

## SECTION C. SURVEY DOCUMENTS

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OFFICE OF THE  
DIRECTOR

NATIONAL SCIENCE FOUNDATION

4201 WILSON BOULEVARD  
ARLINGTON, VIRGINIA 22230

FROM THE DIRECTOR  
NATIONAL SCIENCE FOUNDATION

The National Science Foundation requests your company's participation in its 1993 Survey of Industrial Research and Development. This annual survey is the only source of detailed information on U.S. industry's research and development (R&D) performance.

Your company's participation is vital to the accuracy of the resulting information. Because R&D expenditures are concentrated in relatively few companies, a completed response is needed from each surveyed firm – there is no good substitute for the information that you can provide. Your company can be assured of complete confidentiality. Survey data will be released only in aggregate form so that responses of individual companies cannot be identified.

Survey results will be made available to government and industry officials, researchers, and other interested individuals. If you have questions concerning the operation of this survey, please direct them to the Census Bureau's Innovation and Technology Branch on (301) 763-5598. If you would like to receive a copy of the final publication or if you need to speak with someone at NSF, please call Jennifer Gray in the Division of Science Resources Studies on (703) 306-1772.

Sincerely,

Neal Lane  
Director

Enclosures



UNITED STATES DEPARTMENT OF COMMERCE  
Bureau of the Census  
Washington, DC 20233-0001  
OFFICE OF THE DIRECTOR

FROM THE ACTING DIRECTOR  
BUREAU OF THE CENSUS

The Bureau of the Census conducts the "Survey of Industrial Research and Development" under sponsorship of the National Science Foundation (NSF). Data on research and development expenditures are essential to policymakers in analyzing and forecasting long-term economic growth and formulating policy recommendations.

We request your cooperation in completing the report form for 1993. The 1993 report should cover your entire domestic company operations. We also enclose the instructions for completing the report form and a letter from the NSF emphasizing the survey's prominence.

The law (Title 13, United States Code) authorizes this report. Your response is mandatory for Items 1A and 1B and Item 3A.3, Columns 4 and 6. We need your cooperation in reporting the remaining items to make the results of the survey comprehensive and accurate. We recognize you may not maintain book records for particular items. In such cases, please use carefully prepared estimates.

By Section 9 of the same law (Title 13), your report to the Bureau of the Census is confidential. Only sworn Bureau of the Census employees will see the information you reported, and they will use it only for statistical purposes. Copies retained in your files are immune from legal process.

Please return the completed form within 60 days. If you have questions concerning this survey, need copies of the form, or need a time extension, please call the Technology and Innovation Branch of our Industry Division on (301) 763-5598. We thank you for your continued cooperation in this vital survey.

Sincerely,

A handwritten signature in black ink, appearing to read "Harry A. Scarr".

Harry A. Scarr

Enclosures

<b>NOTICE</b> - Your report to the Census Bureau is confidential by law (Title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.		<b>FORM RD-1(L)</b> <small>(1-95-94)</small>		<b>U.S. DEPARTMENT OF COMMERCE</b> <b>BUREAU OF THE CENSUS</b> <b>COLLECTING AND COMPILED AGENT FOR</b> <b>THE NATIONAL SCIENCE FOUNDATION</b>	
<b>RETURN TO</b>  Bureau of the Census 1201 East 10th Street Jeffersonville, IN 47132-0001	<b>SURVEY CODE</b> <b>4001</b>		In correspondence pertaining to this report refer to this <b>CENSUS FILE NUMBER</b> (11 digits) ►		
	<b>INDUSTRY CODE</b> <b>WEIGHT</b> <b>STATE</b> <b>ADDRESS</b> <b>SIC CODE</b>				
Name of person who supplied 1992 data					
Data supplied in items 1A and 1B and in item 3A, line 3, columns 4 and 6, for 1993 on this form will satisfy the mandatory reporting requirements. (Title 13, U.S. Code.)					
<b>PLEASE READ ENCLOSED INSTRUCTIONS BEFORE COMPLETING THIS FORM.</b>					

(Please correct any error in name and address, including ZIP Code.)

**GENERAL INSTRUCTIONS**

Please complete this form and return within 60 days in the envelope provided.  
 Make a copy for your records.

Enter 0 (zero) where appropriate rather than leaving an item blank.

THIS REPORT SHOULD COVER YOUR ENTIRE COMPANY, INCLUDING ALL SUBSIDIARIES.

Figures for 1992 are those reported by your company last year. THE FIGURES SHOULD BE REVISED, IF NECESSARY, TO BE COMPARABLE TO 1993 DATA.

- The phrase **performed within the company** includes the activities of domestic subsidiaries.
- The phrase **foreign subsidiaries** is defined as those subsidiaries located outside of the 50 States and the District of Columbia.

Explain any substantial increase or decrease in 1993 figures over 1992 in the "Remarks" section on the back page.

Please report figures in thousands of dollars. Reasonably accurate estimates are acceptable.

**Section I - GENERAL COMPANY DATA**

<b>Item 1 - SALES AND EMPLOYMENT FOR THE COMPANY</b>										Domestic net sales and receipts of this company <small>(Report in thousands of dollars)</small>		
<b>A. Domestic net sales and receipts of this company</b> INCLUDE sales of products and services to other companies, individuals, U.S. Government agencies, and foreign countries. EXCLUDE domestic intra-company transfers and sales by foreign subsidiaries.										1992 1993 Bil. Mil. Thou. Bil. Mil. Thou.		
										1992 1993 Number Number		
										111 112		
<b>B. Total domestic company employment in all activities during the pay period which includes the 12th of March 1993 (Item 1 of I.R.S. Form 941, if one Form 941 was filed for the entire company.)</b>										January 1993 January 1994 Number Number		
										503 504		
<b>C. Total - Sum of lines 2A and 2B</b>										505 506		
<b>C. TOTAL - Sum of lines 2A and 2B</b>										501 502		

<b>Item 3 - REPORT COSTS INCURRED FOR RESEARCH AND DEVELOPMENT</b>										(Report in thousands of dollars)									
1992										1993									
Federal funds (1)			Company and other (2)			Total ((1)+(2)) (3)			Federal funds (4)			Company and other (5)			Total ((4)+(5)) (6)				
Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.		
<b>A. Within the company</b>										<b>B. Outside the company</b>									
1. Basic research - If "NONE," please mark (X) here and enter 0 (zero) where appropriate. →										Total company funds for research and development activities financed by the company but performed by others outside the company within the United States (Should be excluded from 3.A.3. above)									
2. Applied research a. Applied research b. Development c. Total - Sum of lines a and b										Total company funds for research and development activities performed by foreign subsidiaries or by other organizations outside the United States (Should be excluded from 3.B.3. and 3.B. above)									
3. Total - Sum of lines 1 and 2.c.										365									
362										366									
382										366									
372										375									
<b>D. TOTAL - Company and other funds, except Federal - Sum of lines 3.A.3., 3.B., and 3.C.</b>																			
<b>Item 4 - COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 1994</b>										1994 Bil. Mil. Thou.									
										401									

(Comparable to the 1993 figure reported in item 3.A.3., column (5).)

