EPA Efforts to Improve Serviceability of Heavy-Duty Vehicles and Engines

AMY KOPIN, ENVIRONMENTAL PROTECTION SPECIALIST, HEAVY-DUTY ONROAD AND NONROAD CENTER

ASSESSMENT & STANDARDS DIVISION, EPA OFFICE OF TRANSPORTATION AND AIR QUALITY

SERVICEABILITY AND INDUCEMENT PROPOSAL BACKGROUND– MAY 5, 2022

Presentation Overview

- **Background:**
- Actions proposed and intended under EPA's Clean Trucks Plan

- **Proposed Serviceability Provisions:**
- Improved service-related information
- Revised "inducements" approach
- Onboard Diagnostic ("OBD") improvements

- **Next Steps:**
- Rulemaking status and submitting comments
- More information

EPA's Clean Trucks Plan

1) Current proposal to set more stringent **criteria pollutant standards** (including NOx, PM, HC, and CO) for heavy-duty trucks beginning in model year (MY) 2027 and **strengthening the "Phase 2" GHG standards** for MY 2027 and beyond

2) Upcoming proposal to set more stringent emissions standards for **medium-duty commercial vehicles** for MY 2027 and later; these revised standards will be proposed in combination with new standards for light-duty vehicles for MY 2027 and beyond

3) Upcoming proposal to **set "Phase 3" GHG standards** for heavy-duty vehicles beginning as soon as MY 2030 that are significantly stronger than the MY 2027 GHG standards

https://www.epa.gov/regulations-emissions-vehicles-and-engines/clean-trucks-plan

Overview of Heavy Duty 2027+ Proposal

- New criteria pollutant standards and compliance provisions for heavy-duty highway engines
- Targeted reductions for Phase 2 GHG emissions from heavy-duty vehicles
- This presentation highlights aspects of the proposed rule that target issues raised in comments on the Advanced Notice of Proposed Rulemaking
- The proposal includes targeted provisions to help ensure that owners can efficiently maintain emissions performance over the operational life of the engine, including: enhanced communication with operators, updated diagnostic requirements, a revised inducement (engine derate) policy for SCR- based aftertreatment systems, and improved access to service information.

Proposed Serviceability Improvements

More repair and servicing information in owner's manual, including:

1. A **description** of how the emission control systems operate
2. **Diagrams** of the engine and emission-related components and expected key operating parameters
3. A description of how to use the OBD system to troubleshoot problems and access emission-related diagnostic information
4. A wiring diagram to troubleshoot aftertreatment-related components
5. Provide **instructions** on where to find emission recall and technical repair information that is available without charge
6. **QR code** on engine label that links to engine information and owner's manual

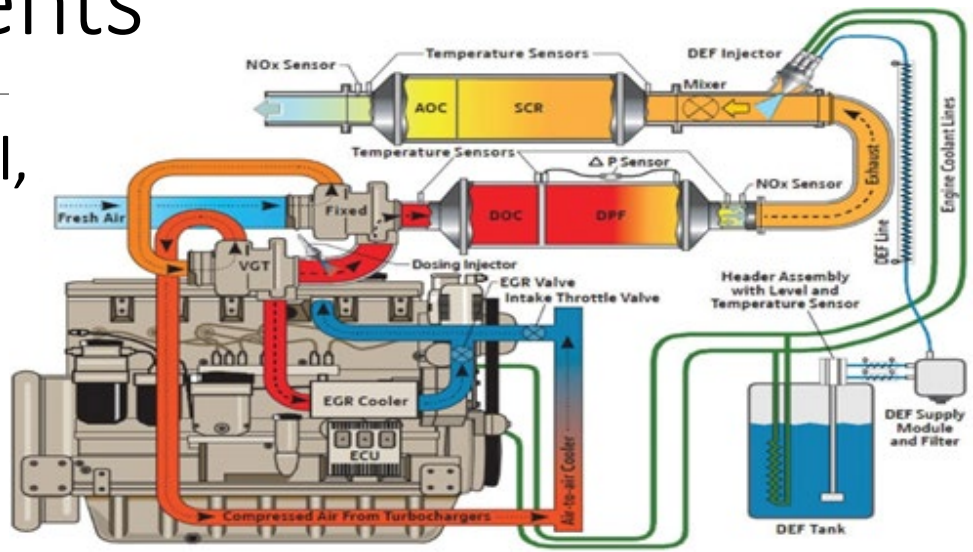
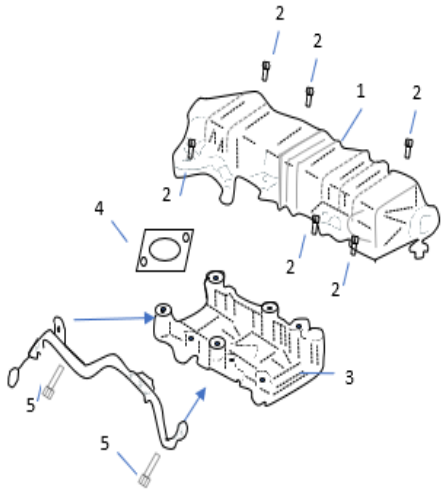


Figure used with permission from John Deere

Proposed Serviceability Improvements continued…

7. Exploded-view drawings with **part numbers** and basic assembly requirements
8. DPF-specific information:
   - Criteria for cleaning the DPF (e.g., pressures and filter weight)
   - Access to DPF inlet and outlet pressures with a generic scan tool
   - Instructions on how to remove DPF for cleaning



