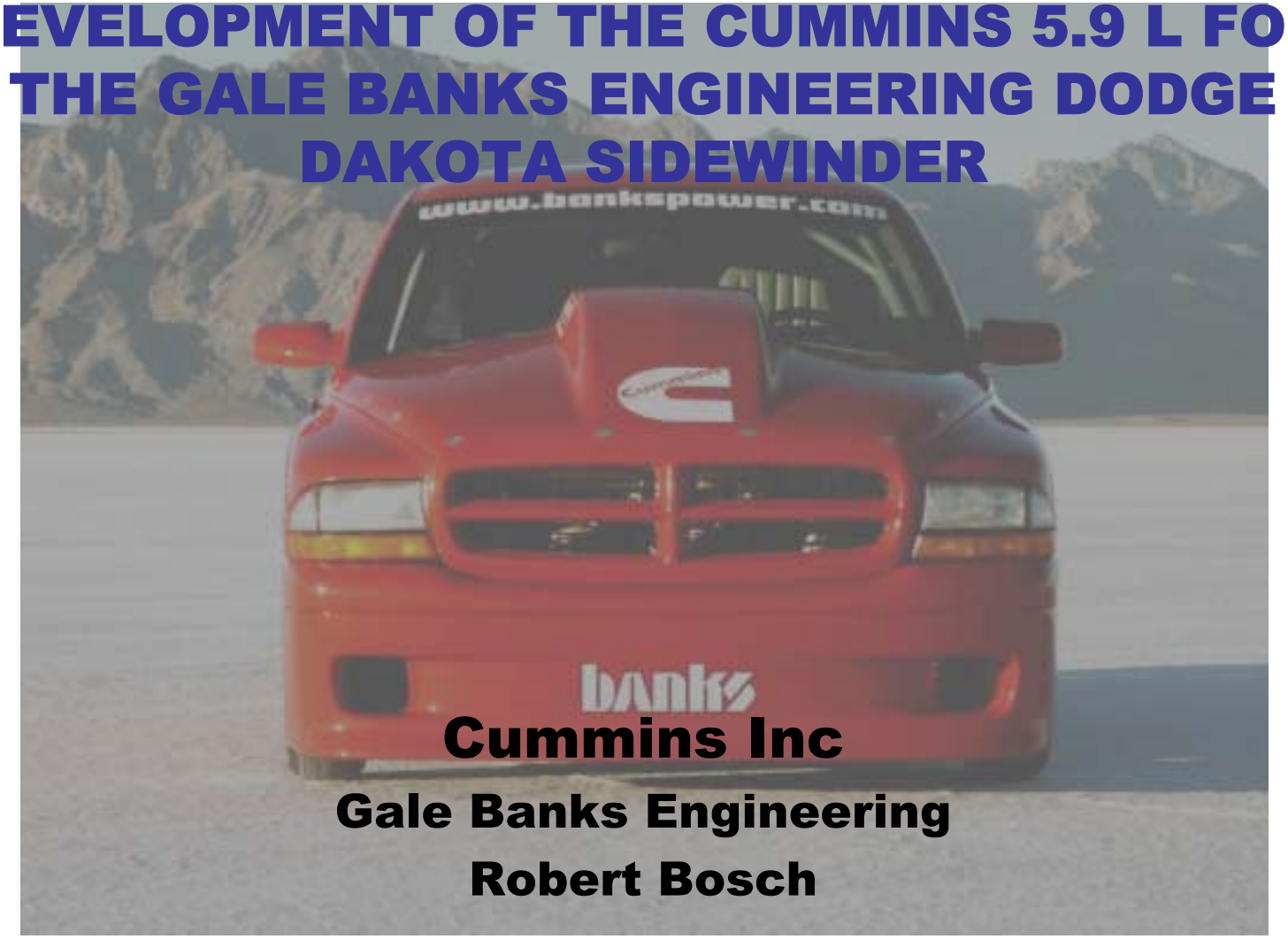
DEVELOPMENT OF THE CUMMINS 5.9 L FOR THE GALE BANKS ENGINEERING DODGE DAKOTA SIDEWINDER



Cummins Inc

Gale Banks Engineering

Robert Bosch

2003 DEER - Newport, RI

Introduction

- Two year collaboration between Gale Banks Engineering and Cummins Inc, to showcase diesel power in a “sporting light”.

