/	12/	2.73
CO BCKGRD METER/RANGE/PPM	1.2/	12/	1.12
CO2 SAMPLE METER/RANGE/PCT	81.6/	3/	1.6133
CO2 BCKGRD METER/RANGE/PCT	2.4/	3/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	134.77
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	8.39
HC CONCENTRATION PPM	-.36
CO CONCENTRATION PPM	1.62
CO2 CONCENTRATION PCT	1.5776
NOX CONCENTRATION PPM	134.71

HC MASS GRAMS	.000
CO MASS GRAMS	.159
CO2 MASS GRAMS	2432.66
NOX MASS GRAMS	20.647
PM MASS GRAMS	.489
FUEL MASS KG	.766
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T9-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/23/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16198 MILES (26062 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.018
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	595.8 (16.87)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2986. (84.6)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.73
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	2.2/	12/	2.07
CO BCKGRD METER/RANGE/PPM	1.0/	12/	.94
CO2 SAMPLE METER/RANGE/PCT	81.0/	3/	1.5991
CO2 BCKGRD METER/RANGE/PCT	2.6/	3/	.0440
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	133.28
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	8.47
HC CONCENTRATION PPM	-.58
CO CONCENTRATION PPM	1.15
CO2 CONCENTRATION PCT	1.5603
NOX CONCENTRATION PPM	133.25

HC MASS GRAMS	.000
CO MASS GRAMS	.113
CO2 MASS GRAMS	2416.02
NOX MASS GRAMS	21.932
PM MASS GRAMS	.506
FUEL MASS KG	.760
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T1-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16822 MILES (27066 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.98 IN HG (736.1 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .953
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.970/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	590.7 (16.73)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	2961. (83.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.3/	9/	2.29
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	1.7/	12/	1.59
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	83.9/	3/	1.6687
CO2 BCKGRD METER/RANGE/PCT	2.8/	3/	.0474
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	141.15
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13

DILUTION FACTOR	8.12
HC CONCENTRATION PPM	-.73
CO CONCENTRATION PPM	1.27
CO2 CONCENTRATION PCT	1.6272
NOX CONCENTRATION PPM	141.04

HC MASS GRAMS	.000
CO MASS GRAMS	.124
CO2 MASS GRAMS	2497.99
NOX MASS GRAMS	21.562
PM MASS GRAMS	.649
FUEL MASS KG	.786
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T2-US0	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/12/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	US06
ODOMETER 16861 MILES (27129 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .981
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	599.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.977/.984
MEASURED DISTANCE MILES (KM)	7.97 (12.83)
BLOWER FLOW RATE SCFM (SCMM)	602.6 (17.07)
GAS METER FLOW RATE SCFM (SCMM)	.85 (.02)
TOTAL FLOW SCF (SCM)	6033. (170.8)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.62
HC BCKGRD METER/RANGE/PPM	1.7/	2/	1.72
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	80.9/	11/	.7432
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	36.7/	9/	36.70
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	18.22
HC CONCENTRATION PPM	.99
CO CONCENTRATION PPM	.01
CO2 CONCENTRATION PCT	.7036
NOX CONCENTRATION PPM	36.65

HC MASS GRAMS	.097
CO MASS GRAMS	.003
CO2 MASS GRAMS	2200.65
NOX MASS GRAMS	11.744
PM MASS GRAMS	1.014
FUEL MASS KG	.693
FUEL ECONOMY MPG (L/100KM)	36.69 (6.41)

1-BAG COMPOSITE RESULTS

HC	G/MI	.012	
CO	G/MI	.000	
NOX	G/MI	1.473	
PM	G/MI	.127	
FUEL ECONOMY MPG (L/100KM)		36.69 (6.41)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T3-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/13/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16934 MILES (27246 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	590.9 (16.73)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2963. (83.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.4/	9/	2.36
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	1.4/	12/	1.31
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	83.7/	3/	1.6638
CO2 BCKGRD METER/RANGE/PCT	3.0/	3/	.0508
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	136.45
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	8.14
HC CONCENTRATION PPM	-.84
CO CONCENTRATION PPM	1.09
CO2 CONCENTRATION PCT	1.6193
NOX CONCENTRATION PPM	136.31

HC MASS GRAMS	.000
CO MASS GRAMS	.106
CO2 MASS GRAMS	2487.43
NOX MASS GRAMS	21.294
PM MASS GRAMS	.629
FUEL MASS KG	.783
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T4-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/14/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 16990 MILES (27336 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .987
 RELATIVE HUMIDITY 64.0 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 300.2
 DRY/WET CORRECTION FACTOR, SAMP/BACK .968/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 593.9 (16.82)
 GAS METER FLOW RATE SCFM (SCMM) 1.04 (.03)
 TOTAL FLOW SCF (SCM) 2977. (84.3)

HC SAMPLE METER/RANGE/PPM (BAG)	3.5/ 9/ 3.45
HC BCKGRD METER/RANGE/PPM	4.5/ 2/ 4.56
CO SAMPLE METER/RANGE/PPM	1.7/ 12/ 1.59
CO BCKGRD METER/RANGE/PPM	.5/ 12/ .47
CO2 SAMPLE METER/RANGE/PCT	84.5/ 3/ 1.6833
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .0508
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/ 9/ 140.51
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10
CH4 SAMPLE PPM (1.220)	1.65
CH4 BCKGRD PPM	2.21

DILUTION FACTOR 8.04
 HC CONCENTRATION PPM -.54
 CO CONCENTRATION PPM 1.11
 CO2 CONCENTRATION PCT 1.6388
 NOX CONCENTRATION PPM 140.42
 CH4 CONCENTRATION PPM -.29
 NMHC CONCENTRATION PPM -.54

HC MASS GRAMS .000
 CO MASS GRAMS .109
 CO2 MASS GRAMS 2529.44
 NOX MASS GRAMS 22.351
 PM MASS GRAMS .619
 CH4 MASS GRAMS .000
 NMHC MASS GRAMS (FID) .000
 FUEL MASS KG .796
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T5-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17045 MILES (27425 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	594.7 (16.84)
GAS METER FLOW RATE SCFM (SCMM)	1.70 (.05)
TOTAL FLOW SCF (SCM)	2984. (84.5)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.68
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	2.7/	12/	2.54
CO BCKGRD METER/RANGE/PPM	.7/	12/	.66
CO2 SAMPLE METER/RANGE/PCT	84.0/	3/	1.6711
CO2 BCKGRD METER/RANGE/PCT	2.7/	3/	.0457
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	143.11
NOX BCKGRD METER/RANGE/PPM	.8/	1/	.20

DILUTION FACTOR	8.10
HC CONCENTRATION PPM	-.51
CO CONCENTRATION PPM	1.84
CO2 CONCENTRATION PCT	1.6311
NOX CONCENTRATION PPM	142.94

HC MASS GRAMS	.000
CO MASS GRAMS	.181
CO2 MASS GRAMS	2523.52
NOX MASS GRAMS	22.622
PM MASS GRAMS	N/A
FUEL MASS KG	.794
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	N/A	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T6-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17103 MILES (27518 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	591.2 (16.74)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	2963. (83.9)

HC SAMPLE METER/RANGE/PPM (BAG)	2.5/	9/	2.55
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	1.5/	12/	1.41
CO BCKGRD METER/RANGE/PPM	.5/	12/	.47
CO2 SAMPLE METER/RANGE/PCT	84.4/	3/	1.6808
CO2 BCKGRD METER/RANGE/PCT	2.9/	3/	.0491
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	143.01
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	8.06
HC CONCENTRATION PPM	-.91
CO CONCENTRATION PPM	.93
CO2 CONCENTRATION PCT	1.6379
NOX CONCENTRATION PPM	142.92

HC MASS GRAMS	.000
CO MASS GRAMS	.091
CO2 MASS GRAMS	2516.66
NOX MASS GRAMS	22.336
PM MASS GRAMS	.601
FUEL MASS KG	.792
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T7-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17160 MILES (27610 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 74.00F (23.30C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 58.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	590.2 (16.71)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2957. (83.7)

HC SAMPLE METER/RANGE/PPM (BAG)	.8/	9/	.81
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	2.3/	12/	2.16
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	84.0/	3/	1.6711
CO2 BCKGRD METER/RANGE/PCT	2.9/	3/	.0491
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.1/	9/	3.12
NOX BCKGRD METER/RANGE/PPM	1.2/	1/	.30

DILUTION FACTOR	8.10
HC CONCENTRATION PPM	-2.65
CO CONCENTRATION PPM	1.73
CO2 CONCENTRATION PCT	1.6281
NOX CONCENTRATION PPM	N/A

HC MASS GRAMS	.000
CO MASS GRAMS	.168
CO2 MASS GRAMS	2496.38
NOX MASS GRAMS	N/A
PM MASS GRAMS	.646
FUEL MASS KG	.786
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T8-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17218 MILES (27703 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	592.6 (16.78)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	2970. (84.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.7/	9/	3.71
HC BCKGRD METER/RANGE/PPM	5.4/	2/	5.46
CO SAMPLE METER/RANGE/PPM	1.9/	12/	1.78
CO BCKGRD METER/RANGE/PPM	.9/	12/	.84
CO2 SAMPLE METER/RANGE/PCT	82.9/	3/	1.6445
CO2 BCKGRD METER/RANGE/PCT	3.0/	3/	.0508
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	135.42
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13
CH4 SAMPLE PPM (1.220)			2.02
CH4 BCKGRD PPM			2.32

DILUTION FACTOR	8.23
HC CONCENTRATION PPM	-1.09
CO CONCENTRATION PPM	.96
CO2 CONCENTRATION PCT	1.5999
NOX CONCENTRATION PPM	135.31
CH4 CONCENTRATION PPM	-.01
NMHC CONCENTRATION PPM	-1.09

HC MASS GRAMS	.000
CO MASS GRAMS	.094
CO2 MASS GRAMS	2463.81
NOX MASS GRAMS	21.832
PM MASS GRAMS	.544
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.775
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T9-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17277 MILES (27798 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.034
RELATIVE HUMIDITY 72.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.966/.981
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.6 (16.81)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2972. (84.2)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/	9/	2.87
HC BCKGRD METER/RANGE/PPM	3.8/	2/	3.85
CO SAMPLE METER/RANGE/PPM	2.4/	12/	2.25
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	84.8/	3/	1.6906
CO2 BCKGRD METER/RANGE/PCT	3.0/	3/	.0508
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	141.74
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	8.01
HC CONCENTRATION PPM	-.50
CO CONCENTRATION PPM	1.49
CO2 CONCENTRATION PCT	1.6462
NOX CONCENTRATION PPM	141.61

HC MASS GRAMS	.000
CO MASS GRAMS	.146
CO2 MASS GRAMS	2536.84
NOX MASS GRAMS	23.577
PM MASS GRAMS	.671
FUEL MASS KG	.799
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T1-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/ 9/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17444 MILES (28067 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.21 IN HG (741.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.4 (16.81)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)
TOTAL FLOW SCF (SCM)	2976. (84.3)

HC SAMPLE METER/RANGE/PPM (BAG)	14.2/	9/	14.18
HC BCKGRD METER/RANGE/PPM	4.3/	2/	4.35
CO SAMPLE METER/RANGE/PPM	31.2/	12/	30.19
CO BCKGRD METER/RANGE/PPM	.6/	12/	.56
CO2 SAMPLE METER/RANGE/PCT	82.6/	3/	1.6360
CO2 BCKGRD METER/RANGE/PCT	2.9/	3/	.0477
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	137.79
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13
CH4 SAMPLE PPM (1.220)			1.74
CH4 BCKGRD PPM			2.13

DILUTION FACTOR	8.26
HC CONCENTRATION PPM	10.35
CO CONCENTRATION PPM	28.10
CO2 CONCENTRATION PCT	1.5941
NOX CONCENTRATION PPM	137.68
CH4 CONCENTRATION PPM	-.13
NMHC CONCENTRATION PPM	10.35

HC MASS GRAMS	.502
CO MASS GRAMS	2.757
CO2 MASS GRAMS	2460.07
NOX MASS GRAMS	22.377
PM MASS GRAMS	.542
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.502
FUEL MASS KG	.776
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T2-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/10/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17499 MILES (28155 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.22 IN HG (742.2 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.968/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	594.1 (16.83)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	2983. (84.5)

HC SAMPLE METER/RANGE/PPM (BAG)	14.7/	9/	14.71
HC BCKGRD METER/RANGE/PPM	4.3/	2/	4.35
CO SAMPLE METER/RANGE/PPM	32.2/	12/	31.18
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	82.8/	3/	1.6408
CO2 BCKGRD METER/RANGE/PCT	2.8/	3/	.0460
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	139.02
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	8.23
HC CONCENTRATION PPM	10.88
CO CONCENTRATION PPM	28.87
CO2 CONCENTRATION PCT	1.6003
NOX CONCENTRATION PPM	138.89

HC MASS GRAMS	.529
CO MASS GRAMS	2.839
CO2 MASS GRAMS	2475.01
NOX MASS GRAMS	22.619
PM MASS GRAMS	.546
FUEL MASS KG	.781
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONET3-SS1	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 17555 MILES (28245 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .978
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	300.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.969/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.3 (16.80)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	2975. (84.3)

HC SAMPLE METER/RANGE/PPM (BAG)	15.1/	9/	15.07
HC BCKGRD METER/RANGE/PPM	4.7/	2/	4.76
CO SAMPLE METER/RANGE/PPM	32.0/	12/	30.98
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	83.9/	3/	1.6671
CO2 BCKGRD METER/RANGE/PCT	2.9/	3/	.0477
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	****/	9/	140.89
NOX BCKGRD METER/RANGE/PPM	.9/	1/	.23
CH4 SAMPLE PPM (1.220)			1.57
CH4 BCKGRD PPM			2.00

DILUTION FACTOR	8.10
HC CONCENTRATION PPM	10.90
CO CONCENTRATION PPM	29.06
CO2 CONCENTRATION PCT	1.6254
NOX CONCENTRATION PPM	140.69
CH4 CONCENTRATION PPM	-.18
NMHC CONCENTRATION PPM	10.90

HC MASS GRAMS	.529
CO MASS GRAMS	2.851
CO2 MASS GRAMS	2507.51
NOX MASS GRAMS	22.182
PM MASS GRAMS	.571
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	.529
FUEL MASS KG	.791
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T1-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/24/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 14809 MILES (23827 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.04 IN HG (737.6 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .973
 RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.0
 DRY/WET CORRECTION FACTOR, SAMP/BACK .980/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 599.0 (16.96)
 GAS METER FLOW RATE SCFM (SCMM) .89 (.03)
 TOTAL FLOW SCF (SCM) 11998. (339.8)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/ 9/ 3.00
HC BCKGRD METER/RANGE/PPM	3.4/ 2/ 3.45
CO SAMPLE METER/RANGE/PPM	.2/ 12/ .19
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	60.8/ 11/ .4896
CO2 BCKGRD METER/RANGE/PCT	7.1/ 11/ .0451
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.4/ 9/ 8.38
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10

DILUTION FACTOR 27.65
 HC CONCENTRATION PPM -.32
 CO CONCENTRATION PPM -.17
 CO2 CONCENTRATION PCT .4461
 NOX CONCENTRATION PPM 8.29

HC MASS GRAMS .000
 CO MASS GRAMS .000
 CO2 MASS GRAMS 2775.17
 NOX MASS GRAMS 5.239
 PM MASS GRAMS .119
 FUEL MASS KG .873
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000
CO	G/MI	.000
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T2-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/25/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS1
ODOMETER 14867 MILES (23921 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.19 IN HG (741.4 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .979
 RELATIVE HUMIDITY 60.4 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1201.00
 DRY/WET CORRECTION FACTOR, SAMP/BACK .980/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 602.7 (17.07)
 GAS METER FLOW RATE SCFM (SCMM) .88 (.02)
 TOTAL FLOW SCF (SCM) 12082. (342.2)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/ 9/ 2.92
HC BCKGRD METER/RANGE/PPM	3.6/ 2/ 3.65
CO SAMPLE METER/RANGE/PPM	.3/ 12/ .28
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	60.2/ 11/ .4830
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.4/ 9/ 8.40
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10

DILUTION FACTOR 28.03
 HC CONCENTRATION PPM -.60
 CO CONCENTRATION PPM -.08
 CO2 CONCENTRATION PCT .4419
 NOX CONCENTRATION PPM 8.31

HC MASS GRAMS .000
 CO MASS GRAMS .000
 CO2 MASS GRAMS 2768.44
 NOX MASS GRAMS 5.318
 PM MASS GRAMS N/A
 FUEL MASS KG .871
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000
CO	G/MI	.000
NOX	G/MI	*****
PM	G/MI	N/A
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T3-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/26/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 14927 MILES (24017 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.13 IN HG (739.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.5 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12011. (340.2)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/ 9/	2.96
HC BCKGRD METER/RANGE/PPM	3.4/ 2/	3.45
CO SAMPLE METER/RANGE/PPM	.5/ 12/	.47
CO BCKGRD METER/RANGE/PPM	.4/ 12/	.37
CO2 SAMPLE METER/RANGE/PCT	61.0/ 11/	.4918
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.4/ 9/	8.41
NOX BCKGRD METER/RANGE/PPM	.3/ 1/	.08

DILUTION FACTOR	27.52
HC CONCENTRATION PPM	-.36
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.4502
NOX CONCENTRATION PPM	8.34

HC MASS GRAMS	.000
CO MASS GRAMS	.040
CO2 MASS GRAMS	2803.62
NOX MASS GRAMS	5.354
PM MASS GRAMS	.103
FUEL MASS KG	.882
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T4-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/27/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 14983 MILES (24107 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.91 IN HG (734.3 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .961
RELATIVE HUMIDITY 56.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	594.8 (16.84)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	11915. (337.4)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/	9/	2.88
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	61.8/	11/	.5008
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	6.8/	9/	6.75
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	27.03
HC CONCENTRATION PPM	-.34
CO CONCENTRATION PPM	-.08
CO2 CONCENTRATION PCT	.4585
NOX CONCENTRATION PPM	6.66

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2832.83
NOX MASS GRAMS	4.131
PM MASS GRAMS	.128
FUEL MASS KG	.892
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T5-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/28/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15040 MILES (24199 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .994
RELATIVE HUMIDITY 61.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	602.2 (17.05)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12064. (341.7)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.69
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.3/	12/	.28
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	61.6/	11/	.4985
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/	9/	9.69
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	27.15
HC CONCENTRATION PPM	-.53
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.4582
NOX CONCENTRATION PPM	9.66

HC MASS GRAMS	.000
CO MASS GRAMS	.038
CO2 MASS GRAMS	2865.77
NOX MASS GRAMS	6.274
PM MASS GRAMS	N/A
FUEL MASS KG	.902
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	N/A	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T6-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/29/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15096 MILES (24289 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.002
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.7 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	12014. (340.3)

HC SAMPLE METER/RANGE/PPM (BAG)	4.0/ 9/ 4.01
HC BCKGRD METER/RANGE/PPM	4.8/ 2/ 4.86
CO SAMPLE METER/RANGE/PPM	.6/ 12/ .56
CO BCKGRD METER/RANGE/PPM	.8/ 12/ .75
CO2 SAMPLE METER/RANGE/PCT	62.1/ 11/ .5041
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.3/ 9/ 9.35
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10
CH4 SAMPLE PPM (1.170)	2.13
CH4 BCKGRD PPM	1.67

DILUTION FACTOR	26.84
HC CONCENTRATION PPM	-.67
CO CONCENTRATION PPM	-.16
CO2 CONCENTRATION PCT	.4619
NOX CONCENTRATION PPM	9.25
CH4 CONCENTRATION PPM	.52
NMHC CONCENTRATION PPM	-1.28

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2877.62
NOX MASS GRAMS	6.030
PM MASS GRAMS	.131
CH4 MASS GRAMS	.118
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.906
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	.000	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T7-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/30/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15154 MILES (24382 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.019
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.4 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12008. (340.1)

HC SAMPLE METER/RANGE/PPM (BAG)	3.5/ 9/	3.48
HC BCKGRD METER/RANGE/PPM	3.4/ 2/	3.45
CO SAMPLE METER/RANGE/PPM	1.0/ 12/	.94
CO BCKGRD METER/RANGE/PPM	.9/ 12/	.84
CO2 SAMPLE METER/RANGE/PCT	60.4/ 11/	.4852
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.6/ 9/	8.61
NOX BCKGRD METER/RANGE/PPM	.4/ 1/	.10

DILUTION FACTOR	27.89
HC CONCENTRATION PPM	.16
CO CONCENTRATION PPM	.11
CO2 CONCENTRATION PCT	.4435
NOX CONCENTRATION PPM	8.51

HC MASS GRAMS	.031
CO MASS GRAMS	.045
CO2 MASS GRAMS	2761.49
NOX MASS GRAMS	5.642
PM MASS GRAMS	.113
FUEL MASS KG	.869
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T8-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 1/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15213 MILES (24477 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.85 IN HG (732.8 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.006
RELATIVE HUMIDITY 64.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	595.1 (16.85)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	11923. (337.7)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/	4.37
HC BCKGRD METER/RANGE/PPM	5.2/ 2/	5.26
CO SAMPLE METER/RANGE/PPM	.7/ 12/	.66
CO BCKGRD METER/RANGE/PPM	.3/ 12/	.28
CO2 SAMPLE METER/RANGE/PCT	60.4/ 11/	.4852
CO2 BCKGRD METER/RANGE/PCT	6.8/ 11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.2/ 9/	9.19
NOX BCKGRD METER/RANGE/PPM	.2/ 1/	.05
CH4 SAMPLE PPM (1.170)		1.84
CH4 BCKGRD PPM		1.58

DILUTION FACTOR	27.89
HC CONCENTRATION PPM	-.71
CO CONCENTRATION PPM	.37
CO2 CONCENTRATION PCT	.4435
NOX CONCENTRATION PPM	9.14
CH4 CONCENTRATION PPM	.32
NMHC CONCENTRATION PPM	-1.08

HC MASS GRAMS	.000
CO MASS GRAMS	.146
CO2 MASS GRAMS	2741.76
NOX MASS GRAMS	5.933
PM MASS GRAMS	.106
CH4 MASS GRAMS	.072
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.863
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T9-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 2/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15271 MILES (24571 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.85 IN HG (732.8 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.021
RELATIVE HUMIDITY 65.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1199.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.9777/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	594.7 (16.84)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11910. (337.3)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.10
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	.6/	12/	.56
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	61.1/	11/	.4929
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.2/	9/	9.16
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	27.46
HC CONCENTRATION PPM	-.32
CO CONCENTRATION PPM	.19
CO2 CONCENTRATION PCT	.4507
NOX CONCENTRATION PPM	9.14

HC MASS GRAMS	.000
CO MASS GRAMS	.075
CO2 MASS GRAMS	2783.12
NOX MASS GRAMS	6.019
PM MASS GRAMS	.125
FUEL MASS KG	.876
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T1-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15763 MILES (25362 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.12 IN HG (739.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.5 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11949. (338.4)

HC SAMPLE METER/RANGE/PPM (BAG)	2.9/	9/	2.89
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.3/	12/	.28
CO BCKGRD METER/RANGE/PPM	.1/	12/	.09
CO2 SAMPLE METER/RANGE/PCT	61.6/	11/	.4985
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.3/	9/	9.35
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	27.15
HC CONCENTRATION PPM	-.33
CO CONCENTRATION PPM	.18
CO2 CONCENTRATION PCT	.4563
NOX CONCENTRATION PPM	9.28

HC MASS GRAMS	.000
CO MASS GRAMS	.073
CO2 MASS GRAMS	2827.03
NOX MASS GRAMS	5.835
PM MASS GRAMS	.133
FUEL MASS KG	.890
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T2-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15817 MILES (25449 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG) DRY BULB TEMPERATURE 70.00F (21.10C) NOX HUMIDITY C.F. .988
 RELATIVE HUMIDITY 64.1 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.3
 DRY/WET CORRECTION FACTOR, SAMP/BACK .979/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 596.2 (16.89)
 GAS METER FLOW RATE SCFM (SCMM) 1.04 (.03)
 TOTAL FLOW SCF (SCM) 11948. (338.4)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/ 9/ 4.58
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 5.87
CO SAMPLE METER/RANGE/PPM	.3/ 12/ .28
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	60.9/ 11/ .4907
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.9/ 9/ 8.91
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08
CH4 SAMPLE PPM (1.170)	2.28
CH4 BCKGRD PPM	1.96

DILUTION FACTOR 27.58
 HC CONCENTRATION PPM -1.07
 CO CONCENTRATION PPM .10
 CO2 CONCENTRATION PCT .4485
 NOX CONCENTRATION PPM 8.83
 CH4 CONCENTRATION PPM .39
 NMHC CONCENTRATION PPM -1.53

HC MASS GRAMS	.000
CO MASS GRAMS	.038
CO2 MASS GRAMS	2778.21
NOX MASS GRAMS	5.650
PM MASS GRAMS	.128
CH4 MASS GRAMS	.087
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.874
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T3-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15872 MILES (25538 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.98 IN HG (736.1 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .948
RELATIVE HUMIDITY 56.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.986
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.9 (16.82)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11897. (336.9)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.27
HC BCKGRD METER/RANGE/PPM	3.6/	2/	3.65
CO SAMPLE METER/RANGE/PPM	.2/	12/	.19
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	60.5/	11/	.4863
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.7/	9/	8.74
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13

DILUTION FACTOR	27.83
HC CONCENTRATION PPM	-.25
CO CONCENTRATION PPM	.00
CO2 CONCENTRATION PCT	.4440
NOX CONCENTRATION PPM	8.62

HC MASS GRAMS	.000
CO MASS GRAMS	.002
CO2 MASS GRAMS	2738.95
NOX MASS GRAMS	5.266
PM MASS GRAMS	.135
FUEL MASS KG	.862
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T4-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15929 MILES (25629 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.26 IN HG (743.2 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .950
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.4 (17.00)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.03)
TOTAL FLOW SCF (SCM)	12027. (340.6)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/ 9/	3.05
HC BCKGRD METER/RANGE/PPM	4.4/ 2/	4.46
CO SAMPLE METER/RANGE/PPM	.4/ 12/	.37
CO BCKGRD METER/RANGE/PPM	.2/ 12/	.19
CO2 SAMPLE METER/RANGE/PCT	60.9/ 11/	.4907
CO2 BCKGRD METER/RANGE/PCT	6.4/ 11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.8/ 9/	8.80
NOX BCKGRD METER/RANGE/PPM	.4/ 1/	.10

