



Applied Projects in the Arizona Border Region: Reducing Diesel Emissions

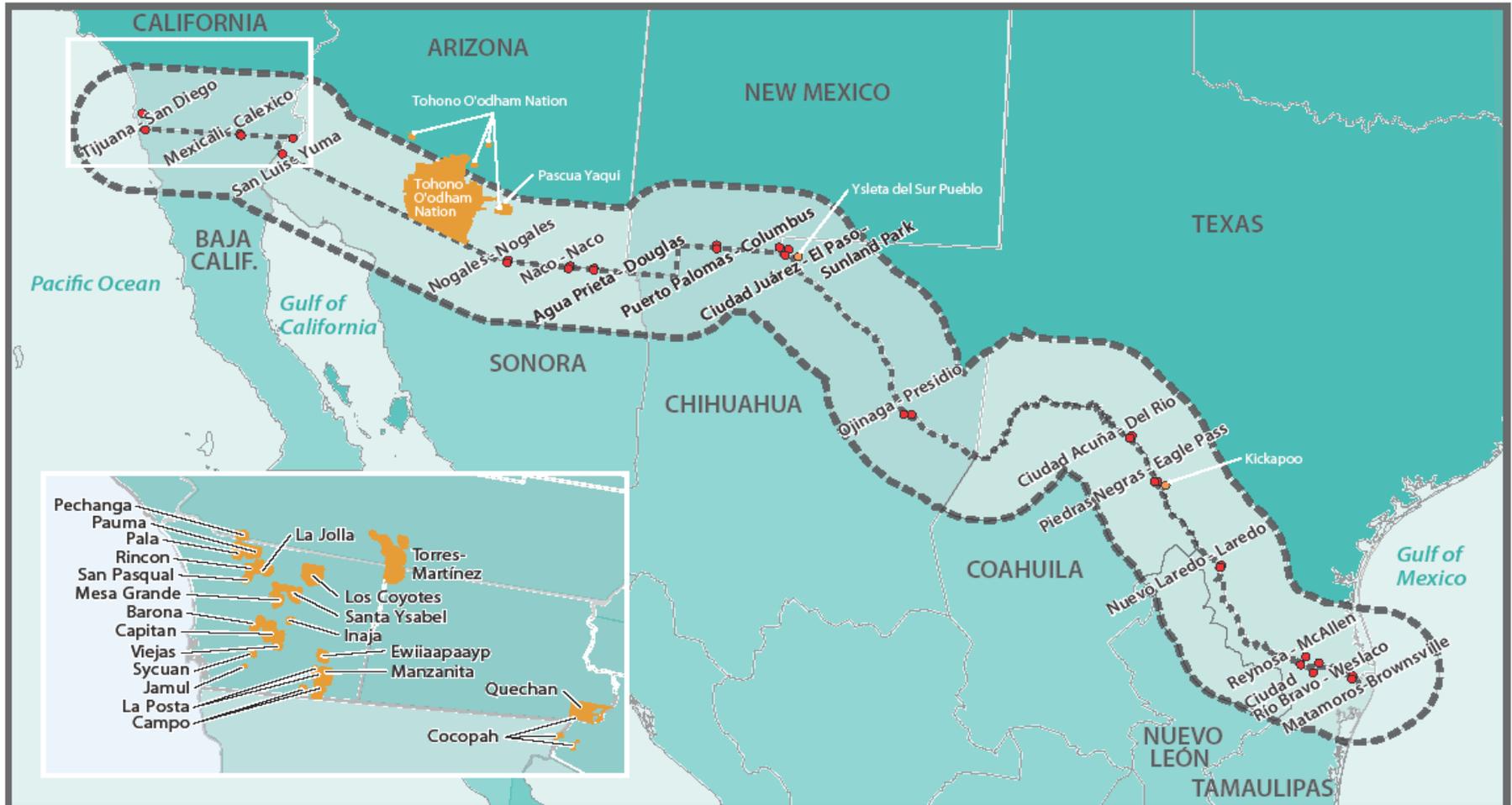
Edna A. Mendoza, Director
ADEQ Office of Border Environmental Protection

Pima County Department of Environmental Quality
Environmental Quality Advisory Council Meeting
November 28, 2012

