4.1. **Pollution Problem and Social Responsibility**: The general nature of pollution problem was discussed in the previous chapters. Now, the relationship between pollution problem and accounting will be developed and explained. This relationship is mostly indirect since accountants are not the major pollutors. Employers of many private accountants and clients of public accountants have significant pollution problems. The accountants should contribute their knowledge and skills toward the solution of the problems of their employers and clients.

As the accountants are involved with the problems faced by their employers and clients, it is necessary to examine the pollution problem first from the business firm's point of view. In this chapter, the necessary background is provided and the relationship between the pollution problem on the one hand and the business firms on the other is sought to be established.

This chapter is needed because for many business firms, environmental problems rank very high in a listing of social responsibilities. Examination of the general area of social responsibility on the part of the business firms and the attempts to account for it, in sufficient depth, are helpful to get the pollution problem into a proper perspective.

4.2. **Some Early Views**: Social responsibility on the part of the business firms is not a new idea, but there are conceptual differences regarding the nature and extent of social responsibility.
In this connection, Raymond and Richards speak of a "social contract". The implied social contract set a pattern of behaviour for individuals, enabling them to co-operate with each other. In the Western industrialised nations, the social contract viewed economic growth as the source of progress. In the United States, gross national product is used as a measure of economic progress with the assumption that social progress would be a by product. Business firms with profit motive, being engaged in productive activities, increase the supply of goods and services and at the same time generate purchasing power through payments for productive services. The benefits to society were considered to be enough without any serious question about the external or social costs of such activities. Recently, changes in the concept of social contract have led to separate consideration of social progress along with economic progress.

The use of gross national product as a measure of social well-being could be questioned because GNP is a measure of total production rather than net production. Two refinements give an even better measure of social progress. The first one is a price-level adjustment. It is needed because net national product gives current output produced valued at current prices. The effects of price changes need to be eliminated through the use of price index numbers since changes in quantities, rather than changes in prices gives the better measure of social progress. The second refinement is adjustment of the figures for population changes by converting them to a per capita basis.

According to Theodore Roosevelt, social responsibility is not an entirely new idea to business world, but today the scope and magnitude of social concern have changed.

Business is confronted with a varied set of social demands which are primarily national rather than local in scope. Furthermore, previous business concern for its environment was considered to be completely voluntary, and when actions were taken, they were viewed as being highly benevolent. Now, similar actions are regarded as requirements and the firm which is not active in social affairs is looked upon as misanthropic.

In addition to these differentiating factors is the fact that today business is facing coercion, both overt and covert, to become socially concerned.¹

In the words of D. Mead Johnson, President of Mead Johnson and Company:

In general, it is my belief that a free society rewards socially desirable institutions by permitting them to survive and grow. The fact that many of our larger enterprises have enjoyed unprecedented growth during the past decade is at least some evidence that their results and objectives usually have been oriented in a right direction.

One of the principal criticisms that is valid with regard to businessmen and the profit motive, however, is that too many businessmen do not understand the relationship of franchise-building to long run profits. By franchise building, I mean creating and maintaining a favourable industry and public attitude toward your firm and your product.²

Herman C. Nolen, President of Me Kesson and Robbins, added:

Management must also consider the competitive results of any policy. If, even in the short run, a given socially desirable policy costs more money, the firm may suffer a serious competitive disadvantage.³

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Richard Eells' writing reveals a picture in referring to the dilemma faced by business firms:

If business, one of the vital private sectors of society, rejects the many social commitments that are urged upon it both from outside and within, the consequences may be serious ...

On the other hand, business may suffer equally serious consequences by shouldering a too heavy burden of social responsibility. Capital, talent and energy may be sapped by the spate of activities alien to the profit motive ...

