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Additives in Canadian Fuels

1999

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Environment Canada

Additives in Canadian Fuels

1999

Notice

The information contained in this report is compiled from data submitted by the producers and importers of liquid fuels in Canada pursuant to the requirements of the Federal *Fuels Information Regulations, No. 1*. Submissions have been verified for reasonableness but are subject to potential errors made at the source.

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1.0 Summary

This report summarizes data concerning the use of additives in petroleum fuels in Canada for the 1999 year. The information used in this report was provided pursuant to the *Fuels Information Regulations, No. 1* of the *Canadian Environmental Protection Act*. Under the regulations, companies producing or importing more than 400 m³ annually of liquid fuel containing an additive must submit information on the fuel additives used to Environment Canada. The information must be provided within 60 days of the first use or any change in the use of the additive.

Additives are used in various types of fuel, to differing degrees and for different purposes. Gasoline had the largest inventory of additives with 47 additives that had 20 uses. This was followed by diesel fuel with 35 additives that had 23 uses. Propane has the least with 4 additives that had 2 uses. Tables 3.1 to 3.7 summarize the uses of additives in the different fuel types. Not all batches of any given fuel type would contain additives utilized to produce all the uses listed for that type.

2.0 Introduction

2.1 Fuels Information Regulations, No. 1

Under the federal *Fuels Information Regulations, No. 1* (refer to Appendix A), companies producing or importing more than 400 m³ annually of liquid fuel containing an additive must submit information on the fuel additives used to Environment Canada. The information must be provided within 60 days of the first use and within 60 days of any change in the use of the additive. During 1999, Environment Canada requested companies to review the data on file. A copy of the request letter is in Appendix B. This report summarizes the findings of the review.

2.2 Information Reported

Importers and refiners provide the information on a form entitled *Report on Fuel Additives in Petroleum Fuels* (refer to Appendix C). Information provided includes the brand name of the fuel additive, the purpose of the additive, the additive composition and the fuel it is added to. Quantitative information includes the annual quantity used (kg), the weighted average (mg/L), and the minimum and maximum concentrations (mg/L). The company must also provide the name of the manufacturer of the additive, as well as the addresses of both the reporting company and the manufacturer. In addition, importing companies must indicate the location of their fuel storage tanks.

The regulations apply to any liquid form of petroleum-based fuel. There are 8 different types of fuel reported. Each type is further subdivided in this report according to uses or special characteristics. The types and subdivisions are found in Table 2.1. Companies use these descriptions in submitting their reports.

Table 2.1 Fuel Categories including the Fuel Types.

Category	Sub-Category	Applicable Fuel Types
Aviation Turbine Fuel	N/A	turbine fuel; jet A, A1, B or 5; military type; aviation fuels
Kerosene/ Stove Oil	N/A	any kerosene or stove oil; light diesel for stoves
Gasoline	Motor	any motor gasoline <i>except that which is leaded</i>
	Aviation	any aviation gasoline(100-LL, 100/80. etc.....)
	Leaded	any leaded motor gasoline
Diesel	Marine	marine fuel; marine or naval diesel
	Mining	any mining diesel
	Regular	any diesel not of the 2 above types and with a wt. % of sulphur >0.05%
	Low-Sulphur	any low sulphur diesel, i.e. wt. % of sulphur <0.05%
Distillate	N/A	any distillate; distillate/gasoline; mid-distillate/heavy fuel oil
Fuel Oil	Light	# 0, 1, 2 fuel oils; home heating fuel; furnace oil; heating oil
	Heavy	# 5, 6 fuel oil; fuel oil; boiler oil
Propane	N/A	any propane or liquefied petroleum gas (LPG)
Synthetic Crude Oil	N/A	any synthetic crude sold as fuel

The companies that have reported are listed in Appendix D and the names of the additive manufacturers are in Appendix E.

3.0 Additive Use in Canadian Fuels

3.1 Uses of Additives

There were 95 different fuel additives reported for 1999, produced by a variety of manufacturers (refer to Appendix E). Additives have many purposes, such as a flow improver, anti-oxidant, octane improver, oxygenate, lubricity improver, detergent, static electricity dissipater / electrical conductivity improver, dye, anti-knock agent, anti-haze, odourant, deposit control, cetane improver, pour point depressant, elemental sulphur mitigation, corrosion inhibitor, metal deactivator, hydrogen sulphide scavenger, mercaptan scavenger, stabilizer and anti-freeze.

