



Reducing Exhaust Emissions With
An On Demand System For
Water in Fuel Emulsification

Eric Hutchingame, Chairman
Sea to Sky Pollution Solutions Corporation
December 4, 2006



Sea to Sky
POLLUTION SOLUTIONS
BREATHE EASY - THE COAST IS CLEAR

Our Mission: Reduce Effluents and Emissions



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Our Mission: Reduce Effluents and Emissions
Our Core Belief: Environmentalism and
Entrepreneurialism are not opposing values
You do not "Go Green" by going in the red.



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Our Mission: Reduce Effluents and Emissions

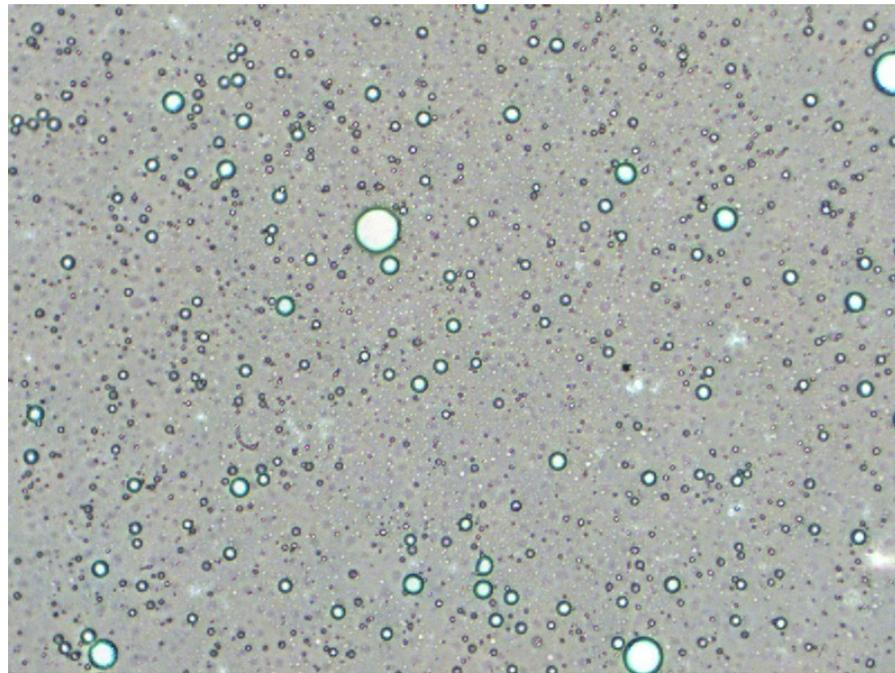
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Our Approach: Develop Pollution Solutions with
Innovative Applications of Proven Technology

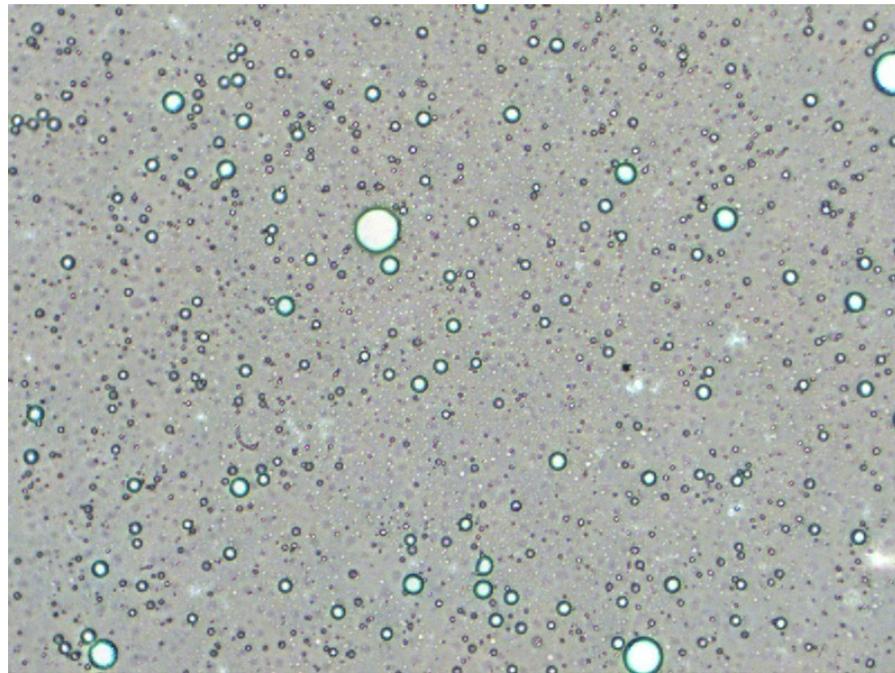
Water in Fuel Emulsions “**WiFE**”

