

California Environmental Policy Council Hearing

PuriNOx Technology Multimedia Evaluation

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April 30, 2004

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**

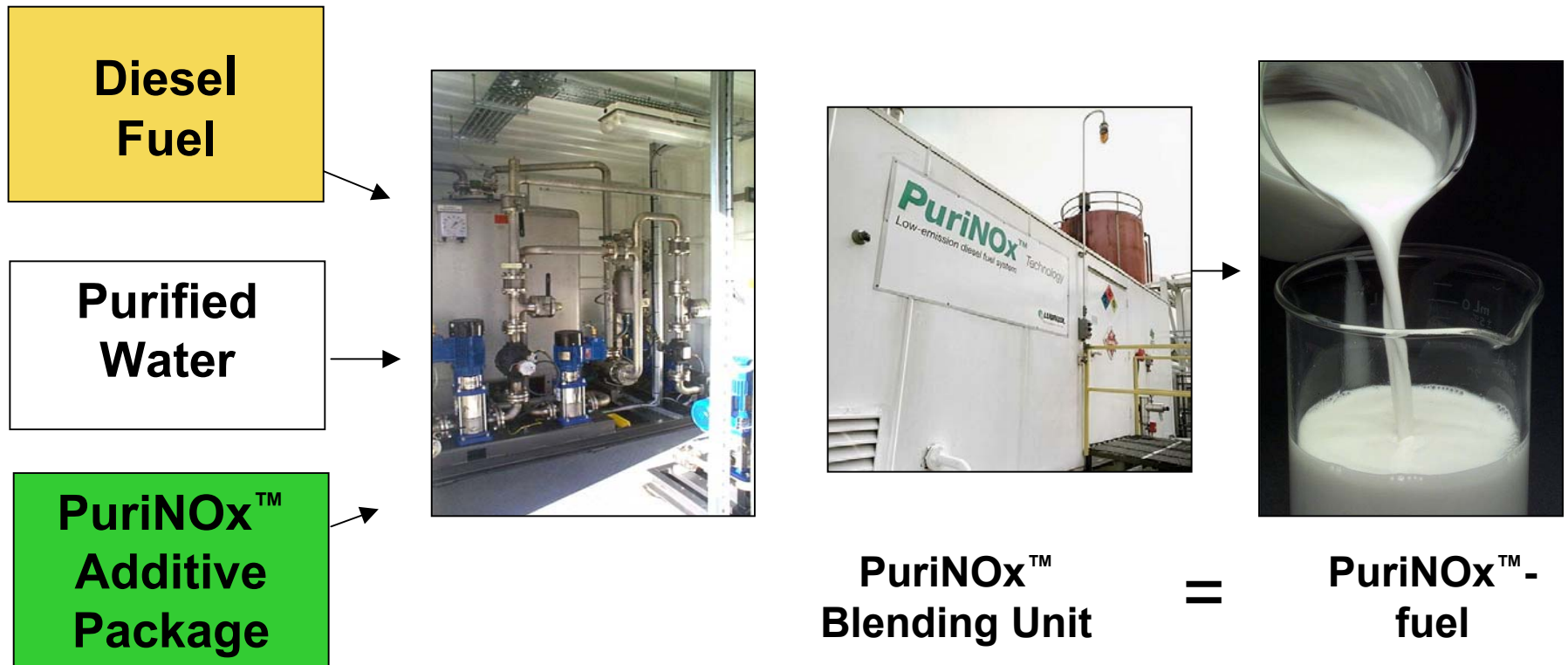


**Founded in 1928
World Headquarters:
Wickliffe, Ohio, USA
Approximately 5,200
Employees**

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

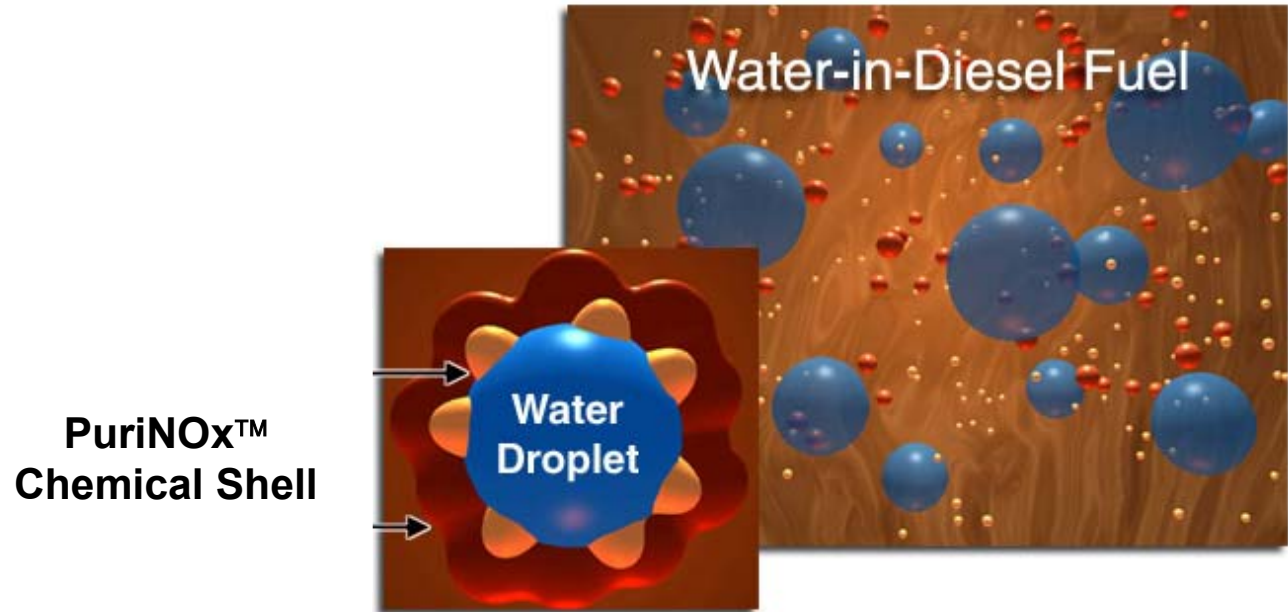
**Manufacturing Plants:
34 Facilities in
15 Countries**