DILUTION FACTOR	27.58
HC CONCENTRATION PPM	-1.25
CO CONCENTRATION PPM	.19
CO2 CONCENTRATION PCT	.4516
NOX CONCENTRATION PPM	8.70

HC MASS GRAMS	.000
CO MASS GRAMS	.074
CO2 MASS GRAMS	2815.88
NOX MASS GRAMS	5.384
PM MASS GRAMS	.139
FUEL MASS KG	.886
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T5-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 15985 MILES (25719 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.36 IN HG (745.7 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .912
RELATIVE HUMIDITY 45.7 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.988
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	604.3 (17.11)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	12104. (342.8)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.73
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	60.9/	11/	.4907
CO2 BCKGRD METER/RANGE/PCT	6.3/	11/	.0400
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.8/	9/	9.79
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	27.59
HC CONCENTRATION PPM	-.69
CO CONCENTRATION PPM	.19
CO2 CONCENTRATION PCT	.4522
NOX CONCENTRATION PPM	9.77

HC MASS GRAMS	.000
CO MASS GRAMS	.075
CO2 MASS GRAMS	2837.86
NOX MASS GRAMS	5.840
PM MASS GRAMS	.143
FUEL MASS KG	.893
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T6-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/20/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16039 MILES (25806 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.30 IN HG (744.2 MM HG)	DRY BULB TEMPERATURE 73.00F (22.80C)	NOX HUMIDITY C.F. .962
RELATIVE HUMIDITY 53.8 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1199.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.5 (17.01)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12022. (340.5)

HC SAMPLE METER/RANGE/PPM (BAG)	3.0/	9/	3.02
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	60.5/	11/	.4863
CO2 BCKGRD METER/RANGE/PCT	6.3/	11/	.0400
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.3/	9/	9.28
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	27.83
HC CONCENTRATION PPM	-.21
CO CONCENTRATION PPM	.19
CO2 CONCENTRATION PCT	.4477
NOX CONCENTRATION PPM	9.26

HC MASS GRAMS	.000
CO MASS GRAMS	.074
CO2 MASS GRAMS	2790.80
NOX MASS GRAMS	5.800
PM MASS GRAMS	.139
FUEL MASS KG	.878
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T7-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/21/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16096 MILES (25898 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.26 IN HG (743.2 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .970
RELATIVE HUMIDITY 57.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.5 (17.01)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)
TOTAL FLOW SCF (SCM)	12030. (340.7)

HC SAMPLE METER/RANGE/PPM (BAG)	4.7/	9/	4.70
HC BCKGRD METER/RANGE/PPM	5.5/	2/	5.57
CO SAMPLE METER/RANGE/PPM	.3/	12/	.28
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	60.8/	11/	.4896
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	8.8/	9/	8.85
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03
CH4 SAMPLE PPM (1.170)			2.68
CH4 BCKGRD PPM			2.10

DILUTION FACTOR	27.64
HC CONCENTRATION PPM	-.66
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.4504
NOX CONCENTRATION PPM	8.82
CH4 CONCENTRATION PPM	.65
NMHC CONCENTRATION PPM	-1.42

HC MASS GRAMS	.000
CO MASS GRAMS	.038
CO2 MASS GRAMS	2809.73
NOX MASS GRAMS	5.577
PM MASS GRAMS	.103
CH4 MASS GRAMS	.148
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.884
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T8-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/22/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16152 MILES (25988 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .952
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	597.6 (16.93)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	11970. (339.0)

HC SAMPLE METER/RANGE/PPM (BAG)	3.2/	9/	3.20
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	60.6/	11/	.4874
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.2/	9/	9.17
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	27.77
HC CONCENTRATION PPM	-.61
CO CONCENTRATION PPM	-.35
CO2 CONCENTRATION PCT	.4482
NOX CONCENTRATION PPM	9.14

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2781.95
NOX MASS GRAMS	5.641
PM MASS GRAMS	.111
FUEL MASS KG	.876
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	.000	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T9-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/23/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16207 MILES (26077 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.018
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	597.8 (16.93)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	11976. (339.2)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.08
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	.8/	12/	.75
CO BCKGRD METER/RANGE/PPM	.7/	12/	.66
CO2 SAMPLE METER/RANGE/PCT	60.6/	11/	.4874
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.3/	9/	9.29
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	27.77
HC CONCENTRATION PPM	-.34
CO CONCENTRATION PPM	.11
CO2 CONCENTRATION PCT	.4464
NOX CONCENTRATION PPM	9.21

HC MASS GRAMS	.000
CO MASS GRAMS	.043
CO2 MASS GRAMS	2771.77
NOX MASS GRAMS	6.082
PM MASS GRAMS	.128
FUEL MASS KG	.872
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T1-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16832 MILES (27082 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.97 IN HG (735.8 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .953
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	595.1 (16.85)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	11922. (337.6)

HC SAMPLE METER/RANGE/PPM (BAG)	2.7/	9/	2.67
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	.3/	12/	.28
CO BCKGRD METER/RANGE/PPM	.1/	12/	.09
CO2 SAMPLE METER/RANGE/PCT	62.0/	11/	.5030
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.5/	9/	9.49
NOX BCKGRD METER/RANGE/PPM	.5/	1/	.13

DILUTION FACTOR	26.91
HC CONCENTRATION PPM	-.55
CO CONCENTRATION PPM	.18
CO2 CONCENTRATION PCT	.4608
NOX CONCENTRATION PPM	9.37

HC MASS GRAMS	.000
CO MASS GRAMS	.073
CO2 MASS GRAMS	2848.41
NOX MASS GRAMS	5.771
PM MASS GRAMS	.131
FUEL MASS KG	.897
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T2-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/12/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16886 MILES (27169 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .981
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.6 (16.90)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	11953. (338.5)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/ 9/ 2.62
HC BCKGRD METER/RANGE/PPM	1.5/ 2/ 1.52
CO SAMPLE METER/RANGE/PPM	.7/ 12/ .66
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	61.4/ 11/ .4963
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.4/ 9/ 9.38
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10

DILUTION FACTOR	27.27
HC CONCENTRATION PPM	1.15
CO CONCENTRATION PPM	.46
CO2 CONCENTRATION PCT	.4553
NOX CONCENTRATION PPM	9.29

HC MASS GRAMS	.224
CO MASS GRAMS	.181
CO2 MASS GRAMS	2821.74
NOX MASS GRAMS	5.897
PM MASS GRAMS	.135
FUEL MASS KG	.888
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T3-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/13/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 16944 MILES (27262 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.4 (16.89)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	11949. (338.4)

HC SAMPLE METER/RANGE/PPM (BAG)	2.6/	9/	2.58
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	.4/	12/	.37
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	61.2/	11/	.4940
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.3/	9/	9.32
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10

DILUTION FACTOR	27.40
HC CONCENTRATION PPM	-.83
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.4530
NOX CONCENTRATION PPM	9.22

HC MASS GRAMS	.000
CO MASS GRAMS	.039
CO2 MASS GRAMS	2806.75
NOX MASS GRAMS	5.811
PM MASS GRAMS	.137
FUEL MASS KG	.883
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T4-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/14/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17000 MILES (27352 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	598.3 (16.94)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)
TOTAL FLOW SCF (SCM)	11990. (339.6)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/ 9/	4.55
HC BCKGRD METER/RANGE/PPM	5.1/ 2/	5.16
CO SAMPLE METER/RANGE/PPM	1.0/ 12/	.94
CO BCKGRD METER/RANGE/PPM	.8/ 12/	.75
CO2 SAMPLE METER/RANGE/PCT	60.5/ 11/	.4863
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.2/ 9/	9.25
NOX BCKGRD METER/RANGE/PPM	.3/ 1/	.08
CH4 SAMPLE PPM (1.220)		2.42
CH4 BCKGRD PPM		1.98

DILUTION FACTOR	27.83
HC CONCENTRATION PPM	-.42
CO CONCENTRATION PPM	.20
CO2 CONCENTRATION PCT	.4459
NOX CONCENTRATION PPM	9.18
CH4 CONCENTRATION PPM	.51
NMHC CONCENTRATION PPM	-1.04

HC MASS GRAMS	.000
CO MASS GRAMS	.080
CO2 MASS GRAMS	2771.97
NOX MASS GRAMS	5.884
PM MASS GRAMS	.127
CH4 MASS GRAMS	.115
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.872
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T5-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17055 MILES (27441 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.12 IN HG (739.6 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.979/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	598.7 (16.96)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	11999. (339.8)

HC SAMPLE METER/RANGE/PPM (BAG)	3.1/	9/	3.09
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	.6/	12/	.56
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	61.3/	11/	.4952
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/	9/	9.67
NOX BCKGRD METER/RANGE/PPM	1.1/	1/	.28

DILUTION FACTOR	27.33
HC CONCENTRATION PPM	-.53
CO CONCENTRATION PPM	.37
CO2 CONCENTRATION PCT	.4560
NOX CONCENTRATION PPM	9.41

HC MASS GRAMS	.000
CO MASS GRAMS	.146
CO2 MASS GRAMS	2837.07
NOX MASS GRAMS	5.988
PM MASS GRAMS	.153
FUEL MASS KG	.893
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T6-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17113 MILES (27534 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	596.6 (16.90)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11953. (338.5)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/ 9/	2.81
HC BCKGRD METER/RANGE/PPM	3.8/ 2/	3.85
CO SAMPLE METER/RANGE/PPM	.4/ 12/	.37
CO BCKGRD METER/RANGE/PPM	.3/ 12/	.28
CO2 SAMPLE METER/RANGE/PCT	62.0/ 11/	.5030
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	10.2/ 9/	10.19
NOX BCKGRD METER/RANGE/PPM	.3/ 1/	.08

DILUTION FACTOR	26.91
HC CONCENTRATION PPM	-.90
CO CONCENTRATION PPM	.10
CO2 CONCENTRATION PCT	.4627
NOX CONCENTRATION PPM	10.12

HC MASS GRAMS	.000
CO MASS GRAMS	.039
CO2 MASS GRAMS	2867.45
NOX MASS GRAMS	6.377
PM MASS GRAMS	.159
FUEL MASS KG	.903
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T7-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17170 MILES (27626 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.98 IN HG (736.1 MM HG)	DRY BULB TEMPERATURE 74.00F (23.30C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 58.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	593.9 (16.82)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11900. (337.0)

HC SAMPLE METER/RANGE/PPM (BAG)	2.8/ 9/	2.81
HC BCKGRD METER/RANGE/PPM	3.8/ 2/	3.85
CO SAMPLE METER/RANGE/PPM	.3/ 12/	.28
CO BCKGRD METER/RANGE/PPM	.3/ 12/	.28
CO2 SAMPLE METER/RANGE/PCT	61.5/ 11/	.4974
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.5/ 9/	9.53
NOX BCKGRD METER/RANGE/PPM	.6/ 1/	.15

DILUTION FACTOR	27.21
HC CONCENTRATION PPM	-.90
CO CONCENTRATION PPM	.01
CO2 CONCENTRATION PCT	.4552
NOX CONCENTRATION PPM	9.39

HC MASS GRAMS	.000
CO MASS GRAMS	.003
CO2 MASS GRAMS	2808.48
NOX MASS GRAMS	6.070
PM MASS GRAMS	.124
FUEL MASS KG	.884
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T8-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17228 MILES (27719 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	597.2 (16.91)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	11969. (339.0)

HC SAMPLE METER/RANGE/PPM (BAG)	4.8/ 9/ 4.77
HC BCKGRD METER/RANGE/PPM	6.1/ 2/ 6.17
CO SAMPLE METER/RANGE/PPM	.2/ 12/ .19
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	60.4/ 11/ .4852
CO2 BCKGRD METER/RANGE/PCT	7.0/ 11/ .0445
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/ 9/ 9.75
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08
CH4 SAMPLE PPM (1.220)	2.45
CH4 BCKGRD PPM	2.22

DILUTION FACTOR	27.89
HC CONCENTRATION PPM	-1.18
CO CONCENTRATION PPM	-.08
CO2 CONCENTRATION PCT	.4423
NOX CONCENTRATION PPM	9.68
CH4 CONCENTRATION PPM	.31
NMHC CONCENTRATION PPM	-1.55

HC MASS GRAMS	.000
CO MASS GRAMS	.000
CO2 MASS GRAMS	2744.79
NOX MASS GRAMS	6.291
PM MASS GRAMS	.127
CH4 MASS GRAMS	.070
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.864
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	CH4	G/MI	*****
CO	G/MI	.000	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T9-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17286 MILES (27813 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.034
RELATIVE HUMIDITY 72.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.7
DRY/WET CORRECTION FACTOR, SAMP/BACK	.9777.981
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	597.8 (16.93)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	11981. (339.3)

HC SAMPLE METER/RANGE/PPM (BAG)	3.3/	9/	3.31
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	1.5/	12/	1.41
CO BCKGRD METER/RANGE/PPM	1.2/	12/	1.12
CO2 SAMPLE METER/RANGE/PCT	62.0/	11/	.5030
CO2 BCKGRD METER/RANGE/PCT	7.2/	11/	.0458
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.7/	9/	9.71
NOX BCKGRD METER/RANGE/PPM	.6/	1/	.15

DILUTION FACTOR	26.90
HC CONCENTRATION PPM	-.30
CO CONCENTRATION PPM	.30
CO2 CONCENTRATION PCT	.4589
NOX CONCENTRATION PPM	9.57

HC MASS GRAMS	.000
CO MASS GRAMS	.120
CO2 MASS GRAMS	2851.00
NOX MASS GRAMS	6.422
PM MASS GRAMS	.132
FUEL MASS KG	.897
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T1-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/ 9/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17453 MILES (28081 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.8 (17.01)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)
TOTAL FLOW SCF (SCM)	12041. (341.0)

HC SAMPLE METER/RANGE/PPM (BAG)	21.7/	9/	21.71
HC BCKGRD METER/RANGE/PPM	5.3/	2/	5.36
CO SAMPLE METER/RANGE/PPM	67.9/	12/	66.79
CO BCKGRD METER/RANGE/PPM	.6/	12/	.56
CO2 SAMPLE METER/RANGE/PCT	59.8/	11/	.4786
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.2/	9/	9.20
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05
CH4 SAMPLE PPM (1.220)			2.67
CH4 BCKGRD PPM			2.11

DILUTION FACTOR	27.80
HC CONCENTRATION PPM	16.54
CO CONCENTRATION PPM	64.18
CO2 CONCENTRATION PCT	.4388
NOX CONCENTRATION PPM	9.15
CH4 CONCENTRATION PPM	.64
NMHC CONCENTRATION PPM	15.76

HC MASS GRAMS	3.246
CO MASS GRAMS	25.477
CO2 MASS GRAMS	2739.39
NOX MASS GRAMS	6.016
PM MASS GRAMS	.484
CH4 MASS GRAMS	.146
NMHC MASS GRAMS (FID)	3.092
FUEL MASS KG	.878
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****		CH4	G/MI	*****
CO	G/MI	*****		NMHC	G/MI	*****
NOX	G/MI	*****				
PM	G/MI	*****				
FUEL ECONOMY MPG (L/100KM)		.00 (*****)				

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T2-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/10/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17509 MILES (28171 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.22 IN HG (742.2 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.5
DRY/WET CORRECTION FACTOR, SAMP/BACK	.978/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	601.8 (17.04)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	12058. (341.5)

HC SAMPLE METER/RANGE/PPM (BAG)	19.0/ 9/ 18.96
HC BCKGRD METER/RANGE/PPM	3.7/ 2/ 3.75
CO SAMPLE METER/RANGE/PPM	63.5/ 12/ 62.33
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	59.9/ 11/ .4797
CO2 BCKGRD METER/RANGE/PCT	6.5/ 11/ .0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.0/ 9/ 9.04
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08

DILUTION FACTOR	27.78
HC CONCENTRATION PPM	15.35
CO CONCENTRATION PPM	60.04
CO2 CONCENTRATION PCT	.4399
NOX CONCENTRATION PPM	8.97

HC MASS GRAMS	3.016
CO MASS GRAMS	23.868
CO2 MASS GRAMS	2750.26
NOX MASS GRAMS	5.903
PM MASS GRAMS	.467
FUEL MASS KG	.880
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONET3-SS2	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS2
ODOMETER 17564 MILES (28260 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.19 IN HG (741.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.8 (17.01)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)
TOTAL FLOW SCF (SCM)	12038. (340.9)

HC SAMPLE METER/RANGE/PPM (BAG)	19.5/	9/	19.45
HC BCKGRD METER/RANGE/PPM	5.4/	2/	5.46
CO SAMPLE METER/RANGE/PPM	63.3/	12/	62.13
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	60.3/	11/	.4841
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	9.0/	9/	9.03
NOX BCKGRD METER/RANGE/PPM	.4/	1/	.10
CH4 SAMPLE PPM (1.120)			2.35
CH4 BCKGRD PPM			1.92

DILUTION FACTOR	27.53
HC CONCENTRATION PPM	14.18
CO CONCENTRATION PPM	59.99
CO2 CONCENTRATION PCT	.4431
NOX CONCENTRATION PPM	8.93
CH4 CONCENTRATION PPM	.50
NMHC CONCENTRATION PPM	13.62

HC MASS GRAMS	2.783
CO MASS GRAMS	23.809
CO2 MASS GRAMS	2765.33
NOX MASS GRAMS	5.698
PM MASS GRAMS	.486
CH4 MASS GRAMS	.114
NMHC MASS GRAMS (FID)	2.673
FUEL MASS KG	.885
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T1-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/24/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 14821 MILES (23846 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .973
 RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.2
 DRY/WET CORRECTION FACTOR, SAMP/BACK .983/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 602.8 (17.07)
 GAS METER FLOW RATE SCFM (SCMM) .88 (.02)
 TOTAL FLOW SCF (SCM) 12075. (342.0)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/ 4.41
HC BCKGRD METER/RANGE/PPM	3.2/ 2/ 3.24
CO SAMPLE METER/RANGE/PPM	14.5/ 12/ 13.84
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	16.8/ 11/ .1095
CO2 BCKGRD METER/RANGE/PCT	6.9/ 11/ .0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.3/ 9/ 3.32
NOX BCKGRD METER/RANGE/PPM	.3/ 1/ .08

DILUTION FACTOR 121.72
 HC CONCENTRATION PPM 1.19
 CO CONCENTRATION PPM 13.37
 CO2 CONCENTRATION PCT .0660
 NOX CONCENTRATION PPM 3.25

HC MASS GRAMS .235
 CO MASS GRAMS 5.323
 CO2 MASS GRAMS 413.25
 NOX MASS GRAMS 2.066
 PM MASS GRAMS .146
 FUEL MASS KG .133
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T2-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/25/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 14878 MILES (23938 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.17 IN HG (740.9 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1201.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	606.0 (17.16)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12152. (344.2)

HC SAMPLE METER/RANGE/PPM (BAG)	4.2/	9/	4.24
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	13.8/	12/	13.16
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.5/	11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.4/	9/	3.40
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03

DILUTION FACTOR	124.11
HC CONCENTRATION PPM	.92
CO CONCENTRATION PPM	12.69
CO2 CONCENTRATION PCT	.0659
NOX CONCENTRATION PPM	3.37

HC MASS GRAMS	.182
CO MASS GRAMS	5.085
CO2 MASS GRAMS	414.97
NOX MASS GRAMS	2.172
PM MASS GRAMS	.159
FUEL MASS KG	.133
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T3-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/26/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 14939 MILES (24036 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .987
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	604.3 (17.11)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12106. (342.8)

HC SAMPLE METER/RANGE/PPM (BAG)	4.3/ 9/	4.31
HC BCKGRD METER/RANGE/PPM	3.6/ 2/	3.65
CO SAMPLE METER/RANGE/PPM	14.1/ 12/	13.45
CO BCKGRD METER/RANGE/PPM	.4/ 12/	.37
CO2 SAMPLE METER/RANGE/PCT	16.7/ 11/	.1088
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.5/ 9/	3.46
NOX BCKGRD METER/RANGE/PPM	.3/ 1/	.08

DILUTION FACTOR	122.53
HC CONCENTRATION PPM	.69
CO CONCENTRATION PPM	12.78
CO2 CONCENTRATION PCT	.0672
NOX CONCENTRATION PPM	3.39

HC MASS GRAMS	.136
CO MASS GRAMS	5.100
CO2 MASS GRAMS	422.00
NOX MASS GRAMS	2.193
PM MASS GRAMS	.160
FUEL MASS KG	.135
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T4-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/27/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 14995 MILES (24126 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.90 IN HG (734.1 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .962
RELATIVE HUMIDITY 56.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.8 (16.99)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	12017. (340.3)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/	4.43
HC BCKGRD METER/RANGE/PPM	3.4/ 2/	3.45
CO SAMPLE METER/RANGE/PPM	15.2/ 12/	14.51
CO BCKGRD METER/RANGE/PPM	.2/ 12/	.19
CO2 SAMPLE METER/RANGE/PCT	17.1/ 11/	.1115
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.4/ 9/	4.39
NOX BCKGRD METER/RANGE/PPM	.4/ 1/	.10

DILUTION FACTOR	119.44
HC CONCENTRATION PPM	1.02
CO CONCENTRATION PPM	14.04
CO2 CONCENTRATION PCT	.0693
NOX CONCENTRATION PPM	4.29

HC MASS GRAMS	.199
CO MASS GRAMS	5.561
CO2 MASS GRAMS	432.09
NOX MASS GRAMS	2.687
PM MASS GRAMS	.132
FUEL MASS KG	.139
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T5-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/28/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15052 MILES (24218 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	606.0 (17.16)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12138. (343.8)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/	4.36
HC BCKGRD METER/RANGE/PPM	3.5/ 2/	3.55
CO SAMPLE METER/RANGE/PPM	15.8/ 12/	15.10
CO BCKGRD METER/RANGE/PPM	.1/ 12/	.09
CO2 SAMPLE METER/RANGE/PCT	16.7/ 11/	.1088
CO2 BCKGRD METER/RANGE/PCT	6.4/ 11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	4.5/ 9/	4.55
NOX BCKGRD METER/RANGE/PPM	.1/ 1/	.03

DILUTION FACTOR	122.35
HC CONCENTRATION PPM	.85
CO CONCENTRATION PPM	14.70
CO2 CONCENTRATION PCT	.0685
NOX CONCENTRATION PPM	4.52

HC MASS GRAMS	.167
CO MASS GRAMS	5.881
CO2 MASS GRAMS	431.16
NOX MASS GRAMS	2.890
PM MASS GRAMS	.159
FUEL MASS KG	.139
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T6-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/29/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15108 MILES (24308 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.002
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	605.9 (17.16)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	12139. (343.8)

HC SAMPLE METER/RANGE/PPM (BAG)	5.8/	9/	5.82
HC BCKGRD METER/RANGE/PPM	4.9/	2/	4.96
CO SAMPLE METER/RANGE/PPM	15.6/	12/	14.90
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	17.1/	11/	.1115
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.71
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.170)			1.99
CH4 BCKGRD PPM			1.67

DILUTION FACTOR	119.29
HC CONCENTRATION PPM	.90
CO CONCENTRATION PPM	14.29
CO2 CONCENTRATION PCT	.0687
NOX CONCENTRATION PPM	3.64
CH4 CONCENTRATION PPM	.33
NMHC CONCENTRATION PPM	.52

HC MASS GRAMS	.179
CO MASS GRAMS	5.718
CO2 MASS GRAMS	432.44
NOX MASS GRAMS	2.396
PM MASS GRAMS	.177
CH4 MASS GRAMS	.075
NMHC MASS GRAMS (FID)	.103
FUEL MASS KG	.139
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T7-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 4/30/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15166 MILES (24402 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.98 IN HG (736.1 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.019
RELATIVE HUMIDITY 65.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1199.9
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	603.4 (17.09)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12085. (342.3)

HC SAMPLE METER/RANGE/PPM (BAG)	5.0/	9/	5.05
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	16.6/	12/	15.87
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.9/	11/	.1102
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.4/	9/	3.38
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	120.70
HC CONCENTRATION PPM	1.73
CO CONCENTRATION PPM	15.24
CO2 CONCENTRATION PCT	.0686
NOX CONCENTRATION PPM	3.33

HC MASS GRAMS	.341
CO MASS GRAMS	6.070
CO2 MASS GRAMS	429.89
NOX MASS GRAMS	2.220
PM MASS GRAMS	.000
FUEL MASS KG	.139
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	.000	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T8-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 1/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 152225 MILES (244930 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.85 IN HG (732.8 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.006
RELATIVE HUMIDITY 64.6 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.5 (16.98)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	12014. (340.2)

HC SAMPLE METER/RANGE/PPM (BAG)	5.5/	9/	5.49
HC BCKGRD METER/RANGE/PPM	4.6/	2/	4.66
CO SAMPLE METER/RANGE/PPM	16.5/	12/	15.78
CO BCKGRD METER/RANGE/PPM	.9/	12/	.84
CO2 SAMPLE METER/RANGE/PCT	17.0/	11/	.1108
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.4/	9/	3.43
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05
CH4 SAMPLE PPM (1.170)			1.78
CH4 BCKGRD PPM			1.58

DILUTION FACTOR	119.96
HC CONCENTRATION PPM	.87
CO CONCENTRATION PPM	14.60
CO2 CONCENTRATION PCT	.0687
NOX CONCENTRATION PPM	3.39
CH4 CONCENTRATION PPM	.21
NMHC CONCENTRATION PPM	.62

HC MASS GRAMS	.171
CO MASS GRAMS	5.781
CO2 MASS GRAMS	427.66
NOX MASS GRAMS	2.215
PM MASS GRAMS	.153
CH4 MASS GRAMS	.049
NMHC MASS GRAMS (FID)	.122
FUEL MASS KG	.138
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-20-T9-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/ 2/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15283 MILES (24590 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.85 IN HG (732.8 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. 1.021
RELATIVE HUMIDITY 65.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1203.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.981/.982
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	599.4 (16.97)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12035. (340.8)