**Section II - RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY**

<b>Item 5 - COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THIS COMPANY BY PRINCIPAL GOVERNMENT AGENCY</b>										Key code			1991 (1)			1992 (2)			1993 (2)		
Allocate the total reported in item 3.A., line 3, column (4), Federal funds, into the following principal agencies:										6			Bil. Mil. Thou.			Bil. Mil. Thou.					
1. Department of Defense										01			N			O					
2. National Aeronautics and Space Administration										02			T			P					
3. Department of Energy										03			S			A					
4. Other Federal agencies										04			K			E					
5. TOTAL COSTS - Sum of lines 1 through 4										05			D			C					
<b>Item 6 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THIS COMPANY BY MAJOR TYPE OF EXPENSE</b>										Key code			1991 (1)			1992 (2)			1993 (2)		
Allocate the total reported in item 3.A., line 3, column (6), total company research and development - Exclude lines 3.B. and 3.C.										6			Bil. Mil. Thou.			Bil. Mil. Thou.					
1. Wages and salaries of research and development personnel - Include scientists and engineers, technicians, secretaries, and other personnel.										01			N			O					
2. Costs of materials and supplies consumed - Do not include in this item components, models, and other materials supplied by other research organizations.										02			T			S					
3. Other costs - Include service and supporting costs, R&D depreciation, and share of overhead.										03			K			E					
4. TOTAL COSTS - Sum of lines 1 through 3										04			D			C					



## SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1993

## Section II - RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY - Continued

Key code		1992			1993			1994		
		Federal funds			Total funds			Federal funds		
		(1)	(2)	(1)	(2)	(1)	(2)	(3)	(4)	(3)
10		Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
A. Nuclear	1. Fission	01								
	2. Fusion	02								
	3. Total	03								
B. Fossil fuels	1. Oil	04								
	2. Gas	05								
	3. Shale	06								
	4. Coal	a. Synthetic fuels	07							
		b. Mining	08							
		c. All other	09							
		d. Total coal	10							
	5. Other fossil fuels	11								
	6. Total	12								
C. Geothermal, solar, conservation and utilization	1. Geothermal	13								
	2. Solar	14								
	3. Conservation and utilization	15								
	4. Total	16								
D. All other energy		17								
E. TOTAL - Sum of lines A through D →	18									

## Item 11 - POLLUTION ABATEMENT RESEARCH AND DEVELOPMENT PERFORMED WITHIN THIS COMPANY

Key code		1992			1993			1994		
		Federal funds			Total funds			Federal funds		
		(1)	(2)	(1)	(2)	(1)	(2)	(3)	(4)	(3)
11		Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
A. Air	1. Automotive emissions	01								
	2. Electric power plant emissions	02								
	3. All other	03								
	4. Total air	04								
B. Water		05								
C. Solid waste		06								
D. Other		07								
E. TOTAL - Sum of lines A through D →	08									

## Section III - RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

## Item 12 - FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY AND EXPENDITURE

Report the amount of total foreign research and development, item 3.C., column (5), for the countries with the largest expenditures. If necessary, write in countries not listed. Report the balance of foreign research and development on line 9.

Key code		1993		
		Bil.	Mil.	Thou.
12	01			
	02			
	03			
	04			
	05			
	06			
	07			
	08			
	09			
10. TOTAL - Sum of lines 1 through 9 →	10			

## Item 13 - COVERAGE AND OPERATIONAL STATUS

A. Are research and development expenditures for entire domestic company, including subsidiaries, reported on this form?

1301  Yes

1302  No - Please explain in the "Remarks" section on the back of the page.

B. Was this company owned or controlled by another company on December 31, 1993?

1303  Yes - Complete 13.C. Date acquired: Month \_\_\_\_\_ Year \_\_\_\_\_

1304  No

C. New owner information

602 Name

603 Address (Number and street)

604 City

605 State

606 ZIP Code

## Item 14 - CERTIFICATION - This report is substantially accurate and has been prepared in accordance with instructions

Name of person to contact regarding this report	Telephone	Area code	Number	Extension
Signature of authorized official	Title		701 Date	



**INSTRUCTIONS FOR SURVEY OF INDUSTRIAL  
RESEARCH AND DEVELOPMENT DURING 1993  
FORM RD-1L****Outline of Instructions**

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## GENERAL INSTRUCTIONS

Please complete and return this form in the envelope provided within 60 days. Make a copy for your records.

**INTRODUCTION** – Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is ensured.

**SURVEY SCOPE** – This report covers privately-owned nonfarm business firms in all sectors of the United States Economy. It does not include operations owned by Federal, State or local governments, or nonprofit organizations.

If your company is a nonprofit organization, please indicate so in the remarks section, page 4, and return the form.

If this form has been directed to a trust or pension plan which performs no activity other than investments, do not report. Please note in remarks section, page 4, and return the form.

**REPORTING ENTITY** – Report R&D for all domestic operations of your company, including subsidiaries and divisions. Report for all parts of the company that are located in the 50 States and the District of Columbia. Report sales and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 States or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

**Companies Reporting in Survey for the First Time** – Companies which did not report in the 1992 survey are asked to provide figures for both 1992 and 1993. If the company had no R&D expenditures, complete only Item 1. Enter "No R&D" in the "Remarks" section, sign, and return the form.

**Figures for Earlier Years are Preposted on the Form** – If your company reported for 1992, entries from that form have been copied on the present form. Please describe in the "Remarks" section (page 4 of the form) the reasons for any substantial increase or decrease in the 1993 figures entered on this form when compared to corresponding 1992 figures. Examples of such reasons are new government contracts, acquisitions and divestitures, revised accounting method, etc. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in "Remarks," and give the total amount of R&D accounted for by such unit.

**Revision of Earlier Year Figures** – If your company reported for 1992, entries from that form are pre-printed on the current form. Please revise the 1992 figures to be comparable with 1993 data and explain in the "Remarks" section any significant revisions made.

**ESTIMATES ARE ACCEPTABLE** – If you cannot answer a question from your company records, please estimate the answer carefully.

**HOW TO REPORT** – Report all value figures in thousands of dollars.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.	Dol.
Report	\$1	124	679	000

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124 million dollars.

	Bil.	Mil.	Thou.	Dol.
Report	\$1	124	000	000

**PERIOD COVERED BY THE REPORT** – Figures should be reported on a calendar year basis. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September and March. Please report employment figures (Items 1B and 2) for the specific time indicated for both of these items. Enter "0" where appropriate rather than leaving a blank space.

**ADDITIONAL FORMS** – Photocopies of this form are acceptable. If you require additional forms, write to the Bureau of the Census, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 288-3331.