3.2 Most Common Additive Uses by Fuel Type

The information provided to Environment Canada by refiners and importers on the uses of additives in Canadian fuels is summarized in Tables 3.1 to 3.7. The tables present the uses of the additives reported for each fuel type (Aviation Turbine Fuel, Diesel, Distillates, Fuel Oil, Gasoline, Kerosene and Stove Oil, Propane) listed in decreasing order of the number of refiners and importers that reported using additives for that purpose. For different uses with the same number of users, further ranking is carried out based on the column *% of Canadian Fuel that the Refiners and Importers Represent*. The column entitled *% of Canadian Fuel that the Refiners and Importers Represent* indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use). For each use listed, there may be several different additives that produce that result.

There were 47 additives reported for gasoline that together have 20 different uses. Deposit control was the most reported use by 11 refiners and 1 importer that combined supply 56 % of Canadian gasoline. The use of additives as an anti-oxidant was reported by 11 refiners that together supply 71 % of Canadian gasoline. Additives used as an octane improver containing metals are used by 15 refiners that together supply 87 % of Canadian gasoline.

Oxygenates are reported to be added by 5 refiners and 1 importer that supply 16.1 % of Canadian gasoline. Note that the use of oxygenates is likely to be much larger than shown as many companies do not consider oxygenates to be “additives”. The term “additive” is not defined in the regulations. The common usage of the term (e.g. the Canadian General Standards Board’s standard for unleaded automotive gasoline and the federal Benzene in Gasoline and Sulphur in Gasoline regulations) implies that oxygenates are not “additives”. Nevertheless oxygenate usage must be reported under the Benzene in Gasoline Regulations. A summary of oxygenate usage will be part of a report on that regulation that Environment Canada will soon be preparing. This report will be available to the public upon request.

There were 35 additives reported for diesel fuel that have 23 uses. The use of additives as a lubricity improver was reported by 12 refiners that supply 61 % of Canadian diesel fuel. The use of additives as a cetane improver was reported by 7 refiners that combined supply 42 % of Canadian diesel fuel.

There were 27 additives reported for fuel oil that have 16 uses. The use of additives as a static electricity dissipater / electrical conductivity improver was reported by 5 refiners that together supply 47 % of Canadian fuel oil. The use of additives as an anti-oxidant was reported by 3 refiners that supply 26 % of Canadian fuel oil.

There were 4 propane additives that have 2 uses. 7 refiners reported using additives as an odourant and 1 refiner reported using additives for water absorption in liquid propane. The information for the percentages of Canadian propane those refiners and importers supply was not available.

8 additives that have 6 uses were reported for kerosene and stove oil. The most reported use was as a static electricity dissipater / electrical conductivity improver by 3 refiners who supply 6 % of Canadian kerosene and stove oil. Use of additives as a lubricity improver was reported by 2 refiners that combined account for 11 % of the supply of Canadian kerosene and stove oil.

There were 7 different additives reported for aviation turbine fuel that have 5 uses. Static electricity dissipater / electrical conductivity improver was the most reported use by 11 refiners and 1 importer that together supply 69 % of Canadian aviation turbine fuel. The use of additives as a corrosion inhibitor was reported by 5 refiners that supply 40 % of Canadian aviation turbine fuel.

9 additives that have 9 uses were reported for distillates. The use of additives as a lubricity improver was reported by 8 refiners that supply 20 % of Canadian distillates. The use of additives as a static electricity dissipater / electrical conductivity improver was reported by 2 refiners that supply 10 % of Canadian distillates.