The dilemma strikes deep at the roots of managerial authority, its scope and uses and even into the central purpose of the corporation in a free society.¹

The author did present opposing views including those of Theodore Levitt, a Chicago management consultant:

The "social responsibility syndrome" is dangerous, says Levitt, because it clashes with the sound principle that "the business of business is profits" and that: "in the end business has only two responsibilities — to obey the elementary canons of every day face-to-face and to seek material gain".²

Eells who is in charge of Public Policy Research at General Electric Company, continues:

Levitt is not arguing alone. Milton Friedman at the University of Chicago has declared, in the same vein, that if anything is certain to destroy our free society, to undermine its very foundations, it would be a widespread acceptance by management of some social responsibilities in some sense other than to make as much money as possible.³

These early views point to a trend in the direction of greater corporate social responsibility which slowed down by considerable high-level opposition.

4.3. Increased Emphasis on Social Responsibility: There was a rapid acceleration of the trend toward greater corporate social responsibility in the decade of the 1960s. Some reasons have been enumerated by Keith Davis, Professor of Management at Arizona State University for the increased emphasis on social responsibility.

The first reason is pluralism. According to Davis, a pluralistic society is a social system in which diverse groups maintain autonomous participation and influence, creating numerous centres of social power and each centre is faced with a need to be concerned with social responsibility in its relations with the social system. The second reason is the complex modern society with its various parts being more interdependent. Thirdly, social sciences are bringing into light how business activities affect society. Fourthly, current ethical concepts have led people to favour more responsible action and business tends to reflect the values of society in its actions. Fifthly, society is willing more to conserve its wealth and culture than to accept the risk of disruptions arising from irresponsible acts. The modern public opinion is such that business must act in a responsible manner to maintain a favourable public image. The sixth reason is that the various privately organised groups have exerted much pressure on business, especially large corporations. Sevethly, coercion by government is becoming a reality with more and more restrictive controls upon business. Such restrictions generally result in a permanent loss of freedom and initiative. Many of the firms which

like to retain free enterprise system, see the need for business
to use its power in a responsible manner without giving government
any cause to intervene. A power-responsibility equation, which
means that social responsibility is equated with the amount of
social power, can be applied here. According to this view,
avoidance of social responsibility results in erosion of social
power. And finally, the reason for increased emphasis on social
responsibility is the wide separation between the ownership and
control of business. Normal legal channels of responsibility have
become less clear with this separation but the power-responsibil-
ity equation points to the need for managerial responsibility.

4.4. What is Social Responsibility? The concept of social
responsibility itself has undergone changes. As the formulation of
a precise definition of social responsibility clearly reflecting
its contents and boundaries is difficult, it is helpful to examine
some contemporary views. According to Keith Davis:

The substance of social responsibility arises from concern for
the ethical consequences of one's acts as they might affect the
interests of others. This idea exists in most religions and
philosophies of the world. Quite frequently, however, a tendency
exists to limit its application to person-to-person contacts.
Social responsibility moves one large step further by
emphasizing institutional actions and their effect upon the
whole social system.¹

The words of Clare Griffin help in understanding social responsi-
bility and shed light on the above mentioned problem of separation
of business ownership and control.

In times past people made things for other people. Paul Revere
as owner and worker made a silver bowl for a patron. He would

naturally be proud of it and eager that it should please the buyer and surely he would be conscientious in making a good product. Nobody called it social responsibility. It was individual responsibility for "his" product. But now, in a sense, people don't make things. An organisation of a million people with production lines and so on produces the thing. And the small stock holder may well say of an unsatisfactory product: "Don't look at me. The company made the product. I merely invest in the Company". The system of mass production by an organisation is immeasurably more efficient and it makes possible the affluence we now enjoy. But it gives rise to a question of the locus of responsibility.

The major point I am arguing here is that as this responsibility has shifted from the owners and the workers, it has come to rest on the organisation which with its relative freedom must assume responsibility.  

Elibirt and Parket are of opinion:

...that social responsibility means the commitment of a business or business in general, to an active role in the solution of broad social problems, such as racial discrimination, pollution, transportation, or urban decay.

