Certification and Compliance Program Overview

- Compliance program covers vehicles, engines, equipment, fuels
  - Certificate/registration required for every vehicle & gallon of fuel sold in U.S.
  - Today's focus: vehicle & engine compliance programs
- Compliance Mandates
  - Clean Air Act – emission standards, certificates of conformity, testing & certification, in-use compliance, fuels, compliance fees, renewable fuels standard
  - Energy Policy Act – renewable fuels standard, various studies
  - Transportation Act – HOV rule
- California waiver requests
- Public information
- Manufacturer support (e.g. SCR, alternative fuel converters)
Industries Covered

- **Highway Vehicles and Engines**
  - Cars, trucks, vans, SUVs, motorcycles
  - Heavy duty trucks, buses

- **Nonroad Engines, Vehicles, and Equipment**
  - Large diesel (construction equipment)
  - Large gas (forklifts, compressors, air ground service equipment)
  - Handheld utility engines (chainsaws, leaf-blowers, trimmers)
  - Non handheld utility engines (lawnmowers, garden tractors)
  - Marine (outboard/inboard motors, jet skis)
  - Recreational vehicles (snowmobiles, ATVs, off-road motorcycles)
  - Locomotives

- **Large “case load” growing fast**
  - Currently 350 manufacturers, 2,600 certificates annually

Background & Current Priorities

- **Light Duty**
  - Covers passenger vehicles, light and medium trucks, motorcycles, ATVs, imports; 16 million new vehicles annually
  - Complex regs, near-zero standards
  - Emerging technologies, eg hybrids, diesel, flex-fuel vehicles
  - New fuel economy label & CAFE program
  - New GHG program

- **Heavy Duty Highway**
  - Covers utility and heavy highway applications
  - Stringent new standards in 2007 & 2010
  - Starting first confirmatory testing in 2009

- **Nonroad**
  - Covers very broad population of small and large engines
  - Huge growth in number of new industries & manufacturers
  - Compliance testing, implementing new regulations for small gasoline, marine and locomotive engines
  - New nonroad CI confirmatory testing started in 2006, small SI starting this fall

- **General**
  - Information dissemination – green vehicle guide, new fuel economy trends and compliance reports
  - Compliance data enterprise architecture system
The Challenge: Many More Certificates & Players

- Certification numbers growing quickly:
  - MY 1995 – 810 certificates
  - MY 2006 – 2600 certificates
  - MY 2010 – ~4000 certificates

- Complexity and nature of certification growing as regulations offer industry increasing flexibility

- Industries and manufacturers new to EPA regs & processes
  - Newly regulated sectors
  - Explosive growth especially from China

- Special challenges with some foreign manufacturers

How OTAQ Ensures Emission Compliance

- Integrated program to monitor compliance over useful life
  - Light-duty program mature but growing increasingly complex
  - Using lessons learned to build HD and NR programs

- Program Components:
  - Pre-Production Certification
    - ensure pollution prevention through proper design
    - detect problems early
  - Assembly Line Testing (aka “Selective Enforcement Audits” (SEA))
    - verify that production vehicles comply with standards
    - no longer used for light-duty but may be helpful for engines/equipment
  - In-use Testing & Recall
    - ensures in-use vehicles comply with standards

- Strong EPA compliance presence
  - Delivers on promised regulatory emission benefits
  - Provides level playing field
  - Detects problems early
  - Encourages compliance and deters non-compliance
Compliance Life of a Light-duty Vehicle

- Vehicle Design and Build
- EPA Confirmatory Testing (Random and Targeted)
- Manufacturer testing of prototype vehicle representative of production
- EPA Assembly Line Emission Test Audit
- Review information requirements
  - Emissions data
  - Application (describes covered vehicles)
  - OBD, ORVR and other requirements
- EPA Recall Testing up to 75% of Useful Life Miles
- EPA Issues Certificate of Conformity
- Low-mileage In-use Verification Testing performed by manufacturer
- Durability demonstration approval
- EPA Actions
- Manufacturer Action
- High-mileage In-use Verification Testing performed by manufacturer
- Pre-Production Certification Process
  - EPA Confirmatory testing
  - Issue Certificate of Conformity (signed by Administrator's designee)
  - Audit phase-in and AB&T tracking requirements post-certification
- End of Useful Life (per Clean Air Act)
  - Emission levels predicted via certification durability testing

Pre-Production Certification Process

- Review information requirements
  - Emissions data
  - Application (describes covered vehicles)
  - OBD, ORVR and other requirements
- Collect fees
- Durability demonstration approval
- OBD Approval
- Emissions testing
  - Manufacturer
  - EPA confirmatory testing
- Issue Certificate of Conformity (signed by Administrator's designee)
- Audit phase-in and AB&T tracking requirements post-certification
Confirmatory Testing