Major Contributors

Systems integration, VGT controls, Cylinder head Mods, Vehicle Engineering

Engine system performance

Engine management system

Fuel Injection Equipment

Turbocharging Equipment

Project Goals - Power to the Fifth

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•600+ HP and 1000+ ft-lb of torque.

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•Capable of towing race equipment to events.

•Quiet and low visible emissions.

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- Street legal
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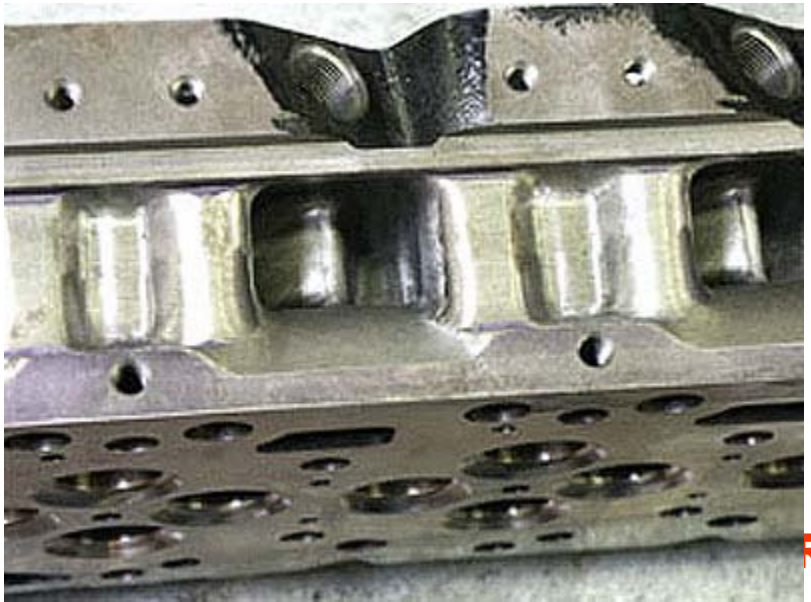
Engine Modifications



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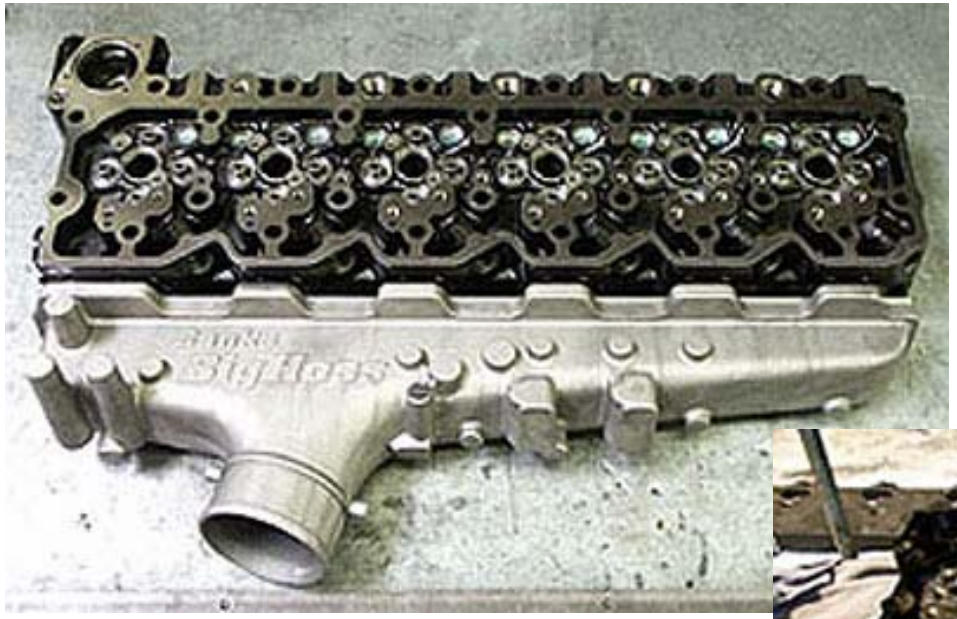

