













Publicly Owned On-road and Off-road Vehicles



Diesel Retrofit Overview

- Directed at reducing diesel emissions and the health impacts associated with diesel exhaust
- Components of the rules:
 - Provides for installation of closed crankcase ventilation systems (school bus)
 - Provide tailpipe retrofits (BART) for certain heavy duty diesel engines
 - Reimbursement of purchase and installation costs

Intent of the Diesel Retrofit Law



- □ Reduce 150 tons of diesel particulate matter from the air every year.
- □ Target vehicles that have large operational presence in neighborhoods and have potential to directly expose citizens to diesel particulate matter.
- □ Prioritizes the reduction of fine particulate matter (PM_{2.5}) in urban communities



Completed Retrofits...

- □ School Bus CCVS ~7,000 installs
- ☐ School Bus BART 205
- □ Solid Waste BART ~1600
- □ NJTransit BART- ~700 & in process
- □ Commercial Bus BART ~1600 & in process
- □ Voluntary Nonroad Retrofits 212



Regulated Vehicles

- ☑ School Buses
- ☑ Solid Waste Collection Vehicles
- ☑ Public & Private Commercial Buses
- Publicly Owned On-Road Vehicles
 - Includes Recycling Trucks
- Publicly Owned Off-Road Equipment



Retrofit Law Components

- Compliance burden on vehicle owner
- Submit Inventory / Cost Estimate
 - September 8, 2011 for public diesel fleets (submitting before this date is encouraged)
- ☐ State pays for retrofits
 - State Contract
 - Authorized installers
- □ Retrofit warranty



Compliance Tools

- □ Guidance Document
- ☐ State Contract Authorized Installers
- Electronic Submittal through web portal
- Workshops
- www.Stopthesoot.org website
- □ List server messaging system
- □ Program Staff



Devices on Contract

- Designed to capture solids, liquids, and gaseous emissions and treat before exhaust
- Designed to replace muffler
- Application design based on engine/chassis manufacturer for sizing & plumbing
- Particle Filters, Oxidation Catalysts, Flow-Through Filters
- ☐ Meet definition of BART
- USEPA or CARB verified diesel retrofit emission control and reductions (%)
 - USEPA and CARB restrictions apply on model, year, use, fuel & temperature restrictions



Authorized Installers

- A person/entity who holds a written agreement – service, sales, etc... with one or more retrofit manufacturer
- Must be on State Contract as per regulations
- Provide Best Available Retrofit Technology that has been verified by California or USEPA to meet standards referenced in NJ regulations.

Authorized Installer Tasks



- □ Needs to confirm the device will work with engine/chassis combination
- Manufacturer authorized & trained
- Provide turnkey cost estimate
- Warranty Service
- Product information and training
- Coordinate Reimbursement with State



Reimbursement

- Reimbursement direct to Authorized Installer on State Contract
- Covered cost
 - BART & ancillary items for turnkey
 - Installation
- Not covered
 - Consumable items such as replacement filters
 - Remedial repairs necessary to retrofit vehicle
 - Existing damage, wear and tear, or modifications precluding installation of BART.
 - Non-contract installations unless under approved grant.

Diesel Retrofits-Regulated Vehicles



- "Regulated off-road diesel equipment" means any model year 1996 or newer off-road diesel equipment operated in the State that is owned by the State or any political subdivision thereof, or a county or municipality, or any political subdivision thereof, and that is equipped with a more than 175 horsepower engine.
- "Regulated on-road diesel vehicle" means any onroad diesel vehicle registered in the State that is owned by the State or any political subdivision thereof, or a county or municipality, or any political subdivision thereof.

Retrofit Law-General exemptions



- □ 2007 & newer model year on-road engines
 - Engines meeting the 0.01 g/bhp*hr standard
- □ Off-road engines meeting 0.015 g/bhp*hr PM standard (~2011 to 2014 phase in)
- ☐ First aid, emergency, ambulance, rescue & fire
 - Dedicated equipment, not plow trucks
- Agricultural Vehicles
 - Farm Equipment



What are the retrofits?