Table 3.1: Additive Uses in Canadian Gasoline

Uses*	# of Refiners and Importers		% of Cdn Gasoline that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Deposit Control	11	1	55.8	249.5	0	530
Anti-oxidant	11	0	71.2	14.6	0	100
Octane Improver/Anti-knock (metal)	15	0	87.0	60.4	0	180
Corrosion Inhibitor	9	0	49.2	18.8	0	30
Detergent	6	2	23.6	273	0	514
Octane Improver / Anti-knock (Oxygenate)****	5	1	16.1	31,327	0	105,000
Metal Deactivator	3	0	17.3	20.5	0	80
Octane Improver/Anti-knock (other)	2	0	26.6	967	80	1,400
Dye	2	0	26.6	1	1	2
Static Electricity Dissipater / Electrical Conductivity Improver	2	0	24.9	0.5	0	2
Identification	2	0	14.2	1.7	0	19
Multipurpose Inhibitor	2	0	6.3	108	0	150
Anti-freeze	1	0	24.3	780	660	820
Hydrogen Sulphide Scavenger	1	0	8.3	75	50	100
Mercaptan Scavenger	1	0	8.3	75	50	100
Dehazer	1	0	5.4	2.3	0.6	3.4
Detergent, Corrosion Inhibitor	1	0	2.4	6	5	6
Stabilizer	1	0	1.4	4	0	8
Anti-oxidant, Corrosion Inhibitor	0	1	0.3	0.007	N/A	N/A
Elemental Sulphur Mitigation	1	0	N/A	43.3	0	200

* Terms listed reflect the usage as reported by companies

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

**** Actual oxygenate usage is much larger - refer to text.

Table 3.2 : Additive Uses in Canadian Diesel Fuel

Uses*	# of Refiners and Importers		% of Cdn Diesel Fuel that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Lubricity Improver	12	0	61.0	67	0	92
Cetane Improver	7	0	42.2	452.6	0	1,400
Static Electricity Dissipater / Electrical conductivity improver	7	0	37.8	41	0.004	10
Corrosion Inhibitor	6	0	42.3	8.5	3	N/A
Stabilizer	2	0	20.4	23.5	9	96
Dye	2	0	8.8	302	180	N/A
Hydrogen Sulphide Scavenger	2	0	8.6	75	50	100
Mercaptan Scavenger	2	0	8.6	75	50	100
Flow Improver	2	0	6.2	172.7	0	580
Pour Point Depressant	1	1	5.3	19	0	2,500
Elemental Sulphur Mitigation	2	0	3.5	57.5	0	200
Deposit Control	1	0	6.3	330	278	415
Detergent	1	0	6.3	171	128	257
Identification	1	0	6.3	2	0	19
Ignition Improver	1	0	6.3	513	0	1,500
Multi-purpose	1	0	6.3	4	4	4
Anti-freeze	1	0	5.6	85	N/A	N/A
Detergent, Lubricity Improver	1	0	5.6	93	N/A	N/A
Premium Diesel Package	1	0	3.2	379	379	379
Anti-haze	1	0	2.6	5	0	100
Corrosion Inhibitor, Electrical Conductivity Improver	0	1	0.02	0.007	0.006	0.008
Anti-oxidant	1	0	0.01	12	12	12
Additive Mixture, Dye, Octane Improver, Conductivity Improver, Lubricant	1	0	N/A	2,500	2,000	3,000

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Table 3.3 : Additive Uses in Canadian Fuel Oil

Uses*	# of Refiners and Importers		% of Cdn Fuel Oil that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Static Electricity Dissipater / Electrical Conductivity Improver	5	0	47.2	12.5	0	50
Anti-oxidant	3	0	25.7	44.3	0	90
Dye	3	0	23	168.5	N/A	180
Pour Point Depressant	3	0	22.0	290	0	300
Hydrogen Sulphide Scavenger	2	0	11.7	75	50	100
Anti-freeze	1	0	13.9	85	N/A	N/A
Anti-haze	1	0	13.9	211	N/A	N/A
Corrosion Inhibitor	1	0	13.9	4	N/A	N/A
Flow Improver	1	0	13.9	2	N/A	N/A
Low Temperature Operability Improver	1	0	13.9	935	N/A	N/A
Mercaptan Scavenger	1	0	4.3	75	50	100
Stabilizer	1	0	2.8	1	0	3
Cetane Improver	1	0	0.2	535	0	1,500
Identification	1	0	0.2	4	0	19
Emulsion Stabilizer	0	1	N/A	N/A	N/A	2,226
High Temperature Corrosion Inhibitor	0	1	N/A	N/A	N/A	7,290

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Table 3.4 : Additive Uses in Canadian Propane

Uses*	# of Refiners and Importers		% of Cdn Propane that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Odourant	7	0	N/A	26.7	12	48
Water Absorber	1	0	N/A	1,300	N/A	N/A

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Table 3.5 : Additive Uses in Canadian Kerosene and Stove Oil