**FILING EXTENSIONS** – If you cannot complete the survey in 60 days, request an extension of time by writing to the address below (please include your Census File Number):

Bureau of the Census  
1201 East 10th Street  
Jeffersonville, IN 47132-0001

or call: (812) 288-3331.

**ALTERNATIVE REPORTING FORMATS** – For information concerning use of reporting formats other than the form provided, such as computer tape, diskette, or printouts, contact Mr. Jesse Havard on (301) 763-5915.

**BURDEN HOUR ESTIMATE** – Public reporting burden for this collection of information is estimated to average 20 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information including suggestions for reducing this burden to Herman G. Fleming, National Science Foundation 4201 Wilson Boulevard, Arlington, VA 22230; and to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB No. 3145-0027), Washington, DC 20503.

Direct **QUESTIONS** regarding this form to the Bureau of the Census, ATTN: Industry Division, Washington, DC 20233-0001, or call (301)763-5598.

**DEFINITION OF RESEARCH AND DEVELOPMENT**

**R&D** includes basic research and applied research in the sciences and in engineering, and design and development prototype products and processes.

For the purposes of this study, R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences including related engineering, and the biological sciences including medicine but excluding psychology, if the purpose of such activity is to do one or more of the following things:

1. Pursue a planned search for new knowledge, whether or not the search has reference to a specific application.
2. Apply existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses.
3. Apply existing knowledge to problems involved in the improvement of a present product or process.

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of the questions.

**Activities to be excluded from R&D:**

- Routine product testing
- Research in social sciences or psychology
- Geological and geophysical exploration activities
- Technical services such as:
- Quality and quantity control
- Technical plant sanitation control
- Trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D – Social Science R&D is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law
  - Software development

**SPECIFIC INSTRUCTIONS****Section 1 – GENERAL COMPANY DATA****Item 1 – SALES AND EMPLOYMENT FOR THE COMPANY****Item 1A – Domestic Net Sales and Receipts**

Sales and receipts are defined as the revenue for goods produced, distributed, or services provided. Include revenue from investments, rents, and royalties only if it is the principal business of the company. The reported figures should represent net value f.o.b. plant after discount and allowances and should exclude freight charges and excise taxes.

**Include:**

- All operating receipts from taxable operations, as well as total revenue from tax-exempt activities
- Sales of products and services to other companies, individuals, U.S. Government agencies, and foreign countries
- Transfers to foreign subsidiaries

**Exclude:**

- Domestic intra-company transfers
- Sales by foreign subsidiaries

**Item 1B – Domestic Employment**

Report the number of employees of the company in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 1993. This figure would be the same as Item 1 of Treasury Form 941, if one Form 941 was filed for the entire company. Report number of employees, not payroll.

**Item 2 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS**

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers on the rolls in January.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 1994 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

## **Item 3 – REPORT COSTS INCURRED FOR RESEARCH AND DEVELOPMENT**

### ***Include as costs:***

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation
- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
  - Travel costs and professional dues
  - Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

### ***Exclude as costs:***

- R&D performed abroad (outside the Continental U.S.) such as in Canada and Puerto Rico (Except in Item 3.C.)
- R&D performed by non-company R&D organizations of any kind (Except in Item 3.B.)
- Capital expenditures
- Patent expense
- Income taxes and interest
- The portion of company-held R&D contracts that were subcontracted outside the reporting company
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering
- Social Science R&D

## **Item 3.A – Report Costs Incurred for Research and Development Performed Within the Company**

Federally sponsored R&D performed within the company should be reported in column 4.

Costs of company sponsored R&D performed within the company, or R&D performed within the company under contract from non-federal sources should be reported in column 5.

Costs of INDEPENDENT R&D should also be reported in column 5. For the purpose of this survey, INDEPENDENT R&D is defined as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services.

### **Types of Research**

#### **Item 3.A.1 – Basic Research**

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, (although they may be in the fields of present or potential interest to the reporting company).

#### **Item 3.A.2.a – Applied Research**

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

#### **Item 3.A.2.b – Development**

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research. Include the findings or other general scientific knowledge into products or process.

### ***Include as development:***

- The design and operation of pilot plants and semiwork plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

### ***Exclude as development:***

- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Pre-production planning
- Any other items excluded from the definition of total R&D

## **ESTIMATING BASIC, APPLIED, AND DEVELOPMENT EXPENDITURES**

If your company does not keep records that meet or can be allocated to these specific categories, estimate by:

- Isolating the projects that clearly fall in the development category. If your company fabricates products, such development activity will include the design, construction, and testing of prototypes and models. Some defense contracts typically call for several test models. If your company's research and development frequently involves the development of a "process" as in chemicals and petroleum, such development activity would include operations beyond the bench scale, primarily the design and operations of pilot plants or semiworks.
- Isolating the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. If R&D work is done in production units as well as in various laboratories, it is generally development type.
- Distributing the balance on the basis of individual projects or on the basis of other summaries of the work. Please use the definitions for basic, applied, and development given above.

#### **Item 3.A.2.c – Total Costs for Applied Research and Development**

Add line 3.A.2.a and line 3.A.2.b.

**Item 3.A.3. – Total Costs for Basic and Applied Research and Development Performed Within the Company**

Add line 3.A1 and line 3.A.2.c.

**Item 3.B – Total Costs Incurred for R&D Performed Outside the Company Within the United States and Financed by the Company**

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations for R&D activities performed for the company.

Do not include subcontracting of R&D contracts received from the Federal Government or other companies.

**Item 3.C – Total Costs Incurred for Research and Development Performed by Foreign Subsidiaries or by Other Organizations Outside of the United States and Financed by the Company**

FOREIGN SUBSIDIARIES are those outside of the 50 States and the District of Columbia.

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations

**Item 3.D –Total-Company and Other Funds, Except Federal**

With the exception of "Other funds," this number represents company sponsored R&D performed within the company. It is comparable to information reported on Form 10K if you report to the Securities and Exchange Commission.

To complete this item, add line 3.A.3, line 3.B and line 3.C.

**SOURCE OF FUNDS****Item 3 – FEDERAL FUNDS – (Columns 1+4)****Include:**

- Amount of work done on Federal R&D contracts or subcontracts in the current year
- R&D portions of procurement contracts or subcontracts

**Exclude:**

- Federal R&D contracts and R&D portions of procurement contracts that you subcontracted to other R&D organizations (including these would cause duplication in the statistical totals, which include data on work actually performed by each company).
- If your company performs independent research and development (IR&D), please read the following carefully:

• Definition of IR&D – We define IR&D funds as expenditures that are reimbursable by the government for qualified projects that usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are not included in work done under a research contract with the government. They are reimbursed to the company through indirect charges to the government for the purchase of products or services.

