

# **California Environmental Policy Council Hearing**

## **PuriNOx Technology Multimedia Evaluation**

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# The Lubrizol Corporation

**A global, fluid technology company  
concentrating on high-performance  
chemicals, systems and services for  
industry and transportation.  
Industry--\$2 Billion Annual Sales**

**Core Competencies in:  
Technical Problem Solving  
Chemical Formulation  
Global Chemical Manufacturing**

**Research Centers:  
Wickliffe, Ohio, USA  
Hazelwood, England  
Kinuura, Japan**

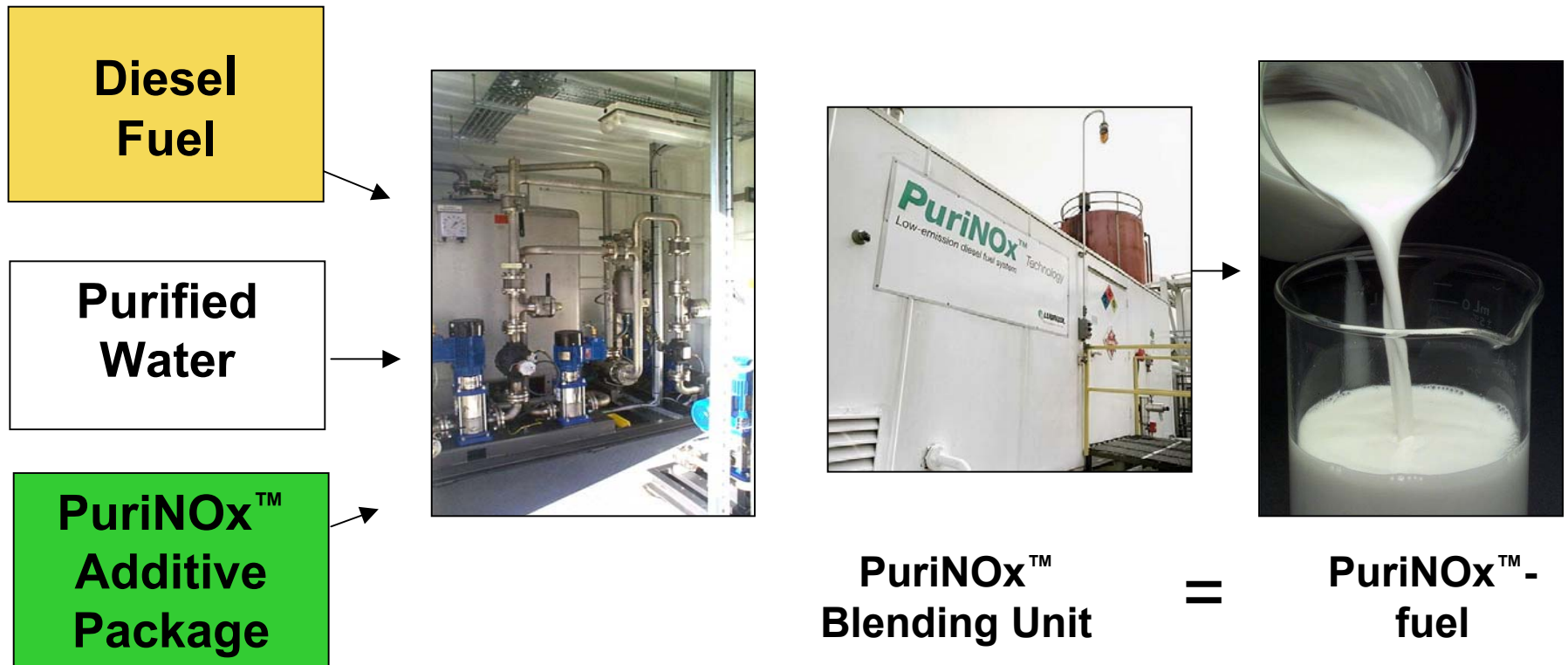