- Manufacturers do bulk of emission certification and fuel economy testing at their own labs
- EPA audits (or confirmatory tests) a subset of those vehicles at our Ann Arbor facility. This testing has great value because it provides manufacturers incentive to perform accurate tests.
  - Test approximately 15%
  - Random tests, new technology, high emission levels, high FE, low FE, etc.
- The tests that manufacturers are required to perform include
  - FTP (Federal Test Procedure)
  - HFET (Highway Fuel Economy Test)
  - US06 (Aggressive, high-speed driving, part of Supplemental FTP requirements)
  - SC03 (Air conditioning under 95 degree conditions, part of Supplemental FTP requirements)
  - Cold Temperature FTP (FTP performed at 20 degrees)
  - Evaporative Emission Tests (designed to determine the amount of hydrocarbon emitted from sources other than combustion, such as during refueling, or from leaky gas caps)
- EPA’s new fuel economy labeling rule adds the US06, SC03 and Cold Temperature FTP to the tests required to determine the city and highway estimates posted on the window stickers of new vehicles.

Assembly Line Testing

- EPA selects vehicles off of the assembly line for emission testing
  - Ensures that production vehicles comply with emission standards and are technically the same as pre-production cert vehicles
- Rarely used in current LD program
  - Early LD assembly line audits turned up few problems due to strength of the pre-production certification testing program
- Still very valuable for HD and NR program
  - Logistical difficulties with shipping and set-up make it difficult to bring engines to NVFEL for confirmatory testing
In-use Testing and Recall

- **Goals**
  - Assure compliance throughout useful life of vehicle
  - Deter poor quality and improve durability
  - Detect and fix in-use problems
- One to two million LD vehicles recalled annually
  - Estimated 20,000 tons of pollution saved
- **In-use data sources:**
  - EPA in-use testing (we procure and test privately-owned vehicles)
  - Manufacturer in-use verification program (IUVP) testing
    - required as part of EPA’s compliance regulations
    - over 2000 in-use tests performed by manufacturers every year
  - OBD data
    - Many different operating parameters and component functionality
      information stored in the OBD computer to inform manufacturer of problems
  - Warranty, Service, Consumer, & Defect reporting
  - CARB Partnership
    - California shares its in-use test data with us, and vice versa
- HD and NR manufacturer in-use programs in place

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Fuel Economy Labeling

- **Determine FE City & Highway Label Estimates**
  - Currently determined from 5 tests
    - City values obtained from same test used for emission certification
      emissions for City FE (FTP)
    - Highway values obtained from a higher-speed Highway test, that
      is also used for emission certification (HFET)
    - City and highway values adjusted to reflect three additional driving
      cycles used for emission certification
      - US06 - represents high speed, aggressive driving
      - SC03 – represents heavy accessory use (air conditioning) in 95 degree
        temperature.
      - Cold FTP – represents cold weather conditions (20 deg. F)
- **EPA issues over 1,000 fuel economy labels every year**
- All fuel economy results from a given model year are
  compiled annually by EPA and published jointly with DOE in the annual Fuel Economy Guide
Fuel Economy CAFE and Gas Guzzler

- Corporate Average Fuel Economy (CAFE)
  - EPA administers the required testing and calculations to determine each manufacturer’s corporate average fuel economy. Separate CAFE values are determined for cars and trucks.
  - We submit the final numbers to DOT-NHTSA who administers compliance with the standards.
  - CAFE calculations and test requirements are not the same as those for vehicle label estimates.

- Gas Guzzler Tax
  - EPA provides IRS with Gas Guzzler Data for cars (not trucks) that fail to comply with the mandated fuel economy levels. Fuel economy calculations are different than those for CAFE and labeling.

IUVP Requirements

- IUVP reporting done in “one year” cycles
  - Each cycle must include low and high mileage testing (different MYs)
  - Testing required for each test group
  - IUVP not required for test groups less than 5,000

- Low Mileage Testing
  - Minimum mileage of 10,000 miles
  - Must be completed within 1 year of end of production of that test group
  - Low mileage testing not required for test groups smaller than 15,000
  - Started with 2004 MY for all test groups

- High Mileage Testing
  - Minimum mileage of 50,000 miles
  - One vehicle per test group must have mileage of at least 75% of useful life (e.g., 90,000 for Tier 2)
  - Must start within 4 years and be completed within 5 years of end of production of test group
  - Started with 2001 MY for all test groups
  - Started with 2000 MY for early opt-in test groups
IUVP Required Tests

- **Low Mileage**
  - FTP
  - US06
  - OBD system status
  - 1 vehicle per Evap/Refueling Family: 2-day Evap & ORVR Refueling test

- **High Mileage**
  - FTP
  - US06
  - OBD system status
  - 1 High Altitude Vehicle: FTP and US06
  - 1 vehicle per Evap/Refueling Family: 2-day Evap & ORVR Refueling test

Note: Cold CO, SCO3 (air conditioning), 3-Day Evap, and Highway tests are not required.

