

# Fuel Quality Management



## IPU Fuel Conditioning Solutions



The complete range of products and services to detect, treat and prevent harmful diesel fuel contamination

Diesel powered equipment, such as generators and fire pumps, for emergency or mission critical applications rely on having pure, clean diesel fuel in the tank. The ultra fine tolerances of today's super efficient diesel engines mean they are extremely sensitive to any fuel quality problems or fuel contamination.



So often the unseen, forgotten or ignored component for diesel engines and generator sets, fuel is easily contaminated through simple human error, poor refuelling practises, various unpredictable sources and, often, neglect.

## What's in your fuel tank?

Contamination Type	Cause	Consequences
<b>Water</b>	Poor fuel handling and transfer processes. Leaking fuel tanks. Condensation with fuel tank. Poor quality fuel delivery.	Engine and fuel system damage. Corrosion. Fuel oxidation. Growth of diesel bug.
<b>Diesel Bug</b>	Grows as a result of water contamination.	Blocked engine filters & fuel components. Corrosion of fuel tanks.
<b>Condensation within Fuel tank</b>	Naturally occurring in fuel. Increases with heat & mechanical stress to fuel.	Blocked engine filters.
<b>Gums, Resins &amp; Acids</b>	Fuel oxidation, accelerated by water content.	Filter blockage & corrosion
<b>Other particles – rust, grit, soot etc</b>	Poor fuel quality, poor fuel handling, corroding fuel tanks	Filter blockage and fuel system wear.

Modern diesel fuel specifications are particularly susceptible to contamination. The bio-diesel that they contain absorbs water from the atmosphere, water in fuel is bad news, we all know that water can wreck your fuel injection systems but it can also encourage the growth of 'diesel bug' in fuel tanks. A well known phenomenon in boating circles, 'diesel bug' is a cocktail of different bacteria and fungi that will live and thrive in the water in your fuel tank, feeding on your diesel. They can multiply unchecked and will quickly grow to form slime and chunks of bio-mass that will easily clog your diesel engine filters and cause power failure.

Consider that some of the latest generation diesel engines operate with fuel injection pressures up to 35000 psi and with filtration as fine as 3 micron and it's obvious that even the slightest fuel contamination can put these engines and the gen-sets they power at risk.

It may sound like something from War of the Worlds, but your big, expensive, powerful generators, data centres and the like could be brought down by something as simple as bacteria.



## So how do you de-bug your fuel?

Every application is unique and there is no 'silver bullet' that will ensure clean, dry, trouble free fuel. It's now generally recognised that a robust Fuel Management Programme consistently applied over the long term is the best way to maintain your fuel quality, in fact it's what many engine manufacturers and fuel companies recommend.



## The IPU Fuel Conditioning experts can work with you to design the optimum Fuel Management Programme for your specific conditions, which could include:

### Regular Sampling and Testing

We provide the necessary equipment and training to ensure that your service engineers can carry out basic fuel testing 'tank side'. ATP testing can provide indications of 'diesel bug' growth in fuel tanks within minutes, and mobile particle counters can assess fuel cleanliness to give you an instant measurement of your diesel fuel quality.

For those times that you need more in depth analysis of your fuel, the IPU Fuel Testing Laboratory service can provide you with lab standard, accredited fuel tests including:

- Particle Assessment to ISO4406 or NAS code
- Karl Fischer Water Content Testing to IP438
- Total Viable Count Microbe Testing to IP385/99
- Spectrographic Testing for Metals Content (based on ASTM D5185)
- Bio Diesel (FAME) Content in Diesel

We can even provide ground water and soil analysis .....

Depending upon the tests required, turnaround time can be as low as 24 hours from receipt of sample.



### Fuel Storage and Handling Procedures

The IPU Fuel Conditioning experts can advise you on good fuel storage and handling practices to minimise the risk of contamination and maintain fuel integrity. Following an in depth assessment of your fuel storage facility and fuel quality, we can advise on, or provide:

- Fuel tank cleaning
- Fuel tank testing
- Fuel tank repair
- Fuel tank replacement

### Fuel Treatment

When contaminated fuel is detected, the IPU Fuel Conditioning team will work with you to identify the best possible solution for bringing your fuel back into optimum condition. This could be filtering the entire stock of fuel to remove harmful contaminants, or we could recommend the use of fuel additives to kill microbial infection or restore fuel properties and stabilise the fuel.



