



Environment Accounts and Statistics Division

# Survey of Environmental Protection Expenditures, 1998

Confidential when completed

Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.

Si vous préférez ce questionnaire en français, veuillez cocher

### Correct as required

Establishment name

Operating name

C / O

Address

City

Province/Territory

Postal code



## Please read before completing

### SURVEY OBJECTIVE

This survey provides a measure of the cost imposed on industry by environmental protection in Canada through Canadian and international environmental regulations, conventions and voluntary agreements. The survey also aims at identifying practices and technologies used in Canadian industry for the purpose of preventing or abating pollution.

The results of this survey will be published in the Statistics Canada publication *Environmental Protection Expenditures in the Business Sector 1998*, Catalogue No. 16F0006X1E. The results will also be combined to government and household expenditures to form a complete account of the costs of environmental protection to Canadians.

### CONFIDENTIALITY

Statistics Canada is prohibited by law from publishing any statistics which would divulge information obtained from this survey that relates to any identifiable business, without the previous written consent of that business. The data reported will be treated in strict confidence, used for statistical purposes and published in aggregate form only. The confidentiality provisions of the Statistics Act are not affected by either the Access to Information Act or any other legislation.

### AUTHORITY

This survey is conducted under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19. **COMPLETION OF THIS QUESTIONNAIRE IS A LEGAL REQUIREMENT UNDER THE STATISTICS ACT.**

### INFORMATION

If you require assistance in completing this questionnaire or if you have any questions or comments regarding this survey, please contact:

**Operations and Integration Division  
Statistics Canada  
Ottawa, ON, Canada, K1A 0T6**

Telephone (toll-free): **1-800-255-7726 (within Canada)**  
Fax: **1-800-755-5514 (within Canada)**  
E-mail address: **enviro.oid.exp@statcan.ca**

The questionnaire is available in an electronic spreadsheet format. Please contact the Operations and Integration Division if you prefer to use this reporting option.

In all correspondence concerning this questionnaire, please quote the identification number that appears on the address label.

**Important :** Please read the Definitions and concepts on page 14 before answering. If your response for an item is zero, please write "0" in the corresponding box rather than leaving the cell blank.

**Please return this questionnaire within 30 days of receipt.**

If you are unable to do so, kindly inform the Operations and Integration Division of the expected completion date.

For Statistics Canada use only

Rec.			
D	M	Y	

Ed.			
D	M	Y	

Kyd.			
D	M	Y	

Bat.			

Coll.	

FSC		

4-2300-2.1: 1999-08-31 STC / NAD - 475-04244

**Please report expenditures in thousands of Canadian dollars**

**1. Reporting year**

Report must cover your financial year ending between **April 1, 1998** and **March 31, 1999**.

<b>Day</b>	<b>Month</b>	<b>Year</b>	<b>Day</b>	<b>Month</b>	<b>Year</b>
010	020	030	040	050	060
From			to		

**2. Environmental monitoring** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ All costs related to equipment, supplies, labour and purchased services required for monitoring pollutants emitted by this establishment. Expenditures associated with participation to the National Pollutant Release Inventory (NPRI) and other similar programs are to be included.

<b>Operating expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
\$ 000	\$ 000	\$ 000
100	110	120

**3. Environmental assessment and audits** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ Expenditures for reviews of current operations for compliance with regulations (audits)
- ◆ Expenditures to evaluate the environmental impact of proposed programs or projects (assessments)
- ◆ Associated legal and consulting costs

<b>Operating expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
\$ 000	\$ 000	\$ 000
130	140	150

**4. Site reclamation and decommissioning** *If the expenditure is zero, please write "0" in corresponding box.*

**a) Expenditures on site remediation made during the fiscal year 1998 for any active site belonging to your establishment**

<b>Operating expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
\$ 000	\$ 000	\$ 000
161	171	181

**b) Expenditures on site decommissioning made during the fiscal year 1998 following the closing down of a site (even if closing occurred before 1998)**

<b>Operating expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
\$ 000	\$ 000	\$ 000
162	172	182

*A list of processes and technologies associated with site reclamation and decommissioning is provided in Question 12e.*

**Exclude**

- ◆ Any fine or compensation for environmental damage (this is to be reported in Question 8)
- ◆ Any provision for future environmental liability

**Please report expenditures in thousands of Canadian dollars**

**5. Protection and restoration of wildlife and habitat** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ All expenditures made to protect wildlife and habitat from the effects of this establishment's operations or to restore stocks that have been adversely affected by such operations

**Exclude**

- ◆ Expenditures for site reclamation and decommissioning which are already reported in Question 4
- ◆ Expenditures for aesthetic purposes

**Operating expenditures**  
\$ 000

190

**Capital expenditures**  
\$ 000

200

**Total expenditures**  
\$ 000

210

+ =

**6. Treatment and control of pollution (end-of-pipe processes)**

Treatment and control of pollution are performed using end-of-pipe equipment or installation. **These end-of-pipe processes are not an integral part of production**; their sole purpose is to abate or to control undesirable substances resulting from normal production.