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### Number of Vehicles To Be Tested for Exhaust Emissions

(Per Certified Test Group)

<table>
<thead>
<tr>
<th>Sales Per Test Group:</th>
<th>1-5000*</th>
<th>5001-14,999*</th>
<th>1-50,000**</th>
<th>50,001-250,000</th>
<th>Over 250,000</th>
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<tbody>
<tr>
<td>Low Mileage Vehicles:</td>
<td>Voluntary</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>High Mileage Vehicles:</td>
<td>Voluntary</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

*Only applies to small volume test groups or manufacturers.
** e.g., GM could have 4 test groups at 5,000 each. First 3 groups qualify as small volume – 4th group falls here & requires 2 low & 4 high vehicles
In-Use Confirmatory Program (IUCP)

- Manufacturer-conducted recall-quality in-use tests that can be used as basis for ordering a recall
  - Vehicles procured are screened according to the “properly maintained and used” recall requirement
  - More extensive screening than original IUVP tests
  - Maximum mileage: vehicle’s useful life

- IUCP Threshold
  - Mean IUVP emissions for a test group exceed threshold of 1.30 times the certification emission standard and at least 50% of test vehicles for that test group fail for the same pollutant
  - FTP, High-Altitude FTP, and high mileage US06 tests are included
  - Evaporative, ORVR and the 75% useful life tests are excluded

Verify – EPA’s Engine and Vehicle Compliance Information System

- Verify will help streamline the compliance process for EPA and manufacturers by:
  - Creating infrastructure for electronic collection of data and documents
  - Integrating all compliance databases (light-duty, heavy-duty, and nonroad)
Consumer Information

- Green Vehicle Guide
  - Identifies vehicles that perform well on emissions and fuel economy
  - Redesigned site will allow side-by-side vehicle comparisons

- Fuel Economy Guide

- Fuel Economy Trends

Appendix 1

Five Cycles for Emissions and Fuel Economy
Federal Test Procedure Driving Cycle (FTP)

- Also called the "City" test
- Used to measure both emissions & fuel economy
- Urban driving from 1970's
- 68°F-86°F
- Avg. speed 21 mph
- Max acceleration 3.3 mph/sec

![FTP Test Diagram]

**EPA Federal Test Procedure (FTP)**

- Duration = 1874 seconds
- Distance = 11.04 miles
- Average Speed = 21.19 mph

Highway Test Procedure Driving Cycle (HFET)

- Used primarily for FE
- Rural driving
- Avg. speed 48 mph
- Max speed 60 mph
- Max acceleration 3.3 mph/sec

![HFET Test Diagram]

**HWFEC**

- Length = 765 sec
- Distance = 10.3 miles
- Average Speed = 48.3 mph
- Max Speed = 59.9 mph
- Max Acceleration = 3.3 mph/sec
High Speed/Aggressive Driving Test Cycle (US06)

- Used for Supplemental FTP emissions compliance
- Will soon be used for fuel economy labeling
- Contains elements of both City and Highway driving
- Max speed 80 mph; avg. speed 48 mph
- Max acceleration rate 8.46 mph/sec

Air Conditioning Test Cycle (SC03)

- Used for Supplemental FTP emission compliance
- Will soon be used for fuel economy labeling
- Designed to account for effects of air conditioning under hot ambient conditions (95°F, sun load)
- Max speed 54.8 mph
- Avg. speed 22 mph
- Max acceleration rate 5.1 mph/sec
Cold Temperature Test (Cold FTP)

- Used for emissions compliance with 20°F cold CO standard
- Will soon be used for fuel economy labeling
- Same test procedure as the City test, but at 20°F, rather than 75°F

EPA Federal Test Procedure (FTP)
Duration = 1874 seconds, Distance = 11.04 miles, Average Speed = 21.19 mph

Appendix 2

Sample Fuel Economy Labels
Old Fuel Economy Label

Compare this vehicle to others in the FREE FUEL ECONOMY GUIDE available at the dealer.

**CITY MPG**

23

1993 CANARY 2.0 LITER
L4 ENGINE FUEL INJECTED
AUTO 3 SPD TRANS CATALYST
FEEDBACK FUEL SYSTEM

Estimated Annual Fuel Cost: $3850

Actual mileage will vary with options, driving conditions, driving habits and vehicle’s condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between 19 and 27 mpg in the city and between 26 and 35 mpg on the highway.

**HIGHWAY MPG**

30

For Comparison Shopping, all vehicles classified as COMPACT have been issued mileage ratings ranging from 11 to 31 mpg city and 16 to 41 mpg highway.

New Fuel Economy Label

**EPA Fuel Economy Estimates**

These estimates reflect new xmp methods beginning with 2008 models.

**CITY MPG**

18

Expected range for most drivers
15 to 21 MPG

**HIGHWAY MPG**

25

Expected range for most drivers
21 to 29 MPG

Estimated Annual Fuel Cost
$2,039
based on 15,000 miles at $2.80 per gallon

Combined Fuel Economy
This Vehicle
21

10 to 31

Your actual mileage will vary depending on how you drive and maintain your vehicle.

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov