

CITY OF HAMILTON

TRANSPORTATION, OPERATIONS & ENVIRONMENT
Fleet Services

| | |
|--|---|
| Report to: Mayor and Members Hearing Sub-Committee | Submitted by: Peter M. Crockett, P.Eng. General Manager |
| Date: June 20, 2002 | Prepared by: Roy W. Duncan Extension 5965 |

**SUBJECT: Fuel Additive Demonstration Project - City of Hamilton (TOE02128)
(City Wide)**

RECOMMENDATION:

- (a) That Ferox Combustion Catalyst, MEA Technologies, be approved as the test product for the Fuel Additive Demonstration Project, City of Hamilton (Expression of Interest (C11-37-02) {Appendix A}) at a total estimated cost of \$150,000.
- (b) That the test be conducted on the Transit/DARTS diesel bus fleet and the entire municipal fleet.
- (c) That staff report to Council on the results of the Fuel Additive Demonstration Project by the end of 2003.

Peter M. Crockett, P.Eng., General Manager
Transportation, Operations & Environment

EXECUTIVE SUMMARY:

The City of Hamilton retained an independent consultant to conduct a fuel additive demonstration project with the objective of determining if fuel additives/ devices reduce fuel consumption in heavy duty diesel vehicles and the fuel cost savings, if any, relative to the cost of the additive/device.

The demonstration project will consist of a test of one product over a period of up to one year. In order to select the test product the City of Hamilton issued a Request for Expression of Interest. A product analysis was completed based on the data which was submitted. A Steering Committee consisting of representatives from Transit, Roads &

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Traffic, Water/Wastewater, Fleet's Repair & Service, EMS (Fire and Ambulance) and Hydro was formed to ensure maximum exposure and consensus in approach.

The Steering Committee recommends that Ferox Combustion Catalyst, MEA Technologies, be approved as the test product for the Fuel Additive Demonstration Project based on an analysis of the responses to the request for an Expression of Interest.

BACKGROUND:

The City of Hamilton retained an independent consultant to conduct a fuel additive demonstration project with the objective of determining if fuel additives/ devices reduce fuel consumption in heavy duty diesel vehicles and the fuel cost savings, if any, relative to the cost of the additive/device.

Originally, it was the intention of the City of Hamilton to conduct the demonstration using a study group of up to 98 diesel buses with an average annual fuel consumption of 3,300,000 litres. The City has now added 45 DARTS vehicles with an average annual fuel consumption of 560,000 litres to the study group.

The demonstration will consist of a test of one product over a period of up to one year. The variables which will be monitored will include: total fuel consumed; total kilometres driven (a) in service and (b) other; total operating time (a) in service and (b) other; and additive volume used (if applicable). The gross fleet average results will be compared to three year historical data.

The City of Hamilton prepared a Request for Expression of Interest (Contract C11-37-02) as attached to this report (Appendix A). The intention of the City was to prepare a short list of product lines to be invited to a subsequent Request for Proposal such that one product may have been chosen for testing. Five fuel additives and two devices were submitted for consideration. A product analysis was completed based on the data which was submitted.

At this time, the Steering Committee formed to oversee this project is recommending that, because only seven products were submitted for consideration and because Ferox Combustion Catalyst, MEA Technologies, rated above the other six products in the analysis, the City not proceed with a Request for Proposal.

ANALYSIS OF ALTERNATIVES:

A total of five fuel additives and two devices were submitted for consideration. The product analysis focused on a comparison of data submitted and total approximate cost for each product.

The completeness and significance of data submitted was measured individually for each item on the Request for Expression of Interest. Each item received equal weight with data submitted receiving a possible score of 0-1-2. Total score was calculated as the sum of individual scores.

Total approximate cost was calculated based on total volume or quantity of product needed to treat fuel for 98 diesel buses for one year. The total approximate cost calculated does not include taxes, shipping and/or installation (if applicable).

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A summary of data submitted, and calculation of total score and total approximate cost is attached to this report (Appendix B).

Table 1 is a categorized summary of product, total score and approximate cost for 98 Transit buses.