### Fuel Maintenance

To ensure that your diesel fuel remains in prime condition and free from contamination we recommend that you employ a 'fuel polishing system'. IPU Diesel Defence Fuel Polishing systems are available to suit any fuel tank in any application. All units operate 'stand alone' with basic 24 hour/7 day digital timers or advanced remote control and monitoring. Easily connected into Building Management Systems, they are ideal for unmanned facilities containing diesel generator sets, DRUPS or fire pumps and come with a variety of alarms and automatic functions. Our fuel experts will specify a fuel polishing unit and running cycle to meet your very specific requirements. Ensuring your diesel fuel remains free from harmful water, diesel bug and dirt.



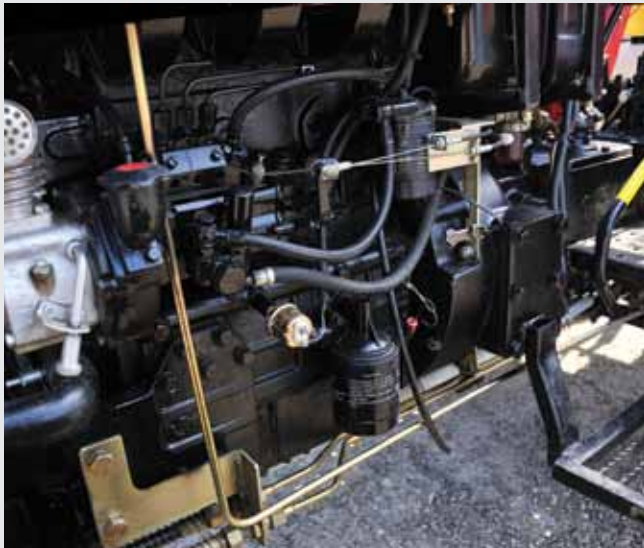
## Case Study - UK Data Centre

### The problem

IPU were called in to investigate issues related to contaminated fuel at a UK data centre. The site had experienced critical failure to the back-up diesel generators. Upon test they had started and run as usual but, after 4 minutes operation, the generators stopped running.

### The Issues

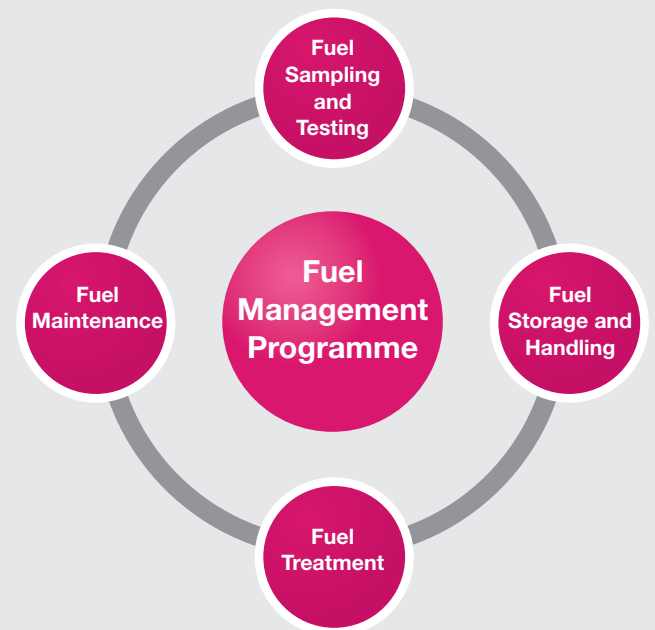
After carrying out a thorough site survey, we established that the underground tank had a sheared dip cap. A high water table in the area and heavy rains meant the fuel tank manhole was filled with water. The sump pump was unable to cope with the high volumes. Immediate action was taken to isolate the underground tank from the day tanks to ensure no water could enter the primary tanks.



### The Solution

After the go ahead, we emptied the tank, removing 9000 litres of water and recovering 13000 litres of diesel fuel from the underground tank, and repaired the dip cap point. The tank has been sealed and pressure tested and is now secure. We continue to work with the site management team and have recommended the installation of a fuel polishing unit to maintain fuel quality for the future.

Why did this happen? Key to managing any fuel storage facility is a regular inspection and maintenance regime. Fuel contamination is often down to poor housekeeping and fuel management procedures. Don't wait if there is any doubt; address the situation immediately and get the advice and assistance from professionals.



## Maintain your fuel quality with an IPU Fuel Management Programme



### IPU GROUP Fuel Conditioning

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2003/372