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QUESTIONNAIRES

USED FOR THE COLLECTION OF

SCIENCE AND TECHNOLOGY STATISTICS

IN 1988

Canada

QUESTIONNAIRES
USED FOR THE COLLECTION OF
SCIENCE AND TECHNOLOGY STATISTICS
IN 1988

Prepared by:
Danielle Séguin
Science, Technology and
Capital Stock Division
Statistics Canada

June 1988

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TABLE OF CONTENTS

FEDERAL GOVERNMENT

These questionnaires are sent to all departments and agencies involved in S&T activities. They are normally completed on behalf of the next lower budgetary level (Program). The first four are incorporated into the federal budgetary process and are a joint responsibility to the Treasury Board Secretariat, the Ministry of State for Science and Technology, and Statistics Canada. They provide the basic data for **Federal Scientific Activities**, Statistics Canada Catalogue No. 88-204. The fifth form is distributed by Statistics Canada to provide information for the **Directory of Federal Government Scientific and Technological Establishments**, Statistics Canada Catalogue No. 88-206E.

The sixth, seventh and eighth forms are used to gather scientific data by region.

Statistics Canada Statistique Canada

SCIENCE ADDENDUM TO MAIN ESTIMATES 1988/89

EXPENDITURES ON ACTIVITIES

IN THE

NATURAL SCIENCES

Enquiries concerning this form should be directed to:

Bert Plaus
Project Leader
Public Sector
993-6347
Science, Technology and Capital Stock Division
Statistics Canada
Ottawa, Ontario
K1A 0T6

Department or Agency:	Program:
Enquiries to be directed to: Name: Position title:	Date: Telephone No.:

5-4600-100: 5-8-87 TB/CT-REG B101534

Canada

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1986/87

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. Scientific data collection								
8. Information services								
9. Testing and standardization								
10. Feasibility studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III TOTAL EXPENDITURES								[1]

[1] Must equal natural science funds reported for 1986/87, page 7.

5-4600-100

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1987/88

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
				($'000)				
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. Scientific data collection								
8. Information services								
9. Testing and standardization								
10. Feasibility studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. TOTAL EXPENDITURES [1]								

[1] Must equal natural science funds reported for 1987/88, page 7.

5 4600-100

79
15

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1988/89

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. Scientific data collection								
8. Information services								
9. Testing and standardization								
10. Feasibility studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III TOTAL EXPENDITURES								1

Must equal natural science funds reported for 1988/89, page 7.

5-4600-100

PERSON-YEARS ON INTRAMURAL SCIENTIFIC ACTIVITIES IN THE NATURAL SCIENCES

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Category	1986/87				1987/88				1988/89			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
Executive												
Scientific and professional												
Administrative and foreign service												
Technical												
Administrative support												
Operational												
Military personnel												
Total												

(3)

96

- 7 -

KEY

A: Personnel engaged in R & D
B: Personnel engaged in related scientific activities
C: Personnel engaged in the administration of extramural programs

5-4600-100

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
TOTAL SCIENTIFIC EXPENDITURES IN THE APPLICATION AREAS*

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1 Advancement of science – Basic						
2 Strategic						
3 Communications						
4 Culture and recreation						
5 Developing nations						
6 Energy						
7 Environmental issues – Air						
8 Land						
9 Water						
10 Other						
11 Food – Agriculture						
12 Fisheries						
13 Health						
14 Housing and urban development (includes construction)						
15 Manufacturing technologies						
16 Northern development						
17 Oceans						
18 Policy development (includes official languages)						
19 Resources – Forestry						
20 Mineral						
21 Water						
22 Other						
23 Security – Domestic						
24 National defence						
25 Social development and welfare						
26 Space						
27 Transportation						
28 Other						
TOTAL EXPENDITURES						

*NOTE: EXPENDITURES LISTED ON THIS PAGE INCLUDE THE R&D EXPENDITURES

5-4600-100

174

28

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
R & D EXPENDITURES IN THE APPLICATION AREAS

• FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1. Advancement of science – Basic						
2. Strategic						
3. Communications						
4. Culture and recreation						
5. Developing nations						
6. Energy						
7. Environmental issues – Air						
8. Land						
9. Water						
10. Other						
11. Food – Agriculture						
12. Fisheries						
13. Health						
14. Housing and urban development (includes construction)						
15. Manufacturing technologies						
16. Northern development						
17. Oceans						
18. Policy development (includes official languages)						
19. Resources – Forestry						
20. Mineral						
21. Water						
22. Other						
23. Security – Domestic						
24. National defence						
25. Social development and welfare						
26. Space						
27. Transportation						
28. Other						
TOTAL EXPENDITURES						

174

28

– 9 –

5-4600-100

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
PROGRAM SUMMARY

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

	1986/87	1987/88	1988/89
		($'000)	
1. Total Program			
11. Operating			
12. Capital			
13. Grants, contributions and other transfer payments			
14. Receipts and revenues credited to the vote			
Net expenditures (11 + 12 + 13 - 14)			
2. Program funds available for natural sciences			
21. Operating			
22. Capital			
23. Grants, contributions and other transfer payments			
24. Receipts and revenues credited to the vote			
Net expenditures on natural sciences (21 + 22 + 23 - 24)			
3. Transfers for natural science activities[1]			
31. Total transferred into this program			
32. Total transferred from this program			
NATURAL SCIENCE FUNDS REPORTED (21 + 22 + 23 + 31 - 32)	2	3	4

[1] The amount and the names of the originating and recipient programs should be identified on a separate page.
[2] Must equal total expenditures, page 1.
[3] Must equal total expenditures, page 2.
[4] Must equal total expenditures, page 3.

5-4600-100

Statistics Canada Statistique Canada

GUIDE TO THE COLLECTION OF EXPENDITURE DATA IN THE NATURAL SCIENCES

MAIN ESTIMATES
SCIENCE ADDENDUM
1988/89

Canada

GUIDE TO THE COLLECTION OF EXPENDITURE DATA IN THE NATURAL SCIENCES

1. INTRODUCTION

1.1 This introduction is intended to provide an overview of the process of collecting science expenditure data; definitions of and explanatory notes on natural sciences, social sciences, scientific and technological activities, performance sectors, and other terms used are given in subsequent sections.

1.2 The collection of science expenditures is organized by the Science, Technology and Capital Stock Division of Statistics Canada in cooperation with the Treasury Board Secretariat. Collection is carried out in conjunction with submissions by departments and agencies of their Main Estimates to the Treasury Board.

1.3 Collection is undertaken to gather essential data describing the recent, current and proposed state of the federal resources allocated to science. Federal science expenditures data are provided to the Ministry of State for Science and Technology (MOSST) who in turn use the data in the development of advice to MOSST's Minister and the Treasury Board Secretariat, as well as in policy development and in monitoring the implementation of science policies. Statistics Canada maintains the historical expenditure series in natural sciences dating back to 1963 and to 1971 in the social sciences.

1.4 The basic reporting unit is the budgetary program of a department or agency. Each budgetary program forms the subject of separate scientific expenditure reports for the natural and for the social science activities within it. Both the program and the program activities within it may be scientific in whole or in part only. It is only expenditures on the scientific components of a program or its activity which are reported on. In some programs it will be difficult to distinguish between the natural and social sciences. However, some allocation must be made and in determining this allocation, the dominant orientation of the projects and the area of expertise of the personnel involved must be considered. Detailed definitions are given on the following pages.

1.5 On the questionnaires, the identified expenditures are looked at from several different viewpoints and in various subdivisions. Expenditures on **research and development** (R&D) and **related scientific activities** (RSA) are subdivided to provide an indication of the 'what' of a department's scientific effort. Expenditures in each category of scientific activity are further subdivided into 'current' and 'capital' segments. Current expenditures are additionally subdivided by sector, to indicate the 'where' and 'by whom' the activity is performed (e.g., in industry, in universities).

Enquiries should be directed to:

Bert Plaus
Project Leader
Public Sector
993-6347

Science, Technology and Capital Stock Division
Statistics Canada
Ottawa, Ontario
K1A 0T6

1.6 The human resources allocated to scientific activities are summarized in terms of the involved categories of personnel (executive, scientific and professional, etc.) and the principle focus of their efforts (R&D, RSA, administration of extramural programs).

1.7 The 'why' of the scientific activity is addressed by asking departments to identify areas of expenditure application (e.g. oceans, energy), as well as to summarize the sector of performance (intramural or extramural).

1.8 When completed, checked for consistency with previous reports, entered into the data base and totalled along the various dimensions, these data provide snapshots of the federal resources allocated to science, supporting not only the work of central agencies but also the submissions of departments and agencies requesting resources.

2. GENERAL

2.1 In order to assist departments in the preparation of science expenditure reports, computer print-outs of data previously submitted at the time of Main Estimates are provided.

2.2 The remainder of this guide consists of definitions/explanations for terms used in the questionnaire. In order to make these as readily identifiable as possible, they are arranged by questionnaire page number. The numbering of the row and column headings of the dummy questionnaire pages serves to identify defining/explanatory notes.

2.3 The **natural sciences** consist of disciplines concerned with understanding, exploring, developing or utilizing the natural world. Included are the engineering, mathematical, life and physical sciences.

2.4 The term **social sciences** is to be regarded as synonymous with social sciences and humanities and thus embraces all disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans. Included are such disciplines as anthropology, business administration and commerce, communications, criminology, demography, economics, geography, history, languages, literature and linguistics, law, library science, philosophy, political science, psychology, religious studies, social work, sociology, and urban and regional studies.

3. ACTIVITIES/PERFORMERS

3.1 Pages 1-3 refer to different fiscal years and the headings of all three are identical. One set of definitions/explanations therefore suffices.

3.2 Actual and planned expenditures on scientific and technological activities are to be classified according to the type of scientific activity and the performance sector in which the activities were or will be conducted.

3.3 **Scientific and technological (S&T) activities** are required for the generation, dissemination or initial application of the new S&T knowledge. The central activity is scientific **research and experimental development** (R&D). In addition there are a number of activities closely related to R&D, and are termed **related scientific activities** (RSA). Those identified as being appropriate for the federal government in the natural sciences are: scientific data collection, information services, testing and standardization, feasibility studies, education support, and museum services.

3.4 The **performer** is equivalent to the sector in which the scientific activity is conducted. The basic distinction is between intramural and extramural performance. Extramural payments are classified on the basis of the performance sectors to which they are made. The appropriate extramural performers are Canadian industry, Canadian universities, Canadian non-profit institutions, foreign performers, Canadian provincial and municipal governments, and other performers.

3.5 Questionnaire pages 1-3:

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1986/87

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. **RESEARCH AND EXPERIMENTAL DEVELOPMENT** Current expenditures:								
1. In-house R & D								
2. Contracts: (a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. **RELATED SCIENTIFIC ACTIVITIES:** Current expenditures:								
7. Scientific data collection								
8. Information services								
9. Testing and standardization								
10. Feasibility studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. **TOTAL EXPENDITURES**								[1]

[1] Must equal natural science funds reported for 1986/87, page 7.

5-4600-100

Page 1 of 7

Activities:

I. **Research and experimental development** (R&D) – creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use this knowledge in new applications.

The central characteristic of R&D is an appreciable element of novelty and of uncertainty. New knowledge, products or processes are sought. The work is normally performed by, or under the supervision of, persons with postgraduate degrees in the natural sciences or engineering.

R&D is generally carried out by specialized R&D units. However, an R&D project may also involve the use of non-R&D facilities (e.g., testing grounds), the purchase or construction of specialized equipment and materials, and the assistance of other units. Costs of such items, attributable to the project, are to be considered R&D costs.

R&D units may also be engaged in non-R&D activities such as technical advisory services, testing, and construction of special equipment for other units. So far as is practical, the effort devoted to such operations should be excluded from R&D.

On the other hand, R&D may be carried out by units normally engaged in other functions (e.g. a marine survey ship used for hydrological research, a geological survey team may be directed to work in a certain area in order to provide data for a geophysical research project). Such effort is part of an R&D project and, again, so far as is practical, the costs should be assigned to R&D expenditures.

Examples:

1. Routine autopsy on the causes of death is not research, but special investigation of a particular mortality in order to establish the side effects of certain treatments is research. Similarly, routine tests, such as blood and bacteriological tests, are not research, but a special program of blood tests in connection with the introduction of a new drug is applied research.

2. The keeping of daily records of temperature or of atmospheric pressure is data collection and not research. The investigation of new methods of measuring temperature is research as is the study and development of new systems and techniques for interpreting the data.

3. The development of new methods of identifying tree species and determining if they are diseased is R&D; the use of recently developed methods, such as remote sensing and infra-red photography, as part of normal forestry surveys, is not.

4. The operation of a new transportation system as a demonstration project is not R&D; however, the creation of the system as a prototype and the technical evaluation of its operations should be considered R&D.

5. Grants to provide equipment for an R&D laboratory are to be considered R&D grants; however, when given to provide equipment primarily for teaching or medical care they should not be considered in the R&D category.

Item 1. In-house R&D – R&D performed by personnel assigned to the reporting program. It may include R&D carried out on behalf of another program on a cost recovery basis.

Item 2. Contracts – payments to organizations or individuals outside the federal government for the conduct of R&D by the recipient or to provide support for the federal government's in-house R&D program.

a) **R&D Contracts** – contracts to an outside institution or individual to fund R&D performed by the institution or individual. The criterion is: would the performer report the contract as intramural government-funded R&D if asked? If the answer is yes the activity would be an R&D contract, if no it would be a supporting contract. Contracts to other federal government departments should be reported as a transfer of funds on page 7 of the questionnaire.

b) **Supporting contracts** – contracts to an outside institution or individual to provide goods or services necessary to support the in-house R&D program. Examples are contracts with data processing firms for computing services, maintenance contracts for R&D facilities, or procurement contracts for specialized equipment which is not considered capital. The **total** amount reported for this activity should be reported under the **intramural** column on pages 1-3, 5 and 6 and should **not** be included in any of the extramural columns in the questionnaire.

Contracts for related scientific activities (RSA) should continue to be reported in the appropriate activity and performance sector spaces provided on the questionnaire.

Item 3. R&D grants and contributions – awards to organizations or individuals for the conduct of R&D and intended to benefit the recipients rather than provide the program with goods, services or information. These funds are normally identical to that portion of the budgetary 'grants and contributions' line object of expenditure which is devoted to R&D activities.

Grants and contributions for related scientific activities (RSA) are to be reported in the appropriate activity and performance sector spaces provided on the questionnaire.

Item 4. Research fellowships – awards to individuals for advanced research training and experience. Awards intended primarily to support the education of the recipients should be reported as education support.

Item 5 & 13. Administration of extramural programs – the costs of identifiable units engaged in the administration of contracts and grants and contributions for scientific activities that are to be performed outside the federal government. These expenditures should be broken down by the type of scientific activity supported, i.e. R&D or RSA.

Item 6 & 14. Expenditures on construction, acquisition or preparation of land, buildings, machinery and equipment are **capital expenditures.** All other expenditures are **current expenditures.**

II. **Related scientific activities**

Item 7. Scientific data collection – the gathering, processing, collating and analyzing of data on natural phenomena. These data are normally the results of surveys, routine laboratory analyses or compilations of operating records.

Data collected as part of an existing or proposed research project are charged to research. Similarly, the costs of analyzing existing data as part of a research project are R&D costs, even when the data were originally collected for some other purpose. The development of new techniques for data collection is also to be considered a research activity.

Examples of scientific data collection are routine geological, hydrographic, oceanographic and topographic surveys; routine astronomical observations; maintenance of meteorological records; and wildlife and fisheries surveys.

Item 8. Information services – all work directed to recording, classifying, translating and disseminating scientific and technological information. Included are the operations of scientific and technical libraries, S&T consulting and advisory services, the Patent Office, the publication of scientific journals and monographs, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily towards the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R&D, should be assigned to information services. The costs of printing and distributing reports from another activity, such as R&D, are normally attributable to that activity.

Item 9. Testing and standardization – work directed towards the establishment of national and international standards for materials, devices, products and processes, the calibration of secondary standards and non-routine quality testing. The development of new measures for standards, or of new methods of measuring or testing, is R&D and should be reported as such. Exclude routine testing such as monitoring radioactivity levels or soil tests before construction.

Item 10. Feasibility studies – technical investigations of proposed engineering projects to provide additional information required to reach decisions on implementation. Besides feasibility studies **per se**, the related activity of demonstration projects are to be included. Demonstration projects involve the operation of scaled-up versions of a facility or process, or data on factors such as costs, operational characteristics, market demand and public acceptance. Projects called 'demonstration projects' but which conform to the definition of R&D should be considered R&D. Once a facility or process is operated primarily to provide a service or to gain revenue, rather than as a demonstration, it should no longer be included with feasibility studies. In all demonstration projects, only the **net** costs should be considered. Examples of demonstration projects are the Spry Point Ark, the Geothermal Heating Project, Regina, and the Fluidized Bed Combustion System, P.E.I.

Item 11. Education support – grants to individuals or institutions on behalf of individuals which are intended to support the post-secondary education of students in technology and the natural sciences. General operating or capital grants are excluded. The activity includes the support of foreign institutions. Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Item 12. Museum services – the collecting, cataloguing, and displaying of specimens of the natural world or of representations of natural phenomena. The scientific activities of natural history museums, zoological and botanical gardens, aquaria, planitaria and nature reserves are included.

The activity involves a systematic attempt to preserve and display items from the natural world; in some ways it could be considered an extension of information services. Parks which are not primarily restricted reserves for certain fauna or flora are excluded. In all cases the costs of providing entertainment and recreation to visitors should be excluded (e.g. restaurants, children's gardens and nurseries).

If practical, resources of museums and like institutions devoted to other activities such as R&D or information services should be excluded from museum services and assigned to those activities.

When a museum covers not only natural history but also aspects of human cultural activities, the museum's resources should be apportioned between the natural and the social sciences. However, museums of science and technology which display artificial or synthetic objects and also illustrate the operation of scientific 'laws' should be considered as engaged in museum services in the social sciences.

Performers:

Intramural includes costs incurred for:

- scientific activities carried out by in-house personnel of units assigned to the program;
- the related acquisition of land, buildings, machinery and equipment for scientific activities;
- the administration of scientific activities by program employees;
- the purchase of goods and services to support in-house scientific activities.

The intramural expenditures reported for scientific activities are those direct costs, including salaries, associated with scientific programs. The costs should include that portion of a program's contribution to employee benefit plans (e.g., superannuation) which is applicable to the scientific personnel within the program. Non-program ("indirect") costs such as the value of services provided by other departments without charge and accommodation provided by the reporting program are to be excluded.

Canadian industry – business and government enterprises including public utilities and government-owned firms. Incorporated consultants providing scientific and engineering services are also included. Industrial research institutes located at Canadian universities are considered to be in the university sector.

Canadian universities – including affiliated institutes owned, administered or staffed by universities.

Canadian non-profit institutions – charitable foundations, voluntary health organizations, scientific and professional societies, and other organizations not established to earn profits. Non-profit institutions primarily serving or controlled by another sector should be included in the controlling sector (e.g. the Pulp and Paper Research Institute is in Canadian Industry).

Canadian provincial and municipal governments – departments and agencies of these governments. Government enterprises, such as provincial utilities are included in the Canadian industry sector, and hospitals in the Canadian non-profit institutions sector.

Foreign performers – all foreign government agencies, foreign companies (including foreign subsidiaries of Canadian firms), international organizations, non-resident foreign nationals and Canadians studying or teaching abroad.

Other performers – include provincial research councils, and individuals or organizations in Canada not belonging to any of the above sectors.

4. PERSON-YEARS

4.1 Intramural expenditure data should be supported by data on the person-years devoted to scientific activities by all the employees engaged in these activities.

4.2 Questionnaire page 4:

PERSON-YEARS ON INTRAMURAL SCIENTIFIC ACTIVITIES IN THE NATURAL SCIENCES

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Category	1986/87				1987/88				1988/89			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
Executive												
Scientific and professional												
Administrative and foreign service												
Technical												
Administrative support												
Operational												
Military personnel												
Total												

KEY

A: Personnel engaged in R & D
B: Personnel engaged in related scientific activities
C: Personnel engaged in the administration of extramural programs

5-4600-100

Page 4 of 7

4.3 **Person-year** – a measure of the time actually devoted to the conduct of science activities. An employee who is engaged in scientific activities for half a year has a person-year equivalence of 0.5. Personnel data reported should be consistent with expenditure data.

5. APPLICATION AREAS

5.1 The application areas listed on the questionnaire do not represent the full range of possible applications. They do, however, attempt to cover the major areas of current economic, political and technological interest. In many instances projects do have multiple applications and a department should assign its expenditures to the various applications consistent with the stated objective of the department. Care must be taken to avoid "double counting".

5.2 Please list on page 5 the total expenditures on scientific activities in each of the application areas. On page 6 please list only the expenditures for R&D activities in the application areas. On both pages distinguish between intramural and extramural expenditures.

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
TOTAL SCIENTIFIC EXPENDITURES IN THE APPLICATION AREAS*

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1. Advancement of science – Basic						
2. Strategic						
3. Communications						
4. Culture and recreation						
5. Developing nations						
6. Energy						
7. Environmental issues – Air						
8 Land						
9. Water						
10 Other						
11 Food – Agriculture						
12 Fisheries						
13. Health						
14. Housing and urban development (includes construction)						
15 Manufacturing technologies						
16 Northern development						
17. Oceans						
18. Policy development (includes official languages)						
19 Resources – Forestry						
20 Mineral						
21 Water						
22 Other						
23 Security – Domestic						
24 National defence						
25 Social development and welfare						
26 Space						
27 Transportation						
28 Other						
TOTAL EXPENDITURES						

*NOTE: EXPENDITURES LISTED ON THIS PAGE INCLUDE THE R&D EXPENDITURES

Page 5 of 7

5-4600-100

Item 1. Advancement of science – basic – activities motivated by scientific curiosity with the objective of increasing scientific knowledge.

Item 2. Advancement of science – strategic – activities in support of background knowledge in fields of identified strategic importance. At this time these are: microelectronics and related information technologies, biotechnology and advanced industrial materials. The basic impulse for strategic research is primarily technological need. When the investigation of a strategic field is concerned with specific applications, expenditures should be assigned to the relevant areas.

Item 3. Communications – activities in support of the development and regulation of communication services, including telecommunications.

Item 4. Culture and recreation – activities related to the development and promotion of artistic, cultural, fitness, sport and recreational activities.