TABLE 1 PRODUCT SUMMARY (FOR 98 TRANSIT BUSES)

| Product | Score | Cost |
|--------------------------------------|--------------|-------------|
| Ferox Combustion Catalyst | 28 | \$28,558 |
| Lubrication Engineers 2400 DC1 Plus | 24 | \$46,359 |
| Muscle Products FT-10 | 20 | \$85,421 |
| Power Up GEN49D | 24 | \$45,144 |
| RXP | 24 | \$14,229 |
| Magna -Tek Magnetic Induction Device | 25 | \$35,280* |
| Tadger | 26 | \$68,992* |

* One time cost

Ferox Combustion Catalyst received the highest overall score because data submitted included the most complete and significant information related to product specification and testing. No other additive received higher scores for those items on the Expression of Interest. City of Hamilton, Fleet Services has information regarding the chemical make up of Ferox which it does not for any other of the fuel additives.

Ferox Combustion Catalyst did not have the lowest total approximate cost. RXP fuel additive submitted a lower cost. However, because no product specification and insufficient testing (specific to fuel economy) was submitted, the total score for RXP was not deemed acceptable. Magna-Tek Magnetic Induction Device and Tadger submitted one time costs (not including installation) that may prove to be more economical if the product is installed for longer than the duration of the demonstration project. However, their technology was not sufficiently tested and the total score was not deemed acceptable. Further, the difficulty of installation and possible mechanical problems arising from weight of the product led to lack of confidence in the devices.

It is recommended that Ferox Combustion Catalyst, MEA Technologies, be approved as the test product for the Fuel Additive Demonstration Project based on an analysis of the responses to a request for an Expression of Interest.

In addition, staff recommend that the use of the Ferox product be expanded to include the balance of the fleet for the duration of the demonstration project. The extent of the evaluation of this, as part of the project, will include "Clean Air" emissions testing as required on the fleet and an overall comparison of before and after results.

MEA Technologies has submitted a letter of confirmation which indicates the total cost to conduct the demonstration using a study group of 98 diesel buses and 45 DARTS vehicles. This total cost is in the sum of \$43,756.00 and includes shipping and taxes. A letter of confirmation of total cost submitted by Ferox Combustion Catalyst, MEA Technologies is attached.

FINANCIAL/STAFFING/LEGAL IMPLICATIONS:

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Financial: Beyond the cost of the product, which is in the 2002/2003 Fleet operating budget, there are no budget implications. It is hoped that the experiment will lead to less fuel consumption and reduced overall costs.

Staffing: There are no additional staff requirements.

Legal: There are no known legal implications.

POLICIES AFFECTING PROPOSAL:

N/A

CONSULTATION WITH RELEVANT DEPARTMENTS/AGENCIES:

A Steering Committee has been formed to oversee this demonstration project. The Committee members are as follows:

Roy Duncan, Fleet Services
Paul Thompson, Transit
Martin White, Roads & Traffic
Peter Christie, Water/Wastewater
John Hamilton, Repair & Service, Fleet Services
Bob Kay, Chief Mechanical Officer, Fire and Ambulance
John Noble, Hydro

CITY STRATEGIC COMMITMENT:

This trial use of a fuel additive is consistent with the City's objective of reducing emissions and reducing operating costs.

**THE CITY OF HAMILTON
EXPRESSION OF INTEREST**

***FUEL ADDITIVE DEMONSTRATION PROJECT
CITY OF HAMILTON, FLEET SERVICES***

Contract Number: C11-37-02

Closes: Friday, April 26, 2002

Purchasing Division
Finance & Corporate Services

Contract. No. C11-37-02

EXPRESSION OF INTEREST

The City of Hamilton has retained an independent contractor to conduct a fuel additive demonstration project with the purpose of determining if fuel additives/devices reduce fuel consumption in heavy duty diesel vehicles and the cost savings relative to the cost of the product.

The City of Hamilton will be preparing a short list of product lines to be invited to a subsequent Request for Proposal such that one product may be chosen for testing and/or purchase.

Sealed Expressions of Interest addressed to the Manager of Purchasing, Standard Life Building, 120 King Street West, 9th Floor, Suite 900, Hamilton, ON, L8P 4V2 will be received at **only** the Purchasing Division up to and including **ELEVEN o'clock a.m. Local Time Friday, April 26, 2002** for the above.

