

TADGER
GROUP
INTERNATIONAL



**CUSTOM MADE FOR
CLEANER AIR & LESS FUEL**

Environmental Technology Demonstration

Location: Citgo Service Ctr

Long Island, NY

Dates: Aug 2, 2006



**Long Island Gasoline
Retailers Association**

**Serving Long Island
and the Five Boroughs**



631-755-5550

Summary

Tadger Group International and LIGRA collaborated to demonstrate the Tadger in-line emission reduction technology. The testing program was performed according to the New York Vehicle Inspection Program (NYVIP) for light duty vehicles under NY 240. The test vehicles were baseline tested, equipped with the Tadger technology and retested with the Tadger installed.

The NY 240 composite tests on two different vehicles indicated average changes in hydrocarbons of -58.5% , carbon monoxide of -37.1% , oxides of nitrogen of -24.2% and carbon dioxide of -19.8%

The NY 240 phase 2 tests on two different vehicles indicated average changes in hydrocarbons of -70.5% , carbon monoxide of -43.7% , oxides of nitrogen of -33.1% and carbon dioxide of -28.9%

Definitions

HC.....	Hydrocarbons
CO.....	Carbon Monoxide
NO _x	Oxides of Nitrogen
CO ₂	Carbon Dioxide
g / m.....	Grams per mile