Item 5. Developing nations – activities towards the economic, technical, educational and social development of developing nations.

Item 6. Energy – activities concerned with the production, use, transmission, and conservation of energy resources of all types.

Item 7-10. Environmental issues – activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R&D on diseases caused by pollution should be reported under the health application. Whenever possible, those activities dealing with air, land and water should be reported separately.

Item 11. Food – agriculture – activities supporting the primary industry of agriculture. The S&T activities for resources such as water should be included under the resources application.

Item 12. Food – fisheries – activities supporting the fishing industry. The S&T activities for resources such as water should be included under the resources application.

Item 13. Health – activities related to the maintenance of the physical well-being of the population. S&T activities involving food such as nutrition and food contaminants should be included under this application.

Item 14. Housing and urban development – activities for the building and designing of houses and in support of the orderly and rational development of urban areas and including activities related to general construction. Specialized construction is more appropriately considered under the relevant application such as agriculture or transportation.

Item 15. Manufacturing technology includes general S&T activities in support of industrial technologies or techniques and processes for example CADCAM and Robotics. This application also includes intramural operations of the federal government which are carried out to support industry as a whole, e.g. technical information services. It excludes support of specific applications, such as defence or energy, even when industry will probably benefit or carry out the work.

Item 16. Northern development – activities intended to advance the social, cultural, political and economic development of northern Canada. These activites are distinguished from other applications by the fact that their primary purpose is the development of the north. Socio-economic and certain other S&T activities of pipeline development specific to the north should also be included here.

Item 17. Oceans – activities related to investigations of the oceans and the development of ocean technology.

Item 18. Policy development – activities in support of general government functions, development of economic science and other policies for attainment of national goals and also includes activities related to the status of the two official languages in Canadian society and their compliance with the official language act.

Item 19–22. Resources – activities related to evaluation, development and management of national resources. Activities dealing with forestry, minerals and water should be separated. When a particular resource is studied because of its specific role in some other operation (e.g. water for agriculture or fisheries, or forestry for energy) the expenditures should be allocated to the primary application.

Item 23. Security – domestic – activities related to the protection of the citizen's life and property.

Item 24. Security – national defence – activities related to the security of the State from foreign intervention and civil disorder.

Item 25. Social development and welfare – activities related to social problems which include, for example, social services, consumer protection, working conditions and personnel development.

Item 26. Space – activities related to investigations of the upper atmosphere and outer space. Exploration may be carried out by satellites, rockets and balloons, or by ground-based means such as optical and radio telescopes. The development of satellites for other applications such as telecommunications or mineral location should be reported under the appropriate applications.

Item 27. Transportation – activities in support of the development and regulation of transportation services.

Item 28. Other – should be identified if more than one item and reported on separate sheet if necessary.

6. PROGRAM SUMMARY

6.1 The department or agency should summarize separately by program its total submission and identify that portion which represents expenditures on scientific activities.

6.2 Questionnaire page 7:

EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
PROGRAM SUMMARY

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

	1986/87	1987/88	1988/89
		($'000)	
1. Total Program			
11. Operating			
12. Capital			
13. Grants, contributions and other transfer payments			
14. Receipts and revenues credited to the vote			
Net expenditures (11 + 12 + 13 - 14)			
2. Program funds available for natural sciences			
21. Operating			
22. Capital			
23. Grants, contributions and other transfer payments			
24. Receipts and revenues credited to the vote			
Net expenditures on natural sciences (21 + 22 + 23 - 24)			
3. Transfers for natural science activities[1]			
31. Total transferred into this program			
32. Total transferred from this program			
NATURAL SCIENCE FUNDS REPORTED (21 + 22 + 23 + 31 - 32)	[2]	[3]	[4]

[1] The amount and the names of the originating and recipient programs should be identified on a separate page
[2] Must equal total expenditures, page 1
[3] Must equal total expenditures, page 2.
[4] Must equal total expenditures, page 3.

S-4600-100

Page 7 of 7

Item 31. Total transferred into this program – payments received by the reporting program from other federal government programs for services rendered in scientific activities. These funds should be included in the reporting program's breakdown of expenditures on each page of the questionnaire.

Item 32. Total transferred from this program – payments to other federal government programs for the conduct of scientific activities. These funds should be reported by the **recipient** programs as transfers into their programs and should not be included in the **reporting** program's breakdown of expenditures on pages 1-6 of the questionnaire.

Statistics Canada Statistique Canada

SCIENCE ADDENDUM TO MAIN ESTIMATES 1988/89

EXPENDITURES ON ACTIVITIES

IN THE

SOCIAL SCIENCES

Enquiries concerning this form should be directed to:

Bert Plaus
Project Leader
Public Sector
993-6347
Science, Technology and Capital Stock Division
Statistics Canada
Ottawa, Ontario
K1A 0T6

epartment or Agency:	Program:
nquiries to be directed to:	Date:
ame:	
osition title:	Telephone No.:

4600-102: 5-8-87 TB/CT-REG. B101534

Canada

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1986/87

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
				($'000)				
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. General purpose data collection								
8. Information services								
9. Economic and feasibility studies								
10. Operations and policy studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. TOTAL EXPENDITURES								[1]

[1] Must equal social science funds reported for 1986/87, page 7.

5-4600-102

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1987/88

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. General purpose data collection								
8. Information services								
9. Economic and feasibility studies								
10. Operations and policy studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. TOTAL EXPENDITURES								[1]

[1] Must equal social science funds reported for 1987/88, page 7.

5-4600-102

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1988/89

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. RESEARCH AND EXPERIMENTAL DEVELOPMENT								
Current expenditures:								
1. In-house R & D								
2. Contracts:								
(a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. RELATED SCIENTIFIC ACTIVITIES:								
Current expenditures:								
7. General purpose data collection								
8. Information services								
9. Economic and feasibility studies								
10. Operations and policy studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. TOTAL EXPENDITURES								[1]

[1] Must equal social science funds reported for 1988/89, page 7.

5-4600-102

PERSON-YEARS ON INTRAMURAL SCIENTIFIC ACTIVITIES IN THE SOCIAL SCIENCES

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Category	1986/87				1987/88				1988/89			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
Executive												
Scientific and professional												
Administrative and foreign service												
Technical												
Administrative support												
Operational												
Military personnel												
Total												

KEY

A: Personnel engaged in R & D
B: Personnel engaged in related scientific activities
C: Personnel engaged in the administration of extramural programs

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES
TOTAL SCIENTIFIC EXPENDITURES IN THE APPLICATION AREAS*

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1 Advancement of science – Basic						
2 Strategic						
3 Communications						
4 Culture and recreation						
5 Developing nations						
6 Energy						
7 Environmental issues – Air						
8 Land						
9 Water						
10 Other						
11 Food – Agriculture						
12 Fisheries						
13 Health						
14 Housing and urban development (includes construction)						
15 Manufacturing technologies						
16 Northern development						
17 Oceans						
18 Policy development (includes official languages)						
19 Resources – Forestry						
20 Mineral						
21 Water						
22 Other						
23 Security – Domestic						
24 National defence						
25 Social development and welfare						
26 Space						
27 Transportation						
28 Other						
TOTAL EXPENDITURES						

*NOTE: EXPENDITURES LISTED ON THIS PAGE INCLUDE THE R&D EXPENDITURES

5-4600-102

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIEN
R & D EXPENDITURES IN THE APPLICATION AREAS

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1 Advancement of science – Basic						
2 Strategic						
3 Communications						
4 Culture and recreation						
5 Developing nations						
6 Energy						
7 Environmental issues – Air						
8 Land						
9 Water						
10 Other						
11 Food – Agriculture						
12 Fisheries						
13 Health						
14 Housing and urban development (includes construction)						
15 Manufacturing technologies						
16 Northern development						
17 Oceans						
18 Policy development (includes official languages)						
19 Resources – Forestry						
20 Mineral						
21 Water						
22 Other						
23 Security – Domestic						
24 National defence						
25 Social development and welfare						
26 Space						
27 Transportation						
28 Other						
TOTAL EXPENDITURES						

5-4600-102

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES
PROGRAM SUMMARY

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

	1986/87	1987/88	1988/89
		($'000)	
1. Total Program			
11. Operating			
12. Capital			
13. Grants, contributions and other transfer payments			
14. Receipts and revenues credited to the vote			
Net expenditures (11 + 12 + 13 - 14)			
2. Program funds available for social sciences			
21. Operating			
22. Capital			
23. Grants, contributions and other transfer payments			
24. Receipts and revenues credited to the vote			
Net expenditures on social sciences (21 + 22 + 23 - 24)			
3. Transfers for social science activities[1]			
31. Total transferred into this program			
32. Total transferred from this program			
SOCIAL SCIENCE FUNDS REPORTED (21 + 22 + 23 + 31 - 32)	2	3	4

[1] The amount and the names of the originating and recipient programs should be identified on a separate page.
[2] Must equal total expenditures, page 1.
[3] Must equal total expenditures, page 2.
[4] Must equal total expenditures, page 3.

Statistics Canada Statistique Canada

GUIDE TO THE COLLECTION OF EXPENDITURE DATA IN THE SOCIAL SCIENCES

MAIN ESTIMATES
SCIENCE ADDENDUM
1988/89

Canada

GUIDE TO THE COLLECTION OF EXPENDITURE DATA IN THE SOCIAL SCIENCES

1. INTRODUCTION

1.1 This introduction is intended to provide an overview of the process of collecting science expenditure data; definitions of and explanatory notes on natural sciences, social sciences, scientific and technological activities, performance sectors, and other terms used are given in subsequent sections.

1.2 The collection of science expenditure data is organized by the Science, Technology and Capital Stock Division of Statistics Canada in cooperation with the Treasury Board Secretariat. Collection is carried out in conjunction with submissions by departments and agencies of their Main Estimates to the Treasury Board.

1.3 Collection is undertaken to gather essential data describing the recent, current and proposed state of the federal resources allocated to science. Federal science expenditures data are provided to the Ministry of State for Science and Technology (MOSST) who in turn use the data in the development of advice to MOSST's Minister and the Treasury Board Secretariat, as well as in policy development and in monitoring the implementation of science policies. Statistics Canada maintains historical expenditure series in natural sciences dating back to 1963 and to 1971 in the social sciences.

1.4 The basic reporting unit is the budgetary program of a department or agency. Each budgetary program forms the subject of separate scientific expenditure reports for the natural and for the social science activities within it. Both the program and the program activities within it may be scientific in whole or in part only. It is only expenditures on the scientific components of a program or its activity which are reported on. In some programs it will be difficult to distinguish between the natural and social sciences. However, some allocation must be made and in determining this allocation, the dominant orientation of the projects and the area of expertise of the personnel involved must be considered. Detailed definitions are given on the following pages.

1.5 On the questionnaires, the identified expenditures are looked at from several different viewpoints and in various subdivisions. Expenditures on **research and development** (R&D) and **related scientific activities** (RSA) are subdivided to provide an indication of the "what" of a department's scientific effort. Expenditures in each category of scientific activity are further subdivided into "current" and "capital" segments. Current expenditures are additionally subdivided by sector, to indicate the "where" and "by whom" the activity is performed (e.g., in industry, in universities).

Enquiries should be directed to:

Bert Plaus
Project Leader
Public Sector
993-6347

Science, Technology and Capital Stock Division
Statistics Canada
Ottawa, Ontario
K1A 0T6

1.6 The human resources allocated to scientific activities are summarized in terms of the involved categories of personnel (executive, scientific and professional, etc.) and the principle focus of their efforts (R&D, RSA, administration of extramural programs).

1.7 The "why" of the scientific activity is addressed by asking departments to identify areas of expenditure application (e.g. oceans, energy), as well as to summarize the sector of performance (intramural or extramural).

1.8 When completed, checked for consistency with previous reports, entered into the data base and totalled along the various dimensions, these data provide snapshots of the federal resources allocated to science, supporting not only the work of central agencies but also the submissions of departments and agencies requesting resources.

2. GENERAL

2.1 In order to assist departments in the preparation of science expenditure reports, **computer print-outs of data previously submitted at the time of Main Estimates** are provided.

2.2 The remainder of this guide consists of definitions/explanations for terms used in the questionnaire. In order to make these as readily identifiable as possible, they are arranged by questionnaire page number.

2.3 The term **social sciences** is to be regarded as synonymous with social sciences and humanities and thus embraces all disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans. Included are such disciplines as anthropology, business administration and commerce, communications, criminology, demography, economics, geography, history, languages, literature and linguistics, law, library science, philosophy, political science, psychology, religious studies, social work, sociology, and urban and regional studies.

2.4 The **natural sciences** consist of disciplines concerned with understanding, exploring, developing or utilizing the natural world. Included are the engineering, mathematical, life and physical sciences.

3. ACTIVITIES/PERFORMERS

3.1 Pages 1-3 refer to different fiscal years and the headings of all three are identical. One set of definitions/explanations therefore suffices.

3.2 Actual and planned expenditures on scientific and technological activities are to be classified according to the type of scientific activity and the performance sector in which the activities were or will be conducted.

3.3 **Scientific and technological (S&T) activities** are required for the generation, dissemination or initial application of the new S&T knowledge. The central activity is scientific **research and experimental development** (R&D). In addition there are a number of activities closely related to R&D, and are termed **related scientific activities** (RSA). Those identified as being appropriate for the federal government in the social sciences are: general purpose data collection, information services, economic and feasibility studies, operations and policy studies, education support, and museum services.

3.4 The **performer** is equivalent to the sector in which the scientific activity is conducted. The basic distinction is between intramural and extramural performance. Extramural payments are classified on the basis of the performance sectors to which they are made. The appropriate extramural performers are Canadian industry, Canadian universities, Canadian non-profit institutions, foreign performers, Canadian provincial and municipal governments, and other performers.

3.5 Questionnaire pages 1-3:

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES:
EXPENDITURES BY ACTIVITY

FISCAL YEAR 1986/87

Department _____

Program _____

Activity \ Performer	Intramural	Canadian industry	Canadian universities	Canadian non-profit institutions	Provincial and municipal gvts.	Foreign performers	Other	Total
	($'000)							
I. **RESEARCH AND EXPERIMENTAL DEVELOPMENT** Current expenditures:								
1. In-house R & D								
2. Contracts: (a) R & D contracts								
(b) Supporting contracts								
3. R & D grants and contributions								
4. Research fellowships								
5. Administration of extramural programs								
6. Capital expenditures								
II. **RELATED SCIENTIFIC ACTIVITIES:** Current expenditures:								
7. General purpose data collection								
8. Information services								
9. Economic and feasibility studies								
10. Operations and policy studies								
11. Education support								
12. Museum services								
13. Administration of extramural programs								
14. Capital expenditures								
III. **TOTAL EXPENDITURES**								[1]

[1] Must equal social science funds reported for 1986/87, page 7.

5-4600-102

Activities:

I. **Research and experimental development** (R&D) – creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humans, culture and society and the use of this stock of knowledge to devise new applications.

R&D requires the acquisition of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the re-evaluation of existing observations.

An R&D project generally has three characteristics:

- a substantial element of uncertainty, novelty and innovation;
- a well-defined project design;
- a report on the procedures and results of the projects.

Examples:

1. Investigation of the factors determining regional variations in economic growth.
2. Studies of the effects of an urban development scheme on family group cohesiveness.
3. Investigation of the variables effecting the educational performance of children drawn from different social and ethnic groups.
4. Development of reward systems which take into account the differing motives, attitudes and perception of management and workers.

Both "research" and "development" are often used with different meanings in the government. For example, it is increasingly common to hear that a person is "researching" something (i.e. the person is looking for information about something). Similarly, there are many units with either "research" or "development" or both terms in their titles which are concerned primarily with information gathering, speech writing, preparation of position papers or departmental organization. These should be excluded from the scientific activity of R&D.

"Many social scientists perform work in which they bring the established methodologies and facts of the social sciences to bear upon a particular problem, but which cannot be classified as research. The following are examples of work which might be included in this category and are **not** R&D: interpretative commentary on the probable economic effects of a change in the tax structure, using existing economic data; forecasting future changes in the pattern of the demand for social services within a given area arising from an altered demographic structure; operations research as a contribution to decision-making, e.g. planning the optimal distribution system for a factory; the use of standard techniques in applied psychology to select and classify industrial and military personnel, students, etc., and to test children with reading or other disabilities".

Item 1. In-house R&D – R&D performed by personnel of the reporting program. It may include R&D carried out on behalf of another program on a cost recovery basis.

Item 2 Contracts – payments to organizations or individuals outside the federal government for the conduct of R&D by the recipient or to provide support for the federal government's in-house R&D program.

a) **R&D Contracts** – contracts to an outside institution or individual to fund R&D **performed** by the institution or individual. The criterion is: would the performer report the contract as intramural government-funded R&D if asked? If the answer is yes the activity would be an R&D contract, if no it would be a supporting contract. Contracts to other federal government departments should be reported as a transfer of funds on page 7 of the questionnaire.

b) **Supporting contracts** – contracts to an outside institution or individual to provide goods or services necessary to support the in-house R&D program. Examples are contracts with data processing firms for computing services, maintenance contracts for R&D facilities, or procurement contracts for specialized equipment which is not considered capital. The **total** amount reported for this activity should be reported under the **intramural** column on pages 1-3, 5 and 6 and should **not** be included in any of the extramural columns in the questionnaire.

Contracts for related scientific activities (RSA) should continue to be reported in the appropriate activity and performance sector spaces provided on the questionnaire.

Item 3. R&D grants and contributions – awards to organizations or individuals for the conduct of R&D and intended to benefit the recipients rather than provide the program with goods, services or information. These funds are normally identical to that portion of the budgetary "grants and contributions" line object of expenditure which is devoted to R&D activities.

Grants and contributions for related scientific activities (RSA) are to be reported in the appropriate activity and performance sector spaces provided on the questionnaire.

Item 4. Research fellowships – awards to individuals for advanced research training and experience. Awards intended primarily to support the education of the recipients should be reported as education support.

Item 5 & 13. Administration of extramural programs – the costs of identifiable units engaged in the administration of contracts and grants and contributions for scientific activities that are to be performed outside the federal government. These expenditures should be broken down by the type of scientific activity supported, i.e. R&D or RSA.

Item 6 & 14. Expenditures on construction, acquisition or preparation of land, buildings, machinery and equipment are **capital expenditures.** All other expenditures are **current expenditures.**

II. **Related scientific activities**

Item 7. General purpose data collection – the routine gathering, processing, collating, analysis and publication of information on human phenomena using surveys, regular and special investigations and compilations of existing records. It excludes data collected primarily for internal administrative purposes (e.g. departmental personnel statistics) as well as the collection of data as part of an R&D project.

Data collected as part of an existing or proposed research project are charged to research. Similarly, the costs of analyzing existing data as part of a research project are R&D costs, even when the data were originally collected for some other purpose. The development of new techniques for data collection is also to be considered a research activity.

The institutions involved are generally the statistical bureaux of Canadian governments and the statistical sections of departments and agencies. If there are units whose principal activity is R&D, their costs and personnel should be assigned to R&D; specialized libraries with separate budgets should be assigned to information services.

Item 8. Information services – all work directed to recording, classifying, translating and disseminating scientific and technological information. Included are the operations of scientific and technical libraries, S&T consulting and advisory services, the Patent Office, the publication of scientific journals and monographs, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily towards the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R&D, should be assigned to information services. The costs of printing and distributing reports from another activity, such as R&D, are normally attributable to that activity.

Item 9. Economic and feasibility studies – investigations of the socio-economic characteristics and implications of specific situations. Such studies are generally limited to a specific problem and involve the application of established social science techniques and methodologies. Examples are a study of the viability of an iron foundry in a foreign country, and a cost-benefit study of a proposed paper manufacturing centre in Manitoba.

Item 10. Operations and policy studies – the analysis and assessment of departmental programs, policies and operations, the activities of units concerned with the continuing analysis and monitoring of external phenomena (e.g. foreign economic statistics, defence and security information) as well as studies to provide an information base for policy development. The work is carried out by specialized units in some government departments, by consultants, by royal commissions and by task forces.

Item 11. Education support – grants to individuals or institutions intended to support the post-secondary education of students in the social sciences and humanities. General purpose grants to educational institutions are excluded. The activity includes the support of foreign students in their studies of the social sciences at Canadian or foreign institutions. Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Item 12. Museum services – the collecting, cataloguing and displaying of specimens and representations relating to human history, social organization and creations. The activity involves a systematic attempt to preserve and display the works of human beings and to provide information on their works, history, and nature. The scientific activities of historical museums, archeological displays, and art galleries are included. In all cases, the costs of providing entertainment and recreation to visitors should be excluded (e.g. restaurants, children's gardens and museums).

If practical, resources of museums and like institutions devoted to other activities, such as R&D or information services should be excluded from museum services and assigned to those activities.

When a museum also covers aspects of natural history, the museum's operation should be divided between the social and natural sciences. However, museums of science and technology, war, etc., which display synthetic or artificial objects and may also illustrate the operations of certain technologies, should be considered as engaged in museum services in social sciences.

Performers:

Intramural includes costs incurred for:

- scientific activities carried out by in-house personnel of units assigned to the program;
- the related acquisition of land, buildings, machinery and equipment for scientific activities;
- the administration of scientific activities by program employees;
- the purchase of goods and services to support in-house scientific activities.

The intramural expenditures reported for scientific activities are those direct costs, including salaries, associated with scientific programs. The costs should include that portion of a program's contribution to employee benefit plans (e.g., superannuation) which is applicable to the scientific personnel within the program. Non-program ("indirect") costs such as the value of services provided by other departments without charge and accommodation provided by the reporting program are to be excluded.

Canadian industry – business and government enterprises including public utilities and government-owned firms. Incorporated consultants providing scientific and engineering services are also included. Industrial research institutes located at Canadian universities are considered to be in the university sector.

Canadian universities – including affiliated institutes owned, administered or staffed by universities.

Canadian non-profit institutions – charitable foundations, voluntary health organizations, scientific and professional societies, and other organizations not established to earn profits. Non-profit institutions primarily serving or controlled by another sector should be included in the controlling sector (e.g. the Pulp and Paper Research Institute is in Canadian Industry).

Canadian provincial and municipal governments – departments and agencies of these governments. Government enterprises, such as provincial utilities are included in the Canadian industry sector, and hospitals in the Canadian non-profit institutions sector.