HC SAMPLE METER/RANGE/PPM (BAG)	6.5/	9/	6.51
HC BCKGRD METER/RANGE/PPM	6.9/	2/	6.98
CO SAMPLE METER/RANGE/PPM	15.9/	12/	15.19
CO BCKGRD METER/RANGE/PPM	.5/	12/	.47
CO2 SAMPLE METER/RANGE/PCT	17.1/	11/	.1115
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.5/	9/	3.51
NOX BCKGRD METER/RANGE/PPM	.0/	1/	.00

DILUTION FACTOR	119.16
HC CONCENTRATION PPM	-.41
CO CONCENTRATION PPM	14.39
CO2 CONCENTRATION PCT	.0681
NOX CONCENTRATION PPM	3.51

HC MASS GRAMS	.000
CO MASS GRAMS	5.709
CO2 MASS GRAMS	424.75
NOX MASS GRAMS	2.335
PM MASS GRAMS	.170
FUEL MASS KG	.137
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T1-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15774 MILES (25380 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .972
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1201.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	603.2 (17.08)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	12095. (342.5)

HC SAMPLE METER/RANGE/PPM (BAG)	4.2/	9/	4.19
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	12.2/	12/	11.61
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.7/	11/	.1088
CO2 BCKGRD METER/RANGE/PCT	6.8/	11/	.0432
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.5/	9/	3.52
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	122.74
HC CONCENTRATION PPM	.78
CO CONCENTRATION PPM	11.19
CO2 CONCENTRATION PCT	.0660
NOX CONCENTRATION PPM	3.47

HC MASS GRAMS	.153
CO MASS GRAMS	4.463
CO2 MASS GRAMS	413.60
NOX MASS GRAMS	2.207
PM MASS GRAMS	.144
FUEL MASS KG	.133
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T2-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15829 MILES (25468 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .988
RELATIVE HUMIDITY 64.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	601.4 (17.03)
GAS METER FLOW RATE SCFM (SCMM)	1.03 (.03)
TOTAL FLOW SCF (SCM)	12051. (341.3)

HC SAMPLE METER/RANGE/PPM (BAG)	5.9/ 9/ 5.93
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 5.87
CO SAMPLE METER/RANGE/PPM	12.5/ 12/ 11.90
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	17.0/ 11/ .1108
CO2 BCKGRD METER/RANGE/PCT	7.1/ 11/ .0451
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/ 9/ 3.73
NOX BCKGRD METER/RANGE/PPM	.7/ 1/ .18
CH4 SAMPLE PPM (1.170)	2.24
CH4 BCKGRD PPM	2.03

DILUTION FACTOR	120.33
HC CONCENTRATION PPM	.11
CO CONCENTRATION PPM	11.36
CO2 CONCENTRATION PCT	.0661
NOX CONCENTRATION PPM	3.56
CH4 CONCENTRATION PPM	.23
NMHC CONCENTRATION PPM	-.15

HC MASS GRAMS	.022
CO MASS GRAMS	4.512
CO2 MASS GRAMS	413.01
NOX MASS GRAMS	2.297
PM MASS GRAMS	.164
CH4 MASS GRAMS	.051
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.132
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC G/MI *****	CH4 G/MI *****
CO G/MI *****	NMHC G/MI .000
NOX G/MI *****	
PM G/MI *****	
FUEL ECONOMY MPG (L/100KM) .00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T3-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15884 MILES (25557 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .948
RELATIVE HUMIDITY 56.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.985/.986
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	600.9 (17.02)
GAS METER FLOW RATE SCFM (SCMM)	.86 (.02)
TOTAL FLOW SCF (SCM)	12038. (340.9)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/	9/	4.60
HC BCKGRD METER/RANGE/PPM	3.3/	2/	3.34
CO SAMPLE METER/RANGE/PPM	12.5/	12/	11.90
CO BCKGRD METER/RANGE/PPM	.4/	12/	.37
CO2 SAMPLE METER/RANGE/PCT	16.7/	11/	.1088
CO2 BCKGRD METER/RANGE/PCT	6.6/	11/	.0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.6/	9/	3.64
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	122.67
HC CONCENTRATION PPM	1.28
CO CONCENTRATION PPM	11.30
CO2 CONCENTRATION PCT	.0672
NOX CONCENTRATION PPM	3.59

HC MASS GRAMS	.251
CO MASS GRAMS	4.483
CO2 MASS GRAMS	419.64
NOX MASS GRAMS	2.221
PM MASS GRAMS	.140
FUEL MASS KG	.135
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T4-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15941 MILES (25649 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.25 IN HG (743.0 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .950
RELATIVE HUMIDITY 53.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	607.1 (17.19)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12162. (344.4)

HC SAMPLE METER/RANGE/PPM (BAG)	4.0/	9/	4.02
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	12.5/	12/	11.90
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.5/	11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.3/	11/	.0400
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.69
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	124.27
HC CONCENTRATION PPM	.31
CO CONCENTRATION PPM	11.49
CO2 CONCENTRATION PCT	.0678
NOX CONCENTRATION PPM	3.64

HC MASS GRAMS	.061
CO MASS GRAMS	4.607
CO2 MASS GRAMS	427.36
NOX MASS GRAMS	2.280
PM MASS GRAMS	.158
FUEL MASS KG	.137
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T5-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 15997 MILES (25739 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.36 IN HG (745.7 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .912
RELATIVE HUMIDITY 45.7 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.987/.988
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	609.9 (17.27)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12219. (346.1)

HC SAMPLE METER/RANGE/PPM (BAG)	4.0/	9/	4.01
HC BCKGRD METER/RANGE/PPM	3.4/	2/	3.45
CO SAMPLE METER/RANGE/PPM	11.6/	12/	11.03
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.4/	11/	.1067
CO2 BCKGRD METER/RANGE/PCT	6.2/	11/	.0393
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.8/	9/	3.80
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	125.15
HC CONCENTRATION PPM	.59
CO CONCENTRATION PPM	10.57
CO2 CONCENTRATION PCT	.0677
NOX CONCENTRATION PPM	3.73

HC MASS GRAMS	.118
CO MASS GRAMS	4.259
CO2 MASS GRAMS	429.08
NOX MASS GRAMS	2.251
PM MASS GRAMS	.160
FUEL MASS KG	.137
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T6-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/20/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16054 MILES (25830 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.29 IN HG (744.0 MM HG)	DRY BULB TEMPERATURE 73.00F (22.80C)	NOX HUMIDITY C.F. .962
RELATIVE HUMIDITY 53.8 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1201.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	606.3 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	12156. (344.3)

HC SAMPLE METER/RANGE/PPM (BAG)	4.3/	9/	4.34
HC BCKGRD METER/RANGE/PPM	3.2/	2/	3.24
CO SAMPLE METER/RANGE/PPM	12.8/	12/	12.19
CO BCKGRD METER/RANGE/PPM	.7/	12/	.66
CO2 SAMPLE METER/RANGE/PCT	16.5/	11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.74
NOX BCKGRD METER/RANGE/PPM	.0/	1/	.00

DILUTION FACTOR	124.20
HC CONCENTRATION PPM	1.12
CO CONCENTRATION PPM	11.32
CO2 CONCENTRATION PCT	.0671
NOX CONCENTRATION PPM	3.74

HC MASS GRAMS	.222
CO MASS GRAMS	4.535
CO2 MASS GRAMS	423.15
NOX MASS GRAMS	2.368
PM MASS GRAMS	.161
FUEL MASS KG	.136
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T7-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/21/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16108 MILES (25917 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.25 IN HG (743.0 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .970
RELATIVE HUMIDITY 57.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	606.3 (17.17)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)
TOTAL FLOW SCF (SCM)	12147. (344.0)

HC SAMPLE METER/RANGE/PPM (BAG)	5.9/	9/	5.88
HC BCKGRD METER/RANGE/PPM	5.3/	2/	5.36
CO SAMPLE METER/RANGE/PPM	12.6/	12/	12.00
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.7/	11/	.1088
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.8/	9/	3.80
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03
CH4 SAMPLE PPM (1.170)			2.32
CH4 BCKGRD PPM			2.19

DILUTION FACTOR	122.56
HC CONCENTRATION PPM	.56
CO CONCENTRATION PPM	11.57
CO2 CONCENTRATION PCT	.0679
NOX CONCENTRATION PPM	3.78
CH4 CONCENTRATION PPM	.15
NMHC CONCENTRATION PPM	.38

HC MASS GRAMS	.110
CO MASS GRAMS	4.633
CO2 MASS GRAMS	427.46
NOX MASS GRAMS	2.410
PM MASS GRAMS	.161
CH4 MASS GRAMS	.035
NMHC MASS GRAMS (FID)	.074
FUEL MASS KG	.137
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T8-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/22/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16164 MILES (26007 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.10 IN HG (739.1 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .952
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	602.4 (17.06)
GAS METER FLOW RATE SCFM (SCMM)	.89 (.03)
TOTAL FLOW SCF (SCM)	12068. (341.8)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/ 9/	4.63
HC BCKGRD METER/RANGE/PPM	3.8/ 2/	3.85
CO SAMPLE METER/RANGE/PPM	13.5/ 12/	12.87
CO BCKGRD METER/RANGE/PPM	.3/ 12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.5/ 11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.3/ 11/	.0400
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/ 9/	3.72
NOX BCKGRD METER/RANGE/PPM	.1/ 1/	.03

DILUTION FACTOR	124.09
HC CONCENTRATION PPM	.81
CO CONCENTRATION PPM	12.35
CO2 CONCENTRATION PCT	.0678
NOX CONCENTRATION PPM	3.69

HC MASS GRAMS	.160
CO MASS GRAMS	4.912
CO2 MASS GRAMS	424.07
NOX MASS GRAMS	2.297
PM MASS GRAMS	.156
FUEL MASS KG	.136
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00 (*****)	

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-040

VEHICLE NUMBER 220	TEST CRC-70-T9-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 5/23/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16219 MILES (26096 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.07 IN HG (738.4 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. 1.018
 RELATIVE HUMIDITY 65.0 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.2
 DRY/WET CORRECTION FACTOR, SAMP/BACK .981/.982
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 602.7 (17.07)
 GAS METER FLOW RATE SCFM (SCMM) .87 (.02)
 TOTAL FLOW SCF (SCM) 12074. (341.9)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/ 4.41
HC BCKGRD METER/RANGE/PPM	3.5/ 2/ 3.55
CO SAMPLE METER/RANGE/PPM	13.5/ 12/ 12.87
CO BCKGRD METER/RANGE/PPM	.4/ 12/ .37
CO2 SAMPLE METER/RANGE/PCT	16.9/ 11/ .1102
CO2 BCKGRD METER/RANGE/PCT	6.7/ 11/ .0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/ 9/ 3.72
NOX BCKGRD METER/RANGE/PPM	.4/ 1/ .10

DILUTION FACTOR 121.08
 HC CONCENTRATION PPM .90
 CO CONCENTRATION PPM 12.21
 CO2 CONCENTRATION PCT .0680
 NOX CONCENTRATION PPM 3.63

HC MASS GRAMS	.176
CO MASS GRAMS	4.859
CO2 MASS GRAMS	425.49
NOX MASS GRAMS	2.413
PM MASS GRAMS	.166
FUEL MASS KG	.136
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T1-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16844 MILES (27101 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.97 IN HG (735.8 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .953
RELATIVE HUMIDITY 53.3 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.984/.985
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	601.7 (17.04)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12052. (341.3)

HC SAMPLE METER/RANGE/PPM (BAG)	4.6/	9/	4.61
HC BCKGRD METER/RANGE/PPM	3.9/	2/	3.95
CO SAMPLE METER/RANGE/PPM	13.8/	12/	13.16
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.9/	11/	.1102
CO2 BCKGRD METER/RANGE/PCT	6.9/	11/	.0438
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.66
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	121.03
HC CONCENTRATION PPM	.69
CO CONCENTRATION PPM	12.63
CO2 CONCENTRATION PCT	.0667
NOX CONCENTRATION PPM	3.61

HC MASS GRAMS	.136
CO MASS GRAMS	5.018
CO2 MASS GRAMS	416.73
NOX MASS GRAMS	2.246
PM MASS GRAMS	.161
FUEL MASS KG	.134
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T2-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/12/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16898 MILES (27188 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.02 IN HG (737.1 MM HG) DRY BULB TEMPERATURE 71.00F (21.70C) NOX HUMIDITY C.F. .981
 RELATIVE HUMIDITY 60.5 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.4
 DRY/WET CORRECTION FACTOR, SAMP/BACK .983/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 603.9 (17.10)
 GAS METER FLOW RATE SCFM (SCMM) .87 (.02)
 TOTAL FLOW SCF (SCM) 12099. (342.7)

HC SAMPLE METER/RANGE/PPM (BAG)	4.2/ 9/ 4.18
HC BCKGRD METER/RANGE/PPM	1.3/ 2/ 1.32
CO SAMPLE METER/RANGE/PPM	11.7/ 12/ 11.13
CO BCKGRD METER/RANGE/PPM	.2/ 12/ .19
CO2 SAMPLE METER/RANGE/PCT	16.6/ 11/ .1081
CO2 BCKGRD METER/RANGE/PCT	6.6/ 11/ .0419
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.6/ 9/ 3.59
NOX BCKGRD METER/RANGE/PPM	.1/ 1/ .03

DILUTION FACTOR 123.57
 HC CONCENTRATION PPM 2.87
 CO CONCENTRATION PPM 10.71
 CO2 CONCENTRATION PCT .0665
 NOX CONCENTRATION PPM 3.56

HC MASS GRAMS .565
 CO MASS GRAMS 4.271
 CO2 MASS GRAMS 417.46
 NOX MASS GRAMS 2.289
 PM MASS GRAMS .140
 FUEL MASS KG .134
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T3-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/13/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 16955 MILES (27280 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.00 IN HG (736.6 MM HG)	DRY BULB TEMPERATURE 72.00F (22.20C)	NOX HUMIDITY C.F. .974
RELATIVE HUMIDITY 57.1 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	602.7 (17.07)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12075. (342.0)

HC SAMPLE METER/RANGE/PPM (BAG)	4.0/	9/	4.03
HC BCKGRD METER/RANGE/PPM	3.2/	2/	3.24
CO SAMPLE METER/RANGE/PPM	10.1/	12/	9.59
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.8/	11/	.1095
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.68
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	122.22
HC CONCENTRATION PPM	.82
CO CONCENTRATION PPM	9.12
CO2 CONCENTRATION PCT	.0673
NOX CONCENTRATION PPM	3.63

HC MASS GRAMS	.161
CO MASS GRAMS	3.630
CO2 MASS GRAMS	421.23
NOX MASS GRAMS	2.313
PM MASS GRAMS	.144
FUEL MASS KG	.135
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T4-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/14/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17000 MILES (27352 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.09 IN HG (738.9 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. .988
RELATIVE HUMIDITY 64.0 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.1
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	604.3 (17.11)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)
TOTAL FLOW SCF (SCM)	12108. (342.9)

HC SAMPLE METER/RANGE/PPM (BAG)	6.2/	9/	6.16
HC BCKGRD METER/RANGE/PPM	5.3/	2/	5.36
CO SAMPLE METER/RANGE/PPM	10.0/	12/	9.49
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.5/	11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.6/	9/	3.60
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03
CH4 SAMPLE PPM (1.220)			2.16
CH4 BCKGRD PPM			1.97

DILUTION FACTOR	124.35
HC CONCENTRATION PPM	.84
CO CONCENTRATION PPM	9.00
CO2 CONCENTRATION PCT	.0665
NOX CONCENTRATION PPM	3.57
CH4 CONCENTRATION PPM	.21
NMHC CONCENTRATION PPM	.58

HC MASS GRAMS	.165
CO MASS GRAMS	3.594
CO2 MASS GRAMS	417.45
NOX MASS GRAMS	2.313
PM MASS GRAMS	.148
CH4 MASS GRAMS	.048
NMHC MASS GRAMS (FID)	.115
FUEL MASS KG	.133
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T5-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/15/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17067 MILES (27460 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.11 IN HG (739.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .980
RELATIVE HUMIDITY 60.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1201.8
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	595.1 (16.85)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	11938. (338.1)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/	9/	4.41
HC BCKGRD METER/RANGE/PPM	3.7/	2/	3.75
CO SAMPLE METER/RANGE/PPM	10.3/	12/	9.78
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.4/	11/	.1067
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.6/	9/	3.59
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08

DILUTION FACTOR	125.25
HC CONCENTRATION PPM	.69
CO CONCENTRATION PPM	9.30
CO2 CONCENTRATION PCT	.0664
NOX CONCENTRATION PPM	3.52

HC MASS GRAMS	.134
CO MASS GRAMS	3.659
CO2 MASS GRAMS	411.29
NOX MASS GRAMS	2.227
PM MASS GRAMS	.148
FUEL MASS KG	.131
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T6-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/16/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17125 MILES (27554 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.99 IN HG (736.3 MM HG) DRY BULB TEMPERATURE 72.00F (22.20C) NOX HUMIDITY C.F. .974
 RELATIVE HUMIDITY 57.1 PCT.

BAG NUMBER 1
 BAG DESCRIPTION
 RUN TIME SECONDS 1200.00
 DRY/WET CORRECTION FACTOR, SAMP/BACK .983/.984
 MEASURED DISTANCE MILES (KM) .00 (.00)
 BLOWER FLOW RATE SCFM (SCMM) 602.0 (17.05)
 GAS METER FLOW RATE SCFM (SCMM) .87 (.02)
 TOTAL FLOW SCF (SCM) 12057. (341.5)

HC SAMPLE METER/RANGE/PPM (BAG)	4.4/ 9/ 4.40
HC BCKGRD METER/RANGE/PPM	3.8/ 2/ 3.85
CO SAMPLE METER/RANGE/PPM	11.0/ 12/ 10.45
CO BCKGRD METER/RANGE/PPM	.3/ 12/ .28
CO2 SAMPLE METER/RANGE/PCT	16.5/ 11/ .1074
CO2 BCKGRD METER/RANGE/PCT	6.4/ 11/ .0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.6/ 9/ 3.59
NOX BCKGRD METER/RANGE/PPM	.2/ 1/ .05

DILUTION FACTOR 124.39
 HC CONCENTRATION PPM .58
 CO CONCENTRATION PPM 9.97
 CO2 CONCENTRATION PCT .0671
 NOX CONCENTRATION PPM 3.54

HC MASS GRAMS .114
 CO MASS GRAMS 3.962
 CO2 MASS GRAMS 419.71
 NOX MASS GRAMS 2.254
 PM MASS GRAMS .149
 FUEL MASS KG .134
 FUEL ECONOMY MPG (L/100KM) .00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****
CO	G/MI	*****
NOX	G/MI	*****
PM	G/MI	*****
FUEL ECONOMY MPG (L/100KM)		.00 (*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T7-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/17/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17125 MILES (27554 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 28.97 IN HG (735.8 MM HG)	DRY BULB TEMPERATURE 74.00F (23.30C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 58.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.3
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	601.1 (17.02)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12042. (341.0)

HC SAMPLE METER/RANGE/PPM (BAG)	4.3/	9/	4.32
HC BCKGRD METER/RANGE/PPM	5.5/	2/	5.57
CO SAMPLE METER/RANGE/PPM	13.0/	12/	12.38
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.8/	11/	.1095
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	2.3/	9/	2.29
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	121.89
HC CONCENTRATION PPM	-1.20
CO CONCENTRATION PPM	11.94
CO2 CONCENTRATION PCT	.0673
NOX CONCENTRATION PPM	N/A

HC MASS GRAMS	.000
CO MASS GRAMS	4.742
CO2 MASS GRAMS	420.09
NOX MASS GRAMS	N/A
PM MASS GRAMS	.156
FUEL MASS KG	.135
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	.000	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T8-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/18/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17240 MILES (27739 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.03 IN HG (737.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. 1.003
RELATIVE HUMIDITY 64.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	601.8 (17.04)
GAS METER FLOW RATE SCFM (SCMM)	1.02 (.03)
TOTAL FLOW SCF (SCM)	12060. (341.6)

HC SAMPLE METER/RANGE/PPM (BAG)	6.1/	9/	6.05
HC BCKGRD METER/RANGE/PPM	5.8/	2/	5.87
CO SAMPLE METER/RANGE/PPM	9.9/	12/	9.40
CO BCKGRD METER/RANGE/PPM	.3/	12/	.28
CO2 SAMPLE METER/RANGE/PCT	16.6/	11/	.1081
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.5/	9/	3.55
NOX BCKGRD METER/RANGE/PPM	.1/	1/	.03
CH4 SAMPLE PPM (1.220)			2.32
CH4 BCKGRD PPM			2.11

DILUTION FACTOR	123.60
HC CONCENTRATION PPM	.23
CO CONCENTRATION PPM	8.91
CO2 CONCENTRATION PCT	.0659
NOX CONCENTRATION PPM	3.52
CH4 CONCENTRATION PPM	.23
NMHC CONCENTRATION PPM	-.05

HC MASS GRAMS	.046
CO MASS GRAMS	3.542
CO2 MASS GRAMS	412.13
NOX MASS GRAMS	2.308
PM MASS GRAMS	.153
CH4 MASS GRAMS	.053
NMHC MASS GRAMS (FID)	.000
FUEL MASS KG	.132
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	.000
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-120-T9-SS3	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 6/19/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17298 MILES (27832 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.08 IN HG (738.6 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.034
RELATIVE HUMIDITY 72.5 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1202.0
DRY/WET CORRECTION FACTOR, SAMP/BACK	.980/.981
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	604.1 (17.11)
GAS METER FLOW RATE SCFM (SCMM)	.87 (.02)
TOTAL FLOW SCF (SCM)	12119. (343.2)

HC SAMPLE METER/RANGE/PPM (BAG)	4.7/	9/	4.72
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	12.3/	12/	11.71
CO BCKGRD METER/RANGE/PPM	.5/	12/	.47
CO2 SAMPLE METER/RANGE/PCT	17.6/	11/	.1150
CO2 BCKGRD METER/RANGE/PCT	7.4/	11/	.0471
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.8/	9/	3.81
NOX BCKGRD METER/RANGE/PPM	.8/	1/	.20

DILUTION FACTOR	116.18
HC CONCENTRATION PPM	1.21
CO CONCENTRATION PPM	10.95
CO2 CONCENTRATION PCT	.0683
NOX CONCENTRATION PPM	3.61

HC MASS GRAMS	.238
CO MASS GRAMS	4.377
CO2 MASS GRAMS	429.29
NOX MASS GRAMS	2.454
PM MASS GRAMS	.177
FUEL MASS KG	.138
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T1-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/ 9/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17465 MILES (28101 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.20 IN HG (741.7 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	606.5 (17.18)
GAS METER FLOW RATE SCFM (SCMM)	1.04 (.03)
TOTAL FLOW SCF (SCM)	12153. (344.2)

HC SAMPLE METER/RANGE/PPM (BAG)	13.8/	9/	13.78
HC BCKGRD METER/RANGE/PPM	4.8/	2/	4.86
CO SAMPLE METER/RANGE/PPM	15.5/	12/	14.81
CO BCKGRD METER/RANGE/PPM	.8/	12/	.75
CO2 SAMPLE METER/RANGE/PCT	16.3/	11/	.1061
CO2 BCKGRD METER/RANGE/PCT	6.4/	11/	.0406
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.70
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.220)			2.12
CH4 BCKGRD PPM			2.15

DILUTION FACTOR	124.45
HC CONCENTRATION PPM	8.96
CO CONCENTRATION PPM	13.72
CO2 CONCENTRATION PCT	.0658
NOX CONCENTRATION PPM	3.62
CH4 CONCENTRATION PPM	-.01
NMHC CONCENTRATION PPM	8.96

HC MASS GRAMS	1.776
CO MASS GRAMS	5.499
CO2 MASS GRAMS	414.44
NOX MASS GRAMS	2.404
PM MASS GRAMS	.280
CH4 MASS GRAMS	.000
NMHC MASS GRAMS (FID)	1.776
FUEL MASS KG	.135
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	.000
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T2-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/10/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17521 MILES (28191 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.22 IN HG (742.2 MM HG)	DRY BULB TEMPERATURE 70.00F (21.10C)	NOX HUMIDITY C.F. 1.008
RELATIVE HUMIDITY 68.2 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.4
DRY/WET CORRECTION FACTOR, SAMP/BACK	.982/.983
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	607.1 (17.19)
GAS METER FLOW RATE SCFM (SCMM)	.88 (.02)
TOTAL FLOW SCF (SCM)	12164. (344.5)

HC SAMPLE METER/RANGE/PPM (BAG)	12.4/	9/	12.40
HC BCKGRD METER/RANGE/PPM	3.5/	2/	3.55
CO SAMPLE METER/RANGE/PPM	15.1/	12/	14.42
CO BCKGRD METER/RANGE/PPM	.6/	12/	.56
CO2 SAMPLE METER/RANGE/PCT	16.3/	11/	.1061
CO2 BCKGRD METER/RANGE/PCT	6.5/	11/	.0413
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.69
NOX BCKGRD METER/RANGE/PPM	.2/	1/	.05

DILUTION FACTOR	124.60
HC CONCENTRATION PPM	8.88
CO CONCENTRATION PPM	13.53
CO2 CONCENTRATION PCT	.0651
NOX CONCENTRATION PPM	3.64

HC MASS GRAMS	1.760
CO MASS GRAMS	5.425
CO2 MASS GRAMS	410.79
NOX MASS GRAMS	2.415
PM MASS GRAMS	.269
FUEL MASS KG	.134
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	
CO	G/MI	*****	
NOX	G/MI	*****	
PM	G/MI	*****	
FUEL ECONOMY MPG (L/100KM)		.00	(*****)

SOUTHWEST RESEARCH INSTITUTE - DEPARTMENT OF EMISSIONS RESEARCH
 COMPUTER PROGRAM LDT 2.7-R 1-BAG EPA FTP VEHICLE EMISSION RESULTS PROJECT NO. 08-4471-060

VEHICLE NUMBER 220	TEST CRC-NONE-T3-SS	DIESEL EM-4495-F
VEHICLE MODEL 99 MERCEDES BENZ	DATE 7/11/2002 RUN	FUEL DENSITY 7.030 LB/GAL
ENGINE 2.2 L (134 CID)-4	DYNO 7 BAG CART 1	H .133 C .867 O .000 X .000
TRANSMISSION M5	ACTUAL ROAD LOAD 8.12 HP (6.06 KW)	SS3
ODOMETER 17576 MILES (28279 KM)	TEST WEIGHT 3500 LBS (1587 KG)	

BAROMETER 29.19 IN HG (741.4 MM HG)	DRY BULB TEMPERATURE 71.00F (21.70C)	NOX HUMIDITY C.F. .979
RELATIVE HUMIDITY 60.4 PCT.		

