The general nature of the pollution problem and its relationship to social responsibility, to business firms and to accounting were discussed in the previous chapters. In response to the need for further research, a rather intensive study has been undertaken to examine the impact of pollution control upon accounting. For this empirical study:

A. Letters were sent to different companies requesting them to submit:
   i) copies of the company's Annual Reports for the past two years;
   ii) printed or mimeographed materials, reflecting the approach of the company to pollution control;
   iii) an attached questionnaire duly filled in.

As the names of the executives responsible for pollution control were not available, in most cases the letter was sent to the General Manager, with the request that he may have the questionnaire completed by the appropriate executive in his company.

After a reasonable time had elapsed, one follow-up letter was mailed to those companies from which no reply had been received.

B. Personal interviews were conducted to provide an in-depth perspective for evaluating the questionnaires and other data supplied by the companies. These interviews were in addition to the three earlier ones which had been conducted with the objective of determining the feasibility of the study.
Results of the Study: Information were obtained from questionnaires, interviews, annual reports and various other materials provided by participating companies. These information were all directed to the objective of revealing the impact of pollution control upon accounting of profit-seeking business firms. The results of the study were organised into the following categories:

a) Environmental Policy.
b) Organisation of Pollution Control.
c) Social Responsibility.
d) Analysis of Questionnaires.

The first three categories are discussed briefly to provide a background while major attention is directed to the analysis of questionnaires. There is no separate heading for "Interviews" or for "Other Materials". Data from these sources are used to provide a deeper understanding throughout the following study and are also used on a selective basis, together with information from annual reports, to provide illustrations of good performance at appropriate points.

Environmental Policy: Before analysing the questionnaire, it was considered necessary to observe what different companies were doing in regard to certain fundamental matters relating to pollution control, including their environmental policy in general.

A company facing pollution problem usually adopts some sort of environmental policy, either formally or informally. Available examples of policies suggest that there is no standard format.
value of a formally stated policy can be debated but it is interesting to note that most of the companies adopting some sort of environmental policy are successful in their fight against different types of pollution. It appears that considerable thought and effort precede the adoption of a formal environmental policy.

**Organisation for Pollution Control**: Many companies are giving separate recognition to environmental activities and are assigning pollution control responsibilities to specific executives. A desirable organisation for pollution control should comprise (i) an environmental committee to provide for inputs from various executives, and (ii) a high level executive to supervise and co-ordinate the company's environmental activities. All such executives were interviewed and a strong impression emerged that the top environmental control executive should be a person who can work effectively with people within his own company and elsewhere.

**Social Responsibility**: In the analysis of data coming from several sources, primarily from the Annual Reports, in this empirical study, it was observed that the emphasis was limited to the pollution control area of social responsibility.

Some insight into social responsibility was gained through the interviews in two ways. First, by the nature of the discussions and secondly, by the answers to the following two questions:

i) Has your company deliberately considered the idea of assuming some measure of social responsibility in regard to pollution control? And,
ii) If so, have these considerations resulted in the adoption of specific social responsibility policies in the area of pollution control?

provided an indication as to the acceptance of social responsibility in regard to pollution. Since only those companies which believed to be making some progress in pollution control were interviewed, naturally the answers were uniformly, "Yes".

Analysis of Questionnaires: An analysis of the results of the questionnaire (Appendix -A) was made under the following heads:

A. Capital Budgeting.

B. Closing down of plant because of pollution control standards.

C. Research works regarding pollution control.

D. Accounting for expenditures.

E. Recycling.

F. Tax liability.

G. Approaches to encourage pollution control expenditures.

H. Reporting.

I. Need for modification of accounting records.

A. Capital Budgeting: Relating to the installation of pollution control equipment in existing facilities.

Companies identifying pollution control outlays: Question 1.1 is relating to existing facilities and asks "Are expenditures recorded in a manner which facilitates identification of pollution control outlays?". Of the 16 companies completing the questionnaire, 12 (75 percent) answered "Yes". In some companies expenditures were not recorded in a manner to clearly identify pollution control outlays.
Techniques and criteria for pollution control decisions:

Question 1.2 asks: "Are the same techniques (such as pay back period) used in taking decisions on capital expenditures relating to pollution control as on other types of capital expenditures?" 12 (75 percent) companies answered "No".

