INTRODUCTION

Eleven of Transport Canada's units in four cities were treated. These were selected at four airports in British Columbia to determine the effects of Microlon TFE Metal Treatment under a controlled test basis. The units ranged from a 4 cycle gas engine to a large Cat 3208 diesel V-8 engine.

Microlon Metal Treatment is manufactured by Chemlon Inc.

Microlon is a volatile liquid, solvent dispersed, colloidal suspension of Teflon* flurocarbon thermo plastic which is prepared by Chemlons' proprietary process.

The test objectives were to measure the relative impact of Microlon Teflon Metal Treatment on the following automotive parameters:

A Wear
B Compression
C R. P. M.
D Operating Temperatures
E Fuel Consumption
F Oil
G Emissions
H Quicker Starts and Quieter Operation

The evaluation proceeded in three phases:

1 Establish the baseline characteristics of each unit.
2 Perform the Microlon TFE Metal Treatment and determine initial impact on all units.
3 Long range mileage accumulation data and test for final results.

The experimental data was compiled and evaluated by Microlon Canada representatives in conjunction with Transport Canada personnel.

2. TEST PROCEDURES

For reference purposes, all vehicles chosen for testing were coded under Transport Canada vehicle identity numbers as follows:

VANCOUVER INTERNATIONAL AIRPORT

1.	Green 3 (53-6020)	Ford 1/2 ton pick-up 360 cu. in. V-8 gas engine
2.	Blue 30 (61-7432)	Jacobsen F-20 Ford 192 cu. in. 4 cyl. diesel engine
3.	Blue 8 (55-7652)	I.H.C. dump truck 3208 8 cyl. Cat diesel
4.	Blue 19 (57-7532)	Timpco Air Sweeper (twin engine) a) Ford - 361 cu. in. V-8 gas engine (front) b) Ford - 172 cu. in. 4 cyl gas eng. (rear)
5.	Sid Harris	1970 Dodge (personal vehicle) 225 cu. in. 6 cyl. gas engine

VICTORIA INTERNATIONAL AIRPORT

1.	Blue 4 (53-9033)	G.M.C. 1/2 ton pick-up 250 cu. in. cyl. gas engine
2.	Blue 6 (55-7655)	I.H.C. dump truck 3208 8 cyl. Cat diesel

PRINCE GEORGE AIRPORT

1.	Blue 1 (53-7004)	G.M.C. 1/2 ton pick-up 305 cu. in. V-8 gas engine
2.	Blue 15 (55-7815)	I.H.C. dump truck 3208 8 cyl. Cat diesel

TERRACE AIRPORT

1.	Blue 1 (53-7005)	Chev 1/2 ton pick-up 305 cu. in. V-8 gas engine
2.	Blue 9 (56-7541)	White Western Star dump truck 3208 8 cyl Cat diesel

To establish baseline data, all eleven units were tested prior to Microlon treatments in the following manner.

1. To be able to compare the effects on wear, an oil analysis was done before and after treatment with Microlon. It is important to note that the oil samples drawn after the Microlon treatments were from the second oil change. This was done because the oil after the first change would be heavily laden with metal particles due to the tremendous cleansing action of Microlon. Samples drawn after the second oil change all had similar hours of operation.

2. To establish results on compression, R.P.M. and operating temperatures, readings were taken before and after treatment. Third readings were taken after the second oil change.

3. To compare fuel and oil consumption, the baseline data used was directly from the extensive and thorough records of Transport Canada. The average consumption for the previous six months are the figures used to compare results.

4. Unfortunately, the necessary equipment needed to measure exhaust emmissions was not available at the testing facilities. This is a very dramatic area of improvement after treatment with Microlon. We have included some results compiled at two independent United States laboratories, Daeco Automotive Engineering Corporation in Wilmington, California and Southwest Research Institute of San Antonio, Texas.

5. Quicker starts and quieter operation are very hard to measure so we have noted the drivers and supervisors comments in regards to these catagories.

Following baseline tests, each unit was treated with the recommended amount of Microlon TFE Metal Treatment after an oil change. The product was furnished by Microlon Canada.

Following these additions, each unit was run at an idle for approximately one hour. This was to enable the cleaners to work and then evaporate leaving the dry lubricant in the pores of the metal. Immediately after the idling period, R.P.M. readings and compression tests were taken where possible.

The final tests for these units were compiled after a significant number of miles had been put on each vehicle over a period of four to six months.