**Founded in 1928  
World Headquarters:  
Wickliffe, Ohio, USA  
Approximately 5,200  
Employees**

**Sales and Technical  
Service Offices:  
50 Worldwide**

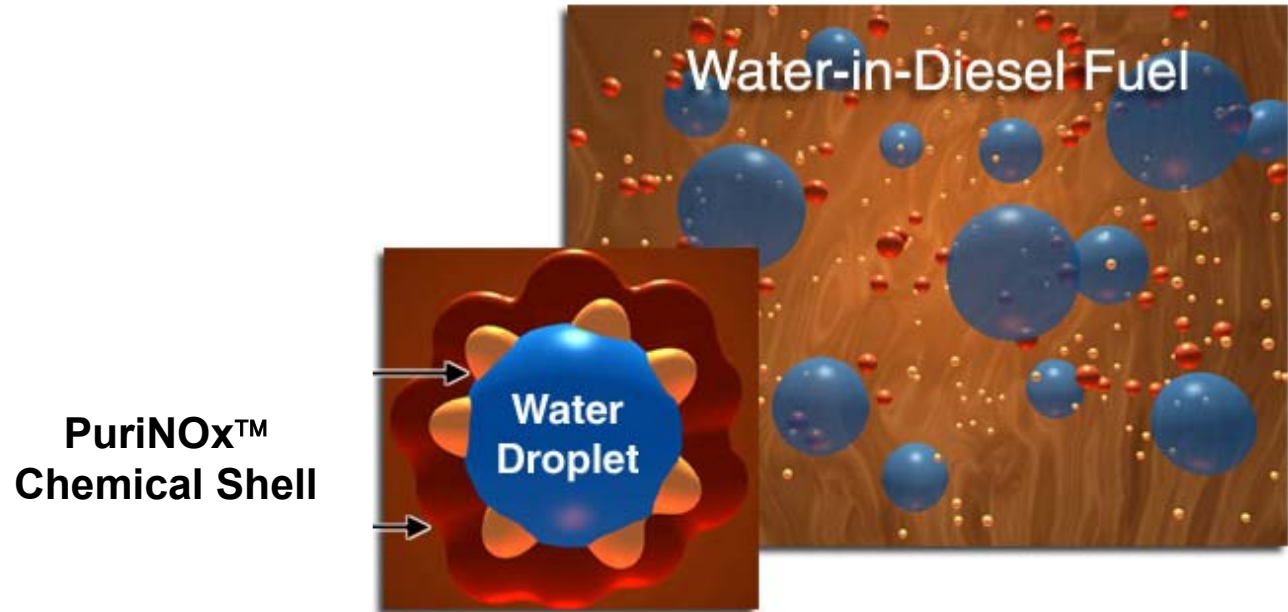
**Manufacturing Plants:  
34 Facilities in  
15 Countries**

# PuriNOx™ Technology

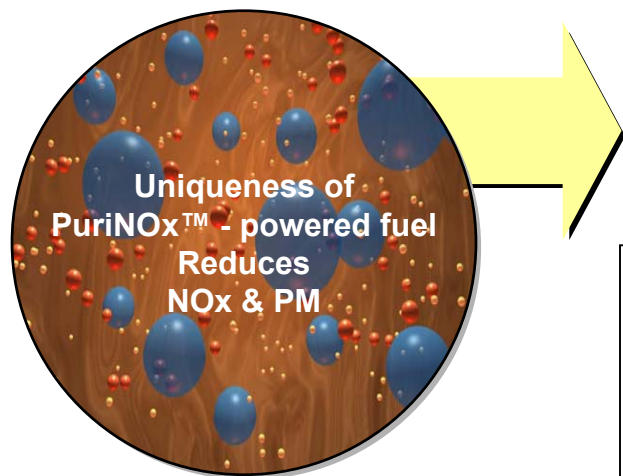


# What is PuriNOx Emulsified Fuel?

- Water-in-diesel blend
- PuriNOx additive encapsulates water droplets
- Water cools combustion temperature and lowers NOx
- Water slightly delays combustion and lowers PM
- Engines recognizes liquid as fuel—water does not come into contact engine and fuel systems