4.5. Acceptance of Social Responsibility : To what extent is social responsibility accepted by large corporations ? A media opinion in the U.S.A. reports:

Corporations are still supposed to produce profit, but more and more executives share the sentiments expressed in a directive sent to local plant managers and supervisors of Owens-Illinois, Inc. : "It is not enough merely to make a good product, deliver it at a good price and earn a good profit."

What is enough? For an increasing number of companies, the answer in theory, at least, is to help clean the air and water, to provide jobs for minorities, to contribute money and talent to the solution of urban problems, to be more helpful to

consumers and, in general, to help enhance the quality of life for everyone. At long last, it seems, the corporation is developing a social conscience.1

Business managers must tune in to society's needs, turn on know-how to tackle those needs, and drop into society to help resolve them. Managers of today must be sufficiently sensitive and skilled to be the leader of change — to anticipate and respond to changing social needs.

Thus, evidences point to the greater acceptance of corporate social responsibility but what of the cost? Because, profits are lowered by the price paid for pollution control and safety research.

4.6. Accounting for Social Responsibility: It is obvious that there are costs of social responsibility but traditional accounting systems are not designed to account for such costs and benefits. So long, little thought was given to this deficiency, but the need for some form of social accounting has become more widely recognised with the accelerating trend toward social responsibility. This need has not been met adequately but attempts have been made and some of those efforts are discussed below:

i) Social Accounting in the 1950s. Until the recent emphasis on social responsibility, the term social accounting was generally taken to mean "national income accounting". John P. Powelson distinguishes four branches of social accounting, viz,

1. The national income and product account, compiled by the Department of Commerce.
2. The statement of sources and uses of funds developed by the Federal Reserve System.
3. The balance of payments statement, which reflects international transactions.
4. Input - Output tables, developed by Wassily Leontief, which reflect inter-industry relationships by showing how the output of one industry becomes inputs to other industries.

All these branches of social accounting clearly reflect the macro point of view, emphasising the economy as a whole and they use accounting principles which are found more in macro-economics than in accounting theory.

The first mentioned branch of social accounting, i.e. national income accounting, has proved to be useful in measuring the performance of an economy and references are made to gross national product as such a measure. As a measure of social progress, weaknesses of gross national product have already been noted and adjustments resulting in a more effective measure for that purpose were described. Because of increased emphasis upon social responsibility the need for further refinements are recognised for proper accounting of the social progress of nation.

ii) Extensions of Social Accounting: According to David F. Linowes, a partner in the New York office of Laventhol, Krekstein, Horwath & Horwath, social accounting is the area of accounting

beyond the field of business and he chose the term "socio-economic accounting" to designate the accounting function. Accounting discipline is needed in economic areas and Linowes indicates that some weaknesses in national income accounting is due to lack of participation by the CPAs. He recommends that accountants should lend their skills in areas which have been considered beyond the range of traditional accounting. Measurement beyond traditional accounting is difficult and sometimes monetary measures are also impossible. Other disciplines are attempting such measures without an understanding of accounting principles and participation by accountants in these undertakings are needed.

Linowes divided socio-economic accounting into three sub-areas:

1. Accountability of social institutions, such as the Universities.

Sybil Mobley describes socio-economic accounting as the ordering, measuring and analysis of the economic and social consequences of entrepreneurial and governmental behaviour and also sees it as encompassing present accounting to be extended to include social consequences. She applies these ideas to national income accounting, financial accounting and managerial accounting areas which are within Linowes's macro-micro categories. Thus, application of socio-economic accounting will require a flexible

framework. It will also raise questions concerning the entity concept, periodicity, the point of realisation, money as the unit of measure, etc.

Also in Canada, the need for social accounting is recognised. Senator Manning took a micro approach to predict the development of a new system of social accounting to supplement financial accounting. Business needs measures of social progress as well as of financial success. Norms should be made to define social assets and social liabilities in such a way that will allow them to be balanced off against each other and professional accountants should meet the challenge.