TRANSPORT CANADA - TEST RESULTS

Test results are summarized in the following charts. Since the test conditions were all in actual working conditions, they should be considered as typical. Based on changes from baseline characteristics, the impact of the Microlon treatments is considered to be extremely significant.

All data represented in this report has been supplied by the individual supervisors at each airport and by an independent laboratory. The enclosed information is both accurate and complete.

Unit Blue 30 in Vancouver is a Jacobsen F-20 Ford run by a 192 cubic inch 4 cylinder diesel engine. This engine responded well but did not show much reduction in metal content in the oil after treatment. It is suspected that much of this is due to loosened deposits and residues left from the untreated period of operation. Because of this suspicion, a third oil analysis was done and the desired results shown.

It was noticed that Blue 19 (Timpco Air Sweeper - Twin Engine), had some trouble in the 361 cubic inch V-8 gas engine in the front. In fact, cylinders two and five were not firing at all before treatment. After treatment they began to work, but still not efficiently. Both cylinders were replaced and were not treated before the second oil change. This would explain why the iron content from 387 ppm to 327 ppm. The fact that the new rings had to be seated would explain the reason that the chromium content in the oil actually increased from 29 ppm to 48 ppm. A third oil analysis bore out these assumptions.

The information on Blue 6 (Victoria) is still incomplete. Unfortunately, the man conducting the test was transferred before its completion and we have been unable to obtain any further information.

Fuel consumption on Mr. Sid Harris' Dodge increased by 5.9%. The engine responded superbly in all other areas. Suspected carburetion trouble prompted Mr. Harris to replace the same.

Fuel consumption on Blue 15 (Prince George) increased by 5%. This is due to the immense amount of time that the unit is left idling in winter season. Mr. Ken Smith expressed surprise that the increase was only 5% as the engine is left at an idle about 50% of the time in winter.

FUEL CONSUMPTION

UNIT	BEFORE (MPG)	AFTER (MPG)	% CHANGE
GREEN 3 Vancouver	5.8	6.9	18.97
BLUE 30 * Vancouver	1.26 gal per hr	.85 gal per hr	33.00
BLUE 8 Vancouver	5.9	6.2	5.8
BLUE 19 (front & Vancouver rear)	3.85	4.55	18.20
*DODGE Vancouver	22.0	20.7	-5.9
BLUE 4 Victoria	17.72	19.11	7.8
BLUE 6 Victoria	6.62	N/A	N/A
BLUE 1 Prince George	9.93	13.56	36.6
*BLUE 15 Prince George	8.36	7.94	-5.0
BLUE 1 Terrace	8.79	9.93	13.0
BLUE 9 Terrace	2.61	2.84	8.8

*Rated at gallons per hour as the unit is basically stationary. A negative change is the desired result.

*DODGE: The engine responded superbly in all other areas. Suspected carburetion trouble prompted a change and above mileage improved

*BLUE 15: This is due to the great amount of time that the unit was left idling in the winter season. Mr. Ken Smith expressed surprise that the increase was only 5%.

TEST RESULTS

OIL CONSUMPTION

UNIT	BEFORE	AFTER	% CHANGE
Green 3 Vancouver	None	None	--
Blue 30 Vancouver	47 L./1000 hrs.	15 L./1000 hrs.	-68%
Blue 8 Vancouver	15.2 L/1000 mi.	.35 L/1000 mi.	-98%
Blue 19 Vancouver	5.94 L/1000 mi.	.55 L/1000 mi.	-99%
Dodge Vancouver	4.55 L/1000 mi.	None	-100%
Blue 4 Victoria	None	None	--
Blue 6 Victoria	None	None	--
Blue 1 Prince George	4.3 L/month	None	-100%
Blue 15 Prince George	4.8 L/month	N/A	--
Blue 1 Terrace	1.0 L/month	1.0 L/month	--
Blue 9 Terrace	14.0 L/month	N/A	--

TEST RESULTS

Oil consumption data is very incomplete as most units were consuming little or no oil before treatment. Consumption over a one year period would give a more realistic comparison. Included in this report are findings of the Southwest Research Institute on oil consumption.

Unfortunately, data on unit Blue 9 in Terrace is somewhat incomplete at this time.