# Uniqueness of PuriNOx™ Fuel



**Reduces NOx by up to 30% and  
Particulates by up to 65%**

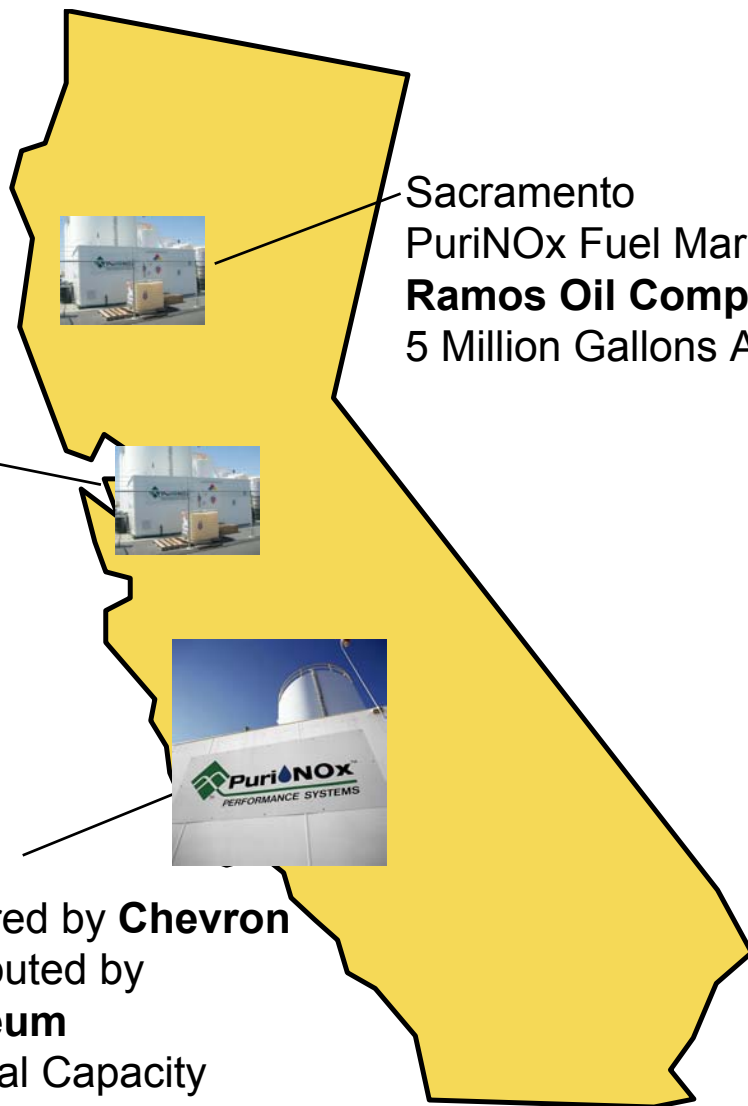
**Tested and Confirmed Energy  
Savings of 1-3%**

**Immediate Air Quality Benefits when  
Fuel is Utilized with only Minor  
Maintenance to Vehicles/Equipment  
(Fuel Filter Change)**

**Uses Existing Storage, Distribution and  
Fueling Facilities with Minor  
Modifications**

**Handles Like Diesel Fuel  
But with defined stability parameters**

# PuriNOx Technology Manufacturing Sites



Sacramento  
PuriNOx Fuel Marketed by  
**Ramos Oil Company**  
5 Million Gallons Annual Capacity



Fresno  
PuriNOx Fuel Marketed by  
**R.V. Jensen**  
5 Million Gallons Annual  
Capacity – Q204



Los Angeles  
Proformix<sup>®</sup> Fuel Manufactured by **Chevron**  
Marketed and Distributed by  
**General Petroleum**  
25 Million Gallons Annual Capacity