**HOW TO REPORT**

Report expenditures for which you anticipate reimbursement as company funds in column 5. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

**Item 3 – COMPANY AND OTHER FUNDS**

(Columns 2+5) Report all company-sponsored research and development performed within the company. Report R&D performed under contract from non-federal sources.

**Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 1994**

Report the estimated cost of company and other non-federally sponsored R&D that will be performed within the 50 States and the District of Columbia. This item is comparable to the 1993 figure reported in item 3.A.3, column 5.

**Section II – RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY****Item 5 – COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT BY PRINCIPAL AGENCY**

Distribute the cost of Federal research and development work (item 3A, line 3, columns 1 and 4) by Federal agency – If exact figures are not available by agency, please estimate or apportion according to the number of scientists and engineers working on the Federal projects and/or the costs of Federal programs.

**Item 6 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE**

If most R&D is performed in units where summaries are regularly prepared by element of cost, base the breakdown of research and development costs upon the records of such units. If existing records do not yield figures for this item, the item may be estimated.

**Item 6.1 – Wages and Salaries**

Report the gross earnings paid in calendar year 1993 to employees engaged in R&D (follow the definition of salaries and wages that is used for calculating the withholding tax). Include salaries of officers in the research establishment(s) if a corporation; exclude payments to proprietor or partners if an unincorporated concern. (Scientists and engineers are defined in item 2.) Exclude employee fringe benefits which are to be reported in item 6.3 – Other Costs.

## **Item 6.2 – Materials and Supplies**

Report the delivered cost for all purchased materials consumed, whether received from other companies, withdrawn from inventory, or received from other establishments of this company. Include all work that was done for your laboratories and other technical units by non company organizations (for example, model construction by a non company model shop). Exclude purchases from other R&D organizations.

## **Item 6.3 – Other Costs**

Include items related to your R&D activities and not included in items 6.1 and 6.2. Include utilities, books and periodicals, property and other taxes, employee fringe benefits, and company overhead.

## **Item 7 – FIELDS OF BASIC RESEARCH**

Use the following definitions to help you divide your company's basic research into broad research fields.

### **Item 7.1 – Chemistry**

Includes inorganic, organo-metallic, organic, and physical.

### **Item 7.2 – Engineering (Including metallurgy)**

Includes aeronautical (including aerospace and space technology), chemical, nuclear, civil, electrical, and mechanical engineering, etc.) and metallurgy and materials.

### **Item 7.3 – Geological Sciences**

Includes geodesy, hydrology, geochemistry, seismology, soil sciences, etc.

### **Item 7.4 – Mathematics**

Includes areas such as algebra; foundations and logic; geometry; numerical analysis, etc.

### **Item 7.5 – Computer Sciences**

Includes activities directed toward enhancing the understanding of computer structures and computational processes to provide bases for the future capabilities for computational solutions of presently intractable problems.

### **Item 7.6 – Physics**

Includes acoustics; atomic and molecular; condensed matter; elementary particle; nuclear structure; optics; plasma.

### **Item 7.7 – Astronomy**

Includes laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; Gamma-ray, neutrino astronomy.

## **Item 7.8 – Atmospheric Sciences**

Includes aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology.

## **Item 7.9 – Oceanography**

Includes biological oceanography; chemical oceanography; physical oceanography; marine geophysics.

## **Item 7.10 – Biological Sciences**

Includes all sciences (other than clinical medical sciences) which deal with life processes, including plant and animal sciences, biochemistry, cell biology, nutrition, microbiology, physiology, etc.

## **Item 7.11 – Clinical Medical Sciences**

Includes all sciences concerned with the use of scientific knowledge for the identification, treatment, and cure of disease including internal medicine, neurology, preventive medicine and public health, pathology, pharmacology, psychiatry, dentistry, veterinary medicine, etc.

## **Item 7.12 – Other Sciences**

To be used for multidisciplinary and interdisciplinary projects which cannot be classified within one of the above primary fields of science.

## **Item 7.13 – Total Basic Research Costs**

This should be the same as Item 3.A.1., columns 3 and 6.

## **Item 8 – APPLIED RESEARCH AND DEVELOPMENT BY PRODUCT CLASS PERFORMED WITHIN THE COMPANY**

Enter both Federal and total cost of applied R&D by product group. Costs should be entered in the field which is the END PRODUCT for the firm performing the R&D. For example, R&D in very large scale integrated (VLSI) circuits would be reported by a semiconductor firm on line 25, electrical industrial apparatus, if the chips are the final product sold by the firm. The same type of microelectronic R&D by a computer firm, however, would be reported on line 22, office, computing and accounting machines, if the chip are intended to be part of a computer which is the firm's end product.

Definitions for various fields of applied R&D are listed in the instructions for items 8.1 through 8.37. For those companies familiar with the Standard Industrial Classification (SIC), the 1987 SIC codes are given after each title. Note that the SIC definition here applies to each field of R&D and effort, and not necessarily to the overall code in which your company's manufacturing output is classified.

Report cost of Federally funded applied R&D by product group in column 1, and total cost of applied R&D by product group (also including Federal) in column 2.

**How To Report Atomic Energy Devices:**

- Radioactive isotopes and other radiation sources should be reported in line 8.5.
- Partially fabricated reactor fuel element materials and control rods should be reported in line 8.14.
- Nuclear reactors; reactor components and equipment; core structurals; heat exchangers and condensers; valves; complete reactor fuel elements and control rods for use in propulsion, power plants, and other; and atomic waste casks should be reported in line 8.17.
- Fuel handling equipment, control rod drive mechanism and components for power plants, propulsion, and other; pressurizers, components, and auxiliary equipment; and pumps should be reported in line 8.23.
- Atom smashers (particle accelerators) should be reported in line 8.29.
- Accessory instrumentation for reactor control should be reported in line 8.34.
- Hot laboratory equipment and special instrumentation should be reported in line 8.35.

**Item 8.1 – Food and Kindred Products (SIC 20)**

Foods and beverages for human consumption and certain related products such as vegetable and animal fats and oils, and prepared feeds for animals and fowls.

**Item 8.2 – Textile and Mill Products (SIC 22)**

Mill preparation of fibers and mill manufacture of yarn, thread, twine etc; manufacture of broadwoven and knit.

**Item 8.3 – Lumber and Wood Products (SIC 24)**

Includes cutting timber and pulpwood: merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or related materials.

**Item 8.4 – Paper and Allied Products (SIC 26)**

Includes manufacturing of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes. Also included are establishments primarily engaged in manufacturing bags of plastic film and sheet.

**Item 8.5 – Industrial Inorganic and Organic Chemicals (SIC 281 and 286)**

Includes alkalies and chlorine, industrial gases, inorganic pigments, and industrial inorganic chemicals not elsewhere classified (n.e.c.). Also includes industrial organic chemicals including gum and wood chemicals, cyclic crudes, and cyclic intermediates, dyes, and organic pigments, and other industrial organic chemicals n.e.c. Includes radioactive isotopes and other radiation sources.