Expression of Interest documents may be obtained in the Purchasing Division, 9th Floor, 120 King Street West, Hamilton, ON between 9:00 a.m. and 4:30 p.m. – **FREE OF CHARGE.**

If unable to attend in person you may arrange to forward your completed return courier waybill, including your account number with the courier, and envelope; and have the courier pick up on your behalf. **The Purchasing Division must be contacted at telephone number (905) 546-2773 and informed of this so that staff may prepare the package for pickup by courier.** Documents will not be sent out by collect shipment by courier, and the City will not be responsible for any lost deposit.

Manager of Purchasing
City of Hamilton

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Contract C11-37-02

Request for Expression of Interest

**Fuel Additive Demonstration Project
City of Hamilton, Fleet Services**

The City of Hamilton has retained an independent contractor to conduct a fuel additive demonstration project with the purpose of determining if fuel additives/devices reduce fuel consumption in heavy duty diesel vehicles and the cost savings relative to the cost of the product.

The demonstration project will consist of a test of one product over a period of up to one year. The variables which will be monitored will include: total fuel consumed; total kilometres driven (a) in service and (b) other; total operating time (a) in service and (b) other; and additive volume used (if applicable). The gross fleet average results will be compared to three year historical data.

It is the intention of the City of Hamilton to conduct this demonstration on the entire Hamilton Street Railway (HSR) bus fleet. The diesel fleet consists of 98 heavy duty urban transit buses. Table 1 shows the fleet makeup by manufacturer, engine type and age profile. The annual planned total kilometres driven by the diesel fleet is 5,600,000 km and 3,300,000 litres of fuel are consumed.

Table 1 ~ TRANSIT BUS MODELS

| <u>Quantity</u> | <u>Year</u> | <u>Make</u> | <u>Model</u> | <u>Engine</u> | <u>Fuel</u> | <u>Transmission</u> | <u>Seats</u> | <u>GVW (kgs)</u> |
|-----------------|-------------|-------------|--------------|---------------|-------------|---------------------|--------------|------------------|
| 5 | 1982 | GM | TA60102N | 8V71 | D | V-730 | 60 | 20,000 |
| 14 | 1985 | GM | TC40102N | 6V71 | D | V-731 | 47 | 15,400 |
| 15 | 1986 | GM | TC40102N | 6V71 | D | V-731 | 46 | 15,400 |
| 15 | 1987 | GM | TC40102N | 6V92TA | D | V-731 | 46 | 15,400 |
| 14 | 1988 | MCI | TC40102N | 6V92TA | D | V-731 | 46 | 15,400 |
| 15 | 1989 | OBI | Orion V | 6V92T | D | ZF4HP590 | 44 | 15,000 |
| 20 | 1997 | Nova | LFS | C8.3 | D | ZF5HP590 | 35 | 15,000 |
| D = Diesel | | | | | | | | |

The City of Hamilton will be preparing a short list of product lines to be invited to a subsequent Request for Proposal such that one product may be chosen for testing and/or purchase. This Request for Expression of Interest is being advertised in the Hamilton Spectator and sent to known potential vendors. If you or your firm is an applicant then you must provide the following minimum data in response to this Request for Expression of Interest before any further consideration may be given to your product.

1. Marketing information including product trade name/marketing name. Name and address of the individual or corporation applying for this evaluation. Name of person(s) who are authorized to represent the organization and who will be the principal contact.
2. A statement of company background including years in business and/or other pertinent information including patent protection information, and name of product manufacturer.
3. A description of the product and the purpose /objective of the product as it relates to improvements in fuel economy, emissions and/or driveability.
4. A statement indicating which types or groups of vehicles and conditions (i.e. weather) for which the product is, or is not applicable.
5. For products which are fuel additives, a copy of the product specification and/or a chemical analysis by a recognized national testing laboratory for the primary active ingredients and for the carrier ingredients, and/or mixing instructions for the product (indicate tools, equipment and skills required).
6. For products which are devices, a copy of drawings and/or schematics, installation instructions for the product (indicate tools, equipment and skills required) and maintenance procedures where applicable.
7. An explanation of the mode of action of the product as it relates to improvements in fuel economy, emissions and/or driveability.