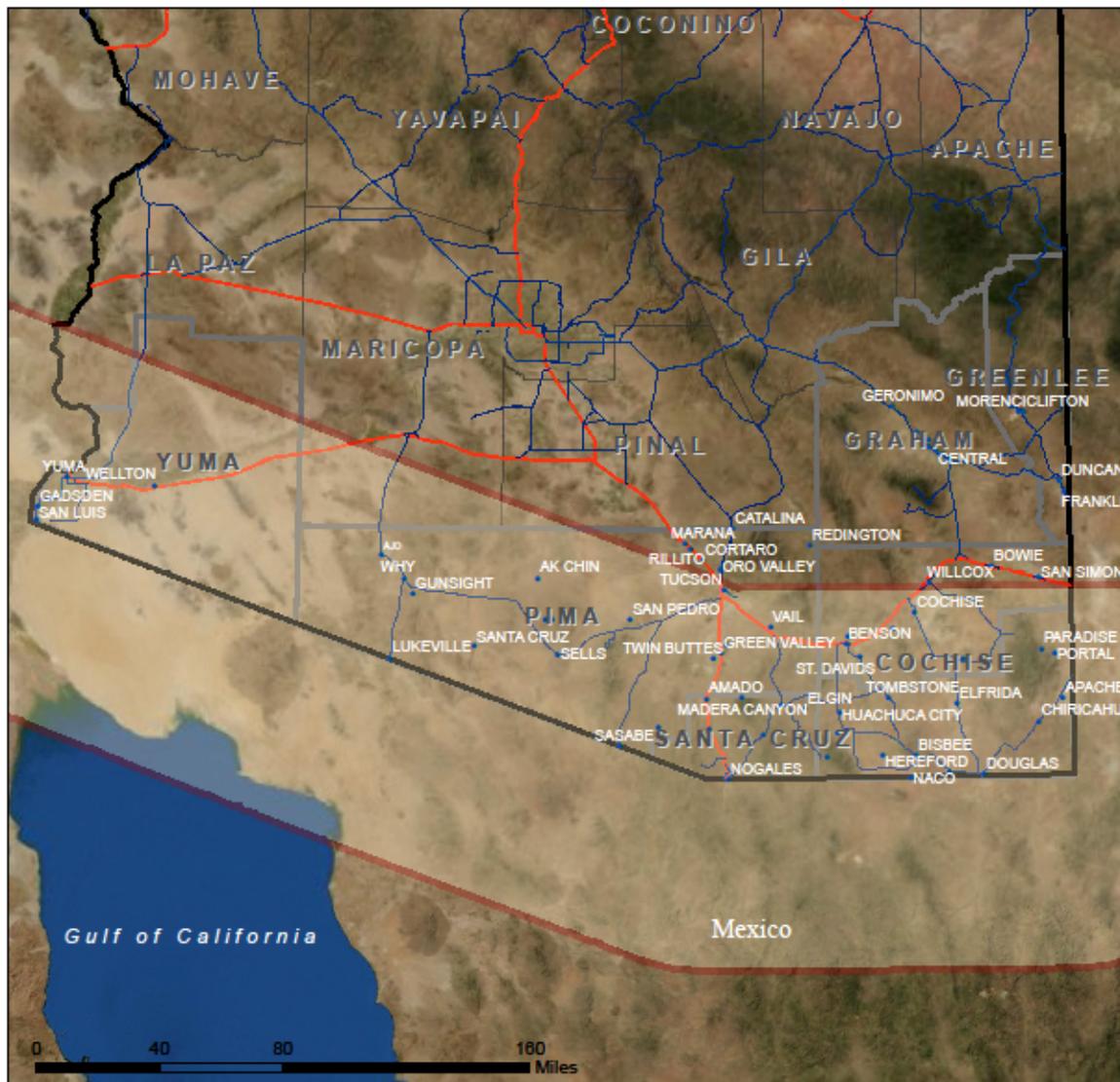
What is the Border Office?

- Located in ADEQ's Southern Regional Office in Tucson
- Functions as Liaison with Binational and Border Organizations
- Assists Media Divisions with Transboundary or Cross-Border Issues
- Implements Projects in Arizona's Border Region

