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The Emission and Oil Connection

Kevin S. McCartney, Automotive Support Services - Training, Consulting,
Product Development Article originally appeared in Colorado's Air Care News. It is reprinted by permission.

Catalytic converters provide a huge emission reduction on most automobiles. Many Original Equipment Manufacturers (OEM) depend on catalysts to clean up 99% of exhaust emissions. That's a much bigger contribution to clean air than any other single component. A good catalytic converter can reduce NOx emissions from 2000 PPM to 20 PPM. That's a huge reduction!

We all know that catalytic converters fail, but what makes them fail? A catalyst doesn't get used up in the process of oxidizing or reducing emissions. It should theoretically last forever. Anything that causes a converter to overheat can quickly destroy it. In the case of extreme misfires, destruction can occur in less than a minute. But, contamination and sintering are the more common causes of converter failure.

Sintering is a process in which the continual heating and cooling of the substrate and washcoat eventually reduces the effective surface area and efficiency of the converter. Every catalytic converter will eventually degrade, but it should take a very long time to reduce efficiency enough to cause an emission failure (IE:ASM/IM240 test or OBDII).

Contamination is something we have more control over. Lead, Sulfur and Phosphorous are the primary contaminants that destroy converters. Lead has been removed from gasoline and should no longer be a problem. Sulfur and Phosphorous can get into the converter from gasoline or engine oil. They also increase EGR system deposits. The sulfur and phosphorous limits for gasoline are regulated by government agencies. It is pretty low and not something we have much control over. The phosphorous and sulfur that gets into the converter from engine oil is something we can control. There are indications that phosphorous may now be a major cause of catalytic converter failure on some models during the emissions warranty period. Always make sure that the manufacturer's lubricating oil specifications are followed exactly on late model vehicles.

Sulfur and phosphorous from the oil enter the engine through the PCV system. The more volatile components in the oil vaporize and carry these contaminants into the intake manifold. Most of this happens during the first 300-500 miles after each oil change, since most volatile components vaporize from the oil within that first 500 miles. So, changing oil more often will slightly accelerate sulfur and phosphorus loading in the converter and EGR deposit formation. The degree of impact depends on the amount of phosphorous and sulfur, and the volatility of the oil. Using the manufacturer- recommended rating (API, ILSAC and/or proprietary) and viscosity of oil will minimize this effect.

Car manufacturers have been concerned about the impact of oil on emission systems for years. Organizations in the United States and Japan combined to create new oil standards that would improve emission system life while simultaneously improving engine longevity and fuel efficiency. The International Lubrication Standardization and Approval Committee (ILSAC) is the organization that now develops standards for engine oil that indicate catalytic converter compatibility, fuel efficiency and engine protection.

The ILSAC GF-1 standard was created in October of 1990 and quickly became the minimum requirement for oil used in American and Japanese automobiles. It was upgraded in October 1992 and then replaced by ILSAC GF-2 in 1996. ILSAC GF-3 replaced ILSAC GF-2 in 1997. Unfortunately, after over ten years, most automotive technicians still don't recognize the need to use ILSAC approved oil in emission controlled cars.

Some oil companies have compounded the problem with misleading labeling. One company commonly

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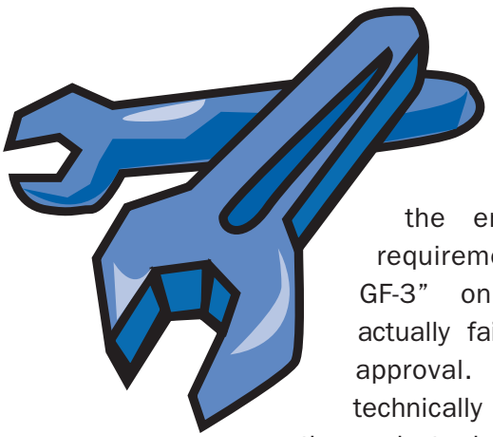

includes the claim: "Exceeds the engine protection requirements of ILSAC GF-3" on products that actually fail to meet ILSAC approval. The claim is technically correct because the products do meet and exceed engine protection requirements, but they do not meet other requirements of ILSAC GF-3. Many technicians and consumers assume that the statement indicates the product meets all ILSAC requirements when in fact it does not.