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8. A listing of possible harmful effects on mechanical components by considering corrosion, elastomer compatibility, engine sequence testing, filter media compatibility, filter plugging, lubricity and water tolerance and/or any other that apply as defined by the Detroit Diesel Corporation Fuel Additives literature.
9. Material Safety Data Sheet (MSDS).
10. A copy of any Federal and/or Provincial certification.
11. Copies of test reports and/or product evaluations by Environment Canada and/or the Environmental Protection Agency approved laboratories, universities and/or other independent laboratories. These reports must state test size, methodology, results and supportive data.
12. Copies of published articles from recognized professional and/or trade magazines or journals concerning product testing results and other documented results.
13. A current list of fleet systems which operate fleets similar in size, equipment and operation which use the product and may be contacted directly.
14. Copies of letters from the major diesel engine manufacturers stating their warranty policy with respect to use of the product.
15. Copies of letters from the major diesel fuel suppliers stating their policy with respect to use of the product.
16. A written statement of product cost, estimated installation/mixing cost and time, and any quantity discount breakdown which could apply. State fuel savings relative to product cost.
17. A written statement of product availability including identification of local distributor, delivery method and required delivery lead time.
18. Proof of liability insurance.
19. Proof of ability to obtain a Letter of Credit. The Request for Proposal will require the submission of a Letter of Credit to recover costs for damage or destruction of bus engines or other components.

GENERAL CONDITIONS

The Expression of Interest must be organized to address each of the nineteen items listed above.

The attached Expression of Interest Form shall be included in your submission and shall be signed by an officer of the company.

The applicant must submit eight (8) copies for consideration. Company brochures may be attached to the Expression of Interest.

The complete Expression of Interest will be reviewed and a selected short list of applicants will be sent a Request for Proposal with a project Terms of Reference which will assist them in the preparation of their proposal. The selected applicants will then submit a detailed proposal on how their product can meet the demands of the demonstration project.

Sealed Expression of Interest referenced to the project, addressed to Manager of Purchasing, Standard Life Building, 9th Floor Suite 900, 120 King Street West, Hamilton, ON, L8P 4V2 will be received at **only** the Purchasing Division up to and including **ELEVEN o'clock a.m. Local Time Friday, April 26, 2002** for the above.

Questions related to this Expression of Interest, Contract C11-37-02 or the intent of the proposed demonstration project are to be directed to:

Wayne A. Kay, B.Sc., Associate, Transportation Analyst
SERNAS TRANSTECH
141 Brunel Road
Mississauga ON L4Z 1X3
T 416.213.7121 F 905.890.8499
wkay@sernastranstech.com

**ANALYSIS OF RESPONSES TO THE REQUEST FOR EXPRESSION OF INTEREST
FUEL ADDITIVE DEMONSTRATION PROJECT
CITY OF HAMILTON, FLEET SERVICES**

Project Purpose:

- 1) to determine if fuel additives/devices reduce fuel consumption in heavy-duty diesel vehicles
- 2) to identify a (fuel) cost savings relative to the cost of the product
- 3) to test one product over a period of up to one year using the HSR bus fleet

Fleet Information:

- 1) 98 diesel fuelled urban transit buses
- 2) annual fuel consumed = 3,300,000 lit.
- 3) annual km driven = 5,600,000 km

Variables Monitored:

- 1) total fuel consumed
- 2) total kilometres driven
- 3) in-service kilometres
- 4) total operating time
- 5) in-service time
- 6) additive volume used (if applicable)

Comparative Data:

Demonstration project using gross fleet averages

versus

Historical (3-year) data using gross fleet averages

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Expression of Interest Analysis
1 Product Information and # 2 Marketing Information

- Fuel Additive Products = 5 submissions

Ferox Combustion Catalyst

(Canadian distributor)

MEA Technologies, Hamilton, ON

Principle contact: Brian Docherty

Business history = 7 years in Canada (distr.)

Sourced from Parish Chemical (Utah)

Lubrication Engineers 2400 DC1 Plus

Davis Controls Ltd. , Oakville, ON

Principle contact: Christopher Barnes

Business history = 51 years in U.S. (manuf.)

