HDIUT “Lessons Learned” with Horiba gaseous & PM PEMS, the Users’ Perspective

CeCERT PEMS Workshop
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adverse comment, we will not take further action on this proposed rule. If we receive adverse comment on the rule or any portions of the rule, we will withdraw the direct final rule or the portion of the rule that received adverse comment. We will address all public comments in a subsequent final rule based on this proposed rule. We will not institute a second comment period on this action. Any parties interested in commenting must do so at this time.

II. Does this action appl

This action will affect manufacture and certify diesel engines and vehic the highway.

Category	NAICS code [a]	Examples of potentially affected entities
Industry	336112 336120	Engine and Truck Manufacturers.
Industry	333112	Manufacturers of lawn and garden tractors.
Industry	333618	Manufacturers of new engines.
Industry	482110, 482111, 482112	Railroad owners and operators.
Industry	811112, 811198	Independent commercial importers of vehicles and parts.

[a] North American Industry Classification System (NAICS).

To determine whether particular activities may be affected by this action, you should carefully examine the regulations. You may direct questions regarding the applicability of this action as noted in **FOR FURTHER INFORMATION CONTACT.**

III. What should I consider as I prepare my comments for EPA?

A. Submitting CBI. Do not submit this information to EPA through *http://*

your estimate in sufficient detail to allow for it to be reproduced.

- Provide specific examples to illustrate your concerns, and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.
- Make sure to submit your comments by the comment period deadline identified.

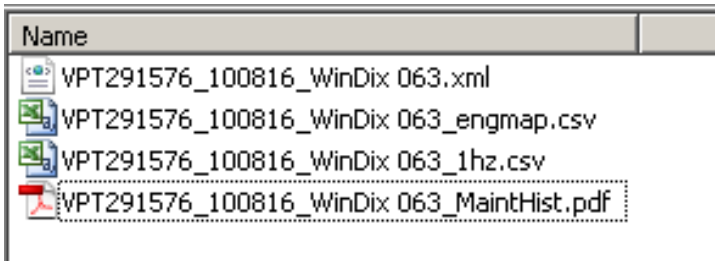
IV. Details of the Proposed Rule

NO_X).[2] The developmen accuracy margins are fu below.

The in-use testing pro a mandatory two-year pi gaseous emissions in cal 2005 and 2006. The prog included a pilot progran emissions in calendar ye 2008. The programs are enforceable after their re program ends, *i.e.*, the 2 year for gaseous emissio

Lesson 1: Involve the PEMS manufacturer(s) & secure their investment in your success*.

***Success is defined as completely fulfilling the HDIUT obligation including report submissions and any follow-up questioning from the authorities.**



- Volvo Powertrain / Horiba HDIUT partnership since 2008
  - All Volvo Powertrain enforceable gaseous programs have been conducted with the Horiba OBS-2200.
  - Volvo Powertrain PM Pilot-1 was performed with the Horiba OBS-2200 + TRPM PEMS with the assistance of Horiba contract testing services.
  - The TRPM used for PM Pilot-1 was a rental prototype.
    - VPTNA provided detailed “lessons learned” and recommendations to Horiba for consideration of the production TRPM.

Lesson 2: Exploit recognized expertise to assure credibility.