**a) Pollution treatment and control expenditures** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ Any capital or operating expenditure for equipment or facilities which are separately identifiable and which have been installed exclusively to reduce or eliminate pollutants resulting from production
- ◆ Any expenditure related to waste collection, removal and treatment done by your establishment's or company's employees
- ◆ Any purchase of waste and sewerage management services or any other purchase of services reported in Question 11

**Exclude**

- ◆ Any expenditure specific to workers' health and safety
- ◆ Any expenditure for on-site recycling (Question 7)

**Operating expenditures**  
\$ 000

250

**Capital expenditures**  
\$ 000

260

**Total expenditures**  
\$ 000

270

+ =

**b) Did you report capital expenditures in Question 6a?**

1  Yes 2  No ► *Go to Question 7*

**What percentage of this amount was spent on reducing or abating each of the following?**

**Substances emitted to air**  
%

280

**Substances released to surface waters**  
%

290

**On site contained solid/liquid waste**  
%

300

**Noise, vibration or radiation**  
%

310

+ + + = **100%**

*A list of environmental processes/technologies is provided in Question 12.*

**Please report expenditures in thousands of Canadian dollars**

**7. Pollution prevention**

"Pollution prevention is the use of processes, practices, materials, products or energy that avoid or minimise the creation of pollutants and waste, and reduce overall risk to human health or the environment."

*Pollution Prevention - A Federal Strategy for Action, Government of Canada (1995)*

This question identifies expenditures and methods used for the purpose of preventing or minimising pollution and waste, or promoting resource conservation.

**a) Expenditures on pollution prevention** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ All operating and capital expenditures for equipment or facilities integrated to a production process that avoid or minimise the production of pollutants and waste
- ◆ All operating and capital expenditures for equipment or facilities related to leak and spill prevention. They may include expenditures on the following: spill containments; dyke extensions; accessories (valves, pumps); and emission detection equipment
- ◆ All operating and capital expenditures for equipment or facilities used for conserving energy or water
- ◆ All operating and capital expenditures for equipment or facilities associated with recirculation, recovery, reuse and recycling of materials or substances

**Exclude**

- ◆ Any expenditure already included in Questions 2 to 6
- ◆ Any expenditure specific to worker's health and safety

<b>Operating expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
\$ 000	\$ 000	\$ 000
500	+	520
	=	

**b) Did you report capital expenditures in Question 7a?**

1  Yes    2  No    ► *Go to Question 7c*

**What percentage of this amount was spent on preventing or minimising each of the following?**

<b>Substances emitted to air</b>	<b>Substances released to surface waters</b>	<b>On site contained solid/liquid waste</b>	<b>Noise, vibration or radiation</b>
%	%	%	%
530	+	540	+
	=	550	+
	=	560	=
			<b>100%</b>

**Please report expenditures in thousands of Canadian dollars**

**7. Pollution prevention - Continued**

**c) Pollution prevention methods**

If you have prevented or reduced waste, or pollutants or conserved resources in fiscal year 1998, or if you are planning to do so in the next 2 years, please indicate how it was/will be achieved by checking the appropriate boxes. Please include any project, regardless of whether or not they are required by environmental regulation or convention.

Methods of pollution prevention	1998	1999-2000
Product design or reformulation	810 <input type="checkbox"/>	815 <input type="checkbox"/>
Substitution or modification of production process (integrated process)	830 <input type="checkbox"/>	835 <input type="checkbox"/>
Recirculation, recovery, on-site recycling or reuse of materials or substances <sup>1</sup>	850 <input type="checkbox"/>	855 <input type="checkbox"/>
Energy conservation	860 <input type="checkbox"/>	865 <input type="checkbox"/>
Material substitution, reduction or elimination, or solvent substitution	870 <input type="checkbox"/>	875 <input type="checkbox"/>
Prevention of leaks and spills	880 <input type="checkbox"/>	885 <input type="checkbox"/>
Other	890 <input type="checkbox"/>	895 <input type="checkbox"/>

1. Recirculation, recovery, reuse or recycling: recirculation, reuse, recovery or recycling of water, materials or substances generated during production, excluding materials transferred or recycled off site.  
 Examples: vapour recovery, recovery of sludge, water recirculation, reuse of water for refrigeration condenser operation.