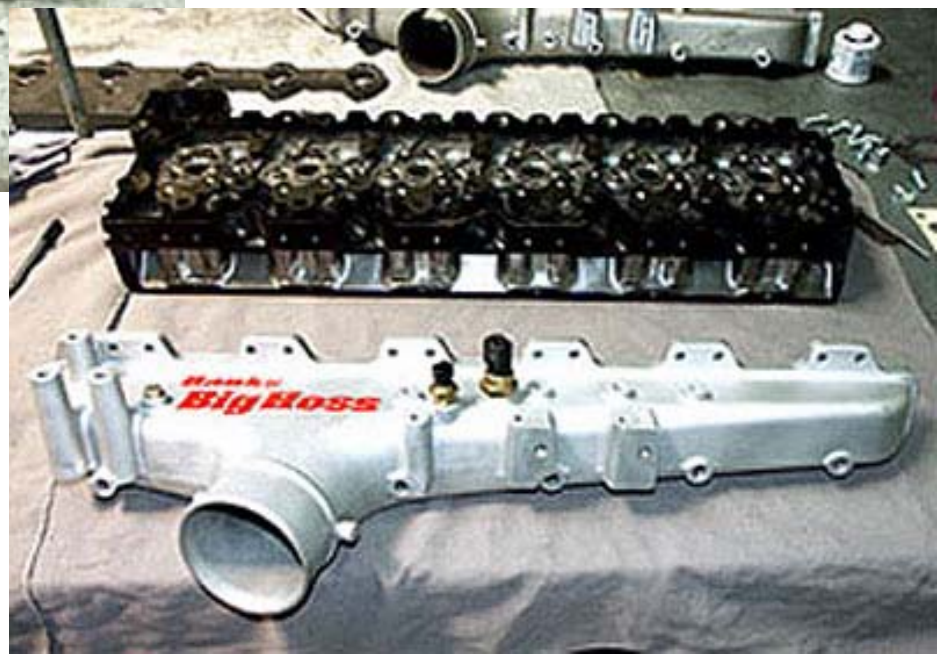

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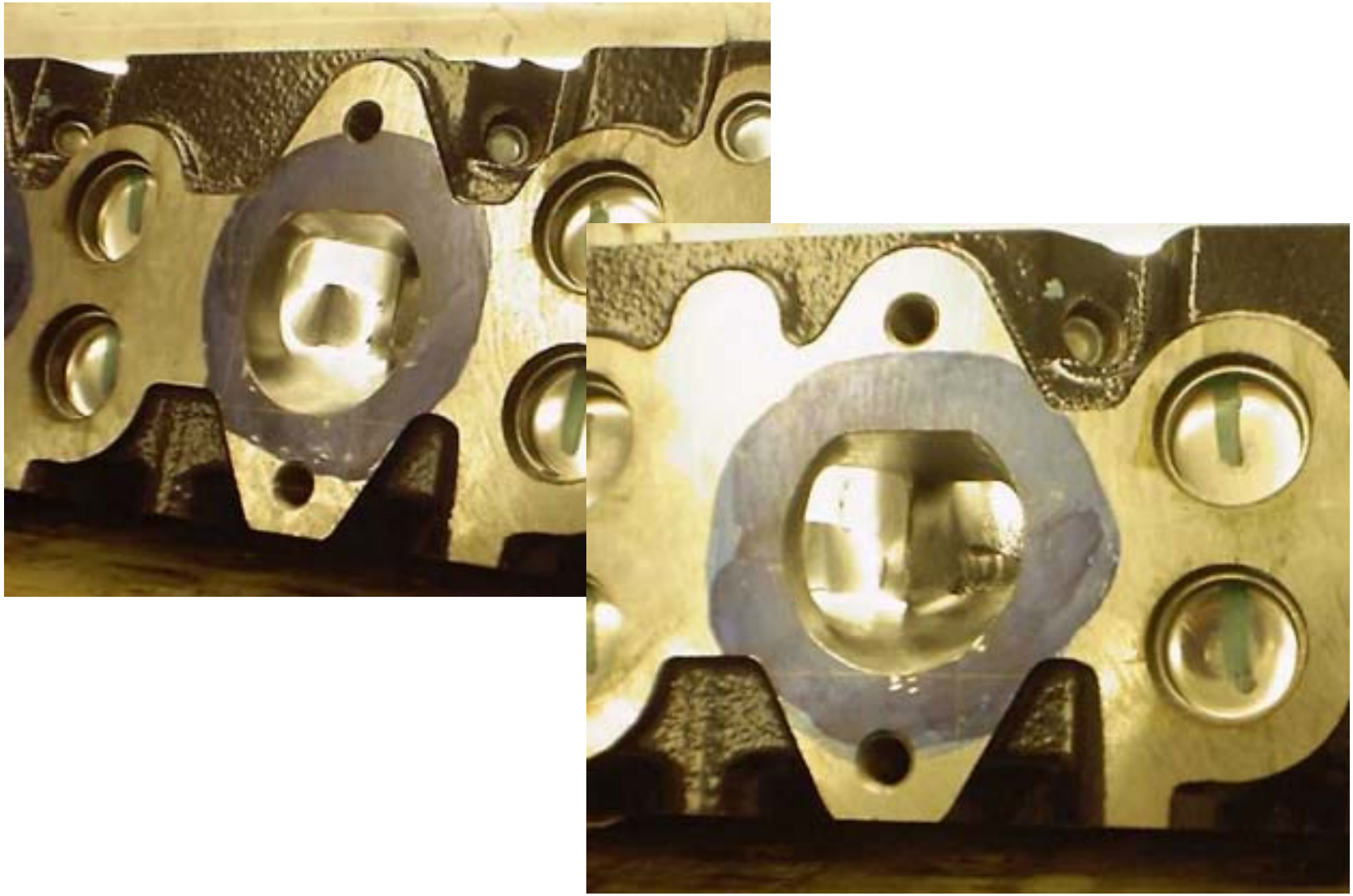

