FEROX
Combustion Managers ™

MEA TECHNOLOGIES INC.
CANADIAN DISTRIBUTOR

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DATE: APRIL 8, 1996

REPORT TO: MR. C. GUTHRO
MANAGER OF FLEET SERVICES

FROM: B. DOCHERTY, V/P MEA TECHNOLOGIES/FEROX

SUBJECT: TEST RESULTS OF FEROX ENVIRONMENTAL FUEL CATALYST

Dear: Mr. Guthro

We are very pleased to submit to you the results of the controlled testing that was conducted at Traffic Dept. in order to verify significant reductions of polluting emissions and particulate smoke by the use of the FEROX combustion catalyst.

As you will recall, FEROX technology is based on the catalytic effects of organo metallics. This technology was originally developed by Parish Chemical under contract for the U.S Military and U.S. aerospace industry. In a FEROX treated environment the surfaces of the fuel particles and deposits are modified such that the catalyst lowers the energy of activation of the modified surfaces. The modified surfaces can then burn at a much lower temperature.

A typical engine develops a temperature gradient ranging from 200 Celsius at the combustion chamber wall, to 1200 Celsius at the centre of the combustion process. Many of the fuel components require a temperature greater than 600 Celsius to combust. The heavy fuel components that are exposed only to the 200-600 Celsius range never fully burn and are what contribute to deposit formation, particulate smoke, polluting emissions and other undesirable combustion side effects.

The FEROX modified surfaces and fuel particles begin to combust at temperatures as low as 200 Celsius. This is often below the surface temperature of exposed fuel particles and deposits even at the combustion chamber wall. This allows FEROX treated fuel and modified surfaces to now burn over the entire temperature range to which they will be exposed. The results are more complete combustion and eventual complete removal of all engine deposits as well as the inhibition of new deposit growth.

But most important is that FEROX dramatically reduces polluting emissions and particulate smoke. Fleet Services has demonstrated a sincere commitment to improving the harmful emissions and particulate smoke to the environment, and it was our company's goal to help you meet this objective.

TEST BACKGROUND

In October/94, it was agreed that a variety of vehicles would be subjected to a series of baseline emission and particulate smoke tests. This testing would be conducted at Mohawk College (Fennell Campus/Automotive Dept.) using both their Snap-On and Bear four gas analyzers. The test group (Traffic Dept.) would then begin using FEROX treated fuel for a period of approx. 1 year. After which time , the test and control (non-treated) vehicles would be returned to Mohawk College for final smoke and emissions testing to determine any changes from the original measurements.

The format that was agreed upon in order to demonstrate the performance of FEROX is as follows.

Three sets of matched vehicles were chosen. Of the six vehicles selected, 3 would be treated (test group) while the other 3 would be untreated (control group). Here is a breakdown of the vehicles tested.

TREATED

1. Unit # 6010 (aerial truck F700, diesel)
2. Unit # 6015 (1 ton diesel pick-up)
3. Unit # 6099 (1/2 ton pick-up, gas)

UNTREATED

1. Unit # 6016 (aerial truck F700, diesel)
2. Unit # 6013 (1 ton diesel pick-up)
3. Unit # 6097 (1/2 ton gas pick-up)

FINAL RESULTS OF TREATED VEHICLES

After accumulating 15 months of driving, the following observations and measurements were compiled after final testing at Mohawk College in Feb/96. Since 2 four gas analyzers were used, the results shown are an average reading of the two machines.

1. Unit # 6010 (treated) had shown a **30% reduction** in unburned hydrocarbons, a **17.2% reduction** in carbon monoxide emissions and **95% reduction** in particulate smoke.

2. Unit # 6015 (treated) had shown a **33% reduction** in unburned hydrocarbons, and a **20% reduction** in carbon monoxide emissions.

3. Unit # 6099 had shown a **11% decrease** in carbon monoxide emissions. (Note: unburned hydrocarbon readings were inconclusive as one of the 4 gas analyzers began experiencing technical problems at this point of the test. CO readings were steady but HC readings were not). Inspection of the exhaust flange that was installed prior to test indicated only a small amount of exhaust particulate as compared to a large amount still present in untreated matched Unit # 6097. Noted by Al Fletcher and myself.

FINAL RESULTS OF UNTREATED VEHICLES

It would be a natural assumption that these untreated vehicles would show virtually no changes from their original emission measurements. However, there were decreases in both HC and CO readings which were cause for some concern by myself. After an investigation into this matter it was discovered that Units # 6016 and 6013 had been sometimes fuelling from the FEROX treated tanks at Traffic Dept. when they were not supposed to. In the case of Unit # 6016 during the course of the test, 40% of the fuel consumed was FEROX treated. In the case of Unit # 6013, 35% of the fuel consumed was FEROX treated. This accurately explains why there were reductions in this group.

1. Unit # 6016 had shown a **10.4% decrease** in unburned hydrocarbons, a **15.5% decrease** in carbon monoxide emissions plus the presence of particulate smoke was dramatically shown in the particulate filter trap. This indicated that FEROX was just starting to soften and remove the deposits. A comparison with the particulate filter from matched Unit # 6010 reflects these results.

2. Unit # 6013 had shown a **40% decrease** in unburned hydrocarbons and a **20% reduction** in carbon monoxide emissions.

3. Unit # 6097 had shown a 24% decrease in unburned hydrocarbons and a 7% increase in carbon monoxide emissions. Inspection after the removal of the flange in the exhaust system dramatically showed the presence of large amounts of exhaust particulate. Al Fletcher and myself observed this and compared it to the much smaller amount that was present in matched treated Unit # 6099.

CONCLUSIONS

The results of testing conducted for the City of Hamilton Fleet Services positively confirms that the addition of the FEROX FUEL CATALYST dramatically reduced the harmful polluting emissions and particulate smoke in the vehicles that were treated. In respect to reductions in fuel consumption, it should be noted that scientific evidence proves that reductions in unburned hydrocarbons

effectively relates to reductions in fuel consumption. Since fuel is a hydrocarbon, unburned hydrocarbons are a measurement of unburned fuel. Therefore if the fuel is being more completely and efficiently combusted, it means that less fuel is required than was previously required.

In closing we would like to thank you for allowing us the opportunity to demonstrate the benefits of our product on your fleet and trust that we have positively shown the City of Hamilton Fleet Services a technology which will allow you to meet your criteria of reducing harmful emissions and smoke.

Sincerely,

Brian Docherty
V/P, MEA Technologies