A list of environmental processes/technologies is included in Question 12.

**8. Environmental charges** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

- ◆ Permits, fees, levies, special assessment and related fees
- ◆ Other charges paid to regulating bodies in order to allow operations to take place at this establishment
- ◆ Any fines, penalties, or damage awards paid to government agencies or to individuals

\$ 000

760
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**9. Other environmental protection expenditures** *If the expenditure is zero, please write "0" in corresponding box.*

**Include**

**Exclude**

- |                                                                                                                                                                                                                                                                                           |                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>◆ The costs of administration for an environmental affairs division</li> <li>◆ Training and information programs</li> <li>◆ Any other additional expenditures that are required to comply with environmental regulations or conventions</li> </ul> | <ul style="list-style-type: none"> <li>◆ Research and development expenditures</li> </ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|

\$ 000

770
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**Please report expenditures in thousands of Canadian dollars**

**10. Total expenditures on environmental protection** *If the expenditure is zero, please write "0" in corresponding box.*

Cell 801: includes total from operating expenditures reported in questions 2 to 9.  
 Cell 802: includes total from capital expenditures reported in questions 2 to 7.  
 They should also include all data for which breakdowns were not available.

Operating expenditures \$ 000	Capital expenditures \$ 000	Total expenditures \$ 000
801	+	802
		=
		803

**11. Purchase of environmental services** *If the expenditure is zero, please write "0" in corresponding box.*

**From the total environmental protection expenditures reported in Question 10, what was the amount of environmental services purchased from a private contractor or a government?**

\$ 000

**a) Waste management services or sewerage services** 240

**Include**

- ◆ All expenditures related to the use of a waste collection, disposal or treatment service, or an off-site recycling service provided by a private contractor or a federal, provincial or local government body
- ◆ All expenditures related to the use of a sewerage service provided by a federal, provincial or local government body

**Exclude**

- ◆ Any expenditures for waste management activities done by your establishment's or company's employees (Question 6)
- ◆ Any expenditure for recycling on site (Question 7)

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\$ 000

**b) Environment-related construction and engineering services** 805

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\$ 000

**c) Other environmental services** 804

**Examples:**

- ◆ purchase of environmental assessment and audit services
- ◆ purchase of services for site reclamation or decommissioning
- ◆ purchase of services associated with wildlife and habitat protection and restoration

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\$ 000

**d) Total purchase of environmental services** 806

**Include**

- ◆ sum of cells 240, 805 and 804

**Exclude**

- ◆ any expenditure for environmental services provided by the employees of your establishment or your company

## 12. Environmental processes and technologies

Indicate how this establishment has abated or prevented pollution resulting from normal production by checking the appropriate boxes. If you use a process not already specified, please report it next to the "Other" category.