Surveys have shown that the majority of technicians depend exclusively on brand loyalty, viscosity and the term "synthetic" in selecting engine oil. Brand names and synthetic claims are not reliable indications of anything. A federal trade commission judgement allows relatively common group II base stock oil to be advertised as full synthetic.

Many technicians select viscosity based on old habits instead of manufacturer recommendations. The result is that many cars receive engine oil that unnecessarily increases damage to the catalytic converter and the engine itself. This is especially true in warmer climates. Technicians often assume that thicker oil is required in warmer climates. They often end up with oil that is thicker but lower quality. Replacing a 5W-20 oil with a similarly priced 5W-30 will often cause a decrease in the oil's ability to cope with extended high temperature operation. This may be a function of the oil blenders need to use higher-grade base stocks to meet the Ford and Honda proprietary service ratings for 5W-20. In addition to lubrication, oil also serves as a coolant, a hydraulic fluid for lash adjusters, variable cam timing, and impacts the life of emission systems.

General Motors owners manuals specifically state that the use of 10W-40 and 20W-50 viscosity is prohibited in their newer automobiles. There are no oil products in these viscosity's that have passed ILSAC approval (but some do meet the emission portion of ILSAC). ILSAC has introduced the new more stringent GF-4 rating that is required to further extend emission system life on many 2005 model year cars.

Using the wrong oil could possibly jeopardize the emissions warranty. Catalytic converters are now covered under warranty for 70,000, 80,000, 100,000 or 150,000 miles depending on the certification level of the vehicle and the state of origin. ILSAC GF-4 oil can also extend the emission system life on older cars.

5W-30 and in many cases 5W-20 viscosity is recommended for most newer cars, but a few still require 10W-30. In most cases where 10W-30 is approved, 5W-30 is still the preferred viscosity. All of these are commonly available in ILSAC GF-3 approved products.

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Special Delivery

If you would like to receive the Gateway Air Repair at your home address instead of your workplace, please complete the information sheet on the back of this issue, checking the "new address" box and mail to Gateway Air Repair, Attn: Robert Arrol, PO Box 1034, St. Charles, MO 63302 or e-mail information directly to rob.arrol@mo.etest.com. If you would like to receive future Gateway Air Repairs electronically by e-mail, contact Rob Arrol with your request and e-mail address.

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Training and Special Events

The following is a list of training available in the St. Louis area. This information is for reference only and is not endorsed or sponsored by the Gateway Clean Air Program. To find out what training is currently being offered, please contact any of the training providers listed below. Please contact trainers to confirm dates and course costs.

CARQUEST

The trainer is Lou Nelson. For more information, contact Chris Chesney at (919) 573-3342 or Mike Mulcahy at (314) 566-4303. Courses are held at 800 N. 17th St., St. Louis, MO 63106

Enhanced OBDII Abstract Monitor Failures
(course code OBD204): March 30-31, 2005

Current Probing
(course code EE206): April 6-7, 2005

Fault Pattern Recognition Application
(course code AD501): June 15-16, 2005

Intermittent Drivability Case Studies
(course code AD511): June 22-23, 2005

All courses are approved for MRRT continuing education.

Design Technology, Inc.

The trainer is Lou Craven. For information on training offered by DTI, call (636) 939-5670
or fax (636) 477-9093

Advanced Misfire Diagnostics and OBDII (Mode 6)
This course will cover effective misfire diagnostics utilizing Scan Tools, DSO's and Engine Analyzers. All types of misfire will discussed in depth. Hands on demonstrations regarding the use of "new" diagnostic procedures to quickly find the root cause of the misfiring cylinder emphasized. Enhanced On-Board Diagnostic's Mode 6 will be demonstrated on actual vehicle using Scan Tool and PC Based Scan Software. This course is approved for MRRT continuing education.