Foreign performers – all foreign government agencies, foreign companies (including foreign subsidiaries of Canadian firms), international organizations, non-resident foreign nationals and Canadians studying or teaching abroad.

Other performers – include provincial research councils, and individuals or organizations in Canada not belonging to any of the above sectors.

4. PERSON-YEARS

4.1 Intramural expenditure data should be supported by data on the person-years devoted to scientific activities by all the employees engaged in these activities.

4.2 Questionnaire page 4:

PERSON-YEARS ON INTRAMURAL SCIENTIFIC ACTIVITIES IN THE SOCIAL SCIENCES

FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

Category	1986/87				1987/88				1988/89			
	A	B	C	Total	A	B	C	Total	A	B	C	Total
Executive												
Scientific and professional												
Administrative and foreign service												
Technical												
Administrative support												
Operational												
Military personnel												
Total												

KEY

A: Personnel engaged in R & D
B: Personnel engaged in related scientific activities
C: Personnel engaged in the administration of extramural programs

5-4600-102

4.3 **Person-year** – a measure of the time actually devoted to the conduct of science activities. An employee who is engaged in scientific activities for half a year has a person-year equivalence of 0.5. Personnel data reported should be consistent with expenditure data.

5. APPLICATION AREAS

5.1 The application areas listed on the questionnaire do not represent the full range of possible applications. They do, however, attempt to cover the major areas of current economic, political and technological interest. In many instances projects do have multiple applications and a department should assign its expenditures to the various applications consistent with the stated objective of the department. Care must be taken to avoid "double counting".

5.2 Please list on page 5 the total expenditures on scientific activities in each of the application areas. On page 6 please list only the expenditures for R&D activities in the application areas. On both pages distinguish between intramural and extramural expenditures.

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES
TOTAL SCIENTIFIC EXPENDITURES IN THE APPLICATION AREAS*

Department _____

FISCAL YEARS 1986/87 1987/88 1988/89

Program _____

Application areas	1986/87		1987/88		1988/89	
	Intramural	Extramural	Intramural	Extramural	Intramural	Extramural
	($'000)					
1. Advancement of science – Basic						
2. Strategic						
3. Communications						
4. Culture and recreation						
5. Developing nations						
6. Energy						
7. Environmental issues – Air						
8 Land						
9 Water						
10 Other						
11 Food – Agriculture						
12 Fisheries						
13. Health						
14 Housing and urban development (includes construction)						
15 Manufacturing technologies						
16 Northern development						
17 Oceans						
18. Policy development (includes official languages)						
19 Resources – Forestry						
20. Mineral						
21 Water						
22 Other						
23 Security – Domestic						
24 National defence						
25 Social development and welfare						
26 Space						
27 Transportation						
28 Other						
TOTAL EXPENDITURES						

*NOTE: EXPENDITURES LISTED ON THIS PAGE INCLUDE THE R&D EXPENDITURES

5-4600-102

Page 5 of 7

Item 1. Advancement of science – basic – activities motivated by scientific curiosity with the objective of increasing scientific knowledge.

Item 2. Advancement of science – strategic – activities in support of background knowledge in fields of identified strategic importance. At this time these are: microelectronics and related information technologies, biotechnology and advanced industrial materials. Thhe basic impulse for strategic is primarily technological need. When the investigation of a strategic field is concerned with specific applications, expenditures should be assigned to the relevant areas.

Item 3. Communications – activities in support of the development and regulation of communication services, including telecommunications.

Item 4. Culture and recreation – activities related to the development and promotion of artistic, cultural, fitness, sport and recreational activities.

Item 5. Developing nations – activities towards the economic, technical, educational and social development of developing nations.

Item 6. Energy – activities concerned with the production, use, transmission, and conservation of energy resources of all types.

Item 7-10. Environmental issues – activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R&D on diseases caused by pollution should be reported under the health application. Whenever possible, those activities dealing with air, land and water should be reported separately.

Item 11. Food – agriculture – activities supporting the primary industry of agriculture. The S&T activities for resources such as water should be included under the resources application.

Item 12. Food – fisheries – activities supporting the fishing industry. The S&T activities for resources such as water should be included under the resources application.

Item 13. Health – activities related to the maintenance of the physical well-being of the population. S&T activities involving food such as nutrition and food contaminants should be included under this application.

Item 14. Housing and urban development – activities for the building and designing of houses and in support of the orderly and rational development of urban areas and including activities related to general construction. Specialized construction is more appropriately considered under the relevant application such as agriculture or transportation.

Item 15. Manufacturing technology includes general S&T activities in support of industrial technologies or techniques and processes for example CADCAM and Robotics. This application also includes intramural operations of the federal government which are carried out to support industry as a whole, e.g. technical information services. It excludes support of specific applications, such as defence or energy, even when industry will probably benefit or carry out the work.

Item 16. Northern development – activities intended to advance the social, cultural, political and economic development of northern Canada. These activites are distinguished from other applications by the fact that their primary purpose is the development of the north. Socio-economic and certain other S&T activities of pipeline development specific to the north should also be included here.

Item 17. Oceans – activities related to investigations of the oceans and the development of ocean technology.

Item 18. Policy development – activities in support of general government functions, development of economic science and other policies for attainment of national goals and also includes activities related to the status of the two official languages in Canadian society and their compliance with the official language act.

Item 19–22. Resources – activities related to evaluation, development and management of national resources. Activities dealing with forestry, minerals and water should be separated. When a particular resource is studied because of its specific role in some other operation (e.g. water for agriculture or fisheries, or forestry for energy) the expenditures should be allocated to the primary application.

Item 23. Security – domestic – activities related to the protection of the citizen's life and property.

Item 24. Security – national defence – activities related to the security of the State from foreign intervention and civil disorder.

Item 25. Social development and welfare – activities related to social problems which include, for example, social services, consumer protection, working conditions and personnel development.

Item 26. Space – activities related to investigations of the upper atmosphere and outer space. Exploration may be carried out by satellites, rockets and balloons, or by ground-based means such as optical and radio telescopes. The development of satellites for other applications such as telecommunications or mineral location should be reported under the appropriate applications.

Item 27. Transportation – activities in support of the development and regulation of transportation services.

Item 28. Other – should be identified if more than one item and reported on separate sheet if necessary.

6. PROGRAM SUMMARY

6.1 The department or agency should summarize separately by program its total submission and identify that portion which represents expenditures on scientific activities.

6.2 Questionnaire page 7:

EXPENDITURES ON ACTIVITIES IN THE SOCIAL SCIENCES
PROGRAM SUMMARY
FISCAL YEARS 1986/87 1987/88 1988/89

Department _____

Program _____

	1986/87	1987/88	1988/89
		($'000)	
1. Total Program			
11. Operating			
12. Capital			
13. Grants, contributions and other transfer payments			
14. Receipts and revenues credited to the vote			
Net expenditures (11 + 12 + 13 - 14)			
2. Program funds available for social sciences			
21. Operating			
22. Capital			
23. Grants, contributions and other transfer payments			
24. Receipts and revenues credited to the vote			
Net expenditures on social sciences (21 + 22 + 23 - 24)			
3. Transfers for social science activities[1]			
31. Total transferred into this program			
32. Total transferred from this program			
SOCIAL SCIENCE FUNDS REPORTED (21 + 22 + 23 + 31 - 32)	2	3	4

[1] The amount and the names of the originating and recipient programs should be identified on a separate page.
[2] Must equal total expenditures, page 1.
[3] Must equal total expenditures, page 2.
[4] Must equal total expenditures, page 3.

5-4600-102

Page 7 of 7

Item 31. Total transferred into this program – payments received by the reporting program from other federal government programs for services rendered in scientific activities. These funds should be included in the reporting program's breakdown of expenditures on each page of the questionnaire.

Item 32. Total transferred from this program – payments to other federal government programs for the conduct of scientific activities. These funds should be reported by the **recipient** programs as transfers into their programs and should not be included in the **reporting** program's breakdown of expenditures on pages 1-6 of the questionnaire.

STATISTICS CANADA STATISTIQUE CANADA

Canada

Science, Technology and Capital Stock Division

INVENTORY OF FEDERAL GOVERNMENT SCIENTIFIC AND TECHNOLOGICAL ESTABLISHMENTS IN THE NATURAL SCIENCES AND ENGINEERING, 1986-87.

Background

Regional information is required for government decentralization studies and for estimates of the regional balance of total science expenditures. Information requested in this exercise will serve as an updated inventory base facilitating future surveys, detailed studies or other projects. The results will be released as the Directory of Federal Scientific and Technological Establishments, 1987.

Instructions

You will find enclosed both blank questionnaires as well as a copy of your 1985-86 submission. Please update your 1985-86 submission to reflect 1986-87 information and also provide us with the total actual person-years utilized by the establishment in 1986-87. Use the blank questionnaire to report additional scientific establishments that are either new in 1986-87 or were overlooked in 1985-86.

Please forward the completed package by **September 11th 1987,** directly to:

Science, Technology and Capital Stock Division
Statistics Canada
6th Floor, Section D, Jean Talon Building
Tunney's Pasture
Ottawa, Ontario
K1A 0T6

For advice or assistance, please call **Bert Plaus** at (613) 993-6347 or **Janet Thompson** at (613) 991-2580.

Division des sciences, de la technologie et du stock de capital

INVENTAIRE DES ETABLISSEMENTS SCIENTIFIQUES ET TECHNOLOGIQUES DE L'ADMINISTRATION FEDERALE DANS LES SCIENCES NATURELLES ET EN GENIE, 1986-1987.

Généralités

Nous avons besoin de données régionales afin d'effectuer des études sur la décentralisation de l'Etat et d'établir des estimations de la répartition par région des dépenses totales au titre des activités scientifiques. Les données demandées dans la présente exercice serviront à l'établissement d'un répertoire à jour qui facilitera la réalisation d'enquêtes, d'études détaillées ou d'autres projets. Les résultats paraîtront dans le Répertoire des établissements scientifiques et technologiques de l'administration fédérale, 1987.

Instructions

Vous trouverez ci-joint des questionnaires en blanc et une photocopie de votre soumission pour l'année 1985-1986. Veuillez réviser l'année 1985-1986 en relief avec l'information de l'année 1986-1987 et nous fournir un total actuel des années-personnes selon l'établissement de 1986-1987. Utilisez les questionnaires en blanc pour rapporter les établissements scientifiques additionnels qui sont nouveaux en 1986-1987 ou qui auraient été oubliés en 1985-1986.

Veuillez envoyer, au plus tard **le 11 septembre 1987,** l'ensemble des documents complétés ci-joints adresser à:

Division des sciences, de la technologie et du stock de capital
Statistique Canada
Immeuble Jean-Talon, 6^{e} étage, section D
Parc Tunney
Ottawa (Ontario)
K1A 0T6

Pour de plus amples renseignements, veuillez communiquer avec **Bert Plaus** au numéro (613) 993-6347 ou **Janet Thompson** au numéro (613) 991-2580.

Science, Technology and Capital Stock Division

Division des sciences, de la technologie et du stock de capital

INERNTORY OF FEDERAL GOVERNMENT SCIENTIFIC AND TECHNOLOGICAL ESTABLISHMENTS IN THE NATURAL SCIENCES AND ENGINEERING, 1986-87.

INVENTAIRE DES ETABLISSEMENTS SCIENTIFIQUES ET TECHNOLOGIQUES DE L'ADMINISTRATION FEDERALE DANS LES SCIENCES NATURELLES ET EN GENIE, 1986-1987.

Department or Agency - Ministère ou organisme: _____

Program - Programme: _____

1. Name of Scientific and Technological Establishment - Nom d'établissement scientifique et technologique:

_____

Address - Adresse:

Street / P.O. Box - Rue / C.P.: _____

_____

City - Ville: _____

Province: _____ Postal code - Code postal: _____

2. For Further information please contact - Pour plus de renseignements veuillez communiquer avec:

Contact name - Personne-ressource: _____

Title - Titre: _____

Telephone - Téléphone: _____

3. 1986-87 establishment personnel (person-years) - Personnel de l'établissement (années-personnes), 1986-1987:

_____ Total

Science, Technology and Capital Stock Division

Division des sciences, de la technologie et du stock de capital

INERNTORY OF FEDERAL GOVERNMENT SCIENTIFIC AND TECHNOLOGICAL ESTABLISHMENTS IN THE NATURAL SCIENCES AND ENGINEERING, 1986-87.

INVENTAIRE DES ETABLISSEMENTS SCIENTIFIQUES ET TECHNOLOGIQUES DE L'ADMINISTRATION FEDERALE DANS LES SCIENCES NATURELLES ET EN GENIE, 1986-1987.

4. Program description - Description du programme:

5. Special equipment (state of the art) - Equipement spécial (matériel d'avant-garde)

Science, Technology and Capital Stock Division

PAYMENTS TO EXTRAMURAL PERFORMERS FOR SCIENTIFIC ACTIVITIES

1986-87

Departments and agencies of the federal government are asked annually to identify the major recipients of their scientific payments. We are now requesting a detailed listing of the recipients of federal payments made in connection with a scientific activity, by science, activity, payment type and performer.

Please provide us with a list of 1986-87 science payments, including:

(1) name and address of the organization or individual receiving the payment;
(2) amount ($000);
(3) field of science: natural or social;
(4) type of payment: grant, contract or contribution;
(5) activity carried out by the performer: Research and Development (R&D) or a Related Scientific Activity (RSA);
(6) performing sectors: Canadian industries, Canadian universities, Canadian non-profit institutions, Canadian provincial and municipal governments, other Canadian performers, foreign performers;
(7) name of program (if applicable) - eg. Defence Industry Productivity Program (DIPP).

A suggested format is given below:

Name and Address	Amount ($000)	Science	Activity	Payment Type	Performer
XXX Company Limited 123 First Street Regina, Saskatchewan S5R 6R8	123	Natural	R&D	Contract	Industry
YYY Company Limited 345 Second Street Vancouver, British Columbia V5A 2T5	350	Natural	R&D	Grant	Industry

Lists containing the required data in some other format including tapes, disks, or modem connection are acceptable.

Expenditures reported on this submission should be comparable to the extramural expenditures, by sector and activity, shown on the estimate year in the 1987-88 Main Estimates Science Addendum (MESA) or equal to the 1986-87 values that will be reported on the 1988-89 MESA. A copy of data provided on the 1987-88 MESA is attached.

For further clarification of terms and definitions, please refer to the enclosed guide.

This information is being collected jointly on behalf of Statistics Canada and the Ministry of State for Science and Technology (MOSST) under Section 11 of the Statistics Act which states:

> "The Minister may enter into an agreement with any department of any municipal or other corporation for the exchange of information collected jointly with such department or corporation from a respondent and for subsequent tabulation or publication based on such information."

Science, Technology and Capital Stock Division

Included in this section of the act is the following provision:

> "The agreement shall not apply in respect of any respondent who gives notice in writing to the Chief Statistician that he/she objects to the sharing of the information between Statistics Canada and the department or corporation as the case may be."

Statistics Canada and MOSST have such an agreement for sharing information gathered in this exercise. The joint agreement shall not apply to data provided by a department or agency which has given the required notice to the office of the Chief Statistician.

When such notice has been given, such specified data will be held by Statistics Canada alone, as provided for in the Statistics Act. MOSST and Statistics Canada will maintain as confidential data obtained under this agreement.

Please forward the completed list by September 11, 1987 directly to:

Science, Technology and Capital Stock Division
Statistics Canada
6th Floor, Section D, Jean Talon Building
Tunney's Pasture
Ottawa, Ontario
K1A 0T6

For advice or assistance, please call **Bert Plaus** at (613) 993-6347 or **Janet Thompson** at (613) 991-2580.

SOME GUIDELINES:

(1) **Small Contracts**

Special attention should be given to contracts under $50,000. It has been found that the majority of these contracts are for services or in support of in-house research projects.

Support or service contracts should **not** be included with extramural payments. They are defined as contracts to an outside institution or individual to provide goods or services necessary to support in-house R&D programs and should be reported intramurally as supporting contracts on the MESA. Examples are contracts with data processing firms for computing services, maintenance contracts for R&D facilities, or procurement contracts for specialized equipment which is not considered capital.

Whenever possible, true R&D contracts of less than $50,000 can be aggregated and reported by science, activity and payment type, region and performing sector.

(2) **Recipients of payments to be classified as "other Canadian performers"**

Grants to universities on behalf of individuals can be included with the institution, eg. "Canadian university", while those made directly to the student without any indicated university affiliation should be included with "other Canadian performers".

Payments to Provincial Research Organizations or Councils should always be included with "other Canadian performers".

(3) **Discrepancies**

Reasons for large discrepancies in expenditures reported on this form and the estimate year in the 1987-88 MESA should be explained in your covering letter.

Statistics Canada Statistique Canada

Canada

Science, Technology and Capital Stock Division

EXPENDITURES AND PERSONNEL OF ESTABLISHMENTS
ENGAGED IN ACTIVITIES IN THE
SOCIAL SCIENCES AND HUMANITIES,
1986/87

DEPARTMENT OR AGENCY: _____

PROGRAM: _____

ENQUIRIES TO BE DIRECTED TO: _____

DATE: _____ PHONE: _____

REGION	TOTAL INTRAMURAL R&D	TOTAL INTRAMURAL S&T	TOTAL R&D PERSONNEL	TOTAL S&T PERSONNEL
	($ '000)		(PERSON-YEARS)	
NEWFOUNDLAND				
PRINCE EDWARD ISLAND				
NOVA SCOTIA				
NEW BRUNSWICK				
QUEBEC (EXCLUDING HULL)				
ONTARIO (EXCLUDING OTTAWA)				
OTTAWA				
HULL				
MANITOBA				
SASKATCHEWAN				
ALBERTA				
BRITISH COLUMBIA				
YUKON AND NORTHWEST TERRITORIES				
CANADA TOTAL (1)				

(1) As reported on "Main Estimates Science Addendum 1988/89", for year 1986/87.

Statistics Canada Statistique Canada

Canada

Science, Technology and Capital Stock Division

EXPENDITURES AND PERSONNEL OF SCIENTIFIC AND TECHNOLOGICAL ESTABLISHMENTS ENGAGED IN ACTIVITIES IN THE NATURAL SCIENCES AND ENGINEERING, 1986/87

DEPARTMENT OR AGENCY: _____

PROGRAM: _____

ENQUIRIES TO BE DIRECTED TO: _____

DATE: _____ PHONE: _____

REGION	TOTAL INTRAMURAL R&D	TOTAL INTRAMURAL S&T	TOTAL R&D PERSONNEL	TOTAL S&T PERSONNEL
	($ '000)		(PERSON-YEARS)	
NEWFOUNDLAND				
PRINCE EDWARD ISLAND				
NOVA SCOTIA				
NEW BRUNSWICK				
QUEBEC (EXCLUDING HULL)				
ONTARIO (EXCLUDING OTTAWA)				
OTTAWA				
HULL				
MANITOBA				
SASKATCHEWAN				
ALBERTA				
BRITISH COLUMBIA				
YUKON AND NORTHWEST TERRITORIES				
CANADA TOTAL (1)				

(1) As reported on "Main Estimates Science Addendum 1988/89", for year 1986/87.

PROVINCIAL GOVERNMENT

Statistics Canada has agreements with the governments of Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, and Saskatchewan to assist them to collect data on their S&T activities. Forms 1 and 2 are used, with minor provincial variations. Individual reports are provided to each government (subsequent dissemination is at the discretion of each provincial government). Aggregates are used, with estimates for the other provincial governments, to develop accounts for regional expenditures on R&D.

The third form is completed by the Alberta Research Council, the British Columbia Research Council, the Centre de recherche industrielle du Québec, the Manitoba Research Council, the New Brunswick Research and Productivity Council, the Nova Scotia Research Foundation, the Ontario Research Foundation, and the Saskatchewan Research Council. The information collected is published in "The Provincial Research Organizations", published in the monthly service bulletin, **Science Statistics**, Statistics Canada Catalogue No. 88-001.

PROVINCIAL GOVERNMENT ACTIVITIES

IN THE NATURAL SCIENCES

QUESTIONNAIRE AND GUIDE

FISCAL YEAR 1987-88

Si vous préférez obtenir ce questionnaire en français, veuillez cocher ☐

Ministry/Department or Agency		Reporting Unit	
Coordinator	Mailing Address		Telephone No.
Enquiries to be directed to		Telephone No.	Date

-4600-120.1: 24-2-88 TB/CT REG. B101536

INTRODUCTION

This questionnaire covers natural science activities funded by the provincial government. It includes expenditure and personnel data for research and development (R&D) and related scientific activities (RSA). All departments and agencies known to be conducting or funding activities in the natural sciences are included.

The classifications used in this questionnaire will not necessarily correspond to existing accounting systems or organizational units. Accurate data, therefore, depend on the good will and intelligent judgement of the responding officers. Information is required which describes the characteristics and magnitude of the department's activities; it is not a matter of decimal precision of data.

The data collected provide useful information for the development and analysis of provincial science policy. These statistics are also included with data collected from other sectors to provide national aggregates published by Statistics Canada. Data are released only with the approval of the provincial government.

This questionnaire includes only scientific activities in the natural sciences and engineering.

Natural sciences and engineering include the following disciplines:

Life sciences	– medical and biological
Physical sciences	– chemistry, physics and astronomy
Environmental sciences	– geology, oceanography and the study of the atmosphere
Engineering sciences	– architecture, civil engineering, etc.
Mathematical sciences	

If departmental scientific activities involve natural science disciplines, complete this questionnaire.

The social sciences and humanities include such disciplines as:

Anthropology	Law
Business administration and commerce	Library science
Communications	Philosophy
Criminology	Political science
Demography	Psychology
Economics	Religious studies
Geography	Social work
History	Sociology
Languages, literature and linguistics	Urban and regional studies

If departmental scientific activities involve these disciplines, complete the separate questionnaire on activities in the social sciences and humanities.

In many instances, particularly in health fields, it will be difficult to distinguish between the natural and social sciences. In such instances, however, some allocation must be made. Respondents should consider the main orientation of the projects involved and the field of training of the personnel in determining this allocation. Any measure which reflects the actual situation is acceptable.

Scientific Activities

The activities which concern us are those scientific and technological (S&T) activities which involve the generation, dissemination and initial application of new scientific and technological knowledge. The central activity is **research and experimental development** (R&D). In addition, there are a number of activities closely related to R&D and are termed **related scientific activities** (RSA). Included in this survey are: education support, technical surveys, information services, special services and studies, and museum services.