- Water suspended in fuel is defined as Water in Fuel Emulsions “**WiFE**”



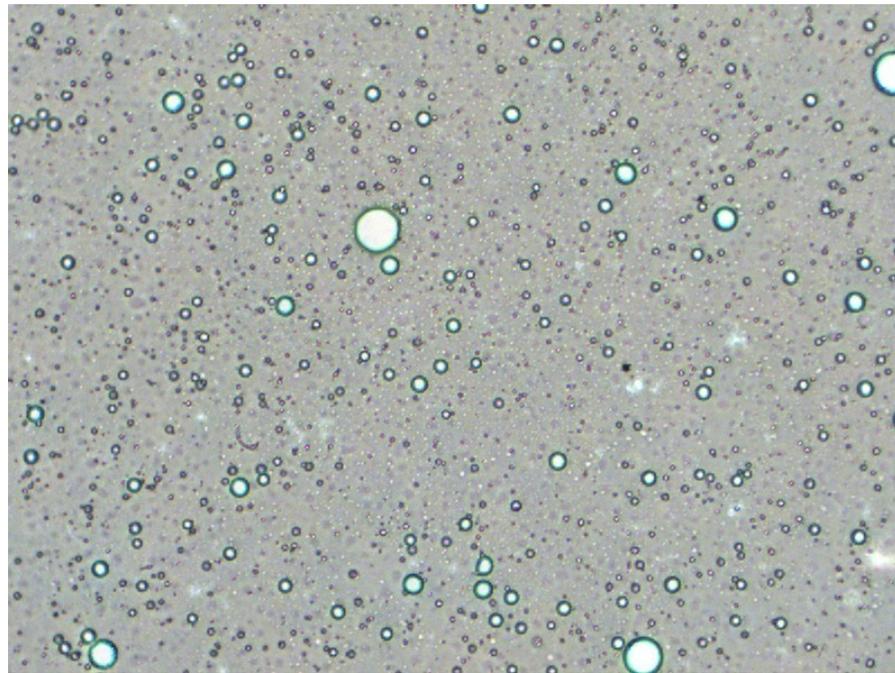
WiFE is a proven technology and has been Manufactured for 100 Years

- Adding water to diesel fuel began in early 1900's with hundreds of patents issued on water-diesel blends



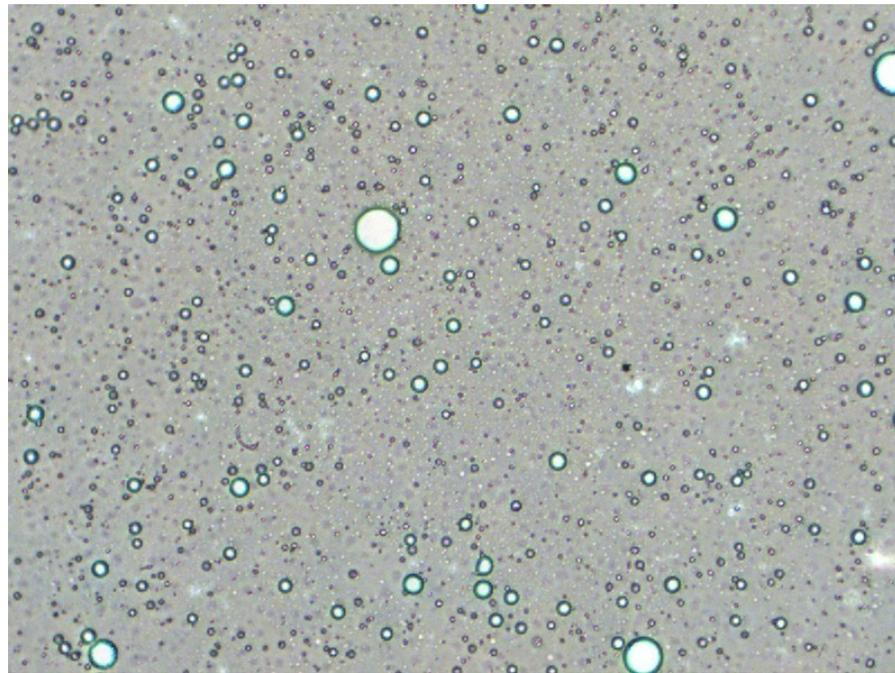
WiFE produces Micro Explosions that Increase the Efficiency of Fuel Dispersion

- Water vaporization increases the dispersion of fuel during combustion due to smaller size of fuel droplets.