Processes and Technologies	Do you use this technology?	If yes, please check the purpose	
		Is the purpose pollution abatement?	Is the purpose pollution prevention?
<b>a) Gas treatment process</b>			
Please indicate, by checking the appropriate box(es), if you use pollution abatement (end-of-pipe) processes or pollution prevention processes as defined in questions 6 and 7.			
<b>Physical treatment</b>			
Gravity deposition			
Precipitation chamber .....	1000 <input type="checkbox"/> Yes ➤	1001 <input type="checkbox"/>	1002 <input type="checkbox"/>
Dust collector system .....	1003 <input type="checkbox"/> Yes ➤	1004 <input type="checkbox"/>	1005 <input type="checkbox"/>
Inertial separator			
Cyclone .....	1006 <input type="checkbox"/> Yes ➤	1007 <input type="checkbox"/>	1008 <input type="checkbox"/>
Vortex .....	1009 <input type="checkbox"/> Yes ➤	1010 <input type="checkbox"/>	1011 <input type="checkbox"/>
Centrifugal precipitator .....	1012 <input type="checkbox"/> Yes ➤	1013 <input type="checkbox"/>	1014 <input type="checkbox"/>
Impingement eliminator .....	1015 <input type="checkbox"/> Yes ➤	1016 <input type="checkbox"/>	1017 <input type="checkbox"/>
Electrostatic precipitator .....	1018 <input type="checkbox"/> Yes ➤	1019 <input type="checkbox"/>	1020 <input type="checkbox"/>
Filtration			
Bag house .....			
Activated carbon filter .....	1021 <input type="checkbox"/> Yes ➤	1022 <input type="checkbox"/>	1023 <input type="checkbox"/>
Membrane filter .....	1024 <input type="checkbox"/> Yes ➤	1025 <input type="checkbox"/>	1026 <input type="checkbox"/>
1027 <input type="checkbox"/> Yes ➤	1028 <input type="checkbox"/>	1029 <input type="checkbox"/>	
Adsorption			
Activated carbon adsorption .....	1030 <input type="checkbox"/> Yes ➤	1031 <input type="checkbox"/>	1032 <input type="checkbox"/>
Other media .....	1033 <input type="checkbox"/> Yes ➤	1034 <input type="checkbox"/>	1035 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1036 <input type="checkbox"/> Yes ➤	1037 <input type="checkbox"/>	1038 <input type="checkbox"/>
<b>Biological treatment</b>			
Biological filtration .....	1039 <input type="checkbox"/> Yes ➤	1040 <input type="checkbox"/>	1041 <input type="checkbox"/>
Activated sludge .....	1042 <input type="checkbox"/> Yes ➤	1043 <input type="checkbox"/>	1044 <input type="checkbox"/>
Phytoremediation .....	1045 <input type="checkbox"/> Yes ➤	1046 <input type="checkbox"/>	1047 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1048 <input type="checkbox"/> Yes ➤	1049 <input type="checkbox"/>	1050 <input type="checkbox"/>
<b>Chemical treatment</b>			
Scrubbing			
Wet scrubbing system .....	1051 <input type="checkbox"/> Yes ➤	1052 <input type="checkbox"/>	1053 <input type="checkbox"/>
Air scrubbing .....	1054 <input type="checkbox"/> Yes ➤	1055 <input type="checkbox"/>	1056 <input type="checkbox"/>
Desulfurisation .....	1057 <input type="checkbox"/> Yes ➤	1058 <input type="checkbox"/>	1059 <input type="checkbox"/>
Catalytic reduction .....	1060 <input type="checkbox"/> Yes ➤	1061 <input type="checkbox"/>	1062 <input type="checkbox"/>
Chemical oxidation .....	1063 <input type="checkbox"/> Yes ➤	1064 <input type="checkbox"/>	1065 <input type="checkbox"/>
Ozonation .....	1066 <input type="checkbox"/> Yes ➤	1067 <input type="checkbox"/>	1068 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1069 <input type="checkbox"/> Yes ➤	1070 <input type="checkbox"/>	1071 <input type="checkbox"/>
<b>Thermal treatment</b>			
Flare system .....	1072 <input type="checkbox"/> Yes ➤	1073 <input type="checkbox"/>	1074 <input type="checkbox"/>
Vapour condenser .....	1075 <input type="checkbox"/> Yes ➤	1076 <input type="checkbox"/>	1077 <input type="checkbox"/>
Dryer .....	1078 <input type="checkbox"/> Yes ➤	1079 <input type="checkbox"/>	1080 <input type="checkbox"/>