BAG NUMBER	1
BAG DESCRIPTION	
RUN TIME SECONDS	1200.2
DRY/WET CORRECTION FACTOR, SAMP/BACK	.983/.984
MEASURED DISTANCE MILES (KM)	.00 (.00)
BLOWER FLOW RATE SCFM (SCMM)	607.6 (17.21)
GAS METER FLOW RATE SCFM (SCMM)	1.05 (.03)
TOTAL FLOW SCF (SCM)	12175. (344.8)

HC SAMPLE METER/RANGE/PPM (BAG)	14.6/	9/	14.60
HC BCKGRD METER/RANGE/PPM	5.3/	2/	5.36
CO SAMPLE METER/RANGE/PPM	15.6/	12/	14.90
CO BCKGRD METER/RANGE/PPM	.2/	12/	.19
CO2 SAMPLE METER/RANGE/PCT	16.5/	11/	.1074
CO2 BCKGRD METER/RANGE/PCT	6.7/	11/	.0425
NOX SAMPLE METER/RANGE/PPM (BAG) (D)	3.7/	9/	3.67
NOX BCKGRD METER/RANGE/PPM	.3/	1/	.08
CH4 SAMPLE PPM (1.220)			2.10
CH4 BCKGRD PPM			1.99

DILUTION FACTOR	122.80
HC CONCENTRATION PPM	9.28
CO CONCENTRATION PPM	14.40
CO2 CONCENTRATION PCT	.0652
NOX CONCENTRATION PPM	3.60
CH4 CONCENTRATION PPM	.13
NMHC CONCENTRATION PPM	9.12

HC MASS GRAMS	1.841
CO MASS GRAMS	5.780
CO2 MASS GRAMS	411.73
NOX MASS GRAMS	2.321
PM MASS GRAMS	.310
CH4 MASS GRAMS	.029
NMHC MASS GRAMS (FID)	1.810
FUEL MASS KG	.134
FUEL ECONOMY MPG (L/100KM)	.00 (*****)

1-BAG COMPOSITE RESULTS

HC	G/MI	*****	CH4	G/MI	*****
CO	G/MI	*****	NMHC	G/MI	*****
NOX	G/MI	*****			
PM	G/MI	*****			
FUEL ECONOMY MPG (L/100KM)		.00 (*****)			

APPENDIX B

ELEMENTAL CARBON AND ORGANIC CARBON RESULTS

APPENDIX TABLE B-1. ELEMENTAL CARBON AND ORGANIC CARBON RESULTS

Set	Total Mass	O1TC	O1TU	O2TC	O2TU	O3TC	O3TU	O4TC	O4TU	OPTC	OPTU	OCTC
1 -> 3 20g	FTP, mg/mi	2.27	1.59	2.28	0.39	5.16	0.15	2.52	1.06	0.01	0.00	12.24
	US06, mg/mi	1.67	0.79	1.89	0.51	4.74	0.63	5.89	0.66	0.01	0.00	14.21
	SS1, mg/hr	149.43	17.78	136.45	16.77	173.04	5.96	558.11	77.67	1.70	0.30	1018.75
	SS2, mg/hr	12.07	1.61	14.39	0.28	32.38	2.44	20.48	2.37	0.08	0.02	79.40
	SS3, mg/hr	8.12	5.55	17.48	3.83	40.23	2.73	21.67	1.16	0.06	0.05	87.58
4 -> 6 70g	FTP, mg/mi	1.27	0.15	2.31	0.35	4.68	0.23	2.76	0.86	0.00	0.00	11.02
	US06, mg/mi	1.50	0.15	1.29	0.03	4.40	0.05	5.50	0.52	0.01	0.00	12.68
	SS1, mg/hr	33.94	8.34	77.46	3.76	140.90	5.74	361.52	145.79	0.98	0.47	614.75
	SS2, mg/hr	9.11	1.26	12.66	0.16	35.96	1.86	43.02	36.27	0.15	0.10	100.92
	SS3, mg/hr	5.47	0.73	11.93	1.05	36.09	2.13	27.57	17.84	0.07	0.03	81.13
7 -> 9 120g	FTP, mg/mi	1.08	0.05	2.46	0.34	3.84	0.17	2.22	0.90	0.00	0.00	9.60
	US06, mg/mi	1.14	0.19	1.52	0.65	3.12	0.23	2.70	1.55	0.00	0.00	8.47
	SS1, mg/hr	26.53	2.37	34.38	21.35	115.25	32.77	369.74	219.91	0.65	1.12	546.57
	SS2, mg/hr	9.50	1.62	12.97	0.58	28.37	1.53	21.12	21.83	0.05	0.06	72.02
	SS3, mg/hr	6.95	2.32	11.99	0.18	27.44	2.65	13.50	2.32	2.19	3.80	62.10
10 -> 12 None	FTP, mg/mi	48.14	3.98	11.57	2.93	16.36	1.93	7.40	0.73	0.00	0.00	83.47
	US06, mg/mi	31.22	5.88	13.40	1.43	19.84	5.71	7.24	1.05	0.02	0.02	71.72
	SS1, mg/hr	970.77	337.31	707.01	199.16	739.02	92.04	235.09	9.88	2.04	2.79	2654.26
	SS2, mg/hr	604.25	139.58	174.66	82.61	222.09	37.81	77.45	5.65	0.37	0.31	1078.80
	SS3, mg/hr	127.22	10.40	99.43	5.20	179.25	10.42	56.78	1.09	0.12	0.00	462.78
O1TC	Organic Carbon Fraction 1 (up to 120°C) concentration					O4TC	Organic Carbon Fraction 4 (up to 550°C) concentration					
O1TU	Organic Carbon Fraction 1 (up to 120°C) concentration uncertainty					O4TU	Organic Carbon Fraction 4 (up to 550°C) concentration uncertainty					
O2TC	Organic Carbon Fraction 2 (up to 250°C) concentration					OPTC	Pyrolyzed Organic Carbon concentration					
O2TU	Organic Carbon Fraction 2 (up to 250°C) concentration uncertainty					OPTU	Pyrolyzed Organic Carbon concentration uncertainty					
O3TC	Organic Carbon Fraction 3 (up to 450°C) concentration					OCTC	Organic Carbon concentration					
O3TU	Organic Carbon Fraction 3 (up to 450°C) concentration uncertainty											

APPENDIX TABLE B-1 (CONT'D). ELEMENTAL CARBON AND ORGANIC CARBON RESULTS

Set	Total Mass	OCTU	E1TC	E1TU	E2TC	E2TU	E3TC	E3TU	ECTC	ECTU	TCTC	TCTU
1 -> 3 20g	FTP, mg/mi	3.17	13.38	7.68	50.97	8.94	0.07	0.03	64.41	1.27	76.65	1.96
	US06, mg/mi	1.66	21.00	9.39	107.31	17.56	0.02	0.01	128.33	8.36	142.53	7.15
	SS1, mg/hr	64.93	3774.35	676.42	523.07	743.48	3.42	5.59	4299.22	78.04	5317.97	14.88
	SS2, mg/hr	2.06	324.88	34.09	8.08	2.88	0.00	0.00	332.87	36.88	412.27	38.33
	SS3, mg/hr	5.97	151.39	9.61	323.72	27.02	0.36	0.51	475.41	21.24	562.96	23.74
4 -> 6 70g	FTP, mg/mi	1.21	15.58	6.36	50.83	9.07	0.02	0.03	66.43	5.67	77.46	5.91
	US06, mg/mi	0.38	21.34	5.29	103.72	10.21	0.00	0.00	125.06	9.01	137.74	9.21
	SS1, mg/hr	145.87	2275.71	554.59	2333.43	664.61	2.77	2.44	4610.96	130.88	5225.71	126.13
	SS2, mg/hr	36.55	310.09	64.51	16.28	25.01	0.00	0.00	326.24	75.10	427.14	38.75
	SS3, mg/hr	20.92	198.48	102.62	288.03	113.53	0.04	0.04	486.47	18.17	567.63	13.13
7 -> 9 120g	FTP, mg/mi	0.40	6.98	3.91	59.88	5.39	0.03	0.04	66.89	3.19	76.49	3.59
	US06, mg/mi	1.80	10.22	3.84	124.66	8.14	0.04	0.03	134.93	4.38	143.40	2.83
	SS1, mg/hr	272.53	2048.70	1172.53	2706.09	959.98	1.03	1.09	4755.25	337.46	5301.83	560.73
	SS2, mg/hr	22.79	153.31	181.97	246.25	216.72	0.00	0.00	399.51	56.01	471.53	50.00
	SS3, mg/hr	3.14	64.55	30.64	431.89	62.44	0.00	0.00	494.26	43.41	556.31	43.31
10 -> 12 None	FTP, mg/mi	2.94	15.41	4.95	75.83	7.07	0.11	0.13	91.36	3.78	174.82	6.71
	US06, mg/mi	9.46	14.85	4.70	149.23	31.26	0.76	0.81	164.84	33.48	236.56	42.94
	SS1, mg/hr	51.96	426.36	349.54	5180.41	520.86	48.44	42.09	5653.02	229.23	8307.28	177.64
	SS2, mg/hr	47.76	131.14	77.86	299.81	71.09	0.89	1.55	431.43	5.71	1510.30	53.19
	SS3, mg/hr	16.95	26.33	3.61	505.78	26.97	11.55	6.91	543.60	22.79	1006.30	33.72
OCTU	Organic Carbon concentration uncertainty					E3TU	Elemental Carbon Fraction 3 (up to 800°C) concentration uncertainty					
E1TC	Elemental Carbon Fraction 1 (up to 550°C) concentration					ECTC	Elemental Carbon concentration					
E1TU	Elemental Carbon Fraction 1 (up to 550°C) concentration uncertainty					ECTU	Elemental Carbon concentration uncertainty					
E2TC	Elemental Carbon Fraction 2 (up to 700°C) concentration					TCTC	Total Carbon concentration					
E2TU	Elemental Carbon Fraction 2 (up to 700°C) concentration uncertainty					TCTU	Total Carbon concentration uncertainty					
E3TC	Elemental Carbon Fraction 3 (up to 800°C) concentration											

APPENDIX C

TRACE ELEMENTS FROM XRF ANALYSIS

APPENDIX TABLE C-1. TRACE ELEMENTS FROM XRF ANALYSIS

Set	Total Mass	NAXC	NAXU	MGXC	MGXU	ALXC	ALXU	SIXC	SIXU	PHXC	PHXU	SUXC	SUXU	CLXC	CLXU	KPXC	KPXU
1 -> 3	FTP, mg/mi	0.240	0.196	0.034	0.010	0.020	0.022	0.068	0.010	0.012	0.010	0.079	0.013	0.018	0.004	0.002	0.002
	US06, mg/mi	0.086	0.150	0.129	0.041	0.022	0.015	0.122	0.043	0.038	0.020	0.266	0.077	0.051	0.009	0.003	0.003
	SS1, mg/hr	13.529	12.660	5.063	5.576	2.061	1.329	1.247	0.881	3.141	0.434	183.843	38.379	0.000	0.000	0.111	0.096
	SS2, mg/hr	6.508	7.333	2.581	1.870	1.087	0.325	1.104	0.456	0.107	0.082	1.145	0.038	0.316	0.074	0.000	0.000
	SS3, mg/hr	10.646	4.920	1.053	0.480	1.519	0.649	0.980	0.181	0.170	0.148	0.776	0.041	0.117	0.088	0.006	0.010
4 -> 6	FTP, mg/mi	0.156	0.139	0.104	0.034	0.022	0.004	0.193	0.013	0.006	0.001	0.086	0.021	0.012	0.006	0.004	0.005
	US06, mg/mi	0.107	0.117	0.191	0.058	0.049	0.024	0.509	0.091	0.038	0.007	0.393	0.057	0.054	0.018	0.004	0.003
	SS1, mg/hr	19.886	7.998	10.506	3.451	1.084	0.341	9.703	0.840	1.159	0.916	157.259	28.172	0.000	0.000	0.022	0.038
	SS2, mg/hr	0.933	0.929	1.057	0.417	0.487	0.005	1.587	0.508	0.109	0.042	1.414	1.011	0.132	0.037	0.017	0.021
	SS3, mg/hr	7.283	5.942	1.195	0.769	0.767	0.269	2.120	0.489	0.122	0.155	1.196	0.220	0.081	0.038	0.000	0.000
7 -> 9	FTP, mg/mi	0.145	0.138	0.062	0.053	0.015	0.015	0.051	0.015	0.020	0.016	0.145	0.094	0.011	0.001	0.001	0.001
	US06, mg/mi	0.000	0.000	0.087	0.108	0.019	0.017	0.077	0.019	0.033	0.005	0.341	0.072	0.051	0.003	0.000	0.001
	SS1, mg/hr	6.773	9.370	5.931	2.332	2.461	1.122	1.371	0.645	2.815	0.725	167.847	36.795	0.000	0.000	0.071	0.093
	SS2, mg/hr	2.411	2.440	1.137	0.804	0.588	0.468	0.555	0.290	0.075	0.035	1.515	0.414	0.215	0.100	0.018	0.032
	SS3, mg/hr	2.495	4.322	0.658	0.443	0.357	0.242	0.653	0.121	0.107	0.072	1.336	0.232	0.204	0.139	0.019	0.029
10 -> 12	FTP, mg/mi	0.083	0.144	0.334	0.296	0.104	0.085	0.087	0.017	0.028	0.005	0.134	0.051	0.028	0.027	0.000	0.000
	US06, mg/mi	1.095	0.583	0.226	0.200	0.198	0.144	0.204	0.069	0.066	0.036	0.400	0.277	0.032	0.040	0.004	0.006
	SS1, mg/hr	32.705	31.335	39.592	15.016	10.841	6.833	8.170	5.951	0.000	0.000	21.709	6.152	1.459	1.622	0.378	0.485
	SS2, mg/hr	17.183	27.363	14.759	2.541	4.936	0.787	2.649	0.213	0.736	0.528	1.508	0.393	0.199	0.251	0.147	0.131
	SS3, mg/hr	16.675	18.226	7.907	5.398	4.240	1.924	2.370	1.675	0.707	0.411	1.656	0.487	0.522	0.476	0.000	0.000
NAXC	Sodium concentration (qualitative only)					PHXC	Phosphorous concentration										
NAXU	Sodium concentration uncertainty					PHXU	Phosphorous concentration uncertainty										
MGXC	Magnesium concentration (qualitative only)					SUXC	Sulfur concentration										
MGXU	Magnesium concentration uncertainty					SUXU	Sulfur concentration uncertainty										
ALXC	Aluminum concentration					CLXC	Chlorine concentration										
ALXU	Aluminum concentration uncertainty					CLXU	Chlorine concentration uncertainty										
SIXC	Silicon concentration					KPXC	Potassium concentration										
SIXU	Silicon concentration uncertainty					KPXU	Potassium concentration uncertainty										

APPENDIX TABLE C-1 (CONT'D). TRACE ELEMENTS FROM XRF ANALYSIS

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C-2

Set	Total Mass	CAXC	CAXU	TIXC	TIXU	VAXC	VAXU	CRXC	CRXU	MNXC	MNXU	FEXC	FEXU	COXC	COXU	NIXC	NIXU
1 -> 3	FTP, mg/mi	0.036	0.007	0.002	0.004	0.000	0.000	0.003	0.003	0.002	0.002	0.067	0.031	0.001	0.001	0.003	0.002
	US06, mg/mi	0.093	0.016	0.003	0.006	0.000	0.000	0.018	0.004	0.004	0.001	0.293	0.088	0.004	0.002	0.005	0.001
	SS1, mg/hr	3.716	0.381	0.148	0.256	0.018	0.032	0.422	0.120	0.101	0.025	5.478	1.535	0.106	0.096	0.198	0.047
	SS2, mg/hr	0.456	0.061	0.043	0.075	0.016	0.015	0.000	0.000	0.006	0.009	1.446	2.298	0.019	0.014	0.012	0.011
	SS3, mg/hr	0.157	0.050	0.024	0.021	0.028	0.013	0.016	0.014	0.010	0.005	0.150	0.045	0.008	0.007	0.023	0.015
4 -> 6	FTP, mg/mi	0.035	0.004	0.002	0.003	0.000	0.000	0.003	0.004	0.001	0.001	0.033	0.017	0.001	0.001	0.002	0.001
	US06, mg/mi	0.095	0.008	0.004	0.008	0.001	0.001	0.012	0.002	0.003	0.002	0.248	0.039	0.000	0.000	0.005	0.000
	SS1, mg/hr	3.503	0.478	0.014	0.024	0.017	0.029	1.089	1.444	0.056	0.034	4.958	2.345	0.013	0.023	0.227	0.130
	SS2, mg/hr	0.461	0.187	0.007	0.012	0.000	0.000	0.000	0.000	0.009	0.013	0.148	0.053	0.000	0.000	0.015	0.003
	SS3, mg/hr	0.550	0.474	0.022	0.038	0.003	0.004	0.000	0.000	0.003	0.005	0.129	0.017	0.000	0.000	0.005	0.009
7 -> 9	FTP, mg/mi	0.043	0.023	0.005	0.009	0.000	0.000	0.005	0.009	0.001	0.001	0.101	0.130	0.001	0.001	0.001	0.001
	US06, mg/mi	0.077	0.011	0.002	0.003	0.000	0.000	0.005	0.005	0.001	0.001	0.116	0.041	0.000	0.000	0.002	0.001
	SS1, mg/hr	2.957	0.473	0.013	0.023	0.034	0.058	0.185	0.017	0.017	0.016	3.719	2.452	0.067	0.058	0.112	0.073
	SS2, mg/hr	0.705	0.648	0.008	0.014	0.000	0.000	0.022	0.039	0.017	0.022	0.153	0.077	0.019	0.016	0.013	0.006
	SS3, mg/hr	0.304	0.096	0.000	0.000	0.000	0.000	0.051	0.088	0.004	0.006	0.226	0.233	0.004	0.003	0.024	0.016
10 -> 12	FTP, mg/mi	0.042	0.013	0.005	0.009	0.002	0.003	0.004	0.006	0.001	0.001	0.121	0.021	0.002	0.003	0.002	0.003
	US06, mg/mi	0.113	0.071	0.013	0.023	0.001	0.002	0.029	0.050	0.007	0.012	0.487	0.382	0.004	0.005	0.009	0.004
	SS1, mg/hr	2.315	0.225	0.237	0.411	0.000	0.000	0.075	0.129	0.115	0.199	3.598	0.979	0.184	0.319	0.277	0.167
	SS2, mg/hr	0.093	0.112	0.082	0.143	0.000	0.000	0.019	0.033	0.005	0.008	0.200	0.070	0.054	0.087	0.029	0.035
	SS3, mg/hr	0.537	0.235	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.351	0.085	0.000	0.000	0.046	0.071
CAXC	Calcium concentration					MNXC	Manganese concentration										
CAXU	Calcium concentration uncertainty					MNXU	Manganese concentration uncertainty										
TIXC	Titanium concentration					FEXC	Iron concentration										
TIXU	Titanium concentration uncertainty					FEXU	Iron concentration uncertainty										
VAXC	Vanadium concentration					COXC	Cobalt concentration										
VAXU	Vanadium concentration uncertainty					COXU	Cobalt concentration uncertainty										
CRXC	Chromium concentration					NIXC	Nickel concentration										
CRXU	Chromium concentration uncertainty					NIXU	Nickel concentration uncertainty										

APPENDIX TABLE C-1 (CONT'D). TRACE ELEMENTS FROM XRF ANALYSIS

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C-3

Set	Total Mass	CUXC	CUXU	ZNXC	ZNXU	GAXC	GAXU	ASXC	ASXU	SEXC	SEXU	BRXC	BRXU	RBXC	RBXU	SRXC	SRXU
1 -> 3	FTP, mg/mi	0.003	0.002	0.042	0.007	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.002	0.000
	US06, mg/mi	0.008	0.003	0.100	0.009	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001
	SS1, mg/hr	0.158	0.057	4.711	0.391	0.030	0.052	0.000	0.000	0.000	0.000	0.127	0.023	0.024	0.042	0.043	0.074
	SS2, mg/hr	0.029	0.013	0.326	0.029	0.007	0.013	0.001	0.002	0.008	0.013	0.000	0.000	0.001	0.001	0.003	0.005
	SS3, mg/hr	0.008	0.007	0.174	0.023	0.029	0.030	0.001	0.002	0.018	0.015	0.008	0.009	0.020	0.010	0.016	0.014
4 -> 6	FTP, mg/mi	0.002	0.001	0.032	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	US06, mg/mi	0.008	0.001	0.110	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
	SS1, mg/hr	0.195	0.028	4.029	0.371	0.000	0.000	0.006	0.010	0.000	0.000	0.033	0.057	0.000	0.000	0.000	0.000
	SS2, mg/hr	0.017	0.002	0.326	0.083	0.010	0.018	0.006	0.006	0.000	0.001	0.004	0.004	0.007	0.013	0.006	0.008
	SS3, mg/hr	0.008	0.010	0.126	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7 -> 9	FTP, mg/mi	0.005	0.004	0.039	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001
	US06, mg/mi	0.005	0.001	0.082	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	SS1, mg/hr	0.116	0.030	3.584	0.534	0.038	0.064	0.014	0.025	0.000	0.000	0.055	0.048	0.012	0.021	0.034	0.059
	SS2, mg/hr	0.011	0.006	0.304	0.016	0.006	0.010	0.003	0.005	0.000	0.000	0.002	0.003	0.008	0.013	0.000	0.000
	SS3, mg/hr	0.011	0.013	0.116	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10 -> 12	FTP, mg/mi	0.003	0.002	0.039	0.009	0.002	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.004	0.003	0.002
	US06, mg/mi	0.010	0.001	0.097	0.029	0.005	0.008	0.003	0.004	0.001	0.002	0.000	0.000	0.000	0.001	0.004	0.006
	SS1, mg/hr	0.159	0.275	2.531	0.404	0.363	0.628	0.051	0.088	0.000	0.000	0.127	0.207	0.118	0.156	0.302	0.424
	SS2, mg/hr	0.004	0.007	0.412	0.135	0.000	0.000	0.000	0.000	0.007	0.013	0.320	0.554	0.052	0.090	0.022	0.038
	SS3, mg/hr	0.003	0.004	0.094	0.096	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CUXC	Copper concentration					SEXC	Selenium concentration										
CUXU	Copper concentration uncertainty					SEXU	Selenium concentration uncertainty										
ZNXC	Zinc concentration					BRXC	Bromine concentration										
ZNXU	Zinc concentration uncertainty					BRXU	Bromine concentration uncertainty										
GAXC	Gallium concentration					RBXC	Rubidium concentration										
GAXU	Gallium concentration uncertainty					RBXU	Rubidium concentration uncertainty										
ASXC	Arsenic concentration					SRXC	Strontium concentration										
ASXU	Arsenic concentration uncertainty					SRXU	Strontium concentration uncertainty										

APPENDIX TABLE C-1 (CONT'D). TRACE ELEMENTS FROM XRF ANALYSIS

REPORT 08.04471

C-4

Set	Total Mass,	YTXC	YTXU	ZRXC	ZRXU	MOXC	MOXU	PDXC	PDXU	AGXC	AGXU	CDXC	CDXU	INXC	INXU	SNXC	SNXU
1 -> 3	FTP, mg/mi	0.001	0.001	0.001	0.000	0.002	0.002	0.000	0.000	0.002	0.003	0.004	0.002	0.003	0.001	0.000	0.000
	US06, mg/mi	0.001	0.002	0.001	0.002	0.002	0.004	0.000	0.000	0.000	0.000	0.002	0.002	0.001	0.001	0.000	0.001
	SS1, mg/hr	0.050	0.087	0.059	0.101	0.000	0.000	0.000	0.000	0.092	0.160	0.041	0.071	0.000	0.000	0.000	0.000
	SS2, mg/hr	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.025	0.149	0.151	0.155	0.135	0.006	0.010
	SS3, mg/hr	0.013	0.011	0.004	0.006	0.014	0.012	0.000	0.000	0.013	0.011	0.120	0.132	0.097	0.100	0.000	0.000
4 -> 6	FTP, mg/mi	0.001	0.001	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.002	0.002	0.002	0.002	0.003	0.003
	US06, mg/mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.005	0.003	0.002	0.000	0.000	0.004	0.003
	SS1, mg/hr	0.035	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.111	0.146	0.184	0.000	0.000	0.318	0.480
	SS2, mg/hr	0.017	0.024	0.020	0.023	0.000	0.000	0.006	0.010	0.037	0.049	0.002	0.004	0.001	0.001	0.035	0.060
	SS3, mg/hr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.023	0.065	0.022	0.036	0.033	0.000	0.000
7 -> 9	FTP, mg/mi	0.001	0.001	0.001	0.002	0.002	0.002	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001
	US06, mg/mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.005	0.005	0.003	0.004	0.004	0.005
	SS1, mg/hr	0.018	0.032	0.052	0.091	0.027	0.048	0.000	0.000	0.101	0.119	0.030	0.051	0.000	0.000	0.000	0.000
	SS2, mg/hr	0.010	0.017	0.010	0.011	0.024	0.032	0.000	0.000	0.000	0.000	0.037	0.033	0.002	0.004	0.000	0.000
	SS3, mg/hr	0.000	0.000	0.000	0.000	0.001	0.001	0.012	0.021	0.006	0.011	0.031	0.030	0.022	0.038	0.000	0.000
10 -> 12	FTP, mg/mi	0.005	0.008	0.004	0.007	0.007	0.012	0.000	0.000	0.000	0.001	0.002	0.003	0.000	0.000	0.002	0.003
	US06, mg/mi	0.003	0.006	0.003	0.005	0.004	0.007	0.000	0.000	0.011	0.019	0.011	0.001	0.009	0.015	0.001	0.001
	SS1, mg/hr	0.509	0.489	1.016	0.880	0.990	1.714	0.034	0.060	0.110	0.096	0.473	0.409	0.460	0.500	0.571	0.989
	SS2, mg/hr	0.000	0.000	0.081	0.139	0.061	0.106	0.000	0.000	0.004	0.007	0.000	0.000	0.117	0.102	0.000	0.000
	SS3, mg/hr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.312	0.000	0.000	0.011	0.019	0.353	0.611
YTXC	Yttrium concentration						AGXC	Silver concentration									
YTXU	Yttrium concentration uncertainty						AGXU	Silver concentration uncertainty									
ZRXC	Zirconium concentration						CDXC	Cadmium concentration									
ZRXU	Zirconium concentration uncertainty						CDXU	Cadmium concentration uncertainty									
MOXC	Molybdenum concentration						INXC	Indium concentration									
MOXU	Molybdenum concentration uncertainty						INXU	Indium concentration uncertainty									
PDXC	Palladium concentration						SNXC	Tin concentration									
PDXU	Palladium concentration uncertainty						SNXU	Tin concentration uncertainty									