- □ Best Available Retrofit Technology (BART)
 - Attached to exhaust pipe in place of existing muffler
 - 3 main types Diesel Oxidation Catalyst (DOC), Flow Through Filter (FTF), and Diesel Particulate Filter (DPF)
- Minimum exhaust PM (particulate) emission reductions
 - 3 PM reduction levels called BART Levels

BART Minimum Control Efficiency



BART Level	Minimum Control Efficiency (particulate matter reduction by weight %)	
3	85	
2	50	
1	25	

Control Efficiency determined according to verification results from USEPA or CARB



Steps to Compliance



Basic Program Steps

- 1. Owner identifies Regulated Vehicles
- 2. Determine appropriate BART & Installer
- 3. Submit Inventory Form (includes cost estimates)
- 4. DEP review/approve cost estimates
- 5. Installation
- 6. Submittals and Recordkeeping
- 7. One-Time Compliance Inspections



Develop Inventory

- Includes all self-propelled diesel vehicles & equipment in fleet
- Complete Inventory on BART Submittal form
 - Determine desired BART
 - □ Installer input
 - □ Independent research
 - Choose installer(s) from the state contract
 - Installers offer 1-2 BART brands
 - ☐ Can use more than one installer
 - May be needed for unique applications
 - Some exceptions based on vehicle design space constraints



Determining BART

- □ Type of vehicle and Engine Model Year
 - On-road 2006 and older BART 2
 - Off-road
 - Over 175 hp
 - □ 1996 2014 EMY -BART 3
 - BART installation requirements do not apply to engines in this category that are rated from 175-750 horsepower and were certified to a particulate emissions standard of 0.015 g/bhp-hr, or rated above 750 horsepower and were certified to a particulate emissions standard of 0.03 g/bhp-hr phased in from 2011 to 2015. (Tier 4)
- Examination and Observations by Authorized Installer
 - Exhaust Temperature Profiles
 - Backpressure Monitoring
 - Sizing Concerns

BART Levels for Public Fleets



Vehicle or Equipment Type	Engine Model Year	<u>Minimum</u> <u>BART Level</u>
On-road vehicle other than a commercial bus or solid waste vehicle	2006 and older	BART 2
*Off-road equipment >175 horsepower	1996 - 2014 *	BART 3