Research and Experimental Development

Research and experimental development (R&D) is defined as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use this knowledge in new applications.

The central characteristic of R&D is an appreciable element of novelty and of uncertainty. *New* knowledge, products or processes are sought. The work is normally performed by, or under the supervision of, persons with post-graduate degrees in the natural sciences or engineering.

R&D is generally carried out by specialized R&D units. However, an R&D project may also involve the use of non-R&D facilities (e.g., testing grounds), the purchase or construction of specialized equipment and materials, and the assistance of other units. Costs of such items, attributable to the project, are to be considered R&D costs.

R&D units may also be engaged in non-R&D activities such as technical advisory services, testing, and construction of special equipment for other units. So far as it is practical, the effort devoted to such operations should be excluded from R&D.

On the other hand, R&D may be carried out by units normally engaged in other functions (e.g., a marine survey ship used for hydrological research, a geological survey team directed to work in a certain area in order to provide data for a geophysical research project). Such effort is part of an R&D project and, again so far as is practical, the costs should be assigned to R&D expenditures.

Examples:

1. The development of new methods of identifying tree species and checking their condition is R&D; the use of recently developed methods, such as remote sensing and infra-red photography, as part of normal forestry surveys, is not.
2. The operation of a new transportation system as a demonstration project is not R&D; however the *creation* of the system as a *prototype* and the evaluation of its operations should be considered R&D.
3. Grants to provide equipment for an R&D laboratory are to be considered R&D; grants to provide the same equipment primarily for teaching or medical care should not be considered R&D.

Related Scientific Activities

Education support – grants to individuals or institutions which are intended to support the post-secondary education of students in the natural sciences and engineering. General operating or capital grants are excluded. Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Technical surveys – activities directed towards the exploration and systematic description of the earth and its natural resources.

The activities which make up technical surveys include the gathering, processing, collating and analyzing of data on natural phenomena except when part of a research project or a museum service. The preparation of maps and survey reports, their printing and cataloguing, are also included.

Typical technical surveys are regular geological, hydrographic, and topographic surveys; forest inventories; routine astronomic observations; establishment and maintenance of meteorological records; soil, plant, fisheries, and wildlife surveys; routine soil and water tests; and monitoring of radioactivity levels.

Information services – all work directed to recording, classifying, translating, and disseminating scientific and technological information (**Technology Transfer**). Included are the operations of scientific and technical libraries, the publication of scientific journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily toward the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R&D or technical surveys, should be assigned to information services. Advisory and consultancy services for Industry and Agriculture are part of information services. The costs of printing and distributing reports from activities such as technical surveys or R&D are attributable to those activities.

Special services and studies – work directed towards the establishment of national and provincial standards for materials, devices products and processes; the calibration of secondary standards; non-routine quality testing; feasibility studies and demonstration projects.

Feasibility studies are technical investigations of proposed engineering projects to provide additional information required to reach decisions on implementation. Demonstration projects involve the operation of scaled-up versions of a facility or process, or prototypes, after the R&D is completed, to provide additional data on factors such as costs, operational characteristics, market demand and public acceptance. Projects called "demonstration projects" but which conform to the definition of R&D should be considered R&D. Once a facility or process is operated primarily to provide a service or to gain revenue, rather than as a demonstration, it should no longer be considered in special services and studies. In all demonstration projects, only the *net* costs should be considered.

Museum services – comprise the collecting, cataloguing, and displaying of specimens of the natural world or representations of natural phenomena. The scientific activities of natural history museums, zoological and botanical gardens, acquaria, planitaria, and nature reserves are included.

The activity represents a systematic attempt to preserve and display items from the natural world; in some ways it could be considered an extension of information services. Parks which are not primarily restricted reserves for certain fauna or flora are not included. In all cases the costs of providing entertainment and recreation to visitors should be excluded (e.g., restaurants, children's gardens, and nurseries).

If practical, resources of such institutions devoted to other activities, such as R&D or Information services, should be excluded from museum services and assigned to those activities.

When a museum covers not only natural history but also aspects of human cultural activities, the museum's resources should be prorated between the natural and the social sciences. However, museums of science and technology, which display artificial or synthetic objects and also may illustrate the operations of scientific "laws", should be considered in museum services in the social sciences and humanities.

A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES (p.vi)

List those units (section/division/branch/station/group) of the department which carry out scientific activities and check the appropriate activities. If most of the units of a larger organization are engaged in the same activity, only the larger unit need be identified.

The list should help you to ensure that all the activities of the department are considered and that smaller units are not overlooked. It will also assist the data users to better understand the nature of the various scientific activities performed and could serve as a starting point for users requiring more information on some aspect of the the department's activities.

B. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES (p. vii)

Enter the name and city of each recipient of a major payment (≥$25,000) and enter the payment in the appropriate activity column. Both grants and contracts are included.

The information provided here will assist you to complete Question 1, the "key" question in the survey. It will also be used by Statistics Canada to ensure that major external performers of scientific activities are included in surveys of the other sectors.

Replies to this question will be treated as confidential by both Statistics Canada and the provincial government.

1. PERFORMERS OF SCIENTIFIC ACTIVITIES (p. 1 and 4)

Performers

Intramural – the reporting department. The scientific work is normally carried out by personnel assigned to the department and usually in facilities of the department. Also included are the administration of extramural programs, the costs of acquiring land, buildings and equipment to be used in scientific activities, and contracts to provide services required for scientific projects (e.g., rental of aircraft, computer services).

Industry – Canadian business and government enterprises. Include public utilities and government-owned firms as well as non-profit institutions and associations mainly serving industry and not controlled by another institution (e.g., Pulp & Paper Research Institute). Consultants providing scientific and engineering services are also included. Industrial research institutes affiliated with a university belong in the Universities sector.

Universities – Canadian universities and affiliated institutes owned, administered or staffed by them (e.g., Atlantic Industrial Research Institute of Nova Scotia Technical College). Teaching facilities in non-university hospitals are included.

Hospitals and health organizations – Canadian hospitals and health organizations which are not part of university medical schools.

Provincial research organizations – The Nova Scotia Research Council, the New Brunswick Research and Productivity Council, le Centre de recherche industrielle du Québec, the Ontario Research Foundation, the Manitoba Research Council, the Saskatchewan Research Council, the Alberta Research Council, and the Research Council of British Columbia.

Other – the federal government, other provincial government departments, municipal governments, individuals and institutions not identified with any other sector, and foreign performers.

Activities – the activities of R&D and RSA including education support, technical surveys, information services, special services and studies, and museum services have been defined above. These activities are further classified by type of expenditure.

Current expenditures – expenditures on items such as personnel, transportation and communications, information, professional and special services, rentals, purchased repair and upkeep, utilities, materials and supplies. Current expenditures for R&D are divided as follows:

> **In-house R&D** – R&D performed by personnel of the reporting department. It may include R&D carried out on behalf of another department and covered by a transfer of funds, as well as services provided by other organizations in support of an in-house R&D project (e.g. computing, transportation).
>
> **R&D contracts** – payments to other organizations to carry out R&D intended to directly benefit the reporting department. The administration of R&D contracts is an intramural cost.
>
> **R&D grants and contributions** – payments to other organizations (or individuals) for R&D intended basically to benefit the recipient of the grant. Contributions and loans should be considered as grants. The administration of R&D grants and contributions is an intramural cost.
>
> **Research fellowships** – payments to individuals for advanced research training and experience. The aim of the program should be research training rather than education.
>
> **Administration of extramural programs** – identifiable costs related to administration of contracts and grants and contributions for scientific activities that are to be performed outside the provincial government. The expenditures should be broken down by the type of scientific activity supported, i.e. R&D or RSA.

Capital expenditures – expenditures on the construction and acquisition of land, buildings, machinery, and equipment.

2. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES (p. 1)

This question identifies the sources of funds for the total expenditures on scientific activities reported in Question 1. It will help to ensure that work funded from outside the department is not overlooked.

From departmental budget – that portion of the total departmental budget which was spent on natural science activities.

From other departments – money transferred from another provincial department to this one for activities in the natural sciences. Include when applicable, provincial portions of any federal-provincial cost sharing programs and identify the program.

From the federal government – all funds from the federal government used for natural science activities. The funds are referred to as payments, contributions, transfers, etc. Also include federal portions of any federal-provincial cost sharing programs and identify the program.

From trust funds – all funds from trust funds used for natural science activities.

From other sources – all funds for natural science activities from sources not specified above such as reserve or lottery funds, revenues from sales or fees.

3. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES (p. 2 and 4)

The categories used to classify personnel will generally correspond to those used by the provincial government. The definitions given below indicate the training and educational level generally required for such categories. In all cases, however, consider the job classification, not the person's qualifications, because there will be some employees who exceed the qualifications required by the job (e.g., a person with a degree in a technical or clerical position).

Scientific and professional – people in jobs that require at least one academic degree or nationally recognized professional qualification (e.g., chartered accountant – C.A.) as well as those with equivalent experience.

Technical – people in jobs that require specialized vocational or technical training beyond the secondary level (e.g., community colleges and technical institutes) as well as those with experience equivalent to this training.

Other – clerical, secretarial, administrative, operational and other support personnel.

Data are requested by activity and category of employment in person-years or full-time equivalent. Persons engaged only in a scientific activity are considered one person-year. Those working part-time only on scientific activities are considered as a fraction corresponding to their involvement. Include both permanent and non-permanent employees.

Care should be taken to ensure that the personnel data reported are consistent with the expenditure data. This is the most common reason for questioning the validity of a return. It is suggested that respondents check this by dividing the reported total person-years into the intramural personnel costs reported in Question 4 to determine if the cost per person is a reasonable figure.

4. DETAIL OF INTRAMURAL EXPENDITURES (p. 2)

These data are useful for intra-departmental comparisons, for construction of constant dollar expenditures series, and for editing the question on personnel.

Some work is considered intramural although it is actually performed outside the department. The supplier of these goods and services does not consider them to be of a scientific nature. Examples are computing services purchased from another government department or the private sector, materials and supplies for the department's scientific activities, rental of accommodation or transportation. All non-capital expenditures of this nature are to be considered "other costs", even if the personnel costs portion of such purchases are known. "Personnel costs" are to be used only for the departmental personnel reported in the preceding question.

5. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES (p. 3 and 5)

The objectives listed are not mutually exclusive, nor do they represent the total range of possible objectives. They are, however, intended to cover the major areas of current economic, political and technological interest. This list is common to both the social and natural sciences.

Report expenditures under the objective which is primary to that expenditure. Generally, the objective selected should be consistent with the stated objectives of the reporting department.

Advancement of science – activities for the development of general scientific knowledge (e.g., general R&D grants to universities or support of fields such as astronomy and archaeology).

Communications – activities in support of the development and regulation of communication services, including telecommunications.

Energy and fuels:

Conservation – activities directed towards the conservation of energy (e.g., domestic and commercial buildings, vehicles and other transportation systems, industrial processes, etc.).

Fossil fuels – activities concerned with the exploration, extraction, refining and use of crude oils, natural gas and coal.

Hydro electric energy – activities directed towards the generation and use of hydro electric power.

Renewable resources – activities directed towards the exploration or use of solar, biomass, hydraulic, geothermal or peat energy.

Other (specify) – any other activities not covered by those listed above.

Environmental issues – activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R&D on diseases caused by pollution should be reported under the health objective. Those activities dealing with air, land and water should be reported separately.

Health – activities related to the maintenance and improvement of the physical well-being of the population.

Industrial and economic development:

Agriculture – activities which support the agricultural industry.

Fisheries – activities which support the fishing industry.

Forestry – activities which support the forestry industry.

Manufacturing – measures intended to achieve efficient and sustained growth in manufacturing industries, and the encouragement of the production of new goods and services.

Minerals – activities related to the location, extraction, processing, use and conservation of mineral resources (except fuels).

Other (specify) – any objectives not covered by those listed above.

Social development:

Culture, sport and recreation – activities related to the support and development of culture, physical fitness, sport and recreation. Include wilderness recreation and conservation of flora.

Education – education support, grants for education research, activities in support of education policy.

Human resources – activities directed towards the development and utilization of the labour force. Labour relations, personnel policy and training programs, demographic and immigration studies are included.

Urban and regional studies – studies directed towards understanding and improving life within urban and rural communities.

Other (specify) – other activities directed towards social well-being (e.g., administration of justice, consumer protection).

Transportation – activities in support of the development and regulation of transportation services.

Wildlife – activities in support of the conservation and preservation of wildlife.

Other (specify) – any objectives not covered by those listed above.

NS

1 (8)

Province _____

Ministry/Department _____

A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page ii)

Unit	R&D	Education support	Technical surveys	Information services	Special services and studies	Museum services	Admin. of extramural RSA progran
				(√)			

DESCRIPTION OF INTRAMURAL ACTIVITIES

Briefly describe the intramural scientific activities of the reporting department. Describe major current projects rather than overall programs. Attach any relevant material (papers, annual reports, etc.) which provide descriptions of departmental activities.

1 (7)

Province _____

Ministry/Department _____

MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

Recipient	R&D	Education support	Technical surveys	Information services	Special services and studies	Museum services
	$000					

DESCRIPTION OF EXTRAMURAL ACTIVITIES

Briefly describe extramural projects or programs and identify the performing sectors.
If descriptive material or lists of projects are available they may be submitted in lieu of completing this question.

NS

15 (76)

Province _____

Ministry/Department _____

1. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

Scientific activity	Intramural activities	Payments to: Industry	Universities	Hospitals and health organizations	Provincial research organizations	Other	Total 1987-88
	$000						
Research and experimental development (R&D):							
Current expenditures:							
1. In-house R&D							
2. R&D contracts							
3. R&D grants and contributions							
4. Research fellowships							
5. Administration of extramural R&D programs							
6. **Sub-total** (1 + 2 + 3 + 4 + 5)							
7. Capital expenditures							
Related scientific activities (RSA):							
Current expenditures:							
8. Education support							
9. Technical surveys							
10. Information services							
11. Special services and studies							
12. Museum services							
13. Administration of extramural programs							
14. Capital expenditures							
15. **TOTAL EXPENDITURES**							

2. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

6 – (6)

	$000
1. From departmental budget	
2. From other departments	
3. From federal government (specify source)	
4. From trust funds	
5. From other sources (reserve or lottery funds, revenues from sales or fees)	
6. **TOTAL EXPENDITURES**	

5-4600-120.1

NS

Province _____

Ministry/Department _____

(4) – (16)

. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iv)

Category	R&D	Related scientific activities	Administration of extramural programs	Total 1987-88
	Person-years			
. Scientific and professional				
. Technical				
. Other				
. TOTAL PERSONNEL				

. DETAIL OF INTRAMURAL EXPENDITURES, 1987-88 (Instructions – Page iv)

Current expenditures:	$000
. Total estimated personnel costs	
. Other costs (e.g., computing services, materials and supplies, rentals)	
. Sub-total, current expenditures	
Capital expenditures:	
. Land and buildings	
. Machinery and equipment	
. Sub-total, capital expenditures	
. TOTAL INTRAMURAL EXPENDITURES	1

Equal to Question 1: column 1, row 15.

(7) – (7)

5-4600-120.1

NS

27 – (135)

Province _____

Ministry/Department _____

5. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iv)

Objective	Intramural		Extramural		Total 1987-8
	R&D	Related scientific activities	R&D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Conservation					
4. Fossil fuels					
5. Hydro electric energy					
6. Renewable resources					
7. Other (specify) _____					
Environmental issues:					
8. Air					
9. Land					
10. Water					
11. Other (specify) _____					
12. Health					
Industrial and economic development:					
13. Agriculture					
14. Fisheries					
15. Forestry					
16. Manufacturing					
17. Minerals					
18. Other (specify) _____					
Social development:					
19. Culture, sport and recreation					
20. Education					
21. Human resources					
22. Urban and regional studies					
23. Other (specify) _____					
24. Transportation					
25. Wildlife					
26. Other (specify) _____					
27. TOTAL	1	2	3	4	

[1] Equal to Question 1: column 1, rows 6 and 7.
[2] Equal to Question 1: column 1, rows 8, 9, 10, 11, 12, 13 and 14.
[3] Equal to Question 1: columns 2, 3, 4, 5 and 6, row 6.
[4] Equal to Question 1: columns 2, 3, 4, 5 and 6, rows 8, 9, 10, 11 and 12.

5-4600-120.1

S

15 - (79)

Province _____

Ministry/Department _____

PERFORMERS OF SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iii)

Scientific activity	Intramural activities	Payments to: Industry	Universities	Hospitals and health organizations	Provincial research organizations	Other	Total 1988-89
	$000						
esearch and experimental development (R&D):							
urrent expenditures:							
In-house R&D							
R&D contracts							
R&D grants and contributions							
Research fellowships							
Administration of extramural R&D programs							
Sub-total (1 + 2 + 3 + 4 + 5)							
Capital expenditures							
elated scientific activities (RSA):							
urrent expenditures:							
Education support							
Technical surveys							
Information services							
Special services and studies							
Museum services							
Administration of extramural programs							
Capital expenditures							
TOTAL EXPENDITURES							

DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iv)

4 - (16)

Category	R&D	Related scientific activities	Administration of extramural programs	Total 1988-89
	Person-years			
Scientific and professional				
Technical				
Other				
TOTAL PERSONNEL				

NS

22 – (135)

Province _____

Ministry/Department _____

8. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iv)

Objective	Intramural		Extramural		Total 1988-8
	R&D	Related scientific activities	R&D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Conservation					
4. Fossil fuels					
5. Hydro electric energy					
6. Renewable resources					
7. Other (specify) _____					
Environmental issues:					
8. Air					
9. Land					
10. Water					
11. Other (specify) _____					
12. Health					
Industrial and economic development:					
13. Agriculture					
14. Fisheries					
15. Forestry					
16. Manufacturing					
17. Minerals					
18. Other (specify) _____					
Social development:					
19. Culture, sport and recreation					
20. Education					
21. Human resources					
22. Urban and regional studies					
23. Other (specify) _____					
24. Transportation					
25. Wildlife					
26. Other (specify) _____					
27. TOTAL	1	2	3	4	

[1] Equal to Question 6: column 1, rows 6 and 7.
[2] Equal to Question 6: column 1, rows 8, 9, 10, 11, 12, 13 and 14.
[3] Equal to Question 6: columns 2, 3, 4, 5 and 6, row 6.
[4] Equal to Question 6: columns 2, 3, 4, 5 and 6, rows 8, 9, 10, 11 and 12.

5-4600-120 1

PROVINCIAL GOVERNMENT ACTIVITIES
IN THE SOCIAL SCIENCES AND HUMANITIES

QUESTIONNAIRE AND GUIDE

FISCAL YEAR 1987-88

Si vous préférez obtenir ce questionnaire en français, veuillez cocher ☐

Ministry/Department or Agency		Reporting Unit
Coordinator	**Mailing Address**	**Telephone No.**
Enquiries to be directed to	**Telephone No.**	**Date**

-4600-121.1: 6-4-88 STC/SCT - 465 - 60325

INTRODUCTION

This questionnaire covers activities in the social sciences and humanities funded by the provincial government. It includes expenditure and personnel data for research and development (R&D) and related scientific activities (RSA). All departments and agencies known to be conducting or funding activities in the social sciences are included.

The classifications used in this questionnaire will not necessarily correspond to existing accounting systems or organizational units. Accurate data, therefore, depend on the good will and intelligent judgement of the responding officers. Information is required which describes the characteristics and magnitude of the department's scientific activities; it is not a matter of decimal precision of data.

The data collected provide useful information for the development and analysis of provincial science policy. These statistics are also included with data collected from other sectors to provide national aggregates published by Statistics Canada. Data are released only with the approval of the provincial government.

This questionnaire includes only scientific activities in the social sciences and humanities.

The social sciences and humanities include such disciplines as:

Anthropology	Law
Business administration and commerce	Library science
Communications	Philosophy
Criminology	Political science
Demography	Psychology
Economics	Religious studies
Geography	Social work
History	Sociology
Languages, literature and linguistics	Urban and regional studies

If departmental scientific activities involve these disciplines, complete this questionnaire.

Natural sciences and engineering include the following disciplines:

Life sciences	– medical and biological
Physical sciences	– chemistry, physics and astronomy
Environmental sciences	– geology, oceanography and the study of the atmosphere
Engineering sciences	– architecture, civil engineering, etc.
Mathematical sciences	

If departmental scientific activities involve these disciplines, complete the separate questionnaire on the natural sciences and engineering.

In many instances, particularly in health fields, it will be difficult to distinguish between the social and natural sciences. In such instances, however, some allocation must be made. Respondents should consider the main orientation of the projects involved and the field of training of the personnel in determining this allocation. Any measure which reflects the actual situation is acceptable.

Scientific Activities

The activities which concern us are those scientific and technological (S&T) activities which involve the generation, dissemination and initial application of new scientific and technological knowledge. The central activity is **research and experimental development** (R&D). In addition, there are a number of activities closely related to R&D and are termed **related scientific activities** (RSA). Included in this survey are: education support, technical surveys, information services, special services and studies, and museum services.

Research and Experimental Development

Research and experimental development (R&D) is defined as creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humans, culture and society and the use of this stock of knowledge to devise new applications.

Both "research" and "development" are often used with different meanings in the government. For example, it is increasingly common to hear that someone is researching something, i.e., the person is looking for information about something.

Similarly, there are many units with either research or development or both terms in their titles which are concerned primarily with information gathering, speech writing, preparation of position papers or departmental organization. These activities are **not** true research and development but could be related scientific activities.

R&D requires the acquisition of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the reevaluation of existing observations.

An R&D project generally has three characteristics:

- a substantial element of uncertainty, novelty and innovation;
- a well-defined project design;
- a report on the procedures and results of the project.

Examples:

1. Investigation of the factors determining regional variations in economic growth.
2. Investigation of the variables effecting the educational performance of children drawn from different social and ethnic groups.

"Many social scientists perform work in which they bring the established methodologies and facts of the social sciences to bear upon a particular problem, but which cannot be classified as research. The following are examples of work which might come in this category and are *not* R&D: interpretative commentary on the probable economic effects of a change in the tax structure, using existing economic data; forecasting future changes in the pattern of the demand for social services within a given area arising from an altered demographic structure; operations research as a contribution to decision-making, e.g., planning the optimal distribution system for a factory; the use of standard techniques in applied psychology to select and classify industrial and military personnel, students, etc., and to test children with reading or other disabilities."
(Frascati Manual)

Related Scientific Activities

Education support – grants to individuals or institutions which are intended to support the post-secondary education of students in the social sciences and humanities. General operating or capital grants are excluded. Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Statistical surveys – the collecting, processing and disseminating of statistics on humankind, their economic and social activities. Included are the development of technical methodology and statistical analysis.