March 18; 8:30 a.m. – 3 p.m.
April 1; 8:30 a.m. – 3 p.m.
April 6; 4 – 8 p.m.
April 18; 4 – 8 p.m.

C.O.P. "Coil On Plug"
Low Amp Current Ramping Pattern Interpretation New type ignition systems are prevalent on most Import and Domestic cars, trucks and SUV's. This 8 hour course is designed to get the technician familiar with both types of ignition systems and the test required for effective diagnosis. Voltage Pattern and Low Amp Current Ramping Pattern interpretation will be covered in depth in class. Cylinder Misfire Analysis and Common Trigger Types will be discussed along with pattern failures. This course is approved for MRRT continuing education.

March 23; 8:30 a.m. – 3 p.m.
March 29, 30; 4 – 7:30 p.m.
April 15; 8:30 a.m. – 3 p.m.

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Most Common OBD II DTC's and Failures- "Domestic Vehicles"

This 4 hour course is designed to cover the 4 common DTC's generated by the OBDII computer on Domestic Vehicles. Our IM240 Test lanes have been sampling the OBDII system on most vehicles over the past few years. We took the Generic Application DTC's and broke them down into the top 4 for each Manufacturer. Along with the DTC description this course covers the most likely failure causing event and the best possible repair to correct the DTC fault condition. This course is approved for MRRT continuing education.

March 28; 4 – 8 p.m.

Most Common OBD II DTC's and Failures "Asian and European Vehicles"

This course is approved for MRRT continuing education.

March 31; 4 – 8 p.m.

MRRT Continuing Education Classes

April 20; 6 – 10 p.m.

April 25 - South County Area; 6 – 10 p.m.

Advanced Engine Diagnostic for Asian Vehicles (Honda/Toyota/Nissan)

"Advanced Level 4" course. Class time is 8:30 a.m. – 3:30 p.m. This course is approved for MRRT continuing education.

April 4

May 2

June 6

Modern Underhood Systems Technology (M.U.S.T.)

"Level I/Daytime" course. Class time is 8:30 a.m. – 3: 30 p.m. This course is approved for MRRT continuing education.

DI Ignition Systems – April 5

EI Ignition Systems – May 3

Compression/Thermodynamics – June 7

Fuel Systems-Hydraulic/Electronic – July 5

Automotive Computer Technology – August 2

02 Waveform Analysis – September 6

Federal Mogul

6565 Wells Ave., St. Louis, MO 63133
Contact: Thomas Martin
(314) 977-0798; fax (314) 512-8398

Technical Information: 1-888-819-5681 (no charge)
Technical Bulletins: 1-888-819-5681 (no charge)
Diagnostic Line: 1-900-486-0400 or 1-866-265-4170 ($3.95/min.)
Training Course Information: 1-888-771-6005
Web site: www.federal-mogul.com/training

TECH 301 - Automotive Electronics

(2.5 days = 20 hours)

Students will become proficient with the diagnostic tools needed to service electrical systems and learn skills necessary to develop diagnostic strategies. Exercises will include use of diagnostic tools, such as an oscilloscope. This course is approved for MRRT continuing education.

May 2-4

July 18-20

September 26-28

October 17-19

October 31 – November 2

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Training and Special Events, continued

TECH 304 - Domestic Drivability

(2.5 days = 20 hours)
Engine controls and components are reviewed as they relate to OBD I & II. Students will become proficient with scanning tools, oscilloscopes, multimeters and understanding the benefits of dynamometers. This course is approved for MRRT continuing education.
March 21-23
July 20-22
September 19-21
October 19-21