WEAR RATES*

UNIT	STAGE	IRON	CHROMIUM	COPPER	ALUMINUM	TIN	TOTAL	% CHANGE
GREEN 3 (van)	before	217	13	36	33	34	333	243.3
	after	60	7	12	10	8	97	
BLUE 30** (van)	before	51	8	3	6	8	76	1.3
	after	51	11	1	6	6	75	
BLUE 8 (van)	before	36	1	1	2	6	46	155.6
	after	13	1	1	2	1	18	
BLUE 19** (van) front	before	387	29	32	58	22	528	23.1
	after	327	48	6	32	19	429	
BLUE 19 (van) rear	before	230	15	24	84	14	367	132.3
	after	128	4	3	19	4	158	
DODGE (van)	before	192	3	1	22	9	227	773.1
	after	19	1	1	2	3	26	
BLUE 4 Victoria	before	23	2	2	5	7	39	95.0
	after	14	1	1	1	3	20	
BLUE 6 Victoria	before	33	1	1	4	5	44	N/A
	after	N/A	N/A	N/A	N/A	N/A	N/A	
BLUE 1 Prince George	before	233	9	2	29	7	280	150.0
	after	92	3	2	12	3	112	
BLUE 15 Prince George	before	16	1	1	3	2	23	64.3
	after	9	1	1	2	1	14	
BLUE 1 Terrace	before	550	20	15	15	29	629	182.1
	after	214	5	1	7	6	223	
BLUE 9 Terrace	before	65	3	19	77	4	168	522.2
	after	21	1	3	1	1	27	

*Wear rates are expressed in parts per million.

**Oil samples compared are drawn from the third oil change.

Note: All oil samples are drawn half way through the draining.
% Change is expressed in terms of how much greater wear rates were before treatment.

COMPRESSION *

UNIT	STAGE	CYL 1	CYL 2	CYL 3	CYL 4	CYL 5	CYL 6	CYL 7	CYL 8	TOTAL	PLUS-MINUS
GREEN 3	before	120	130	125	125	120	125	130	125	1000	
(van)	after	135	140	140	140	130	135	140	140	1100	+100
BLUE 19 (van) front	before	120	130	100	90	125	85	100	75	825	
	after	125	130	115	90	115	120	100	80	875	+50
BLUE 19 (van) rear	before	155	135	140	100					530	
	after	145	140	120	125					530	
DODGE (van) 6 cyl	before	140	135	130	140	140	140			825	
	after	140	140	130	140	140	145			835	+10
BLUE 4 Victoria 6 cyl	before	155	160	160	160	155	160			950	
	after	155	160	165	160	160	160			960	+10
BLUE 1 Prince George	before	125	110	110	110	120	100	130	100	905	
	after	125	130	120	125	120	120	130	120	990	+85
BLUE 1 Terrace	before	150	150	150	155	150	155	150	150	1210	
	after	150	150	150	150	150	150	150	150	1200	-10

* These tests were conducted on gasoline engines only. Optimum compression (according to factory specification) is at the most desired reading. Too high compression may often be as harmful as too low compression. Normalization and balance are the most significant results derived from a Microlon Treatment.

R. P. M.

UNIT	BEFORE	AFTER*	INCREASE	% INCREASE
GREEN 3 (van)	580	625	45	7.8
BLUE 30 (van)	900	900	--	--
BLUE 8 (van)	675	710	35	5.2
BLUE 19 (van front)	800	860	60	7.5
BLUE 19 (van rear)	850	1000	150	17.6
DODGE (van)	800	840	40	5.0
BLUE 4 Victoria	720	740	20	2.8
BLUE 6 Victoria	6 5	700	75	12.0
BLUE 1 Prince George	525	575	50	9.5
BLUE 15 Prince George	600	650	50	8.3
BLUE 1 Terrace	N/A	N/A	N/A	N/A
BLUE 9 Terrace	700	750	50	7.1
TOTALS	7775	8350	575	7.4

* Readings taken one hour after product application.

TEST RESULTS

OPERATING TEMPERATURES

Due to the inaccuracy of available temperature guages, no readings were taken. There is ample evidence that operating temperatures will be reduced as another by product of reduced friction. This is particularily evident in gear boxes. We did not treat any transmissions or rear ends but this is another application area that will slightly improve over-all vehicle performance.

EMISSIONS

We did not have the facilities to measure hydro-carbon emissions. This is an area of dramatic improvement after the Microlon treatment. The decrease in exhaust emissions is attributed to many factors, the two main ones being:

A clean engine operating with less resistance due to the Teflon impregnation will operate more efficiently. An efficient engine will burn fuel more completely and emit less.

Less oil is burned in an engine operating cleaner and more efficiently. Also, with Teflon impregnated in the cylinder walls, there is less oil left in the combustion chamber. Consequently less oil is burned and less by porducts of oil are emitted.

