



# VCERTT NEWS

VCERTT: VERMONT CENTER FOR EMISSIONS REPAIR AND TECHNICIAN TRAINING  
A PARTNERSHIP OF VERMONT TECHNICAL COLLEGE AND THE VT DEPARTMENT OF ENVIRONMENTAL CONSERVATION TO PROVIDE OBDII INFORMATION AND TRAINING TO VERMONT TECHNICIANS

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## CONTENTS:

**VCERTT CASE STUDY:** 3  
Oldsmobile Cutlass  
P0171: System Lean

**TECH NEWS:** 2  
Chrysler and VW both  
caught with OBD faults.  
They'll make good to  
consumers.

**TRAINERS:** 4  
Meet Betsy Dorries:  
VCERTT Director and  
Trainer

**NEW DIESELS:** the full 4  
story regarding their  
availability in Vermont

## DECEMBER EVAP TRAINING IN BURLINGTON: "EXCELLENT! NICE WAY TO PRESENT INFO TO A GROUP", "GREAT POWER POINT SHOW!"



CAN YOUR SCAN TOOL  
CAN?

VCERTT had a great turn out December 1st for our first training in the new large group format. We received many great comments about the dinner provided by the Sheraton in Burlington where the event was held. Our usual pizza, provided at our lab-based trainings, was clearly outdone. The PowerPoint presentation and demonstration provided training on today's evaporative emissions systems. Information was presented on how the systems operate, what goes wrong with them, and how to diagnose and repair them. We also discussed the more recent phenomena of drivability concerns caused by EVAP system problems. Many attendees reported frequent EVAP codes and several chimed in

to say that they had seen the water contamination, vent solenoid failures, and fuel filling problems mentioned during the discussion. Each attendee was asked to fill out an evaluation of the training before receiving a training certificate from VCERTT. The comments were overwhelmingly positive but we will also pay close attention to those suggestions people made for improvement. We will offer more of these trainings in Burlington and in other locations. Keep an eye out on our website, [www.VCERTT.org](http://www.VCERTT.org), and in our next newsletter for specific dates and locations. For more information or to make suggestions, contact Betsy Dorries at 802-238-3211 or at [OBDNews@vtc.edu](mailto:OBDNews@vtc.edu).

**ABOUT VCERTT NEWS:**

The purpose of this newsletter is to provide specialized information to the front line: you, the technicians, service advisors and managers in the field handling repairs and customers. The OBD Inspection Program is now well established. While the OBD inspection itself is an easy addition to the VSI we know that repairing OBD II faults may not be as simple. The success of the OBD Inspection Program falls largely on your ability to perform effective repairs. VCERTT is committed to trying to help. We offer this newsletter to provide information and a forum for discussion. We ask you to call or email us with your questions or suggestions. When you have a troublesome vehicle repair related to OBDII, we'd like to hear about it. If you have problems with a particular vehicle or a scan tool, give us a call. We may be able to help and we can pass along relevant information. We're always looking for test vehicles for our Case Studies - let us take your problem vehicle and attempt a repair, no charge for our time, just help for everyone.

**CALL US AT: 802-238-3211**

**OR EMAIL US AT: [OBDNEWS@VTC.EDU](mailto:OBDNEWS@VTC.EDU)**

**VW AND CHRYSLER PAY THE PRICE**

In separate issues, VW and Chrysler will both lose a hefty chunk of profit due to failures in their OBD II systems. EPA's investigations have uncovered serious defects that have allowed excessive emissions and cost consumers for repairs. An EPA administrator states: "Cleaner cars require emissions control systems that work, and prompt measures to fix emission-related defects when they occur. This case demonstrates EPA's commitment to ensuring that automobile manufacturers comply with their emission-defect reporting and emission system obligations under the Clean Air Act." The settlements also protect consumers from added costs and will reimburse qualifying repairs related to the defects. Both companies will enhance their emission related defect reporting procedures.