Uses*	# of Refiners and Importers		% of Cdn Kerosene and Stove Oil that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Static Electricity Dissipater /Electrical Conductivity Improver	3	0	6.1	8.3	0	50
Lubricity Improver	2	0	11.2	87.5	75	100
Cetane Improver	1	0	5.9	275	0	320
Elemental Sulphur Mitigation	1	0	5.9	15	0	100
Hydrogen Sulphide Scavenger	1	0	5.5	75	50	100
Mercaptan Scavenger	1	0	5.5	75	50	100

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Table 3.6 : Additive Uses in Canadian Aviation Fuel

Uses*	# of Refiners and Importers		% of Cdn Aviation Fuel that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Static Electricity Dissipater / Electrical Conductivity Improver	11	1	68.5	1	0	6
Corrosion Inhibitor	5	0	40.1	19	0	25
Anti-icing	5	0	33.8	1232	1,020	1,700
Anti-oxidant	3	0	28.6	13.5	0	21
Metal Deactivator	3	0	21.2	4.8	0	6

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).

*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Table 3.7 : Additive Uses in Canadian Distillates

Uses*	# of Refiners and Importers		% of Cdn Distillates that the Refiners and Importers Represent **	Average Concentration (mg/L)***	Range of Concentration (mg/L)	
	Refiners	Importers			Min.	Max.
Lubricity Improver	8	0	20.4	50	0	100
Static Electricity Dissipater / Electrical Conductivity Improver	2	0	10.1	2	0	6
Cetane Improver	2	0	5.4	200	0	1,000
Metal Deactivator	1	0	10.1	5.4	0	6
Pour Point Depressant	1	0	10.1	400	0	800
Cloud Point Depressant	1	0	8.8	160	0	200
Flow Improver	1	0	3.3	300	100	500
Hydrogen Sulphide Scavenger	1	0	3.3	100	0	350
Multi-purpose Inhibitor	1	0	3.3	20	0	30

* Terms listed reflect the usage as reported by companies.

** Based on 1998 Data. Indicates the percentage of the total amount of Canadian fuel that is imported and produced by the companies that

reported that use (note that this is not necessarily the same as the percentage of fuel that actually contains additives for that use).
*** This is the arithmetic average of the Weighted Average of Additive Concentration (mg/L) reported by refiners and importers.

Appendix A

Fuels Information Regulations, No. 1

Clean Air Act

Fuels Information Regulations, No. 1

1. Short Title. These Regulations may be cited as the Fuels Information Regulations, No. 1.

2. Interpretation. In these Regulations, “**Minister**” means the Minister of the Environment.

3. Application. These Regulations apply to fuels in liquid form that originate from crude oils, coal or bituminous sands.

4. Information. (1) Every person who produces in Canada or imports into Canada more than 400 cubic meters of a fuel named in an item of Form 1 of the schedule shall submit to the Minister, for each quarter of the calendar year during which the fuel was produced or imported, the information required by that Form.

(2) Information submitted pursuant to subsection (1) shall be submitted on or before January 31 following the end of the calendar year during which the fuel was produced or imported.

5. (1) Every person who produces in Canada or imports into Canada a fuel that contains any additive other than lead or lead compounds shall submit to the Minister, in respect of each additive not previously reported to the Minister under these Regulations, the information required by Form 2 of the schedule within sixty days of selling a cumulative total of 400 cubic meters of the fuel containing that additive within a calendar year.

(2) Where any change occurs in the information submitted by a person required by section 1, 2 or 4 of Form 2 of the schedule, that person shall, within sixty days of the change, report the change to the Minister.

Schedule

Form 1 - Report on Sulphur Content

Reporting
 Period _____
 Company
 Name _____
 Facility
 Name _____ Telephone _____
 Facility
 Address _____

Fuels Produced or Imported for use or Sale in Canada

Name of Fuel	Quantity Refined, Produced or Imported (cubic metres)	API Gravity	Sulphur Content (Weight %)		
			Highest	Lowest	Weighted Average
1. Aviation Turbo Fuel					
2. Motor Gasoline					
a) lead free					
b) regular					
c) premium					

- 3. Kerosene and Stove Oil
- 4. Diesel Oil (by type)
- 5. No. 2 Light Fuel Oil
- 6. Heavy Fuel Oil
 - a) No. 4
 - b) No. 5
 - c) No. 6
- 7. Synthetic Crude (sold as fuel)
- 8. A fuel other than the fuels named in item 1 to 5