Sourced from Lubrication Engineers (Texas)

Muscle Products FT-10 Fuel Treatment with

MT-10 Metal Treatment (oil)

TWF Lubricants Ltd., Mississauga, ON

Principle contact: Blaine Mitton

Business history = 4 years in Canada (distr.)

And 17 years in U.S. (manuf.)

Sourced from Muscle Products (Pennsylvania)

Power Up GEN 49D with Anti-Gel

Preventative Maintenance Products Inc.,

Stratfordville, ON

Principle contact: Dan Buehner

Business history = 20 years in Canada (manuf.)

Sourced from Maryn International (Calgary, AL)

RXP Fuel Additive

RXP Products Inc., St Petersburg, Florida

Principle contact: Don Woodward

Business history = 12 years in U.S. (distr./manuf.)

Sourced from RXP Products (Florida)

- Fuel Line Devices = 2 submissions

Magnetic Induction Device (Magna-Tek)

Magna-Tek Solutions Inc., Mississauga, ON

Principle contact: Paul Meddick

Business history = 7 years in Canada (distr./manuf.)

Sourced from Magna-Tek (Mississauga, ON)

Tadger

The Tadger Group International, Grimsby, ON

Principle contact: John Mogford

Business history = 1.5 years in Canada (distr./manuf.)

Sourced from Diversitech Systems (Waterloo, ON)

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| | ADDITIVES | | | | | DEVICES | |
|---|----------------|----------------------------|-------------------------|--------------------------|-------------------|-----------------------|----------------------------|
| | Ferox | Lub. Eng. 2400 DC1 Plus | Muscle FT-10 + MT-10 | Power Up GEN49D + A-G | RXP | Magna-Tek | Tadger |
| #3 Purpose/Claims: | | | | | | | |
| Improves Fuel Economy (by reducing fuel consumption) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Claimed Fuel Savings | 3-10% | 7.4% | 5-20% | 2-6% | 1-10% | 6-18% | 2.5% |
| Increases Power/Performance | | Yes | Yes | | | Yes | |
| Reduces Emissions | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Reduces Deposit Formation or Reduces Carbon/Cleans Engine | Yes | | Yes | | Yes | | |
| Extends Engine/Parts Life (by improving lubricity/reducing wear therefore reducing maintenance) | Yes | Yes | Yes | Yes | | Yes | |
| Other: | | | | | | | |
| Cools Exhaust | Yes | | | | | | |
| Improves 'Cold' Operation | | Yes | | Yes | | | |
| Fuel Preservative | | Yes | | | | | |
| #4 Applicability: | | | | | | | |
| Any Fossil Fuel Engine | Yes | | | | Yes | Yes | |
| All Diesel Engines | | Yes | | Yes (low S) | | | |
| Diesel and Gasoline | | | Yes | | | | Yes |
| #5 Technical Data: | | | | | | | |
| Primary Ingredient | Yes (kerosene) | Yes (kero/nap) | | (on request) | | | |
| #6 Drawings/Installation: | | | | | | Yes clamps on-line | Yes in-line (as filter) |
| #7 Mode of Action: | | | | | | | |
| More Complete Combustion | Yes | Yes | Yes | Yes | Yes (temp. incr.) | Yes | Yes |
| Lower Combustion Temperature | Yes | | | | | | |
| Detergent/Oxidation Inhibitor | | Yes | | Yes | | | |
| Minimizes Deposits/Dissolves | Yes | | Yes | Yes | Yes | Yes | Yes |
| Detailed Information | Yes | No | No | No | No | Yes | Yes |
| #8 Safety/No Harmful Effect: | Yes | Yes | Yes (listed) | Yes | Yes | Yes (computer) | Yes |
| #9 MSDS Provided: | Yes | Yes | Yes | Yes | Yes | Yes (n/a) | Yes |