Gerald H.B. Ross, a Chartered Accountant and a member of the Innovative Research Group at Touche Ross & Co., uses the term social accounting. He sees the need for a vastly improved system of national accounting and reporting in the macro area because the present system is not adequate to reflect the changes in the quality of life. He also argues for measurement of the social performance of individual government agencies and departments. He refers to the needs of decision makers in the micro area. Ross also argues that awareness of social responsibilities creates the need for social accounting information to serve their needs and also external reporting needs. Ross concludes taking the view that social accounting may never be an exact science, but the problems of society are too great to be ignored:

They will inevitably involve some sort of measurement - no matter

how imprecise. Yet we must not let the desire for precision become 
the blinders that will hide opportunities around us. As John 
Maynard Keynes warned of accountants: "It is better to be vaguely 
right than precisely wrong".1

4.7. A Review of Social Accounting: All the various dimensions of 
social accounting, or socio-economic accounting are useful. The 
interdependent nature of modern society puts a high priority on 
macro socio-economic accounting. There is also a need for social 
accountability on the part of departments and agencies 
administering social programmes. What is relevant here is the 
failure of many of the programmes to show "measurable results". 
The need to account for corporate social responsibility, caused 
the inquiry into social accounting and what Linowes calls micro-
socio-economic accounting best serves that need. So the micro 
division of social accounting should be developed in greater 
detail.

Micro-Socio-Economic Accounting: Accounting for corporate social 
responsibility requires three steps: 1) recognition of the need, 
2) preparation of a plan and 3) implementation of the plan. The 
first step was slow in coming and though there is no unanimous 
opinion, enough sound cases have been presented to conclude that 
the need has been recognised. Regarding the other two steps less 
progress has been made for various practical reasons, the 
principal one being the measurement difficulties. Accountants are 
habituated to measure revenues and costs and to report results in 
monetary terms, but the usual measuring techniques are inadequate 

1. Gerald H.B. Ross. "Social Accounting: Measuring the Unmeasura-
bles", Canadian Chartered Accountant, (July 1971), Pages: 47-54. 
2. "A Decade of the Great Society: Success or Failure", U.S. News 
and World Report (June 9, 1975), Pages: 26-31.
for social accounting, especially in measuring benefits. Achievements to date in this respect have been limited and some of the proposals are noted below:

The Socio-Economic Operating Statement: David Linowes has suggested a "Socio-Economic Operating Statement" (SEOS) which would be prepared periodically but, unlike a financial statement, it would reflect only expenditures made voluntarily by the business firm for some social purpose and would exclude the expenditures which are required by law or contract as mandatory costs of doing business.

The estimated costs of social actions which should have been taken but were ignored should be offset against the expenditures made voluntarily by the business firm.

These positive and negative figures are divided into three groups on the SEOS, as: (1) Relations with People, (2) Relations with Environment and (3) Relations with Product. In each group, Net Improvement (or Net Deficit) is measured by improvement minus detriment.

By adding the Net Improvements, the Total Socio-Economic Improvement (or Deficit) is obtained and by adding this total to the Net Cumulative Socio-Economic Improvements at the beginning of the year, the Grand Total Net Socio-Economic Actions at the end of the year is obtained.

Linowes suggested that the statement should be prepared internally by a small interdisciplinary team headed by an accountant and should be audited by an outside, independent, interdisciplinary team headed by a CPA.
According to Linowes, SEOS is a means of giving visibility to corporate social actions and he proposes that the Government should allow a tax deduction for a portion of the annual net social expenditures shown on this statement.

4.8. The Social Audit: Social audit has recently attracted considerable attention but as John van Pelt has pointed out, "At present, there is no general agreement on what a social audit is, who should do it, or how the task should be undertaken".

According to David Fetyko, social audit has been vaguely defined and is normally referred to as any and all business activities which have social consequences. He lists seven goals to be included in a company's social audit and outlines the following four general approaches for reporting the results:

a. The Inventory Approach: A list of all of the company's social activities is prepared.

b. The Cost or Outlay Approach: In addition to the list of social activities, the amount spent on each activity is disclosed.

c. The Program Management Approach: In addition to the information disclosed by the cost or outlay approach, a statement is made as to whether or not the company met its objectives for each activity.

d. The Benefit-cost Approach: In addition to the information disclosed by the cost or outlay approach, the real worth, i.e. the benefits of each expenditure is indicated.