_____(Signature of Authorized Company
Official) _____(Ti
tle)
_____(Date
signed)

Form 2 - Liquid Fuel Additive Report

(To be submitted once for each fuel additive)

Fuel Manufacturer /
Importer _____
Telephone _____

Address _____

Additive
Manufacturer _____
Telephone _____

Address _____

1. Type of
Fuel _____
Brand Name of
Additive _____
Purpose of
Additive _____
Quantity Used
Annually _____

2. Fuel Additive Concentration (mg/L)

Highest	Lowest	Weighted Average
_____	_____	_____

3. Composition of Fuel Additive
Complete either paragraph (a) or (b) or attach a copy of a letter from the fuel additive manufacturer attesting to the fact that the information required by paragraph (a) or (b) has been forwarded to Environment Canada.

(a) Chemical name of each Constituent Approx. % by weight

(b) Element	Approx. % by weight
Carbon	
Hydrogen	
Oxygen	

(list other element that individually account for more than 0.1% of the additive weight)

Appendix B

Request Letter



Environment
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Ottawa, Ontario K1A 0H3

March 30, 1999

To: Companies Producing and/or Importing Liquid Fuels (see Distribution List)

Re: Verification of Information Reported on Additives in Liquid Fuels

Information on fuels additives excluding lead and lead compounds but including oxygenates, is required to be submitted to Environment Canada under the *Fuels Information Regulations, No 1*. Under these regulations, every person producing or importing more than 400 m³ annually of a liquid fuel (originating from crude oil, coal or bituminous sands) containing an additive must report information on the additive. This must be done within 60 days of the first use and within 60 days of any change in the information provided. This includes changes in the weighted average of the additive concentration in the product produced or imported.

Environment Canada has reviewed its files on additives in liquid fuels. There appear to be a number of inconsistencies in certain instances and missing data have been noted, and some of the data may be out of date. (For example, in the past some companies have mistakenly reported the concentration of a component of an additive, whereas the regulations require that the concentration of the additive in the fuel that is to be reported.) I am therefore requesting that your company review the information we have on file regarding additives added to liquid fuels.

Please find attached a summary of the latest information we have on file regarding your company's use of additives. Please review the information and if it is correct and up-to-date please advise; if not, please submit new correct information in the form attached. Please note when an additive is only used intermittently or is soon to be discontinued. It would be appreciated if the information could be provided by June 30 1999. Environment Canada's contact in this matter is Mark Tushingham of the Oil Gas & Energy Branch, Environment Canada, 10th floor, 351 St Joseph Blvd, Hull, Quebec K1A 0H3 (Tel: 819-994-0510, Fax: 819-953-8903). Please contact him if there are questions.

Yours sincerely,

Ross M White
Manager, Oil, Gas & Energy Branch



attachments (only to producer and importers)

cc: Canadian Petroleum Products Institute
Canadian General Standards Board
Environment Canada regional directors

Canada



Appendix C

Sample of Form, “Report on Fuel
Additives in Petroleum Fuels”

REPORT ON FUEL ADDITIVES IN PETROLEUM FUELS

This report should be submitted:

- a) each time a new additive has been introduced into a fuel produced in Canada or imported into Canada and when the quantity of the fuel produced or imported exceeds 400 cubic meters,
- b) within 60 days of selling the fuel,
- c) when concentration of reported additive has been changed,
- d) by mail to:

Oil, Gas and Energy Branch/EPS
Environment Canada
10th Floor, 351 St. Joseph Blvd,
Hull, Québec K1A 0H3

Company Name: _____

Name of Refiner/Importer: _____

Address: _____

If importer, state Name and Location of Petroleum Fuel Storage Tanks: _____

Additive Manufacturer: _____

Address: _____

1. Type of fuel: _____

Brand name of Additive: _____ Quantity of Additive used annually (kg) _____

Purpose of Additive: _____

2. Fuel Additive Concentration (mg/L)
Highest _____ Lowest _____ Weighted Average _____

3. Composition of Fuel Additive (*Complete A, B or C*)

A - Chemical Name of Constituent	_____	Percent by weight	_____
	_____		_____
	_____		_____

B- Elements		Total percent by weight	_____
carbon			
hydrogen			
oxygen			

List all other elements which are present in concentration greater than 0.1 weight % in the fuel additive.