APPENDIX TABLE C-1 (CONT'D). TRACE ELEMENTS FROM XRF ANALYSIS

REPORT 08.04471

C-5

Set	Total Mass	SBXC	SBXU	BAXC	BAXU	LAXC	LAXU	AUXC	AUXU	HGXC	HGXU	TLXC	TLXU	PBXC	PBXU	URXC	URXU	
1 -> 3	FTP, mg/mi	0.001	0.002	0.035	0.026	0.021	0.036	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	
	US06, mg/mi	0.000	0.000	0.040	0.008	0.027	0.024	0.000	0.000	0.001	0.001	0.000	0.000	0.003	0.003	0.001	0.001	
	SS1, mg/hr	0.319	0.553	2.622	2.334	1.054	1.826	0.068	0.119	0.026	0.046	0.000	0.000	0.000	0.000	0.064	0.112	
	SS2, mg/hr	0.007	0.011	0.661	0.830	0.654	0.785	0.000	0.000	0.018	0.025	0.000	0.000	0.000	0.000	0.000	0.000	
	SS3, mg/hr	0.036	0.062	0.172	0.299	0.000	0.000	0.007	0.012	0.016	0.020	0.017	0.017	0.028	0.025	0.028	0.025	
4 -> 6	FTP, mg/mi	0.002	0.002	0.003	0.006	0.007	0.013	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	
	US06, mg/mi	0.006	0.006	0.022	0.019	0.060	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	SS1, mg/hr	0.000	0.000	3.264	2.887	0.443	0.768	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.011	0.000	0.000	
	SS2, mg/hr	0.015	0.025	0.299	0.261	0.600	0.739	0.026	0.032	0.006	0.010	0.000	0.000	0.004	0.008	0.015	0.013	
	SS3, mg/hr	0.035	0.060	0.415	0.719	0.252	0.246	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
7 -> 9	FTP, mg/mi	0.001	0.001	0.015	0.023	0.011	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.000	0.000	
	US06, mg/mi	0.000	0.000	0.050	0.030	0.030	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	SS1, mg/hr	0.116	0.101	1.603	1.895	2.466	2.198	0.022	0.039	0.000	0.000	0.000	0.000	0.009	0.016	0.000	0.000	
	SS2, mg/hr	0.081	0.058	0.437	0.381	0.178	0.309	0.000	0.000	0.006	0.011	0.000	0.000	0.000	0.000	0.000	0.001	
	SS3, mg/hr	0.098	0.170	0.727	0.867	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10 -> 12	FTP, mg/mi	0.008	0.014	0.000	0.000	0.063	0.077	0.004	0.007	0.003	0.005	0.000	0.000	0.000	0.000	0.001	0.002	
	US06, mg/mi	0.010	0.017	0.030	0.052	0.201	0.180	0.002	0.004	0.000	0.000	0.000	0.000	0.001	0.002	0.000	0.000	
	SS1, mg/hr	0.680	1.105	18.762	23.057	17.956	18.204	0.257	0.445	0.176	0.305	0.000	0.000	0.328	0.285	0.296	0.316	
	SS2, mg/hr	1.067	0.850	4.404	4.126	1.286	2.228	0.046	0.079	0.021	0.036	0.000	0.000	0.048	0.083	0.000	0.000	
	SS3, mg/hr	0.010	0.017	4.788	4.506	5.884	5.568	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
SBXC	Antimony concentration					HGXC					Mercury concentration							
SBXU	Antimony concentration uncertainty					HGXU					Mercury concentration uncertainty							
BAXC	Barium concentration					TLXC					Thallium concentration							
BAXU	Barium concentration uncertainty					TLXU					Thallium concentration uncertainty							
LAXC	Lanthanum concentration					PBXC					Lead concentration							
LAXU	Lanthanum concentration uncertainty					PBXU					Lead concentration uncertainty							
AUXC	Gold concentration					URXC					Uranium concentration							
AUXU	Gold concentration uncertainty					URXU					Uranium concentration uncertainty							

APPENDIX D

SPECIATION DATA FOR 20 G, 70 G, 120 G DOC AND SYSTEM WITH NO CATALYST

APPENDIX TABLE D-1. SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
METHANE	28.9	22.7	25.8	15.3	19.7	17.5	11.7	10.0	10.8	1.6	5.0	3.3				354.0	216.0	285.0	225.0	147.0	186.0	
ETHANE	2.4	3.6	3.0	1.8	3.4	2.6	1.3	1.9	1.6	0.4	0.0	0.2				38.8	43.5	41.2	26.6	4.8	15.7	
ETHYLENE	61.2	72.0	66.6	16.2	16.6	16.4	17.7	18.6	18.1	0.4		0.2	9.9		4.9				593.3	586.8	590.0	
PROPANE	0.4	0.4	0.4		0.8	0.4	0.2	2.3	1.3		2.3	1.1		52.5	26.2		109.7	54.8	2.0	32.7	17.3	
PROPYLENE	16.8	21.2	19.0	3.1	3.4	3.3	3.3	3.8	3.5										149.2	179.7	164.4	
ACETYLENE	11.2	14.3	12.7	0.9	0.4	0.7		0.6	0.3				52.7		26.3				117.9	141.5	129.7	
PROPADIENE																						
BUTANE		0.7	0.4		0.9	0.5		0.5	0.2		0.2	0.1									16.9	8.5
TRANS-2-BUTENE	0.8	1.4	1.1																			
1-BUTENE	1.9	2.6	2.3																			
2-METHYLPROPENE (ISOBUTYLENE)	1.1	3.5	2.3																			
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.6		0.3																			
PROPYNE																						
1,3-BUTADIENE		1.2	0.6																		14.0	7.0
2-METHYLPROPANE (ISOBUTANE)																						
1-BUTYNE																						
METHANOL																						
CIS-2-BUTENE																					4.6	2.3
3-METHYL-1-BUTENE																						
ETHANOL																						
2-METHYLBUTANE (ISOPENTANE)	0.5	0.7	0.6																		4.6	2.3
2-BUTYNE																						
1-PENTENE																						
2-METHYL-1-BUTENE	0.2		0.1																			
PENTANE	0.3	0.0	0.2	0.3	1.5	0.9	0.0	0.6	0.3	0.1	0.1	0.1	9.5	10.7	10.1	7.5	2.0	4.8	2.3	3.5	2.9	
UNIDENTIFIED C5 OLEFINS																						
2-METHYL-1,3-BUTADIENE		0.4	0.2																			
TRANS-2-PENTENE	0.5		0.3																			
3,3-DIMETHYL-1-BUTENE		0.7	0.3																			
CIS-2-PENTENE	0.3		0.1																			

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
2-METHYL-2-BUTENE	1.0	1.6	1.3	0.5	0.5	0.5		0.5	0.3												
TERT-BUTANOL																					
CYCLOPENTADIENE																					
2,2-DIMETHYLBUTANE																					
CYCLOPENTENE		0.3	0.2																		
4-METHYL-1-PENTENE																					
3-METHYL-1-PENTENE																					
CYCLOPENTANE																					
2,3-DIMETHYLBUTANE	0.3	0.4	0.4																		
MTBE																					
4-METHYL-CIS-2-PENTENE																					
2-METHYLPENTANE	0.6	0.4	0.5	0.2	0.6	0.4	0.0	0.5	0.3	0.0	0.1	0.1	3.5	7.4	5.5	2.7	5.6	4.2	2.6	7.0	4.8
4-METHYL-TRANS-2-PENTENE																					
3-METHYLPENTANE	0.6	0.7	0.6	0.6	0.3	0.5	0.3	1.1	0.7										5.5	5.0	5.2
2-METHYL-1-PENTENE	0.1	0.6	0.4																		
1-HEXENE	0.1	0.6	0.4																		
HEXANE	0.3	0.3	0.3	0.3		0.2	0.2	0.3	0.2	0.1	0.1	0.1		9.7	4.9	6.2		3.1	4.9		2.5
UNIDENTIFIED C6 OLEFINS	1.2	1.9	1.6	1.3		0.7	1.4		0.7	0.3	0.6	0.4							12.1		6.0
TRANS-3-HEXENE																					
CIS-3-HEXENE																					
DI-ISOPROPYL ETHER																					
TRANS-2-HEXENE																					
3-METHYL-TRANS-2-PENTENE	0.3	0.5	0.4																		
2-METHYL-2-PENTENE																					
3-METHYLCYCLOPENTENE																					
CIS-2-HEXENE																					
ETBE																					
3-METHYL-CIS-2-PENTENE	0.1	0.1	0.1		0.3	0.2	0.0	0.2	0.1	0.1		0.0	80.8		40.4						
2,2-DIMETHYLPENTANE, NOTE A		0.1	0.1								0.0	0.0									
METHYLCYCLOPENTANE, NOTE A		0.1	0.1								0.0	0.0									

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
2,4-DIMETHYLPENTANE													10.7		5.3							
2,2,3-TRIMETHYLBUTANE																						
3,4-DIMETHYL-1-PENTENE							0.3	0.1														
1-METHYLCYCLOPENTENE																						
BENZENE	7.7	8.2	8.0		0.7	0.3	1.2	1.1	1.2				7.2		3.6				35.1	44.8	39.9	
3-METHYL-1-HEXENE																						
3,3-DIMETHYLPENTANE	0.3	0.2	0.3																			
CYCLOHEXANE																						
2-METHYLHEXANE																						
2,3-DIMETHYLPENTANE	0.5	0.7	0.6	0.4	0.3	0.3		0.2	0.1				5.2	5.7	5.5							
1,1-DIMETHYLCYCLOPENTANE																						
TERT-AMYL METHYL ETHER																						
CYCLOHEXENE																						
3-METHYLHEXANE	0.2	0.2	0.2																			
CIS-1,3-DIMETHYLCYCLOPENTANE																						
3-ETHYLPENTANE																						
TRANS-1,2-DIMETHYLCYCLOPENTANE																						
TRANS-1,3-DIMETHYLCYCLOPENTANE																						
1-HEPTENE																						
2,2,4-TRIMETHYLPENTANE	0.2	0.1	0.2		0.5	0.2		0.4	0.2	0.1	0.0	0.0	3.2	3.7	3.5	0.7	3.7	2.2	0.7	0.8	0.7	
2-METHYL-1-HEXENE																						
TRANS-3-HEPTENE																						
HEPTANE		0.3	0.1																			
CIS-3-HEPTENE																						
UNIDENTIFIED C7																						
2-METHYL-2-HEXENE																						
3-METHYL-TRANS-3-HEXENE																						
TRANS-2-HEPTENE																						
3-ETHYL-CIS-2-PENTENE																						
2,4,4-TRIMETHYL-1-PENTENE		0.2	0.1											6.9	3.4							

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
2,3-DIMETHYL-2-PENTENE																						
CIS-2-HEPTENE																						
METHYLCYCLOHEXANE	0.7	0.8	0.7																			
CIS-1,2-DIMETHYLCYCLOPENTANE																						
2,2-DIMETHYLHEXANE																						
1,1,3-TRIMETHYLCYCLOPENTANE																						
2,4,4-TRIMETHYL-2-PENTENE																						
2,2,3-TRIMETHYLPENTANE													14.0	14.4	14.2							
2,5-DIMETHYLHEXANE																						
ETHYLCYCLOPENTANE																						
2,4-DIMETHYLHEXANE	0.2	0.3	0.3																			
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE																						
3,3-DIMETHYLHEXANE																						
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE																						
2,3,4-TRIMETHYLPENTANE	0.2	0.4	0.3																			
2,3,3-TRIMETHYLPENTANE																						
TOLUENE	2.9	2.6	2.8	0.6	0.1	0.3	0.6	0.2	0.4	0.1	0.2	0.1	5.5	10.1	7.8	0.1	9.5	4.8	0.3	9.7	5.0	
2,3-DIMETHYLHEXANE																						
1,1,2-TRIMETHYLCYCLOPENTANE																						
2-METHYLHEPTANE		0.3	0.1																			
3,4-DIMETHYLHEXANE, NOTE B																						
4-METHYLHEPTANE		0.3	0.2																			
3-METHYLHEPTANE																						
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE																						
CIS-1,3-DIMETHYLCYCLOHEXANE																						
TRANS-1,4-DIMETHYLCYCLOHEXANE																						
3-ETHYLHEXANE	0.6	0.7	0.6																			
2,2,5-TRIMETHYLHEXANE																						
TRANS-1-METHYL-3-ETHYLCYCLOPENTANE																						
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	0.2	0.2	0.2																			

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
1,1-DIMETHYLCYCLOHEXANE																						
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE																						
1-METHYL-1-ETHYL-CYCLOPENTANE																						
2,4,4-TRIMETHYLHEXANE																						
2,2,4-TRIMETHYLHEXANE																						
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.4	0.6	0.5																			
1-OCTENE																						
TRANS-4-OCTENE																						
OCTANE	0.5	0.7	0.6	0.3		0.2		0.2	0.1													
UNIDENTIFIED C8																						
TRANS-2-OCTENE		0.5	0.3																			
TRANS-1,3-DIMETHYLCYCLOHEXANE, NOTE C																						
CIS-2-OCTENE																						
ISOPROPYLCYCLOPENTANE																						
2,2-DIMETHYLHEPTANE																						
2,3,5-TRIMETHYLHEXANE																						
CIS-1-METHYL-2-ETHYLCYCLOPENTANE		0.2	0.1																			
2,4-DIMETHYLHEPTANE	1.6	2.9	2.3					0.6	0.3													
4,4-DIMETHYLHEPTANE																						
CIS-1,2-DIMETHYLCYCLOHEXANE																						
ETHYLCYCLOHEXANE																						
2,6-DIMETHYLHEPTANE, NOTE D	0.4	1.2	0.8	0.7		0.3		0.2	0.1								5.1	2.6				
1,1,3-TRIMETHYLCYCLOHEXANE																						
2,5-DIMETHYLHEPTANE, NOTE E	0.6	0.9	0.8																			
3,3-DIMETHYLHEPTANE																						
3,5-DIMETHYLHEPTANE, NOTE E																						
ETHYLBENZENE		0.2	0.1																			
2,3,4-TRIMETHYLHEXANE																						
2,3-DIMETHYLHEPTANE																						
m- & p-XYLENE	0.6	1.1	0.9																			

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
INDAN																					
1-METHYL-2-ISOPROPYLBENZENE																					
1,3-DIETHYLBENZENE																					
1,4-DIETHYLBENZENE																					
1-METHYL-3-N-PROPYLBENZENE											0.2	0.1									
1-METHYL-4-N-PROPYLBENZENE, NOTE G																					
1,2 DIETHYLBENZENE	0.3	0.3	0.3																		
1-METHYL-2-N-PROPYLBENZENE																					
1,4-DIMETHYL-2-ETHYLBENZENE																					
1,3-DIMETHYL-4-ETHYLBENZENE																					
1,2-DIMETHYL-4-ETHYLBENZENE																					
1,3-DIMETHYL-2-ETHYLBENZENE																					
UNDECANE																					
1,2-DIMETHYL-3-ETHYLBENZENE																					
1,2,4,5-TETRAMETHYLBENZENE																					
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)																					
3,4 DIMETHYLCUMENE																					
1,2,3,5-TETRAMETHYLBENZENE																					
TERT-1-BUT-2-METHYLBENZENE																					
1,2,3,4-TETRAMETHYLBENZENE																					
N-PENT-BENZENE																					
TERT-1-BUT-3,5-DIMETHYLBENZENE																					
TERT-1-BUTYL-4-ETHYLBENZENE																					
NAPHTHALENE																					
DODECANE																					
1,3,5-TRIETHYLBENZENE																					
1,2,4-TRIETHYLBENZENE																					
HEXYLBENZENE																					
UNIDENTIFIED C9-C12+	2.7	3.0	2.9	0.8	1.1	0.9	0.9	1.4	1.2	0.4		0.2	10.4	111.1	60.8		18.0	9.0	5.6	5.1	5.4
FORMALDEHYDE	37.0	34.7	35.8	10.8	8.1	9.5	11.8	11.2	11.5	0.7	0.4	0.5	31.7	33.6	32.6	9.2	4.6	389.7	551.0	470.4	

APPENDIX TABLE D-1 (CONT'D). SPECIATION DATA FOR 20G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
ACETALDEHYDE	31.2	29.4	30.3	1.8	1.7	1.7	3.4	3.9	3.7	0.1	0.2	0.1	2.9	25.2	14.0		1.6	0.8	167.8	248.9	208.3
ACROLEIN		1.2	0.6											29.4	14.7		6.4	3.2		4.6	2.3
ACETONE	7.3		3.7					0.8	0.4												
PROPIONALDEHYDE		0.1	0.1		0.2	0.1								14.3	7.1					4.5	2.3
CROTONALDEHYDE														18.7	9.4						
ISOBUTYRALDEHYDE, NOTE H	0.1	0.6	0.3								0.1	0.0		7.9	4.0						
METHYL ETHYL KETONE, NOTE H	0.1	0.6	0.3								0.1	0.0		7.9	4.0						
BENZALDEHYDE																					
ISOVALERALDEHYDE		0.1	0.1											3.6	1.8						
VALERALDEHYDE		1.2	0.6											32.4	16.2	0.3		0.2			
O-TOLUALDEHYDE		0.4	0.2											38.4	19.2						
M/P-TOLUALDEHYDE		0.7	0.3											25.2	12.6						
HEXANALDEHYDE		0.8	0.4											34.0	17.0		3.2	1.6			
DIMETHYLBENZALDEHYDE	0.1		0.1											1.2	0.6						
Blanks denote compounds not detected.																					

APPENDIX TABLE D-2. SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
METHANE	29.1	27.2	28.2	16.2	10.3	13.3	13.2	13.9	13.5	3.7	5.7	4.7	48.0		24.0	261.0	444.0	352.5	153.0	105.0	129.0
ETHANE	0.7		0.4		1.2	0.6		2.1	1.1	0.3	0.3	0.3	22.5	38.4	30.4	30.5	22.4	26.5	5.6	16.0	10.8
ETHYLENE	53.2	48.3	50.7		0.1	0.1	3.2	1.7	2.4		0.2	0.1	57.4	5.3	31.3		4.7	2.4	540.0	430.0	485.0
PROPANE	0.9	0.5	0.7	0.1	0.4	0.2				0.3	0.1	0.2	8.2	60.8	34.5	10.7	2.5	6.6	12.5	4.3	8.4
PROPYLENE	14.5	12.8	13.7				2.1	0.3	1.2										112.2	101.5	106.9
ACETYLENE		7.0	3.5	0.6	0.3	0.5	0.7	0.1	0.4										30.3	52.8	41.6
PROPADIENE																					
BUTANE	8.6	0.4	4.5		0.1	0.0				0.2		0.1	7.4		3.7	30.6		15.3	32.3	5.7	19.0
TRANS-2-BUTENE		0.6	0.3																		
1-BUTENE		0.7	0.3																		
2-METHYLPROPENE (ISOBUTYLENE)	0.5	2.0	1.2					3.1	1.6	0.1		0.1	6.6		3.3						
2,2-DIMETHYLPROPANE (NEOPENTANE)																					
PROPYNE																					
1,3-BUTADIENE	0.4	0.8	0.6														49.1	24.5			
2-METHYLPROPANE (ISOBUTANE)		0.4	0.2																	2.9	1.5
1-BUTYNE																					
METHANOL																					
CIS-2-BUTENE		0.5	0.2								0.7	0.3	12.6	12.0	12.3						
3-METHYL-1-BUTENE	0.4		0.2																		
ETHANOL																					
2-METHYLBUTANE (ISOPENTANE)	0.2	0.5	0.4																		
2-BUTYNE																					
1-PENTENE																					
2-METHYL-1-BUTENE		0.7	0.3																		
PENTANE		0.4	0.2	0.2	0.5	0.4	0.1	0.3	0.2	0.1		0.0	4.1		2.0	5.0		2.5	3.3		1.7
UNIDENTIFIED C5 OLEFINS																					
2-METHYL-1,3-BUTADIENE	0.4	0.2	0.3																		
TRANS-2-PENTENE																					
3,3-DIMETHYL-1-BUTENE																					
CIS-2-PENTENE																					

APPENDIX TABLE D-2 (CONT'D). SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
2-METHYL-2-BUTENE		0.3	0.2		0.6	0.3															
TERT-BUTANOL																					
CYCLOPENTADIENE																					
2,2-DIMETHYLBUTANE																					
CYCLOPENTENE																					
4-METHYL-1-PENTENE																					
3-METHYL-1-PENTENE																					
CYCLOPENTANE																					
2,3-DIMETHYLBUTANE		0.2	0.1										10.4	5.2							
MTBE																					
4-METHYL-CIS-2-PENTENE																					
2-METHYLPENTANE	0.3	0.2	0.3		0.1	0.0	0.2	0.2	0.2	0.1	0.1	0.1	55.9	27.9		8.2	4.1		5.5	2.7	
4-METHYL-TRANS-2-PENTENE																					
3-METHYLPENTANE	0.2	0.2	0.2	1.2	0.3	0.8	0.2		0.1	0.3		0.2		4.3	2.1	31.7		15.9	12.4	13.6	13.0
2-METHYL-1-PENTENE																				1.2	0.6
1-HEXENE																				1.2	0.6
HEXANE		0.2	0.1										4.5	2.2							
UNIDENTIFIED C6 OLEFINS	0.4	0.7	0.6		1.6	0.8		0.2	0.1				49.2	24.6		39.0	19.5				
TRANS-3-HEXENE																					
CIS-3-HEXENE																					
DI-ISOPROPYL ETHER																					
TRANS-2-HEXENE																					
3-METHYL-TRANS-2-PENTENE		0.3	0.1																		
2-METHYL-2-PENTENE																					
3-METHYLCYCLOPENTENE																					
CIS-2-HEXENE																					
ETBE																					
3-METHYL-CIS-2-PENTENE																					
2,2-DIMETHYLPENTANE, NOTE A	0.1		0.1	0.2		0.1							5.3	2.7							
METHYLCYCLOPENTANE, NOTE A	0.1		0.1	0.2		0.1							5.2	2.6							

APPENDIX TABLE D-2 (CONT'D). SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
2,4-DIMETHYLPENTANE																						
2,2,3-TRIMETHYLBUTANE																						
3,4-DIMETHYL-1-PENTENE													6.0	3.0								
1-METHYLCYCLOPENTENE																						
BENZENE	2.8	3.1	3.0											31.4	15.7				27.3	37.7	32.5	
3-METHYL-1-HEXENE																						
3,3-DIMETHYLPENTANE																						
CYCLOHEXANE																						
2-METHYLHEXANE																						
2,3-DIMETHYLPENTANE	0.2	0.2	0.2				0.2	0.1														
1,1-DIMETHYLCYCLOPENTANE																						
TERT-AMYL METHYL ETHER																						
CYCLOHEXENE																						
3-METHYLHEXANE										0.1	0.1											
CIS-1,3-DIMETHYLCYCLOPENTANE																						
3-ETHYLPENTANE																						
TRANS-1,2-DIMETHYLCYCLOPENTANE																						
TRANS-1,3-DIMETHYLCYCLOPENTANE																						
1-HEPTENE																						
2,2,4-TRIMETHYLPENTANE	0.0		0.0		0.3	0.1				0.1		0.1	5.1	2.5								
2-METHYL-1-HEXENE																						
TRANS-3-HEPTENE							0.2	0.1														
HEPTANE																						
CIS-3-HEPTENE																						
UNIDENTIFIED C7																						
2-METHYL-2-HEXENE																						
3-METHYL-TRANS-3-HEXENE																						
TRANS-2-HEPTENE																						
3-ETHYL-CIS-2-PENTENE																						
2,4,4-TRIMETHYL-1-PENTENE																						