TECH 306 - Fuel and Ignition System Diagnostics

(2.5 days = 20 hours)
Practical instruction focuses on the fuel delivery and ignition systems that are essential knowledge for technicians. Major fuel and ignition systems will be reviewed; diagnostic procedures include advanced oscilloscope diagnosis. This course is approved for MRRT continuing education.
May 4-6
August 3-5
November2-4

TECH 307 - Advanced Drivability

(2 days = 16 hours)
Students will learn the function and purpose of engine management systems. Advanced test equipment is used to show the best procedures to test and repair. Diagnose problems and perform accurate system repairs by incorporating dynamometers and five gas analysis. This course is approved for MRRT continuing education.
March 23-25
September 21-22

Standard Motor Products

5850 Delor, St. Louis,MO 63109
Contact: John Graves
314-353-8929; fax 314-353-3868
(Sponsor: Parts Plus)

PTS 50-05 Toyota/Lexus Engine Performance

April 27 and April 28
Location: Orlando's (North) at Dorsett and 270

EMLC 200 Automotive Electronic Diagnosis

May 23 and May 24
Location: Forest Park Community College
The class is limited to 20 participants

PTS 60-05 Ford Engine Performance III

November 2 and November 3
Location: Orlando's South

St. Louis Community College at Forest Park

The trainers are Angelo Vitullo and Bob Weil. Contact Angelo at (314) 951-9420 for additional details. To register by phone or for payment by credit card, call Andrea at (314) 539-5341 or (314) 644-9287. All courses are held at St. Louis Community College at Forest Park at 5600 Oakland Ave., St. Louis, MO.

ASE Test Prep L1 Crash Course:

4-hour course. All nights from 6-10 p.m. This course is not approved for MRRT continuing education.
April 25

Automotive Oscilloscopes and Emissions Diagnostics:

9-hour course. All nights 6-9 p.m.This course is approved for MRRT continuing education.
March 1, 3 and 8
April 11, 13 and 18
May 17, 19 and 24

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Carbureted Vehicle I/M Failures and Current Topics Dealing with GCAP Program:

4-hour course. All nights 6-10 p.m. This course is approved for MRRT continuing education.
March 7
April 12
May 4

Evaporative Emissions System Course:

6-hour course. All nights 6-9 p.m. This course is approved for MRRT continuing education.
March 24 and 29
April 4 and 6
May 16 and 18

MRRT/GCAP Course:

4-hour course. All nights 6-10 p.m. This course is not approved for MRRT continuing education.
March 23
April 20
May 25

OBDII and 5 Gas Exhaust Analysis:

4-hour course. All nights 6-10 p.m. This course is approved for MRRT continuing education.
March 9
March 22
April 21
May 12
May 26

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Vehicles will receive a test result of “Reject “ if more than two readiness monitors are not “Complete” in 1996 through 2000 vehicles, and if more than one readiness monitor is not “Complete” in 2001 and newer vehicles. Owners of vehicles receiving a “Reject” test result will be allowed 60 days from the date of that test to set the monitors to “Complete” and return for a test at no additional charge.

Area Trainers!

Are you currently offering automotive repair training in the St. Louis area? If so, please notify the Gateway Clean Air Program for inclusion in a future issue of the Gateway Air Repair. Please include a detailed description of your course, including topics covered, dates, costs and location. Notices may be sent to Robert Arrol at rob.arrol@mo.etest.com or faxed to (314) 739-2901. If the training is emissions-related and you would like it evaluated as a continuing education course offered to all Missouri Recognized Repair Technicians, please contact the Missouri Department of Natural Resources at (314) 416-2115.

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Case Study: OBDII Readiness Issues and the Value of a Disciplined Problem Solving Approach

By Angelo Vitullo, Emissions Program Instructor, Automotive Technology Department, St. Louis Community College at Forest Park

As we transition into the world of On-Board Diagnostics II we must recognize we are no longer diagnosing tailpipe exhaust gas test results. Rather, we are diagnosing a system which predicts, mathematically, when tailpipe exhaust pollutants are reaching a predetermined level and will illuminate a malfunction indicator light (MIL). The MIL is illuminated before tailpipe gases are considered to be excessive, thereby avoiding both exhaust gas pollution and possible component damage. Exhaust gas prediction is computed based upon the data acquired from sensor outputs and the results of specific component tests known as OBDII monitors.