U.S.-Mexico Border Region – Región Fronteriza México-Estados Unidos



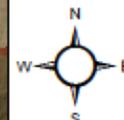
Arizona Border Region



Arizona Border Region

Legend

-  100-km/62.5 mile Border Area
-  SRO Counties



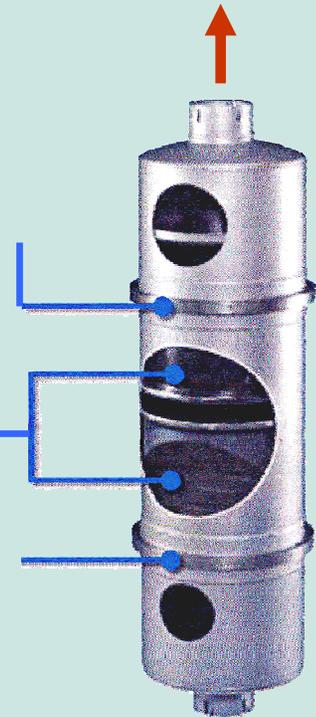
- **School Buses**
 - School/districts willing to participate
 - Buses inspected for mechanical conditions
 - Age of engine, bus usage, temperature data logging (in certain buses)
 - Contractor and provider selection of device
- **Retrofit Devices**
 - Diesel Multi-Stage Filter (DMF)
 - Diesel Particulate Filter (DPF)
 - Low NO₂ Filter (LNF)
 - Diesel Oxidation Catalyst (DOC)

Diesel Multi-Stage Filter (DMF)

- *Reduces PM up to 60%*
- *Can be installed in vehicles of model year 1991 and newer*
- *Maintenance-free designed*
- *It can be used with ULSD and biodiesel blend of up to 20%*
- *Cost per unit with installation is ~\$9,000*

Take-apart design allows easy filter access

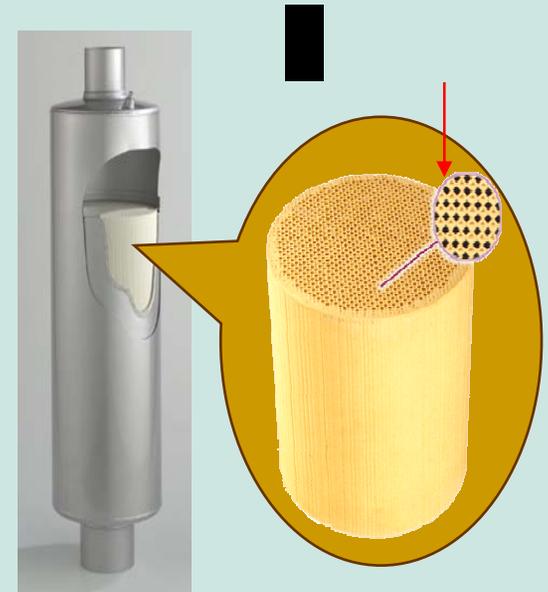
Uses a two-stage metallic filter to trap and reduce diesel particulate matter (PM)



FLOW

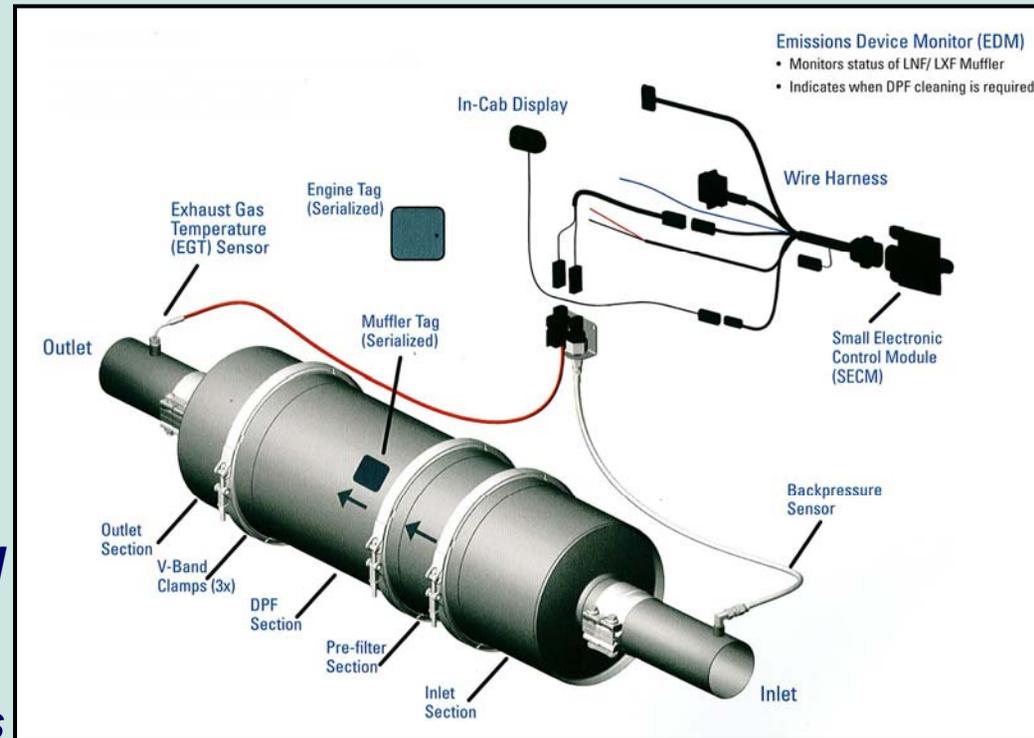
Diesel Particulate Filter (DPF)