* BART installation requirements do not apply to engines in this category

that are rated from 175-750 horsepower and were certified to a particulate

emissions standard of 0.015 g/bhp-hr, or rated above 750 horsepower and

were certified to a particulate emissions standard of 0.03 g/bhp-hr phased

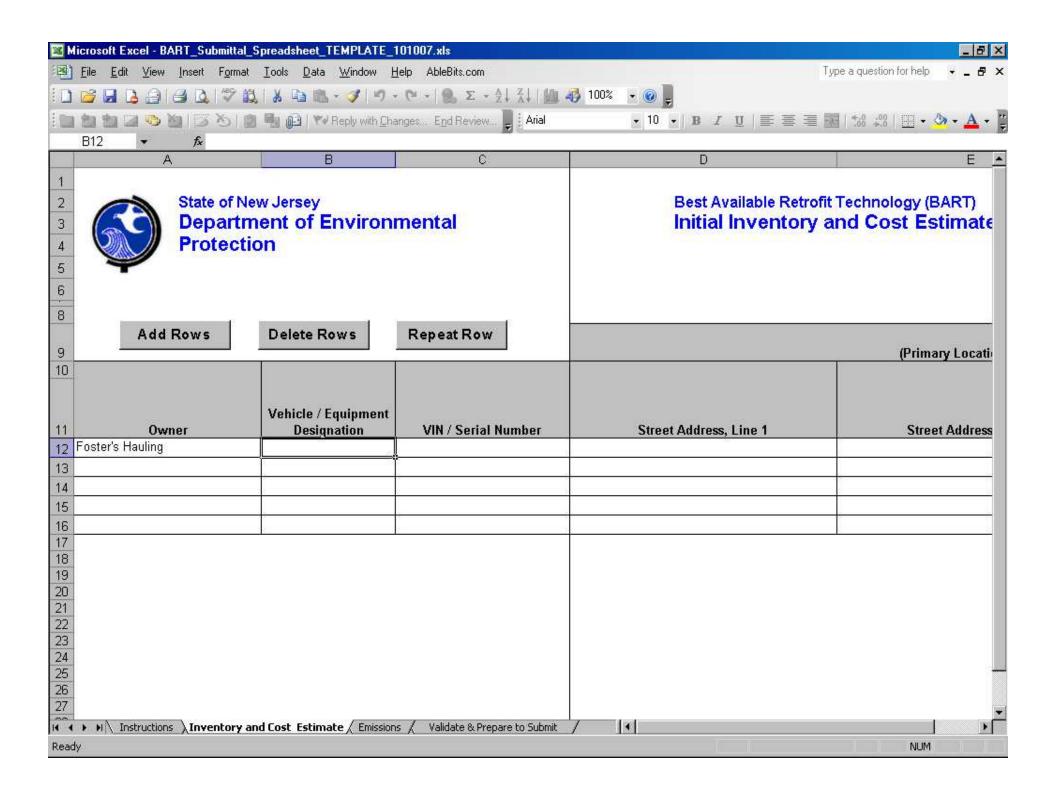
in from 2011 to 2015.

Control Efficiency determined according to verification results from USEPA or CARB

Cost Estimate Information



- Installer provides cost estimate amount for each vehicle
- BART Kit at contract discount
 - Labor hours & rate
 - Mobile Install cost optional
- Exemption or Lower BART Level
 - Document indicated required BART Level is infeasible.
- Owner puts info into form.
 - Form is electronic only





What's on the Form?

- General Information
 - Owner/Contact Person
 - Address/Location of Vehicle
- General Vehicle Information
 - Vehicle Type/Model/Year
 - License Plate/Vehicle Identification Numbers
- Engine Information
 - Horsepower
 - Manufacturer/Year
 - EPA Engine Family Number

What's on the Form? Cont'd

- BART Information
 - Manufacturer/Make/Model
 - Authorized Installer
- Cost Estimate
 - BART Cost/ Labor Rate and full estimated cost quoted from authorized installer on State Contract
 - Estimated Install Time
- Choose Compliance Method
 - Notice of Intent to Comply
 - One of the Fleet Plan Types

Saving the Spreadsheet



- Note: If you use a newer version of Microsoft, please save the spreadsheet in 97/2003 Excel format for a successful submittal
- □ "How to" instructions at www.stopthesoot.org



Submittal Process

- Owners submit one of five submittal types & full diesel fleet inventory
 - Notice of Intent to Comply (NIC) / Fleet Plan
 - Combined Fleet Plan
 - Fleet Averaging Plan
 - Combined Fleet Averaging Plan
 - Annual Supplement (fleets with regulated Solid Waste Vehicles)

DEP has the authority to reject unreasonable cost estimates

Notice of Intent to Comply



- □ The regulated vehicle will meet the prescribed BART level
- Includes cost estimate per vehicle as provided by the authorized installer
- ☐ Inventories submitted with NICs must include all diesel vehicles in the fleet



Fleet Plan

- When prescribed BART level is not feasible for at least one vehicle
- Allows alternate (lower level) BART, repower, rebuild, retirement or exemption
 - Need reports from multiple Authorized Installers
 - DEP has to approve "drop down" application for lower BART level
- Inventory includes other diesel vehicles
 - and Notice of Intent to Comply vehicles
 - And cost estimates for all retrofits



- Two or more fleets can combine all of their diesel vehicles into one submission
- □ All owners involved have Shared Liability
- May be beneficial for smaller diesel fleets
 - For example a municipality combining with county fleet