With each successive approach, the social audit would seem to be more useful.

4.9. **Social Reporting Areas**: A survey of forty-seven corporations in the United States reveals that the following areas should be covered in social reporting. "(1) environmental quality, (2) equal employment opportunities, (3) product safety, (4) educational aid, (5) charitable donations, (6) industry safety, (7) employee benefits and various community support programs".

It should be noted that environmental quality, the first mentioned area for social reporting, is one of the major areas of social concern for many corporations. The scope narrows down from corporate social responsibility in general to the environmental aspect of social responsibility of business firms.

4.10. **Differentiation of Pollution Problem from other Areas of Social Responsibility**: The Matter of Priorities: All the areas of social responsibility have distinguishing characteristics and could be assigned priorities for ranking of the various areas. Mr. Dorsey, President of Gulf Oil Company, places ecological balance first in his list of priority needs of society which is followed by elimination of poverty and attainment of world peace. He believes that society is determined to solve the pollution problem and is willing to pay the price. He also believes that business is the greatest force in the elimination of pollution problem and urges the cooperation of industry and government. Others, may disagree with Mr. Dorsey's order of listing priorities.

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or may substitute another list but it is evident that the pollution problem ranks very high among corporate social responsibilities.

Why the Public Pressures? Before the pollution problem became widely recognised, other areas of corporate social responsibility were so well developed that to meet a public expectation — demand process, business came to play a constructive role to solve such social problems. Public expectations today have become even more intense in the environmental area and they exert pressure for corrective actions in this respect. The following three new elements which were absent in the past development of social responsibility of business can be pointed in this respect:

First, all members of the community must suffer by the consequences of environmental abuse but all of them may not directly be affected by other social problems. For example, a social problem like employment opportunities for disadvantaged persons may not affect an employed person but he cannot avoid the ill effects of polluted air and water in his community.

Second, it is evident that business creates pollution problems but not other social problems like inadequate school facilities. So in the environmental area, business has great responsibility towards the problems of its own creation.

Third, the need for government to play a major role in pollution control is increasingly recognised. It is also recognised that environmental deterioration should be corrected but there is limitations regarding how much a firm can do, especially if
competing firms do nothing. A growing feeling is that some government regulations are necessary for protection of the socially conscious firm from being at a competitive disadvantage. These factors limit freedom of choice by business in undertaking pollution control responsibilities. Without adversely affecting the earnings per share, a company can spend for other social purposes the amount limited to what a company could afford. But in regard to pollution control expenditures, many companies find that they no longer have freedom of choice; with the result that earnings per share are threatened by this type of spending.

4.11. Business and the Environment: Structuring the Issues: An important difficulty in addressing environmental issues within business relates to the role of corporate culture and managerial values in effecting the corporate response. Difficulties involved in penetrating and understanding the relationship between corporate culture and the acceptability, or otherwise, of certain courses of action are pointed by Mitraff and colleagues. They are of the opinion that corporate culture is a multi-layered and highly interactive concept.

Corporate legitimacy issue is held to operate at three levels, namely those of obligation, responsibility and responsiveness. If the issues of corporate obligation was dominant in 1970s, the calls for corporate responsibility was dominant in 1980s, then we can expect the next decade to deal with the more proactive issue of corporate responsiveness. Put simply, corporate bodies should

anticipate and prevent future societal concerns about their operations. In other words, they will have to adopt a more strategic view of the problem. Such a paradigm change in the culture of business cannot be achieved without the wholesale cooperation of managers, shareholders and business educators. The failure to incorporate a new set of environmental values at the heart of corporate culture will result in a process of simply 'bolting on' a false consciousness in the form of a green tinge. This will simply incubate the environmental crisis which will re-emerge at a later date. There is a need for more fundamental inculcation of true environmental values within business.