The institutions involved are normally the statistical bureaux of provincial governments. If there are units whose principal activity is R&D, their costs and personnel should be assigned to R&D; specialized libraries with separate budgets should be assigned to information services.

Information services – all work directed to recording, classifying, translating, and disseminating information resulting from R&D in the social sciences or required in support of such R&D. Included are the operations of specialized libraries and archives, the publication of scholarly journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily toward the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R&D or statistical surveys, would be assigned to information services. The costs of printing and distributing reports from activities such as statistical surveys or R&D are attributable to those activities.

Special services and studies – systematic investigations carried out in order to provide information needed for planning or policy formulation. Demonstration projects are also included.

The work is usually carried out by specialized units in some government departments, by consultants, by royal commissions, and by task forces. The activity is similar to R&D since it may require innovative analyses and a high degree of scientific ability. However, such studies are not intended to acquire new knowledge but to provide specific answers to specific problems (generally immediate, localized and perhaps temporary). The day-to-day operations of units concerned with departmental planning, organization or management are not normally included (i.e. administrative records kept by Departments of Education) but special projects may be relevant.

Examples of special studies: a study of the viability of a petrochemical complex in a certain region of Canada; the Royal Commission on Poverty; the MacKenzie Valley Pipeline Inquiry; the Manitoba Guaranteed Income Experiment; the Science Council's special studies; and social impact studies resulting from development of the Hibernia Oil Fields (net costs).

Museum services – the collecting, cataloguing, and displaying of specimens and representations relating to human history, social organization and creations.

The activity involves a systematic attempt to preserve and display the works of human beings and to provide information on their works, history, and nature. The scientific activities of historical museums, archaeological displays, and art galleries are included. In all cases, the costs of providing entertainment and recreation to visitors should be excluded (e.g., restaurants, children's gardens, and nurseries).

If practical, resources of such institutions devoted to other activities, such as R&D or information services, should be excluded from museum services and assigned to those activities.

When a museum also covers aspects of natural history, the museum's operations should be divided between the social and natural sciences. However, museums of science and technology, war, etc., which display man-made objects and may also illustrate the operations of certain technologies, should be considered as museum services in the social sciences and humanities.

A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES (p. vi)

List those units (section/division/branch/station/group) of the department which carry out scientific activities and check the appropriate activities. If most of the units of a larger organization are engaged in the same activity, only the larger unit need be identified.

The list should help you to ensure that all the activities of the department are considered and that smaller units are not overlooked. It will also assist the data users to better understand the nature of the various scientific activities performed and could serve as a starting point for users requiring more information on some aspect of the department's activities.

B. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES (p. vii)

Enter the name and city of each recipient of a major payment (≥ $25,000) and enter the payment in the appropriate activity column. Both grants and contracts are included.

The information provided here will assist you to complete Question 1, the "key" question in the survey. It will also be used by Statistics Canada to ensure that major external performers of scientific activities are included in surveys of the other sectors.

Replies to this question will be treated as confidential by both Statistics Canada and the provincial government.

1. PERFORMERS OF SCIENTIFIC ACTIVITIES (p. 1 and 4)

Performers

Intramural – the reporting department. The scientific work is normally carried out by personnel assigned to the department and usually in facilities of the department. Also included are the administration of extramural programs, the costs of acquiring land, buildings and equipment to be used in scientific activities, and contracts to provide services required for scientific projects (e.g., rental of aircraft, computer services).

Industry – Canadian business and government enterprises. Include public utilities and government-owned firms as well as non-profit institutions and associations mainly serving industry and not controlled by another institution (e.g., Pulp & Paper Research Institute). Consultants providing scientific and engineering services are also included. Industrial research institutes affiliated with a university belong in the universities sector.

Universities – Canadian universities and affiliated institutes owned, administered or staffed by them (e.g., Atlantic Industrial Research Institute of Nova Scotia Technical College). Teaching facilities in non-university hospitals are included.

Hospitals and health organizations – Canadian hospitals and health organizations which are not part of university medical schools.

Provincial research organizations – The Nova Scotia Research Council, the New Brunswick Research and Productivity Council, le Centre de recherche industrielle du Québec, the Ontario Research Foundation, the Manitoba Research Council, the Saskatchewan Research Council, the Alberta Research Council, and the Research Council of British Columbia.

Other – the federal government, other provincial government departments, municipal governments, individuals and institutions not identified with any other sector, and foreign performers.

Activities – The activities of R&D and RSA including education support, statistical surveys, information services, special services and studies, and museum services have been defined above. These activities are further classified by type of expenditure.

Current expenditures – expenditures on items such as personnel, transportation and communications, information, professional and special services, rentals, purchased repair and upkeep, utilities, materials and supplies. Current expenditures for R&D are divided as follows:

> **In-house R&D** – R&D performed by personnel of the reporting department. It may include R&D carried out on behalf of another department and covered by a transfer of funds, as well as services provided by other organizations in support of an in-house R&D project (e.g. computing, transportation).
>
> **R&D contracts** – payments to other organizations to carry out R&D intended to directly benefit the reporting department. The administration of R&D contracts is an intramural cost.
>
> **R&D grants and contributions** – payments to other organizations (or individuals) for R&D intended basically to benefit the recipient of the grant. Contributions and loans should be considered as grants. The administration of R&D grants and contributions is an intramural cost.
>
> **Research fellowships** – payments to individuals for advanced research training and experience. The aim of the program should be research training rather than education.
>
> **Administration of extramural programs** – identifiable costs related to administration of contracts and grants and contributions for scientific activities that are to be performed outside the provincial government. These expenditures should be broken down by the type of scientific activity supported, i.e. R&D or RSA.

Capital expenditures – expenditures on the construction and acquisition of land, buildings, machinery, and equipment.

2. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES (p. 1)

This question identifies the sources of funds for the expenditures on scientific activities reported in Question 1. It will help to ensure that work funded from outside the department is not overlooked.

From departmental budget – that portion of the total departmental budget which was spent on social science activities.

From other departments – money transferred from another provincial department to this one for activities in the social sciences. Include when applicable, provincial portions of any federal-provincial cost sharing programs and identify the program.

From the federal government – all funds from the federal government used for social science activities. The funds are referred to as payments, contributions, transfers, etc. Also include federal portions of any federal-provincial cost sharing programs and identify the program.

From trust funds – all funds from trust funds used for social science activities.

From other sources – all funds for social science activities from sources not specified above such as reserve or lottery funds, revenues from sales or fees.

3. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES (p. 2 and 4)

The categories used to classify personnel will generally correspond to those used by the provincial government. The definitions given below indicate the training and educational level generally required for such categories. In all cases, however, consider the job classification, not the person's qualifications, because there will be some employees who exceed the qualifications required by the job (e.g., a person with a degree in a technical or clerical position).

Scientific and professional – people in jobs that require at least one academic degree or nationally recognized professional qualification (e.g., chartered accountant – C.A.) as well as those with equivalent experience.

Technical – people in jobs that require specialized vocational or technical training beyond the secondary level (e.g., community colleges and technical institutes) as well as those with experience equivalent to this training.

Other – clerical, secretarial, administrative, operational and other support personnel.

Data are requested by activity and category of employment in person-years or full-time equivalent. Persons engaged only in a scientific activity are considered one person-year. Those working only part-time on scientific activities are considered as a fraction corresponding to their involvement. Include both permanent and non-permanent employees.

Care should be taken to ensure that the personnel data reported are consistent with the expenditure data. This is the most common reason for questioning the validity of a return. It is suggested that respondents check this by dividing the reported total person-years into the intramural personnel costs reported in Question 4 to determine if the cost per person is a reasonable figure.

4. DETAIL OF INTRAMURAL EXPENDITURES (p. 2)

These data are useful for intra-departmental comparisons, for construction of constant dollar expenditures series, and for editing the question on personnel.

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5. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES (p. 3 and 5)

The objectives listed are not mutually exclusive, nor do they represent the total range of possible objectives. They are, however, intended to cover the major areas of current economic, political and technological interest. This list is common to both the social and natural sciences.

Report expenditures under the objective which is primary to that expenditure. Generally, the objective selected should be consistent with the stated objectives of the reporting department.

Advancement of science – activities for the development of general scientific knowledge (e.g., general R&D grants to universities or support of fields such as astronomy and archaeology).

Communications – activities in support of the development and regulation of communication services, including telecommunications.

Energy and fuels:

Conservation – activities directed towards the conservation of energy (e.g., domestic and commercial buildings, vehicles and other transportation systems, industrial processes, etc.).

Fossil fuels – activities concerned with the exploration, extraction, refining and use of crude oils, natural gas and coal.

Hydro electric energy – activities directed towards the generation and use of hydro electric power.

Renewable resources – activities directed towards the exploration or use of solar, biomass, hydraulic, geothermal or peat energy.

Other (specify) – any other activities not covered by those listed above.

Environmental issues – activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R&D on diseases caused by pollution should be reported under the health objective. Those activities dealing with air, land and water should be reported separately.

Health – activities related to the maintenance and improvement of the physical well-being of the population.

Industrial and economic development:

Agriculture – activities which support the agricultural industry.

Fisheries – activities which support the fishing industry.

Forestry – activities which support the forestry industry.

Manufacturing – measures intended to achieve efficient and sustained growth in manufacturing industries, and the encouragement of the production of new goods and services.

Minerals – activities related to the location, extraction, processing, use and conservation of mineral resources (except fuels).

Other (specify) – any objectives not covered by those listed above.

Social development:

Culture, sport and recreation – activities related to the support and development of culture, physical fitness, sport and recreation. Include wilderness recreation and conservation of flora.

Education – education support, grants for education research, activities in support of education policy.

Human resources – activities directed towards the development and utilization of the labour force. Labour relations, personnel policy and training programs, demographic and immigration studies are included.

Urban and regional studies – studies directed towards understanding communities and improving life within the urban and rural community.

Other (specify) – other activities directed towards social well-being (e.g., administration of justice, consumer protection).

Transportation – activities in support of the development and regulation of transportation services.

Wildlife – activities in support of the conservation and preservation of wildlife.

Other (specify) – any objectives not covered by those listed above.

SS

1 - (3)

Province _____

Ministry/Department _____

A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

Unit	Research and experimental development	Related scientific activities
	(√)	

DESCRIPTION OF INTRAMURAL ACTIVITIES

Briefly describe the intramural scientific activities of the reporting department. Describe major current projects rather than overall programs. Attach any relevant material (papers, annual reports, etc.) which provide description of departmental activities.

SS

1-3

Province _____

Ministry/Department _____

. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

Recipient	Research and experimental development	Related scientific activities
	$000	

DESCRIPTION OF EXTRAMURAL ACTIVITIES

Briefly describe extramural projects or programs and identify the performing sectors.
If descriptive material or lists of projects are available they may be submitted in lieu of completing this question.

SS

Province _____

Ministry/Department _____

1. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

Scientific activity	Intramural activities	Payments to: Industry	Universities	Hospitals and health organizations	Provincial research organizations	Other	Total 1987-88
	$000						
Research and experimental development (R&D):							
Current expenditures:							
1. In-house R&D							
2. R&D contracts							
3. R&D grants and contributions							
4. Research fellowships							
5. Administration of extramural R&D programs							
6. **Sub-total** (1 + 2 + 3 + 4 + 5)							
7. Capital expenditures							
Related scientific activities (RSA):							
8. Current expenditures							
9. Administration of extramural programs							
10. Capital expenditures							
11. **TOTAL EXPENDITURES**							

2. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iii)

	$000
1. From departmental budget	
2. From other departments	
3. From federal government (specify source)	
4. From trust funds	
5. From other sources (reserve or lottery funds, revenues from sales or fees)	
6. **TOTAL EXPENDITURES**	

SS

Province _____

Ministry/Department _____

(4) - (16)

3. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iv)

Category	R&D	Related scientific activities	Administration of extramural programs	Total 1987-88
	Person-years			
1. Scientific and professional				
2. Technical				
3. Other				
4. **TOTAL PERSONNEL**				

4. DETAIL OF INTRAMURAL EXPENDITURES, 1987-88 (Instructions – Page iv)

Current expenditures:	$000
1. Total estimated personnel costs	
2. Other costs (e.g., computing services, materials and supplies, rentals)	
3. Sub-total, current expenditures	
Capital expenditures:	
4. Land and buildings	
5. Machinery and equipment	
6. Sub-total, capital expenditures	
7. **TOTAL INTRAMURAL EXPENDITURES**	[1]

[1] Equal to Question 1: column 1, row 11.

7 - (7)

5–4600–121.1

SS

- 27 - (136)

Province _____

Ministry/Department _____

5. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1987-88 (Instructions – Page iv)

Objective	Intramural		Extramural		Total 1987-8
	R&D	Related scientific activities	R&D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Conservation					
4. Fossil fuels					
5. Hydro electric energy					
6. Renewable resources					
7. Other (specify) _____					
Environmental issues:					
8. Air					
9. Land					
10. Water					
11. Other (specify) _____					
12. Health					
Industrial and economic development:					
13. Agriculture					
14. Fisheries					
15. Forestry					
16. Manufacturing					
17. Minerals					
18. Other (specify) _____					
Social development:					
19. Culture, sport and recreation					
20. Education					
21. Human resources					
22. Urban and regional studies					
23. Other (specify) _____					
24. Transportation					
25. Wildlife					
26. Other (specify) _____					
27. TOTAL	1	2	3	4	

[1] Equal to Question 1: column 1, rows 6 and 7.
[2] Equal to Question 1: column 1, rows 8, 9, and 10.
[3] Equal to Question 1: columns 2, 3, 4, 5 and 6, row 6.
[4] Equal to Question 1: columns 2, 3, 4, 5 and 6, row 8.

5-4600-121

SS

11 - (51)

Province _____

Ministry/Department _____

6. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iii)

Scientific activity	Intramural activities	Payments to: Industry	Universities	Hospitals and health organizations	Provincial research organizations	Other	Total 1988-89
	$000						
Research and experimental development (R&D):							
Current expenditures:							
1. In-house R&D							
2. R&D contracts							
3. R&D grants and contributions							
4. Research fellowships							
5. Administration of extramural R&D programs							
6. **Sub-total** (1 + 2 + 3 + 4 + 5)							
7. Capital expenditures							
Related scientific activities (RSA):							
8. Current expenditures							
9. Administration of extramural programs							
10. Capital expenditures							
11. **TOTAL EXPENDITURES**							

7. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iv)

Category	R&D	Related scientific activities	Administration of extramural programs	Total 1988-89
	Person-years			
1. Scientific and professional				
2. Technical				
3. Other				
4. **TOTAL PERSONNEL**				

4 - (16)

SS

27-135

Province _____

Ministry/Department _____

8. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1988-89 ESTIMATES (Instructions – Page iv)

Objective	Intramural		Extramural		Total 1988-89
	R&D	Related scientific activities	R&D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Conservation					
4. Fossil fuels					
5. Hydro electric energy					
6. Renewable resources					
7. Other (specify) _____					
Environmental issues:					
8. Air					
9. Land					
10. Water					
11. Other (specify) _____					
12. Health					
Industrial and economic development:					
13. Agriculture					
14. Fisheries					
15. Forestry					
16. Manufacturing					
17. Minerals					
18. Other (specify) _____					
Social development:					
19. Culture, sport and recreation					
20. Education					
21. Human resources					
22. Urban and regional studies					
23. Other (specify) _____					
24. Transportation					
25. Wildlife					
26. Other (specify) _____					
27. TOTAL	[1]	[2]	[3]	[4]	

[1] Equal to Question 6: column 1, rows 6 and 7.
[2] Equal to Question 6: column 1, rows 8, 9, and 10.
[3] Equal to Question 6: columns 2, 3, 4, 5 and 6, row 6.
[4] Equal to Question 6: columns 2, 3, 4, 5 and 6, rows 8.

5-4600-121.1

Statistics Canada Statistique Canada

Science, Technology and Capital Stock Division

Provincial Research Organizations

19 Survey

Si vous préférez ce questionnaire en français, veuillez cocher ☐

INFORMATION FOR RESPONDENTS

Survey objective

This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority

This survey is conducted under the authority of the Statistics Act, Statutes of Canada, 1970-71-72, Chapter 15.

Confidentiality

Statistics Canada is prohibited from publishing any statistics which would divulge information relating to any identifiable organization without the previous written consent of that organization.

GENERAL INSTRUCTIONS

1. Please answer all questions. Your best estimates are satisfactory when precise figures are not available.
2. Additional forms and explanations of the terms used in the questions can be obtained from the Science and Technology Statistics Section: (613) 951-9919.
3. Please enclose a copy of your latest published annual report with a completed copy of the questionnaire by the end of July 19 and send to:

SCIENCE, TECHNOLOGY AND CAPITAL STOCK DIVISION
STATISTICS CANADA
OTTAWA, ONTARIO
K1A 0T6

I hereby authorize Statistics Canada to publish any or all portions of the data supplied by this institute:

Name _____ Official position _____

Yes ☐ No ☐ Signature _____

PERSON TO BE CONTACTED REGARDING THIS REPORT

Name	Official position	
Business address	Postal code	Telephone (Area code no.) extension
Date	Period covered by institute's fiscal year for 19 (specify day and month) From _____ to _____	

5-4600-109.1: 16-3-88 STC/SCT-465-60323

Canada

10 - (50)

REVENUE

1. Sources and types of funds 19

Source	Grant	Contract	Royalty	Other[1]	Total
			($'000)		
This institution					
Federal government					
Provincial government[2]					
Canadian industry					
Other Canadian					
Foreign					
Total funds received in 19					
Excess of expenditures over receipts during 19					
Subtracts: Money received but not spent during 19					
Total funds during 19					

[1] Other includes items such as rents and income from investments.
[2] Including provincial government boards and municipal governments. Please consider provincial corporations providing commercial services (e.g. power, railroad subway, bus) as Canadian industry.

EXPENDITURES

2. Types of expenditures

	19 (actual)	19 (forecast)
	($'000)	
a) Capital:		
Building, land		
Equipment		
Sub-total		
b) Current:		
Wages and salaries of all personnel (include employee benefits)		
Extramural[1]		
Other current expenditures		
Sub-total (equal total current expenditures by activity and total current expenditures by application, page 3)		
Total **(equal to the grand total funds of question 1)**		

[1] Grants and contracts to others for scientific services.

(5) - (10)

10 - 40

RRENT EXPENDITURES BY ACTIVITY

Activities	Answer in either thousands of dollars or percentages			
	19 (actual)		19 (forecast)	
	($'000)	(%)	($'000)	(%)
Resource surveys				
Analysis and testing[1]				
Scientific research[2]				
Development[3]				
Feasibility studies[4]				
Library and technical information[5]				
Industrial engineering[6]				
Industrial innovation				
Other (specify) _____				
al current (equals total current expenditures in question 2(b))		100%		100%

nalyses and testing which are carried out as part of scientific research or development projects should be considered scientific research or development.
cientific research does **not** include market research (Feasibility studies) nor operations research (Industrial engineering).
evelopment includes the creation of new and improved processes and projects, and the construction and operation of pilot plants.
easibility studies include both economic and technical feasibility studies.
cluding the costs of field men contacting industry on matters relating to technical information.
cluding operations research and management engineering.

RRENT EXPENDITURES BY APPLICATION

Applications of current expenditures	Answer in either thousands of dollars or percentages			
	19 (actual)		19 (forecast)	
	($'000)	(%)	($'000)	(%)
Natural resources[1]				
Primary industries[2]				
Secondary industries[3]				
Construction industry				
Services industries[4]				
Utilities[5]				
Environment[6]				
Developing countries				
Other (specify) _____				
tal current (equals total current expenditures in question 2(b))		100%		100%

xploration, conservation, mensuration of resources.
roduction, harvesting, concentration. Management of firms in these industries.
roducts, processes of manufacturing industries (which includes food and beverages, tobacco, rubber, textiles, clothing, wood products, furniture, paper, primary
netals, metal fabricating, machinery, transportation equipment, electrical products, non-metallic mineral products, petroleum and coal products, chemical products,
cientific and professional instruments). Management of firms in these industries.
inance, trade, tourism.
ransport, communication, power.
ollution abatement, waste recovery and disposal, toxicology.

10 - 40

4 (8)

PERSONNEL (FULL-TIME EQUIVALENT)*

5. Types of personnel and training 19 year end

Type of personnel	Bachelor	Master	Doctor	Other	Total
Professionals: Scientists and engineers (include Senior R & D Administrators and Management Personnel)					
Supporting Staff: Technologists and technicians					
Other (directly engaged in the R & D programme – e.g. machinists and electricians engaged in construction of prototypes and clerks, typists, accountants and storemen engaged in the administration or clerical support of R & D)					
Total					

* Full-time equivalent: Full-time R & D staff plus portion of time spent on R & D by staff engaged only part-time in this activity. Example calculation: If out of five scientists engaged in R & D work, one works solely on R & D projects and the remaining four devote only one quarter of their working time to R & D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists

COMMENTS: Reasons for Major Changes in Reported Expenditures and Personnel – In order to eliminate the necessity to verify discrepancies between this report and your last return (19), please explain any significant changes which might be misconstrued as an error in reporting.

5–4600–109.1

BUSINESS ENTERPRISES

The first form is sent to about 600 of the largest known R&D performers or funders. The second (short form) is sent to about 5,100 smaller actual or potential R&D performers and funders. The third goes to the R&D institutes serving specific industries (and hence excluded from the Private Non-profit sector). Copies of the fourth are sent to all firms and institutes with the other three questionnaires. This survey is carried out on behalf of the Department of Energy, Mines and Resources. Statistics from these four questionnaires are presently primarily in the annual report **Industrial Research and Development Statistics**, Statistics Canada Catalogue No. 88-202.

Statistics Canada Statistique Canada

Science, Technology and Capital Stock Division

Research and development in Canadian industry, 1987

Si vous préférez ce questionnaire en français, veuillez cocher ☐

9 12

Please correct any mistakes in name or address

INFORMATION FOR RESPONDENTS

Survey objective
This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority
This survey is conducted under the authority of the Statistics Act, Statutes of Canada, 1970-71-72, Chapter 15.