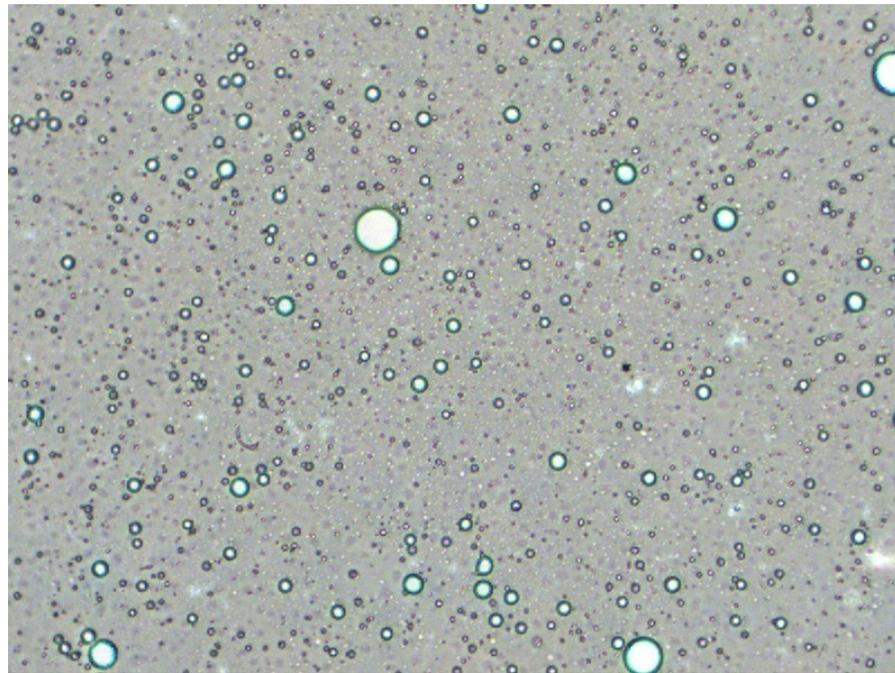
WiFE Increases the Surface Area of the Fuel that comes into contact with the Air

- Increased fuel dispersion increases the contact surface between the fuel and the air during combustion



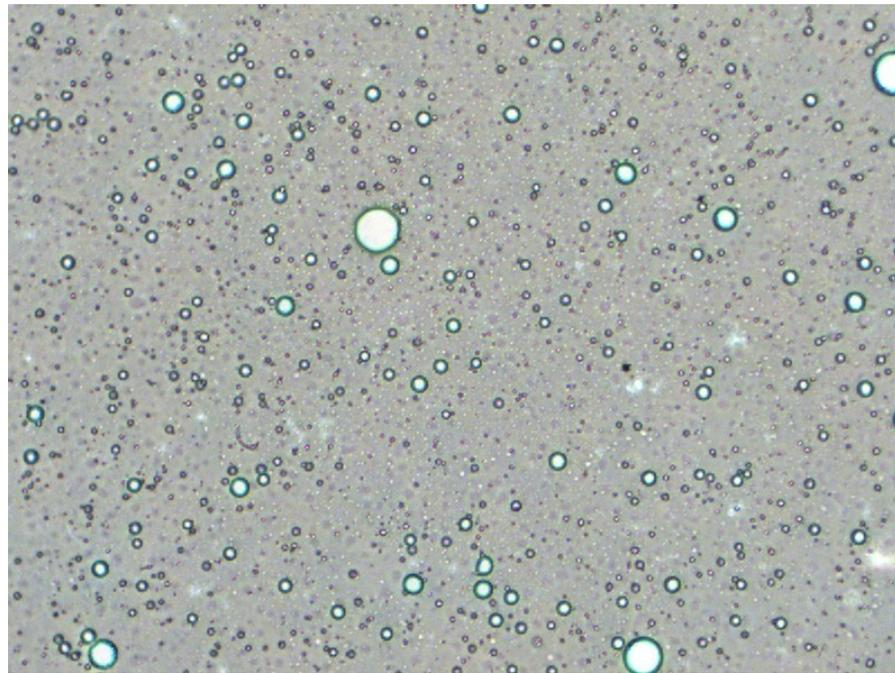
WiFE Increases Thermal Efficiency in the Combustion with Smaller Fuel Droplets

- Increasing the contact surface area between the fuel and air increases the efficiency of the combustion