C- Attach copy of confirmation letter from the fuel additive manufacturer that the information required under A or B has been forwarded to Environment Canada

Signature of Official

Title

Date



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Appendix D

Reporting Companies

Arco Products Company

Cherry Point Refinery
4519 Grandview Road
Blaine, Washington 98230

Bitor America Corporation

*Morichal Production
Facility/ Venezuela*
5100 Town Center Cr. #450
Boca Raton, FL 33486

Chevron Canada Ltd.

Burnaby Refinery
355 N. Willingdon Avenue
Burnaby, B.C.
V5C 1X4

Consumers' Co-operative

*Consumers' Co-operative
Refineries Ltd.*
P.O. Box 260
Regina, Saskatchewan
S4P 5A1

Husky Oil Ltd.

Prince George Refinery
P.O. Box 1380
Prince George, B.C.
V2L 4V4

Imperial Oil Ltd.

Dartmouth Refinery
600 Pleasant St.
Dartmouth, Nova Scotia
B2Y 2Z7

Imperial Oil Ltd.

Distribution Dept.
111 St. Clair Ave. W.
Toronto, Ontario
M5W 1K3

Imperial Oil Ltd.

Nanticoke Refinery
P.O. Box 500
Sarnia, Ontario
N7T 7M5

Imperial Oil Ltd.

Sarnia Refinery
P.O. Box 3004
Sarnia, Ontario
N7T 7M5

Imperial Oil Ltd.

Strathcona Refinery
P.O. Box 1020
Hwy 16A East & 34 Street
Edmonton, Alberta
T5J 2M1

Irving Oil Ltd.

Refining Division
P.O. Box 2360
Saint John, New Brunswick
E2L 4H6

Nova Chemicals

Corunna Site
785 Petrolia Line
Corunna, Ontario
N0N 1G0

Parkland Refining Ltd.

P.O. Box 309
Bowden, Alberta
T0M 0K0

Petro-Canada

Burrard Products Terminal
1155 Glenayre Drive
Port Moody, British
Columbia

V3H 3E1

Petro-Canada

Edmonton Refinery
Hwy 16A East
211-106A Ave, NW.
Edmonton, Alberta
T5J 2M1

Petro-Canada

Kamloops Terminal
2955 Tranquille Highways
Kamloops, B. C.
V2B 7W2

Petro-Canada

*Mississauga Lubricants
Centre*
385 South down Road
Mississauga, Ontario
L6M 3E7

Petro-Canada

Montréal Refinery
11701 Sherbrooke Street E.
Montréal, Québec
H1B 1C3

Petro-Canada

Oakville Refinery
3275 Rebecca Street
Oakville, Ontario
L6L 6N5

Petroles Norcan Inc.

6370 Notre Dame St. Est
Montréal, Québec
H1B 1C3

Shell Canada Products Ltd.

Burmound Terminal

2751 Underhill Ave.
Burnaby, B.C.
V5A 3C3

Shell Canada Products Ltd.
Calgary Terminal
10326 Barlow Trail SE
Calgary, Alberta
T2C 4K9

Lévis, Québec
G6W 7N1

Shell Canada Products Ltd.
Montreal East Refinery
10501 Rue Sherbrooke Est
Montréal, Québec
H1B 1B3

Shell Canada Products Ltd.
Scotford Refinery
P.O. Box 23
Fort Saskatchewan, Alberta

Shell Canada Products Ltd.
Sherwood Terminal
251 92nd
Edmonton, Alberta
T5J 2M1

Shell Canada Products Ltd.
Winnipeg Terminal
212 Panet Road
Winnipeg, Manitoba
R2J 0S3

Sunoco Inc.
36 York Mills Road
North York, Ontario
M2P 2C5

Syncrude Canada Ltd.
P.O. Box 4009
Maildrop 3065
Fort MacMurray, Alberta
T9H 2L1

Ultramar Ltée
Raffinerie de St-Romuald
165 Chemin des Iles
C.P. 41055

Appendix E

Manufacturers of Additives

Adspec

Blackwell, Oklahoma

Alcor

East Germany

API

Red Deer, Alberta

Archer Daniels Midland

Company (ADM)

P.O. Box 1476

Decatur, Illinois 62525

Arr-Maz Products, L.P.

