



BOTTOM LINE ANALYSIS

This cost savings analysis was prepared in cooperation with Master Chief Hill of the US Coast Guard Maintenance & Logistics Command using data from the 82' Cutter Pt. Chico, and 110' Cutters Anacapa and Long Island over a period of two years when **ALGAE-X®** performance was monitored and evaluated.

Installation of **ALGAE-X®** units in Diesel Engine applications results in significant savings in personnel and engine maintenance costs, reduced downtime, periodic tank cleaning, toxic biocide additives, fuel consumption, and filter cartridge replacements. Not considering any additional benefits resulting from better fuel economy, which may be substantial, nor calculating savings from reduced downtime, **ALGAE-X® units have proven to pay for themselves in approximately 2 to 4 months!!**

Fuel filter cartridges

The Cutter Long Island reports that filter changes were required at 300 hours, or less. After installing **ALGAE-X®** units the interval has increased to the SOP of 400 hours, and the elements appear clean when changed, therefore could be run for additional hours. (Filter change intervals in systems with clean, bug free fuel can exceed 1000 hours.)

If the filters cost \$15 each and are replaced every 300 hours on 4 engines, or 12.5 - 24 hour run days, the cost per filter change is \$60. If this represents 3 weeks of operations it requires approx. 17 changes per year at a cost of \$1020.

With **ALGAE-X®** the cost of filters replacement for this vessel will be at least 1/3 less, approx. \$683. **Savings on filter elements annually: \$337.**

Tank Cleaning

Buildup of sludge/organic debris in fuel tanks ultimately requires having the tanks cleaned. Methods vary from emptying the tank and physically entering it to remove the sludge, to the use of a filtration/re-circulation system to "polish the fuel". The costs to perform this task include personnel, time and money. Typical rates for tank cleaning are approx. \$.25 to \$1 dollar per gallon of tank capacity.

An 82' Cutter with two 2,000 gallon tanks may cost \$1000-\$4000 to clean every year or two. Reduction in the amount of sludge build up in tanks is a key benefit of the **ALGAE-X®** units. Working vessels have reported that tanks were **totally free of sludge** on inspection. **Reducing Tank Cleaning by only 50% will save \$500-\$2000 annually.**

Additives/Biocides

The cost of biocides is \$.005-\$.01 per gallon of fuel. **Eliminating the need for this additive on a vessel using 2000 gallons of fuel per week will save \$500-\$1000 annually.** Elimination of storage facilities, hazardous disposal fees, and risks to personnel who are required to use these toxic items are important added benefits.

Downtime

Calculating the cost of downtime for the Coast Guard is different from that for a commercial vessel. Obviously, income is not generated from operations, however unavailability of one boat places added duty on others, and some missions simply are not accomplished. **ALGAE-X[®]** will significantly increase unit readiness and reliability.

Engine Maintenance

The consequences of bacterial contamination and fuel breakdown are not restricted to the quality of fuel. The formation of acid waste products also cause pitting and corrosion to injectors and pumps, as well as iron and aluminum oxides in fuel tanks, which become part of the fuel mix and contribute to engine wear and incomplete combustion (SMOKE).

Injectors for mid sized engines can cost \$100-\$175. If their duty cycle is 5000 hours (approx. 1 year), injector replacement for a 12 cylinder Engine will cost \$1200-\$2100 annually. With **ALGAE-X[®]** units controlling the effects of microbial contamination and, therefore, the production of acid and sludge in the fuel system, injectors and pumps should last 10,000 hours or more. **This saves \$600-\$1050 per engine per year.**

Fuel Consumption

Providing Optimal Fuel Quality results in Peak Engine Performance, which typically reduces fuel consumption and harmful emissions. A large portion of the stack emissions is attributable to non-combusted fuel. Many **ALGAE-X[®]** installations report reduced smoke, indicating that the fuel is burning more efficiently.

Most of these reports are anecdotal, and do not quantify the effects. However, a test with the Los Angeles County School District provided some interesting numbers, as has other dyno-testing that showed total elimination of opacity. Other factors to consider are e.g. RPM's, load, sea conditions, etc.

SUMMARY

The installation of **LG-X1500's** on the 12 cylinder main engines, and **LG-X500's** on the Gensets of an 82' or 110' Cutter would realize the following estimated **annual savings**. These figures do not reflect the obvious savings in Fuel.

1. Filter Cartridges	\$85	\$337
2. Tank Cleaning	\$250-\$1000	\$500-\$2000
3. Biocides	\$250-\$500	\$500-\$1000
4. Engine Maintenance	<u>\$600-\$1050</u>	<u>\$1800-\$3150</u>

Total savings \$1185-\$2685, Per Main Engine - \$3137-\$6487 Per Boat !!

The cost of installing ALGAE-X[®] units on these vessels is only a fraction of the total annual savings in the first year.