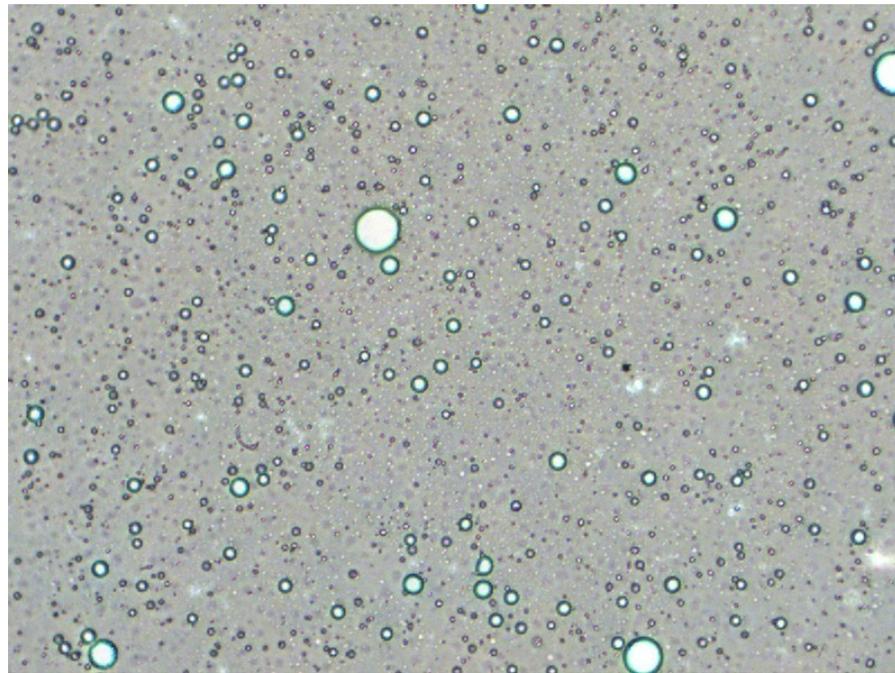
WiFE Increases the Energy Output from Combustion Reducing Fuel Requirements

- Increased combustion efficiency increases thermal efficiency which results in reduced fuel requirements



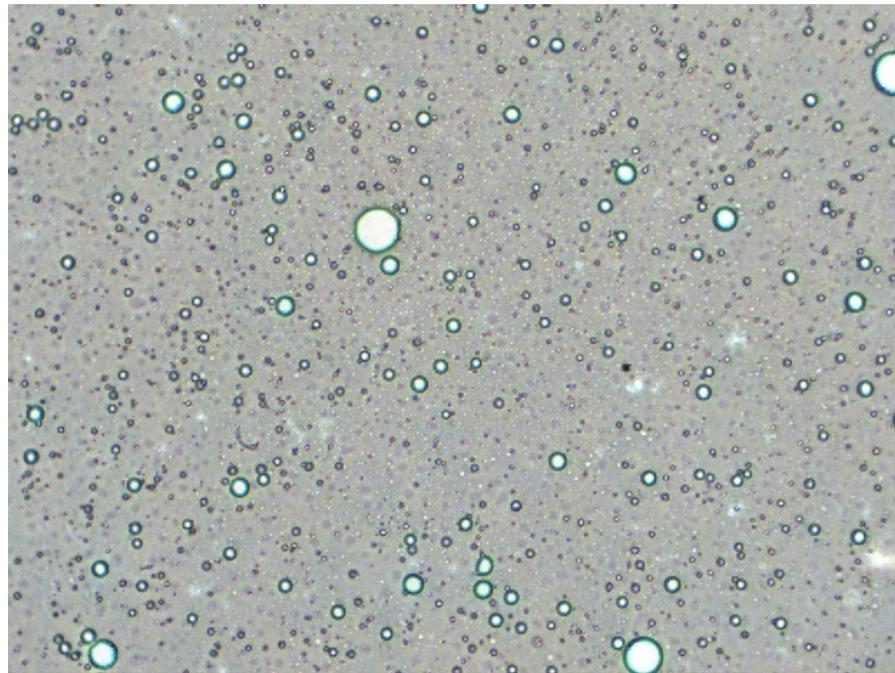
WiFE Lowers Combustion Temperature When Water in WiFE Becomes Steam

- The combustion temperature peaks are lowered when the water in WiFE is evaporated in combustion chamber



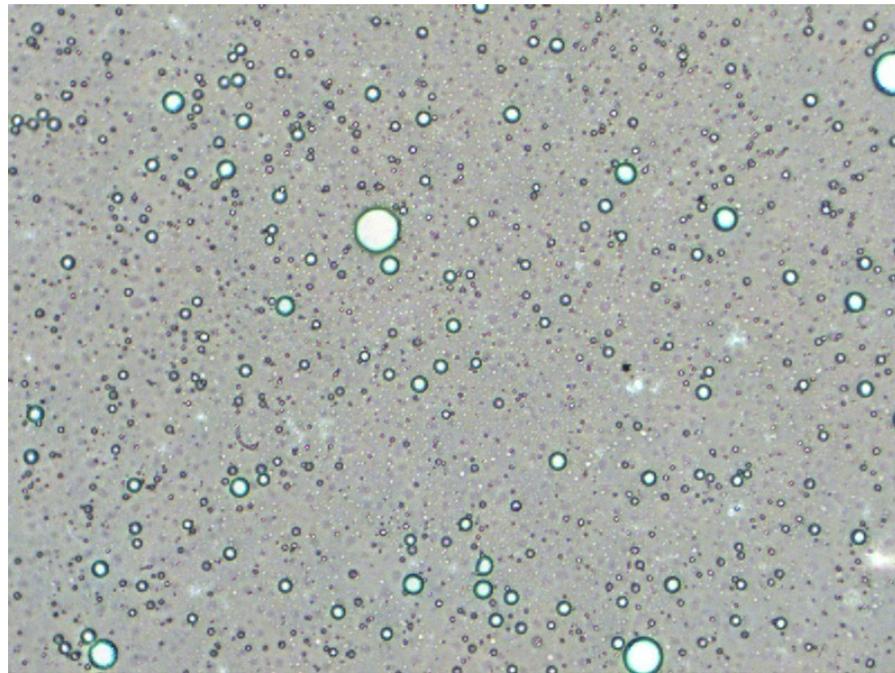
WiFE Reduces the Production of NO_x by Reducing the Combustion Temperature