Corporate actions and plans for environmental improvements is perhaps the most obvious level at which to approach the problem, as these are visible representations of the corporate response.

4.12. The Challenge to Industry: The discussion of the ecological background reveals that industry has great contribution to the pollution problem. On the other hand, the fact that the pollution problem is an important area of corporate social responsibility indicates a significant role for industry to find out the solutions. As the nature of this role and the response of business firms in assuming responsibility for pollution control cannot be easily determined, it is helpful to examine the views of some leaders in business, government and education. Raymon Mulford, Chairman and Chief Executive officer of Owens-Illinois Glass Company, takes a positive but cautious, somewhat generalised approach to environmental problems, using a six point outline.
First, the increased population and their desire for the good things of life which industrial production can provide has created a relatively new problem of waste accumulation and disposal.

Secondly, although it may seem that things are going badly, we cannot turn back to earlier life which was a cruel hard life characterised by starvation and disease.

Thirdly, businessman should take initiative to solve the pollution problem, with the business community becoming a force working for intelligent preservation and utilisation of resources.

Fourthly, the production system must be oriented toward recycling of materials. This is necessary not only for shortages and higher costs of original materials but also to find out ways of disposing of used materials. Reuse could become the ideal method of disposal.

Fifthly, zero pollution is impossible but realistic approach should be established in regard to the environment together with other national problems.

Sixthly, the recognition of the necessity of solution to these problems forces acceptance of considerable social costs, because capital and human resources are diverted to environmental control.

Peter Drucker points to some delusions or misunderstandings regarding environment. The first delusion is that the dependence on technology should be reduced to clean up the environment when technology is needed at a level at least as high as the technology

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which created the need for environmental control.

The second delusion is that the cost of cleaning up the environment can be paid for out of business profits. The cost is very high and should have been recognised all along. These costs will have to be borne either by consumers in the form of higher prices or by taxpayers in the form of higher taxes.

Another delusion is that the environmental problem can be solved by reducing industrial production but this is not possible for several reasons. One of the reasons is that the needed environmental control requires huge amount of electric power, amounts beyond what is now available. Another reason is that the reduction of industrial output will restrict the scope for employment but employment opportunities need to be expanded as the number of young people who will be entering the job market is very large. So unemployment in the name of ecology would not be popular. The final reason is that the reduction of industrial output to clean up environment would require cutting back other desirable programmes.

The fourth delusion is that punitive legislation is the proper way to clean up the environment. Laws prohibiting and requiring certain actions are needed but incentives to preserve the environment and for its improvement are more needed.

Thus, there exists... the need for rigorous analysis, united effort, and hard work. The real challenge in the environmental situation is to think through what risks to afford

and what risks are not permissible and where to draw the line, and what price to pay for what degree of insurance.

Maurice Stans says "One thing is clear to all of us from experience - government alone cannot resolve the social and economic gaps of our time...

It is business that can, with the help and co-operation of government, show the way to avoid and prevent pollution and waste of resources."

It is held that the responsibility to society and the earning of profits not only are compatible but are of necessity related. Social responsibility like pollution control requires large expenditures so only profitable companies can afford to do so. As a responsibility to the population, the government should assess the nature of the environmental pollution problem and should also set and enforce consistent standards. The responsibility for the manufacturer is to meet the standards by whatever means required.

It is admitted that complete co-operation is needed to solve the problem but unfortunately there are conflicts between government and industry and there are difficulties. The conflicts are mainly regarding the setting of standards, conducting research and when the standard is effective. Though there are conflicts, industry must face upto the task.

4.13. What About Small Business? Industrial pollution is generally associated with large business enterprises and this study is

mainly concerned with the pollution problems of big corporation. Nevertheless some attention should also be given to the small business.