Vehicles

1995 7.4L GMC Suburban 2500
1997 4.9L Ford Expedition

Test Equipment

ESP systems emissions analyzer # E046973878

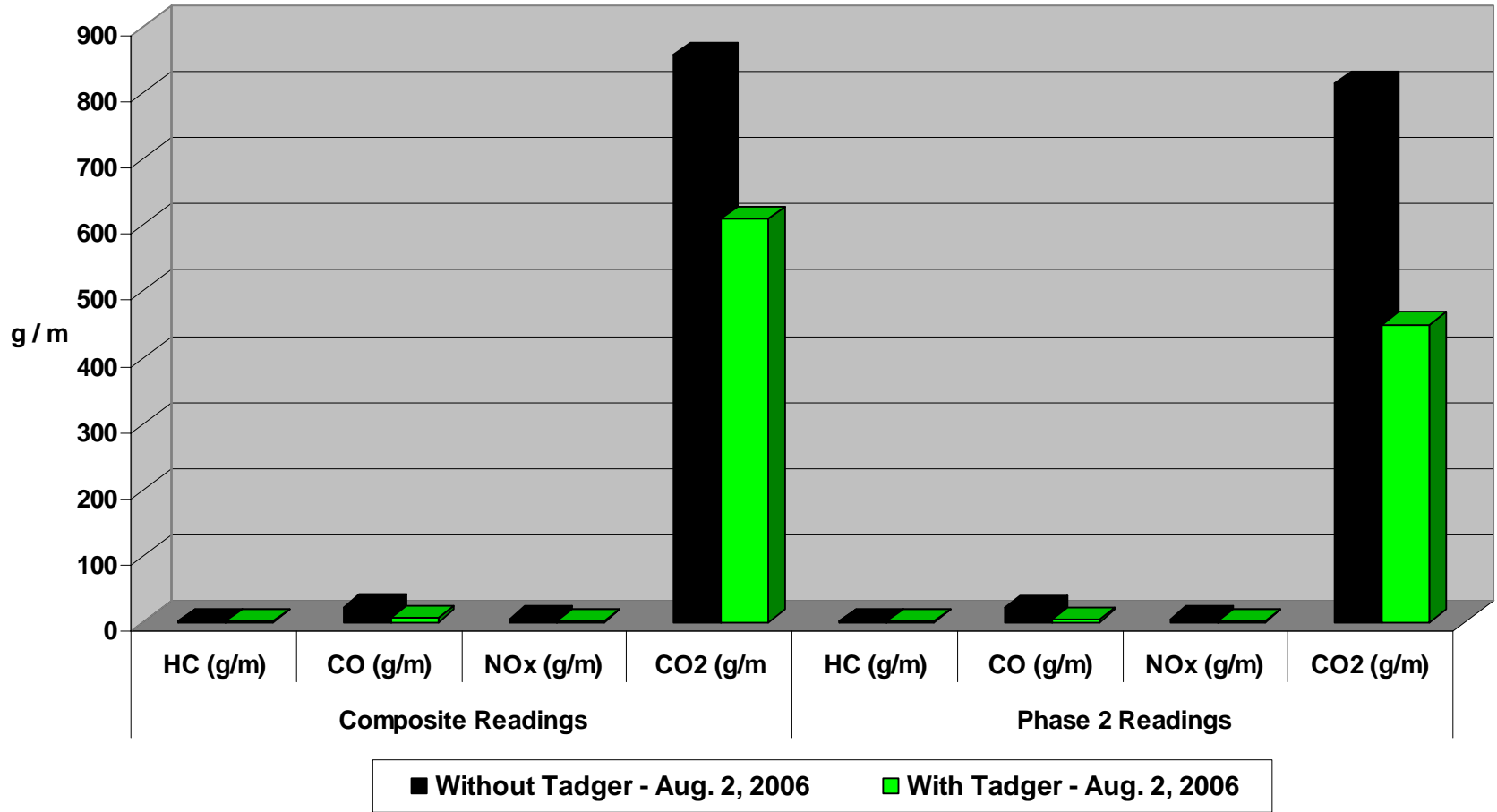
Test Procedure

- 1) Warm up engine
- 2) Baseline emission test with no Tadger installed
- 3) Install Tadger (10 min.)
- 4) Warm up engine (3 mile drive)
- 5) Emission test with Tadger installed

Results

The results have been documented and illustrated on the attached graphs. Additional test results for other municipalities, private industry and larger fleets is available on request or at www.tadgergroup.com

NY 240 Tailpipe Emissions Inspection
1995 7.4L GMC Suburban 2500



DIAGNOSTIC INSPECTION REPORT

Wed 02-Aug-2006 11:28:46 AM

Station Number: 1520723

Analyzer Number: E046973878

Vehicle Information

Model Year...: 1995	Make.: GMC
Fuel Type...: Gasoline	Model: K2500 SUBURBAN
Engine Size.: 7.4	Cylinders...: 8
Transmission: Automatic	Exhaust.....: Single

NY 240 DIAGNOSTIC TEST

Composite Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	1.22	1.60
CO (g/m):	22.79	40.00
NOx (g/m):	5.12	3.50
CO2 (g/m):	857.62	

Phase 2 Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	1.12	1.00
CO (g/m):	22.47	32.00
NOx (g/m):	5.17	3.50
CO2 (g/m):	815.19	

DIAGNOSTIC INSPECTION REPORT

Wed 02-Aug-2006 12:55:08 PM

Station Number: 1520723

Analyzer Number: E046973878

Vehicle Information

Model Year...: 1995
Fuel Type...: Gasoline
Engine Size.: 7.4
Transmission: Automatic