- Lower temperature peaks during combustion means lower NO_x production during combustion.



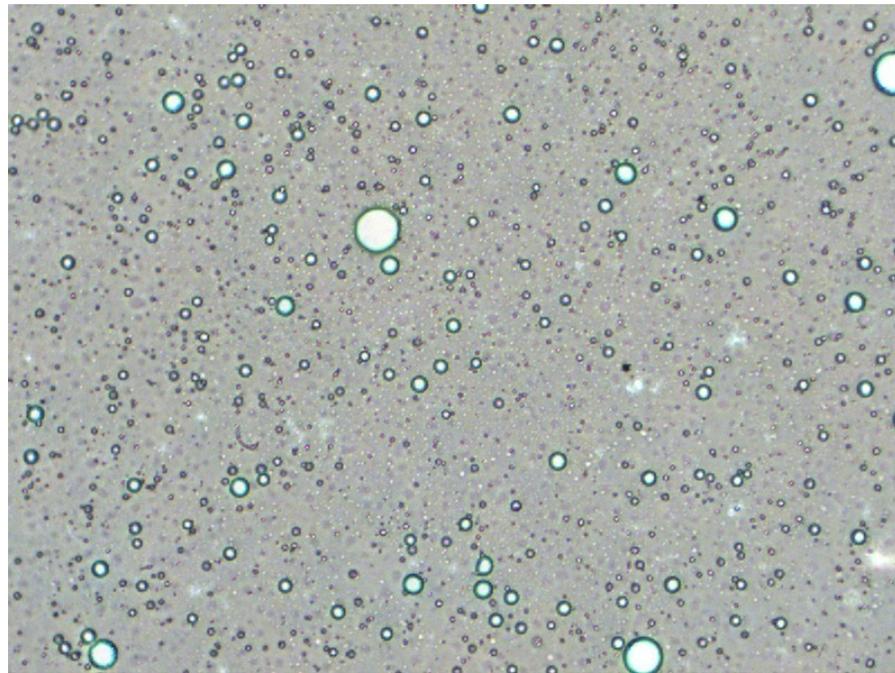
WiFE Increases the Amount of Oxygen Available in the Combustion Chamber

- WiFE increases oxygen during the pre-mix period of combustion where soot forms from partial combustion.



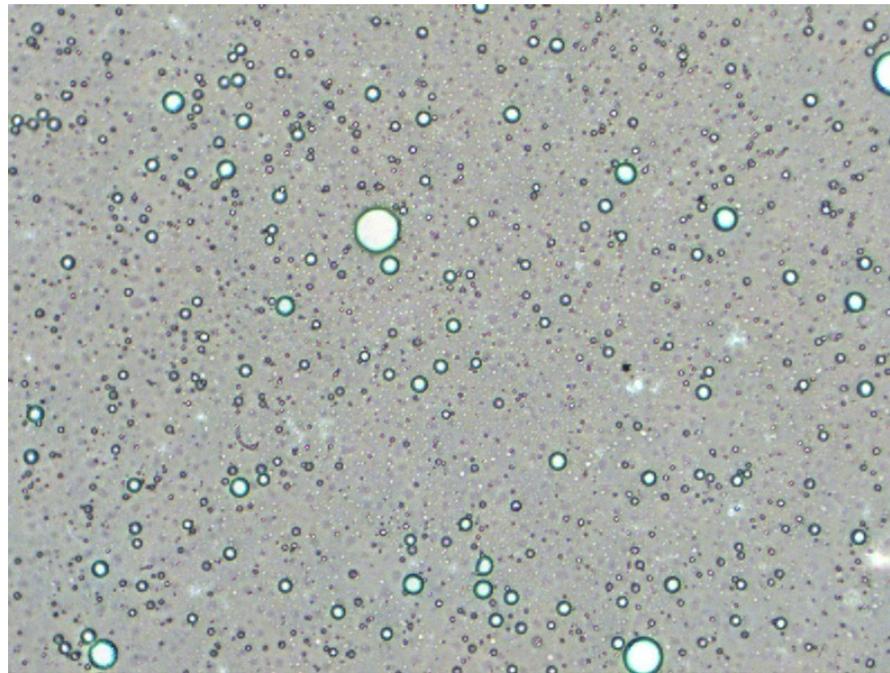
WiFE Reduces Formation of PAH

- Increased oxygen reduces soot by reducing the formation of polycyclic aromatic hydrocarbons PAHs