We've heard them a million times, the problem solving approaches we must apply to solve the problems of the universe. By using these basic fundamentals in the realm of automotive diagnostics these steps can be defined accordingly:

1. Discuss the diagnostic fee structure for emissions-related repairs with the customer. Some emissions diagnostic challenges can be conquered in minutes, others take hours and can be complicated by multiple existing issues.

2. Precise and concise definition of the problem or customer complaint. This begins with the face-to-face customer contact and may involve a service advisor – which can lead to a communication breakdown. The customer explanation of the problem may be refined by asking questions such as: Was there a drivability issue associated with the MIL illumination? Was the vehicle cold or warm? How much fuel was in the tank? What is the frequency of the problem? How was the vehicle being driven? What were the weather conditions when the problem occurred? What is the vehicle repair history? What type of service has been performed recently?, and so on. Sometimes a phone call to the customer or the actual driver of the vehicle is required. Other required sources of information include the I/M Test Failure Report. The DTC's must be recorded as well as the all-important freeze frame data. And remember; don't erase anything from the PCM memory.

3. Attempt to recreate the problem in the shop or out on the road. The customer interview will enhance this activity.

4. Research the customer complaint and consider the probable causes. A recent Gateway Air Repair case study referenced the phrase: "Without Guidance, We Are Lost." This takes discipline and should be considered early in the repair process. I've seen too many wrench turning hours wasted due to lack of research which could have led to the discovery of known issues. Research includes Technical Service Bulletins (TSBs), Wiring Diagrams, The VECI label under the vehicle hood that lists the OE emissions control components along with vacuum and evaporative system schematics, Mitchell or Alldata repair information, telephone hotline diagnostic services, personal contacts at dealerships and specialty shops, recalls, the availability of Powertrain Control Module reflashes, automotive websites such as International Automotive

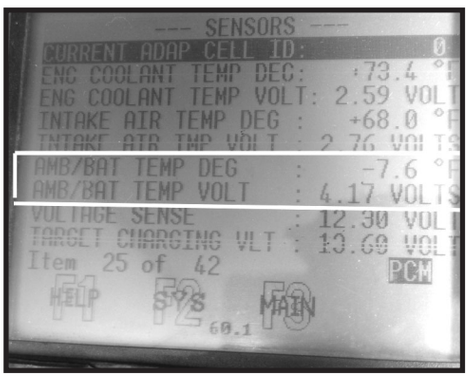
Technicians Network, the state I/M Program Administrator (in our case the Missouri Department. of Natural Resources), and of course, the results of any tests we perform on the vehicle.

At this point it is prudent to discuss the value of understanding the OBDII system we are dealing with on the subject vehicle. We must learn the vehicle I/M readiness status, the enabling criteria, freeze frame data and the conditions necessary to set any Diagnostic Trouble Codes which may exist.

5. Review and prioritize the possible solutions to the problem. We may have one or more possible service activities to perform at this point: a misfire code may be addressed by a spark plug, spark plug wire, decarbonization, fuel injector, valve job, TSBs, reflash, etc. Customer narratives, test results, scan tool data, and similar information can help us determine the most probable cause.

6. Perform the repair.

7. Verify the repair. By enabling the specific component monitor and reviewing the test results with a scan tool, repair verification of an OBDII equipped vehicle is accomplished.



Our subject vehicle for this article is a 1998 Chrysler Cirrus, 2.5L engine with A/T, SMPFI, and 91,000 miles on the odometer. The vehicle owner spoke with a service manager informing him of an OBDII emissions test failure and gave the service manager the failure record paperwork. Unfortunately, that was the extent of the face-to-face customer contact. Sadly, at this juncture the problem solving steps 1 Discuss the diagnostic fee structure and 2 Precise and concise definition of the customer complaint were disregarded.