Fleet Averaging Plan

- Option if fleet has 75+ regulated vehicles
- one or more vehicles cannot meet BART
 - fleet plan trigger
- Allows alternate (lower level) BART, repower, rebuild, or retirements.
- Can use non-regulated vehicles and equipment retrofits to achieve the required diesel emissions reduction
 - All vehicles in plan then become regulated vehicles

Fleet Averaging Plan

- □ Requires emissions modeling submittals to show same or greater benefit and better cost benefit
- Submittal includes all diesel vehicles in fleet
- Includes cost estimate per vehicle as provided by the authorized installer
- 2 or more fleets can do combined FAP

Combined Fleet Averaging Plan



- Used to reach minimum 75 vehicle for a fleet averaging plan
- All involved will sign the Joint and Severable Liability Statement
- □ Includes all diesel vehicles in fleet
- □ Include cost estimate per vehicle as provided by the authorized installer



Annual Supplement

- Public Fleets with Solid Waste Vehicles or Commercial Buses
 - Prior submitted inventory/cost estimate
 - Need to provide cost estimates and any new vehicles to existing inventory.
 - Choose Annual Submittal Inventory / Cost Estimate
 - Add any new vehicles
 - Provide compliance method, BART and cost estimates for all public on-road and off-road vehicles.

Multiple Types of Regulated Vehicles



- □ All diesel vehicles in the fleet have to be submitted with this inventory
 - Non-regulated diesels
 - If the fleet was already submitted while submitting for Solid Waste Vehicles-
 - Choose "annual supplement" under Service Selection
 - □ "New" fleet vehicles with 2006 or older engines can be added to fleet update
- Choose "Non-Regulated/Due Later"
 - As a compliance option in the inventory

Why Collect This Information?



- ☐ Information is needed to
 - Determine correct BART
 - Prevent fraud
 - Pre-populate Compliance Form
 - Verify BART and Authorized Installer, satisfy procurement process
 - Determine funds availability



DEP review

- Reasonable cost based on state contract rates
- ☐ Fleet plan and Exemption and requests technical soundness.
- Evaluate Fleet averaging plans
- Outcome can be: approval, partial approval
 - Rejected portions must resubmit



Notification

- ☐ Approved--> Letter
 - Approval for purchase/installation
 - Lists approved vehicles
- □ Rejections--> Letter
 - The DEP will work with owner to identify mutually acceptable BART
 - If no agreement can be reached, then DEP will issue final determination:
 - Identify alternative BART or exempt
- Partial Approvals



Cost Estimate Approval

- Letter of approval sent to owner
- Letter must be presented to installer
- □ No installations shall be performed until the DEP confirms that funds are set aside (approval letter)



Install Timeframes

- DEP provides owner with a Notification to retrofit
 - Install timeframes based on fleet size
 - < 75 regulated vehicles install required within 120 days of notification</p>
 - □ 75 150 regulated vehicles install required within 180 days of notification
 - □ > 150 regulated vehicles install required within 270 days of notification



Installation

- Letter from DEP noticing to begin installation
 - Has location for downloading compliance form
- □ Use authorized installer on cost estimate
 - Owner coordinates with installer
 - DEP does not coordinate installations
- Compliance form must be submitted to DEP w/in 5 days of installation with owner signoff VERY IMPORTANT

Compliance Form



- Pre-populated with inventory info
- Key tracking document for state contracting process and program monitoring
 - Documents from owner that the vehicle has been retrofitted
 - MVC signoff at next regularly scheduled inspection
 - Steps required in Diesel Retrofit Statute
- Keep on vehicle at all times
 - Copy at central office location and DEP



Compliance Form

- Owner downloads-prints & signs after install
 - Enter "retrofit device family name" by hand
 - ☐ Send copy to DEP, original with vehicle
 - ☐ Form due to DEP 5 days after retrofit installation is complete (Owner signature & device family name)
- □ Installation verified at next emissions inspection
 - Inspector signs compliance form
 - Owner sends copy of signed form to DEP
 - □ Form due 30 days after inspection
 - Must have Inspector signature
 - Original stays with vehicle