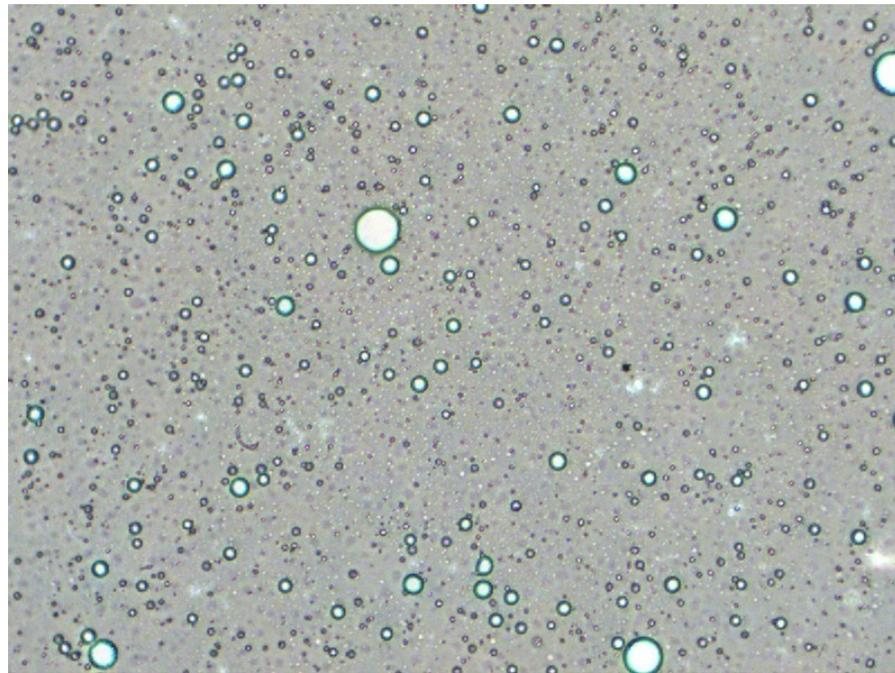
WiFE Reduces Soot/PM Emissions

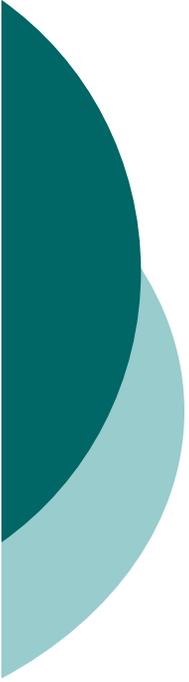
- Reduced PAH formation means that less soot is produced by oxidization & less soot means less PM emissions



WiFE Manufacturers Produce a Blend that Typically Includes Between 10-20% Water

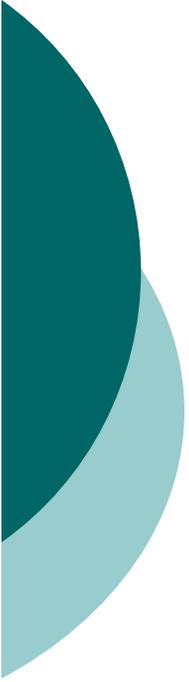
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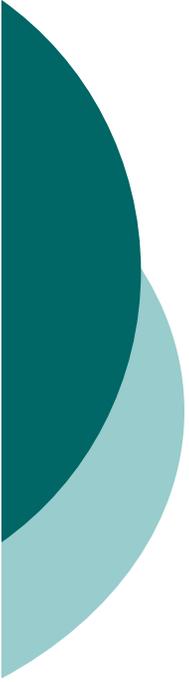
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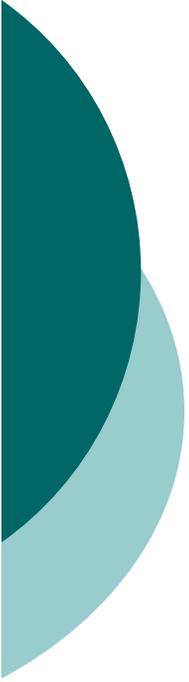