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| | ADDITIVES | | | | | DEVICES | |
|--------------------------------------|--|--|---|--|--|--|------------------------------------|
| | Ferox | Lub. Eng. 2400 DC1 Plus | Muscle FT-10 + MT-10 | Power Up GEN49D + A-G | RXP | Magna-Tek | Tadger |
| #10 Government Certification: | No | No | No | No | No | No | No |
| #11 Testing Trials: | EC: 7% savings on buses | No | No | No | Independent (inconclusive) | No | EC: inconclusive on postal vans |
| #12 Published Articles: | No | No | No | No | Yes | On Magnets | No |
| #13 History of Use: | Hamilton ES Hamilton Hydro Other Fire Dept Welland Fleet (not transit) Waste Mgmt | Fleet Use (no data) School Buses St. AnneTrucks | Single Vehicle Endorsements (no data) | Freightliner Test Railway/China Danford Trucks | Gas Vehicles Railway/U.S. Ringhaver CAT Dardanelle Trucks | Hall Transport Trent River Truck Lines Landfill CAT | York Region (single bus test) |
| #14 Engine Manufacturers: | No | No | No | No | No | No | No |
| #15 Diesel Fuel Suppliers: | No | No | No | No | No | No | No |
| #16 Product Costs: | | | | | | | |
| Drum Size (lit.) | 208 | 208 | 208 | 205 | 208 | n/a | n/a |
| \$Cdn/Drum | \$9,000 | \$2,922 | \$3,446 | \$4,674 | \$1,148 | | |
| \$Cdn/Litre | \$43.27 | \$14.05 | \$16.57 | \$22.80 | \$5.52 | | |
| \$Cdn/Vehicle | | | | | | \$360 | \$704 |
| Hours to Install/Bus | | | | (5% discount) | (U.S. x 1.63) | 1 | 1 |
| | | | | | | (assumes not installed) | |
| Mixing Rate: | | | | | | | |
| Mix Rate | 1/5000 | 1/1000 | 1/640 (FT-10) 2 oz. / 10 gal. | 1/2500 Summer 1/1250 Winter | 1/1280 1 oz. / 10 gal. | n/a | n/a |
| Mix Ratio | 0.0002 | 0.001 | 0.00156 | 0.0006 (50/50) | 0.00078 | | |
| Required (lit. or veh.) | 660 | 3300 | 5156 | 1980 | 2578 | 98 | 98 |
| Annual Expense | \$28,558 | \$46,359 | \$85,421 | \$45,144 | \$14,229 | | |
| Total Device Cost | | | | | | \$35,280 | \$68,992 |
| Est. Installed @ \$70/hr | | | | | | \$6,860 | \$6,860 |
| #17 Availability: | U.S. 2 weeks | Oakville | Mississauga | Calgary 10 days | U.S. 2 days | Mississauga (inventoried) | Grimsby (inventoried) |
| #18 Liability Insurance | Yes (manuf.) | Yes | Yes | Yes (expired) | Yes (expired) | Yes (on request) | Yes |
| #19 Proof/Letter of Credit | Yes (on request) | Yes | | Yes (on request) | | | Yes |

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ESTIMATED PRODUCT EXPENSES AND SAVINGS

| EXPENSES/SAVINGS | | | ADDITIVES | | | | | DEVICES | |
|---------------------|----------------------|---------|-----------|----------------------------|----------------------|--------------------------|----------|-----------|----------|
| | | | Ferox | Lub. Eng. 2400 DC1 Plus | Muscle FT-10 Only | Power Up GEN49D + A-G | RXP | Magna-Tek | Tadger |
| Product Costs: | | | | | | | | | |
| | Annual Use Cost | | \$28,560 | \$46,360 | \$85,420 | \$45,140 | \$14,230 | | |
| | Est. Installed Cost | | | | | | | \$42,140 | \$75,850 |
| | Cost/year (18 yrs) | | \$28,560 | \$46,360 | \$85,420 | \$45,140 | \$14,230 | \$2,341 | \$4,214 |
| | Cost Ratios (18 yrs) | | 2.0 | 3.3 | 6.0 | 3.2 | 1.0 | 0.2 | 0.3 |
| Fuel Savings *: | | | | | | | | | |
| at | 1% | Savings | | | \$19,800 | | | \$19,800 | |
| | 2% | | | | \$39,600 | | | \$39,600 | |
| | 3% | | | | \$59,400 | | | \$59,400 | |
| | 4% | | | | \$79,200 | | | \$79,200 | |
| | 5% | | | | \$99,000 | | | \$99,000 | |
| Break-even (years): | | | | | | | | | |
| at | 1% | Savings | 1.4 | 2.3 | 4.3 | 2.3 | 0.7 | 2.1 | 3.8 |
| | 2% | | 0.7 | 1.2 | 2.2 | 1.1 | 0.4 | 1.1 | 1.9 |
| | 3% | | 0.5 | 0.8 | 1.4 | 0.8 | 0.2 | 0.7 | 1.3 |
| | 4% | | 0.4 | 0.6 | 1.1 | 0.6 | 0.2 | 0.5 | 1.0 |
| | 5% | | 0.3 | 0.5 | 0.9 | 0.5 | 0.1 | 0.4 | 0.8 |