## 12. Environmental processes and technologies - Continued

Processes and Technologies	Do you use this technology?	If yes, please check the purpose	
		Is the purpose pollution abatement?	Is the purpose pollution prevention?
<b>Thermal treatment - Concluded</b>			
Incineration			
Thermal recuperative incineration .....	1081 <input type="checkbox"/> Yes ➤	1082 <input type="checkbox"/>	1083 <input type="checkbox"/>
Catalytic incineration .....	1084 <input type="checkbox"/> Yes ➤	1085 <input type="checkbox"/>	1086 <input type="checkbox"/>
Thermal regenerative incineration .....	1087 <input type="checkbox"/> Yes ➤	1088 <input type="checkbox"/>	1089 <input type="checkbox"/>
Fluidised bed .....	1090 <input type="checkbox"/> Yes ➤	1091 <input type="checkbox"/>	1092 <input type="checkbox"/>
Oxidation			
Thermal oxidation .....	1093 <input type="checkbox"/> Yes ➤	1094 <input type="checkbox"/>	1095 <input type="checkbox"/>
Catalytic oxidation .....	1096 <input type="checkbox"/> Yes ➤	1097 <input type="checkbox"/>	1098 <input type="checkbox"/>
Cooling tower .....	1099 <input type="checkbox"/> Yes ➤	1100 <input type="checkbox"/>	1101 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1102 <input type="checkbox"/> Yes ➤	1103 <input type="checkbox"/>	1104 <input type="checkbox"/>
<b>b) Liquid treatment</b>			
<b>Physical treatment</b>			
Screening .....	1105 <input type="checkbox"/> Yes ➤	1106 <input type="checkbox"/>	1107 <input type="checkbox"/>
Degritting .....	1108 <input type="checkbox"/> Yes ➤	1109 <input type="checkbox"/>	1110 <input type="checkbox"/>
Primary clarification (sedimentation, gravity settling chamber) .....	1111 <input type="checkbox"/> Yes ➤	1112 <input type="checkbox"/>	1113 <input type="checkbox"/>
Precipitator .....	1114 <input type="checkbox"/> Yes ➤	1115 <input type="checkbox"/>	1116 <input type="checkbox"/>
Centrifugal precipitator .....	1117 <input type="checkbox"/> Yes ➤	1118 <input type="checkbox"/>	1119 <input type="checkbox"/>
Oil/water separation			
Gravity .....	1120 <input type="checkbox"/> Yes ➤	1121 <input type="checkbox"/>	1122 <input type="checkbox"/>
Oilphlyic pads .....	1123 <input type="checkbox"/> Yes ➤	1124 <input type="checkbox"/>	1125 <input type="checkbox"/>
Coalescing separators .....	1126 <input type="checkbox"/> Yes ➤	1127 <input type="checkbox"/>	1128 <input type="checkbox"/>
Adsorption system			
Activated carbon adsorption .....	1129 <input type="checkbox"/> Yes ➤	1130 <input type="checkbox"/>	1131 <input type="checkbox"/>
Polymer .....	1132 <input type="checkbox"/> Yes ➤	1133 <input type="checkbox"/>	1134 <input type="checkbox"/>
Other media .....	1135 <input type="checkbox"/> Yes ➤	1136 <input type="checkbox"/>	1137 <input type="checkbox"/>
Contact system			
Air stripping .....	1138 <input type="checkbox"/> Yes ➤	1139 <input type="checkbox"/>	1140 <input type="checkbox"/>
Steam stripping .....	1141 <input type="checkbox"/> Yes ➤	1142 <input type="checkbox"/>	1143 <input type="checkbox"/>
Flotation .....	1144 <input type="checkbox"/> Yes ➤	1145 <input type="checkbox"/>	1146 <input type="checkbox"/>
Filtration			
Bed filtration system (e.g. sand filter) .....	1147 <input type="checkbox"/> Yes ➤	1148 <input type="checkbox"/>	1149 <input type="checkbox"/>
Pressure (press filter, filter leaf) .....	1150 <input type="checkbox"/> Yes ➤	1151 <input type="checkbox"/>	1152 <input type="checkbox"/>
Vacuum (rotary, drum, centrifugal) .....	1153 <input type="checkbox"/> Yes ➤	1154 <input type="checkbox"/>	1155 <input type="checkbox"/>
Membrane (dialysis, reverse osmosis, ultrafiltration, electro dialysis, piezodialysis, pervaporation) .....	1156 <input type="checkbox"/> Yes ➤	1157 <input type="checkbox"/>	1158 <input type="checkbox"/>
Gravity (belt) .....	1159 <input type="checkbox"/> Yes ➤	1160 <input type="checkbox"/>	1161 <input type="checkbox"/>
Equalisation pond .....	1162 <input type="checkbox"/> Yes ➤	1163 <input type="checkbox"/>	1164 <input type="checkbox"/>
UV disinfection .....	1165 <input type="checkbox"/> Yes ➤	1166 <input type="checkbox"/>	1167 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1168 <input type="checkbox"/> Yes ➤	1169 <input type="checkbox"/>	1170 <input type="checkbox"/>