APPENDIX TABLE D-2 (CONT'D). SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
2,3-DIMETHYL-2-PENTENE																					
CIS-2-HEPTENE																					
METHYLCYCLOHEXANE	0.6	0.3	0.4																		
CIS-1,2-DIMETHYLCYCLOPENTANE																					
2,2-DIMETHYLHEXANE																					
1,1,3-TRIMETHYLCYCLOPENTANE																					
2,4,4-TRIMETHYL-2-PENTENE																					
2,2,3-TRIMETHYLPENTANE												5.1	2.6								
2,5-DIMETHYLHEXANE																					
ETHYLCYCLOPENTANE																					
2,4-DIMETHYLHEXANE																					
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE																					
3,3-DIMETHYLHEXANE																					
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE																					
2,3,4-TRIMETHYLPENTANE																					
2,3,3-TRIMETHYLPENTANE																					
TOLUENE	0.7	0.8	0.7	0.6	0.6	0.6	0.3	0.2	0.2	0.1	8.5	4.3	9.1	4.5							
2,3-DIMETHYLHEXANE																					
1,1,2-TRIMETHYLCYCLOPENTANE																					
2-METHYLHEPTANE																					
3,4-DIMETHYLHEXANE, NOTE B																					
4-METHYLHEPTANE																					
3-METHYLHEPTANE																					
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE																					
CIS-1,3-DIMETHYLCYCLOHEXANE																					
TRANS-1,4-DIMETHYLCYCLOHEXANE																					
3-ETHYLHEXANE	0.2		0.1																		
2,2,5-TRIMETHYLHEXANE																					
TRANS-1-METHYL-3-ETHYLCYCLOPENTANE																					
CIS-1-METHYL-3-ETHYLCYCLOPENTANE																					

APPENDIX TABLE D-2 (CONT'D). SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi		FTP Bag 2, mg/mi		FTP Bag 3, mg/mi		US06, mg/mi		SS1, mg/hr		SS2, mg/hr		SS3, mg/hr	
		Avg		Avg		Avg		Avg		Avg		Avg		Avg
1,1-DIMETHYLCYCLOHEXANE														
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE														
1-METHYL-1-ETHYL-CYCLOPENTANE														
2,4,4-TRIMETHYLHEXANE														
2,2,4-TRIMETHYLHEXANE														
TRANS-1,2-DIMETHYLCYCLOHEXANE														
1-OCTENE														
TRANS-4-OCTENE		0.2	0.1											
OCTANE														
UNIDENTIFIED C8														
TRANS-2-OCTENE								0.1	0.1			6.5	3.3	
TRANS-1,3-DIMETHYLCYCLOHEXANE, NOTE C														
CIS-2-OCTENE														
ISOPROPYLCYCLOPENTANE														
2,2-DIMETHYLHEPTANE														
2,3,5-TRIMETHYLHEXANE														
CIS-1-METHYL-2-ETHYLCYCLOPENTANE		3.1	1.6											
2,4-DIMETHYLHEPTANE														
4,4-DIMETHYLHEPTANE	0.7	0.5	0.6		0.9	0.4		1.5	0.7					
CIS-1,2-DIMETHYLCYCLOHEXANE														
ETHYLCYCLOHEXANE		0.5	0.3						0.2	0.1				
2,6-DIMETHYLHEPTANE, NOTE D	0.3		0.1											
1,1,3-TRIMETHYLCYCLOHEXANE							0.4		0.2					
2,5-DIMETHYLHEPTANE, NOTE E														
3,3-DIMETHYLHEPTANE														
3,5-DIMETHYLHEPTANE, NOTE E														
ETHYLBENZENE														
2,3,4-TRIMETHYLHEXANE														
2,3-DIMETHYLHEPTANE														
m- & p-XYLENE		0.2	0.1											

APPENDIX TABLE D-2 (CONT'D) . SPECIATION DATA FOR 70G DOC

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Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
INDAN																						
1-METHYL-2-ISOPROPYLBENZENE																						
1,3-DIETHYLBENZENE																						
1,4-DIETHYLBENZENE																						
1-METHYL-3-N-PROPYLBENZENE																						
1-METHYL-4-N-PROPYLBENZENE, NOTE G																						
1,2 DIETHYLBENZENE																						
1-METHYL-2-N-PROPYLBENZENE																						
1,4-DIMETHYL-2-ETHYLBENZENE																						
1,3-DIMETHYL-4-ETHYLBENZENE																						
1,2-DIMETHYL-4-ETHYLBENZENE																						
1,3-DIMETHYL-2-ETHYLBENZENE																						
UNDECANE																						
1,2-DIMETHYL-3-ETHYLBENZENE																						
1,2,4,5-TETRAMETHYLBENZENE																						
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)																						
3,4 DIMETHYLCUMENE																						
1,2,3,5-TETRAMETHYLBENZENE																						
TERT-1-BUT-2-METHYLBENZENE																						
1,2,3,4-TETRAMETHYLBENZENE																						
N-PENT-BENZENE																						
TERT-1-BUT-3,5-DIMETHYLBENZENE																						
TERT-1-BUTYL-4-ETHYLBENZENE																						
NAPHTHALENE																						
DODECANE																						
1,3,5-TRIETHYLBENZENE																						
1,2,4-TRIETHYLBENZENE																						
HEXYLBENZENE																						
UNIDENTIFIED C9-C12+	1.2	2.6	1.9		2.9	1.4	0.7	1.1	0.9	0.3	0.7	0.5	7.0	26.9	16.9	8.4	24.2	16.3				
FORMALDEHYDE	32.2	24.3	28.2	0.2	0.1	0.1	0.8	0.4	0.6	0.4	0.1	0.2	4.2	73.9	39.1	7.8	3.9	382.3	380.6	381.5		

APPENDIX TABLE D-2 (CONT'D) . SPECIATION DATA FOR 70G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
ACETALDEHYDE	19.9	14.2	17.1	0.6		0.3	0.5		0.2	0.4		0.2	24.0		12.0	11.1	0.0	5.6	188.4	171.3	179.9
ACROLEIN	0.5		0.3	0.5		0.2	0.4		0.2	0.1		0.0	8.2	22.1	15.1	6.3		3.2	4.0		2.0
ACETONE		1.2	0.6											909.5	454.8						
PROPIONALDEHYDE	0.4	0.5	0.5				0.8		0.4	0.2		0.1		10.3	5.2						
CROTONALDEHYDE				0.3		0.1	0.2		0.1	0.2		0.1	21.7	19.0	20.3	4.7		2.4			
ISOBUTYRALDEHYDE, NOTE H	0.2	0.0	0.1	0.1		0.0				0.0		0.0		14.7	7.4	1.3		0.6			
METHYL ETHYL KETONE, NOTE H	0.2	0.0	0.1	0.1		0.0				0.0		0.0		14.7	7.4	1.3		0.6			
BENZALDEHYDE	0.1		0.1							0.0		0.0		12.4	6.2	1.1		0.6			
ISOVALERALDEHYDE				0.2		0.1														0.9	0.5
VALERALDEHYDE	0.7		0.4	0.2		0.1															
O-TOLUALDEHYDE																					
M/P-TOLUALDEHYDE																					
HEXANALDEHYDE										0.0		0.0		40.1	20.0						
DIMETHYLBENZALDEHYDE														10.8	5.4						
Blanks denote compounds not detected.																					

APPENDIX TABLE D-3. SPECIATION DATA FOR 120G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
METHANE	21.0	27.3	24.2	11.9	16.9	14.4	9.7	18.7	14.2	2.0	4.7	3.4				345.0	210.0	277.5	144.0	159.0	151.5
ETHANE	2.3	2.3	2.3	1.3	1.7	1.5	0.9	0.8	0.8	0.2	0.3	0.2					11.1	5.6	20.4	11.7	16.1
ETHYLENE	39.9	37.5	38.7		0.3	0.1		0.1	0.1	0.0	2.4	1.2	60.9	1.6	31.3				557.4	518.6	538.0
PROPANE		1.7	0.9		0.5	0.3		0.4	0.2	0.1		0.0	1.2		0.6	20.3	1.3	10.8	9.8	34.9	22.3
PROPYLENE	10.6	10.6	10.6								0.1	0.1								128.4	64.2
ACETYLENE	5.5	4.8	5.2	0.3		0.2		0.1	0.0		0.2	0.1	0.6	6.2	3.4				132.5	42.2	87.3
PROPADIENE																					
BUTANE	0.0	0.0	0.0	5.3		2.7				0.0	0.2	0.1	0.4	8.7	4.5		9.4	4.7	41.4	15.6	28.5
TRANS-2-BUTENE		0.5	0.2													85.6		42.8	6.3		3.2
1-BUTENE	0.5	1.6	1.0																		
2-METHYLPROPENE (ISOBUTYLENE)	1.8	4.7	3.3				1.8		0.9												
2,2-DIMETHYLPROPANE (NEOPENTANE)		0.3	0.1																		
PROPYNE																					
1,3-BUTADIENE	1.6	0.6	1.1																11.0		5.5
2-METHYLPROPANE (ISOBUTANE)	0.3		0.2	0.3		0.2															
1-BUTYNE																					
METHANOL																					
CIS-2-BUTENE	0.2		0.1																		
3-METHYL-1-BUTENE																					
ETHANOL																					
2-METHYLBUTANE (ISOPENTANE)	6.4		3.2																		
2-BUTYNE																					
1-PENTENE																					
2-METHYL-1-BUTENE																					
PENTANE	0.4	0.4	0.4	0.5	0.7	0.6	0.3	0.6	0.5		0.1	0.1	9.9	12.2	11.0	6.5	7.3	6.9		5.1	2.6
UNIDENTIFIED C5 OLEFINS																					
2-METHYL-1,3-BUTADIENE																					
TRANS-2-PENTENE																					
3,3-DIMETHYL-1-BUTENE																					
CIS-2-PENTENE																					

APPENDIX TABLE D-3 (CONT'D). SPECIATION DATA FOR 120G DOC

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Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
2-METHYL-2-BUTENE					0.4	0.2		0.3	0.1												
TERT-BUTANOL																					
CYCLOPENTADIENE																					
2,2-DIMETHYLBUTANE																					
CYCLOPENTENE																					
4-METHYL-1-PENTENE																					
3-METHYL-1-PENTENE																					
CYCLOPENTANE																					
2,3-DIMETHYLBUTANE								0.2	0.1		0.1	0.1									
MTBE																					
4-METHYL-CIS-2-PENTENE																					
2-METHYLPENTANE	0.4	0.0	0.2				0.2	0.1	0.1	0.1	0.2	0.2		8.8	4.4		5.7	2.8		6.8	3.4
4-METHYL-TRANS-2-PENTENE																					
3-METHYLPENTANE		0.2	0.1		0.3	0.2					0.3	0.1								9.8	4.9
2-METHYL-1-PENTENE																					
1-HEXENE																					
HEXANE		0.2	0.1					0.3	0.1		0.2	0.1		5.9	2.9						
UNIDENTIFIED C6 OLEFINS		1.2	0.6	1.4	1.8	1.6	1.6	1.4	1.5	1.2	1.4	1.3	54.7	59.2	56.9		9.3	4.7	5.2	17.4	11.3
TRANS-3-HEXENE																					
CIS-3-HEXENE																					
DI-ISOPROPYL ETHER																					
TRANS-2-HEXENE																					
3-METHYL-TRANS-2-PENTENE																					
2-METHYL-2-PENTENE																					
3-METHYLCYCLOPENTENE																					
CIS-2-HEXENE																					
ETBE																					
3-METHYL-CIS-2-PENTENE										0.2		0.1	6.9		3.4						
2,2-DIMETHYLPENTANE, NOTE A											0.1	0.0		16.3	8.2						
METHYLCYCLOPENTANE, NOTE A											0.1	0.0		16.0	8.0						

APPENDIX TABLE D-3 (CONT'D). SPECIATION DATA FOR 120G DOC

REPORT 08.04471

D-23

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
INDAN																						
1-METHYL-2-ISOPROPYLBENZENE																						
1,3-DIETHYLBENZENE																						
1,4-DIETHYLBENZENE																						
1-METHYL-3-N-PROPYLBENZENE																						
1-METHYL-4-N-PROPYLBENZENE, NOTE G																						
1,2 DIETHYLBENZENE																						
1-METHYL-2-N-PROPYLBENZENE																						
1,4-DIMETHYL-2-ETHYLBENZENE																						
1,3-DIMETHYL-4-ETHYLBENZENE																						
1,2-DIMETHYL-4-ETHYLBENZENE																						
1,3-DIMETHYL-2-ETHYLBENZENE																						
UNDECANE																						
1,2-DIMETHYL-3-ETHYLBENZENE																						
1,2,4,5-TETRAMETHYLBENZENE																						
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)																						
3,4 DIMETHYLCUMENE																						
1,2,3,5-TETRAMETHYLBENZENE																						
TERT-1-BUT-2-METHYLBENZENE																						
1,2,3,4-TETRAMETHYLBENZENE																						
N-PENT-BENZENE																						
TERT-1-BUT-3,5-DIMETHYLBENZENE																						
TERT-1-BUTYL-4-ETHYLBENZENE																						
NAPHTHALENE																						
DODECANE																						
1,3,5-TRIETHYLBENZENE																						
1,2,4-TRIETHYLBENZENE																						
HEXYLBENZENE																						
UNIDENTIFIED C9-C12+	2.0	1.9	1.9	3.1	1.1	2.1	1.0	1.1	1.0	0.5	0.5	0.5	18.8	28.2	23.5	11.6	17.1	14.4	9.2		4.6	
FORMALDEHYDE	24.6	24.3	24.4	0.3	0.5	0.4	0.0	0.2	0.1	0.2	0.2	0.2	22.2	22.2	22.2	123.0	0.9	61.9	434.5	520.9	477.7	

APPENDIX TABLE D-3 (CONT'D). SPECIATION DATA FOR 120G DOC

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
ACETALDEHYDE	8.3	9.8	9.0	0.1		0.1	0.1		0.0	0.1	0.1	0.1	17.3	17.3	17.3	117.0		58.5	236.5	241.7	239.1
ACROLEIN	0.2	0.5	0.3					0.5	0.2										4.6	10.6	7.6
ACETONE	0.5	0.4	0.4					0.0	0.0										2.4	51.4	26.9
PROPIONALDEHYDE	0.3	0.5	0.4	0.0		0.0													1.6		0.8
CROTONALDEHYDE	0.3	0.1	0.2																		
ISOBUTYRALDEHYDE, NOTE H	0.3	0.1	0.2		0.1	0.0										1.7	0.8	2.2			1.1
METHYL ETHYL KETONE, NOTE H	0.3	0.1	0.2		0.1	0.0										1.7	0.8	2.2			1.1
BENZALDEHYDE																					
ISOVALERALDEHYDE				0.7		0.4															
VALERALDEHYDE		0.5	0.2																0.6		0.3
O-TOLUALDEHYDE																					
M/P-TOLUALDEHYDE	0.5	0.1	0.3													3.3	1.7	3.9			2.0
HEXANALDEHYDE																					
DIMETHYLBENZALDEHYDE																					
Blanks denote compounds not detected.																					

APPENDIX TABLE D-4. SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
METHANE	21.5	26.3	23.9	17.7	13.1	15.4	9.9	10.8	10.3	2.2	3.4	2.8				438.0	342.0	390.0		87.0	43.5
ETHANE	2.5	3.1	2.8	2.9	1.7	2.3	1.1	1.1	1.1	0.5	0.3	0.4	65.9		33.0					39.5	19.7
ETHYLENE	91.0	106.4	98.7	69.3	76.3	72.8	47.8	46.5	47.1	14.5	14.2	14.3	721.2	675.8	698.5	1680.8	1499.9	1590.4	578.0	581.4	579.7
PROPANE		1.6	0.8		0.5	0.2		0.1	0.1							10.6		5.3		31.0	15.5
PROPYLENE	27.1	32.0	29.6	15.1	21.4	18.2	10.3	13.3	11.8	4.5	3.6	4.0	293.3	223.2	258.2	410.4	348.4	379.4	199.6	184.7	192.2
ACETYLENE	20.7	20.3	20.5	14.4	14.3	14.3	10.2	9.2	9.7	3.6	3.6	3.6	102.7	115.3	109.0	379.1	323.6	351.3	121.6	114.3	118.0
PROPADIENE																					
BUTANE	1.1	1.5	1.3	0.6	0.7	0.6									16.7	8.4	10.4	15.8	13.1	12.9	6.5
TRANS-2-BUTENE	3.8		1.9																		
1-BUTENE	1.4	3.5	2.5		4.9	2.5		3.1	1.5												
2-METHYLPROPENE (ISOBUTYLENE)	8.3	10.4	9.3	5.3	5.8	5.5	4.2	1.4	2.8	1.0	1.0	1.0	101.4	121.7	111.6	73.6	84.1	78.8	46.4	51.3	48.9
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.5	0.8	0.7																		
PROPYNE																					
1,3-BUTADIENE	9.2	11.2	10.2	5.1	4.0	4.5		2.9	1.5	0.3	0.6	0.5	38.3	51.2	44.7	34.8	139.4	87.1		26.5	13.3
2-METHYLPROPANE (ISOBUTANE)	0.9	1.0	0.9	10.2	0.7	5.5		0.4	0.2												
1-BUTYNE																					
METHANOL																					
CIS-2-BUTENE	0.5		0.2	1.0	2.0	1.5							47.6	30.7	39.2	50.8	33.6	42.2	11.0	27.4	19.2
3-METHYL-1-BUTENE																					
ETHANOL																					
2-METHYLBUTANE (ISOPENTANE)				2.4		1.2	0.1		0.1	0.5		0.2									
2-BUTYNE																					
1-PENTENE																					
2-METHYL-1-BUTENE	0.9	0.7	0.8	1.4		0.7	0.4		0.2							9.8		4.9			
PENTANE	0.5		0.2	0.6		0.3	0.3		0.2	0.2		0.1				7.4		3.7	6.4		3.2
UNIDENTIFIED C5 OLEFINS																					
2-METHYL-1,3-BUTADIENE	1.6	1.6	1.6	0.9	1.1	1.0	0.6	0.7	0.7	0.2	0.1	0.2	14.2	12.9	13.5	13.9	12.2	13.1	7.2		3.6
TRANS-2-PENTENE	4.8	0.5	2.7	4.8	0.4	2.6	0.3	0.3	0.3				6.6	6.7	6.7						
3,3-DIMETHYL-1-BUTENE																					
CIS-2-PENTENE	0.7	0.0	0.4	1.1		0.5	0.6		0.3								9.8	4.9			

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
2-METHYL-2-BUTENE	0.3	0.3	0.3		0.8	0.4		0.4	0.2												
TERT-BUTANOL																					
CYCLOPENTADIENE	1.1	0.1	0.6	0.7		0.3	0.4		0.2							5.3	2.7				
2,2-DIMETHYLBUTANE	0.6	0.6	0.6	0.4	0.4	0.4	0.2	0.3	0.3							7.5	6.2	6.9			
CYCLOPENTENE	0.1		0.1										6.9	6.8	6.8						
4-METHYL-1-PENTENE	3.6	3.9	3.8	2.6	1.9	2.2	0.3	1.3	0.8	0.1	0.3	0.2	24.9	5.6	15.2						
3-METHYL-1-PENTENE																					
CYCLOPENTANE	0.9	1.0	0.9													34.8	19.3	27.0	8.6	7.7	8.1
2,3-DIMETHYLBUTANE																					
MTBE																					
4-METHYL-CIS-2-PENTENE																					
2-METHYLPENTANE	1.1	0.4	0.8				1.0		0.5	0.4	0.1	0.3	43.9	37.2	40.6		9.7	4.8			
4-METHYL-TRANS-2-PENTENE																					
3-METHYLPENTANE	1.6		0.8																0.7		0.4
2-METHYL-1-PENTENE	1.9	2.0	1.9	1.8	1.7	1.8	1.0	1.1	1.0	0.4	0.4	0.4	27.9	14.0	15.6	17.2	16.4	15.9	16.8	16.4	
1-HEXENE	1.9	2.0	1.9	1.8	1.7	1.8	1.0	1.1	1.0	0.4	0.4	0.4	27.9	14.0	15.6	17.2	16.4	15.9	16.8	16.4	
HEXANE		0.0	0.0																		
UNIDENTIFIED C6 OLEFINS	9.8	12.1	10.9	4.6	6.8	5.7	2.8	3.7	3.3		1.1	0.6	62.5	48.6	55.6	170.2	62.0	116.1		29.7	14.9
TRANS-3-HEXENE																					
CIS-3-HEXENE	0.4	0.4	0.4													8.5		4.2			
DI-ISOPROPYL ETHER																					
TRANS-2-HEXENE																					
3-METHYL-TRANS-2-PENTENE																					
2-METHYL-2-PENTENE																					
3-METHYLCYCLOPENTENE																					
CIS-2-HEXENE																					
ETBE																					
3-METHYL-CIS-2-PENTENE		0.4	0.2											103.6	51.8						
2,2-DIMETHYLPENTANE, NOTE A		0.1	0.1		0.3	0.1		0.1	0.1								3.5	1.8			
METHYLCYCLOPENTANE, NOTE A		0.1	0.1		0.2	0.1		0.1	0.1								3.4	1.7			

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
2,4-DIMETHYLPENTANE																						
2,2,3-TRIMETHYLBUTANE																						
3,4-DIMETHYL-1-PENTENE	0.7	0.4	0.5											17.6	8.8							
1-METHYLCYCLOPENTENE		0.4	0.2					0.3	0.2													
BENZENE	9.6	10.6	10.1	5.9	6.7	6.3	3.7	4.3	4.0	1.6	2.1	1.9	56.3	75.9	66.1	136.7	129.6	133.1	41.1	53.8	47.5	
3-METHYL-1-HEXENE		0.3	0.1																			
3,3-DIMETHYLPENTANE																						
CYCLOHEXANE													12.4		6.2	14.9		7.4				
2-METHYLHEXANE																						
2,3-DIMETHYLPENTANE								0.3	0.2													
1,1-DIMETHYLCYCLOPENTANE																						
TERT-AMYL METHYL ETHER																						
CYCLOHEXENE	1.0	1.0	1.0										15.2	6.8	11.0		14.2	7.1				
3-METHYLHEXANE																						
CIS-1,3-DIMETHYLCYCLOPENTANE	1.8	1.3	1.5	0.7	0.3	0.5	0.3	0.2	0.2	0.3	0.2	0.3	20.0	20.0	20.0	14.0		7.0				
3-ETHYLPENTANE	0.4	0.5	0.4																			
TRANS-1,2-DIMETHYLCYCLOPENTANE																						
TRANS-1,3-DIMETHYLCYCLOPENTANE																						
1-HEPTENE																						
2,2,4-TRIMETHYLPENTANE	2.7	2.5	2.6	2.1	1.2	1.6	1.2	0.7	0.9		0.5	0.2		50.5	25.3	9.7	25.9	17.8		15.7	7.9	
2-METHYL-1-HEXENE																						
TRANS-3-HEPTENE																						
HEPTANE	0.5	0.4	0.5											6.1	3.0	8.1		4.1				
CIS-3-HEPTENE																						
UNIDENTIFIED C7	1.5	0.7	1.1				0.5		0.2					15.9	7.9	32.0		16.0	6.5		3.3	
2-METHYL-2-HEXENE																						
3-METHYL-TRANS-3-HEXENE																						
TRANS-2-HEPTENE	0.4	0.4	0.4										6.2		3.1							
3-ETHYL-CIS-2-PENTENE																						
2,4,4-TRIMETHYL-1-PENTENE																						

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
2,3-DIMETHYL-2-PENTENE																						
CIS-2-HEPTENE	0.3	0.3	0.3																			
METHYLCYCLOHEXANE	1.0	1.0	1.0		0.7	0.3	0.4	0.5	0.4	0.2	0.2	0.2	8.6	16.4	12.5	10.2	11.0	10.6	7.7	6.3	7.0	
CIS-1,2-DIMETHYLCYCLOPENTANE																						
2,2-DIMETHYLHEXANE																						
1,1,3-TRIMETHYLCYCLOPENTANE																						
2,4,4-TRIMETHYL-2-PENTENE		0.2	0.1																			
2,2,3-TRIMETHYLPENTANE																						
2,5-DIMETHYLHEXANE																						
ETHYLCYCLOPENTANE																						
2,4-DIMETHYLHEXANE	0.5	0.5	0.5	0.6	0.6	0.6		0.4	0.2		0.1	0.1	3.3	24.3	13.8	3.8		1.9				
1-TRANS-2-CIS-4-TRIMETHYLCYCLOPENTANE																						
3,3-DIMETHYLHEXANE																						
1-TRANS-2-CIS-3-TRIMETHYLCYCLOPENTANE																						
2,3,4-TRIMETHYLPENTANE	1.0	0.7	0.8		0.4	0.2	0.3	0.2	0.3							4.4		2.2				
2,3,3-TRIMETHYLPENTANE	0.4		0.2																			
TOLUENE	3.7	2.9	3.3	2.4	5.0	3.7	1.7	0.5	1.1	0.2	1.1	0.6	4.3	29.7	17.0	52.6	37.7	45.1	4.2	11.7	7.9	
2,3-DIMETHYLHEXANE	0.9	1.0	1.0													16.6		8.3				
1,1,2-TRIMETHYLCYCLOPENTANE																						
2-METHYLHEPTANE		0.3	0.1																			
3,4-DIMETHYLHEXANE, NOTE B																						
4-METHYLHEPTANE																						
3-METHYLHEPTANE																						
1-CIS,2-TRANS,3-TRIMETHYLCYCLOPENTANE	0.9	0.9	0.9							0.2		0.1	12.4		6.2	6.1		3.0				
CIS-1,3-DIMETHYLCYCLOHEXANE																						
TRANS-1,4-DIMETHYLCYCLOHEXANE																						
3-ETHYLHEXANE	0.5	0.6	0.6	0.6		0.3	0.4		0.2							9.8		4.9	6.5		3.2	
2,2,5-TRIMETHYLHEXANE		0.3	0.1																			
TRANS-1-METHYL-3-ETHYLCYCLOPENTANE																						
CIS-1-METHYL-3-ETHYLCYCLOPENTANE	2.3	2.3	2.3	1.5	1.4	1.5	0.9	0.9	0.9	0.4	0.5	0.5	44.8	37.6	41.2		18.9	9.5	9.0	9.7	9.4	