According to the service writer, the vehicle would not pass the emissions test. According to the failure report from the emissions test station, the vehicle was a readiness reject. Research the customer complaintand consider the probable causes. The technician, noticing the lack of monitor readiness aimlessly drove the vehicle a few miles and accomplished nothing. The OBDII drive trace procedure was accessed for this vehicle but unfortunately it was handed to a shop porter who was unable to follow drive trace instructions and also aimlessly drove the vehicle accomplishing nothing. Attempt to recreate the problem in the shop or out on the road. Finally the vehicle was returned to the discouraged customer with instructions to “drive the car for a few days.” The customer paid for a wasted hour of labor and departed more confused than ever.

Shortly after, the customer contacted Illinois EPA for assistance and I became involved. I contacted the customer on the telephone and learned the following information: The customer has been struggling with a lack of readiness issue for close to six months and has had several repair attempts made at other repair shops. He has had no recent battery disconnects or clearing of codes from PCM memory. One locally well known and reputable repair center replaced the PCM in vain and did not charge the customer for the work because it did not fix the car. Precise and concise definition of the problem or customer complaint.

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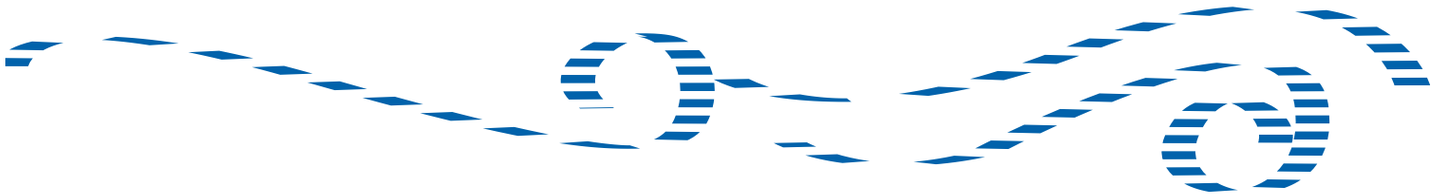

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After this enlightening conversation we arranged to get the vehicle into our shop. A scan tool was attached and the following information was acquired:

I/M Readiness: The only monitor that was complete was the HO2S Heater Monitor. This monitor was enabled at idle after a cold start with engine temperature below 1470 F and battery temperature within +/- 270 of engine temperature. I wondered why that monitor ran and the others did not.

There were no codes. If there were no completed monitors I was not surprised there were no OBDII codes set.

When eyeballing long lists of live sensor data it is easy to overlook a key piece of information. Either print or read every single line of sensor data. Force yourself to rationalize every value displayed. This was a key factor with this repair. We noticed a sensor value of -9 degrees assigned to Ambient/Battery Temperature. On a 700 day with Engine Coolant at 73.40 and Intake Air at 68.00 this was a red flag. Why wasn't there a code for erroneous Battery Temperature Sensor? This could have failed a rationality code.

Vehicle diagnostic information was accessed using electronic shop manuals We looked up some "enabling criteria" or "conditions necessary to run monitor" and learned the EGR, HO2S, and CATALYST monitors all required a minimum ambient temperature of 190 to run.

We also noticed the OBDII Misfire Counter was not functioning. This vehicle, as with most others, must "learn" the specific electrical characteristics of the crank sensor, the crank sensor air gap, the machining characteristics of the crankshaft tone wheel, etc. Chrysler calls this learning process the Adaptive Numerator. There is a drive cycle consisting of a series of vehicle decelerations required to perform this process for this particular vehicle. Some vehicles can perform this learn function in the shop bay. Research will reveal the proper procedure for the subject vehicle in your shop. Without Guidance, We Are Lost. The scan tool readout stated the vehicle did not complete the Adaptive Learn procedure, so the misfire counter, a continuous component monitor (CCM), was disabled. When researching the enabling criteria for the Misfire Monitor we learned it also would be disabled due to the ambient temperature requirement of 190, hence the inability to learn the adaptive numerator and start counting misfires.