*based on 3,300,000 litres total annual consumption at an average cost of \$ 0.60/litre

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SUMMARY OF PRODUCT SCORING

| INFORMATION | ADDITIVES | | | | | DEVICES | |
|-----------------------------|--|----------------------------|-------------------------|--------------------------|-----|-------------------|--------|
| | Ferox | Lub. Eng. 2400 DC1 Plus | Muscle FT-10 + MT-10 | Power Up GEN49D + A-G | RXP | Magna-Tek | Tadger |
| 1 Product/Marketing Info | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 Manuf. Background | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 Purpose/Claim | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4 Diesel Applicability | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 5/6 Technical Data/Drawings | 2 | 1 | 0 | 1 | 0 | 2 | 2 |
| 7 Mode of Action | 2 | 1 | 1 | 1 | 1 | 2 | 2 |
| 8 Safety/No Harmful Effect | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 9 MSDS | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 10 Gov't Certification | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 Testing Trials | 2 | 0 | 0 | 0 | 1 | 0 | 1 |
| 12 Published Articles | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| 13 History of Use | 2 | 2 | 1 | 2 | 2 | 2 | 1 |
| 14 Engine Manuf. Endorsed | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 Diesel Fuel Endorsed | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 Mix Rate/Cost | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 17 Availability/Delivery | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 18 Liability Insurance | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 19 Letter of Credit | 2 | 2 | 0 | 2 | 0 | 0 | 2 |
| <hr/> | | | | | | | |
| Total: | 28 | 24 | 20 | 24 | 24 | 25 | 26 |
| Percent: | 78% | 67% | 56% | 67% | 67% | 69% | 72% |
| Cost Ratios: | 2.0 | 3.3 | 6.0 (annual) | 3.8 | 1.0 | 0.2 (one-time) | 0.3 |
| <hr/> | | | | | | | |
| Scoring: | 0 Insufficient information provided | | | | | | |
| | 1 Questionable significance or incomplete information provided | | | | | | |
| | 2 Adequate information provided | | | | | | |

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Additional Information: Test Trials/User History (Items # 11, 12 &13)

Ferox

- 1) Environment Canada testing using urban transit buses resulted in a 4.6 to 7% improvement in fuel economy
- 2) Fire Department (in Hamilton) claims 4 to 6% improvement in fuel economy including use of a less expensive fuel grade
- 3) Hydro fleet (in Hamilton) shows an improvement of 7% in fuel economy by comparison of two years
- 4) Five waste management vehicles (in Leesburg, FL) showed an average 7% improvement in fuel economy
- 5) Welland fleet (not transit) reports no failed emissions tests after 2 years of use (contacted)

Lubrication Engineers 2400 DC1 Plus

- 1) Five tractor-trailer fleets (in western U.S.) ranging from 4-20 vehicles with 3.4 to 13.1% improvement in fuel economy
- 2) Fleet of 58 school buses (in Wisconsin) with 5.1% improvement in fuel economy
- 3) Combined = 113 vehicles with 7.4% average improvement in fuel economy
- 4) St. Anne Transportation reports improvements in fuel economy of 8% in new and 1% in old diesel trucks (contacted)

Muscle Products FT-10 + MT-10

- 1) Fuel + engine (oil) treatment for 4 months on a single cement truck with > 20% improvement in fuel economy
- 2) Fuel + engine (oil) treatment indicated 3% improvement in fuel economy based on the same engine
- 3) Fuel + engine (oil) treatment in an 'International' truck operated by TNT Olex (in Thorold, ON) provide 13% improvement in Fuel economy compared to other trucks
- 4) Several private endorsements for combination treatment in gasoline vehicles (no data to support claims of improved fuel economy)