DRRP0001

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION DIESEL RISK REDUCTION PROGRAM COMPLIANCE FORM – BART

Vehicle Owner: Telephone No.: Address:

Program Interest #: Vehicle/Equipment Designation:



Vehicle Description and GVWR:	
VIN/Serial Number:	
Vehicle License Plate State & Number:	
Engine Manufacturer and Model Year:	
EPA Engine Family:	
Retrofit Design/Fleet Plan Option:	
Retrofit Make and Model:	
Retrofit Device Family Name:	
Retrofit Cost (incl. Installation):	-ceV
Installation Certification: I hereby certify that the required retrofit devices have been installed on the aforementioned vehicle on the following Date: I certify under penalty of law that I believe the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information. (Print Vehicle Owner Name) (Vehicle Owner Signature)	Vehicle Inspector: I hereby certify that the retrofit requirement has been met in accordance with the inspection procedure at N.J.A.C. 7:27-32.21. I certify under penalty of law that I have personally examined an am familiar with the information submitted in this documents and all attached documents and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information. (Print Vehicle Inspector Name) (Date)



Reimbursement

- Direct reimbursement to installer state contract
 - No out of pocket costs to vehicle/fleet owner
 - Public fleet may self-install if "authorized installer"
 - □ Labor costs reimbursed by grant
 - □ Hardware purchased from state contract
- ☐ Ineligible = Fuel, maintenance, & repairs

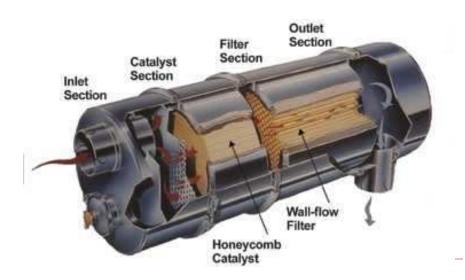


Particulate Control Technology



Tailpipe technologies

- □ 3 main categories: DOC (diesel oxidation catalyst), FTF (flow through filter), DPF (diesel particulate filter)
- Mostly muffler replacements + ancillary





An example of an oxidation catalyst which can reduce particulate matter by 20 - 50 percent. Photo Courtesy of Johnson Matthey



Diesel Oxidation Catalyst

- □ BART Level 1 Devices
 - Have a PM reduction capability of 25%
- □ Uses a catalytically induced reaction that converts PM, CO and Hydrocarbons to CO₂ and H₂O (usually platinum catalyst)
- Does not use a filter
- Often used in combination with other devices to achieve a higher PM reduction



- ☐ BART Level 2 Devices
 - Have a PM reduction capability of 50%
- Exhaust flows through a filter medium (wire mesh) that has flow channels which create a turbulent condition
- ☐ Filter medium treated with a catalyst
- Untreated PM flows out with exhaust
- □ No FTFs are currently verified (not BART)



FTF- Cutaway



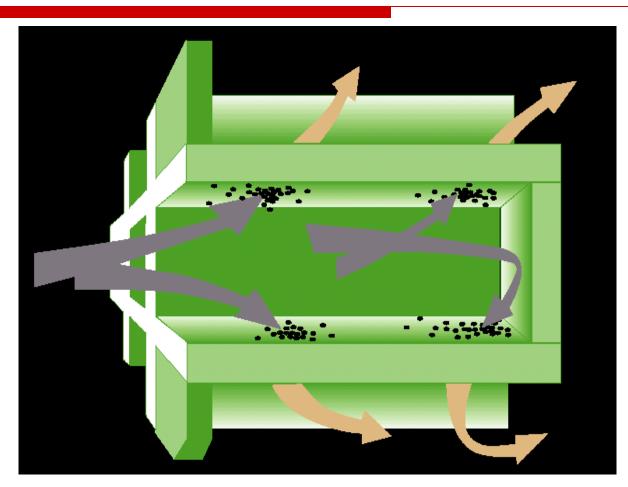
Diesel Particulate Filter (DPF)