## 12. Environmental processes and technologies - Continued

Processes and Technologies	Do you use this technology?	If yes, please check the purpose	
		Is the purpose pollution abatement?	Is the purpose pollution prevention?
<b>b) Liquid treatment - Continued</b>			
<b>Chemical treatment</b>			
Oxidation			
Wet oxidation system .....	1171 <input type="checkbox"/> Yes ➤	1172 <input type="checkbox"/>	1173 <input type="checkbox"/>
Chemical oxidation .....	1174 <input type="checkbox"/> Yes ➤	1175 <input type="checkbox"/>	1176 <input type="checkbox"/>
Electrochemical oxidation .....	1177 <input type="checkbox"/> Yes ➤	1178 <input type="checkbox"/>	1179 <input type="checkbox"/>
Disinfection			
Chlorination .....	1180 <input type="checkbox"/> Yes ➤	1181 <input type="checkbox"/>	1182 <input type="checkbox"/>
Ozonation .....	1183 <input type="checkbox"/> Yes ➤	1184 <input type="checkbox"/>	1185 <input type="checkbox"/>
Reduction system			
Dephosphating .....	1186 <input type="checkbox"/> Yes ➤	1187 <input type="checkbox"/>	1188 <input type="checkbox"/>
Denitrification .....	1189 <input type="checkbox"/> Yes ➤	1190 <input type="checkbox"/>	1191 <input type="checkbox"/>
Dechlorination .....	1192 <input type="checkbox"/> Yes ➤	1193 <input type="checkbox"/>	1194 <input type="checkbox"/>
Neutralisation .....	1195 <input type="checkbox"/> Yes ➤	1196 <input type="checkbox"/>	1197 <input type="checkbox"/>
Ion exchange .....	1198 <input type="checkbox"/> Yes ➤	1199 <input type="checkbox"/>	1200 <input type="checkbox"/>
Flocculation .....	1201 <input type="checkbox"/> Yes ➤	1202 <input type="checkbox"/>	1203 <input type="checkbox"/>
Coagulation .....	1204 <input type="checkbox"/> Yes ➤	1205 <input type="checkbox"/>	1206 <input type="checkbox"/>
Demineralisation .....	1207 <input type="checkbox"/> Yes ➤	1208 <input type="checkbox"/>	1209 <input type="checkbox"/>
Nitrification .....	1210 <input type="checkbox"/> Yes ➤	1211 <input type="checkbox"/>	1212 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1213 <input type="checkbox"/> Yes ➤	1214 <input type="checkbox"/>	1215 <input type="checkbox"/>
<b>Thermal treatment</b>			
Incineration .....	1216 <input type="checkbox"/> Yes ➤	1217 <input type="checkbox"/>	1218 <input type="checkbox"/>
Drying .....	1219 <input type="checkbox"/> Yes ➤	1220 <input type="checkbox"/>	1221 <input type="checkbox"/>
Evaporation .....	1222 <input type="checkbox"/> Yes ➤	1223 <input type="checkbox"/>	1224 <input type="checkbox"/>
Distillation .....	1225 <input type="checkbox"/> Yes ➤	1226 <input type="checkbox"/>	1227 <input type="checkbox"/>
Fluidised bed .....	1228 <input type="checkbox"/> Yes ➤	1229 <input type="checkbox"/>	1230 <input type="checkbox"/>
Thermal oxidation .....	1231 <input type="checkbox"/> Yes ➤	1232 <input type="checkbox"/>	1233 <input type="checkbox"/>
Other (please specify) <input type="text"/>	1234 <input type="checkbox"/> Yes ➤	1235 <input type="checkbox"/>	1236 <input type="checkbox"/>
<b>Biological treatment</b>			
Aerobic treatment			
Activated sludge dewatering .....	1237 <input type="checkbox"/> Yes ➤	1238 <input type="checkbox"/>	1239 <input type="checkbox"/>
Biological polishing or biofiltration .....	1240 <input type="checkbox"/> Yes ➤	1241 <input type="checkbox"/>	1242 <input type="checkbox"/>
Aeration pond .....	1243 <input type="checkbox"/> Yes ➤	1244 <input type="checkbox"/>	1245 <input type="checkbox"/>
Aerobic lagoon .....	1246 <input type="checkbox"/> Yes ➤	1247 <input type="checkbox"/>	1248 <input type="checkbox"/>
Aeration system .....	1249 <input type="checkbox"/> Yes ➤	1250 <input type="checkbox"/>	1251 <input type="checkbox"/>
Anaerobic treatment			
Septic tank .....	1255 <input type="checkbox"/> Yes ➤	1256 <input type="checkbox"/>	1257 <input type="checkbox"/>
Anaerobic digester reactor .....	1258 <input type="checkbox"/> Yes ➤	1259 <input type="checkbox"/>	1260 <input type="checkbox"/>

