ALGAE-X®
Fuel Conditioning

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Fuel Quality, Generator Reliability and Fuel Management Solutions

During Black-outs and Brown-outs life can become really miserable

In emergency situations, like the vast 2003 blackout, we have to be able to rely on standby generators. The increasing number of failing emergency power supply systems has pushed the generator reliability and performance issues to the top of the priority list of property management companies. Losing backup power and depleting battery back up systems before being able to discover and correct the cause of failure can be fatal and extremely costly.

A simple device like a fuel filter can easily clog and shut down your emergency generator, consequently leaving buildings in the dark, cause elevators to stop and servers to crash, or put hospitals in a panic.

Achilles heel of emergency power supply systems

Diesel fuel is the predominant energy source for emergency power supply systems. It is commonly stored in on-site tanks for long periods of time. Periodic service and maintenance of the standby generator is a routine procedure, typically limited to changing filters and lube oil.

Monitoring and maintaining the **"integrity and quality of long-term stored fuel"** is not always part of the SOP in most PM schedules. And that is precisely the Achilles heel of each and every emergency power supply system.

Unlike good red wine, diesel fuel does not get better with age. It is an inherently unstable organic fluid. And, after its long journey from the refinery storage tanks, through pipelines, tankers, barges, tank farms, wholesale and retail vendors to the end-user, fuel quality deterioration is already well underway when it reaches its final destination, the storage tanks of your emergency power supply.

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Periodically exercising the generator for 30 minutes or an hour at the time does not mean that it will be reliable under load or continue to operate during refueling. Modern engines have a very high rate of hot fuel returning back to the tank accelerating the fuel breakdown process and condensation. This flow of fuel can easily disperse bottom sediments to suddenly clog filters and damage injection systems even when visually the fuel still appears “Clear & Bright”.

Taking a closer look at fuel and sediments

It’s a surprising fact that more than **95% of tank sludge and the deposits clogging filter elements are organic materials, fuel compounds of mainly waxes, gums and asphaltenes**.

The difference between “good and bad fuel” is not always immediately obvious. **Diesel is a very complex and inherently unstable organic fluid**, consisting of thousands of different combinations of hydrocarbons, varying in size and form. Its constituents are definitely not homogenous, like e.g. water, butane or propane.

Polymerization, the attraction between the complex building blocks of fuel results in clusters of molecules that keep increasing in size and mass. This process results in fuel particles becoming too large to pass through filter elements ultimately forming solids and tank sludge.

Diesel Fuel Contaminants and Fuel Maintenance Solutions

CONTAMINENTS	SOURCE	EFFECTS	SOLUTIONS
WATER	- Leaks - Fuel delivery - Condensation	- Clogged filters (if filter is water absorbing) - Injector failure - Corrosion - Growth of Bacterial and Fungal Material	- Tank design - Automatic Fuel Conditioning and Filtration Systems - Water Eliminators - Periodic tank cleaning - Periodic tank draining - Primary filter
INORGANIC DEBRIS	- Tank breather - Fuel delivery - Rust, Dust, ..	- Inorganic debris & metallic particles are abrasive causing wear and tear	- Automatic Fuel Conditioning and Filtration System - Periodic tank cleaning - Primary filter
ORGANIC DEBRIS About 95% of what you find in filters and tanks	- Instability products formed by fuel itself (large fuel clusters) - Fuel delivery - Bacterial and fungal growth	- Clogged filters - Tank sludge -Carbon deposits - Injector and lift pump failure and corrosion - Excessive emissions & fuel consumption - Contaminated engine oil	- Automatic Fuel Conditioning and Filtration System - Periodic tank cleaning - Fuel Catalyst

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Conclusion

Fuel System Management and Fuel Maintenance is of crucial importance. The **reliability of an emergency generator depends on fuel quality and stability.**

A well designed program with the aid of an automated fuel conditioning and filtration system will extend fuel shelf life and prevent unexpected failures caused by fuel breakdown, water and tank sludge.

Preserving and monitoring the integrity of the fuel stored for emergency power systems, extending its stability and shelf life will enhance system reliability and save properties money while significantly reducing their liabilities.