Researching the wiring diagrams and component locations guide we found that there was a temperature measurement thermister located behind the left headlamp housing. It was a three wire sensor called the Battery Temperature Sensor. The calibration error had suspended the running of all monitors except the HO2S Heater Monitor. Why? Because that monitor will run as long as there is a cold start and battery temperature is within +/- 270 of engine temperature. In other words, if the engine coolant temperature is 180 or less during a cold start, the HO2S Heater Monitor will run. After learning another repair shop had replaced the PCM in vain, we double checked the PCM part number to confirm it was the right unit for the application.

Perform the Repair. At this point we had a fair amount of confidence our problem was the Ambient/Battery Temperature Sensor. After a routine wiring check we replaced the sensor and noticed immediately, using the scan tool, we now had a realistic temperature

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value. Obviously, the software engineers did not program this sensor for rationality code setting capability. Our next goal was to run all the diagnostic monitors (OBDII Drive Cycle) to confirm there will be no system failures and resulting MIL Lamp Illumination. A scan tool is used for this purpose because some monitor "failures" may be viewed as a one trip failure only. We also want to confirm the successful compilation of the I/M Readiness Page. Repair Verification.

Throughout the repair process, the customer was kept informed. We called him and told him of our test routines, our theory of the problem's root cause and finally, of the successful verification we obtained by running system monitors and obtaining successful test results. Finally, when the customer came for his vehicle, we gave him credit for the hour of labor charged to him when he first visited the shop and left without a solution to his problem. That was our fault – the failure to perform the required OBDII research.

Lessons Learned

OBDII system repairs demand excellent customer communication and definition of the customer complaint. Tests and general diagnostics must be designed and prioritized and carried out with precision. If the test is not conducted carefully the results will be of little value. Access to vehicle data is an absolute requirement. Although the purposes of OBDII system designs are to standardize diagnostic connectors, component names, DTC's etc., actual monitor routines, enabling criteria and software based calibrations are constantly changing and nothing can be taken for granted. One must approach

Articles Wanted

The Gateway Clean Air Program wants to continue to bring readers pertinent repair information. If you have an idea for an article, or have a topic you would like discussed in a future issue, please contact Robert Arrol by fax at (314) 739-2901 or e-mail at rob.arrol@mo.etest.com.

Training Vouchers Available for MRRTs

The Gateway Clean Air Program has supported relevant emissions-related repair training since its inception in early 2000. For 2005, the program will continue that tradition in a slightly different manner. All active Missouri Recognized Repair Technicians as of Jan. 1, 2005 will receive a $50 voucher good towards the total cost for approved continuing education courses. Vouchers must be redeemed at MRRT-approved training courses in 2005 and will not carry over from one year to the next. Participants are encouraged to contact trainers for course availability and costs. For more information, please contact the Missouri Department of Natural Resources at (314) 416-2115.

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ILSAC GF-4 is harder to find but also readily available. Many 5W-30 and 10W-30 products that are advertised for higher mileage vehicles are not ILSAC approved.

Even thinner oil is recommended for some colder climates. A very few European cars still require slightly thicker oil in the warmest climates. Thin high quality oil helps address oil pump cavitation, piston and ring cooling, reduced passage size and cold start lubrication issues.

Many manufacturers have special proprietary requirements for the oil used in their cars. This is most common on European cars and cars with oil monitor systems. But, it also applies to most Fords, Hondas and some specialty models of other makes. Many experts agree that oil meeting more stringent long life ratings should be used when monitors are used to extend oil change intervals. Most manufacturers require this practice.

Technicians should familiarize themselves with the more stringent ACEA and proprietary oil rating systems in selecting the correct oil for these cars and vehicles that are subjected to severe or long life service. ACEA has 14 separate oil ratings that help identify oil that is appropriate for special applications. Information systems like “Mitchell on Demand” and All-Data list appropriate viscosity but often fail to include ACEA and proprietary requirements. The vehicle owner’s manual should be consulted when necessary.