- BART Level 3 Devices
 - Have a PM reduction capability of > 85%
- Uses a filter to "trap" PM particles in the exhaust
- Two styles of filters
 - Passive
 - □ Uses a catalyst to reduce PM ignition temperature and PM is incinerated using exhaust heat
 - Active
 - Uses an external source of heat to incinerate the PM trapped in the filter

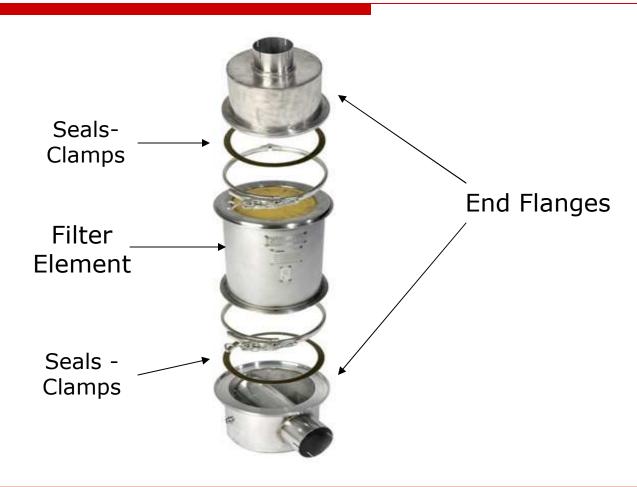


DPF Flow

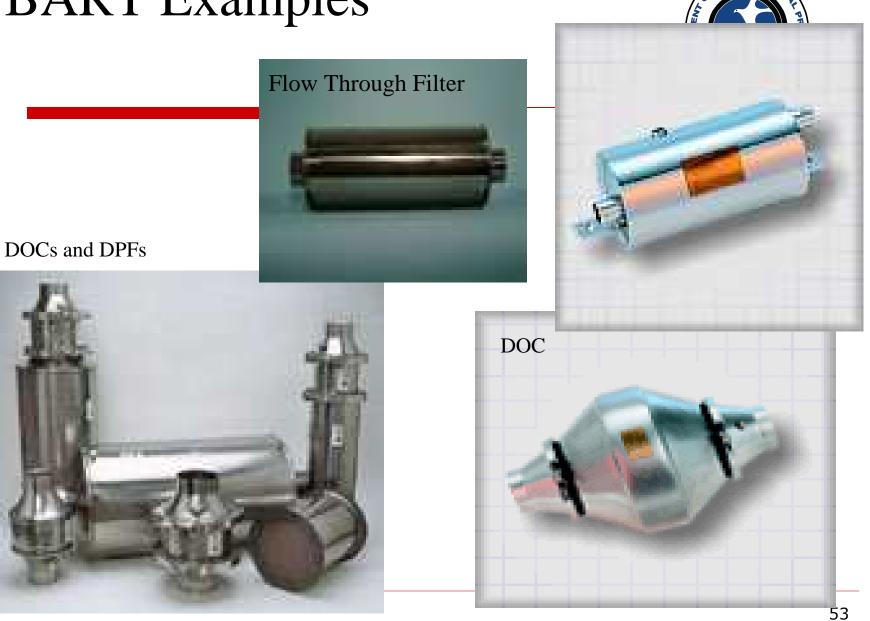




DPF - Disassembled

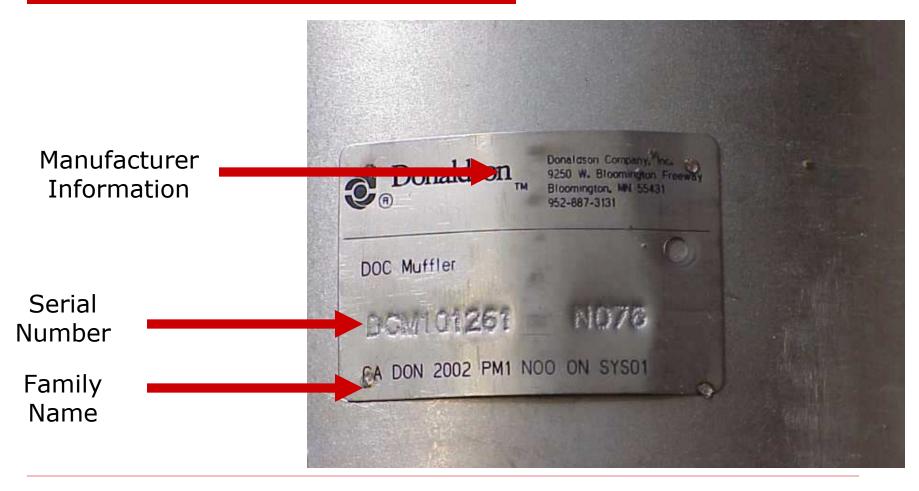


BART Examples





Retrofit Device Label



Particulate Retrofit Resources



- ☐ CARB California Air Resources Board www.arb.ca.gov/diesel/verdev/verdev.htm
- ☐ USEPA National Clean Diesel Campaign http://www.epa.gov/otaq/retrofit/verif-list.htm
- □ Retrofit manufacturers' websites:
 - Caterpillar, Donaldson, Engelhard, HUSS, Engine Control Systems, Cummins Filtration (Fleetgard), Johnson Matthey etc.



Warranty, Maintenance, On-Road Requirements

BART Warranty & Installation Requirements



- □ Retrofit Device Manufacturer
 - Warranty for retrofit and engine damage
 - Must repair any damage to vehicle caused by normal use of retrofit
- Authorized Installer
 - Warranty for installation
 - Must repair any damage to vehicle caused by the installation

BART Warranty & Installation Requirements



- □ Vehicle Owner
 - Must be installed by a manufacturer's authorized installer to be eligible for reimbursement (Statutory requirement)
 - Vehicle has to be in good working order
 High oil consumption is bad for BARTs
 - Must maintain BART retrofit device in accordance with manufacturer specifications

Retrofit Device Warranties



Engine Size & Gross vehicle Rating	Minimum Warranty Period
70-170 HP; GVWR < 19,500 pounds	Five years or 60,000 miles