Confidentiality
Statistics Canada is prohibited from publishing any statistics which would divulge information relating to any identifiable organization without the previous written consent of that organization. The data reported on this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregated form only.

Federal/Provincial Agreement
In order to avoid duplication of enquiry, to reduce the cost of data collection and to provide consistent statistics, an agreement has been made with the Bureau de la statistique du Québec, under Section 10 of the Statistics Act. Statutes of Canada, where data on firms located or having R&D activities in Québec will be transmitted to the Bureau de la Statistique du Québec. The Statistics Act of Québec includes the same provisions for confidentiality and penalties for disclosure of information as the Canada Statistics Act.

Reporting period and coverage
This questionnaire should be completed for your **fiscal year most closely corresponding to the 1987 calendar year.** The report should exclude foreign subsidiary operations.

GENERAL CORPORATE DATA (questions 1 to 4)

1. Company's **fiscal year** most closely corresponding to the 1987 calendar year (*specify day and month*)

From _____ To _____

2. **Revenues:** *Approximate 1987 sales and other revenues of this company.*	193 $ .000 00	3. **Number of employees:** *Average number of employees on payroll in 1987.*	094

4. If this firm has Canadian subsidiaries and/or parent company, identify these affiliated companies and indicate whether parent or subsidiary. (*Attach additional sheet if necessary*).

Name of company (*please print*)	Indicate parent or subsidiary	Performs R&D or makes payments for R&D		Included within this report	
		Yes	No	Yes	No
		Check (x)		Check (x)	

R&D DATA (questions 5 to 12)

5. PERSONNEL OF THIS COMPANY ENGAGED IN R&D IN 1987 (FULL-TIME EQUIVALENT)*

	Bachelors	Masters	Doctors	Total
Professionals Scientists and engineers	082	083	084	
Senior R&D administrators	085	086	087	
Supporting Staff Technicians and technologists (*technically trained personnel who assist scientists and engineers in R&D – e.g. chemical technicians, draftsmen. They may be certified by either provincial educational authorities or by provincial or national scientific or engineering associations.*)				088
Others (*directly engaged in the R&D program, e.g. machinists and electricians engaged in construction of prototypes, or clerks, typists, accountants and storemen engaged in the administration or clerical support of R&D units*)				089
Total R&D personnel				**

* *Full-time equivalent: Full-time R&D staff plus portion of time spent on R&D by staff engaged only part-time in this activity. (For explanation see instruction sheet)*

Example calculation:
If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time to R&D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists

** *Divide wages and salaries for 1987 (Question 6(b)) by total R&D personnel.* ***If the average R&D wages and salaries do not seem reasonable, please review the data.***

1 - (1)
2 - (2)
(6) - 1
(11) - 9

5-4600-4.1. 6-1-88 STC SCT-465-60042

Canada

6. EXPENDITURES FOR R&D PERFORMED WITHIN THIS COMPANY IN CANADA *(1987 grand total should equal the total of question 7.)*

	CURRENT EXPENDITURES			CAPITAL EXPENDITURES				
	Wages and salaries*	Other current costs**	Total current	Land	Buildings	Equipment	Total capital	Total
(a) Made in 1986	001 $ .000 00	002 $ .000 00	$ .000 00	009 $ .000 00	010 $ 000 00	011 $ .000 00	$ .000 00	$ 000 00
(b) Made in 1987	003 $ .000 00	004 $ 000 00	$ 000 00	012 $ .000 00	013 $ .000 00	014 $ .000 00	$ .000 00	$ .000 00
(c) Planned for 1988	005 $ .000 00	006 $ .000 00	$ .000 00	015 $ .000 00	016 $ .000 00	017 $ .000 00	$ 000 00	$ .000 00
(d) Forecast for 1989	007 $ .000 00	008 $ .000 00	$ .000 00	018 $ .000 00	019 $ .000 00	020 $ .000 00	$ .000 00	$ .000 00

**Include fringe benefits of persons engaged in R&D.*

***Include contracts for services required to carry out R&D (e.g. contracts awarded for drilling needed for heavy oil R&D). Exclude contracts for R&D work itself which should be reported in questions 9 & 10. Exclude capital depreciation.*

7. SOURCES OF FUNDS FOR R&D PERFORMED WITHIN THIS COMPANY IN 1987

		Canadian sources	Non-Canadian sources
(a) Internal		021 $ .000 00	022 $ .000 00
(b) Parent, affiliated and subsidiary companies (*only those not included in this report*).			
Company name (*Please print*)			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00	023 $ .000 00	024 $ .000 00
(c) Canadian Federal Government:*			
(i) R&D **grants** and the R&D portion **only** of any other grants.			
Department of Regional Industrial Expansion: Industrial and Regional Development Program (*replacing EDP*)	161 $ .000 00		
Defence Industry Productivity Program	162 $ .000 00		
National Research Council: Industrial Research Assistance Program	163 $ .000 00		
Other grant programs (*specify*) _____	$ .000 00		
(*specify*) _____	$ .000 00		
Sub-total	$ .000 00	027 $ .000 00	
(ii) R&D **contracts** and the R&D portion **only** of any other contracts.			
Contracting departments: (*Payments are often made through Supply and Services Canada for other departments: please specify contracting department*):			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
Sub-total	$ .000 00	026 $ .000 00	
(d) Provincial government: (*specify province*) _____	$ .000 00		
(*specify province*) _____	$ .000 00		
(*specify province*) _____	$ .000 00		
Sub-total	$ .000 00	291 $ .000 00	
(e) R&D contract work for other companies			
Company name (*Please print*)			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00	028 $ .000 00	029 $ .000 00
(f) Others (*i.e. university, foreign government*) specify: _____		030 $ 000 00	031 $ .000 00
Sub-totals		$ .000 00	$ .000 00
Total (*equal to the 1987 grand total expenditures of Question 6(b)*)		$ .000 00	

**Do not include any funds from income tax incentives.*

5-4600-4.1

8. REGIONAL INFORMATION ON R&D IN 1987

Region where R&D was performed	R&D expenditures		R&D personnel	
	Current	Capital	Professionals	Supporting staff
			(Person – years)	
1. Newfoundland	109 $ .000 00	122 $ .000 00	135	148
2. Prince Edward Island	110 $ .000 00	123 $ .000 00	136	149
3. Nova Scotia	111 $ .000 00	124 $ .000 00	137	150
4. New Brunswick	112 $ .000 00	125 $ .000 00	138	151
5. Quebec (excluding Montreal area and national capital region)	113 $ .000 00	126 $ .000 00	139	152
6. Montreal metropolitan area	114 $ .000 00	127 $ .000 00	140	153
7. National capital region	294 $ .000 00	295 $ .000 00	296	297
8. Ontario (excluding Toronto area and national capital region)	115 $ .000 00	128 $ .000 00	141	154
9. Toronto metropolitan area	116 $ .000 00	129 $ .000 00	142	155
10. Manitoba	117 $ .000 00	130 $ .000 00	143	156
11. Saskatchewan	118 $ .000 00	131 $ .000 00	144	157
12. Alberta	119 $ .000 00	132 $ .000 00	145	158
13. British Columbia	120 $ .000 00	133 $ .000 00	146	159
14. Yukon and Northwest Territories	121 $ .000 00	134 $ .000 00	147	160
Total (equal to 1987 expenditures and personnel reported in Question 6 (b) and Question 5)	$ .000 00	$ .000 00		

9. PAYMENTS FOR R&D PERFORMED BY OTHER ORGANIZATIONS* (*1987 should equal the total of question 10.*)

(a) Made in 1986	038 $ 000 00
(b) Made in 1987	039 $ .000 00
(c) Planned for 1988	040 $ .000 00
(d) Forecast for 1989	041 $ .000 00

10. RECIPIENTS OF PAYMENTS* FOR R&D PERFORMED IN 1987 BY OTHER ORGANIZATIONS

		In Canada	Outside Canada
(a) Parent, affiliated and subsidiary companies			
Company name (*please print*)			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00	042 $ .000 00	043 $ 000 00
(b) Other companies			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00	046 $ .000 00	047 $ .000 00
(c) Industrial research institutes or associations (*e.g. Pulp and Paper Research Institute*)			
	$ .000 00		
	$ .000 00	050 $ .000 00	051 $ .000 00
(d) Other – specify (*e.g. provincial research councils or foundations; educational institutions*)			
	$ .000 00		
	$ .000 00		
	$ .000 00		
	$ .000 00	059 $ 000 00	060 $ 000 00
Sub-totals		$ 000 00	$ 000 00
Total (equal to the 1987 figure entered in 9(b))		$ 000 00	

* *Payments made outside Canada should be reported net of withholding taxes.*

5–4600–4.1

OTHER PAYMENTS MADE OR RECEIVED FOR TECHNOLOGY

A company can acquire information based on R&D performed in the past by other companies, organizations or individuals. Similarly, it can sell information based on R&D it has performed in the past. In the preceding section, payments are reported for the support of R&D whilst this R&D is being done. In this section, consider only payments for information and rights derived from R&D performed in the past.

11. PAYMENTS MADE OR RECEIVED IN 1987 BY THIS COMPANY FOR PATENTS, LICENCES AND TECHNICAL "KNOW-HOW"*

	In Canada	Outside Canada
a) **Payments**	101	103
to parent, affiliated and/or subsidiary companies	$ .000 00	$ .000 00
	102	104
to other organizations and/or individuals	$ .000 00	$ .000.00
	062	063
Total	$ .000 00	$ .000 00
b) **Receipts**	105	107
from parent, affiliated and/or subsidiary companies	$ .000 00	$ .000.00
	106	108
from other organizations and/or individuals	$ .000 00	$ .000.00
	064	065
Total	$ .000.00	$ .000 00

** Payments made outside Canada should be reported net of withholding taxes.*

12. Year in which this company began performing R&D: ☐

COMMENTS: ***Reasons for Major Changes in Reported Expenditures and Personnel*** *– In order to eliminate the necessity to verify discrepancies between this report and your last return (1986), please explain any significant changes which might be misconstrued as an error in reporting.*

PLEASE COMPLETE THE ATTACHED **"NATURE OF R&D ACTIVITIES"** QUESTIONNAIRE, IF THIS COMPANY PERFORMED R&D IN 1987.

IN 1987, DID THIS COMPANY PERFORM OR FUND ANY **ENERGY R&D?**

☐ **Yes → Go to and complete the enclosed green questionnaire**

☐ **No → End (*return questionnaires*)**

CERTIFICATION

Name of person who completed this report (*please print*)		Business address:
Official position:	Date:	Postal code: Telephone (area code) ( ) –

5–4600–41

GENERAL INSTRUCTIONS

RESEARCH AND DEVELOPMENT IN CANADIAN INDUSTRY

1. This survey has been carried out since 1955; you may have file copies of your returns for earlier years (eg. 1986) which will help you now. If you are filing a consolidated return for two or more related companies please ensure that consolidated figures are used for all questions (eg. revenues, employment, R&D expenditures, technology payments). "This company", as used in the questionnaire, covers groups of related companies when a consolidated return is filed.

2. Please answer all questions. Your best estimates are satisfactory when precise figures are not available. Your estimates will be better than ours.

3. An industry statistician (call collect 613-951-9919) of the Science, Technology and Capital Stock Division will be pleased to discuss your problems or the definitions and instructions of this form. Please call should more forms be required.

4. Please mail one completed copy of this form **within 30 days of receipt** to:

SCIENCE, TECHNOLOGY AND CAPITAL STOCK DIVISION
STATISTICS CANADA
OTTAWA, ONTARIO
K1A 0T6

R&D Definition (Equivalent to Revenue Canada – see Information Circular 86-4R)

Research and development (R&D) is systematic investigation carried out in the natural and engineering sciences by means of experiment or analysis to achieve a scientific or commercial advance.

Research is original investigation undertaken on a systematic basis to gain new knowledge.

Development is the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes. If successful, development will usually result in devices or processes which represent an improvement in the "state of the art" and are likely to be patentable.

Research and development should be considered to be "Scientific Research and Experimental Development" as defined in Section 37, Regulation 2900 of the Income Tax Act; this section specifically excludes the following:

(i) market research, sales promotion,

(ii) quality control or routine analysis and testing of materials, devices or products,

(iii) research in the social sciences or the humanities,

(iv) prospecting, exploring or drilling for or producing minerals, petroleum or natural gas,

(v) the commercial production of a new or improved material, device or product or the commercial use of a new or improved process,

(vi) style changes, or routine data collection.

Example:

The investigation of electrical conduction in crystals was research. The application of this knowledge to the creation of a new amplifying device – the transistor – was development. The application of the device to the construction of new electrical circuits for television receivers was development. The formulation of new plastic cases for a television receiver is design, not development.

Research and development may be carried out either by a permanent R&D unit (e.g., R&D division) or by a unit generally engaged in any non-R&D activity such as engineering or production. In the first case, the R&D unit may spend part of its time on routine testing or trouble shooting or on some other activities which should not be included in R&D. In the second case, only the R&D portion of such units' total activity should be considered.

Note:

Although the definition of "Scientific Research and Experimental Development" is considered to be the same as R&D, certain expenditures for scientific research and experimental development cannot be claimed for income tax purposes (e.g., land). All expenditures attributable to R&D are included in this report.

Interpretation

Generally speaking, industrial R&D is intended to result in an invention which may subsequently become a technological innovation. An essential requirement is that the outcome of the work is uncertain, i.e., that the possibility of obtaining a given technical objective cannot be known in advance on the basis of current knowledge or experience. Hence much of the work done by scientists and engineers is not R&D, since they are primarily engaged in "routine" production, engineering, quality control or testing. Although they apply scientific or engineering principles their work is not directed towards the discovery of new knowledge or the development of new products and processes. However, work elements which are not considered R&D by themselves but which directly support R&D projects, should be included with R&D in these cases. Examples of such work elements are design and engineering, shop work, computer programming, and secretarial work.

If the primary objective is to make further technical improvements to the product or process, then the work comes within the definition of R&D. If however, the product, process or approach is substantially set and the primary objective is to develop markets, to do pre-production planning or to get a production, or control system working smoothly, then the activity can no longer be considered as part of R&D even though it could be regarded as an important part of the total innovation process. Thus, the design, construction and testing of prototypes, models and pilot plants are part of R&D. But when necessary modifications have been made and testing has been satisfactorily completed, the boundary of R&D has been reached. Hence, the costs of tooling (design and try-out), construction drawings and manufacturing blueprints, and production start-up are not included in development costs.

Pilot plants may be included in development only if the main purpose is to acquire experience and compile data. As soon as they begin operating as normal production units, their costs can no longer be attributed to R&D. Similarly, once the original prototype has been found satisfactory, the costs of other "prototypes" built to meet a special need or fill a very small order are not to be considered as part of R&D.

5-4600-41

(See over)

SPECIFIC CASES AND THEIR TREATMENT

ITEM	TREATMENT	REMARKS
Economic research, market research, management studies	Exclude	All activities in the social sciences.
Quality control, routine testing, style changes, minor adaptation of a product to meet a customer's specific requirements	Exclude	Even if carried out by staff normally engaged in R&D.
Prospecting, exploratory drilling, development of mines, oil or gas wells	Exclude	Except for R&D projects concerned with new equipment or techniques in these activities, such as in-situ and tertiary recovery research.
Engineering	Exclude	Engineering unless it is in direct support of R&D.
Design and drawing	Exclude	Design and drawing unless it is in direct support of R&D.
Prototypes, pilot plants	Include	As long as the primary objective is to make further improvements.
Contracts (questions 6(c) and (e))	Include	All contracts which require R&D. For contracts which include other work, report only the R&D costs.
Tooling up, trial production, trouble shooting	Exclude	Although R&D may be required as a result of these steps.
Patent and licence work	Exclude	All administrative and legal work connected with patents and licences.

Question 2 - Sales and other revenues – Represents the amount of revenues resulting from the sale of products and services (after deducting sales and excise taxes), and other revenues such as those generated from investment and rental.

Question 5 - Full-Time Equivalent (FTE) – R&D may be carried out by persons who work solely on R&D projects or by persons who devote only part of their time to R&D, and the balance to other activities such as testing, quality control and production engineering. To arrive at the total effort devoted to R&D in terms of manpower, it is necessary to estimate the full-time equivalent of these persons working only part-time in R&D.

FTE = Number of persons who work solely on R&D projects + the estimate of time of persons working only part of their time in R&D.

Example calculation:

If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time to R&D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists.

Questions 10 and 11 - Payments made outside Canada for R&D and other technology should be reported net of withholding taxes.

STATISTICS CANADA REGIONAL OFFICES

Newfoundland and Labrador
Statistics Canada
Crosbie Road
St. John's, Newfoundland
A1B 3P2
Tel.: 1-709-772-4048

Manitoba and Southern Saskatchewan
Statistics Canada
266 Graham Avenue
Winnipeg, Manitoba
R3C 0K4
Tel.: 1-204-983-4022
1-800-542-3404

Maritimes
Statistics Canada
1770 Market Street
Halifax, Nova Scotia
B3J 3M3
Tel.: 1-902-426-5662
1-800-565-1685

Alberta, Northern Saskatchewan and Northwest Territories
Statistics Canada
11010 – 101 Street
Edmonton, Alberta
T5H 4C5
Tel.: 1-403-495-4627
1-800-222-6400

Québec
Statistics Canada
200 Dorchester Blvd. West
Montreal, Québec
H2Z 1X4
Tel.: 1-514-283-5724
1-800-361-2831

British Columbia and Yukon
Statistics Canada
757 West Hastings Street
Vancouver, British Columbia
V6C 3C9
Tel.: 1-604-666-3616
1-800-663-1551

Ontario
Statistics Canada
25 St. Clair Avenue, East
Toronto, Ontario
M4T 1M4
Tel.: 1-416-973-6598
1-800-387-0730

5-4600-41

NATURE OF R&D ACTIVITIES

1987

If you have more than one R&D facility, please photocopy this form and provide the information for these units.

Name of R&D unit:

Address of R&D unit:

Street _____ City _____

Province _____ Postal code _____

Contact:

Name _____ Position title _____ ( ) Telephone no. _____

1. What was the approximate current R&D expenditures of this R&D facility in 1987? $ _____,000 00

2. How many scientists and engineers were employed primarily on R&D in the facility at the end of 1987? _____

3. Please estimate, in terms of the percentage of the current R&D expenditures, the approximate distribution of your R&D effort in 1987:

A. Basic research (no specific application in view) _____ %

B. Development of new* products _____ %

C. Improvement of existing* products _____ %

D. Development of new* manufacturing processes _____ %

E. Improvement of existing* manufacturing processes _____ %

F. Development of new* technical services _____ %

G. Improvement of existing* technical services _____ %

100%

* *Please consider* **new** *to mean totally or essentially new unknown to the personnel of your R&D facility. The product, process or service may exist elsewhere in the world but your R&D is not aided by this fact since your personnel do not have access to the information necessary to avoid any of the normal risks of development.* **Existing** *would mean that your staff would be improving a product process service about which they have the basic information – the product process service need not already be provided by your firm.*

4. Field of Technology: *Please indicate the extent to which your R&D was directed towards the fields of technology identified below. Indicate their relative importance for each of the relevant activities from question 3 (2 = primary; 1 = secondary; if the activity is not relevant, leave cell blank).*

Technology	A	B	C	D	E	F	G
1. Microelectronics.							
a) Computer hardware							
b) Software and systems							
c) Artificial intelligence							
d) Transmission carrier technologies							
e) Other (*specify*) _____							
2. Biotechnology:							
a) Biomass							
b) Enzyme							
c) Fermentation							
d) Other (*specify*) _____							
3. Advanced industrial materials:							
a) Ceramics							
b) Composites							
c) Metals							
d) Polymers							
e) Other (*specify*) _____							
4. Other (*specify*) _____							

5-4600-41

Statistics Canada Statistique Canada

Science, Technology and Capital Stock Division

Research and development in Canadian industry, 1987

SHORT FORM

Si vous préférez ce questionnaire en français, veuillez cocher ☐

9 12

Please correct any mistakes in name or address

INFORMATION FOR RESPONDENTS

Survey objective

This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority

This survey is conducted under the authority of the Statistics Act, Statutes of Canada, 1970-71-72, Chapter 15.

Confidentiality

Statistics Canada is prohibited from publishing any statistics which would divulge information relating to any identifiable organization without the previous written consent of that organization. The data reported on this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregated form only.

Federal-Provincial Agreement

In order to avoid duplication of enquiry, to reduce the cost of data collection and to provide consistent statistics, an agreement has been made with the Bureau de la Statistique du Québec, under Section 10 of the Statistics Act, Statutes of Canada, where data on firms located or having R&D activities in Québec will be transmitted to the Bureau de la Statistique du Québec. The Statistics Act of Québec includes the same provisions for confidentiality and penalties for disclosure of information as the Canada Statistics Act.

Reporting period and coverage

This questionnaire should be completed for your **fiscal year most closely corresponding to the 1987 calendar year.** The report should exclude foreign subsidiary operations.

CERTIFICATION

Name of person who completed this report *(please print)*:		Business address:	
Official position:	Date:	Postal code:	Telephone (area code): ( ) -

In 1987, did this company perform or fund any R&D, as defined on the instruction sheet?

☐ **Yes → go to question 1** ☐ **No → end (please complete Certification above and return questionnaires)** 1

GENERAL CORPORATE DATA (questions 1 to 3)

1

1. If this is a consolidated report, please provide in the Comment Section (at the end), the names of companies included. **(Foreign subsidiary operations should be excluded from this report)**

2. Revenues: *Approximate 1987 sales and other revenues of this company.*	193 $,000.00	**3. Number of employees:** *Average number of employees on payroll in 1987.*	094

2 - (2)

R&D DATA (questions 4 to 10)

4. PERSONNEL OF THIS COMPANY ENGAGED IN R&D IN 1987 (FULL-TIME EQUIVALENT)*

Scientists, engineers and senior R&D administrators	Technicians and technologists	Other	Total R&D** personnel
091	088	089	

1 - (4)

* *Full-time equivalent: Full-time R&D staff plus portion of time spent in R&D by staff engaged only part-time in this activity. (For explanation see instruction sheet).*

Example calculation:
If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time to R&D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists

** *Divide wages and salaries for 1987 (Question 5.) by total R&D personnel.* **If the average R&D wages and salaries do not seem reasonable, please review the data.**

5. EXPENDITURES FOR R&D PERFORMED WITHIN THIS COMPANY IN 1987 IN CANADA (should equal the grand total of question 6)

CURRENT EXPENDITURES			CAPITAL EXPENDITURES				Total
Wages and salaries†	Other current costs††	Total current	Land	Buildings	Equipment	Total capital	
003	004		012	013	014		
$,000.00	$,000.00	$,000.00	$,000.00	$,000.00	$,000.00	$,000.00	$,000.00

3 - (8)

† *Include fringe benefits of persons engaged in R&D.*

†† *Include contracts for services required to carry out R&D (e.g. contracts awarded for drilling needed for heavy oil R&D). Exclude contracts for R&D work itself which should be reported in question 7.*
Exclude capital depreciation.