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
1,1-DIMETHYLCYCLOHEXANE																					
TRANS-1-METHYL-2-ETHYLCYCLOPENTANE																					
1-METHYL-1-ETHYL-CYCLOPENTANE																					
2,4,4-TRIMETHYLHEXANE																					
2,2,4-TRIMETHYLHEXANE																					
TRANS-1,2-DIMETHYLCYCLOHEXANE	0.6	0.5	0.5							0.2		0.1		7.9	3.9						
1-OCTENE																					
TRANS-4-OCTENE																					
OCTANE	0.8	0.6	0.7	0.4	0.5	0.5	0.3	0.3	0.3	0.1	0.2	0.1	6.8	7.7	7.3	9.5	9.6	9.6	6.3	7.0	6.7
UNIDENTIFIED C8		0.4	0.2										9.8		4.9				6.5		3.2
TRANS-2-OCTENE																					
TRANS-1,3-DIMETHYLCYCLOHEXANE, NOTE C																					
CIS-2-OCTENE																					
ISOPROPYLCYCLOPENTANE																					
2,2-DIMETHYLHEPTANE																					
2,3,5-TRIMETHYLHEXANE																					
CIS-1-METHYL-2-ETHYLCYCLOPENTANE																					
2,4-DIMETHYLHEPTANE	2.3	2.6	2.5	2.2	2.5	2.4	1.4	1.7	1.6		0.3	0.1				31.9	36.5	34.2	15.2	6.4	10.8
4,4-DIMETHYLHEPTANE																					
CIS-1,2-DIMETHYLCYCLOHEXANE																					
ETHYLCYCLOHEXANE																					
2,6-DIMETHYLHEPTANE, NOTE D	0.4	1.1	0.8		0.7	0.4		0.5	0.2		0.2	0.1		12.0	6.0	6.1	14.0	10.0	9.3	8.8	9.1
1,1,3-TRIMETHYLCYCLOHEXANE																					
2,5-DIMETHYLHEPTANE, NOTE E		0.6	0.3		0.4	0.2		0.3	0.1		0.2	0.1		6.4	3.2		12.2	6.1		6.3	3.2
3,3-DIMETHYLHEPTANE																					
3,5-DIMETHYLHEPTANE, NOTE E																					
ETHYLBENZENE	0.8	0.6	0.7	0.4	0.7	0.5		0.2	0.1		0.2	0.1		12.1	6.0	6.2	9.2	7.7		12.5	6.3
2,3,4-TRIMETHYLHEXANE																					
2,3-DIMETHYLHEPTANE																					
m- & p-XYLENE	4.9	4.3	4.6	2.1	2.3	2.2	1.5	1.2	1.4	0.5	0.4	0.5	27.1	24.8	26.0	47.1	26.2	36.7	15.7	10.5	13.1

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
4-METHYLOCTANE																						
3,4-DIMETHYLHEPTANE																						
4-ETHYLHEPTANE																						
2-METHYLOCTANE	1.3	0.9	1.1	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.2	0.2	7.0	6.9	6.9	10.6	8.7	9.7		5.8	2.9	
3-METHYLOCTANE	0.4	0.4	0.4							0.2	0.1	0.1		5.9	3.0	7.8	7.9	7.9				
STYRENE																						
o-XYLENE	2.4	2.5	2.4	0.9	0.9	0.9	0.5	0.5	0.5	0.2	0.2	0.2	13.5	11.8	12.6	18.5	12.8	15.6	8.4	7.9	8.2	
1-NONENE	2.0	1.7	1.8	1.1	1.2	1.1	0.7	0.6	0.6	0.4	0.3	0.4	33.6	30.9	32.3	20.0	19.9	20.0	8.3	9.0	8.6	
TRANS-3-NONENE																						
CIS-3-NONENE																						
NONANE	2.2	2.4	2.3	1.5	1.5	1.5	0.8	0.9	0.9	0.5	0.4	0.4	18.7	21.2	20.0	31.7		15.9	18.8	17.7	18.2	
TRANS-2-NONENE																						
ISOPROPYLBENZENE (CUMENE)	0.3	0.2	0.3		0.4	0.2		0.2	0.1		0.1	0.1		13.3	6.7							
2,2-DIMETHYLOCTANE	0.3	0.9	0.6	0.5		0.3	0.6		0.3				11.0		5.5	13.3	6.6	10.0				
2,4-DIMETHYLOCTANE	0.6	0.3	0.5				0.3		0.2	0.2		0.1				7.4	9.0	8.2				
n-PROPYLBENZENE	1.2	1.7	1.4		0.7	0.3		0.1	0.0	0.2	0.1	0.1	17.1	7.0	12.0	16.1	7.7	11.9				
1-METHYL-3-ETHYLBENZENE	1.5	1.5	1.5	0.9	0.8	0.9	0.3	0.4	0.4				5.1		2.5	1.4	8.3	4.8				
1-METHYL-4-ETHYLBENZENE	1.1	1.2	1.2	0.7	0.5	0.6		0.4	0.2	0.2		0.1				11.1	5.8	8.5				
1,3,5-TRIMETHYLBENZENE	0.8	1.3	1.1	1.2	0.7	0.9		0.2	0.1	0.2		0.1	10.3		5.1	18.4	5.6	12.0				
1-METHYL-2-ETHYLBENZENE	1.7	1.5	1.6	0.8	0.7	0.7		0.4	0.2	0.2		0.1	7.5		3.8	15.7	11.2	13.4		7.2	3.6	
1,2,4-TRIMETHYLBENZENE	2.2	2.2	2.2	0.5	0.6	0.5	0.2	0.3	0.3				5.9	11.1	8.5	9.5		4.8				
TERT-BUTYLBENZENE																						
1-DECENE																						
DECANE, NOTE F	5.2	6.1	5.7	2.1	2.6	2.4	1.2	1.4	1.3	0.6	0.7	0.6	36.0	38.1	37.1	7.5	25.2	16.3	12.0	9.8	10.9	
ISOBUTYLBENZENE, NOTE F	4.9	5.7	5.3	2.0	2.5	2.2	1.1	1.3	1.2	0.6	0.7	0.6	34.0	36.0	35.0	7.1	23.8	15.4	11.3	9.3	10.3	
1,3-DIMETHYL-5-ETHYLBENZENE																						
METHYLPROPYLBENZENE (sec butylbenzene)																						
1-METHYL-3-ISOPROPYLBENZENE	1.7	2.0	1.9																			
1,2,3-TRIMETHYLBENZENE																						
1-METHYL-4-ISOPROPYLBENZENE																						

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr			
			Avg			Avg			Avg			Avg			Avg			Avg			Avg	
INDAN																						
1-METHYL-2-ISOPROPYLBENZENE																						
1,3-DIETHYLBENZENE																						
1,4-DIETHYLBENZENE	0.3	0.3	0.3	0.7	0.4	0.6	0.3	0.2	0.3							16.9	6.5	11.7	6.4		3.2	
1-METHYL-3-N-PROPYLBENZENE																						
1-METHYL-4-N-PROPYLBENZENE, NOTE G	1.8	1.0	1.4												8.3		4.2					
1,2 DIETHYLBENZENE																						
1-METHYL-2-N-PROPYLBENZENE	0.3	0.4	0.3		0.3	0.2																
1,4-DIMETHYL-2-ETHYLBENZENE																						
1,3-DIMETHYL-4-ETHYLBENZENE	1.0	0.8	0.9		0.4	0.2		0.2	0.1	0.2		0.1		6.1	3.1	8.0	9.4	8.7	10.8		5.4	
1,2-DIMETHYL-4-ETHYLBENZENE	0.3	0.3	0.3					0.2	0.1													
1,3-DIMETHYL-2-ETHYLBENZENE	0.5	0.2	0.4								0.1	0.1										
UNDECANE	6.1	5.7	5.9		3.4	1.7		1.3	0.7	0.9	0.2	0.6	34.6	31.6	33.1	47.7	45.3	46.5	37.8	28.2	33.0	
1,2-DIMETHYL-3-ETHYLBENZENE																						
1,2,4,5-TETRAMETHYLBENZENE																						
2-METHYLBUTYLBENZENE (sec AMYLBENZENE)																						
3,4 DIMETHYLCUMENE																						
1,2,3,5-TETRAMETHYLBENZENE	1.1	1.1	1.1		0.9	0.4				0.2	0.1	0.2	38.3	12.9	25.6	17.3	9.2	13.3	11.0	17.1	14.1	
TERT-1-BUT-2-METHYLBENZENE																						
1,2,3,4-TETRAMETHYLBENZENE											0.1	0.1										
N-PENT-BENZENE																						
TERT-1-BUT-3,5-DIMETHYLBENZENE																						
TERT-1-BUTYL-4-ETHYLBENZENE	0.7		0.4													7.4		3.7				
NAPHTHALENE																						
DODECANE	0.3	2.9	1.6	0.5	2.1	1.3		0.8	0.4		0.4	0.2		38.2	19.1		27.5	13.8		16.2	8.1	
1,3,5-TRIETHYLBENZENE																						
1,2,4-TRIETHYLBENZENE																						
HEXYLBENZENE																						
UNIDENTIFIED C9-C12+	19.4	23.8	21.6	6.6	7.2	6.9	3.2	4.0	3.6	0.6	2.0	1.3	84.8	53.3	69.0	126.2	157.4	141.8		37.3	18.6	
FORMALDEHYDE	95.5	102.9	99.2	70.7	76.1	73.4	40.5	45.1	42.8	14.5	13.4	13.9	840.2	820.5	830.3	999.4	918.2	958.8	592.7	624.8	608.7	

APPENDIX TABLE D-4 (CONT'D). SPECIATION DATA FOR SYSTEM WITH NO CATALYST

Compound	FTP Bag 1, mg/mi			FTP Bag 2, mg/mi			FTP Bag 3, mg/mi			US06, mg/mi			SS1, mg/hr			SS2, mg/hr			SS3, mg/hr		
			Avg			Avg			Avg			Avg			Avg			Avg			Avg
ACETALDEHYDE	47.1	44.9	46.0	30.1	30.8	30.4	17.3	17.3	17.3	5.5	5.0	5.2	321.9	298.0	309.9	474.6	427.2	450.9	240.3	250.0	245.2
ACROLEIN	22.8	25.3	24.0	15.8	18.5	17.2	8.5	9.9	9.2	2.4	2.4	2.4	118.3	130.7	124.5	248.6	242.2	245.4	97.5	114.1	105.8
ACETONE	12.4	6.9	9.7	6.7	3.5	5.1	4.9		2.4	1.7	0.1	0.9	86.0		43.0	105.3	47.3	76.3	59.3	38.3	48.8
PROPIONALDEHYDE	18.4	11.3	14.9	9.2	6.2	7.7	4.8	3.8	4.3	1.3	1.1	1.2	87.5	76.3	81.9	150.2	97.6	123.9	91.2	69.5	80.4
CROTONALDEHYDE	18.4	13.5	15.9	11.8	9.1	10.5	6.7	5.6	6.1	1.8	1.3	1.6	86.2	68.4	77.3	171.9	123.9	147.9	96.8	79.4	88.1
ISOBUTYRALDEHYDE, NOTE H	4.3	4.1	4.2	2.0	2.2	2.1	1.3	1.2	1.3	0.4	0.4	0.4	27.1	24.0	25.6	29.7	23.5	26.6	19.0	20.5	19.7
METHYL ETHYL KETONE, NOTE H	4.3	4.1	4.2	2.0	2.2	2.1	1.3	1.2	1.3	0.4	0.4	0.4	27.1	24.0	25.6	29.7	23.5	26.6	19.0	20.5	19.7
BENZALDEHYDE	4.2	4.1	4.2	3.1	3.2	3.2	1.6	1.6	1.6	0.5	0.4	0.4	15.1	7.2	11.2	55.2	49.9	52.6	19.9	20.7	20.3
ISOVALERALDEHYDE	4.0	3.2	3.6	2.3	2.3	2.3	1.3	1.0	1.2	0.4	0.3	0.3	14.4	9.6	12.0	32.7	37.8	35.3	19.5	18.6	19.1
VALERALDEHYDE	6.1	5.4	5.8	2.8	2.0	2.4	1.5	1.1	1.3	0.6	0.4	0.5	20.4	24.0	22.2	10.8	44.7	27.8	17.1	21.3	19.2
O-TOLUALDEHYDE	2.8	2.2	2.5	2.6	1.8	2.2	1.4	1.4	1.4	0.5	0.5	0.5		9.6	4.8	43.8	32.4	38.1	14.7	13.8	14.3
M/P-TOLUALDEHYDE	12.8	8.1	10.4	7.8	7.4	7.6	3.7	3.0	3.3	0.9	0.7	0.8	67.2	18.0	42.6	117.6	101.7	109.7	79.5	63.9	71.7
HEXANALDEHYDE	1.8	1.7	1.8	1.1	1.0	1.1	0.0	0.5	0.2	0.2	0.1	0.2	10.0		5.0	21.7	10.9	16.3	11.0	12.7	11.8
DIMETHYLBENZALDEHYDE	3.4	1.0	2.2										14.4		7.2	10.5		5.3			
Blanks denote compounds not detected.																					

APPENDIX E

PAH RESULTS

APPENDIX TABLE E-1. PAH RESULTS

Set	Total Mass	Avg naphth	Stdev naphthu	Avg mnaph2	Stdev mnaph2u	Avg mnaph1	Stdev mnaph1u	Avg biphen	Stdev biphenu	Avg enap12	Stdev enap12u	Avg dmn267	Stdev dmn267u	Avg dm1367	Stdev dm1367u	Avg d14523
1 -> 3 20g DOC	FTP, µg/mi	12	11	14	15	6	6	3	5	5	9	6	5	11	10	3
	US06, µg/mi	30	21	21	10	4	5	5	3	5	5	5	0	5	2	3
	SS1, µg/hr	461	798	1511	1979	189	179	345	317	303	492	281	299	568	585	56
	SS2, µg/hr	861	771	306	250	135	125	130	113	108	110	103	90	198	157	24
	SS3, µg/hr	700	477	386	193	125	101	173	159	90	109	69	56	141	125	3
4 -> 6 70g DOC	FTP, µg/mi	55	10	26	2	13	1	6	0	6	1	6	2	16	1	4
	US06, µg/mi	34	3	21	3	6	1	5	1	6	1	9	2	17	5	4
	SS1, µg/hr	1262	254	571	205	243	100	286	136	117	48	3	5	497	194	141
	SS2, µg/hr	921	72	334	49	154	34	106	21	68	16	40	19	227	64	44
	SS3, µg/hr	650	5	282	58	115	6	116	31	15	4	0	0	119	43	31
7 -> 9 120g DOC	FTP, µg/mi	64	8	15	3	8	1	1	2	3	1	5	0	10	1	2
	US06, µg/mi	42	5	12	1	2	1	2	0	2	1	4	1	5	2	1
	SS1, µg/hr	1982	893	668	390	170	28	143	111	105	42	175	215	309	272	4
	SS2, µg/hr	1289	254	300	72	125	46	40	70	58	20	83	59	191	37	53
	SS3, µg/hr	907	155	219	52	99	43	39	49	7	12	46	35	98	87	18
10 -> 12 None	FTP, µg/mi	1999	171	1201	88	876	98	378	77	263	31	395	52	927	117	263
	US06, µg/mi	472	70	227	34	179	31	76	5	57	17	86	20	208	47	55
	SS1, µg/hr	14004	1603	8223	1054	6033	831	3129	630	1600	559	2774	530	7075	957	1733
	SS2, µg/hr	22138	15085	12512	6115	9292	4364	4008	2371	2791	1189	4239	1829	10214	4604	2802
	SS3, µg/hr	14497	3796	8245	2206	6338	1943	3431	1118	1873	592	2990	957	6891	2260	1856

NAPHTH and NAPHTHU = Naphthalene
 MNAPH2 and MNAPH2U = 2-methylnaphthalene
 MNAPH1 and MNAPH1U = 1-methylnaphthalene
 BIPHEN and BIPHENU = Biphenyl
 ENAP12 and ENAP12U = 1+2ethylnaphthalene
 DMN267 and DMN267U = 2,6+2,7-dimethylnaphthalene
 DM1367 and DM1367U = 1,3+1,6+1,7dimethylnaphth
 D14523 and D14523U = 1,4+1,5+2,3-dimethylnaphth

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Stddev d14523u	Avg dmn12	Stddev dmn12u	Avg m_2bph	Stddev m_2bphu	Avg m_3bph	Stddev m_3bphu	Avg m_4bph	Stddev m_4bphu	Avg dbzfur	Stddev dbzfur	Avg atmnap	Stddev atmnapu	Avg em_12n	Stddev em_12nu
1 -> 3 20g DOC	FTP, µg/mi	5	1	1	9	15	11	19	6	10	1	2	3	4	2	3
	US06, µg/mi	5	2	2	29	36	10	7	5	6	2	0	2	1	0	0
	SS1, µg/hr	49	87	151	591	1023	409	708	226	370	109	128	39	39	42	72
	SS2, µg/hr	30	20	19	749	649	444	389	308	261	38	34	43	40	13	11
	SS3, µg/hr	2	13	12	3	4	34	45	19	19	22	28	19	19	4	5
4 -> 6 70g DOC	FTP, µg/mi	1	1	0	22	3	16	0	10	1	3	1	5	0	2	0
	US06, µg/mi	1	2	1	38	6	25	8	16	4	2	0	2	0	1	0
	SS1, µg/hr	67	48	45	1882	282	1202	38	794	55	69	43	94	51	63	35
	SS2, µg/hr	16	18	5	900	14	581	60	402	55	34	7	39	10	15	4
	SS3, µg/hr	7	7	8	7	13	12	22	0	0	25	14	18	9	4	4
7 -> 9 120g DOC	FTP, µg/mi	1	1	1	26	7	17	5	13	3	3	1	1	2	0	0
	US06, µg/mi	0	0	0	36	7	23	5	16	3	2	1	1	0	0	0
	SS1, µg/hr	7	13	8	1916	1218	1231	708	913	257	57	28	42	10	31	21
	SS2, µg/hr	47	10	6	926	68	579	67	405	39	54	19	15	25	5	8
	SS3, µg/hr	18	2	4	0	0	10	16	12	8	45	22	13	18	0	0
10 -> 12 None	FTP, µg/mi	37	104	17	97	14	330	41	129	15	115	12	178	36	160	29
	US06, µg/mi	12	22	3	10	17	53	20	18	11	39	4	29	8	32	13
	SS1, µg/hr	353	612	191	153	240	1439	1360	363	465	1843	124	1294	272	3580	2168
	SS2, µg/hr	1213	1078	517	958	972	3241	2484	1503	1272	1816	1201	1562	1096	2029	1727
	SS3, µg/hr	637	655	204	862	706	2410	1382	965	601	710	287	1832	356	966	516
DMN12 and DMN12U = 1,2-dimethylnaphthalene M_2BPH and M_2BPHU = 2-Methylbiphenyl M_3BPH and M_3BPHU = 3-Methylbiphenyl M_4BPH and M_4BPHU = 4-Methylbiphenyl DBZFUR and DBZFURU = Dibenzofuran ATMNAP and ATMNAPU = A-trimethylnaphthalene EM_12N and EM_12NU = 1-ethyl-2-methylnaphthalene																

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Avg btmnap	Stdev btmnapu	Avg ctmnap	Stdev ctmnapu	Avg em_21n	Stdev em_21nu	Avg etmnap	Stdev etmnapu	Avg ftmnap	Stdev ftmnapu	Avg tmi235n	Stdev tmi235nu	Avg tm245n	Stdev tm245nu	Avg jtmnap
1 -> 3 20g DOC	FTP, µg/mi	1	1	1	1	0	0	0	1	1	1	2	2	0	0	2
	US06, µg/mi	4	6	2	3	2	4	3	3	9	8	5	5	1	1	3
	SS1, µg/hr	64	71	5	5	0	0	33	28	22	26	877	1193	71	63	67
	SS2, µg/hr	33	29	40	69	0	0	20	18	17	15	269	442	25	22	17
	SS3, µg/hr	8	14	15	27	7	12	2	4	57	84	16	16	0	0	1
4 -> 6 70g DOC	FTP, µg/mi	3	0	0	0	0	0	1	1	2	1	23	4	1	1	3
	US06, µg/mi	2	0	1	0	0	0	1	0	1	0	15	13	1	0	2
	SS1, µg/hr	69	48	0	0	12	20	48	32	41	26	1354	588	91	26	117
	SS2, µg/hr	32	10	0	0	8	13	16	8	18	7	256	207	30	6	36
	SS3, µg/hr	12	6	0	0	0	0	7	5	11	7	13	4	8	11	11
7 -> 9 120g DOC	FTP, µg/mi	1	1	0	0	0	0	1	0	1	1	18	5	0	1	1
	US06, µg/mi	1	0	0	0	0	0	1	0	0	0	18	3	0	0	0
	SS1, µg/hr	41	15	0	0	15	14	18	16	24	15	998	185	36	32	90
	SS2, µg/hr	9	16	0	0	0	0	6	9	8	12	374	98	11	19	21
	SS3, µg/hr	8	13	0	0	8	13	4	5	5	8	20	22	7	12	4
10 -> 12 None	FTP, µg/mi	162	31	153	31	6	1	81	16	73	9	136	27	47	9	63
	US06, µg/mi	26	10	17	7	0	0	17	5	13	3	14	2	7	6	11
	SS1, µg/hr	1144	312	481	348	318	537	717	337	575	174	742	228	130	226	670
	SS2, µg/hr	1471	1024	1260	1029	37	64	784	583	602	441	1365	1048	344	292	525
	SS3, µg/hr	1652	317	1384	359	519	778	938	210	708	164	837	182	414	67	648

BTMNAp and BTMNApU = B-trimethylnaphthalene
 CTMNAp and CTMNApU = C-trimethylnaphthalene
 EM_21N and EM_21NU = 2-ethyl-1-methylnaphthalene
 ETMNAp and ETMNApU = E-trimethylnaphthalene
 FTMNAp and FTMNApU = F-trimethylnaphthalene
 TMI235N and TMI235NU = 2,3,5+I-trimethylnaphthalene
 TM245N and TM245NU = 2,4,5-trimethylnaphthalene
 JTMNAp and JTMNApU = J-trimethylnaphthalene

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Stdev jtmnapu	Avg tm145n	Stdev tm145nu	Avg acnapy	Stdev acnapyu	Avg acnape	Stdev acnapeu	Avg fluore	Stdev fluoreu	Avg phenan	Stdev phenanu	Avg a_mflu	Stdev a_mfluu	Avg m_1flu	Stdev m_1fluu
1 -> 3 20g DOC	FTP, µg/mi	3	1	1	1	2	1	1	1	1	9	3	0	0	0	0
	US06, µg/mi	4	1	1	1	1	1	2	7	5	9	4	2	1	12	20
	SS1, µg/hr	76	27	47	6	11	6	10	369	318	265	72	85	74	24	41
	SS2, µg/hr	15	6	10	2	2	12	13	138	109	71	31	39	34	0	0
	SS3, µg/hr	1	2	3	3	2	8	7	83	73	6	6	0	1	0	0
4 -> 6 70g DOC	FTP, µg/mi	0	1	0	1	0	1	0	9	0	10	1	2	0	2	0
	US06, µg/mi	2	0	0	0	0	2	0	6	2	4	1	2	1	0	0
	SS1, µg/hr	40	15	13	3	6	19	16	398	159	229	151	160	83	0	1
	SS2, µg/hr	8	5	3	1	2	23	2	150	35	90	27	49	18	3	4
	SS3, µg/hr	7	2	2	3	3	27	9	92	35	33	20	14	7	13	16
7 -> 9 120g DOC	FTP, µg/mi	1	0	0	0	0	1	2	7	2	8	1	2	1	1	1
	US06, µg/mi	0	0	0	0	0	0	0	5	0	4	0	1	0	0	0
	SS1, µg/hr	79	0	0	1	2	6	6	268	207	319	149	135	89	26	23
	SS2, µg/hr	19	0	0	0	0	46	41	110	90	86	17	36	10	30	38
	SS3, µg/hr	7	1	2	0	0	20	29	112	19	52	32	16	19	14	23
10 -> 12 None	FTP, µg/mi	13	41	5	116	32	22	5	94	15	139	10	44	7	57	13
	US06, µg/mi	3	6	3	24	3	4	3	22	1	57	8	7	6	17	16
	SS1, µg/hr	130	835	735	1054	117	44	54	1038	527	3968	1252	517	460	1219	1491
	SS2, µg/hr	409	327	240	713	478	176	152	829	576	1358	1080	398	343	423	374
	SS3, µg/hr	107	362	137	971	254	207	64	921	204	693	261	210	184	349	310
TM145N and TM145NU = 1,4,5-trimethylnaphthalene ACNAPY and ACNAPYU = Acenaphthylene ACNAPE and ACNAPEU = Acenaphthene FLUORE and FLUOREU = Fluorene PHENAN and PHENANU = Phenanthrene A_MFLU and A_MFLUU = A-methylfluorene M_1FLU and M_1FLUU = 1-methylfluorene																

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Avg b_mflu	Stdev b_mflu	Avg fl9one	Stdev fl9one	Avg xanone	Stdev xanone	Avg acquone	Stdev acquone	Avg pnapone	Stdev pnapone	Avg a_mpht	Stdev a_mpht	Avg m_2pht	Stdev m_2pht	Avg b_mpht
1 -> 3 20g DOC	FTP, µg/mi	0	0	3	2	3	5	0	0	4	5	2	0	3	2	0
	US06, µg/mi	0	0	2	1	1	1	0	0	1	1	1	0	1	0	1
	SS1, µg/hr	14	20	184	141	1	2	43	62	27	32	64	31	90	42	107
	SS2, µg/hr	3	3	46	40	0	0	9	12	0	0	13	4	18	3	0
	SS3, µg/hr	1	1	34	30	7	13	2	1	0	0	0	0	2	3	0
4 -> 6 70g DOC	FTP, µg/mi	0	0	3	1	0	0	0	0	3	0	2	0	3	0	1
	US06, µg/mi	1	1	2	0	0	0	0	0	1	0	1	0	1	0	0
	SS1, µg/hr	68	96	427	245	0	0	4	1	46	35	28	31	55	44	12
	SS2, µg/hr	11	14	97	46	0	0	9	10	10	3	10	4	15	5	14
	SS3, µg/hr	14	23	0	0	0	0	2	1	1	1	1	1	6	4	0
7 -> 9 120g DOC	FTP, µg/mi	2	2	2	1	0	0	0	0	2	1	2	0	2	1	0
	US06, µg/mi	0	0	3	1	0	0	0	0	1	0	1	0	1	0	0
	SS1, µg/hr	26	27	347	210	7	13	35	52	62	27	135	174	183	237	4
	SS2, µg/hr	1	0	56	7	0	0	2	1	4	6	12	4	18	6	7
	SS3, µg/hr	10	15	10	6	0	0	1	0	0	0	4	2	10	2	3
10 -> 12 None	FTP, µg/mi	11	2	41	7	3	1	12	1	27	2	42	5	47	7	1
	US06, µg/mi	1	1	25	1	3	1	8	1	22	3	17	2	21	2	0
	SS1, µg/hr	33	37	2473	839	117	27	163	17	1325	155	842	432	1064	438	3
	SS2, µg/hr	52	78	725	609	46	72	196	297	705	982	431	392	513	471	1
	SS3, µg/hr	44	40	165	95	6	11	5	9	63	22	106	87	125	74	0