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- PM reduction is 2-3 times % of water
i.e. 10-20% water = 30-60% less PM

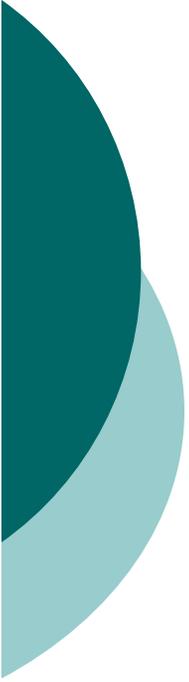


Tests on Various WiFE Manufacturers Produced Almost Identical Test Results



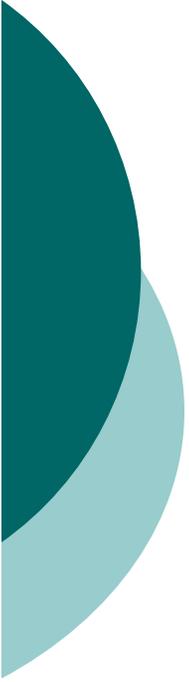
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- In January 2001, the ARB verified that PuriNOx (WiFE) reduced NOx by 14% and reduced PM by 62.9%



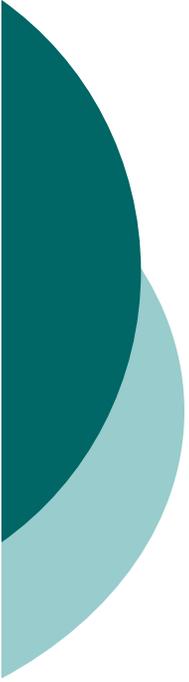
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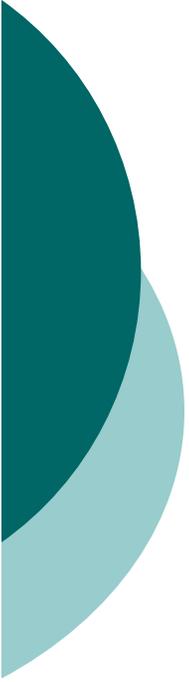
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- In September 2003 the ARB verified that Aquadyn (WiFE) reduced NOx by 15% and reduced PM by 58%



WiFE Increases Energy From Combustion Providing Energy Used for Evaporation

Evaporating water in order to lower temperature peaks during combustion consumes additional Energy in the form of BTU's.



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However, the increase in BTU energy required is offset by the additional energy released from improved thermal efficiency due to increased fuel dispersion.



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**IF WIFE REDUCES
EMMISSIONS AND
DOES NOT INCREASE
FUEL CONSUMPTION,
THEN WHY IS ALMOST
NOBODY USING IT?**



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- Manufacturers of WiFE use MDO and MDO is more expensive than HFO which is used by Most Vessels.



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- The Availability of WiFE is Limited
- WiFE is “Always On” affecting safety

The solution to overcoming these barriers to using WiFE is to produce WiFE on a demand basis when it is required so the vessel is not required to use it all the time because it is "Always On".



In other words, the solution is

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WIFE ON DEMAND
BREATHE EASY - THE COAST IS CLEAR



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- Always On WIFE is made NO. 2 Diesel Fuel while most ocean going vessels use heavy fuel
- WIFE on Demand can be made with any fuel.



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- WiFE on Demand is produced just before combustion and never separates as there is never any fuel in the tank to separate and dislodge residue.