5-4600-6 1: 26-1-88 SQC:SCT - 465-60042

Canada

6. SOURCES OF FUNDS FOR R&D PERFORMED WITHIN THIS COMPANY IN 1987

		Canadian sources	Non-Canadian sources
a) Internal		021 $ .000.00	022 $ .000.00
b) Parent, affiliated or subsidiary companies		023 $ .000.00	024 $ .000.00
c) Canadian Federal Government: (i) **R&D grants** and the R&D portion **only** of any other grants.			
Department of Regional Industrial Expansion: Industrial and Regional Development Program (*replacing EDP*)	161 $ .000.00		
Defence Industry Productivity Program	162 $ .000.00		
National Research Council: Industrial Research Assistance Program	163 $ .000.00		
Other grant programs (*specify*): _____	$ .000.00		
Sub-total	$ .000.00	027 $ .000.00	
(ii) **R&D contracts** and the R&D portion **only** of any other contracts.			
Contracting departments: (*Payments are often made through Supply and Services Canada for other departments; please specify contracting department*)	$ .000.00		
_____	$ .000.00		
Sub-total	$ .000.00	026 $ .000.00	
d) Provincial government: (*i.e., grants and contracts*):			
(*Specify province*) _____	$ .000.00		
(*Specify province*) _____	$ .000.00		
Sub-total	$ .000.00	291 $ .000.00	
e) R&D contract work for other companies		028 $ .000.00	029 $ .000.00
f) Others (*i.e.: University, foreign government*) *specify*:		030 $ .000.00	031 $ .000.00
Sub-totals		$ .000.00	$ .000.00
Total (equal to the grand total column shown in question 5)		$ .000.00	

7. PAYMENTS MADE IN 1987 FOR R&D PERFORMED BY OTHER ORGANIZATIONS*

a) Parent, affiliated or subsidiary companies	in Canada	042 $ .000.00
b) Parent, affiliated or subsidiary companies	Outside Canada	043 $ .000.00
c) Other organizations: _____		092 $ .000.00
Total external payments for R&D		039 $ .000.00

* *Payments made outside Canada should be reported net of withholdings taxes.*

8. PAYMENTS MADE IN 1987 TO OTHER ORGANIZATIONS FOR THE ACQUISITION OF PATENTS, LICENCES AND TECHNICAL "KNOW-HOW"

In Canada 062 $ .000.00 Outside Canada** 063 $ .000.00

** *Payments made outside Canada should be reported net of withholding taxes.*

9. Nature of R&D activities – Please estimate, in terms of the percentage of the current R&D expenditures, the approximate distribution of your R&D effort in 1987:

A. Basic research (*no specific application in view*)	_____%
B. Development of new products*	_____%
C. Improvement of existing* products	_____%
D. Development of new* manufacturing processes	_____%
E. Improvement of existing* manufacturing processes	_____%
F. Development of new* technical services	_____%
G. Improvement of existing* technical services	_____%
	100%

* *Please consider* **new** *to mean totally or essentially new unknown to the personnel of your R&D facility. The product, process or service may exist elsewhere in the world but your R&D is not aided by this fact since your personnel do not have access to the information necessary to avoid any of the normal risks of development.* ***Existing*** *would mean that your staff would be improving a product/process/service about which they have the basic information – the product/process/service need not already be provided by your firm.*

10. Year in which this company began performing R&D: ☐

COMMENTS: Reasons for Major Changes in Reported Expenditures and Personnel – *In order to eliminate the necessity to verify discrepancies between this report and your last return (1986), please explain any significant changes which might be misconstrued as an error in reporting.*

_____

_____

_____

In 1987, did this company perform or fund any **ENERGY R&D?**

☐ **Yes → Go to green questionnaire** ☐ **No → End**

5-4600-6 1

GENERAL INSTRUCTIONS

RESEARCH AND DEVELOPMENT IN CANADIAN INDUSTRY

1. This survey has been carried out since 1955; you may have file copies of your returns for earlier years (e.g. 1986) which will help you now. If you are filing a consolidated return for two or more related companies please ensure that consolidated figures are used for all questions (e.g. revenues, employment, R&D expenditures, technology payments). "This company", as used in the questionnaire, covers groups of related companies when a consolidated return is filed.

2. Please answer all questions. Your best estimates are satisfactory when precise figures are not available. Your estimates will be better than ours.

3. An industry statistician (call collect 613-951-9919) of the Science, Technology and Capital Stock Division will be pleased to discuss your problems or the definitions and instructions of this form. Please call should more forms be required.

4. Please mail one completed copy of this form **within 30 days of receipt** to:

SCIENCE, TECHNOLOGY AND CAPITAL STOCK DIVISION
STATISTICS CANADA
OTTAWA, ONTARIO
K1A 0T6

R&D Definition (equivalent to Revenue Canada – see Information Circular 86-4R)

Research and development (R&D) is systematic investigation carried out in the natural and engineering sciences by means of experiment or analysis to achieve a scientific or commercial advance.

Research is original investigation undertaken on a systematic basis to gain new knowledge.

Development is the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes. If successful, development will usually result in devices or processes which represent an improvement in the "state of the art" and are likely to be patentable.

Research and development should be considered to be "Scientific Research and Experimental Development" as defined in Section 37, Regulation 2900 of the Income Tax Act; this section specifically excludes the following:

(i) market research, sales promotion,

(ii) quality control or routine analysis and testing of materials, devices or products,

(iii) research in the social sciences or the humanities,

(iv) prospecting, exploring or drilling for or producing minerals, petroleum or natural gas,

(v) the commercial production of a new or improved material, device or product or the commercial use of a new or improved process,

(vi) style changes, or routine data collection.

Example:

The investigation of electrical conduction in crystals was research. The application of this knowledge to the creation of a new amplifying device – the transistor – was development. The application of the device to the construction of new electrical circuits for television receivers was development. The formulation of new plastic cases for a television receiver is design, not development.

Research and development may be carried out either by a permanent R&D unit (e.g., R&D division) or by a unit generally engaged in any non-R&D activity such as engineering or production. In the first case, the R&D unit may spend part of its time on routine testing or trouble shooting or on some other activities which should not be included in R&D. In the second case, only the R&D portion of such units' total activity should be considered.

Note:

Although the definition of "Scientific Research and Experimental Development" is considered to be the same as R&D, certain expenditures for scientific research and experimental development cannot be claimed for income tax purposes (e.g., land). All expenditures attributable to R&D are included in this report.

Interpretation

Generally speaking, industrial R&D is intended to result in an invention which may subsequently become a technological innovation. An essential requirement is that the outcome of the work is uncertain, i.e., that the possibility of obtaining a given technical objective cannot be known in advance on the basis of current knowledge or experience. Hence much of the work done by scientists and engineers is not R&D, since they are primarily engaged in "routine" production, engineering, quality control or testing. Although they apply scientific or engineering principles their work is not directed towards the discovery of new knowledge or the development of new products and processes. However, work elements which are not considered R&D by themselves but which directly support R&D projects, should be included with R&D in these cases. Examples of such work elements are design and engineering, shop work, computer programming, and secretarial work.

If the primary objective is to make further technical improvements to the product or process, then the work comes within the definition of R&D. If however, the product, process or approach is substantially set and the primary objective is to develop markets, to do pre-production planning or to get a production, or control system working smoothly, then the activity can no longer be considered as part of R&D even though it could be regarded as an important part of the total innovation process. Thus, the design, construction and testing of prototypes, models and pilot plants are part of R&D. But when necessary modifications have been made and testing has been satisfactorily completed, the boundary of R&D has been reacned. Hence, the costs of tooling (design and try-out), construction drawings and manufacturing blueprints, and production start-up are not included in development costs.

Pilot plants may be included in development only if the main purpose is to acquire experience and compile data. As soon as they begin operating as normal production units, their costs can no longer be attributed to R&D. Similarly, once the original prototype has been found satisfactory, the costs of other "prototypes" built to meet a special need or fill a very small order are not to be considered as part of R&D.

5–4600–6.1

(See over)

SPECIFIC CASES AND THEIR TREATMENT

ITEM	TREATMENT	REMARKS
Economic research, market research, management studies	Exclude	All activities in the social sciences.
Quality control, routine testing, style changes, minor adaptation of a product to meet a customer's specific requirements	Exclude	Even if carried out by staff normally engaged in R&D.
Prospecting, exploratory drilling, development of mines, oil or gas wells	Exclude	Except for R&D projects concerned with new equipment or techniques in these activities, such as in-situ and tertiary recovery research.
Engineering	Exclude	Engineering unless it is in direct support of R&D.
Design and drawing	Exclude	Design and drawing unless it is in direct support of R&D.
Prototypes, pilot plants	Include	As long as the primary objective is to make further improvements.
Contracts (questions 6(c) and (e))	Include	All contracts which require R&D. For contracts which include other work, report only the R&D costs.
Tooling up, trial production, trouble shooting	Exclude	Although R&D may be required as a result of these steps.
Patent and licence work	Exclude	All administrative and legal work connected with patents and licences.

Question 2 - Sales and other revenues – Represents the amount of revenues resulting from the sale of products and services (after deducting sales and excise taxes), and other revenues such as those generated from investment and rental.

Question 4 - Full-Time Equivalent (FTE) – R&D may be carried out by persons who work solely on R&D projects or by persons who devote only part of their time to R&D, and the balance to other activities such as testing, quality control and production engineering. To arrive at the total effort devoted to R&D in terms of manpower, it is necessary to estimate the full-time equivalent of these persons working only part-time in R&D.

FTE = Number of persons who work solely on R&D projects + the estimate of time of persons working only part of their time in R&D.

Example calculation:

If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time to R&D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists.

Questions 7 and 8 - Payments made outside Canada for R&D and other technology should be reported net of withholding taxes.

STATISTICS CANADA REGIONAL OFFICES

Newfoundland and Labrador
Statistics Canada
Crosbie Road
St. John's, Newfoundland
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British Columbia and Yukon
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757 West Hastings Street
Vancouver, British Columbia
V6C 3C9
Tel.: 1-604-666-3616
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Statistics Canada
25 St. Clair Avenue, East
Toronto, Ontario
M4T 1M4
Tel.: 1-416-973-6598
1-800-387-0730

5-4600-6.1

Statistics Canada Statistique Canada

Science, Technology and Capital Stock Division

Research and development in Canadian industry, 1987

Non-profit institutes

Si vous préférez ce questionnaire en français veuillez cocher ☐

9 12

ease correct any mistakes in name or address

Note: This form has been designed for use by industrial research institutes, industrial associations and similar organizations carrying out, or funding, R&D on behalf of Canadian industry.

INFORMATION FOR RESPONDENTS

Survey objective

This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority

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Reporting period

This questionnaire should be completed for your **fiscal year most closely corresponding to the 1987 calendar year.**

Reporting procedure

If the organization is basically devoted to R&D then consider the entire budget, including administration, and exclude only clearly distinguished non-R&D activities. Examples of such non-R&D activities might be the collection and dissemination of market and other economic information to members, the organization of conferences and training courses, grants to support trade fairs, or the operation of laboratories used only for testing and quality control. If R&D is only a minor part of the activities of this organization, then report only those expenditures and personnel associated with the R&D activity.

Communication

If there are problems with the allocation of activities of this organization, please **call collect, (613)951-9919.** Please mail the completed forms **within 30 days of receipt** to: Science, Technology and Capital Stock Division, Statistics Canada, Ottawa, Ontario, K1A 0T6.

R&D Definition

Research and development (R&D) is systematic investigation carried out in the natural and engineering sciences by means of experiment or analysis to achieve a scientific or commercial advance.

Research is original investigation undertaken on a systematic basis to gain new knowledge.

Development is the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes. If successful, development will usually result in devices or processes which represent an improvement in the "state of the art" and are likely to be patentable.

R&D as used in this survey, should be considered to be "scientific research and experimental development" as defined in Section 37 Regulation 2900 of the Income Tax Regulations.

Note: Although the definition of "Scientific Research and Experimental Development" is considered to be the same as R&D, certain expenditures for scientific research cannot be claimed for income tax purposes (e.g. land). All expenditures attributable to R&D are to be included in this survey.

INTERPRETATION

Generally speaking, industrial R&D is intended to result in an invention which may subsequently become a technological innovation. An essential requirement is that the outcome of the work is uncertain, i.e., that the attainment of a given technical objective cannot be known in advance on the basis of current knowledge or experience. Hence much of the work done by scientists and engineers is not R&D since they are primarily engaged in "routine" production, engineering, quality control testing. Although they apply scientific or engineering principles their work is not directed towards the discovery of new knowledge or the development of new products and processes. However, work elements which are not considered R&D by themselves but which directly support R&D projects, should be included with R&D in these cases. Examples of such work elements are design and engineering, shop work, computer programming, and secretarial work.

1. TOTAL EXPENDITURES OF THIS ORGANIZATION IN 1987 ..... $ .000

2. PERSONNEL OF THIS ORGANIZATION ENGAGED IN R&D IN 1987 (FULL-TIME EQUIVALENT)*

	Bachelors	Masters	Doctors	Total
Professionals				
Scientists and engineers	082	083	084	
Senior R&D administrators	085	086	087	
Supporting Staff				
Technicians and technologists (*technically trained personnel who assist scientists and engineers in R&D – e.g. chemical technicians, draftsmen. They may be certified by either provincial educational authorities or by provincial or national scientific or engineering associations*)				088
Other (*directly engaged in the R&D programme – e.g. machinists and electricians engaged in construction or prototypes or clerks, typists, accountants and storemen engaged in the administration or clerical support of R&D units*)				089
Total R&D personnel				

* *Full-time equivalent: Full-time R&D staff plus portion of time spent in R&D by staff engaged only part-time in this activity.*

Example calculation:

If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time R&D, then: FTE = 1 + ¼ + ¼ + ¼ + ¼ = 2 scientists.

** Divide wages and salaries for 1987 (Question 3 (b)) by total R&D personnel. ***If the average R&D wages and salaries do not seem reasonable, pleas review the data.***

3. EXPENDITURES ON R&D PERFORMED WITHIN THIS ORGANIZATION IN CANADA

	CURRENT EXPENDITURES			CAPITAL EXPENDITURES				Total
	Wages and salaries†	Other current costs††	Total, current	Land	Buildings	Equipment	Total, capital	
(a) Made in 1986	001 $ .000.00	002 $ .000.00	$ .000.00	009 $ .000.00	010 $ .000.00	011 $ .000.00	$ .000.00	$ .000
(b) Made in 1987	003 $ .000.00	004 $ .000.00	$ .000.00	012 $ .000.00	013 $ .000.00	014 $ .000.00	$ .000.00	$ .000
(c) Planned for 1988	005 $ .000.00	006 $ .000.00	$ .000.00	015 $ .000.00	016 $ .000.00	017 $ .000.00	$ .000.00	$ .000
(d) Forecast for 1989	007 $ .000.00	008 $ .000.00	$ .000.00	018 $ .000.00	019 $ .000.00	020 $ .000.00	$ .000.00	$ .000

† *Include fringe benefits of persons engaged in R&D.*

†† *Include contracts for services required to carry out R&D (e.g. contracts awarded for drilling needed for heavy oil R&D). Exclude contr for R&D work itself which should be reported in question 6.*
Exclude capital depreciation.

4. SOURCES OF FUNDS FOR R&D PERFORMED WITHIN THIS ORGANIZATION IN 1987

	Canadian sources	Non-Canadian sources
(a) This organization	021 $ .000.00	022 $ .000.00
(b) Member companies *(annual fees, sustaining grants) and other external sources* *	030 $ .000.00	031 $ .000.00
(c) Companies *(R&D contract work)* *	028 $ .000.00	029 $ .000.00

(d) Canadian Federal Government through:

(i) R&D grants and the R&D portion **only** of any other grants.

Department of Regional Industrial Expansion	166 $ .000.00	
National Research Council: Industrial Research Assistance Program	163 $ .000.00	
Other grant programs *(specify)* _____	$ .000.00	
(specify) _____	$ .000.00	
Sub-total	$ .000.00	027 $ .000.00

(ii) R&D **contracts** and the R&D portion **only** of any other contracts.

Contracting departments: *(Payments are often made through Supply and Services Canada for other departments; please specify contracting department)*:		
_____	$ .000.00	
_____	$ .000.00	
_____	$ .000.00	
_____	$ .000.00	
Sub-total	$ .000.00	026 $ .000.00

(e) Provincial government: *(specify province)* _____	$ .000.00	
(specify province) _____	$ .000.00	
(specify province) _____	$ .000.00	
Sub-total	$ .000.00	291 $ .000.00

Sub-totals	$ .000.00	$ .000.00
Total (*equal to the 1987 expenditures of Question 3(b)*)	$ .000.00	

* *If you have a list of major funders, we would appreciate receiving a copy to ensure that they are surveyed.*

5. Regional Information:

Statistics Canada Use Only

6. PAYMENTS FOR R&D PERFORMED BY OTHER ORGANIZATIONS

(a) Made in 1986	038	$ .000
(b) Made in 1987	039	$ .000
(c) Planned for 1988	040	$ .000
(d) Forecast for 1989	041	$ .000

7. RECIPIENTS OF PAYMENTS FOR R&D PERFORMED IN 1987 BY OTHER ORGANIZATIONS

	In Canada	Outside Cana
(a) Companies	046 $ .000.00	047 $ .000
(b) Other	059 $ .000.00	060 $ .000
Sub-Total	$ .000.00	$ .000
Total (*equal to figure entered in 6(b)*)	$ .000.00	

8. PAYMENTS MADE OR RECEIVED BY THIS ORGANIZATION IN 1987 FOR PATENTS, LICENCES AND TECHNICAL "KNOW-HOW"

	In Canada	Outside Cana
(a) Payments	062 $ .000.00	063 $ .000
(b) Receipts	064 $ .000.00	065 $ .000

9. Nature of R&D activities: Please estimate, in terms of the percentage of the current R&D expenditures, the approximate distribution of your R&D effort in 1987:

A. Basic research (no specific application in view)	____ %
B. Development of new* products	____ %
C. Improvement of existing* products	____ %
D. Development of new* manufacturing processes	____ %
E. Improvement of existing* manufacturing processes	____ %
F. Development of new* technical services	____ %
G. Improvement of existing* technical services	____ %
	100 %

** Please consider* **new** *to mean totally or essentially new/unknown to the personnel of your R&D facility. The product, process or service may exist elsewhere in the world but your R&D is not aided by this fact since your personnel do not have access to the information necessary to avoid any of the normal risks of development.* **Existing** *would mean that your staff would be improving a product/process/service about which they have the basic information – the product/process/service need not already be provided by your firm.*

10. Year in which this company began performing R&D: ____

COMMENTS: Reasons for Major Changes in Reported Expenditures and Personnel– *In order to eliminate the necessity to verify discrepancies between this report and your last return (1986), please explain any significant changes which might be misconstrued as an error in reporting.*

CERTIFICATION

Name of person who completed this report (*please print*):		Business address:	
Official position:	Date:	Postal Code:	Telephone (area code): ( ) –

In 1987 did this company perform or fund any energy R&D?

☐ Yes → **Go to and complete the enclosed green questionnaire**

☐ No → **End** ***(return questionnaires)***

Statistics Canada Statistique Canada

Science, Technology and Capital Stock Division | Division des sciences, de la technologie et du stock de capital

Energy R & D expenditures by area of technology, 1987

Dépenses de R-D énergétique par secteur de technologie, 1987

Confidential when completed | **Confidentiel lorsque rempli**

INFORMATION FOR RESPONDENTS

Survey objective
This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority
This survey is conducted under the authority of the Statistics Act, Statutes of Canada, 1970-71-72, Chapter 15.

Confidentiality
Statistics Canada is prohibited from publishing any statistics which would divulge information relating to any identifiable organization without the previous written consent of that organization. The data reported on this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregated form only.

Federal Agreement
In order to avoid duplication of enquiry, to reduce the cost of data collection and to provide consistent statistics, an agreement has been made with the Office of Energy R&D (OERD), under Section 11 of the Statistics Act, Statutes of Canada, for the joint collection and sharing of information. However, the OERD will not be given access to your questionnaire if you send a letter to the Science, Technology and Capital Stock Division, with your completed questionnaire, stating that you do not want it made available to the OERD.

Reporting period and coverage
This questionnaire should be completed for your **fiscal year most closely corresponding to the 1987 calendar year.** The report should exclude foreign subsidiary operations.

RENSEIGNEMENTS

Objectif de l'enquête
Cette enquête est nécessaire pour produire des renseignements statistiques utiles afin de suivre l'évolution des activités scientifiques et technologiques au Canada et d'étayer l'élaboration d'une politique relative aux sciences et à la technologie.

Autorisation
Cette enquête est autorisée en vertu de la Loi sur la statistique, chapitre 15, Statuts du Canada de 1970-71-72.

Confidentialité
La Loi interdit à Statistique Canada de publier toute statistique pouvant divulguer des renseignements au sujet d'un organisme identifiable sans le consentement préalable, par écrit, de cet organisme. Les données déclarées sur ce questionnaire seront examinées avec une discrétion garantie, utilisées pour fin statistiques et publiées d'une façon globale seulement.

Entente fédérale
Afin d'éviter de répéter les éléments de cette enquête, de réduire les coûts de collecte des données et de fournir des statistiques analogues, nous nous sommes entendus avec le Bureau de recherche et développement énergétique (BRDE), en vertu de l'article 11 de la Loi sur la statistique, Statuts du Canada, relativement à la collecte conjointe des données et au partage des renseignements. Conformément à cet accord, les renseignements que vous fournirez seront partagés avec le BRDE, sauf si vous joignez au questionnaire rempli que vous renverrez à la Division des sciences, de la technologie et du stock de capital, une lettre indiquant que vous vous opposez à la transmission de votre questionnaire avec le BRDE.