170-250 HP; GVWR ≥19,500 pounds and ≤33,000 pounds	Five years or 100,000 miles
>250 HP; GVWR >33,000 pounds	Five years or 150,000 miles
>250 HP; GVWR >33,000 pounds; typically driven >100,000 miles per year; <300,000 miles on odometer at time of installation	Two years, unlimited mileage



Maintenance

- Owners are responsible for
 - Retrofit Maintenance
 - □ Varies by retrofit type
 - □ includes visual inspection, ash removal
 - General condition
 - Proper operation
 - Repair damage
 - Vehicle maintenance effects BART maintenance



On-Road Standards

- N.J.A.C. 7:27-14.3- Emissions control devices shall not be:
 - Disconnected
 - Detached
 - Deactivated or in any way be rendered inoperable or less effective
- Except for the purposes of diagnostics, maintenance, repair or replacement
- Enforceable



Responsibility

- Owners
 - Select correct BART for your fleet
 - Fill-out, submit and maintain forms
 - Annual supplements
 - Maintain BART & Vehicles
- DEP
 - Work with owners and installers to solve problems
 - Maintain website for data
 - Store documentation
 - Guidance to regulated community
 - Ensure compliance



Support Information

■ Website at

http://www.stopthesoot.org

- Program Info
- Guidance Documents
- Contacts
- Portal for document submittals/updates
- View state retrofit contracts
- List Server



Diesel Risk Reduction Program (609) 292-7953

tony.iavarone@dep.state.nj.us

adam.lewis@dep.state.nj.us

paul.romano@dep.state.nj.us

jana.opperman@dep.state.nj.us

Diesel Inspection and Maintenance Program





- •Identify diesel vehicles with excessive smoke emissions to ID vehicle maintenance that contributes to air pollution.
- •Roadside and Periodic Inspection components. Municipal (local and county) vehicles are subject to the periodic (annual) inspection portion of the program.

