



WHAT DOES “NO MIL” FROM OBD REALLY MEAN?

A STORY OF TRUST AND CHEATING

GREG BANISH



- MIL must be on if conditions result in emissions >150% of standard.
- Presence of MIL = automatic fail for cert.
- Stored codes must point toward suspected cause of emissions
- OBD Demonstration for MOR certification represents ~\$1M in testing, more in development
 - Various induced failures, measured tailpipe emissions in lab

Engine Diagnostics

General | Airflow | Misfire | Exhaust | DTCs

Mass Airflow Sensor

| | |
|----------------------|------------------|
| High Fail A/D Counts | 980 |
| Low Fail A/D Counts | 50 |
| Default Period | 1,000.00 μ s |
| Minimum Period | 1,300.00 μ s |
| Fail RPM | 6,850 rpm |

Manifold Absolute Pressure Sen

Rationality Tests

| | |
|---------|-----------|
| Min RPM | 500 rpm |
| Max RPM | 2,500 rpm |

P0106

| | |
|-----------|----------|
| Tolerance | 10.0 kPa |
|-----------|----------|

Barometric Pressure Sensor

| | |
|----------------|-------|
| P2228 Max Time | 5.0 s |
| P2229 Max Time | 5.0 s |

Throttle Inlet Pressure Sensor

| | |
|------------|-------|
| Max Counts | 1,022 |
| Min Counts | 1 |

Engine Diagnostics

General | Airflow | Misfire | Exhaust | DTCs

Oxygen Sensors

Monitor

| | |
|----------------|---------------------|
| Timer | 2.10 s |
| O2 Voltage Max | 1.10 V |
| ECT Min | 145.00 $^{\circ}$ F |
| Airflow Min | 0.80 lb/min |
| Max RPM | 600 rpm |
| Min RPM | 50 rpm |
| Delta RPM | 1,000 rpm |
| Max VS | 80.0 mph |
| Min VS | 35.0 mph |
| Delta VS | 9.0 mph |
| Load Max | 0.61 |
| Load Min | 0.20 |
| Delta Load | 0.40 |
| Lambda Max | 1.03 |
| Lambda Min | 0.96 |
| Delta Lambda | 0.10 |

[ECM]

Rich/Lean DTC

| | |
|--------------------|--------|
| P0172/P0175 Thresh | 0.7600 |
| P0171/P0174 Thresh | 1.2900 |

Catalyst

Catalyst MIL Enabled

First Threshold

No Fault Threshold

Normal Threshold SCL Threshold

Engine Diagnostics

General | Airflow | Misfire | Exhaust | DTCs

Detection

| | |
|--------------------|---------------------|
| ECT Max | 250.00 $^{\circ}$ F |
| ECT Min | 20.00 $^{\circ}$ F |
| RPM Min | 100 rpm |
| Background RPM Max | 6,850 rpm |
| Background RPM Min | 500 rpm |

Min Load

Detection Disable

Disable Line Torque Level

Mult RPM Mult Paired Cyl RPM

Mult PC-REV

[ECM] 39212 - Misfire Detection Threshold Paired Cylinder Multiplier (PC-REV): Misfire multiplier table to paired cylinder misfire detection threshold PC-REV channel.

[Parameter Access](#) 0.000 to 5.000





If the MIL isn't on, and we ran the monitors, tailpipe emissions should be less than 150% of the standard.

-Aristotle (probably)

CHECKING COULDN'T BE EASIER



Connected to ECU OK.