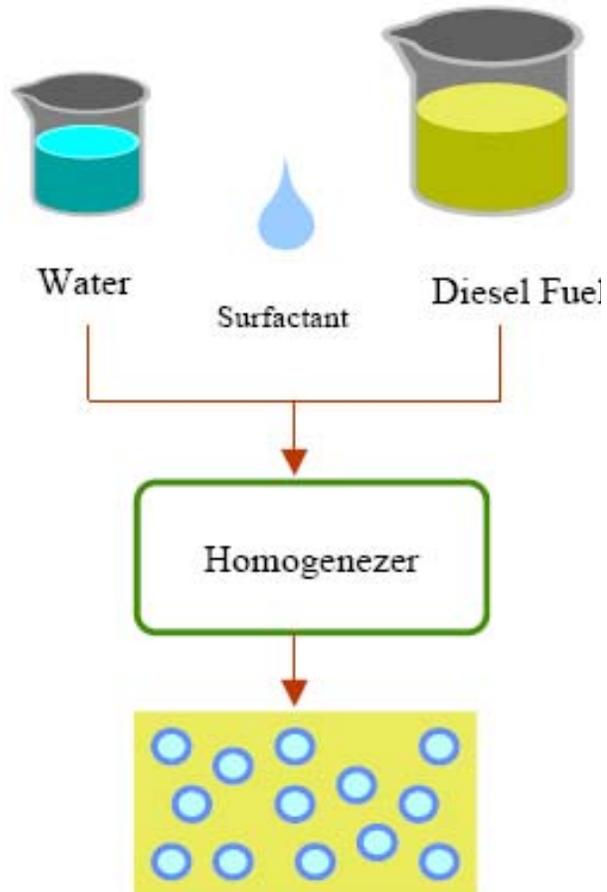
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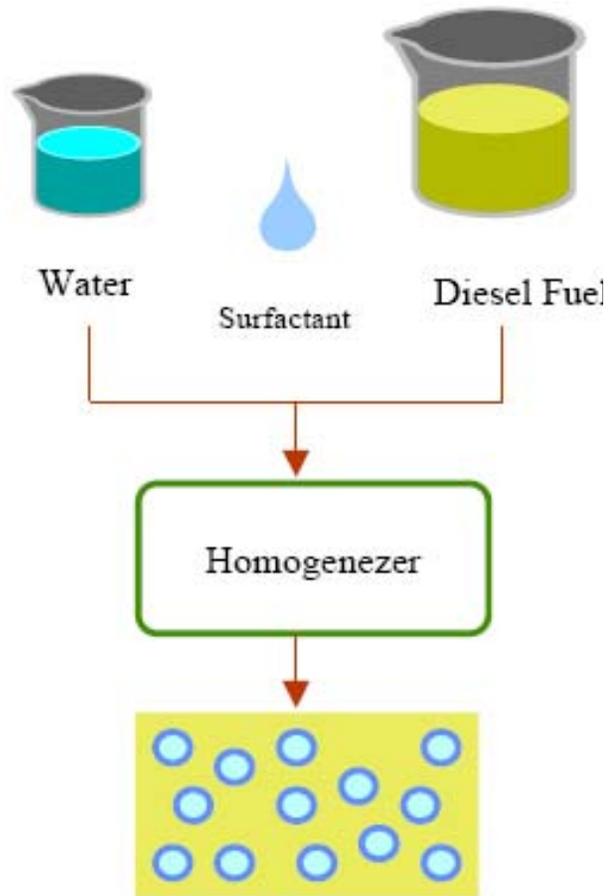
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- WiFE on Demand can be suspended when more power and torque are required.

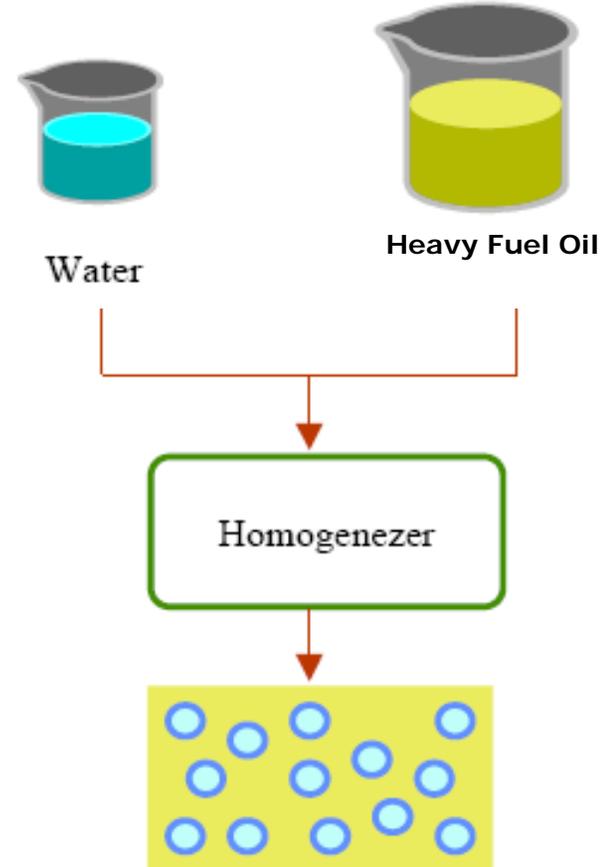
WiFE on Demand with MDO



WiFE on Demand with MDO



WiFE on Demand with HFO

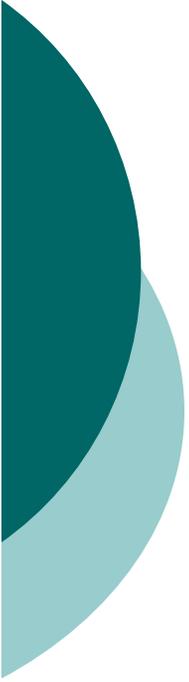


FOR RELIEF FROM NO_x, PM and CO₂ EMISSIONS
JUST ADD WATER



WiFE  **ON DEMAND**

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THANK YOU FOR ATTENTION

Eric Hutchingame, Chairman and CEO

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