- The OBS-2200 first needed to be legally qualified for HDIUT

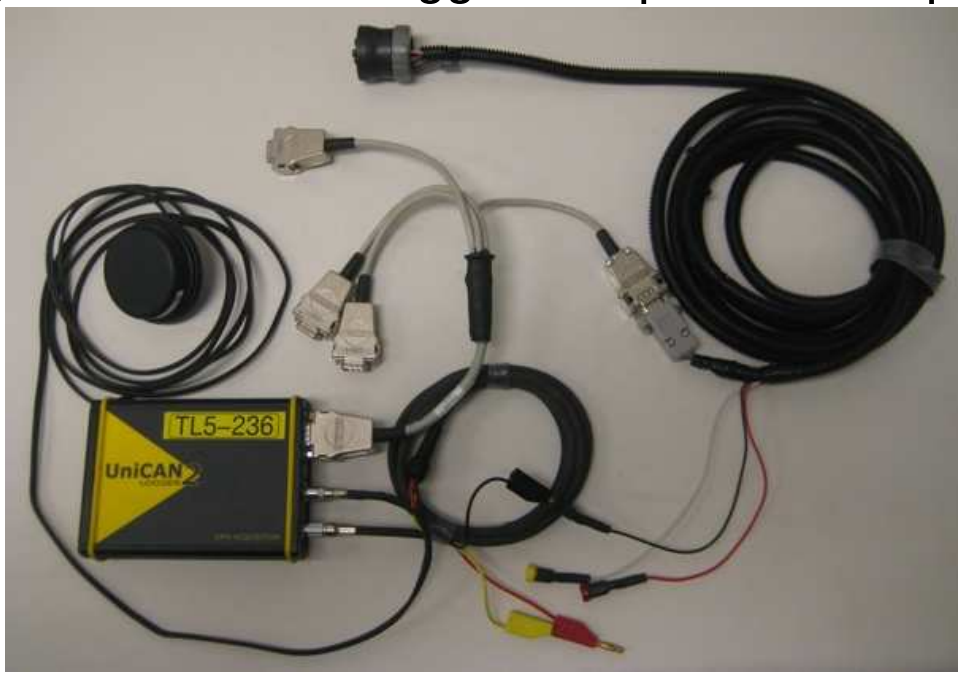
SAE International

Verification of a Gaseous Portable Emissions Measurement System with a Laboratory System Using the Code of Federal Regulations Part 1065	2010-01-1069 Published 04/12/2010
Thomas Bougher and Imad A. Khalek Southwest Research Institute Steven Trevitz Volvo Powertrain Corp. Michael Akard Horiba Instruments Inc.	

- Horiba's technical expert, Dr. Michael Akard, provided crucial support for the implementation of the OBS-2200. Additionally, his on-site support and data analysis was vital to the PM Pilot-1 program.

Lesson 3: Look beyond standard PEMS equipment as necessary.

- The standard J1939 OBD interface is insufficient
  - All data required for HDIUT is not necessarily broadcast
  - The % torque can be inappropriate - subtracts fan power
- Proprietary CAN line data logger has proven indispensable:



Lesson 4: Have a proper gassing system

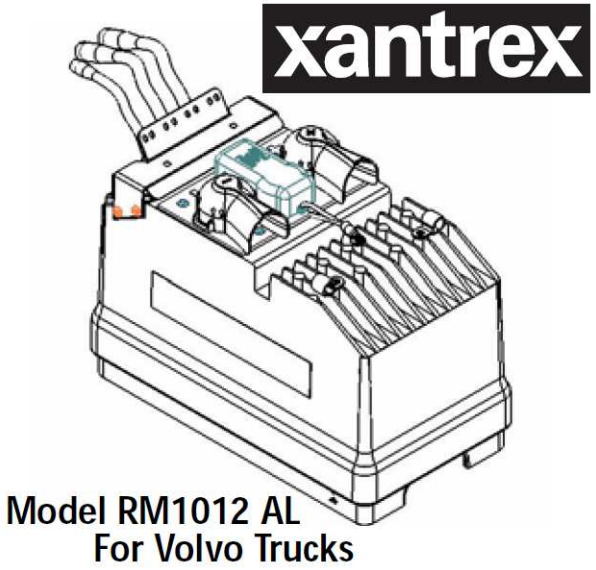
- Sufficient FID fuel for entire man-shift of testing
- VEZ air minimizes drift error
- Net effect is maximized data yield
  - More accurate mass emissions
  - More accurate pass ratio
- Don’t install span gas on board!
  - Span limited to pre & post test
  - 5000 µmole/mole CO

Lesson 5: The “P” in PEMS stands for .....

- **“Profitability”** of today’s run isn’t lookin’ too good!
  - 5% less payload
- **“Probably”** not coming back with everything still working.
- **“Power”** source required.
- **“Prayer”** may be the best option.