Periodic Inspection



- •Annual emissions inspections all diesel vehicles 18,000 pounds GVWR and over.
- •Repair shops, fleets and mobile providers are licensed as Diesel Private Inspection Facilities (Diesel PIF)
- •Municipal (county or local) vehicle maintenance facilities can be licensed as Diesel PIFs or municipalities can have their vehicles inspected at local Diesel PIFs (including Diesel PIFs at other municipalities).
- Diesel PIFs are subject to scheduled overt audits and covert audits.

What vehicles are exempt from inspection?



Emergency vehicles such as ambulances, first aid, rescue, and fire engines.







Misconceptions on EXEMPTIONS



Dump trucks & Utility Vehicles— primary function is to haul materials on a daily basis.

Trucks outfitted with a snowplow for the winter season even though pressed into service during an emergency ARE NOT EXEMPT from annual inspection or other requirements.

This applies to all multi-purpose utility vehicles, construction vehicles, or other vehicles used to perform temporary/ seasonal emergency service.





Diesel Emission Standards Periodic & Roadside Inspections



INOCKS	
Engine Model Year	% Opacity

1990 & older 40 % 1991-1996 30 %

TDIICKS

1997 & newer 20 %

BUSES

Engine Model Year % Opacity RETROFITTED

 1987 & older
 40 %
 30

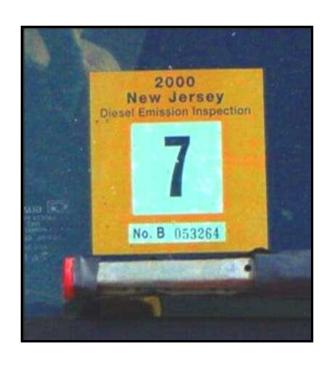
 1988-1993
 30 %
 30

 1994 & newer
 20 %
 20 %

All heavy-duty diesel vehicles and diesel buses: No visible smoke of any color > 3 seconds

Diesel PIF
Inspections





- Emissions inspection must be within 90 days of vehicle registration. Must be performed by a Diesel PIF.
- □ Can be the snap acceleration test, rolling acceleration test, or the stall test. The snap test is most common.
- Passing vehicles get numbered stickers.



HDDVIP Contacts

NJ Dept. of Environmental Protection
Diesel Risk Reduction
Diesel Inspection and Maintenance
401 E State Street - P.O. Box 420
Mail Code 401-03F
Trenton, NJ 08625-0420

Phone: 609-292-1637

Fax: 609-633-6198

E-mail: melissa.evanego@dep.state.nj.us

myNewJersey Registration



- ☐ Go to www.nj.gov/dep/online/
- Click on "New Users request Access to NJDEP" button
- □ New page has "Request Access to DEP-online" in top blue bar, fill in Contact name, etc.
- Click on "request"



Registration cont.

- □ Section "B" is for new users
 - Develop your Log on ID
 - Develop your password
 - Design your security question and answer
- ☐ Click on "Create new myNewJersey Account and Link NJDEP Online to it"



Registration cont.

- □ Fill out contact information
- Click on "Add Contact number" (no dashes)
- ☐ Click "save"
- Brings you back to contact information page, click on "continue"
- Click on "request PIN"-PIN will be emailed to the address provided earlier

Final Steps for Registration



- Request PIN confirmation page-click "continue"
- On new page, under "My Services" blue bar, find "Air Program", bullet box next to "Diesel Retrofit Program"
- □ Click "OK"
- Click "Complete Setup"
- Your myNewJersey account has been created.
- Keep your log on ID and password inside your folder for the Diesel Program