Small business does not necessarily mean small problems. It is difficult for small companies to compete with larger concern. The small companies often have little or nothing in the way of research and development and may not have modern plant and machinery for production of output. Small companies have to compete on an unfavourable basis with large companies for finance, management personnel and product markets. For many small companies, environmental matters overshadow traditional problems.

In a survey in the U.S.A., Presidents of fifty small companies were asked to list and rank the ten most important problems they would face for the next ten years. More than 80 per cent of the Presidents ranked ecology in the upper portion of the list.

APPENDIX TO CHAPTER IV

4.14. The Greening of Risk Assessment: In the face of the recent nuclear power catastrophes, we have come to recognise that one of the prices paid for the contemporary technological advances has been either a dramatic increase in risk, or at least the awareness of risk. The struggle over the question of technological advance and environmental risk has elevated the search for safety measures to the top of the political agenda.

The argument of the supporters of modern techno-industrial complex

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is that risk must be seen as a mixed phenomenon, always producing both dangers and opportunities. Scientifically based quantitative risk assessment is designed to supply a technically rational basis for centralized regulatory decision-making. It reflects an amalgam of managerial and engineering methodologies as a model of rational decision-making. In analytical terms, risk can be expressed as the product of the estimated degree of harm a given technical failure would cause and its probabilities of occurrence. In complicated technological systems, first, the system is broken down into various measurable components. Secondly, the statistical probability of a failure of each of these components is measured, using past performance data, experimental assessments and expert judgements. Thirdly, the crucial environmental factors that might precipitate a technical failure should be examined. Fourthly, the above factors stating statistically as multiple probabilities, must be integrated through a modelling process based on decision-oriented event and fault trees. After the calculation of the various chains of probabilities to provide an overall estimate of system failure, the figure must be multiplied by the estimated damages. The result is a set of objective statements that are to be the focus of regulatory deliberations about risk. But the method outlined above proved to be anything but a success. The fundamental problem is to be found in the technical framing of the risk problem. Analysts are forced to make many uncertain assumptions. This has led to a good deal of disagreement among the experts themselves. Their judgements about these statistics often range from completely reliable to totally useless. Risk assessment has not only failed as a technical tool,


it has also in the process exacerbated the very doubts it set out to assuage.

In a democratic society, the regulatory task of risk assessment has to approach its object of investigation in a very different way. The first step towards a solution is to be found in the theoretical redefinition of large-scale technological systems. They are complicated technical processes functionally woven together by networks of socio-organisational controls. This reality, in fact, bears directly on both the empirical estimation of risk and the social perceptions of acceptable risk.

The search for a democratic form of risk assessment confronts the most sophisticated political and epistemological problems of our time. In epistemological terms it raises the question of how to relate empirical data to norms and values. In political terms it asks how are we to transform our increasingly techno-bureaucratic institutions into less hierarchical democratic structures.

Problem definition is essential to an effective strategy of risk assessment. It is important to bring the social actors themselves into the process of identification and search for risks.

Risk assessment as a managerial decision science is a product of a bureaucratic system and is a tool designed to guide hierarchically structured decision-making processes. A more participatory set of institutions are needed by a more democratically structured practice of expertise.

The establishment of publicly financed centres for the study of technological impacts, located perhaps within the public univer-
sity systems may be an important step in this direction. These could serve as training grounds and laboratories for democrati-
cally committed engineers, scientists and risk specialists. What is needed is an approach capable of facilitating the kinds of discussions that go on in such participatory contexts.

There can be no doubt that many powerful industrial and political interests will vigorously resist such institutional and methodological proposals. They will criticise it as being too expensive, time consuming, inefficient and unscientific.

The prospects of participatory expertise will strike many as being quite bleak. The situation is not as hopelessly entrenched as it at first appears. When economically threatened by environmental challenges, businesses must certainly take notice. Once the businessmen see participation to be the key to the public legitimation of technologies and thus a mechanism for avoiding costly environmental debacles, experimentation with participatory approaches will actually begin to look attractive. Participatory expertise is mainly a radicalization of a practice long included in the managerial tool-box, namely action research.