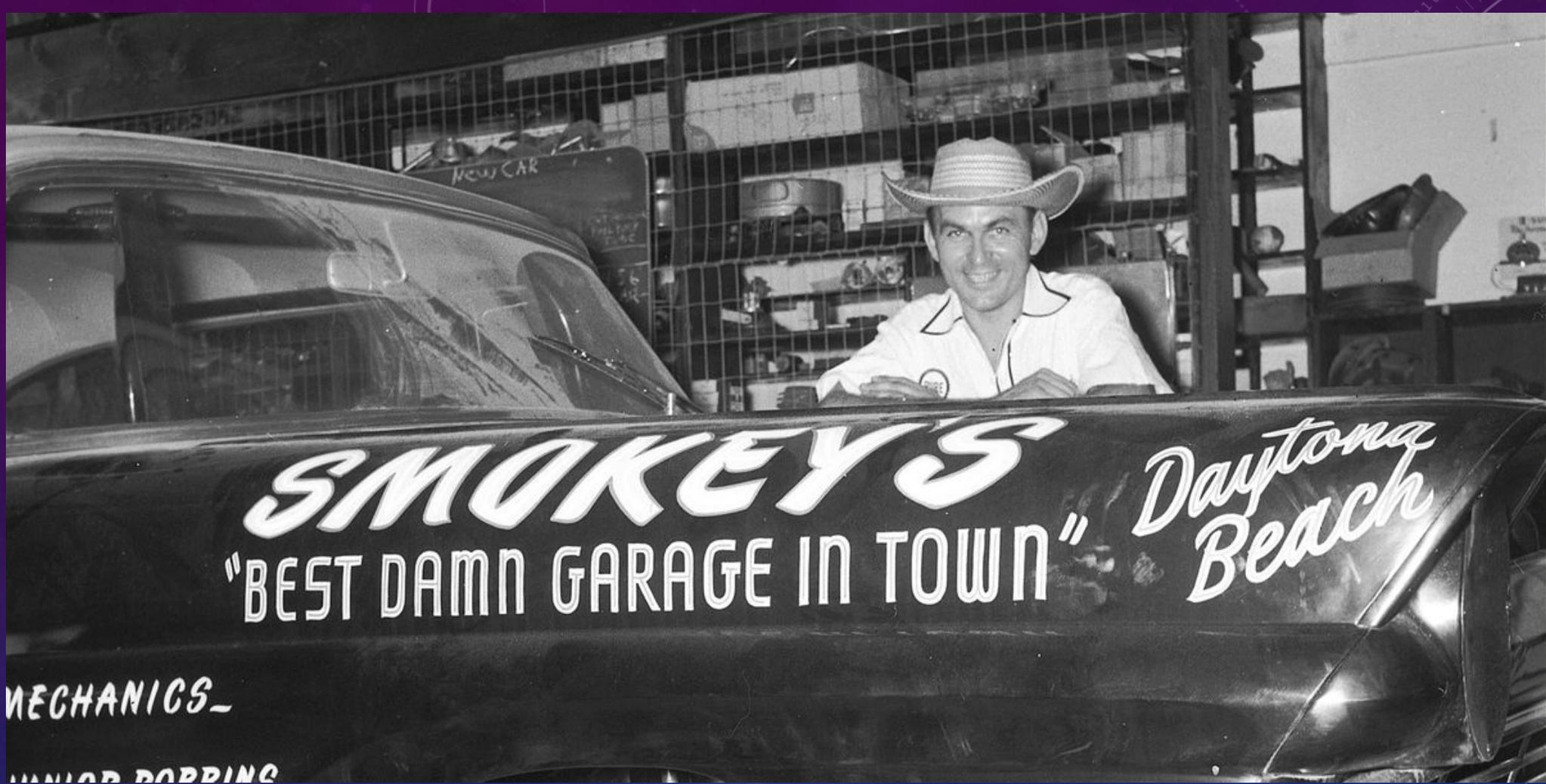
Emissions Readiness s/DTC

- Misfire: Complete
- Fuel System: Complete
- Components: Complete
- System Type: Spark
- Catalyst: Complete
- Heated Catalyst: Not avail
- Evaporative Sys: Complete
- Secondary Air Sys: Not avail
- A/C Refrigerant: Not avail
- O2 Sensor: Complete
- O2 Sensor Heater: Complete
- EGR System: Not avail

Confirmed Emissions DTC's: 0

MIL Is On: False

| | | | |
|-------------|----------|----------------------|---------------|
| Misfire | Complete | Catalyst | Complete |
| Fuel System | Complete | Heated Catalyst | Not Supported |
| Components | Complete | Evaporative System | Complete |
| | | Secondary Air System | Not Supported |
| | | A/C Refrigerant | Not Supported |
| | | Oxygen Sensor | Complete |
| | | Oxygen Sensor Heater | Complete |
| | | EGR System | Not Supported |



“As far as cheating goes, they’ll never stop it. The only way it can be done successfully, only one person can know about it.”

—Smokey Yunick

JUST RELEASED! Ford Powerstroke 3.0L | EGR, DPF & DEF Complete Delete Kit | EZ LYNK With Custom Delete Tunes.