Chrysler will spend over \$90 million, the largest settlement to date for an emission-related defect reporting case. The company failed to properly report defective catalytic converters on nearly 1.5 million 1996-2001 Jeep and Dodge vehicles. The catalytic converters on the affected vehicles have a design flaw that can cause the ceramic core to break up. On certain 1996-1998 vehicles, the OBD system fails to detect the problem and does not illuminate the malfunction indicator light (MIL). Most drivers hear the rattling noise caused by the broken converters but many vehicles have been driven for thousands of miles with degraded converters causing emission levels to rise dramatically. In the settlement, Chrysler will extend the warranty on the catalytic converters on approximately 700,000 1996-1999 Jeeps, Dodge Rams and Dakotas to 10 years or 120,000 miles. These vehicles will also be covered for one year without mileage limitation and for two years if they fail a state OBD emissions test due to a defective OEM converter. Another 300,000 owners will receive notices informing them of the defect and reminding them that the converters are covered for 8 years/80,000 miles. Chrysler will recall about a half a million vehicles to fix a defect in the OBD system. Technicians will also inspect the converters and replace them if they are defective.

The EPA found two emission-related defects on Volkswagens, both relating to certain 1999-2001 Golf, Jetta, and New Beetle models. The first failure is similar to Chrysler's; the converters' ceramic material can rattle and erode over time. VW will extend the converter warranty on those vehicles with the 2.0 liter

AEG engine to 10 years/120,000 miles. The company will notify 345,000 owners of the defect and reimburse people who have already paid to replace the converter.

The second issue will cost VW \$1.1 million in penalty from the EPA for violation of the Clean Air Act in failing to promptly report the defect. Defective oxygen sensors crack from "thermal shock" on start-up in cool and damp conditions. At least 329,000 1999-2001 Golfs, Jettas and New Beetles were recalled, costing VW over \$26 million. The EPA found excessive emissions from a randomly selected vehicle during a routine test. The MILs illuminated on numerous vehicles during the winter of 1999/2000 and warranty claims for cracked oxygen sensors were filed but VW did not report the problem until June 2001.

**P0420 CONVERTER EFFICIENCY**

Is it fact or fiction that replacing the rear oxygen sensor is the proper repair for some vehicles with a DTC indicating a catalytic converter failure? We don't know...yet. Some technicians report that they have successfully repaired vehicles with a P0420 DTC by replacing the rear heated oxygen sensor (HO<sub>2</sub>S) even though there is no DTC indicating a failure with the sensor. It does not seem likely that a faulty rear HO<sub>2</sub>S could cause a P0420, especially without setting an HO<sub>2</sub>S DTC, but the phenomenon is described often enough that we are determined to find out if and when it is possible. VCERTT will conduct research on this issue and keep you informed of our findings as we progress. Initially we'd like to hear from you. Have you had a vehicle in with a P0420 and replaced the rear HO<sub>2</sub>S? Did it fix the problem? How many miles has the vehicle been driven since the attempted repair? How do you diagnose a P0420? Please send us an email at [OBDNews@vtc.edu](mailto:OBDNews@vtc.edu) or call Betsy Dorries at 802-238-3211 to explain your experience(s). Please be sure to include the year, make, model, and engine with your thorough description. If you'd be willing to answer further questions, please leave your phone number. (We do not share phone numbers with any other organizations).

Most manufacturers use the rear HO<sub>2</sub>S to infer the efficiency of the converter. When the correct conditions are met (typically hot engine, no powertrain DTCs, steady cruise or idle and others) the PCM compares the (Continued on page 4)

## VCERTT CASE STUDY

### 1997 OLDSMOBILE CUTLASS: P0171

This fall we had the chance to work on a pesky Cutlass with a persistent DTC, P0171 System Too Lean, Bank 1. The vehicle came to us after a couple of repair attempts at another garage. The front oxygen sensor had been replaced along with the spark plugs, wires, and coil pack. We drove the vehicle and noted no unusual drivability concerns other than a slightly high idle. Our visual inspection showed nothing, though we looked and listened carefully for a vacuum leak. We used our new favorite tool, the smoke machine, to check for vacuum leaks. A vacuum leak is a common cause of lean Fuel Trim DTCs and with the high idle we were hopeful that we'd quickly find the problem. We found no leaks. If you don't have a smoke machine you can use propane to try to find a vacuum leak. When the propane is taken into the engine through the leak, the idle quality will change. We did bring out our propane next, in order to test the oxygen sensor. Even if it was new we wanted to be sure that it was working properly and that the PCM was receiving its signal. On a scan tool with the vehicle idling and at 2500 rpm it was clear that the oxygen sensor signal was staying at a lower voltage, .1 - .4V, indicating a lean condition to the PCM. If the system were working properly we would expect to see the oxygen sensor signal cycling regularly between 0 and 1 volt, (.1-.7-.3-.8-.4-.5-.2-.8, for example). The long term fuel trim (LTFT) was running between +19% and +26%. Long term fuel trim is displayed in percentages between -100% to +100%. A reading of 0% indicates that the PCM is making no correction to the preprogrammed fuel delivery value for the current operating conditions



