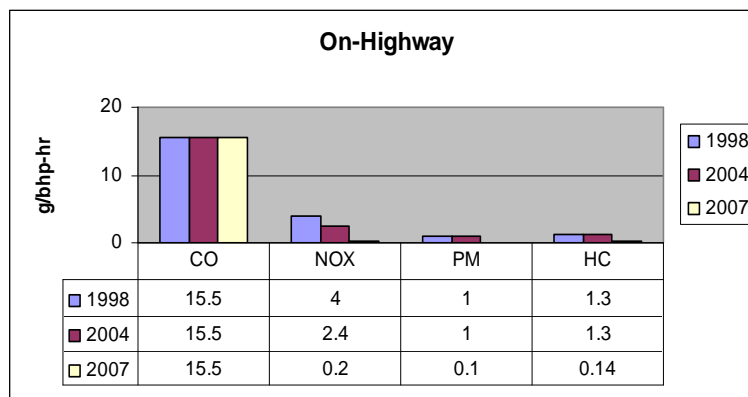


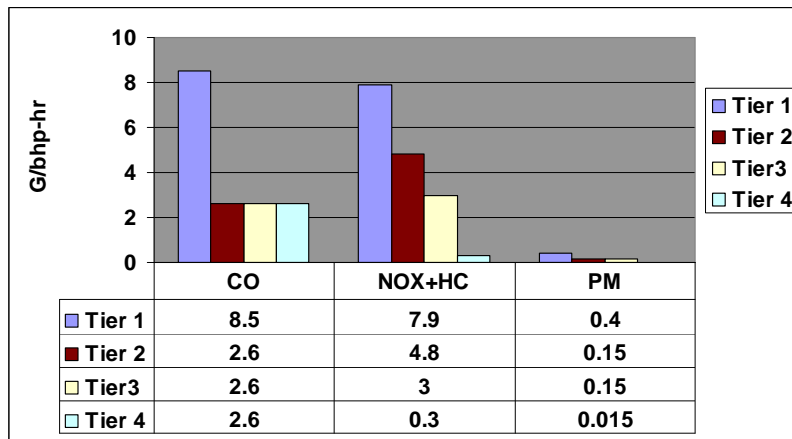
Chassis Dynamotor Results from 2008 On-Highway Pickups

by
Steve "Skinner" Forbush
Arch Coal Inc.

USEPA On-Highway Requirements (under transition)



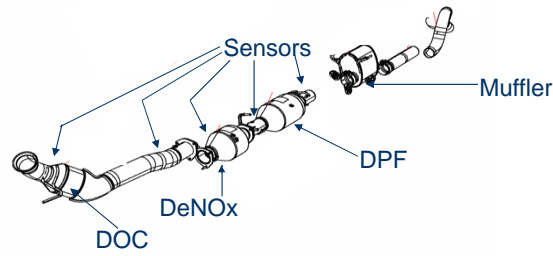
USEPA Off-Highway Requirements (steady state)



Apples and Oranges

- On-Highway tested in full Transition (FTP).
- Off-Highway tested at Steady State (ISO 8178).
- So with this said all of the pickup trucks tested were probably in compliance with their required emissions regulations (Under Transition “FTP”).
- These trucks were tested under a different protocol than they were designed for. Tested under steady state and designed for transition testing.

2007+ On-Highway Hardware



Results 1st Truck 1-ton w/o DeNox

	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
	220 HP	166 hp	Heavy Load	Light Load	Light Load	Light Load
	3000 rpm	3000 RPM	30 MPH	30 MPH	20 MPH	18 MPH
CO ppm	0	0	0	0	0	0
CO2 %	9.90%	8.90%	10.90%	8.70%	9.50%	7.40%
O2 %	7.50%	8.90%	6.20%	9.10%	8.10%	10.90%
NO ppm	391	120	401	810	259	117
NO2 ppm	160	77	218	412	240	135
Temp F	739	722	694	810	712	673
Vent rate CFM	21975	12214	16506	31194	27257	15332
	NO2	CO2	NO2	NO2	NO2	NO2

d

Results 3/4 ton with DeNox

	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
	220 HP	166 hp	Heavy Load	Light Load	Light Load	Light Load
	3000 rpm	3000 RPM	30 MPH	30 MPH	20 MPH	18 MPH
CO ppm	0	0	0	0	0	0
CO2 %	10.00%	8.70%	10.50%	5.40%	3.70%	4.70%
O2 %	7.40%	9.20%	6.70%	13.70%	16.00%	14.60%
NO ppm	170	89	130	312	282	379
NO2 ppm	17	5	7	97	308	392
Temp F	687	759	808	713	651	527
Vent rate CFM	14465	12584	10442	9646	22276	32351
	CO2	CO2	CO2	NO2	NO2	NO2

f

Results 3/4 ton with DeNox

	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
	210 HP	165 HP	156 HP	105 HP	30 MPH	30 mph
	3000 rpm	3000 RPM	1600 RPM	1600 RPM	Heavy load	Light Load
CO ppm	0	0	0	0	0	0
CO2 %	8.70%	6.70%	9.70%	7.60%	10.50%	9.80%
O2 %	9.20%	11.80%	7.80%	9.80%	6.70%	7.70%
NO ppm	1247	289	407	268	348	360
NO2 ppm	312	406	58	51	92	108
Temp F	816	637	794	768	734	724
Vent rate CFM	44293	57638	7344	5754	9938	10221
	NO2	NO2	CO2	CO2	CO2	NO2

d

Results 3/4 ton with DeNox

	Test 1	Test 2	Test 5	Test 6
	237 HP	180 HP	30MPH	30MPH
	3000 rpm	3000 RPM	High load	Light Load
CO ppm	0	0	0	0
CO2 %	9.80%	8.40%	11.30%	6.30%
O2 %	7.60%	9.60%	5.70%	12.40%
NO ppm	1104	1421	337	347
NO2 ppm	195	440	317	295
Temp F				
Vent Rate CFM	39,937	65,634	26,599	24,754
	NO	NO2	NO2	NO2

C

Pre and Post After Treatment

	245 dyno hp 3000 rpm	245 dyno hp 3166 rpm	202 dyno hp 3000 rpm	128 dyno hp 2000 rpm	64 dyno hp 2000 rpm
Pre After Treatment	Before Regeneration	After Regeneration	After Regeneration	After Regeneration	After Regeneration
Nitric Oxide ppm	1274	1384	1373	412	518
Nitrogen Dioxide ppm	125	568	452	208	123
NOX ppm	1399	1952	1825	620	641
Post After Treatment					
Nitric Oxide ppm	834	1052	903	674	445
Nitrogen Dioxide ppm	605	665	825	200	235
NOX ppm	1439	1717	1728	874	680

Conclusions.

- On-Highway vehicles should not be used in underground mines without additional ventilation.
- It is uncertain at this time if On-Highway vehicles can be used in underground mines in the future. Additional testing will be needed to find out for sure.

Questions?