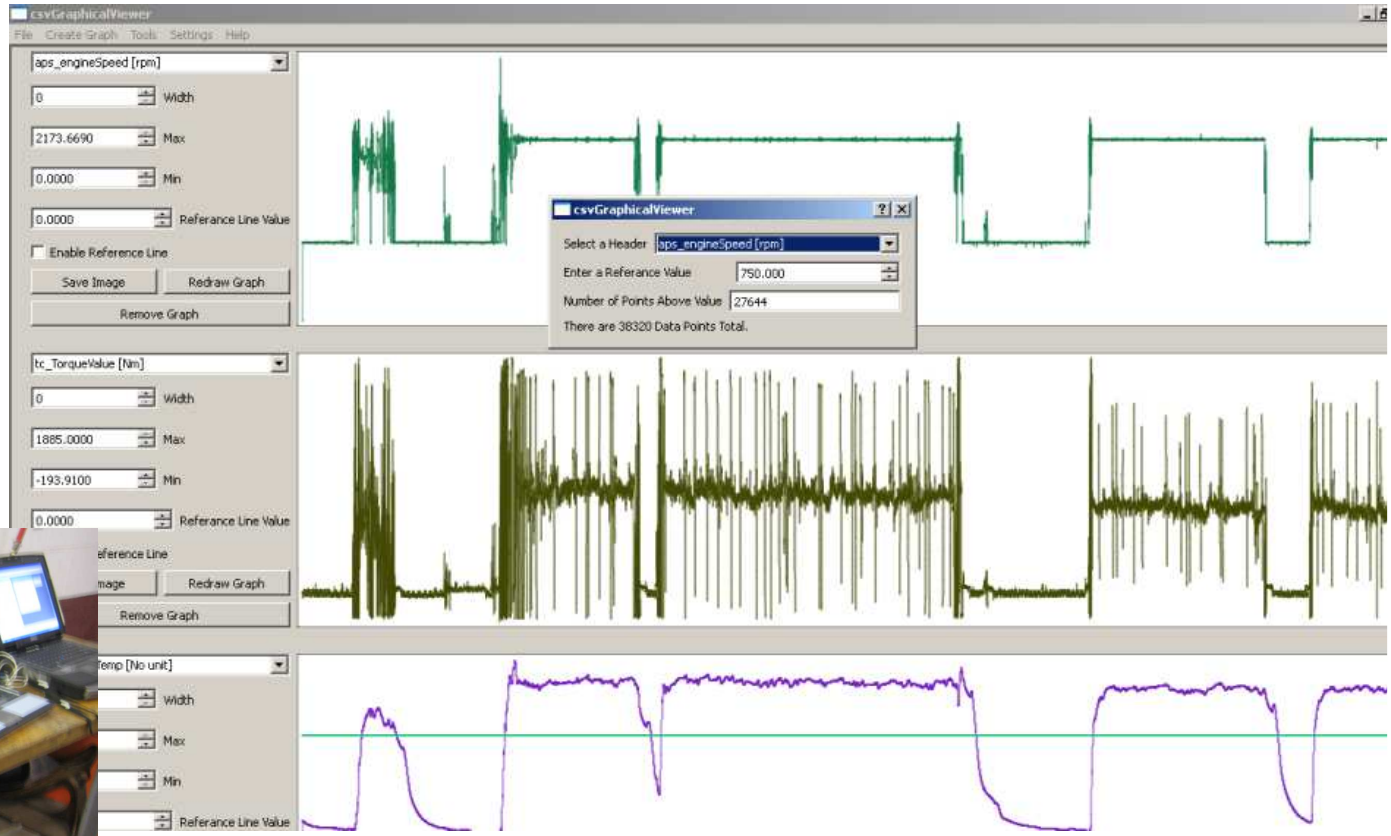
Lesson 6: Include effective & robust electrical power.

- High amperage alternator
- Weatherproof inverter/charger
- Vehicle-grade diesel generator



Lesson 7: Software tools required for rapid assessment of test validity. Dismount or retest decisions must be determined quickly.

- 3 data loggers at 10 hz
- Hourly file writes from OBS
- 1 file each from TRPM & CSM
- 500 MB per test



Lesson 8: Learn how to speak SCHEMA and interpret NTE law.

- The official guidance on reporting is not self-explanatory.
- Rules interpretation of NTE law are not common to all.
  - Threshold determination
  - Round-off procedures
  - In/Out Logic
  - Exclusions
  - Ex temp
  - Over-range
  - NOxNMHC

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Lesson 9: Horiba PEMS Weaknesses

- Repair, calibration, and maintenance support
  - Somewhat mitigated by loaning equipment
- Post processing and reporting software
- The OBS has an issue with storage and release of H20 in the sampling system.
  - The main effect is CO spiking
- The rental prototype TRPM had major reliability problems of which most were caused by signal exchange failures between interfacing modules.

Lesson 10: Horiba PEMS Strengths

- The OBS-2200 brings home the data!
  - Extremely reliable
  - Very high data yield
  - Highly accurate and responsive
  - Exhaust flowmeter is “friendly” to the vehicle
  - Intuitive operation and calibration to users of MEXA benches
- Subsystems of the TRPM work well
  - The DCS (real time device) is highly responsive and has a large dynamic range.

LESSON 11: Don't ask too many questions…….