<https://bigdaddydiesel.com/store/Ford-Powerstroke-3-0L-EGR-DPF-&-DEF-Complete-Delete-Kit-EZ-LYNK-With-Custom-Delete-Tunes-p432770583>



COMMERCIALLY AVAILABLE TOOLS



File Edit Compare Flash Tools Window Help

★ Favorites OS Engine Engine Diag Trans Trans Diag Fuel Sys System Speedo

Comparison Log - Differences

- 12 Power Enrichment Ramp In Rate
- Temperature Control
 - Catalyst Protection
 - Catalyst Over-Temp Enable
- Lean / Fuel Saving
- Spark
 - Advance
 - Retard
- Torque Management
- Engine Diagnostics
 - Airflow
 - Throttle Position Sensor
 - 12 P2101 Throttle Error Positive
 - 12 P2101 Throttle Error Negative
 - Mass Airflow Sensor
 - 12 P0101, P0106, P0121 Perf Test - Min ECT
 - 12 P0101, P0106, P0121 Perf Test - Max ECT
 - Manifold Absolute Pressure Sensor
 - Airflow correlation
 - Misfire
 - cylinder Mode
 - Misfire cylinder Mode Event Time - Idle
 - Misfire cylinder Mode Event Time - Normal
 - DTCs
 - List
 - Master DTC List
- Transmission

Engine Diagnostics

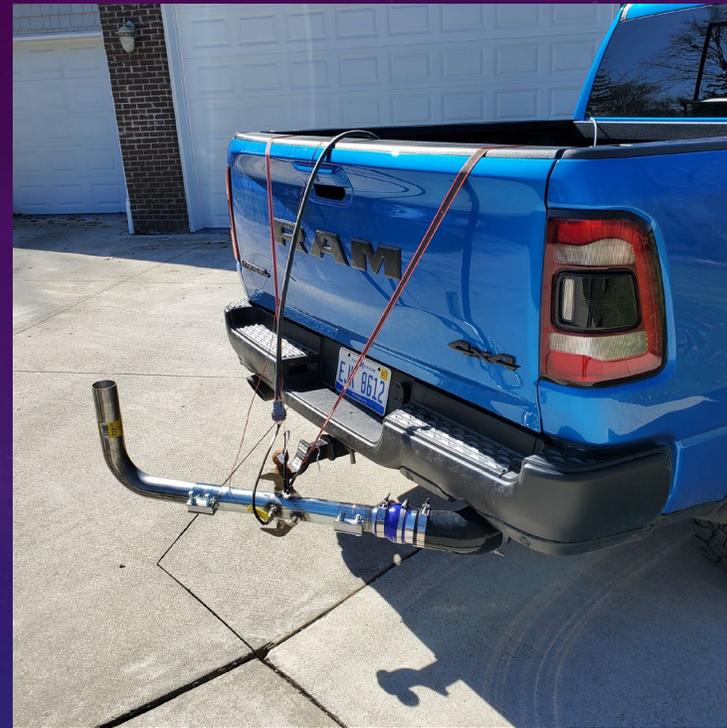
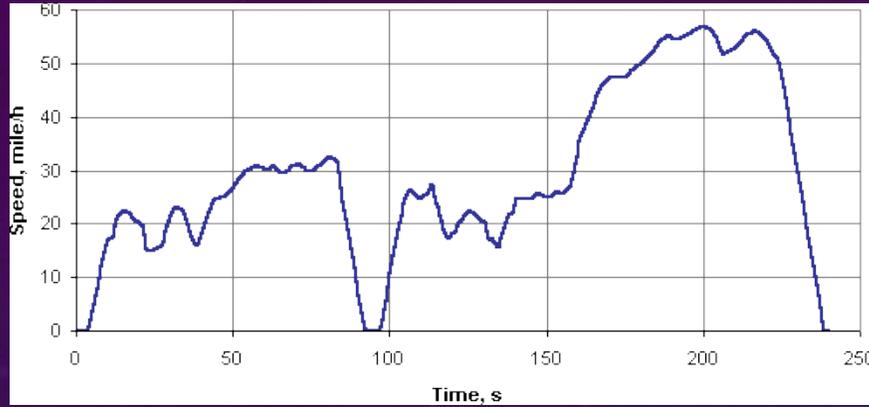
| General | Airflow | Pressure | Misfire | DTCs |
|---------|--|-------------------------------------|---------------------|------|
| DTC | Description | SES Enable | Error Mode | |
| P0137 | O2 Circuit Low Voltage (Bank 1, Sensor 2) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P0138 | O2 Circuit High Voltage (Bank 1, Sensor 2) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P013A | O2 Sensor Slow Response - Rich to Lean (Bank 1 and Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P013B | O2 Sensor Slow Response - Lean to Rich (Bank 1, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P013C | O2 Sensor Slow Response - Rich to Lean (Bank 2, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P013D | O2 Sensor Slow Response - Lean to Rich (Bank 2, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P013E | O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P013F | O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P0141 | O2 Heater Circuit (Bank 1, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P014A | O2 Sensor Delayed Response - Rich to Lean (Bank 2 Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P014B | O2 Sensor Delayed Response - Lean to Rich (Bank 2 Sensor 2) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P0151 | O2 Circuit Low Voltage (Bank 2, Sensor 1) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P0152 | O2 Circuit High Voltage (Bank 2, Sensor 1) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P0153 | O2 Circuit Slow Response (Bank 2, Sensor 1) | <input type="checkbox"/> | No Error Reported | |
| P0155 | O2 Heater Circuit (Bank 2, Sensor 1) | <input checked="" type="checkbox"/> | MIL on Second Error | |
| P0157 | O2 Circuit Low Voltage (Bank 2, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P0158 | O2 Circuit High Voltage (Bank 2, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P015A | O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 1) | <input type="checkbox"/> | No Error Reported | |
| P015B | O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 1) | <input type="checkbox"/> | No Error Reported | |
| P015C | O2 Sensor Delayed Response - Rich to Lean (Bank 2 Sensor 1) | <input type="checkbox"/> | No Error Reported | |
| P015D | O2 Sensor Delayed Response - Lean to Rich (Bank 2 Sensor 1) | <input type="checkbox"/> | No Error Reported | |
| P0161 | O2 Heater Circuit (Bank 2, Sensor 2) | <input type="checkbox"/> | No Error Reported | |
| P0171 | System Too Lean (Bank 1) | <input checked="" type="checkbox"/> | MIL on Second Error | |