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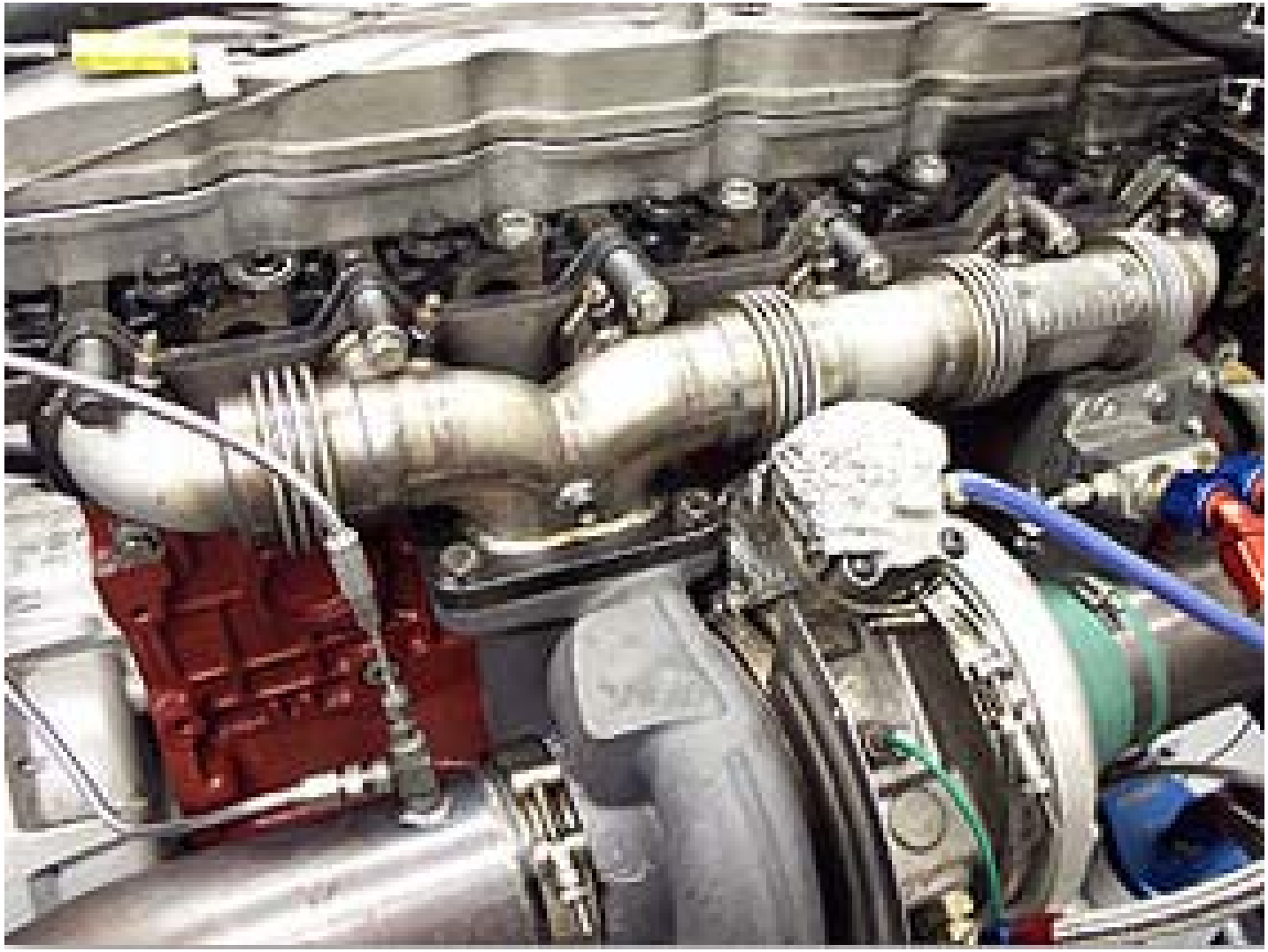
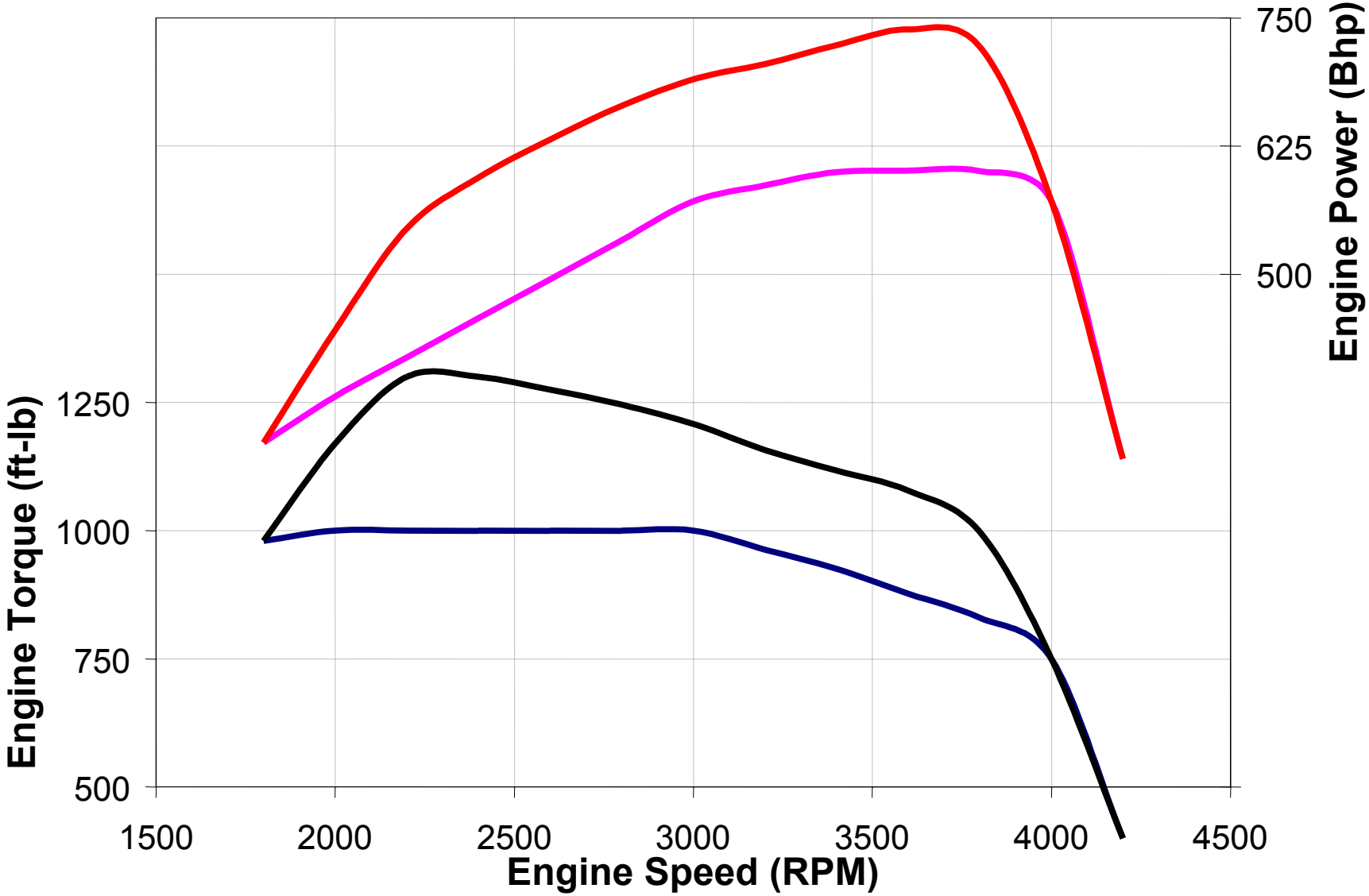