B_MFLU and B_MFLUU = B-methylfluorene
 FL9ONE and FL9ONEU = 9-fluorenone
 XANONE and XANONEU = Xanthone
 ACQUONE and ACQUONEU = Acenaphthenequinone
 PNAPONE and PNAPONEU = Perinaphthenone
 A_MPHT and A_MPHTU = A-methylphenanthrene
 M_2PHT and M_2PHTU = 2-methylphenanthrene
 B_MPHT and B_MPHTU = B-methylphenanthrene

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Stdev b_mphtu	Avg c_mpht	Stdev c_mphtu	Avg m_1pht	Stdev m_1phtu	Avg anrquone	Stdev anrquoneu	Avg dm36ph	Stdev dm36phu	Avg a_dmph	Stdev a_dmphu	Avg b_dmph	Stdev b_dmphu	Avg c_dmph	Stdev c_dmphu
1 -> 3 20g DOC	FTP, µg/mi	0	2	0	1	0	4	5	0	0	1	1	3	2	2	2
	US06, µg/mi	1	1	0	0	0	2	1	10	10	4	6	3	2	2	1
	SS1, µg/hr	113	114	85	11	11	121	24	0	0	145	237	127	51	40	18
	SS2, µg/hr	0	16	12	1	1	21	16	11	20	8	13	21	7	5	3
	SS3, µg/hr	0	13	23	0	0	14	12	0	0	44	45	4	2	7	5
4 -> 6 70g DOC	FTP, µg/mi	1	2	1	2	0	1	0	0	0	0	0	1	0	3	1
	US06, µg/mi	1	1	1	1	0	1	0	0	0	0	0	4	2	1	0
	SS1, µg/hr	21	104	55	23	10	59	12	0	0	0	0	562	389	92	60
	SS2, µg/hr	23	29	7	3	3	10	2	0	0	0	0	50	42	13	2
	SS3, µg/hr	0	1	2	0	0	8	2	0	0	6	10	37	24	5	1
7 -> 9 120g DOC	FTP, µg/mi	0	2	0	1	0	1	0	0	0	1	1	1	0	3	0
	US06, µg/mi	0	1	1	0	0	1	0	0	0	1	1	1	1	1	0
	SS1, µg/hr	4	286	301	105	168	125	124	0	0	33	56	109	129	348	519
	SS2, µg/hr	13	6	0	4	3	8	1	54	93	8	14	41	54	19	12
	SS3, µg/hr	5	1	1	8	7	6	2	0	0	9	8	13	6	7	2
10 -> 12 None	FTP, µg/mi	0	43	5	36	7	9	1	14	5	8	1	37	2	52	8
	US06, µg/mi	0	21	2	16	2	10	1	10	3	7	2	3	1	33	4
	SS1, µg/hr	5	1035	351	790	343	601	47	233	60	149	31	184	158	1327	449
	SS2, µg/hr	2	524	491	388	364	310	392	252	430	156	241	236	290	888	1189
	SS3, µg/hr	0	100	81	76	59	31	6	17	30	0	0	74	61	84	25

C_MPHT and C_MPHTU = C-methylphenanthrene
M_1PHT and M_1PHTU = 1-methylphenanthrene
ANRQUONE and ANRQUONEU = Anthraquinone
DM36PH and DM36PHU = 3,6-dimethylphenanthrene
A_DMPH and A_DMPHU = A-dimethylphenanthrene
B_DMPH and B_DMPHU = B-dimethylphenanthrene
C_DMPH and C_DMPHU = C-dimethylphenanthrene

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Avg dm17ph	Stdev dm17phu	Avg d_dmph	Stdev d_dmpHu	Avg e_dmph	Stdev e_dmpHu	Avg anthra	Stdev anthrau	Avg m_9ant	Stdev m_9antu	Avg fluora	Stdev fluorau	Avg pyrene	Stdev pyreneu	Avg bntiop
1 -> 3 20g DOC	FTP, µg/mi	1	1	2	1	1	1	2	2	0	0	7	3	9	4	1
	US06, µg/mi	2	2	1	1	5	4	1	0	2	2	1	0	2	0	0
	SS1, µg/hr	19	17	40	14	290	296	167	258	123	213	52	26	53	23	0
	SS2, µg/hr	4	2	9	5	48	66	5	5	17	29	11	3	19	4	0
	SS3, µg/hr	49	82	2	1	80	106	0	0	0	0	0	0	9	1	0
4 -> 6 70g DOC	FTP, µg/mi	1	1	2	0	2	1	1	0	1	1	6	1	8	2	0
	US06, µg/mi	1	1	1	0	1	1	0	0	1	1	1	0	1	0	0
	SS1, µg/hr	26	8	26	7	120	85	0	0	52	83	42	35	25	12	2
	SS2, µg/hr	32	18	8	4	28	21	2	4	30	28	13	3	11	2	2
	SS3, µg/hr	24	14	12	6	19	17	0	0	0	0	3	1	7	1	0
7 -> 9 120g DOC	FTP, µg/mi	1	0	2	2	1	0	0	0	1	1	3	2	5	3	0
	US06, µg/mi	1	0	0	0	0	0	0	0	2	2	1	0	1	0	0
	SS1, µg/hr	115	130	166	215	214	90	4	6	94	67	139	182	137	212	2
	SS2, µg/hr	9	4	23	23	18	15	0	0	15	22	13	0	13	5	0
	SS3, µg/hr	6	5	17	16	15	22	0	0	2	2	5	2	7	0	0
10 -> 12 None	FTP, µg/mi	16	2	18	3	15	3	10	1	2	2	25	5	34	5	0
	US06, µg/mi	10	1	15	2	16	5	1	2	1	1	14	1	18	1	0
	SS1, µg/hr	425	126	783	501	528	200	32	55	151	9	252	37	251	49	0
	SS2, µg/hr	411	610	911	1448	338	429	40	62	36	30	191	297	369	521	59
	SS3, µg/hr	36	29	81	42	100	71	34	31	1	1	17	6	14	12	0

DM17PH and DM17PHU = 1,7-dimethylphenanthrene
D_DMPH and D_DMPHU = D-dimethylphenanthrene
E_DMPH and E_DMPHU = E-dimethylphenanthrene
ANTHRA and ANTHRAU = Anthracene
M_9ANT and M_9ANTU = 9-methylanthracene
FLUORA and FLUORAU = Fluoranthene
PYRENE and PYRENEU = Pyrene
BNTIOP and BNTIOPU = Benzonaphthothiophene

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Stdev bntiopu	Avg c1mflpy	Stdev c1mflpyu	Avg bmpyfl	Stdev bmpyflu	Avg cmpyfl	Stdev cmpyflu	Avg dmpyfl	Stdev dmpyflu	Avg m_4pyr	Stdev m_4pyru	Avg m_1pyr	Stdev m_1pyru	Avg bzcphen	Stdev bzcphenu
1 -> 3 20g DOC	FTP, µg/mi	2	0	0	1	1	0	0	2	0	3	2	2	2	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	2	4	23	34	11	10	8	3	6	2	0	0
	SS2, µg/hr	0	0	0	0	0	1	1	3	4	2	1	1	1	0	0
	SS3, µg/hr	0	0	0	0	1	4	1	5	4	3	1	3	1	0	0
4 -> 6 70g DOC	FTP, µg/mi	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	4	0	0	0	0	2	2	12	17	4	3	6	4	0	0
	SS2, µg/hr	1	0	0	0	0	1	1	2	0	1	0	1	1	0	0
	SS3, µg/hr	1	0	0	0	0	1	0	3	1	3	1	3	3	0	0
7 -> 9 120g DOC	FTP, µg/mi	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	3	0	0	42	74	2	1	54	79	53	87	29	46	0	0
	SS2, µg/hr	0	0	0	0	0	1	1	4	3	3	3	2	2	0	0
	SS3, µg/hr	0	0	0	0	1	1	1	4	1	3	0	2	0	0	0
10 -> 12 None	FTP, µg/mi	0	0	0	5	1	3	1	11	1	12	1	8	1	0	0
	US06, µg/mi	0	0	0	4	2	1	0	8	1	9	1	3	1	0	0
	SS1, µg/hr	0	0	0	52	52	37	30	172	149	103	53	35	60	0	0
	SS2, µg/hr	103	0	0	138	228	28	34	272	348	309	405	110	181	0	0
	SS3, µg/hr	0	0	0	17	22	7	2	30	5	32	5	0	0	0	0
C1MFLPY and C1MFLPYU = 1-MeFl+C-MeFl/Py BMPYFL and BMPYFLU = B-MePy/MeFl CMPYFL and CMPYFLU = C-MePy/MeFl DMPYFL and DMPYFLU = D-MePy/MeFl M_4PYR and M_4PYRU = 4-methylpyrene M_1PYR and M_1PYRU = 1-methylpyrene BZCPHEN and BZCPHENU = Benzo(c)phenanthrene																

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Avg baanth	Stdev baanthu	Avg m_7baa	Stdev m_7baau	Avg chrysn	Stdev chrysnu	Avg bzantone	Stdev bzantoneu	Avg baa7_12	Stdev baa7_12u	Avg chry56m	Stdev chry56mu	Avg bbjkfl	Stdev bbjkflu	Avg m_7bpy
1 -> 3 20g DOC	FTP, µg/mi	1	1	1	2	2	2	3	3	1	2	2	3	1	1	1
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
	SS2, µg/hr	0	0	0	0	0	0	5	9	0	0	0	0	0	0	4
	SS3, µg/hr	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0
4 -> 6 70g DOC	FTP, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
	SS2, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	SS3, µg/hr	0	0	0	0	4	6	0	0	2	1	3	5	5	8	1
7 -> 9 120g DOC	FTP, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
	SS2, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	SS3, µg/hr	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0
10 -> 12 None	FTP, µg/mi	1	1	0	0	6	2	12	3	1	0	0	0	1	2	0
	US06, µg/mi	0	0	0	0	3	0	11	1	1	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	0	0	0	212	10	13	5	0	0	0	0	0
	SS2, µg/hr	0	0	0	0	22	39	119	81	6	7	0	0	0	0	0
	SS3, µg/hr	0	0	0	0	0	0	100	12	6	2	0	0	0	0	0

BAANTH and BAANTHU = Benz(a)anthracene
M_7BAA and M_7BAAU = 7-methylbenz(a)anthracene
CHRYSN and CHRYSNu = Chrysene
BZANTONE and BZANTONEU = Benzanthrone
BAA7_12 and BAA7_12U = Benz(a)anthracene-7,12-dione
CHRY56M and CHRY56MU = 5+6-methylchrysene
BBJKFL and BBJKFLU = Benzo(b+j+k)fluoranthene
M_7BPY and M_7BPYU = 7-methylbenzo(a)pyrene

APPENDIX TABLE E-1 (CONT'D). PAH RESULTS

Set	Total Mass	Stdev m_7bpyu	Avg bepyrn	Stdev bepyrnu	Avg peryle	Stdev peryleu	Avg bapyrn	Stdev bapyrnu	Avg incdpy	Stdev incdpyu	Avg bghipe	Stdev bghipeu	Avg dbanth	Stdev dbanthu	Avg corone	Stdev coroneu
1 -> 3 20g DOC	FTP, µg/mi	1	1	1	0	0	3	2	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	11	24	42	0	0	8	13	0	0	0	0	0	0	0	0
	SS2, µg/hr	8	1	2	0	0	0	0	0	0	0	0	0	0	0	0
	SS3, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 -> 6 70g DOC	FTP, µg/mi	0	1	0	0	0	2	1	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0
	SS1, µg/hr	38	49	46	0	0	29	25	0	0	0	0	0	0	0	0
	SS2, µg/hr	4	10	9	0	0	4	4	0	0	0	0	0	0	0	0
	SS3, µg/hr	2	0	1	0	0	0	0	0	0	3	5	0	0	13	23
7 -> 9 120g DOC	FTP, µg/mi	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	21	13	23	0	0	1	2	0	0	0	0	0	0	0	0
	SS2, µg/hr	0	36	53	0	0	34	55	0	0	0	0	0	0	0	0
	SS3, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 -> 12 None	FTP, µg/mi	0	1	1	0	0	2	2	0	0	0	0	0	0	0	0
	US06, µg/mi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS1, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS2, µg/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SS3, µg/hr	0	18	20	0	0	1	2	0	0	0	0	0	0	0	0

BEPYRN and BEPYRNU = BeP
 PERYLE and PERYLEU = Perylene
 BAPYRN and BAPYRNU = BaP
 INCDPY and INCDPYU = Indeno[123-cd]pyrene
 BGHIPE and BGHIPEU = Benzo(ghi)perylene
 DBANTH and DBANTHU = Dibenzo(ah+ac)anthracene
 CORONE and CORONEU = Coronene

APPENDIX F

N-PAH RESULTS

APPENDIX TABLE F-1. N-PAH RESULTS

Set	Total Mass	ni1naph	ni1naphu	ni2naph	ni2naphu	ni2biph	ni2biphu	ni3biph	ni3biphu	ni4bph	ni4bphu	ni13nap	ni13napu	ni15nap
1 -> 3 20g	FTP, µg/mi	0.81	0.82	1.01	1.50	0.00	0.00	0.15	0.26	0.02	0.04	0.00	0.00	0.02
	US06, µg/mi	0.00	0.00	0.00	0.00	0.10	0.17	0.27	0.32	0.13	0.11	0.59	0.46	0.46
	SS1, µg/hr	7.67	13.28	0.00	0.00	0.00	0.00	3.64	4.56	22.99	34.53	0.00	0.00	20.43
	SS2, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	1.66	1.68	2.02	1.37	0.37	0.65	2.05
	SS3, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	6.75	4.92	0.00	0.00	0.00	0.00	0.00
4 -> 6 70g	FTP, µg/mi	0.00	0.00	0.28	0.29	0.00	0.00	0.02	0.02	0.01	0.02	0.00	0.00	1.11
	US06, µg/mi	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00
	SS1, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	1.99	3.45	0.00	0.00	0.00	0.00	0.00
	SS2, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.62	0.00	0.00	0.00	0.00	0.00
	SS3, µg/hr	0.00	0.00	3.94	6.82	0.00	0.00	11.46	7.65	6.67	7.88	0.70	1.22	0.00
7 -> 9 120g	FTP, µg/mi	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.01
	US06, µg/mi	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00
	SS1, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS2, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.85	0.11	0.19	0.00	0.00	0.00
	SS3, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	15.38	12.53	0.00	0.00	0.00	0.00	15.22
10 -> 12 None	FTP, µg/mi	0.00	0.00	0.00	0.00	1.55	1.76	0.37	0.56	0.61	0.87	0.03	0.05	0.17
	US06, µg/mi	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.39
	SS1, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS2, µg/hr	20.45	31.02	0.00	0.00	0.00	0.00	0.68	0.59	2.43	4.20	0.34	0.59	3.12
	SS3, µg/hr	0.00	0.00	0.00	0.00	3.48	6.03	13.39	12.82	0.00	0.00	1.70	2.95	1.04
ni1naph and ni1naphu = 1-Nitronaphthalene ni2naph and ni2naphu = 2-Nitronaphthalene ni2biph and ni2biphu = 2-Nitrobiphenyl ni3biph and ni3biphu = 3-Nitrobiphenyl ni4bph and ni4bphu = 4-Nitrobiphenyl ni13nap and ni13napu = 1,3-Dinitronaphthalene ni15nap and ni15napu = 1,5-Dinitronaphthalene														

APPENDIX TABLE F-1 (CONT'D). N-PAH RESULTS

Set	Total Mass	ni15napu	ni5acnap	ni5acnapu	ni2fluo	ni2fluou	ni9anthr	ni9anthru	ni4phen	ni4phenu	ni9phen	ni9phenu	ni3phen	ni3phenu
1 -> 3 20g	FTP, µg/mi	0.04	0.01	0.02	0.06	0.11	0.00	0.00	0.01	0.02	0.19	0.33	0.00	0.00
	US06, µg/mi	0.80	0.11	0.11	0.02	0.03	0.09	0.08	1.05	1.07	0.08	0.14	0.00	0.00
	SS1, µg/hr	35.38	0.00	0.00	28.39	45.60	0.00	0.00	8.66	13.14	1.39	2.42	0.00	0.00
	SS2, µg/hr	3.56	0.00	0.00	9.88	12.92	0.00	0.00	15.60	27.02	0.54	0.94	5.42	9.38
	SS3, µg/hr	0.00	0.00	0.00	0.00	0.00	0.38	0.65	0.18	0.32	2.98	2.90	0.00	0.00
4 -> 6 70g	FTP, µg/mi	1.92	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.19	0.25	0.00	0.00
	US06, µg/mi	0.00	0.00	0.00	0.53	0.44	0.00	0.00	0.07	0.12	0.02	0.02	0.00	0.00
	SS1, µg/hr	0.00	0.00	0.00	4.49	6.51	0.00	0.00	0.00	0.00	8.44	3.19	0.00	0.00
	SS2, µg/hr	0.00	0.00	0.00	0.54	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS3, µg/hr	0.00	0.00	0.00	0.94	0.50	2.10	3.64	1.31	2.27	2.83	3.20	0.14	0.24
7 -> 9 120g	FTP, µg/mi	0.02	0.00	0.00	1.23	1.43	0.00	0.00	0.04	0.07	0.05	0.04	0.00	0.00
	US06, µg/mi	0.00	0.00	0.00	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS1, µg/hr	0.00	0.00	0.00	0.45	0.78	0.00	0.00	0.00	0.00	0.45	0.78	0.00	0.00
	SS2, µg/hr	0.00	0.00	0.00	30.01	28.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS3, µg/hr	26.36	0.12	0.20	0.57	0.38	1.64	2.84	2.22	3.85	0.34	0.58	9.12	7.96
10 -> 12 None	FTP, µg/mi	0.13	0.00	0.00	0.54	0.57	0.00	0.00	0.01	0.02	0.17	0.19	0.00	0.00
	US06, µg/mi	0.68	0.00	0.00	0.08	0.11	0.00	0.00	0.00	0.00	0.10	0.11	0.00	0.00
	SS1, µg/hr	0.00	0.00	0.00	1.34	2.32	0.00	0.00	6.66	11.53	1.34	2.32	0.00	0.00
	SS2, µg/hr	5.41	0.00	0.00	6.86	6.33	0.00	0.00	0.00	0.00	0.00	0.00	0.69	1.20
	SS3, µg/hr	1.04	0.00	0.00	4.13	3.70	0.00	0.00	3.48	6.03	16.36	27.46	0.00	0.00
ni5acnap and ni5acnapu = 5-Nitroacenaphthene ni2fluo and ni2fluou = 2-Nitrofluorene ni9anthr and ni9anthru = 9-Nitroanthracene ni4phen and ni4phenu = 4-Nitrophenanthrene ni9phen and ni9phenu = 9-Nitrophenanthrene ni3phen and ni3phenu = 3-Nitrophenanthrene														

APPENDIX TABLE F-1 (CONT'D) . N-PAH RESULTS

Set	Total Mass	ni18nap	ni18napu	ni2fluor	ni2fluoru	ni3fluor	ni3fluoru	ni1pyre	ni1pyreu	ni27fluo	ni27fluou	ni27f9on	ni27f9onu	ni7bzanth
1 -> 3 20g	FTP, µg/mi	0.00	0.00	0.11	0.19	0.26	0.44	0.06	0.11	0.14	0.24	0.06	0.10	0.02
	US06, µg/mi	0.09	0.16	0.15	0.22	0.15	0.27	0.07	0.12	0.12	0.16	0.02	0.03	0.02
	SS1, µg/hr	18.24	31.59	0.00	0.00	12.70	12.97	1.39	2.42	0.00	0.00	0.00	0.00	28.10
	SS2, µg/hr	0.00	0.00	25.57	11.91	5.42	5.61	5.28	7.73	0.56	0.97	0.00	0.00	0.00
	SS3, µg/hr	0.00	0.00	0.00	0.00	1.31	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.75
4 -> 6 70g	FTP, µg/mi	0.00	0.00	0.00	0.00	0.03	0.05	0.12	0.18	0.01	0.01	0.08	0.14	0.00
	US06, µg/mi	0.00	0.00	0.03	0.03	0.12	0.21	0.04	0.04	0.00	0.00	0.01	0.01	0.00
	SS1, µg/hr	0.00	0.00	9.07	15.71	4.91	2.11	0.98	0.85	0.00	0.00	0.00	0.00	0.00
	SS2, µg/hr	0.67	0.84	8.22	10.42	8.39	6.63	1.86	2.62	0.00	0.00	0.00	0.00	0.00
	SS3, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.76	0.14	0.24	0.00	0.00	0.00
7 -> 9 120g	FTP, µg/mi	0.00	0.00	0.09	0.15	0.16	0.22	0.22	0.39	0.05	0.05	0.09	0.16	0.00
	US06, µg/mi	0.00	0.00	0.04	0.06	0.03	0.05	0.08	0.14	0.00	0.00	0.02	0.04	0.01
	SS1, µg/hr	0.00	0.00	0.45	0.78	12.56	10.88	7.49	7.17	5.68	9.83	0.00	0.00	0.00
	SS2, µg/hr	0.00	0.00	2.35	4.07	20.35	35.24	2.73	0.04	0.00	0.00	0.00	0.00	0.00
	SS3, µg/hr	9.60	16.63	1.64	2.84	2.98	3.50	7.60	5.08	0.00	0.00	0.94	1.62	0.00
10 -> 12 None	FTP, µg/mi	0.00	0.00	0.07	0.13	0.03	0.06	0.04	0.07	0.00	0.00	0.00	0.00	0.00
	US06, µg/mi	0.12	0.21	0.03	0.06	0.08	0.07	0.02	0.03	0.00	0.00	0.00	0.00	0.00
	SS1, µg/hr	21.30	36.89	0.00	0.00	4.01	4.02	2.65	4.60	2.66	4.61	1.34	2.32	0.00
	SS2, µg/hr	5.55	9.61	3.12	5.41	11.73	13.30	9.97	10.43	1.39	2.40	10.75	18.62	0.69
	SS3, µg/hr	0.00	0.00	0.00	0.00	4.87	5.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ni18nap and ni18napu = 1,8-Dinitronaphthalene ni2fluor and ni2fluoru = 2-Nitrofluoranthene ni3fluor and ni3fluoru = 3-Nitrofluoranthene ni1pyre and ni1pyreu = 1-Nitropyrene ni27fluo and ni27fluou = 2,7-Dinitrofluorene ni27f9on and ni27f9onu = 2,7-Dinitro-9-fluorenone ni7bzanth and ni7bzanthu = 7-Nitrobenz(a)anthracene														

APPENDIX TABLE F-1 (CONT'D). N-PAH RESULTS

Set	Total Mass	ni7bzanthu	ni6chry	ni6chryu	ni13pyr	ni13pyru	ni16pyr	ni16pyru	ni18pyr	ni18pyru	ni910anth	ni910anthu	ni6bap	ni6bapu
1 -> 3 20g	FTP, µg/mi	0.04	0.37	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06
	US06, µg/mi	0.04	0.09	0.15	0.15	0.27	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.00
	SS1, µg/hr	48.68	2.92	5.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44	2.50
	SS2, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.65	1.68	2.91	0.75	1.29
	SS3, µg/hr	1.30	1.88	3.25	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.32	0.38	0.65
4 -> 6 70g	FTP, µg/mi	0.00	0.41	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02
	US06, µg/mi	0.00	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS1, µg/hr	0.00	2.39	4.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.83
	SS2, µg/hr	0.00	4.84	8.07	0.00	0.00	3.35	4.22	0.00	0.00	0.64	0.82	0.00	0.00
	SS3, µg/hr	0.00	10.52	6.46	0.00	0.00	3.10	5.37	0.28	0.49	0.28	0.49	0.42	0.73
7 -> 9 120g	FTP, µg/mi	0.00	0.01	0.02	0.06	0.10	0.15	0.26	0.00	0.01	0.03	0.06	0.00	0.00
	US06, µg/mi	0.01	0.02	0.04	0.07	0.10	0.00	0.00	0.00	0.00	0.02	0.04	0.01	0.03
	SS1, µg/hr	0.00	0.00	0.00	2.26	3.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SS2, µg/hr	0.00	6.79	11.76	1.01	1.74	0.00	0.00	0.00	0.00	0.22	0.39	0.22	0.39
	SS3, µg/hr	0.00	4.98	4.38	3.38	5.01	0.00	0.00	0.47	0.81	1.86	2.15	0.35	0.61
10 -> 12 None	FTP, µg/mi	0.00	0.52	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.00
	US06, µg/mi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.06	0.02	0.03
	SS1, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.98	7.99	1.33	2.31
	SS2, µg/hr	1.20	8.18	7.09	1.01	1.76	0.00	0.00	0.69	1.20	6.92	9.45	1.39	2.40
	SS3, µg/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	2.41	4.16	1.83	0.35	0.60
ni6chry and ni6chryu = 6-Nitrochrysene ni13pyr and ni13pyru = 1,3-Dinitropyrene ni16pyr and ni16pyru = 1,6-Dinitropyrene ni18pyr and ni18pyru = 1,8-Dinitropyrene ni910anth and ni910anthu = 9,10-Dinitroanthracene ni6bap and ni6bapu = 6-Nitrobenz(a)pyrene														