We have included some reports from independent laboratories that measured the impact that a Microlon treatment has on exhaust emissions.

TEST RESULTS

EVALUATION OF CLAIMS

MICROLON REDUCES WEAR - AFFIRMATIVE: Wear rates were found to be from 1.3% to 730.1% higher in the untreated condition.

MICROLON NORMALIZES COMPRESSION - AFFIRMATIVE: Compression was raised in cylinders with extremely low readings and generally balanced in the remaining engines.

MICROLON INCREASES R. P. M. - AFFIRMATIVE: R. P. M.s increased by 2.8% to 17.6%

MICROLON REDUCES FUEL CONSUMPTION - AFFIRMATIVE: Although two engines showed 5.9% and 5.0% poorer fuel economy, there were other factors that explained this occurance. In all the other engines treated, fuel consumption was reduced from 1.3% to 36.6%. The average reduction was 13.61%.

MICROLON REDUCES OIL CONSUMPTION - AFFIRMATIVE: Oil consumption was redueed by 68% to 100%.

MICROLON REDUCES EXHAUST EMISSIONS - NOT MEASURED: In this series of tests, the effect on reduced hydro carbon emissions was not measured. It is significant to note that Southwest Research Institute found reductions of 37% to 78% and Daeco Laboratories found reductions of 25% to 56% on two cars tested.

TEST RESULTS

SOUTHWEST RESEARCH INSTITUTE

San Antonio, Texas
Divisions of Engines, Fuels and Lubricants

Report on: Caterpillar 1-G2 Lubricant Additive Evaluation

Conducted for: Chemlon, Incorporated
REO - 203 - 78
REO - 203 - 78 with Microlon
November 30, 1978

Gaseous Exhaust Emissions - Page 6.51

Hours of Operation		Hydro Carbon ppm	% Change
Before	115	142	
After	115	90	-37%
Before	238	130	
After	240	61.5	-53%
Before	337	307	
After	354	68	-78%
Before	458	235	
After	474	85	-64%

TEST RESULTS

DAECO DAIGH AUTOMOTIVE ENGINEERING CORPORATION

201 West "D" Street
Wilmington, California (203) 549-0840

Prepared by: Mr. A. Lowi, P.E. S.A.E.
Mr. H. D. Daigh, S.A.E.
September 20, 1978

Page 4.7 of their report states:

"DECREASES EMISSIONS - AFFIRMATIVE"

"After a short break-in period following treatment and a spark plug change in the high mileage test car, both cars showed significant reduction in the average level of exhaust manifold hydrocarbons (-25% to -56%). Carbon monoxide levels were up slightly on average (28%) from baseline on the high mileage car (non-catalyst equip This indicates that some enrichment has persisted in the high mileage car after 569 miles which may be temporary, but in any case this amount of CO would likely be attenuated substantially in the exhaust system before leaving the tail pipe. The manifold CO level was reduced slightly (-6%) in the low mileage, catalyst equipped car."

TEST RESULTS - CONCLUSIONS

The information gathered in these field tests support previous testing done in France and the U. S. A..

Although Microlon was primarily invented as a product that will reduce wear by reducing friction, the immediate tangible benefits are extremely significant.

Fuel consumption was reduced by an average of 13.61%. In dollars and cents this saving alone would more than justify the purchase price of the product. It would take less than six months to recuperate the cost in fuel savings alone.

The savings from reducing oil consumption are also significant.

Most importantly, is the reduction of wear. It is very clear in these tests that the machines were wearing out at a much more dramatic rate before they were treated with Microlon. How can one gauge the financial advantages of reducing wear? There are many things to consider other than the cost of replacement parts and labour. Down-time and inconvenience being the most obvious.

Tests are continuing with respect to the condition of the oil after Microlon treatments. The results to date are showing that because the engine is operating more efficiently and not heating up as much, the viscosity is remaining the same as when it was introduced. Although we cannot state it at this point, it appears that after an engine is Microloned, it may allow for longer use of its oil

In the results of these tests there are a wide range of improvements and as many reasons for these. Newer engines are already operating at near peak efficiency and extremely high mileage units may be too worn out to be helped.

With confirmed results such as have been reported in this series of tests by the Transport Canada personnel, there remains little doubt regarding the effectiveness of a Microlon Treatment. Although the product is quite expensive, it is very evident that its use is economically viable.

** COMPLETE REPORT INCLUDING OIL ANALYSES AVAILABLE ON REQUEST