c/o Stanchem

621 Snively Ave

Winter Haven, Florida

Baker-Petrolite

243 North Service Road

Suite 308

Oakville, Ontario

L5H 1G1

Baker-Petrolite

3900 Essex Lane

Houston, Texas 77478

Baker-Petrolite

150 Lakeshore Road West

Suite 32

Mississauga, Ontario

L5H 1G1

Baker-Petrolite

369 Marshall Ave.

St. Louis, MO 63119-1897

Baker-Petrolite

12645 W. Airport Blvd.

Sugar Land, Texas 77507

Baker-Petrolite

13200 Bay Park Rd.

Pacadena, Texas 777478

Basf Corporation

3000 Continental Drive N.

Mount Olive, NJ .7828

Chevron Chemical**Canada Ltd.**

Dondrite Additive Division

3228 South Service Road

Burlington, Ontario

L7N 3H8

Commercial Alcohols Inc.

279 Bloomfield Road

Chatham, Ontario

N7M 5J5

Drew Chemical Limited

525 Finley Ave

Ajax, Ontario

L1S 2E5

Dupont Canada Inc.

P.O. Box 2200

Mississauga, Ontario

L5M 2H3

Elco Corp.

100 Belt Line St.

Cleveland, Ohio

44109

Ethyl Canada

5045 South Service Road

Suite 101

Burlington, Ontario

L7L 6M9

Ethyl Canada

220 St. Clair

Corunna, Ontario

N0N 1G0

Ethyl Canada

48 St. Clair Ave. West

Toronto, Ontario

M4V 2Z2

Ethyl Corporation

Pasadena, Texas 77502

**Ethyl Petroleum Additives
Inc.**

330 South fourth Street

Richmond, Virginia

23218-2189

Etoxyl

Caracas, Venezuela

Imperial Oil Chemicals

P.O. Box 3004

Sarnia, Ontario

N7T 7M5

Infineum USA

P.O. Box CN135

Linden , NJ 07036

Jacklyn Industries

1345 Thornton Road South

Oshawa, Ontario

L1J 8C4

Lubrizol Canada Ltd.

5800 Thorola Stone Road

Niagra Falls, Ontario

L2E 6V2

Lyondell Chemical

Worldwide Inc.
One Houston Center
1221 McKinney Street
Houston, Texas 77101

Methanex

via Stanchem/Travis
Chemicals
43 Jutland Road
Etobicoke, Ontario
M8Z 2T6

Morton International Inc.

100N, Riverside Plaza
Chicago, Illinois
60606-1501

Nalco/Exxon Energy

Chemicals
6216 W. 66th Place
Chicago, Illinois 60638

Nalco/Exxon Energy

Chemicals Canada Inc
180-3553-31 Street N.W.
Calgary, Alberta
T2L 2K7

Nalco/Exxon Energy Inc

7701 Highway 90A
Sugar-Land, Texas
77487

Natural Gas Odorizing

5664 Burleigh Crescent S.E.
Calgary, Alberta
T2L 2K7

**Natural Gas Odorizing
Inc.**

3601 Decker Drive
P.O. Box 1429
Baytown, Texas
77522-1429

Novacor Chemical Ltd.

3300 Bloor Street West
Etobicoke, Ontario
M8X 2X2

Oakite and Baker

Quimicas
Caracas, Venezuela

Octel-Starreon LLC

9375 South Willow Street
Littleton, Colorado
80124

Octel-Starreon LLC

48 Levere
Kirkland, Québec
H9J 3X9

Octel America

Chambers Works
Deepwater
New Jersey 08023

Octel America

300 Executive Drive
Newark, DE 14702

Paramins-Imperial Oil

111 St. Clair Ave. West
Toronto, Ontario
M5W 1K3

**Phillips Chemical
Company**

Bartles, Oklahoma 74004

**South Coast Terminals
Inc.**

7401 Wallisville Road
Box 15525
Houston, Texas 77220-
5535

Union Carbide Canada

100 McArthur
Valleyfield, Québec

Union Carbide Canada

8500 West 6th Street
Argo, Illinois
60501

Uniroyal Chemical CO.

25 Erb St.
Elmira, Ontario
N3B 3A3

UOP Chemicals

25 East Algonquin Road
P.O. Box 5017
Des Plaines, Illinois

Van Waters & Roger Ltd.

9800 Van Horne Way
Richmond, B.C.
V6X 1W5

