



### **Ethanol in Fuel and the Increased Risk of Polluting our Environment**

Ethanol is an alcohol fuel that's distilled from plant materials, such as corn and sugar. Alcohol fuels have been around for years, typically mixed with gasoline. Today Ethanol represents about 10% volume of fuel you put into your car (E10) but cars can run on up to 85% (E85)

The introduction of ethanol to standard petroleum has been hailed as a great step forwards in reducing the toxic exhaust emissions related to the combustion engine.

Global Ethanol production has now reached over 25 billion gallons per annum.

As the focus on climate change increases ethanol will feature more prominently, however as ethanol produces less energy we will need to keep adding it to fuel therefore increasing its use and production.

But what about the impacts of ethanol that are not communicated so favourably?

Fuel with added ethanol behaves very differently to the fuels of the past with a number of distinct characteristics. Like many advancements in science, the development of the infrastructure to deal with the different properties of ethanol blended fuels has lagged behind.

Ethanol is hydrophilic (attracted to and soluble in water) whereas standard fuel is hydrophobic (repelled by water) and therein lies the key difference.

Ethanol is completely miscible in both gasoline and water at all concentrations. The presence of ethanol, therefore, affects the fate and transport mechanisms of E-blend fuels.

With regards to containment and environmental protection, fuel separators designed to trap fuel spills always worked on the basis that fuel floats – with ethanol making the harmful components of fuel soluble the original separator design becomes near obsolete.

The water leaving the separator where E blend fuel is used today is now likely to be contaminated, with worrying side effects for the environment:

- In case of E-blend fuels, the soluble components of fuel that include benzene, toluene, ethyl benzene and xylenes (BTEX) will also partially dissolve. Ethanol and the environmentally harmful elements of BTEX can now pass freely through traditional fuel separators into the local drainage system.
- Ethanol tends to dissolve completely into the groundwater and move with the groundwater in the direction of groundwater flow
- The presence of ethanol can result in mobilizing existing soil contamination.
- Ethanol acts as an energy source and stimulates the growth of aerobic and anaerobic microorganisms in groundwater resulting in the growth of bio films on aquifer material
- The rapid biodegradation of ethanol may also lead to a significant accumulation of volatile fatty acids which are potential degradation products of ethanol and that could decrease the pH to levels that inhibit further naturally occurring bioremediation.
- The rapid consumption of oxygen by ethanol means the groundwater will become anaerobic quickly – rapid oxygen depletion in rivers and streams will kill fish.

## **What Does the Future Look Like a Legal Perspective?**

At present the regulatory authorities are monitoring the situation, most water utilities organisations can cope with the 10% ethanol content in fuel that may pass through the fuel interceptor but this is today.

If the ethanol level in fuel increases or the acceptable levels of ethanol content in water discharge are tightened organisations selling or using E blend fuels will have an issue to face.

In addition, we know BTEX components are carcinogenic – do we really want to allow any of them no matter how small the concentration into our water sources if we can prevent this?

## **So What Next?**

Can you imagine a world where the fuel interceptor becomes a closed system and all contaminated wet waste has to be transported off site and disposed of in a specialist facility?

The costs of this could put many companies out of business and is passing a contaminated waste problem from one source to another really a sustainable solution?

## **Prevention with a Long Term Solution in Mind**

At GW consulting we have developed a multi-purpose, multi surface cleaning product that now has the ability to effectively clean and bio remediate both the ethanol and BTEX components on E- blend fuel wherever it is used.

As opposed to being an additional cost the products have been designed as a replacement solution to current cleaning and maintenance regimes that should already exist.

The multipurpose cleaning solution can be used on surfaces and equipment where there has been a spillage or accumulation of hydrocarbons from petrol through to fats and grease associated with food production

Our products are produced in a concentrated solution to reduce manual handling risk and storage space - to activate the bio remedial cleaning capabilities they simply need to be added to water.

When applied the product immediately encapsulates and traps all volatile organic compounds and then the naturally occurring and harmless bacteria contained within the cleaning solution ingest the hydrocarbon and ethanol leaving behind only water and inert gases.

The surface once cleaned reverts back to its original non- slip design status helping to prevent unnecessary health and safety incidents. It is now worth remembering that the Health & Safety Executive can now fine organisations in proportion to their size and revenue and statistics show 95% of slips and falls result in a broken bone.

At the end of any regular cleaning regime whether it is inside or outside the residual product, (which may even mean the dirty water left in the bucket) can be poured into the containment drains or even mop sink where it will continue to bio remediate within fuel separators and drainage systems.

At GW Consulting we feel removing the problem of contaminated waste at source is better for your business and for the environment.

For more information or if you would like to arrange for a demonstration of our products, please do not hesitate to contact Graeme Warnell at [info@gwenvironmentalconsulting.com](mailto:info@gwenvironmentalconsulting.com) or visit our web site at [www.gwenvironmentalconsulting.com](http://www.gwenvironmentalconsulting.com)

**GW Environmental Consulting - Our concern is the environment. Our passion is helping you protect it for the future**