Selecting the correct oil does take a little effort and familiarity with the various rating systems but it’s worth it. The proper oil can increase fuel efficiency, reduce EGR maintenance, maximize catalyst life and improve air quality while insuring proper engine protection. Look for the ILSAC GF-4 approval to insure maximum emission system life, and look to ACEA, the API SL/SM rating and proprietary ratings for other special lubrication needs. Further training is available on this subject from parts distributors, industry organizations, TDJ events (tdjevents@sbcglobal.net or 713-725-1895), the author and others.

Kevin McCartney provides emission related technical training throughout the country. He worked in research for California emission programs and served as a Master trainer for California’s advanced level emissions instructors. He can be contacted at crashh@prodigy.net or 209-873-1155.

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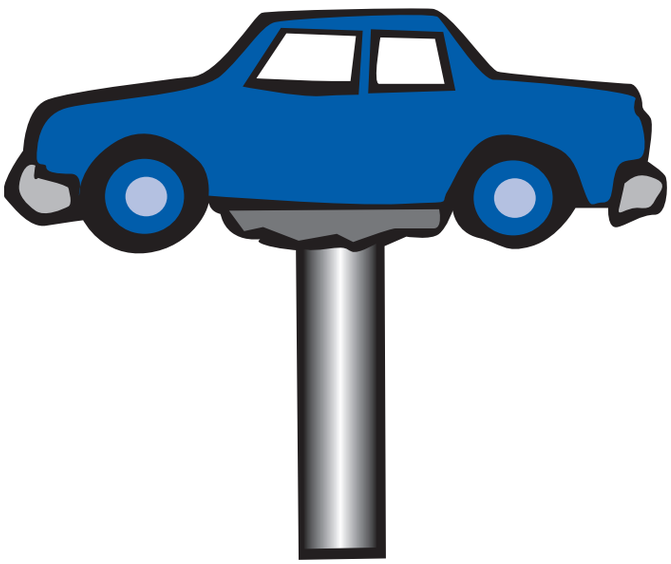

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MRRT Requirements

Code of State Regulation 10 CSR-380 (2)(S) requires that Missouri Recognized Repair Technicians (MRRT) possess valid (current) ASE certifications for A6, A8 and L1, as well as satisfactorily complete at least one four-hour continuing education course per calendar year.

Here are some helpful hints for maintaining your MRRT status:

- When enrolling in a training course, ask the instructor if the department has approved the course for MRRT continuing education credit. Many courses offered may not be officially approved.
- When attending a course, make sure your name and MRRT number appear on the roster and that you sign the roster to show that you were present.
- Make sure that you receive a certificate of completion for the course. This can be used as proof if the roster arrives late or was not submitted to the department.
- Submit copies of your ASE re-certification documents to the department as soon as you receive them. ASE does not provide these to the department and the department cannot request them. Without a copy on file, the department may terminate your MRRT status based on the expiration date of your old certificate.

Note: If your MRRT status is cancelled you will be required to submit whatever records are required and re-attend the mandatory 4-hour GCAP course before applying for re-certification. If you are the only MRRT employed at your shop, your shop will not be listed in the "My Vehicle Failed..." booklet that is given to owners of failing vehicles for at least 3 months and/or until your status has been restored.

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Gateway Air Repair
PO Box 1034
St. Charles, MO 63302-1034

PLEASE POST. Please pass on to any Missouri Recognized Repair Technicians working at this address

Count Me In!

I'd like more information about the Gateway Clean Air Program!

Please Print

Name _____ Technician ID Number _____

Company Name _____ Facility ID Number _____

Address _____

City, State, Zip _____

Phone _____ E-mail Address _____

___ I'd like to receive the Gateway Air Repair electronically.

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Gateway Air Repair
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