**Item 8.6 – Plastics Materials and Synthetic Resins, Synthetic Rubber, Synthetic and Other Manmade Fibers (SIC 282)**

Includes cellulosic and noncellulosic fibers. Excludes glass which should be included in product group 13.

**Item 8.7 Drugs (SIC 283)**

Medicinal chemicals, biological and botanical products, and pharmaceutical preparations.

**Item 8.8 – Agricultural Chemicals (SIC 287)**

Fertilizers, agricultural pesticides, and other agricultural chemicals.

**Item 8.9 – All Other Chemicals (Balance of SIC 28)**

Includes explosives, soaps, glycerins, detergents and cleaning preparations, paints and varnishes, toilet preparation, and miscellaneous chemical products.

**Item 8.10 – Petroleum Refining and Related Industries, Oil and Gas Extraction (SIC 13 and 29)**

Excludes geological and geophysical exploration activities.

**Item 8.11 – Rubber and Miscellaneous Plastics Products (SIC 30)**

Fabricated rubber such as industrial and mechanical rubber goods and fabricated plastics products.

**Item 8.12 – Leather and Leather Products (SIC 31)**

Includes tanning, currying, and finishing hides and skins, leather converters, and establishments manufacturing finished leather and artificial leather products and some similar products made of other materials.

**Item 8.13 – Stone, Clay, Glass, and Concrete Products (SIC 32)**

Ceramics, glass, clay products, abrasives and asbestos products, cement, stone products, concrete products, and other nonmetallic mineral products.

**Item 8.14 – Primary Ferrous Products (SIC 331, 332, 3399, and 3462)**

Products of blast furnaces, steel works, rolling and finishing mills, iron and steel castings and forgings. Includes partially fabricated reactor fuel element materials and control rods.

**Item 8.15 – Primary and Secondary Nonferrous Metals (Balance of SIC 33 and 346)**

Primary and secondary smelting and refining of nonferrous metals, rolled, drawn, and extruded nonferrous metals products, castings and forgings.

**Item 8.16 – Ordnance, Except Missiles (SIC 348, 3795)**

Artillery, small arms, ammunition, tanks and parts, etc.

**Item 8.17 – Fabricated Metal Products (SIC 34 Except 3462, 3463, and 348, Ferrous and Nonferrous Forgings, Ordnance)**

Tinware, hand tools, nonelectric heating apparatus, fabricated structural metal products, metal stampings, fabricated wire products, etc., core structural (barrels, cans, boxes, plates, etc.); heat exchangers, steam and barometric condensers, and valves; and nuclear reactors, reactor components and equipment.

**Item 8.18 – Engines and Turbines (SIC 351)**

Steam engines, steam gas and hydraulic turbines, diesel and other internal combustion engines, n.e.c.

**Item 8.19 – Farm and Garden Machinery and Equipment (SIC 352)**

Farm machinery, including tractors for farm use.

**Item 8.20 – Construction, Mining, and Materials Handling Machinery and Equipment (SIC 353)**

Construction mining and oil field machinery and equipment, elevators, conveyors, hoists, industrial trucks, tractors, trailers, and stackers.

**Item 8.21 – Metal working Machinery and Equipment (SIC 354)**

Machine tools, dies, machine tool accessories, rolling mill machinery, power-driven hand-tools, and wire fabricating machinery and equipment.

**Item 8.22 – Office, Computing, and Accounting Machines (SIC 357)**

Electronic computing equipment; calculating and accounting machines; typewriters; other computing and office machines (except laboratory scales and balances).

**Item 8.23 – Other Machinery, Except Electrical (Balance of SIC 35)**

Special industrial machinery, except metalworking, such as food products machinery, textile and paper industries machinery, general industrial machinery and equipment, and miscellaneous machinery except electrical. Includes pumps, air and gas compressors, and industrial process furnaces and ovens. Includes atomic fuel holding equipment; control rod drive mechanism and components for use on nuclear reactors.

**Item 8.24 – Electric Transmission and Distribution Equipment (SIC 361 and 3825)**

Electric measuring instruments and test equipment power, distribution and specialty transformers, switchgear and switchboard transformers, etc.

**Item 8.25 – Electrical Industrial Apparatus (SIC 362)**

Electric motors and generators, motor starters and controls, carbon and graphite brushes, electrodes. Nonelectronic capacitors, condensers, and rectifiers.

**Item 8.26 – Radio and Television Receiving Equipment, Except Communication Types (SIC 365)**

Radio and television sets, home recorders, prerecorded magnetic tapes, microphones, speaker systems, turntables, phonograph records, compact disc players, etc.

**Item 8.27 – Communications Equipment (SIC 366)**

Telephone and telegraph apparatus, radio and television transmitting, signaling, and detection equipment and apparatus.

**Item 8.28 – Electronic Components and Accessories (SIC 367)**

Semiconductors, computer logic modules, computer chips. solid state electronic devices, integrated circuits, electronic capacitors, transformers, connectors, cathode ray tubes, solar cells, solid state photovoltaic devices, etc.

**Item 8.29 – Other Electrical Machinery Equipment and Supplies (Balance of SIC 36)**

Household appliances, electric lighting and wiring equipment, atom smashers, and miscellaneous electrical machinery, equipment and supplies.

**Item 8.30 – Motor Vehicles and Equipment (SIC 371)**

Motor vehicles such as ambulances, fire engines, personnel carriers, amphibian motor vehicles, truck and automobile trailers, and motor vehicle parts and accessories.

**Item 8.31 – Aircraft and Parts (SIC 372)**

Piloted and unpiloted aircraft and parts of all types, including engines and auxiliary equipment such as landing gear, de-icing equipment, and other auxiliary equipment specifically adopted for aircraft. Exclude radar and radio equipment, electronic sighting devices and aeronautical instruments which should be reported in product group 32.

**Item 8.32 – Missiles and Space Vehicles (SIC 376)**

Include frames or structures launching and handling support equipment and work on the missile system and space as a whole. Exclude electronic guidance control subassemblies and radar which should be reported in product group 35.

**Item 8.33 – Other Transportation Equipment (Balance of SIC 37 Except 3795)**

Ship building, boat building and repairing, railroad equipment, motorcycles, bicycles, and parts, etc. Exclude tanks and tank components which are in product group 16.

**Item 8.34 – Scientific and Mechanical Measuring Instruments (SIC 381, 382 Part)**

Engineering, laboratory, scientific, and research instruments, and associated equipment; automatic controls for regulating residential and commercial environments and appliances; industrial instruments for measurement, display, and control of process variables; nonelectric fire detecting systems, totalizing fluid meters and counting devices; instruments for measuring and testing electricity and electrical signals, and radar systems and equipment; accessory instrumentation for reactor control.