PuriNOx™ Technology

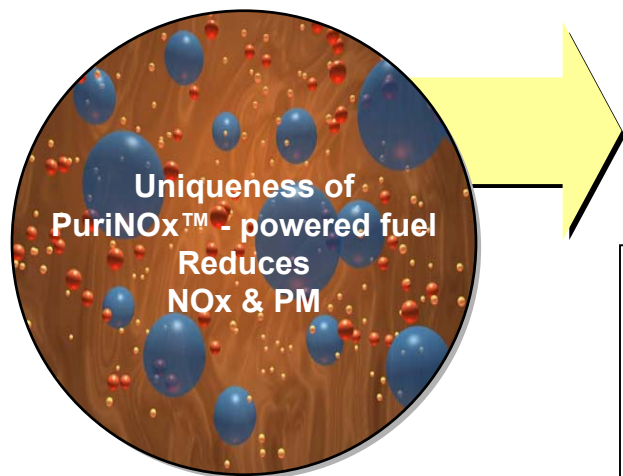


What is PuriNOx Emulsified Fuel?

- 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%**

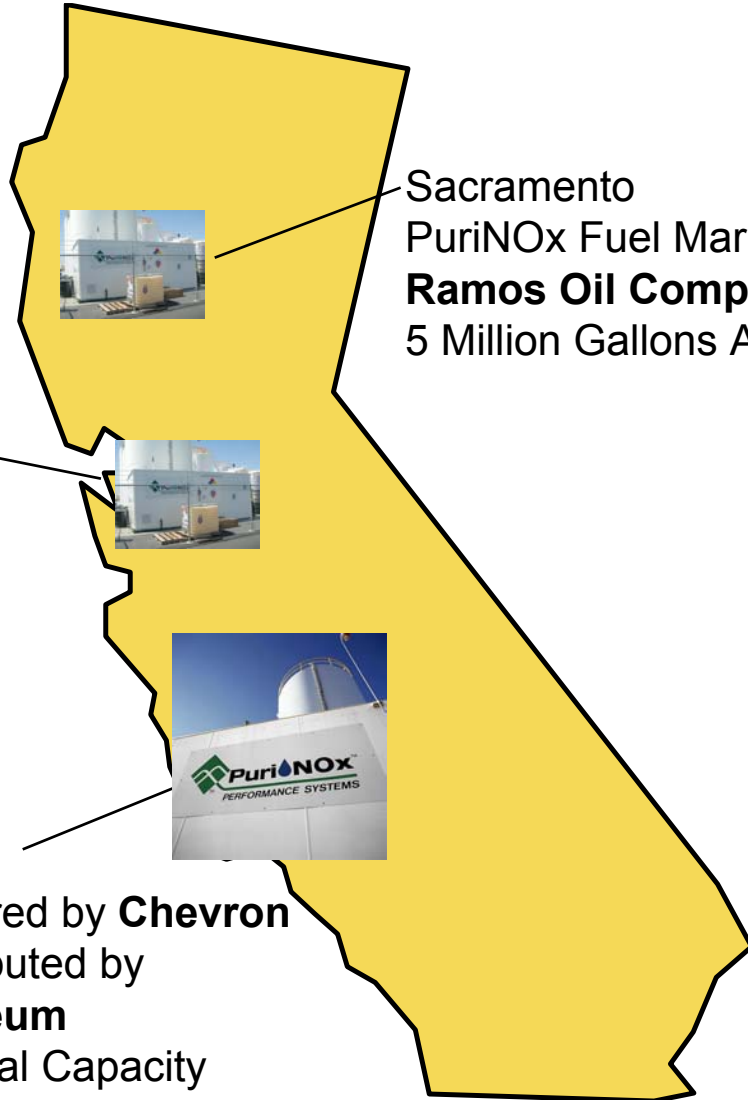
**Tested and Confirmed Energy
Savings of 1-3%**

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