# End-Use Applications

*Emission Sensitive*

## Intensive Use Applications

Centrally Fueled  
Equipment

On-Highway

- Pick Up & Delivery Fleets
- Urban/School Buses
- Waste Management Fleets

Off-Highway

- Mining
- Construction
- Stationary Power
- Port

Others: Agriculture, Locomotive, Marine

*Emission Sensitive*

*Emission Sensitive*

*Emission Sensitive*



# California Applications

Rail



School Buses



Port



Off Road



Municipal Transit



Standby Equipment



Solid Waste





# PuriNOx™ Fuel Regulatory Credentials

Credential	Date Obtained
<p><b>California Air Resources Board (ARB) Verification (Voluntary Markets)</b></p> <ul style="list-style-type: none"> <li>Regulated and Unregulated Emissions Testing</li> <li>Verified that PuriNOx fuel reduces NOx by 14% and PM by 63%</li> </ul>	January 2001
<p><b>U.S. EPA Fuel Registration</b></p> <ul style="list-style-type: none"> <li>Tier 1 – Regulated and Unregulated Emissions Testing and Literature Search</li> <li>Tier 2 – 90 Day Subchronic Inhalation Toxicity Study</li> </ul> <p>No appreciable differences in effects observed with PuriNOx compared to published studies on petroleum diesel exhaust</p>	October 2002
<p><b>U.S. EPA Emissions Verification</b></p> <ul style="list-style-type: none"> <li>Regulated and Unregulated Emissions Testing</li> <li>Established on and off-road emission reduction values for PuriNOx fuel including NOx, PM, HC and CO</li> </ul>	December 2002
<p><b>California Air Resources Board (ARB) Verification (Regulated Markets)</b></p> <ul style="list-style-type: none"> <li>Regulated and Unregulated Emissions Testing</li> <li>U.S. EPA Fuel Registration</li> <li>Multimedia Evaluation</li> </ul> <p>Potential Impact on Soil Media From Release of PuriNOx Additive/Fuel</p> <p>Potential Impact to Water Body From Release of PuriNOx Additive/Fuel</p>	

# Status of ARB Regulatory Verifications Utilizing Lubrizol Technology

Technology	Application	NOx Reduction	PM Reduction	Verification Status
PuriNOx Fuel Technology	Voluntary On/Off Road and Stationary	14%	63%	Complete
AZ Purimuffler Diesel Oxidation Catalyst (DOC)	Regulated On/Off Road	--	i 25% (Level 1)	Pending
PuriNOx Fuel Technology	Centrally-fueled Regulated On Road	15%	i 50% (Level 2)	Pending
PuriNOx Fuel Technology + AZ Purimuffler DOC	Centrally-Fueled Off Road	20%	i 50% (Level 2)	Pending
PuriNOx Fuel Technology + AZ Purimuffler DOC	Centrally Fueled Regulated On Road	20%	i 50% (Level 2)	Pending
Purifilter Particulate Filter	Regulated medium and heavy duty highway	--	i 85% (Level 3)	Complete
Catrap	Regulated Off Road	--	i 85% (Level 3)	Pending
Combifilter	Regulated mobile and stationary	--	i 85% (Level 3)	Pending



# ARB Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines-- Requirements

**P** EPA Fuel Registration

**P** Emissions Test Data

**P** Durability

**P** Field Demonstration

**P** Warranty

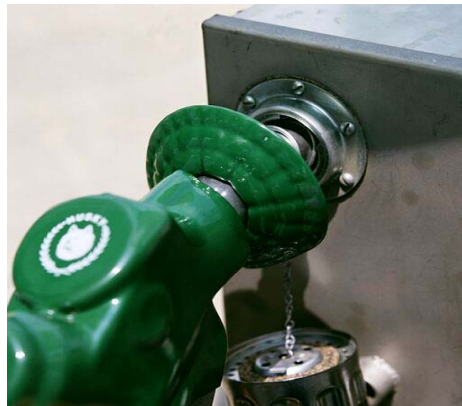
Multimedia Evaluation

# Emission Reduction Synergies-- An Example (California, Off Road):

**Diesel Engine With  
Comm'l Diesel Fuel**



**ULSD**



**Lubrizol  
PuriNOx™**



**Lubrizol/ECS  
AZ Purimuffler**



## Engine Emissions Reductions

**ARB Verified  
14% NOx  
63% PM**

**ARB Confirmed  
20% NOx  
50% PM**

For every 5 million gallons of PuriNOx used in combination with an AZ Purimuffler:

NOx is reduced by 115 Tons and @ current capacity: **805 Tons**

PM is reduced by 13 Tons and @ current capacity: **91 Tons**



# Summary

- Lubrizol fully supports the findings of the multimedia working group indicating that use of the PuriNOx technology does not pose a significant adverse impact on public health and the environment compared to California diesel fuel.
- Lubrizol fully supports staff's revised recommendations related to supplemental comparative studies.
- Lubrizol respectfully requests the Environmental Policy Council accept staff recommendations and advise the Air Resources Board that the multimedia verification procedure requirement has been satisfied.