**Item 8.35 – Optical, Surgical, Photographic, Timing and Other Instruments (Balance of SIC 38, SIC 382 Part)**

Optical instruments and lenses; surgical and medical instruments and apparatus; dental equipment and supplies; ophthalmic goods including contact lenses; optical fire control equipment; photographic equipment and supplies including film and motion picture apparatus; watches, clocks, clockwork operated devices and parts, appliance timers, chronometers.

**Item 8.36 – Computer Programming, Data Processing, and Other Computer Related Services (SIC 737)**

Includes computer programming services, prepackaged software, computer integrated systems design, computer processing and data preparation and processing services, information retrieval services, computer facilities management services, computer rental and leasing, computer maintenance and repair.

**Item 8.37 – Other**

Please write-in category.

**Item 9 – COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY, BY STATE**

Report the cost of R&D for each State in which your company has research and development laboratories or facilities. It is not necessary to calculate separately individual assignments which may be made outside the home State of a particular research staff.

As much as 10 percent of the total may, if desired, be reported in line 52 as "Not distributed by State."

**Item 10 – ENERGY RESEARCH AND DEVELOPMENT**

Include all spending for R&D to increase energy resources or capabilities, including the development of energy equipment. Energy research and development can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy in Items 10A through 10E.

If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred for the energy purpose. In the limited number of cases where the separation of joint (multiple) costs by type of energy cannot be estimate, include the total cost of the R&D project when the primary purpose of the project is energy research and development. If the project is not primarily for energy research and development then exclude all of the project cost.

**Item 10B4 – "Coal"**

"Synthetic fuels" includes programs designed to convert coal to gaseous and liquid products. "Mining" is composed of programs for developing equipment and techniques to improve the productivity and recovery rates of coal mining.

**Item 10C3 – "Conservation and Utilization"**

Includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are R&D undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

**Item 10D – "All Other Energy"**

Includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 10A through 10C.

**Item 11 – POLLUTION ABATEMENT RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY**

Includes R&D spending for the purpose of reducing or eliminating the emission of pollutants. "Pollution" refers to the emission of pollutants to the outside of a firm's property or activities; "abatement" includes prevention, treatment, or recycling.

Exclude costs:

- to contribute to environmental aesthetics
- to increase equipment durability in corrosive environments
- to conserve energy (include as energy R&D in item 5.3.)
- to conserve natural resources
- to increase employee comfort, safety, and health

If the only purpose of the R&D spending is pollution abatement, include the total expenditures on the project. If pollution abatement is only one of several purposes, report only the R&D costs associated with pollution abatement. When the separation of joint costs is not feasible, include the total R&D costs for a project if the purpose is primarily (more than 50 percent) for pollution abatement.

If the project is not primarily for pollution abatement purposes, exclude all of the project costs. Also exclude project costs if expected pollution abatement benefits are obtained at no extra cost.

**Item 11A – Air**

1. Automotive emissions includes all R&D efforts undertaken to reduce exhaust emissions from automobiles.
2. Electric power plants emissions includes efforts directed toward reducing airborne emissions from electric power plants.
3. "All other" includes efforts directed at removing sulfur oxide, nitrogen oxides and particulates, and other fossil-fuel pollutants from the atmosphere.

**Item 11B – Water**

Includes R&D spending on water recirculation or thermal pollution abatement, etc.

**Item 11C – Solid Waste**

Includes R&D spending on waste compacting devices, etc.

**Item 11D – Other**

Includes R&D spending on pollution abatement from noise and radiation, etc.

**Section III – RESEARCH AND DEVELOPMENT  
PERFORMED OUTSIDE THE DOMESTIC  
COMPANY WITH COMPANY FUNDS**

This section of the report form covers the R&D reported in item 3.C of section I, on page one.

**Item 12 – FOREIGN RESEARCH AND  
DEVELOPMENT BY COUNTRY AND  
EXPENDITURE**

Allocate the totals reported in Item 3.C., column 5 by the country in which your various research and development takes place. Estimate the costs associated with each country. If necessary, you may write in countries not listed.

**Item 13 – COVERAGE AND OPERATIONAL  
STATUS****Item 13A**

Check the appropriate box if the domestic company expenditures on this form, including all subsidiaries, have R&D. If no, please explain in remarks section or in a transmittal letter.

**Item 13B**

Check the appropriate box if this company was owned or controlled by another company on December 31, 1993. If yes, provide date of the organizational change.

**Item 13C**

Provide the name and address of the new owner. In the "Remarks" section, specify change or correction, e.g., wholly-owned subsidiary of ABC Company", "merger with XYZ Company", "acquired by 123 Corporation".

**Item 14 – CERTIFICATION**

Report the name and telephone number of the person to contact regarding this report.

**DUE DATE: 60 DAYS AFTER RECEIPT OF FORM**

OMB No. 3145-0027: Approval Expires 12/31/95

FORM **RD-1A**  
(1-18-94)

U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

**SURVEY OF INDUSTRIAL RESEARCH AND  
DEVELOPMENT DURING 1993**

**NOTICE** — Your report to the Census Bureau is **confidential** by law (title 13, U.S. Code).

The instructions and definitions on this form are not complete. Please read the enclosed instruction sheet before completing this form.

**RETURN TO**

▼  
**BUREAU OF THE CENSUS**  
**1201 East 10th Street**  
**Jeffersonville, IN 47132-0001**

Data supplied in item 1 and in item 3A.3, columns 1 and 3 for 1993 on this form will satisfy the mandatory reporting requirements (title 13, U.S. Code).

In correspondence pertaining to this report refer to this **CENSUS FILE NUMBER (11 digits)** ▶

**FROM THE ACTING DIRECTOR**  
**BUREAU OF THE CENSUS**

The Bureau of the Census conducts the "Survey of Industrial Research and Development" under sponsorship of the National Science Foundation. We appreciate your cooperation in reporting the requested information. Each year we select a new sample of firms to distribute the amount of burden placed on respondents and to ensure an accurate representation of all the firms.

Enclosed are the instructions for completing the report form and a letter from the National Science Foundation emphasizing the survey's prominence. The 1993 report covers your entire domestic company operations.

The law (title 13, United States Code) authorizes this report. Your response is mandatory for item 1 and item 3A.3, columns 1 and 3. We need your voluntary cooperation in reporting the remaining items to make the results of the survey comprehensive and accurate. We recognize you may not maintain book records for particular items. In such cases please use carefully prepared estimates.

By section 9 of the same law (title 13), your report to the Bureau of the Census is confidential. Only sworn Bureau of the Census employees will see the information you reported, and they will use it only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.

Please return the completed form within 60 days. If you have questions concerning this survey, need copies of the form, or need additional time, please call the Special Surveys Branch of our Industry Division on (301) 763-5598. We thank you for your cooperation in this vital survey.