Power Up GEN49D

- 1) Freightliner test vehicle using an on-board computer recorded a 9 to 10.7% improvement in fuel economy
- 2) Diesel locomotives (in China) showed a 2% improvement in fuel economy
- 3) Danford Construction (in Madoc, ON) reports reduced fuel consumption in (Cummins) diesel vehicles (contacted)

RXP

- 1) Two gasoline fuelled vehicles showed an average 2.2% improvement in fuel economy
- 2) Two diesel locomotive tests (in U.S.) showed a 2.5% and 6% improvement in fuel economy
- 3) Ringhaver CAT (in St. Petersburg, FL) claims 4 to 5% improvement in fuel economy with a 2,000 vehicle fleet over 9 months

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- 4) Dardanelle School System reports better fuel economy and less deposits with 4 years use in diesel trucks (less fuel gel) (contacted)

Magna-Tek

- 1) Dozer at Britannia Landfill (in Mississauga) had an 18% improvement in fuel economy in a 3 month trial
- 2) Trent River Truck Lines (in Peterborough) claims > 20% improvement in fuel economy with a Kenworth diesel truck
- 3) Hall Transport (in Ayr) claims 3-4% improvement in fuel economy in side-by-side truck operations to western Canada, including in the winter (less fuel gel) (contacted)

Tadger

- 1) Three diesel fuelled Canada Post delivery vans tested by Environment Canada showed a 1.5% improvement in fuel economy (statistically significant?)
- 2) York Region Transit tested for 6 weeks on a single bus and reported reduced emissions (contacted)

FEROX**MEA TECHNOLOGIES INC.
CANADIAN DISTRIBUTOR**

P.O Box 32030
 Stonechurch Postal Outlet
 1070 Stonechurch Rd. E.
 Hamilton, Ontario L8W 3L3
 Tel. (905) 575-8626
 Fax (905) 575-8046

June 14, 2002

Manager of Purchasing
 City of Hamilton
 C/O Sernas Transtech
 141 Brunel Rd.
 Mississauga, Ontario
 L4Z 1X3

Dear Sir:

We are very pleased to submit the following price quotation for the FEROX combustion catalyst as per contract number C11-37-02.

For the Hamilton Street and Railway and the DARTS fleet would be as follows.

| | |
|--|-------------|
| 4 Barrels of FEROX 230 @ \$9000 per barrel = | \$36,000. |
| Shipping..... @ \$512.25 each = | 2,049. |
| Sub-total..... | \$38,049. |
| GST..... | 2,663.43 |
| PST..... | 3,043.92 |
| Total..... | \$43,756.35 |

(note: a 50% deposit of \$21,878.17 will be required at ordering time with the balance due 15 days from final invoice)

In respect to the actual treating of the fuel at HSR, it would be the responsibility of the HSR. I would however want to demonstrate how simple the procedure is before the testing begins.

 For the City of Hamilton Fleet would be as follows.

| | |
|--|-------------|
| 8 Barrels of FEROX 230 @ \$9000 per barrel = | \$72,000. |
| Shipping..... @ \$512.25 each = | 4,098. |
| Sub-total..... | \$76,098. |
| GST..... | 5,326.86 |
| PST..... | 6,087.84 |
| Total..... | \$87,512.70 |

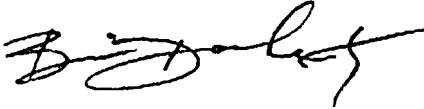
(note: a 50% deposit of \$43,756.35 will be required at ordering time with the balance due 15 days from final invoice)

With respect to the Hamilton fleet, I would be prepared to as I have in the past 9 years help with treating some of the yards. Again, the actual dispensing of FEROX into city yards is a very simple procedure which I could demonstrate to specific city yard personnel along with showing how to properly log each treatment.

“It’s Time to Clear the Air, with Ferox™”

In closing, we thank-you for allowing us to quote on your valued business. Should you have any questions please feel to contact me directly on my cell phone (905) 541-4574.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Docherty". The signature is fluid and cursive, with a prominent initial "B" and a long, sweeping tail.

Brian Docherty

cc. Peter M. Crockett, P. Eng., General Manager
Transportation, Operations & Environment