Make.: GMC
Model: C2500 SUBURBAN
Cylinders...: 8
Exhaust.....: Single

NY 240 DIAGNOSTIC TEST

Composite Readings/Limits

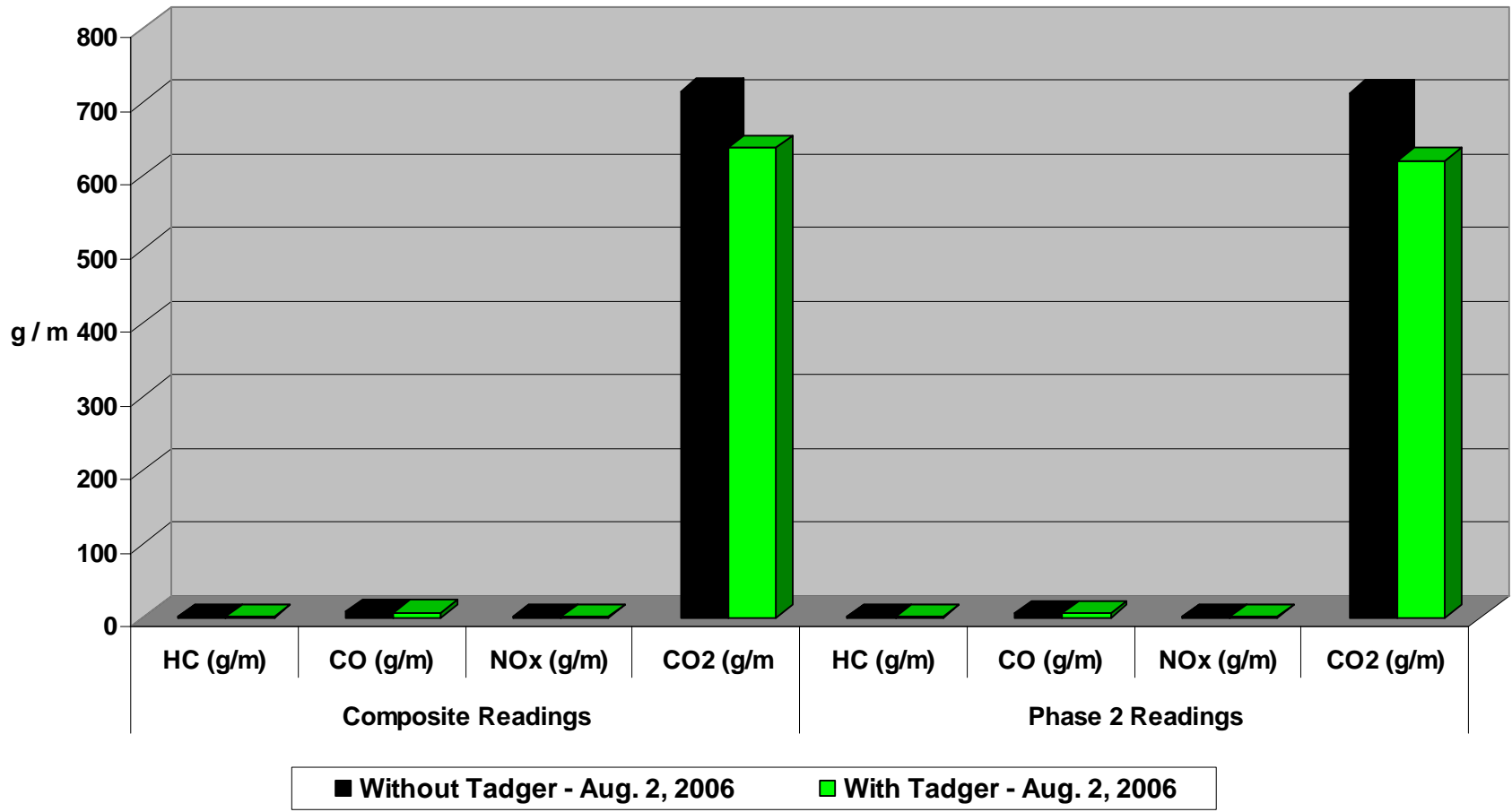
	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.24	1.60
CO (g/m):	6.10	40.00
NOx (g/m):	2.15	2.50
CO2 (g/m):	609.58	

Phase 2 Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.20	1.00
CO (g/m):	3.63	32.00
NOx (g/m):	1.69	2.50
CO2 (g/m):	449.86	

DYNE ABORT

NY 240 Tailpipe Emissions Inspection
1997 4.9L Ford Expedition



DIAGNOSTIC INSPECTION REPORT

Wed 02-Aug-2006 12:13:28 PM

Station Number: 1520723

Analyzer Number: E046973878

Vehicle Information

Model Year...: 1995
Fuel Type...: Gasoline
Engine Size...: 5.0
Transmission: Automatic

Make.: Ford
Model: BRONCO
Cylinders...: 8
Exhaust.....: Single

NY 240 DIAGNOSTIC TEST

Composite Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.41	1.60
CO (g/m):	6.97	40.00
NOx (g/m):	1.04	2.50
CO2 (g/m):	715.42	