Sincerely,



Harry A. Scarr



Enclosures

**PLEASE OPEN AND BEGIN THE SURVEY WITH ITEM 1.**

## GENERAL INSTRUCTIONS

Please complete this form and return within 60 days in the envelope provided. Make a copy for your records. **THIS REPORT SHOULD COVER YOUR ENTIRE COMPANY, INCLUDING ALL SUBSIDIARIES, UNLESS OTHERWISE DESIGNATED.**

Enter 0 (zero) where appropriate rather than leaving a blank space.

Reasonably accurate estimates are acceptable.

If your company is a nonprofit organization, please indicate so in remarks section and return the form. If this form has been directed to a trust or pension plan which performs no activity other than investments, do not report. Please note in remarks and return the form.

### Item 1 - SALES AND EMPLOYMENT FOR COMPANY

	<b>Domestic sales and receipts of this company</b>			
	<b>1993</b>			
	Bil.	Mil.	Thou.	Dol.
A. <b>INCLUDE</b> sales of products and services to other companies, individuals, U.S. Government agencies, and foreign countries from all domestic operations of your company.	102			000
	<b>Domestic employment</b>			
	<b>1993</b>			
	Number			
B. Total domestic company employment in all activities during the pay period which includes the 12th of March 1993. (Item 1 of Treasury Form 941, if one Form 941 was filed for the entire company.)	112			

### RESEARCH AND DEVELOPMENT — R&D

Includes basic and applied research in the sciences and in engineering, and design and development of prototype products and processes.

For the purposes of this survey, research and development includes activities carried on by persons trained, either formally or by experience, in the physical sciences including related engineering, and the biological sciences including medicine but excluding psychology, if the purpose of such activity is to do one or more of the following things:

1. Pursue a planned search for new knowledge, whether or not the search has reference to a specific application. (Basic Research)

2. Apply existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses. (Applied Research)

3. Apply existing knowledge to problems involved in the improvement of a present product or process. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of the questions.

*See instructions for more detail.*

### Item 2 - CHECK FOR RESEARCH AND DEVELOPMENT

Mark (X) the appropriate box.

201  Company had R&D in 1993 - Complete form, enter zeros where applicable, and return this form.

202  Company had no R&D in 1993, but has in the past and may in the future - Go to item 7, sign, and return this form.

203  Company does not conduct R&D - Go to item 7, sign, and return this form.

► Item 3 – REPORT COSTS INCURRED FOR RESEARCH AND DEVELOPMENT IN 1993

A. WITHIN THE COMPANY – Costs incurred for research and development performed within the company by major type and source of funds (Should be excluded from B and C)	Federal funds				Company and other				Total ((1) + (2))			
	(1)				(2)				(3)			
	Bil.	Mil.	Thou.	Dols.	Bil.	Mil.	Thou.	Dols.	Bil.	Mil.	Thou.	Dols.
1. Basic research If "None," please mark (X) → <input type="checkbox"/>	304				305				306			
	\$		000	\$			000	\$			000	
2. Applied research and development	314				315				316			
a. Applied research	\$		000	\$			000	\$			000	
b. Development	324				325				326			
c. Total (Sum of lines a and b) →	\$		000	\$			000	\$			000	
3. TOTAL (Sum of 1 and 2c) →	344				345				346			
B. Outside the company – Total company funds for research and development activities financed by the company but performed by others outside the company within the United States (Should be excluded from A3)					355							
C. Foreign – Total company funds for research and development activities performed by foreign subsidiaries or by other organizations outside the United States (Should be excluded from A3)					\$			000				
D. TOTAL – Company and other funds, except Federal (This line represents company sponsored research and development with the exception of "other funds.") (Sum of A3, B, and C) →					365							
	\$		000									
► Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 1994	Bil.	Mil.	Thou.	Dols.								
	401											
	\$		000									

#### ► Item 5 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS

Includes all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences, engineering, or mathematics equivalent to completion of a 4-year college course of study with a major in these fields, regardless of whether or not they actually hold a degree in this field.

January 1994

Number

502

Report the full-time equivalent number of R&D scientists and engineers on the rolls in January 1994. For employees whose activities are not solely devoted to research and development, report the proportion of their time that is devoted to research and development. (See instructions for examples)

#### ► Item 6A – COVERAGE AND OPERATIONAL STATUS

Are research and development expenditures for entire domestic company, including subsidiaries reported on this form?

- Yes  
 No – Please explain in remarks or on transmittal letter.

Was this company owned or controlled by another company on December 31, 1993?

- Yes – Complete 6B. Date acquired  
 No

Month	Year

601

#### ► Item 6B – NEW OWNER OR OPERATOR

602 Name

603 Address

604 City

605 State

606 ZIP Code

#### ► Item 7 – CERTIFICATION – This report is substantially accurate and has been prepared in accordance with instructions.

Name of person to contact regarding this report

Telephone →

Area code

Number

Extension

Signature of authorized official

Title

701 Date

801 REMARKS

# INSTRUCTIONS AND DEFINITIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1993

## FORM RD-1A

### GENERAL INSTRUCTIONS

Please complete and return this form in the envelope provided within 60 days. Make a copy for your records.

**INTRODUCTION** – Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is ensured.

**SURVEY SCOPE** – This report covers privately-owned nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, State or local governments, or nonprofit organizations.

If your company is a nonprofit organization, please indicate so in the remarks section and return the form.

If this form has been directed to a trust or pension plan which performs no activity other than investments, do not report. Please note in remarks section and return the form.

**REPORTING ENTITY** – Report R&D for all domestic operations of your company, including subsidiaries and divisions. Report for all parts of the company that are located in the 50 States and the District of Columbia. Report sales and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 States or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

**ESTIMATES ARE ACCEPTABLE** – If you cannot answer a question from your company records, please estimate the answer carefully.

**HOW TO REPORT** – Report all value figures in thousands of dollars.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.	Dol.
Report	\$1	123	679	000

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124 million dollars.

	Bil.	Mil.	Thou.	Dol.
Report	\$1	124	000	000

Enter "0" where appropriate rather than leaving a blank space.

**PERIOD COVERED BY THE REPORT** – Figures should be reported on a calendar year basis. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September and March. Please report employment figures (Items 1B and 5) for the specific time indicated for both of these items.

**ADDITIONAL FORMS** – Photocopies of this form are acceptable. If you require additional forms, write to the Bureau of the Census, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 288-3331.

**FILING EXTENSIONS** – If you cannot complete the survey in 60 days, request an extension of time by writing to the address below (please include your Census File Number):

Bureau of the Census  
1201 East 10th Street  
Jeffersonville, IN 47132-0001

or call: (812) 288-3331.

**ALTERNATIVE REPORTING FORMATS** – For information concerning use of reporting formats other than the form provided, such as computer tape, diskette, or printouts, contact Mr. Jesse Havard on (301) 763-5915.

**BURDEN HOUR ESTIMATE** – Public reporting burden for this collection of information is estimated to average 1 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information including suggestions for reducing this burden to Herman G. Fleming, National Science Foundation 4201 Wilson Boulevard, Arlington, VA 22230; and to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB No. 3145-0027), Washington, DC 20503.

