BetterEnergy

Energion™

Magnetic Fuel Treatment Systems

Technical Publication BEL 0015

CASE STUDY : OIL FIRED BOILER
MOD /NATO AD GLEN DOUGLAS

Case Study Objective
To demonstrate the savings achievable by installing Energion™ magnetic fuel conditioning units to promote energy efficiency and reduce emissions.

Potential Users
All sites that use Gas and / or Oil for heating and processing.

Host
Ministry Of Defence, Nato AD Glen Douglas

Savings Achieved
10.12% in oil consumption over the year.

Payback Period
Less than 12 months

Case Summary
Oil readings were provided by Mr Tom Pye, Deputy Energy Manager. RNAD Coulport & NATO AD Glen Douglas

Degree day information was provided by the Dept. of Environment, Bristol.

Emissions test were carried out by North West Combustion Services Ltd.

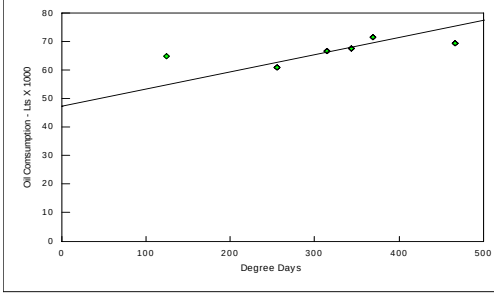
The boilers received their annual service during the shutdown in the summer months which brought them up to full efficiency prior to the units being installed.

The Energion$_{TM}$ units were fitted to No. 2 Boiler during the service shutdown.

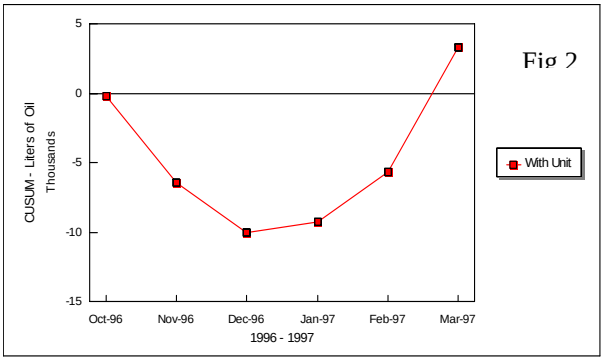
Monitoring
With accurate site monitoring with the historical data available the client was able to compare oil usage on a month by month basis for the years before and after installation of the units .

Projected Usage
From the figures for consumption against Degree days for a scatter graph was constructed to formulate a straight line graph. Fig 1

Fig 1



From this formula and using the degree days for the period under review, the expected oil consumption has been calculated and compared with the actual, from this the CUSUM figures have been plotted against time on Figure 2



It would be expected that the CUSUM line would hover around the zero mark, making consumption similar to the previous year. In the case of the Graph, we can see the CUSUM line drops into negative, indicating some action has been taken which increased efficiency.
The Drop increased until December when the unit was moved further back reducing its effectiveness. This is shown in the increase of consumption

P T O

Savings in Energy – Magnetic Fuel Treatment Units

The savings can be calculated by comparing the fuel consumption for the periods with the unit against the consumption without the units, taking into account the Degree Days.

In the period October to March in the year prior to installation of the units,
1512.32 Lts of oil per Degree day were consumed.

In the period October to March in the year following installation,
1359.16 Lts of oil per Degree day were consumed.

This is a saving of 10.12% in consumption over the heating season.

NOTE these saving would be increased if the unit had not been moved in the December period.

The savings have also been shown in the consumption figures as verified by Mr Tom Pye.

A Total Saving of **40,569.8 Lts** of oil was achieved over the heating season.

Emission Test

Combustion analysis readings were taken from the boiler house exhaust stack. The test carried out was to compare the performance of boiler No.1 without a magnetic unit fitted, with Boiler No.2 which was operating with the magnetic fuel conditioner.

Both boilers were serviced in September during shutdown.

Conclusion

With a considerable increase in oxygen it can be assumed that the fuel is being burnt more efficiently thus producing excess air. Further improvements may be possible by making alterations to the fuel / air ratio.

Also with the reduction in exhaust temperature we can see that more heat is being transferred within the boiler showing the increased efficiency of the heat exchanger due to less build up of carbon within the system.

Reduction in Emissions

With the increase in efficiency which in turn reduces the consumption, we can calculate a reduction in CO^2 produced through burning fossil fuel.

From the Energy Efficiency Office Bristol:-

1 Lt of Heavy Fuel Oil Produces on average 3.19Kg of CO^2

With a saving of 40,569.8 Lts of oil we can calculate a saving 129.41 Tonne of CO^2

CO^2 is one of the “Greenhouse” gases and around 40% of CO^2 gasses released into the atmosphere come from industrial boilers and processes.

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