based on the sensor inputs. The PCM changes fuel trim in response to the oxygen sensor (O<sub>2</sub>S) signal. If the O<sub>2</sub>S indicates a lean condition (low voltage) in the exhaust stream, the PCM responds by adding fuel by increasing the injector pulse width. It does this constantly through short term fuel trim (STFT). These are instantaneous changes made in direct response to the O<sub>2</sub>S. When the STFT increases enough, the PCM makes a fuel trim correction in long term fuel trim and resets the STFT to 0%. It will continue to adjust STFT then LTFT until it has control of the fuel system. When LTFT rises over or falls below a preprogrammed amount, typically plus or minus 20%, the PCM recognizes that there is a problem, sets a DTC and turns on the MIL. If the system is running too rich, the PCM subtracts fuel and the LTFT drops into the negative zone. For diagnosis the LTFT numbers are the ones to watch, these indicate the fuel trend not just the mixture at a particular instant.

On this vehicle, we needed to be certain that the oxygen sensor was capable of generating a higher voltage signal and that it was correctly reporting an excess of oxygen in the exhaust stream. We introduced propane into a vacuum port to richen the fuel mixture. We kept a close eye on the O<sub>2</sub>S reading on the scan tool to see how it responded before the PCM could compensate. Sure enough it shot right up to .9 volts and stayed there. The LTFT started dropping as we held the propane on and the idle began to smooth out. This proved that the sensor was at least active, and that the PCM saw the signal and could respond. Now we knew we were actually dealing with an excess of oxygen in the exhaust stream, likely a lean condition, not a faulty oxygen sensor.

Next we had to eliminate all the possible causes of a lean condition or excess oxygen in the exhaust. A misfire will cause excess oxygen in the exhaust, even though the fuel mixture is not necessarily lean. If the mixture does not burn fully the remaining oxygen in the combustion chamber passes by the O<sub>2</sub>S causing a low voltage reading. This vehicle did not appear to be misfiring under any conditions. Other likely causes of a lean condition include problems with the fuel system such as a plugged fuel filter, dirty injectors, a weak fuel pump or a faulty fuel pressure regulator. Sensors can also cause lean running. A mass airflow sensor (MAF) that is not reporting all the air passing by will cause the PCM to deliver less fuel. This is currently a common problem. We did clean the MAF but saw no changes in the readings. The ECT sensor or IAT sensor could also skew the fuel delivery but they were fine. Before digging deep into the fuel system we followed a hunch and looked at the slightly noisy, shiny PCV valve. It looked and rattled fine but it had a slight whistle. When we



blocked off the vacuum side, the fuel trim began to drop, reaching very close to 0%. We would expect it to drop some, but thought that a full drop to 0% pointed to a problem. The part number was not applicable to this vehicle. With the correct PCV valve (lower flow) the

fuel trim dropped and the O<sub>2</sub>S started cycling regularly between .1 and .9 volts. We had the luxury of driving the vehicle for a while to see if the PCM would extinguish the MIL on its own. It took several drives and an overnight cool down but the OBD system did recognize the correction and the PCM turned the MIL off. For more information on oxygen sensor and fuel trim diagnosis, watch for our revised Oxygen Sensor and Air Fuel Ratio Sensor Diagnosis course and our new course, Fuel Trim DTCs and Diagnosis.

## MEET VCERTT'S BETSY DORRIES

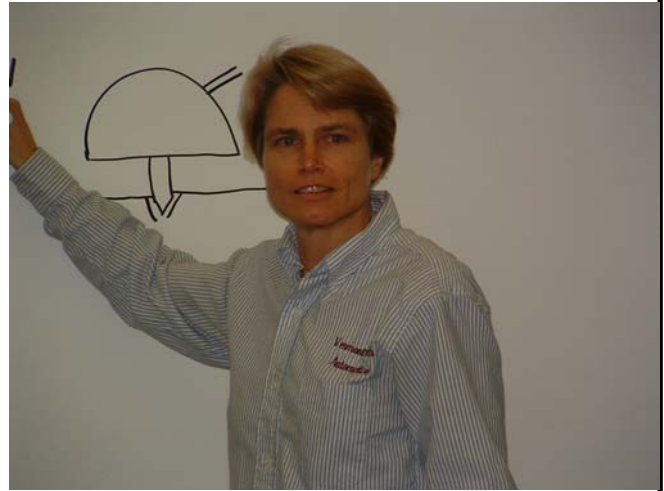
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Betsy Dorries is an automotive professor at Vermont Technical College and manages VCERTT. Her professional specialty and interest is in OBD II emissions control and drivability. Betsy has developed and taught OBD II related classes across North America. She continues to work on cars as time allows and as her aging fleet requires. Betsy says she really enjoys teaching and likes the opportunity to work with technicians. She learns something during each training and feels confident that the participants do as well. Betsy teaches VCERTT classes at various locations. Call Betsy at 802-238-3211 to sign up for any VCERTT class today.