		Application	Part Number	Quantity	Notes
1	EGR Cooler	49 and 50 State	12345678A	1	NA
2	EGR Cooler Bolts M10 x 1.5 x15 (Flanged)	50 State	12345555C	6	50Nm
3	EGR Cooler Base	50 State	12344444D	1	NA
4	EGR Cooler Gasket	50 State	12345666H	1	No sealer required
5	Bolt – M8 x 1.5 x 20 (Flanged)	49 State	123456777D	8	65Nm
6	EGR Pressure Sensing Tube	49 and 50 State	123456788A	1	NA

9. **Troubleshooting guide** to address DEF dosing- and DPF regeneration-related warning signals
10. Codes associated with inducements and DPF engine derates would be displayed in the cab or with a **generic scan tool** (seeking comment on EGR-related derate information)

SCR Inducement Proposal Background

- SCR is very different from other emission control technologies in that it requires **operators maintain** an adequate supply of diesel exhaust fluid ("DEF")
- Operating an SCR-equipped engine without DEF would cause NO_X emissions to increase to levels comparable to having **no NO_X controls** at all
- In response to this concern, EPA issued guidance describing how manufacturers could use engine derates or "inducements" for certain DEF-related faults to ensure that **operators use** an adequate supply of high-quality DEF
- Today – manufacturers design engines with a **5-mph final inducement** for many reasons unrelated to DEF refills, and once a vehicle reaches 'final severe inducement' it generally must be towed to a specialized repair facility to have the condition reset

Proposed Inducement Principles

EPA's inducement approach should result in:

1. operators maintaining an adequate supply of high-quality DEF while discouraging tampering of SCR systems,
2. a speed derating schedule for inducement that balances impacts to operators while still achieving required emission control,
3. unique inducement schedules for different categories of vehicles that reflect different primary operating conditions to ensure that the final inducement speed is effective while acknowledging operating constraints,
4. ensuring that the inducement condition is warranted,
5. clear communication of SCR system problems to the operator,
6. avoiding the need for intervention at a dealer or other specialized service center where possible, and
7. reduced likelihood of in-use tampering based on a more targeted inducement approach.

Proposed SCR Inducement “triggers”

- SCR inducements would only be required based on detecting the following fault conditions:
  - Low DEF fill level
  - Blocked DEF lines or dosing valves
  - Poor DEF quality
  - Open circuit faults as an indication of tampering (e.g., disconnection of DEF pump or quality sensor)
  - Missing catalyst

Other SCR Inducement Proposed Provisions

- NOx **Override** to prevent false inducements
- A derate schedule in four stages implemented over **60 hours**
- Separate derate schedule for **low-speed vehicles** (defined as vehicles with 30 hours of non-idle engine operation at <20 mph)
- Final inducement speeds of **50 mph**, or **35 mph** for low-speed vehicles
- Any OBD signals involved in inducement-related conditions must be readable with **generic scan tools**

Other SCR Inducement Proposed Provisions

- If condition is remedied – system will **automatically reset** after 4 hours or allow generic scan tool reset
- In-cab **information** to help operators understand inducement status
- For **repeat faults** within 80 hours, the vehicle would return to the last stage of inducement
- **Requests for comment**:
  - All aspects of the proposed requirements
  - Retrofitting in-use engines and vehicles
  - Other signals that should be readable with generic scan tools (e.g., those related to maintenance derates)

Proposed Onboard Diagnostic ("OBD") improvements

- Increase the signals that must be accessible with a **generic scan tool**
- Make DEF dosing system test available
- **Health monitors** for the SCR, DPF, and EGR systems:
  - Proactively provide the operator with information on the functionality and status of systems
  - Inform operators about key operating parameters to help identify when there may be a need to perform maintenance
    - Information displayed **in the cab on-demand**
    - DPF monitor based on regeneration frequency
    - SCR monitor based on DEF consumption
    - EGR monitor based on valve position error and EGR cooler performance

Rulemaking Status and Submitting Comments

- NPRM published on March 28, 2022 (see link below for more information)

https://www.epa.gov/regulations-emissions-vehicles-and-engines/proposed-rule-and-related-materials-control-air-1

- Goal is to issue a final regulatory action by the end of 2022

- Public comment period open through May 16
  - Submit comments on https://www.regulations.gov/docket/EPA-HQ-OAR-2019-0055/document
  - See the "Public Participation" section of the preamble on page 17415 of the preamble for instructions on how to submit comments and how EPA handles confidential business information ("CBI")
    - For example, comments can be submitted by emailing: a-and-r-Docket@epa.gov and including "Docket ID No. EPA–HQ–OAR– 2019–0055" in the subject line of the message.

More Information

- Access rule documents, supporting documents and comments received here: https://www.regulations.gov/document/EPA-HQ-OAR-2019-0055-0983
- Access the proposal here: https://www.govinfo.gov/content/pkg/FR-2022-03-28/pdf/2022-04934.pdf
  - Serviceability proposals: see Section IV.B.3. “Serviceability” on pages 17513-17519
  - Inducement proposal: see Section IV.D. “Inducements” on pages 17536-17546
  - OBD proposal: see Section VI.C.1.iii. “Additional OBD Provisions in the Proposed Federal Program” on pages 17528-17533

- Contact Amy Kopin

Environmental Protection Specialist, Heavy-Duty Onroad and Nonroad Center
Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
Email: *kopin.amy@epa.gov*
734-214-4173

https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-commercial-trucks-and-buses-heavy

Submitting Comments

https://www.regulations.gov/docket/EPA-HQ-OAR-2019-0055/document