Direct any **QUESTIONS** regarding this form to the Bureau of the Census, ATTN: Industry Division, Washington, DC 20233-0001, or call (301)763-5598.

**DEFINITIONS OF RESEARCH AND DEVELOPMENT** – R&D includes basic research and applied research in the sciences and in engineering, and design and development of prototype products and processes.

For the purposes of this study, R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences including related engineering,

and the biological sciences including medicine but excluding psychology, if the purpose of such activity is to do one or more of the following things:

1. Pursue a planned search for new knowledge, whether or not the search has reference to a specific application.
2. Apply existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses.
3. Apply existing knowledge to problems involved in the improvement of a present product or process.

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of the questions.

#### **Activities to be excluded from R&D:**

- Routine product testing
- Geological and geophysical exploration activities
- Technical services such as:
- Quality and quantity control
- Technical plant sanitation control
- Trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Research in social sciences and psychology - social science. R&D is defined to encompass those activities devoted to understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law
  - Software development

#### **SPECIFIC INSTRUCTIONS**

#### **Item 1 – SALES AND EMPLOYMENT FOR THE COMPANY**

##### **Item 1A – Domestic Sales and Receipts**

Sales and receipts are defined as the revenue for goods produced, distributed, or services provided. Include revenue from investments, rents, and royalties only if it is the principal business of the company. The reported figures should represent net value f.o.b. plant after discount and allowances and should exclude freight charges and excise taxes.

##### **Include:**

- All operating receipts from taxable operations, as well as total revenue from tax-exempt activities

- Sales of products and services to other companies, individuals, U.S. Government agencies, and foreign countries
- Transfers to foreign subsidiaries

##### **Exclude:**

- Domestic intra-company transfers
- Sales by foreign subsidiaries

#### **Item 1B – Domestic Employment**

Report the number of employees of the company in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 1993. This figure would be the same as Item 1 of Treasury Form 941, if one Form 941 was filed for the entire company. Report number of employees, not payroll.

#### **Item 2 – CHECK FOR RESEARCH AND DEVELOPMENT**

Check the box that best describes the R&D activities of your company.

#### **Item 3 – REPORT COSTS INCURRED FOR RESEARCH AND DEVELOPMENT**

##### **Include as costs:**

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation
- Cost of computer software used in R&D activities
- Total charges for work done on contract, including profit
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

##### **Exclude as cost:**

- R&D performed abroad (outside the continental U.S.) such as in Canada and Puerto Rico (Except in Item 3.C.)
- R&D performed by non-company R&D organizations of any kind (Except in Item 3.B.)
- Capital expenditures
- Patent expense
- Income taxes and interest
- The portion of company-held R&D contracts that were subcontracted outside the reporting company
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering
- Social Science R&D

### **Item 3.A – Report Costs Incurred for Research and Development Performed Within the Company**

Federally sponsored R&D performed within the company should be reported in column 1.

Costs of company sponsored R&D performed within the company, or R&D performed within the company under contract from non-federal sources should be reported in column 2.

Costs of INDEPENDENT R&D should also be reported in column 2. For the purpose of this survey, INDEPENDENT R&D is defined as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services.

### **TYPES OF RESEARCH**

#### **Item 3.A.1 – Basic Research**

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives (although may be in the fields of present or potential interest to the reporting company).

#### **Item 3.A.2.a – Applied Research**

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

#### **Item 3.A.2.b – Development**

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research findings or other general scientific knowledge into products or process.

#### ***Include as development:***

- The design and operation of pilot plants and semiwork plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

#### ***Exclude as development:***

- Routing technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Pre-productions planning
- Any other items excluded from the definition of total R&D

### **ESTIMATING BASIC, APPLIED, AND DEVELOPMENT EXPENDITURES**

If your company does not keep records that meet or can be allocated to these specific categories, estimate by:

- Isolating the projects that clearly fall in the development category. If your company fabricates products, such development activity will include the design, construction, and testing of prototypes and models. Some defense contracts typically call for several test models. If your company's research and development frequently involves the development of a "process" as in chemicals and as in chemicals and petroleum, such development activity would include operations beyond the bench scale, primarily the design and operations of pilot plants or semiworks.
- Isolating the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. If R&D work is done in production units as well as in various laboratories, it is generally development type.
- Distributing the balance on the basis of individual projects or on the basis of other summaries of the work. Please use the definitions for basic, applied, and development given above.

#### **Item 3.A.2.c – Total Costs for Applied Research and Development**

Add line 3.A.2.a and line 3.A.2.b.

#### **Item 3.A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company**

Add line 3.A.1 and line 3.A.2.c.

#### **Item 3.B – Total Costs Incurred for R&D Performed Outside the Company Within the United States and Financed by the Company**

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations for R&D activities performed for the company.

Do not include subcontracting of R&D contracts received from the Federal Government or other companies.

#### **Item 3.C – Total Costs Incurred for Research and Development Performed by Foreign Subsidiaries or by Other Organizations Outside of the United States and Financed by the Company**

FOREIGN SUBSIDIARIES are those outside of the 50 States and the District of Columbia.

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Report R&D activities of foreign divisions and subsidiaries in Item 3.C only.

Exclude R&D performed by foreign subsidiaries which were financed by foreign governments or other outside organizations

**Item 3.D – Total – Company and Other Funds, Except Federal**

With the exception of "Other funds," this number represents company sponsored R&D performed within the company. It is comparable to information reported on Form 10K if you report to the Securities and Exchange Commission.

To complete this item, add line 3.A.3, line 3.B and line 3.C.

**SOURCE OF FUNDS**

**Item 3 – FEDERAL FUNDS (Column 1)**

**Include:**

- Amount of work done on Federal R&D contracts or subcontracts in the current year
- R&D portions of procurement contracts or subcontracts

**Exclude:**

Federal R&D contracts and R&D portions of procurement contracts that you subcontracted to other R&D organizations (including these would cause duplication in the statistical totals, which include data on work actually performed by each company).

**Item 3 – COMPANY AND OTHER FUNDS (Column 2)**

Report all company-sponsored research and development performed within the company. Report R&D performed under contract from non-Federal sources.

**Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 1994**

Report the estimated cost of company and other non-federally sponsored R&D that will be performed within the 50 States and the District of Columbia. This item is comparable to the 1993 figure reported in item 3.A.3, column 2.

**Item 5 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS**

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers on the rolls in January.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientist and engineers in January 1994 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

**Item 6A – Coverage and Operational Status**

Indicate if this form includes R&D expenditures for entire domestic company, including subsidiaries.

Indicate if this company was owned or controlled by another company on December 31, 1993.

**Item 6B – New Owner or Operator**

Report the date the company was acquired and the new owner's name and address information.

**Item 7 – CERTIFICATION**

Report the name and telephone number of the person to contact regarding this report.