Engine Specifications

	Baseline DCX MY03	Sidewinder (street/race)
Rated (HP @ RPM)	305 @ 2900	600 @ 3800 / 730 @ 3800
Torque Peak (HP @ RPM)	555 @ 1400	1000 @ 1800 / 1300 @ 2200
Compression Ratio	17.2:1	15:1
Maximum Fueling (mm3/st)	120	220 / 280
Injection Nozzle flow (cc @ 100 bar/30 s)	500	600 / 750
Maximum injection pressure (bar)	1600	1800
Fuel Economy (combined – mpg)	21	21

Demonstrated Power



Vehicle Systems

	Street	Race
Charge air Cooling	Air – Air	Iced Water – Air
Engine Cooling	Air – Coolant, Electric Fan	Air – Coolant
Turbocharger Control	Pneumatic – Electronic, PRc feedback	Pneumatic – Electronic, PRc feedback
Final Drive	3.30 : 1	1.97 : 1
Tires	Yokohama 295 / 45 R 20	Eagle Speed 800x820x15

Vehicle Installation

Vehicle Class and Competition

October 2002 Entry

Banks Sidewinder:	Entry #212	
BNI Class:	C/Diesel Truck (C/DT)	
BNI C/DT Record:	159.647 MPH	
BNI Record (any pickup):	205.208 MPH (Banks Cyclone)	
FIA Class:	Category B	(Production Vehicle)
	Group 3	(Diesel, Supercharged)
	Class 17	(Engine Size: 5.5–6.0L)
FIA Record:	Open	

Records

	Mile (MPH)	Kilo (KPH)	Exit (MPH)
Friday, October 18: (7-mile course)			
Run 1 (limited to 175 MPH maximum)	172.617	278.517	—
Run 2 (limited to 200 MPH maximum)	192.608	309.584	—
Record Set: 4			
(FIA Mile & Kilo + BNI Int'l. Mile & Kilo)	**182.613**	**294.050**	
Saturday, October 19:(7-mile course)			
Run 1	216.034	347.843	—
Run 2	218.593	350.877	—
Record Set: 4			
(FIA Mile & Kilo + BNI Int'l. Mile & Kilo)	**217.314**	**350.012**	
Saturday, October 19:(5-mile course)			
Run 1 (clocks malfunctioned)	—	—	220.422
Run 2	217.212	—	222.139
Sunday, October 20: (5-mile course)			
Run 1 (pinion failure)	209.954	—	—
Record Set: 1 (SCTA/BNI Nat'l.)	**213.583**		