- **90%+ Particulate Matter (PM) reduction**
- **5% to 10% Nitrogen Oxide (NOx) reduction**
- **Works with electronic engines built after 1994 (all makes)**
- **Use with Ultra Low Sulfur Diesel (ULSD)**
- **Price per unit with installation is ~\$7,000**



Low NO₂ Filter (LNF)

- **90%+ Particulate Matter (PM) reduction**
- **Prevents excess NO₂ emissions**
- **Works with most on-road engines built between 1993 and 2006**
- **Includes built-in DPF**
- **Use with Ultra Low Sulfur Diesel (ULSD)**
- **Price per unit with installation is ~\$10,000**



Diesel Oxidation Catalyst (DOC)

- **Particulate matter reduction of 20% to 30**
- **Carbon monoxide (CO) and hydrocarbon (HC) reductions of up to 50%**
- **No specialized fuel required**
- **Recommended for mechanical engines**
- **Price per unit with installation is ~\$2,000**



DOC Installation



Remove Old
Muffler from Bus



Replace
with DOC





Bus Retrofits by County

SANTA CRUZ COUNTY (2005-2010)	QTY.
Santa Cruz Valley Unified School District # 35 (Rio Rico)	31
Nogales Unified School District (Nogales)	5
Little Red Schoolhouse (Nogales)	3
Patagonia	9
TOTAL	48

COCHISE COUNTY (2009-2010)	QTY.
Douglas Unified School District # 27	9
Palominas School District # 1	6
Bisbee Unified School District # 2	3
Naco Elementary School District # 23	1
Tombstone Unified School District # 1	1
TOTAL	20



Bus Retrofits by County

YUMA COUNTY (2011-2012)	QTY.
Harvest Preparatory Academy	5
Mohawk Valley School District # 17	2
Wellton Elementary School	2
Antelope Union High School	7
Gadsden School District # 32	9
Crane School District # 13	17
Somerton School District # 11	6
Yuma School District One	11
TOTAL	59

Bus Retrofits by County

PIMA COUNTY (2012)	QTY.
Vail Unified School District	10
Tucson Unified School District	19
Amphitheater School District	12
Flowing Wells School District	9
TOTAL	50

TOTAL RETROFITTED SCHOOL BUSES



Yuma County: 59

Cochise County: 20

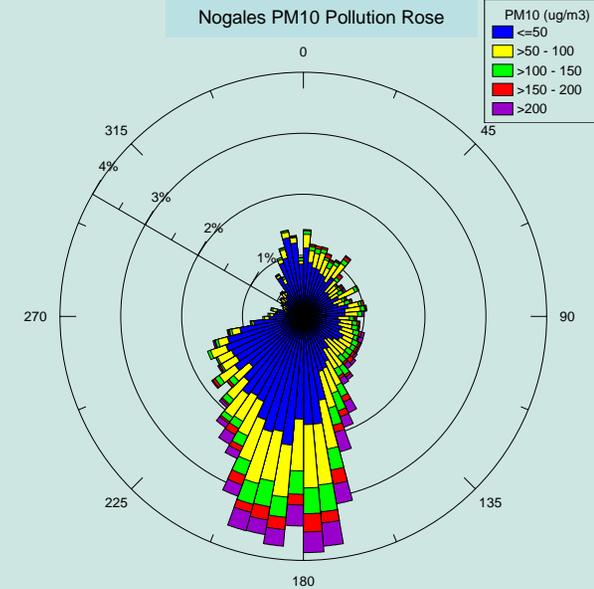


Santa Cruz County: 48

Pima County: 50

Other Retrofit Projects

- Predominant air flow in Nogales is from South to North
- Large volume of commercial traffic
- Retrofitted 71 drayage trucks



Removal of worn exhaust stack with no emissions reduction device.



- **Border 2020** (www.epa.gov/border2020)
 - Meeting of Arizona/Sonora Task Forces
 - Late February/Early March 2013
 - Location TBD

- **Arizona-Mexico Commission** (www.azmc.org)
 - Summer Plenary
 - June 2013
 - Phoenix, AZ

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THANK YOU!