Case Study: Fleet/Diesel Cranes & Trucks

Challenge:

Hydrotex and an east coast port management company worked together to determine the cost effectiveness of utilizing a fuel improver manufactured by Hydrotex. To ensure the results were impartial and accurate, the port management company enlisted an independent third party engineering company to help conduct baseline monitoring during the evaluation.

The off-road diesel vehicle fleet at one of its major terminals included sixty-four (64) Rubber Tire Gantry Cranes (RTGs) and forty (40) Jockey Trucks. Baseline monitoring consisted of the collection of emissions and fuel consumption data over a four-week period. All vehicles utilized ultra-low sulfur (<15 ppm Sulfur) diesel fuel in baseline testing.

Lubrication Solution:

PowerKleen™, a fuel improver manufactured by Hydrotex, was added to the terminal's fuel storage tanks. The fleet utilized the **PowerKleen™** enhanced fuel for a period of eight weeks to allow effective "burn in" of the engine. Following this eight-week period, emissions and fuel consumption monitoring activities resumed for a four-week period while the vehicles continued to use the **PowerKleen™** treated fuel.

For emissions monitoring, the EPA's Criteria Pollutants were measured, specifically CO, NO2, SO2, and PM10. Data was collected at engine idle, throttled, and revved conditions for both the RTGs and Jockey Trucks. All emissions monitoring was conducted in accordance with the EPA's Engine Testing Procedures (40 CFR Part 1065). This standard identifies procedures for selection of measurement equipment, engine preparation, and field testing. Fuel consumption was correlated to engine hours of operation and total fuel consumed.

Return on Investment:

Fuel efficiency was found to **increase 5%** on average. The data indicates, with strong confidence levels, that **PowerKleen™** reduced the concentration of the EPA's Criteria Pollutants in the engine exhaust for RTGs and Jockey Trucks. The independent engineering company concluded that the greatest decreases in emissions were observed during revved engine tests.

For Jockey Trucks:

- The change in NO2 concentrations lies within an 11.25% and 26.89% decrease from background concentrations.
- The change in CO concentrations lies within an 8.80% and 25.84% decrease from background concentrations.
- The change in PM10 concentrations lies within a 64.71% and 78.27% decrease from background concentrations.

For RTG Cranes:

- The change in NO2 concentrations lies within a 5.12% and 15.14% decrease from background concentrations.
- The change in CO concentrations lies within a 4.05% and 13.95% decrease from background concentrations.
- The change in PM10 concentrations lies within a 37.11% and 66.43% decrease from background concentrations.

The results of this test with relation to SO2 reduction were inconclusive. Approximately 64,857.6 gallons of ULS Diesel Fuel were conserved, resulting in Carbon Footprint Reduction of 1,491,725 pounds or 746 tons of CO2.

Economic and Environmental Impact Annualized:

	Jockey Trucks	RTG Cranes	Total
Annual Hours	195,672	175,728	371,400
Baseline Fuel Consumption (GPH)	1.96	5.11	
PowerKleen™ Fuel Consumption (GPH)	1.88	4.83	
Baseline ULS Diesel Used (Gallons)	383,517.10	897,970.10	1,281,487
ULS Diesel w/ **PowerKleen™** Used (Gallons)	367,863.40	848,766.20	1,216,630
Cost of Fuel Baseline (@ $3.00/Gallon)	$1,150,551.36	$2,693,910.24	$3,844,461.60
Cost of Fuel w/ **PowerKleen™** (@ $3.00/Gallon)	$1,103,590.08	$2,546,298.72	$3,649,888.80
PowerKleen™ Cost [1]	$12,604.67	$29,082.59	$41,687.26
Savings [2]	$34,356.63	$118,528.91	**$152,885.54**

1. For the Economic Impact Analysis, the **PowerKleen™** cost is based on current list price for a 55 Gallon Drum and Treatment Ratio of 1:1000. In practice recommended ratios drop to 1:2200 after first treatment for injector clean-up. Therefore, **PowerKleen™** costs are **overstated.**

2. Savings are based on a conservative estimate of annual hours of operation for only the Jockey Trucks and RTG Cranes. Actual realized savings are projected to be higher.