## 12. Environmental processes and technologies - Continued

Processes and Technologies	Do you use this technology?	If yes, please check the purpose	
		Is the purpose pollution abatement?	Is the purpose pollution prevention?
<b>b) Liquid treatment - Concluded</b> <b>Biological treatment - Concluded</b> Biosystem Biological reactor ..... 1264 <input type="checkbox"/> Yes ➤ 1265 <input type="checkbox"/> 1266 <input type="checkbox"/> Multiplate reactor ..... 1267 <input type="checkbox"/> Yes ➤ 1268 <input type="checkbox"/> 1269 <input type="checkbox"/> Other (please specify) <input type="text"/> 1270 <input type="checkbox"/> Yes ➤ 1271 <input type="checkbox"/> 1272 <input type="checkbox"/>			
<b>c) Treatment of noise, vibration or radiation</b> Acoustic barriers ..... 1273 <input type="checkbox"/> Yes ➤ 1274 <input type="checkbox"/> 1275 <input type="checkbox"/> Mufflers ..... 1276 <input type="checkbox"/> Yes ➤ 1277 <input type="checkbox"/> 1278 <input type="checkbox"/> Other (please specify) <input type="text"/> 1279 <input type="checkbox"/> Yes ➤ 1280 <input type="checkbox"/> 1281 <input type="checkbox"/>			
<b>d) Energy conservation</b> <b>Do you use one or more of the following energy conservation processes? If yes, please check the appropriate box(es).</b> Cogeneration ..... 1282 <input type="checkbox"/> Energy efficiency ..... 1283 <input type="checkbox"/> Fuel substitution ..... 1284 <input type="checkbox"/> Waste-to-energy system ..... 1285 <input type="checkbox"/> Clean fuel system ..... 1286 <input type="checkbox"/> Renewable energy source ..... 1287 <input type="checkbox"/> Solar ..... 1288 <input type="checkbox"/> Wind power ..... 1289 <input type="checkbox"/> Geothermal ..... 1290 <input type="checkbox"/> Biomass energy ..... 1291 <input type="checkbox"/> Other (please specify) <input type="text"/> 1292 <input type="checkbox"/>			
<b>e) Site reclamation and decommissioning (including treatment of soils)</b> <b>Do you use one or more of the following processes for site reclamation or decommissioning? If yes, please check the appropriate box(es).</b> <b>Storage and physical treatment</b> Underground storage tanks handling ..... 1293 <input type="checkbox"/> Excavation ..... 1294 <input type="checkbox"/> Solvent extraction system ..... 1295 <input type="checkbox"/> Vapour extraction systems ..... 1296 <input type="checkbox"/> Geomembrane ..... 1297 <input type="checkbox"/> Injection grouting technology ..... 1298 <input type="checkbox"/> Soil washing ..... 1299 <input type="checkbox"/> Reduction ..... 1300 <input type="checkbox"/>			

## 12. Environmental processes - Concluded

### e) Site reclamation and decommissioning (including treatment of soils) - Concluded

#### Biological treatment

- Biological degradation by aeration or bioventilation ..... 1302
- Bioslurping ..... 1303
- Bioremediation ..... 1304
- Renaturalisation ..... 1305
- Phytoremediation ..... 1306

#### Thermal treatment

- Thermal desorption technology ..... 1308
- Thermal oxidation system ..... 1309
- Incineration ..... 1310

Other (please specify)  1311

### f) Waste management

Do you use one or more of the following waste management processes? If yes, please check the appropriate box(es).

#### Physical

- Container ..... 1312
- Dehydration ..... 1313
- Packaging ..... 1314
- Modification or preparation of landfill or waste treatment sites ..... 1315
- Pozzolanic treatment method ..... 1316
- Compacting ..... 1317
- Shredding ..... 1318
- Grinding ..... 1319
- Crushing ..... 1320
- Screening ..... 1321
- Degritting ..... 1322

#### Thermal treatment

- Fluidised bed incineration ..... 1324
- Pyrolysis ..... 1325
- Incineration ..... 1326

#### Biological treatment

- Biopiles ..... 1328
- Composting technology ..... 1329
- Landfarming method ..... 1330

Other (please specify)  1331

### 13. Environmental practices

Indicate the environmental practices adopted by this establishment to avoid or minimise pollution or to conserve resources.

	Yes	No
a) Does this establishment use an environmental management system? If yes, could you briefly describe?  _____ _____	951 <input type="checkbox"/>	<input type="checkbox"/>
b) Is this establishment ISO 14000 certified or does it have an equivalent certification? If yes, please describe.  _____ _____	953 <input type="checkbox"/>	<input type="checkbox"/>
c) Is this establishment implementing any environmental voluntary agreement, or is participating in any voluntary environmental program such as ARET (Accelerated Reduction/Elimination of Toxics)? If yes, please list programs, accords or agreements.  _____ _____	955 <input type="checkbox"/>	<input type="checkbox"/>
d) Does this establishment have a "green" procurement policy?	957 <input type="checkbox"/>	<input type="checkbox"/>
e) Are any of the goods produced by this establishment certified by an environmental Program, for example "Eco-Logo" operated by Terrachoice Inc.? If yes, please describe.  _____ _____	959 <input type="checkbox"/>	<input type="checkbox"/>
f) Does this establishment report information to the National Pollutant Release Inventory (NPRI)?	961 <input type="checkbox"/>	<input type="checkbox"/>
g) Does this establishment publish an annual report on its environmental performance or sustainable development?	963 <input type="checkbox"/>	<input type="checkbox"/>
h) Does this establishment use life-cycle analysis for decision-making?	965 <input type="checkbox"/>	<input type="checkbox"/>
i) Other  _____ _____ _____	967 <input type="checkbox"/>	<input type="checkbox"/>



## Definitions and concepts

**Environmental protection expenditures** are defined in this survey as all operating expenses and capital, and repair expenditures that are incurred in order to anticipate or to comply with Canadian or international environmental regulations, conventions or voluntary agreements. They consist of expenditures for pollution abatement and control and expenditures for restoring wildlife and habitat, expenditures for environmental monitoring, environmental assessments and audits, and expenditures for reclamation and decommissioning of sites. Expenditures to improve employee health, workplace safety and site beautification are excluded.

Expenditures to produce pollution abatement and control equipment for sale are also excluded as they would appear twice in the expenditure data produced by Statistics Canada. Expenditures for environment-related research and development are also excluded since they are reported in Statistics Canada's *Survey on Research and Development in Canadian Industry*.

**Environmental conventions** or voluntary agreements refer to any formal, multi-party commitment by an industry or an

industry association for instance, to meet specific targets in terms of habitat protection, waste reduction, or the elimination or reduction of specific materials that are considered to be harmful or toxic to the natural environment in Canada. Examples include the following: the National Packaging Protocol (reduction of packaging by 50 percent by the year 2000); the Montreal Protocol (elimination of CFCs by 1998); the Canada-U.S. Air Quality Agreement; the "Responsible Care" program from the Canadian Chemical Producers Association; the Accelerated Reduction/Elimination of Toxics (ARET) Program; the Voluntary Challenge and Registry (VCR) Program on climate change; etc.

**Environmental regulations** refer to any current Canadian federal, provincial, municipal law or international legislation that is intended to protect or to restore the environment in Canada. Expenditures related to anticipated legislation may be included as long as its provisions are known.

## How to report

Please report expenditures in **thousands of Canadian dollars**. If, for certain categories, no expenditures have been incurred, **please write "0" in the corresponding box**.

Where precise data are not available, your best estimate is acceptable. If additional information is available in an annual report or an environmental performance report, **please include a copy** when you return the questionnaire.

### TO REPORT CAPITAL EXPENDITURES

Report expenditures made during the 1998 fiscal year.

**Include** all relevant outlays for machinery and equipment and their installation and repair, as well as for the construction of non-residential facilities (contractors or own employees). For construction, include all costs associated with demolition, planning and design (such as engineering and construction fees), any materials supplied to construction contractors for installation and any costs associated with the purchase of land that are neither amortised nor depreciated.

**Exclude** any provisions for future environmental liability.

### TO REPORT OPERATING EXPENSES

**Include** all cash expenses, rather than accruals, incurred during your 1998 fiscal year for labour, fuel and electricity, materials and supplies, and purchased services.

### FOR LOGGING ACTIVITIES

Use Question 5 to report additional expenditures for logging caused by environmental regulation or convention. **Include** the extra cost of any practice that would not otherwise be followed in the absence of environmental regulation or convention. **Exclude** the foregone revenues resulting from regulations or conventions that reduce the allowable harvest.

### FOR MINING ACTIVITIES

Use Question 6 or 11a to report any expenditures that are related to the handling and treatment of mine tailings and that are required by environmental regulation. Even if some of these activities are now considered to be "standard practice", include related expenditures if they are required by regulation or convention. Use Question 9 to report imputed interest on funds held in trust against future environmental liabilities. Report only actual expenditures.

### FOR PETROLEUM OPERATIONS

Please report separately, if possible, environmental protection expenditures associated with different petroleum operations: exploration, refining, chemical products, pipeline transportation.