## AVAILABILITY OF NEW DIESELS IN VERMONT

Despite the rumors, there is not a ban on the sale and registration of new diesel-powered vehicles in Vermont. The California Low Emission Vehicle (LEV) program standards adopted by VT and several other states in the Northeast are fuel neutral. Several manufacturers including Chrysler, Ford and GM, have certified diesel pickup trucks to LEV standards, and are selling these vehicles in VT. What has brought this issue to peoples' attention is the fact that Volkswagen has decided (as of the present) not to make their current diesel passenger cars available for sale in VT (and other LEV states).

For background, the federal Clean Air Act allows states to choose either the federal vehicle emissions program standards or the California vehicle emissions program standards (aka the Low Emission Vehicle or LEV standards). The LEV program is more progressive than the federal program, ensuring that vehicle owners in LEV states receive not only the cleanest vehicles available, but a significantly better warranty as well. In the Northeast, VT, MA, NY, ME, CT, RI and NJ have adopted the LEV standards.

There are two options by which manufacturers can sell vehicles in LEV states.

- Certify the vehicle to LEV standards, or
- Use an "offset" mechanism (in LEV states, this allows manufacturers to sell vehicles not meeting LEV standards by offsetting the greater emissions from these vehicles with the sale of a sufficient number of cleaner vehicles).

As of the present, VW has not certified their new diesels to LEV standards, and has not taken advantage of the offset mechanism. The bottom line is that VW made a business decision to (presumably temporarily) not sell these vehicles in LEV states.

This is a temporary situation. Stricter vehicle emissions standards are being phased in between 2004 and 2007 everywhere in the U.S., i.e., both in LEV program states and federal emissions program states. The only difference is that dirtier vehicles are being allowed in federal program states during this phase-in period. However, by 2007, these vehicles won't be allowed anywhere in the U.S. without emission control system modifications and/or ultra-low sulfur diesel fuel to improve their

emissions.

Proponents of these VW diesels often refer to them as "ultra-clean". And compared to the older technology diesels, they are cleaner. But they are still twice as dirty as the least stringent level allowed under the LEV program, and 30 times dirtier than the cleanest vehicles currently being sold by most manufacturers (including some of VW's other models).

Tailpipe emissions are regulated on a gram per mile basis, so these VW diesels emit between 2 and 30 times the amount of air pollution per mile than vehicles meeting the LEV program standards. These vehicles' relatively good fuel economy does help limit carbon dioxide emissions (greenhouse gas), but this doesn't offset the high emissions of the other pollutants. There are other comparable alternatives such as the Toyota Prius and Honda Civic hybrid that cost the same or less to purchase, are up to 30 times cleaner than the VW diesels, and yet get significantly better fuel economy, thus resulting in even lower carbon dioxide emissions.

## P0420 (Cont. from page 2)

signals of the pre-catalyst and post-catalyst oxygen sensors to determine if the converter is at least 60% efficient. With the front oxygen sensor active and the catalyst working, the post-cat HO<sub>2</sub>S signal should be relatively flat indicating that the oxygen is being used to oxidize hydrocarbons. If the signal fluctuates between .2 and .8 volts similarly to the front HO<sub>2</sub>S, the PCM "sees" that the catalyst is not using the oxygen to minimize emissions. You can visit our website, [www.vcertt.org](http://www.vcertt.org), and view front and rear HO<sub>2</sub>S signals from a good and bad catalyst. Click on the Newsletters tab and then select Spring 2003. The waveforms are in the VCERTT case study P0420: Aftermarket Converters and OBD II on pages 3 and 4. Then, select Contact Us to send us your own story. We look forward to hearing from you! We'll keep you updated in our next newsletter this spring.

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