Totals: 7 runs, 9 records

Comparison with Ferrari Enzo

Ferrari Enzo

Banks Sidewinder

Country of origin	Italy	USA
Type	2-door, 2-pass. coupe	Two-door, two-pass. sport truck
Introduction	2002 Paris Motor show	2002 Bonneville World Finals
Engine		
Displacement	6.0 liter (366 cid)	5.9 liter (359 cid)
No. of cylinders	12	6
Fuel system	Bosch fuel injection	Bosch common rail direct injection
Induction	Naturally aspirated	Holset VGT with Banks controller
Valvetrain	4 valves/cyl, DOHC	4 valves/cyl, cam-in-block
Comp. ratio	11.2:1	15.1:1
Horsepower (Bhp)	660	735
Torque (ft-lb)	485	1300
Max RPM	8200	4000
Transmission	6-speed manual	6-speed manual
Specific output	110 hp/liter (1.8 hp/in3)	125 hp/liter (2.0 hp/in3)

Comparison with Ferrari Enzo

	Ferrari Enzo	Banks Sidewinder
Performance		
Top speed	217.5 mph (estimated)	222.139 mph (measured)
Fuel economy	**8-12 MPG**	**21.2 MPG**
Standard Equipment		
Air conditioning	Yes	Yes
Stereo	No	Yes
Trailer hitch	No	Yes
Automatic trans.	No	Optional
Available colors	Red, yellow	Red
Pricing and Availability		
Price	$650,000	**Priceless**
Availability	Sold out	Sold out

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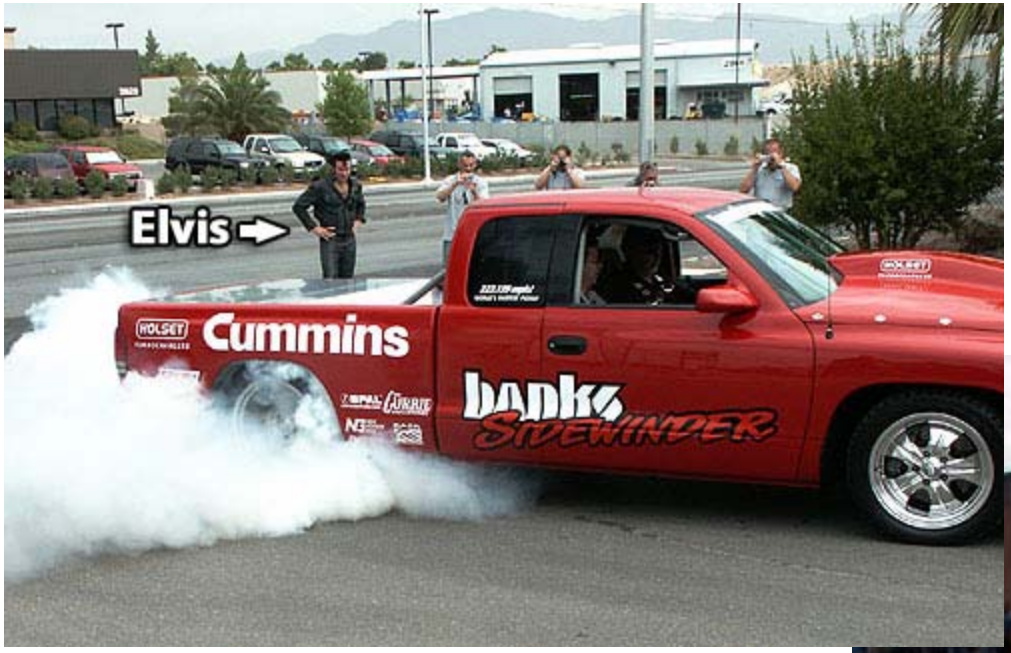
ACHIEVED

PM Emissions



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PM Emissions

Thanks

Cummins:
Rob Smith, Lyle Kocher, Ken King, Matt Meek, Will Harvey
Greg Franks, Jason Mackey, and John Stang

Gale Banks Engineering
Gale Banks, John Espino, Sheldon Tackett, and
Andy Johnston