Période de déclaration et couverture
Le questionnaire doit être rempli pour votre **année financière correspondant le plus à l'année civile 1987.** Le rapport ne doit pas tenir compte des filiales étrangères.

DEFINITION

For the purpose of this questionnaire, R&D is given the same definition as that provided on the **DEFINITION SHEET** with the following qualifications intended to restrict the response to energy:

(i) **Energy R&D** is aimed at increasing conservation through efficiency of use (not through deprivation), increasing supply and improving the efficiency of conversion and transportation of energy.

(ii) **Excludes** R&D on socio-economics, environmental protection (except reduction of pollutants emitted by energy systems), safety and resource assessment.

DÉFINITION

Aux fins de ce questionnaire, la R-D possède la même définition que celle figurant sur la **FEUILLE DE DÉFINITIONS**, avec les restrictions suivantes, destinées à limiter les réponses à la R-D énergétique:

(i) **La R-D énergétique** vise à accroître l'économie d'énergie grâce à une utilisation efficace des produits énergétiques (sans privation), à l'augmentation des approvisionnements de l'effacité de la conversion et du transport de l'énergie.

(ii) **Est exclue** la R-D à caractère socio-économique ou portant sur la protection de l'environnement (sauf la R-D visant la réduction des polluants émis par les systèmes énergétiques), la sécurité et l'évaluation des ressources.

In 1987, did this company carry out or fund any energy R&D, as defined above?

☐ Yes ☐ No

If "**No**", please return this report along with the **completed** main (blue) questionnaire.

If "**Yes**", please estimate the approximate expenditure for the items 1 to 8 and return with the **completed** main (blue) questionnaire. Include all current and capital expenditures.

Est-ce que votre société a exécuté ou financé des travaux de R-D énergétique telle que décrit ci-haut en 1987?

☐ Oui ☐ Non

Si la réponse est "**Non**", veuillez renvoyez cette formule avec le questionnaire principal (bleu) **dûment complété**.

Si la réponse est "**Oui**", indiquez le montant approximatif des dépenses pour chacun des postes 1 à 8 et renvoyer cette formule avec le questionnaire principal (bleu) **dûment complété**. Comptez toutes les dépenses courantes et les dépenses en immobilisations.

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Canada

Energy R&D by area of technology *(See definition sheet)* – R-D énergétique par secteur de technologie *(Voir la feuille de définitions)*	1987 Expenditures on energy R&D done within this firm – Dépenses de R-D énergétique exécutée en 1987 au sein de cette société				1987 Energy R&D payments **outside Canada** – Paiements de R-D énergétique **à l'étranger** pour 1987
	Self-funded – Financée par cette société	Government funded – Financée par les administrations publiques	Other sources – Autres sources	Total	
1. Renewable resources – Ressources renouvelables:					
(a) Solar energy – Rayonnement solaire	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Biomass energy – Biomasse forestière et agricole	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Wind energy – Vent	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Other renewable resources – Autres ressources renouvelables	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
2. Transportation and transmission – Transport et transmission:					
(a) Transportation of energy commodities – Transport des produits énergétiques	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Transmission and distribution of electricity – Transmission et distribution de l'électricité	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
3. Conservation – Économie d'énergie:					
(a) Domestic and Commercial buildings – Immeubles résidentiels et commerciaux	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Vehicles and other transportation systems – Véhicules et autres moyens de transport	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Industrial processes – Procédés industriels	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Other conservation – Autres économies d'énergie	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
4. Fossil fuels – Combustibles fossiles:					
(a) Crude oils and natural gas – Pétroles bruts et gaz naturel:					
(i) Exploration and production (*excluding enhanced recovery*) – Exploration et production (*excluant toute récupération assistée*)	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(ii) Production by enhanced recovery – Production utilisant la récupération assistée	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Oil sands and heavy crude oils – Sables bitumineux et pétroles bruts lourds:					
(i) Surface mined – Extraction en surface	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(ii) In-situ produced – Production in situ	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Refining – Raffinage	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Coal – Charbon	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
5. Nuclear – Énergie nucléaire:					
(a) Fuel exploration, mining and preparation – Exploration, production et transformation des combustibles	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Energy generation – Production de l'énergie	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
6. Other (*specify*) – Autres (*précisez*) _____	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
7. Non-energy R&D – R-D non-énergétique	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
				1	2
8. Total energy and non-energy R&D – Total, R-D énergétique et non-énergétique	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00

1 *Should equal the 1987 total expenditures of question 6 on main (blue) questionnaire (question 3 if on a Non-profit Institute questionnaire). – Doit correspondre au total des dépenses de 1987 rapporté à la question 6 du questionnaire principal (bleu) (question 3 si le questionnaire est sur les organismes sans but lucratif).*

2. *Should equal the 1987 R&D payments **outside Canada** on main (blue) questionnaire – Doit correspondre au total des paiements de R-D fait **à l'étranger** en 1987 dans le questionnaire principal (bleu).*

5-4600-8

YOUR FILE COPY - POUR VOS DOSSIERS

DEFINITIONS FOR THE SURVEY ON ENERGY R&D EXPENDITURES BY AREA OF TECHNOLOGY

(Definitions below correspond to the area of technology items listed on page 2 of this questionnaire.)

1. RENEWABLE RESOURCES

(a) **Solar energy** includes passive, active and photovoltaics.

(b) **Biomass energy** includes forest and agricultural biomass including plantations, harvesting and conversion.

(d) **Other renewable resources** – Examples: hydraulic energy such as waves, tides and rivers; geothermal and peat.

2. TRANSPORTATION AND TRANSMISSION

(a) **Transportation of energy commodities** includes pipelines, conveyor of vehicles, including ships and railways, and associated storage.

(b) **Transmission and distribution of electricity** includes conversion of shaft energy to electricity, and storage of electricity.

3. CONSERVATION

(b) **Vehicles and other transportation systems** includes more energy-efficient use of transportation systems; inter-modal shifts; and alternative fuel and drive systems.

(c) **Industrial processes** means increasing energy efficiency of industrial processes including use of heat otherwise lost; and using energy derived indirectly by combusting industrial and municipal waste and by recycling energy-intensive materials.

4. FOSSILS FUELS

(a) **Crude oils and natural gas** includes natural gas and crude oils from conventional and frontier reservoirs. Natural gas also includes gas derived from unconventional formations. Crude oils include all light crude oils and equivalent hydrocarbons not included in the definition of heavy crude oils.

(i) **Exploration and production** excludes enhanced recovery; also excludes delivery to the refinery gate which is included as part of "Transportation of energy commodities" in this questionnaire.

(ii) **Production by enhanced recovery** includes incremental recovery of crude oils and or natural gas by any secondary or tertiary means as distinct from primary recovery by natural depletion processes only.

(b) **Oil sands and heavy crude oils** – Oil sands include deposits of sand, shale and other rock aggregate containing bitumen which in its natural state is not recoverable at a commercial rate through a well. Heavy crude oils include those of high viscosities with API gravities less than 25° which are only recoverable to a limited extent from reservoirs by using natural depletion processes (primary recovery).

(i) **Surface mined** includes exploration, surface mining, production and upgrading to a refinery feedstock.

(ii) **In-situ produced** includes in-situ production and upgrading to a refinery feedstock, but excludes residual fuel upgrading; and enhanced recovery by any secondary or tertiary means as distinct from primary recovery by natural depletion processes only.

(c) **Refining** includes refining, processing and cleaning of crude oils and natural gases, and residual fuel upgrading; excludes bitumen upgrading.

(d) **Coal** includes supply (exploration, mining and beneficiation including slurry preparation); combustion (including environmental control and coal slurries); and conversion (to solids, liquids and gases, including coprocessing of coal and bitumen). Excludes transportation to point of use, which is included as part of "Transportation of energy commodities" in this questionnaire.

5. NUCLEAR - (Includes both fission and fusion energy)

(b) **Energy generation** includes generation of electricity and heat by nuclear reactors; and safety and wastes management.

6. OTHER (specify) – for example: hydrogen, heat pumps, heat and mechanical storage.

DÉFINITIONS POUR L'ENQUÊTE SUR LES DÉPENSES DE R-D ÉNERGÉTIQUE PAR SECTEUR DE TECHNOLOGIE

(Les définitions ci-dessous correspondent aux rubriques identifiant les types de technologie à la page 2 de ce questionnaire.)

1. RESSOURCES RENOUVELABLES

a) **Rayonnement solaire** comprend les systèmes passifs et actifs et la conversion photovoltaïque.

b) **Biomasse forestière et agricole** comprend la biomasse forestière et agricole, y compris les plantations, la moisson et la conversion.

d) **Autres ressources renouvelables** – Exemples: énergie hydraulique (les vagues, les marées, les cours d'eau); énergie géothermique et la tourbe.

2. TRANSPORT ET TRANSMISSION

a) **Transport des produits énergétiques** comprend les pipelines, les convoyeurs ou les véhicules, y compris les navires et les trains et le stockage connexe.

b) **Transmission et distribution de l'électricité** comprend la conversion de l'énergie motrice en électricité; et le stockage de l'électricité.

3. ÉCONOMIE D'ÉNERGIE

b) **Véhicules et autres moyens de transport** comprend l'utilisation plus efficace des réseaux de transport; les transferts intermodaux; d'autres types de combustible et de systèmes d'entraînement.

c) **Procédés industriels** veut dire l'accroissement du rendement énergétique des procédés; y compris la récupération de la chaleur qui se perdrait autrement; et l'utilisation d'énergie provenant indirectement de la combustion des déchets industriels et municipaux et par le recyclage des matières riches en énergie.

4. COMBUSTIBLES FOSSILES

a) **Pétroles bruts et gaz naturel** comprend le gaz naturel et les pétroles bruts obtenus des réserves classiques et des régions pionnières. Le gaz naturel comprend également les gaz tirés des formations non classiques. Les pétroles bruts comprennent tous les pétroles bruts légers et les hydrocarbures équivalents qui ne sont pas inclus dans la définition des pétroles bruts lourds.

i) **Exploration et production** ne comprend ni la récupération assistée ni le transport à la raffinerie qui fait partie de l'item "Transport des produits énergétiques".

ii) **Utilisant la récupération assistée** comprend la récupération des pétroles bruts ou de gaz naturel au moyen de méthodes secondaires ou tertiaires par opposition à la récupération primaire qui se fait par épuisement naturel seulement.

b) **Sables bitumineux et pétroles bruts lourds** – Les sables bitumineux comprennent des dépôts de sable, de roches argileuses liées et d'autres agrégats rocheux contenant du bitume impossible à récupérer à l'état naturel par forage à un taux commercial. Les pétroles bruts comprennent ceux dont la viscosité est élevée et dont la densité API est inférieure à 25° et qui sont récupérables uniquement dans une certaine mesure à partir des gisements au moyen de la méthode d'épuisement naturel (récupération primaire).

i) **Extraction en surface** comprend l'exploration, l'exploitation à ciel ouvert, la production et la valorisation en vue d'en faire une charge d'alimentation de raffinerie.

ii) **Production in situ** comprend la production in situ et la valorisation en vue d'en faire une charge d'alimentation de raffinerie, mais ne comprend pas la valorisation des combustibles résiduels; une récupération asssistée au moyen de méthodes secondaires ou tertiaires, qui sont distinctes de la récupération primaire qui se fait par épuisement naturel seulement.

c) **Raffinage** comprend le raffinage, le traitement et l'épuration des pétroles bruts et des gaz naturels, et les combustibles résiduels; ne comprend pas la valorisation du bitume.

d) **Charbon** comprend l'approvisionnement (l'exploration, l'exploitation, et l'enrichissement et y compris la préparation des suspensions épaisses); la combustion (y compris les mesures de protection de l'environnement et les suspensions épaisses du charbon); et la conversion (en solides, en liquides et en gaz y compris le cotraitement du charbon et du bitume). Ne comprend pas le transport au point d'utilisation qui est inclu à l'item "Transport des produits énergétiques".

5. ÉNERGIE NUCLÉAIRE - (Comprend l'énergie de fission et de fusion)

b) **Production de l'énergie** comprend la production d'électricité et de chaleur au moyen de réacteurs nucléaires; les mesures de sécurité et la gestion des déchets.

6. AUTRES (précisez) – par exemple: l'hydrogène, les thermopompes, le stockage de la chaleur et de l'énergie mécanique.

5-4600-8

YOUR FILE COPY - POUR VOS DOSSIERS

Energy R&D by area of technology *(See definition sheet)* – R-D énergétique par secteur de technologie *(Voir la feuille de définitions)*	1987 Expenditures on energy R&D done within this firm – Depenses de R-D energetique executee en 1987 au sein de cette societe: Self-funded – Financee par cette societe	Government funded – Financee par les administrations publiques	Other sources – Autres sources	Total	1987 Energy R&D payments **outside Canada** – Paiements de R-D énergétique **à l'étranger** pour 1987
1. Renewable resources - Ressources renouvelables:					
(a) Solar energy – Rayonnement solaire	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Biomass energy – Biomasse forestière et agricole	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Wind energy – Vent	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Other renewable resources – Autres ressources renouvelables	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
2. Transportation and transmission - Transport et transmission:					
(a) Transportation of energy commodities – Transport des produits énergétiques	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Transmission and distribution of electricity – Transmission et distribution de l'électricité	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
3. Conservation - Économie d'énergie:					
(a) Domestic and Commercial buildings – Immeubles résidentiels et commerciaux	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Vehicles and other transportation systems – Véhicules et autres moyens de transport	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Industrial processes – Procédés industriels	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Other conservation – Autres économies d'énergie	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
4. Fossil fuels - Combustibles fossiles:					
(a) Crude oils and natural gas – Pétroles bruts et gaz naturel:					
(i) Exploration and production (*excluding enhanced recovery*) – Exploration et production (*excluant toute récupération assistée*)	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(ii) Production by enhanced recovery – Production utilisant la récupération assistée	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Oil sands and heavy crude oils – Sables bitumineux et pétroles bruts lourds:					
(i) Surface mined – Extraction en surface	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(ii) In-situ produced – Production in situ	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(c) Refining – Raffinage	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(d) Coal – Charbon	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
5. Nuclear - Énergie nucléaire:					
(a) Fuel exploration, mining and preparation – Exploration, production et transformation des combustibles	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
(b) Energy generation – Production de l'énergie	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
6. Other (*specify*) - Autres (*précisez*) _____	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00
7. Non-energy R&D - R-D non-énergétique	$ .000.00	$ .000.00	$ .000.00	$ .000.00 [1]	$ .000.00 [2]
8. Total energy and non-energy R&D - Total, R-D énergétique et non-énergétique	$ .000.00	$ .000.00	$ .000.00	$ .000.00	$ .000.00

1. *Should equal the 1987 total expenditures of question 6 on main (blue) questionnaire (question 3 if on a Non-profit Institute questionnaire). – Doit correspondre au total des dépenses de 1987 rapporté à la question 6 du questionnaire principal (bleu) (question 3 si le questionnaire est sur les organismes sans but lucratif).*
2. *Should equal the 1987 R&D payments **outside Canada** on main (blue) questionnaire – Doit correspondre au total des paiements de R-D fait **à l'étranger** en 1987 dans le questionnaire principal (bleu).*

5-4600-8

PRIVATE NON-PROFIT ORGANIZATIONS

This form is sent to private non-profit organizations considered capable of performing or funding R&D. These consist of philantropic foundations, voluntary health organizations, professionnal societies and associations, and non-profit research institutes which are not part of the business, government or university sectors. The basic statistical report prepared from the data collected is "R&D Expenditures of Private Non-profit Organizations", usually the 12th number of the monthly service bulletin **Science Statistics**, Statistics Canada Catalogue No. 88-001.

Statistics Canada Statistique Canada
Science, Technology and Capital Stock Division

Research and development of Canadian private non-profit organizations, 1987

Si vous désirez un questionnaire en français, veuillez cocher ☐

Please correct any mistakes in name or address

INFORMATION FOR RESPONDENTS

Survey objective

This survey collects data which are essential to assure the availability of pertinent statistical information to monitor science and technology related activities in Canada and to support the development of science and technology policy.

Authority

This survey is conducted under the authority of the Statistics Act, Statutes of Canada, 1970-71-72, Chapter 15.

Confidentiality

Statistics Canada is prohibited from publishing any statistics which would divulge information relating to any identifiable organization without the previous written consent of that organization. The data reported on this questionnaire will be treated in strict confidence, used for statistical purposes and published in aggregated form only.

Reporting period

This questionnaire should be completed for your **fiscal year most closely corresponding to the 1987 calendar year.**

In 1987, did this organization perform or fund any R&D (as defined on the attached instruction sheet)?

☐ **Yes** ⟶ **go to question 1** ☐ **No** ⟶ **end (please complete Certification on other side and return questionnaire)**

1. Please describe briefly your organization's main activities. If you have enclosed an annual report which contains this information, disregard this question.

2. EXPENDITURE FOR R&D PERFORMED WITHIN YOUR ORGANIZATION IN 1987

Major fields of R&D	Current expenditures	Capital expenditures	Total
Natural sciences: Medical	$ .000.00	$ .000 00	$ 000 00
Other	$ .000.00	$ 000 00	$ 000 00
Social sciences and humanities	$ .000 00	$ .000 00	$ 000 00
Total	$ .000 00	$ .000 00	$ 000 00

12/10

3. SOURCES OF FUNDS FOR R&D PERFORMED WITHIN THIS ORGANIZATION IN 1987

(a) Reporting organization (*e.g., interest on own funds, investment income, membership dues, trust funds, payments form patients*)	.000.00
(b) Federal government	.000.00
(c) Provincial government (*specify province*) _____	.000.00
(d) Business enterprises (*e.g. campaigns*)	.000.00
(e) Other Canadian sources	.000.00
(f) Foreign sources	.000.00
(g) **Total** (*equal to total expenditures of question 2*)	.000 00

7/3

4 Identify all organizations providing major R&D funds by attaching a list of organization and their support. Annual reports may provide this information.

5-4600-13 1 4-2-88 STC.SCT – 465-60043

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5. AVERAGE PERSONNEL OF THIS ORGANIZATION ENGAGED IN R&D IN 1987

Category	Full-time staff		Part-time staff mainly engaged in R&D	Total
	Mainly engaged in R&D	Engaged part-time in R&D		
	number			
Scientists and engineers				
Technicians and technologists (*technically trained personnel who assist scientists and engineers in R&D; e.g., chemical technicians, draftsmen. They may be certified by either provincial educational authorities or by provincial or national scientific or engineering associations*)				
Other (*directly engaged in the R&D programme; e.g., machinists and electricians engaged in construction of prototypes or staff engaged in the administration or clerical support of R&D units*)				
Total R&D personnel				

16/16

6. FIELDS OF MEDICAL R&D PERFORMED WITHIN THIS ORGANIZATION – *Please rank in order of importance (e.g. 1 = most important)*

Fields of medical R&D	Rank	Fields of medical R&D	Rank
1. Cellular biology		6. Cancer	
2. Genetics		7. Haematology	
3. Immunology		8. Drugs and their effects	
4. Endocrinology		9. Visual sciences (*i.e. ophtalmology, optometry and other related eye research*)	
5. Nutrition and metabolism		10. Other medical fields	

10/10

7. PAYMENTS FOR R&D PERFORMED BY OTHER ORGANIZATIONS IN 1987

Major fields of R&D	Sector of performance			
	Universities	Other private non-profit organizations	Other	Total
Natural sciences. Medical	$ .000.00	$ .000 00	$ .000.00	$ .000 00
Other	$ 000 00	$ 000 00	$ .000.00	$ .000.00
Social sciences and humanities	$ .000 00	$ .000 00	$ .000 00	$ .000.00
Total	$ 000 00	$ .000 00	$ 000 00	$ .000 00

16/12

8. Attach a list of the organizations or individuals to which major payments were made for R&D (*include a description of the projects if possible*). Annual reports may provide this information

COMMENTS: Reasons for Major Changes in Reported Expenditures and Personnel – *In order to eliminate the necessity to verify discrepancies between this report and your last return (1986), please explain any significant changes which might be misconstrued as an error in reporting.*

CERTIFICATION

Name of person who completed this report (*please print*)		Business address	
Official position	Date	Postal code	Telephone (area code) ( ) -

5-4600-13

Statistics Canada Statistique Canada
Science, Technology and Capital Stock Division

Research and development of Canadian private non-profit organizations, 1987

GENERAL INSTRUCTIONS

1 Please answer all questions. Since the required information cannot normally be readily extracted from available records, your best estimates will be quite satisfactory. This survey was carried out in 1986; you may have a file copy of your return which will help you now.

2. Additional forms and explanations of the terms used in the questions can be obtained from the Science, Technology and Capital Stock Division: call collect (613) 951-9919.

3. Please enclose a copy of your latest published annual report with a completed copy of this questionnaire **within 30 days of receipt** and mail to:

SCIENCE, TECHNOLOGY AND CAPITAL STOCK DIVISION
STATISTICS CANADA
OTTAWA, ONTARIO
K1A 0T6

4. **Definitions**

Research and development (R&D) is creative work in the sciences and humanities undertaken on a systematic basis to increase the stock of knowledge or discover new applications for existing knowledge. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the re-evaluation of existing observations.

Major fields of R&D

(a) Natural sciences:

- Medical sciences include medicine, dentistry, pharmacy, etc.
- Other sciences include all disciplines in the natural sciences except medical sciences (*e.g. mathematics, physics, chemistry, biology and engineering sciences*).

(b) Social sciences and humanities include all disciplines involving the study of human actions and conditions, and the social, economic and institutional mechanism affecting humans (*e.g. economics, history, sociology*).

NOTE: Exclude all non R&D activities (*such as investigative studies, medical care, social services, education and training, dissemination of information, etc.*), which your organization undertakes or funds.

To illustrate the distinction between R&D and investigative studies: the developing and testing of new methods for treating a neurosis is research. A study of psychiatric services in a region to suggest changes is an investigative study.

Expenditures

1. **Current expenditures** are expenditures on items used up within a relatively short time period or costing relatively little. They include wages, salaries, and related costs; materials and supplies used; necessary background literature, minor scientific equipment; and estimated overhead included are any administrative overhead costs.

2. **Capital expenditures** are expenditures on facilities such as buildings, equipment, machinery and land.

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