[ECM] 50 - Master DTC List: Tampering with emissions control devices can be illegal. Please check your local laws as well as EPA rules and regulations for legal modification. Disabling emissions controls should be used on off road use only vehicles. It is illegal to modify diagnostic test results in order to pass emissions testing. FOR OFF ROAD USE ONLY!

WHERE DO WE DRAW THE LINE?

- Separate polluters from good guys
 - It is possible to make lots of power without disabling emissions or OBD
- Quickly identify bad actors, flag them for review.
- Create a reasonable path for in-use compliance on a broad basis.
 - Installers, Users, Auctions
 - Massive impact due to scale

“REASONABLE BASIS”?

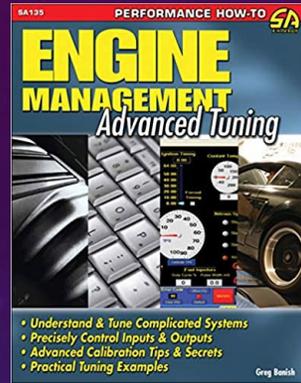
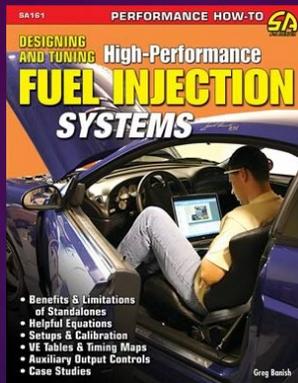
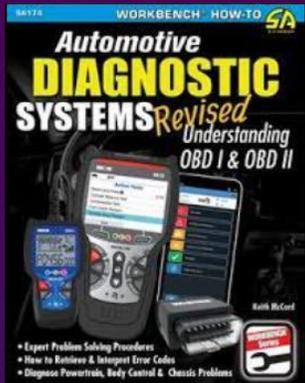


Barriers to Adoption:

- Catches most offenders
 - Allow Non-Defeat Device systems to pass
- Affordable measurement system
- Ease of use and reporting
- Known regulatory standard
 - g/mi, % concentration, OBD, Signature?
 - *NOT 1066*
- Avoid CAA fines with compliant systems



CONTRIBUTIONS



- On-site and 1-on-1 training
- Emissions/Performance consulting