Question 1.3 turns from techniques to criteria in evaluating proposed capital outlays for pollution control. 12 (75 percent) companies reported using different criteria for the evaluation.

Percentage of total capital expenditure designated for pollution control (Q.1.4): 14 (87.5 percent) participating companies reported spending 10 percent or less of their total capital expenditure for pollution control. Some companies were of the opinion that in view of the massive modernisation programmes undertaken, capital expenditure in pollution control was of a comparatively low percentage. Some chemical companies were within 11—50 percent bracket. Hindusthan Heavy Chemicals Limited spent more than 50 percent of their total capital expenditures for pollution control over the past three years.

Acquisition of new plant and equipment including pollution control features: Identification of pollution control outlays for new plant and equipment (Q.2.1):

The companies were asked: "Are expenditures recorded in such a manner so that total outlays for pollution control equipment can be separately complied?" 12 companies (75 percent) out of the respondents did so. Referring back to the question 1.1, it was observed that 75 percent of the companies separately identified
pollution control outlays for existing plant and equipment.

It was observed that Pollution control was incorporated into the design of new facilities to reduce the potential for pollution. Some items clearly were for pollution control and some other items which should have been included anyway ended up being more expensive because of pollution control features included in the design. Some companies took the approach to treat as pollution control equipment only those items which were clearly identified as such, but not such other items because of the excess cost of designing the facilities.

**Percentage of capital outlays for new plant and equipment including pollution control features (Q.2.2):** 13 companies (81.25 percent) fall within the bracket 0-10 percent. Comparing with the existing facilities, 87.50 percent of companies were within the 0-10 percent bracket. Indian Oil Corporation Limited spent up to 10 percent of total capital expenditures for equipment which were specifically designated for pollution control in existing facilities, but for new facilities it spent between 11-50 percent of capital outlays for pollution control features. Hindusthan Heavy Chemicals Limited allocated over 50 percent of their outlays for new plant and equipment to pollution control.

Information available from participating companies concerning capital budgeting revealed a tendency to identify capital budgeting expenditures for pollution control mainly because of regulatory requirements. When pollution standards are fixed, there
may be alternative means to meet the standards. Financial evaluation techniques can be used in these cases to compare the alternatives. The principal problem in the attempt to apply the conventional capital budgeting techniques is the fact that there is generally no economic return from pollution control projects.

B. Closing down of plant because of pollution control standards (Q.3.0): Only 2 companies (12.5 percent) reported plants closed because of pollution control standards. For closing down of plants, factors other than pollution were involved but the enforcement of pollution standards hastened the decision. Available information from other sources indicate that the closed plants already were obsolete and it was considered better to close them down than to meet efficiency and pollution control standards.

C. Research works regarding pollution control (Q.4.0): Companies were asked whether they have utilized their own research facilities in an attempt to solve their pollution control problems. It is not surprising that an overwhelming 12 (75 percent) reporting companies did so. Some reporting companies utilized their own research facilities and also had contracts of some research projects with outsiders. For the solution of special problems, the companies generally used their own research facilities or engaged outside firms on a contract basis.

There seems to be no trend for the reporting companies to set up separate research departments for pollution control. In some cases there exist permanent research units to carry on research work on all aspects of business including pollution control. Each research
project is treated on an individual basis and assigned to the research group best qualified.

Firms that used their own research facilities were asked whether they had capitalised such expenditures or not (Q.5.0). 7 companies i.e. about 58.33 percent of companies having their own research facilities answered 'no'. The typical approach is to charge research expenditures to expense.

D. Accounting for expenditures: Recording of current pollution control expenses (Q.6.0): In contrast to 87.5 percent of companies which separately identified capital expenditures for pollution control, only 7 or 43.75 percent of companies showed expenses for pollution control separately.

Many companies requiring separate figures for pollution control expenses, depended upon estimates and special analyses rather than separately indentifying pollution control expenses in their accounts. There are some reasons for doing so. Relative to a specific pollution control capital expenditures, a specific pollution control operating expense is small in amount and is subject to less close control. Again for some companies, pollution control is so closely tied to production facilities that the expenses are difficult to separate.

Thus most firms are paying primary attention to the capital costs of pollution control but when the initial surge of installing pollution control equipment would phases out, operating expenses will loom larger relative to capital costs.
The current emphasis upon the environment requires showing pollution control operating expenses separately. As discussed above, this goal is difficult to achieve and many companies are compelled to rely on estimates and special analyses. Eventually, it appears that for a well run plant, pollution control will become a regularly accepted feature and the expenses will be treated as ordinary and necessary operating expenses.

Depreciation of pollution control equipment (Q7.0 and Q8.0): Two questions were asked relating to depreciation of pollution control equipment. First, the companies were asked if they prepared separate schedules of depreciation of pollution control equipments. Only 8 companies (50 percent) reported that they prepared separate schedules.

After ascertaining whether separate depreciation schedules were maintained for pollution control equipment, the companies were asked if the same methods were used for depreciation of pollution control equipments as for other capital equipments. 11 companies (68.75 percent) reported that they used the same depreciation method for all capital equipments.

Period costs (Q.9.0): An attempt was made to determine whether pollution control expenses were treated as period or product costs. 50 percent; 8 companies, reported treating pollution control expenses as period costs and 6 companies, (37.5 percent) treated them as product costs. So no clear-cut pattern emerged. Some companies treat these expenses as period costs under certain conditions and as product costs under other conditions. Few companies treat
pollution control expenses as a function of equipment function, that is, if the pollution control expenses are an integral part of manufacturing process, then the expenditure becomes a part of direct manufacturing overhead, otherwise it becomes a period cost.

E. Recycling (Q.10.0 and Q.11.0): The companies were asked whether they employed the principle of "re-cycling" to convert what is waste into usable products. 10 companies (62.5 percent) reported that they had introduced the principle of recycling. Only 3 companies i.e. 30 percent of companies employing recycling, reported that recycling had produced enough revenue to cover the cost of the recycling processes.

Recycling has gained importance for two reasons. The first need is to dispose of the growing volume of wastes without contaminating the air, the water and the land. The reuse solves the waste disposal problem. The second reason is the need for developing alternative supply sources of materials, because of the growing scarcity of many virgin materials. However, the technological and economic factors continue to hamper the recycling efforts. Recycling is impossible due to lack of suitable technology. When technological problem is solved, economic factors limit recycling if the price of virgin materials is cheaper than the cost of recycling. But it is evident that as virgin materials become more scarce, their prices will increase. At the same time, technological improvements tend to lower the cost of recycling. Thus, both technological and economical barriers to recycling are
expected to disappear.

So it is evident that recycling efforts will be accelerated with the approaching scarcity of virgin materials and the improvements of technological methods.

F. Tax liability: Existing tax advantages (Q.12.0 — Q.14.0): The companies were asked if they had received within the past three years special "tax advantages" relative to capital expenditures for pollution control. Only 4 companies (25 percent) acknowledged the tax advantages.

When the companies were asked, "Do you believe that such tax advantages under existing laws are adequate?" 10 companies (62.50 percent) responded "No". Some companies refused to make any comment. Some public sector companies are not interested as they need not pay tax.

In brief, the major changes in the tax laws advocated by the respondents are:

a) 100 percent depreciation on pollution control equipment.
b) Weighted deduction 166 percent or 200 percent.
c) C.S.T. & E.D. should be removed.
d) To allow import of pollution control equipment under open general license at free of duty.
e) 100 percent tax benefits should be allowed on pollution control equipments/plants based on approval/recommendation of Central/State Pollution Control Boards instead of specifying a very few equipments in IT Act for tax concession.
f) Investment subsidies are necessary.
G. Approaches to encourage pollution control expenditures

(Q.15.0): The need for pollution control is well understood and accepted but the problem regarding the private sector enterprises is how can they be motivated to undertake large pollution control expenditures which add virtually nothing to the quantity or quality of the products produced? The companies were asked to give an answer by ranking: using '1' as most desirable approach to encourage pollution control expenditures. Weights are assigned on the basis of ten points for an approach ranked number one, nine points for an approach ranked two, eight for three, and so on. The following table shows the approaches to pollution control outlays listed in order of total points.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Innovative efforts on the part of individual companies</td>
<td>131</td>
</tr>
<tr>
<td>Joint efforts by industry associations</td>
<td>126</td>
</tr>
<tr>
<td>Tax benefits</td>
<td>122</td>
</tr>
<tr>
<td>Penalties assessed by Government for excessive pollution</td>
<td>119</td>
</tr>
<tr>
<td>Compulsory closing down of operations when pollution exceeds a specified level</td>
<td>118</td>
</tr>
<tr>
<td>Public pressure (moral suasion, or acceptance of social responsibility)</td>
<td>107</td>
</tr>
<tr>
<td>Others</td>
<td>70</td>
</tr>
</tbody>
</table>

The high ranking of "innovative efforts on the part of individual companies" and "joint efforts by industry associations", reflect the desire on the part of the industries to solve its own problems. "Tax advantage" also rank very high and does not necessarily suggest the contrary.
Various approaches were suggested under "others" and some of those who did make an entry here ranked their specific approaches number one. Some of such suggestions are as follows:

a) Loans should be provided by the Government on easy terms to facilitate pollution control outlays.

b) Government should bear part of the expenditures.

c) Government should come forward to carry on pollution control activities in a particular area and the companies of that area will contribute to the expenses.

d) Government should make award to the best pollution controlled companies.

The popularity of "tax advantages" as an approach to encourage pollution control is because of the fact that most pollution control outlays produce no revenue and tax advantages to some extent compensate for lack of revenue. The high ranking of "innovative efforts on the part of individual companies" and "joint efforts by industry associations" indicates the desire for minimization of Government controls and to adhere more to the free-enterprise system in solving pollution control problems.

H. Reporting (Q.16 - Q.19): Internal reports on pollution control outlays: 7 companies (43.75 percent) reported that internal reports on pollution control outlays were prepared by them. All of these companies except one prepared reports for both top management and other executives. And only one company prepared report for top management only. The time intervals at which these reports were submitted varied. Only one company submitted weekly reports. Of the 7 companies preparing reports, 2 companies (28.57 percent)
monthly reports and 3 companies (42.86 percent) submitted quarterly reports. 3 companies (42.86 percent) reported annually and 2 companies (28.57 percent) reported at various other time intervals. Totals did not add to the 100 percent because of overlapping; that is, some companies reported at more than one intervals. 3 companies (18.75 percent) were not required to report regarding pollution control to any government. 1 company (6.25 percent) submitted reports to Local Governments. 8 companies (50 percent) reported to State Governments and 4 companies (25 percent) submitted report to the Central and State Governments.

I. Need for modification of accounting records (Q.20.0): The companies were asked, "Does the need for preparing any of the above reports result in the need to modify your accounting records?" All companies responded "No".

Interviews and comments helped to clarify the matter of adequacy of accounting records for reporting on pollution control. For most of the companies, the existing accounting system can provide for pollution control information with minor modifications. For something which is new and still in the trial stages, some companies recognise the need for additional changes in their accounting system. The attitude seems to be that if the added information is needed badly enough to justify the cost, the accounting system should be adapted to provide that information.

Regarding adequacy of accounting records to provide pollution control information, the typical system appears to provide more complete information about capital expenditures than about
operating expenses of pollution control. Capital expenditures have major accounting emphasis because of their huge amounts and of reporting requirements. When the initial surge of capital spending phases out, operating expenses become larger and will command more attention.