Phase 2 Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.17	1.00
CO (g/m):	6.01	32.00
NOx (g/m):	0.94	2.50
CO2 (g/m):	713.08	

DYNE ABORT

DIAGNOSTIC INSPECTION REPORT

Wed 02-Aug-2006 01:23:07 PM

Station Number: 1520723

Analyzer Number: E046973878

Vehicle Information

Model Year...: 1995
Fuel Type...: Gasoline
Engine Size.: 5.0
Transmission: Automatic

Make.: Ford
Model: BRONCO
Cylinders...: 8
Exhaust.....: Single

NY 240 DIAGNOSTIC TEST

Composite Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.26	1.60
CO (g/m):	6.90	40.00
NOx (g/m):	1.14	2.50
CO2 (g/m):	638.76	

Phase 2 Readings/Limits

	<u>Reading</u>	<u>Limit</u>
HC (g/m):	0.07	1.00
CO (g/m):	5.80	32.00
NOx (g/m):	0.95	2.50
CO2 (g/m):	621.01	

DYNE ABORT

1995 7.4L GMC Suburban 2500

Composite Readings

HC (g/m) CO (g/m) NOx (g/m) CO2 (g/m)

Without Tadger - Aug. 2, 2006

1.22 22.79 5.12 857.62

With Tadger - Aug. 2, 2006

0.24 6.1 2.15 609.58

Improvement

80.3% 73.2% 58.0% 28.9%

Phase 2 Readings

HC (g/m) CO (g/m) NOx (g/m) CO2 (g/m)

1.12 22.47 5.17 815.19

0.2 3.63 1.69 449.86

82.1% 83.8% 67.3% 44.8%

1997 4.9L Ford Expedition

Composite Readings

HC (g/m) CO (g/m) NOx (g/m) CO2 (g/m)

Without Tadger - Aug. 2, 2006

0.41 6.97 1.04 715.42

With Tadger - Aug. 2, 2006

0.26 6.9 1.14 638.76

Improvement

36.6% 1.0% -9.6% 10.7%

Phase 2 Readings

HC (g/m) CO (g/m) NOx (g/m) CO2 (g/m)

0.17 6.01 0.94 713.08

0.07 5.8 0.95 621.01

58.8% 3.5% -1.1% 12.9%

FUEL ECONOMY

Using the carbon balance methodology from the Federal Register (40 CFR, Part 600), the equation to determine fuel economy estimate is:

$$FE = \frac{2421}{(\text{CO}_2 \times 0.273) + (\text{HC} \times 0.866) + (\text{CO} \times 0.429)}$$

where

FE = Fuel economy in miles per gallon

CO₂ = Carbon dioxide exhaust emissions in grams per mile

HC = Total running exhaust plus running losses hydrocarbon emissions in grams per mile

CO = Running exhaust carbon monoxide emissions in grams per mile

1995 7.4L GMC Suburban 2500

BEFORE

<u>CO₂</u>	<u>HC</u>	<u>CO</u>	<u>MPG</u>
857.62	1.22	22.79	9.9

AFTER

609.58	0.24	6.1	14.3
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Improvement **44.7%**

1997 4.9L Ford Expedition

BEFORE

<u>CO₂</u>	<u>HC</u>	<u>CO</u>	<u>MPG</u>
715.42	0.41	6.97	12.2

AFTER

638.76	0.26	6.9	13.6
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Improvement **11.9%**

Discussion & Conclusion

TADGER
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INTERNATIONAL



**CUSTOM MADE FOR
CLEANER AIR & LESS FUEL**

The purpose of this test program was to demonstrate the product for its effect on vehicle exhaust emissions.

A total of 4 dynamometer exhaust emission tests were conducted on 2 different vehicles (2 per vehicle) with and without the Tadger product installed.

The results of this dynamometer exhaust emission test program indicated that the Tadger is effective in reducing emissions under load over the 240 second test.