

SUPPORTING STATEMENT – PART A
U.S. Department of Commerce
U.S. Census Bureau
Survey of Industrial Research and Development
(Forms RD-1 and RD-1A)
OMB Control No. 0607-0912

A. Justification

1. Necessity of the Information Collection

The Census Bureau is requesting a revision of the currently approved collection for the annual Survey of Industrial Research and Development (the Survey) that is conducted jointly by the U.S. Census Bureau and the National Science Foundation (NSF). Under a joint project agreement between NSF and the Census Bureau, the Census Bureau is responsible for obtaining clearance of the Survey.

The National Science Foundation Act of 1950 as amended authorizes and directs NSF "...to provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources and to provide a source of information for policy formulation by other agencies of the Federal government." The Survey is the vehicle with which NSF carries out the industrial portion of this mandate. NSF together with the Census Bureau, the collecting and compiling agent, analyze the data and publish the resulting statistics.

Industry is the major performer of research and development (R&D) in the United States, spending over 70 percent of total U.S. R&D outlays each year. A consistent industrial R&D information base is essential to government officials formulating public policy, industry personnel involved in corporate planning, and members of the academic community conducting research. To develop policies designed to promote and enhance science and technology, past trends and the present status of R&D must be known and analyzed. Without comprehensive industrial R&D statistics, it would be impossible to evaluate the health of science and technology in the United States or to make comparisons between the technological progress of our country and that of other nations.

Statistics from the Survey are published in NSF's annual publication series, *Research and Development in Industry*, available via the Internet at www.nsf.gov/statistics/industry. Since 1953, this survey has provided continuity of statistics on R&D expenditures by major industry groups and by source of funds. Over the years, questions on a number of additional areas have been added to the Survey as the need for this R&D information became necessary for policy formulation and research.¹

In the last request for OMB review, response to five questions (total net sales and total employment for the company; and the amount of Federal and total funds the company spent on R&D and cost of R&D performed within the company by state) was mandatory and fulfilled the Census Bureau's data-collecting mandate in Title 13, U.S. Code, Sections 131, 182, 224, and 225. Further, authorization to make the entire survey mandatory every five years to coincide with the Census Bureau's Economic Census was requested and approved. The 'all-mandatory' requirement was last applied for the 2002 cycle of the Survey. The next economic census will be conducted for 2007 and authorization to apply the requirement is requested.

The Census Bureau and NSF also request to add item 13 from Form RD-1 (See Attachment 2 and 2A for Instructions) to Form RD-1A (See Attachment 3 and 3A for Instructions)-R&D by type of expense. This item has been on the Form RD-1 for several years and survey respondents have shown the ability to provide data for this item. Collecting this information on both forms will allow the Census Bureau and NSF to have a more complete estimate of R&D expense by type.

The Census Bureau and the NSF are planning a redesign of the Survey. The Census Bureau will provide a separate OMB submission for the redesigned survey to be implemented for survey year 2008.

2. Need and Uses

Policy officials from many Federal agencies rely on statistics from this survey for essential information. For example, total U.S. R&D expenditures statistics have been used by the Bureau of Economic Analysis (BEA) to update the System of National Accounts and, in fact, BEA has established a separate R&D satellite account in the System. Results from the Survey are needed to develop and subsequently update this detailed satellite account. Also a data linking project was designed to augment the Foreign Direct Investment (FDI) data collected by BEA. This project was the first conducted under new data sharing legislation. The linking of the results of the 1997 and 1999 cycles of the Survey with BEA's 1997 and 1999 FDI benchmark files was the first application of the Confidential Information Protection and Statistical Efficiency Act (CIPSEA) that allows limited data sharing among selected Federal statistical agencies. The Census Bureau and NSF are preparing to conduct annual linkage projects of the R&D data to the FDI and USDIA data, commencing with the 2004 survey files. Plans also call for the possible linkage of the 2007 and future survey files. Further, the Census Bureau links data collected by the Survey with other statistical files. At the Census Bureau, historical company-level R&D data are linked to a file

that contains information on the outputs and inputs of companies' manufacturing plants. Researchers are able to analyze the relationships between R&D funding and other economic variables by using micro-level data.

Many individuals and organizations access the survey statistics via the Internet and hundreds have asked to have their names placed on the mailing list for a paper copy of the annual *SRS InfoBrief* that announces the availability of statistics from each cycle of the Survey. Information about the kinds of projects that rely on statistics from the Survey is available from internal records of NSF's Division of Science Resources Statistics (SRS). In addition, survey statistics are regularly printed in trade publications and many researchers use the survey statistics from these secondary sources without directly contacting NSF or the Census Bureau. Some of the users of the survey statistics and the types of information they request are described below.

Government Users

Government policy officials who are involved in assessing the role of the Federal government in promoting economic growth use survey statistics in their decision-making processes since R&D results affect technological and economic progress. Members of Congress make extensive use of R&D statistics in preparing tax legislation, contacting NSF or the Census Bureau directly through their own staffs, through one of the House or Senate science committees, or through the Congressional Research Service.

NSF staff also work closely with the Office of Science and Technology Policy (OSTP), providing R&D statistics and indications of emerging trends to assist the OSTP staff in their analyses of the status of science and technology in the United States. In addition, NSF has frequent contact with the Office of Management and Budget (OMB), the Congressional Budget Office (CBO), the Congressional Research Service (CRS), and the Congressional Joint Economic Committee which use the survey statistics in their studies.

Statistics produced from the Survey also have been requested by officials from other Federal government and quasi-governmental agencies including the Departments of Agriculture, Commerce, Defense, Education, Energy, Labor, State, and Treasury; the Bureau of Economic Analysis, Bureau of Labor Statistics, Congressional Joint Committee on Taxation, Consumer Products Safety Commission, Environmental Protection Agency, Federal Reserve Banks of Chicago, Dallas, New York, and San Francisco, Government Accounting Office, Government Printing Office, International Trade Administration (Department of Commerce),

International Trade Commission, National Aeronautics and Space Administration, National Institute of Standards and Technology, National Institutes of Health, National Oceanic and Atmospheric Administration, Office of Naval Research, President's Council of Economic Advisors, U.S. Federal Trade Commission, U.S. Patent Office, and U.S. Small Business Administration.

As states and local governments seek to attract high-tech industries to their areas, NSF and the Census Bureau are frequently asked to provide R&D funding and employment figures. Among the state governments and state organizations requesting industry R&D statistics have been Alabama, Arkansas, California Energy Commission, Center for Innovative Technology (VA), Georgia, Indiana, Maine Development Foundation, Maine Science and Technology Foundation, Maryland, Massachusetts Department of Revenue, Michigan Department of Labor and Economic Growth, Michigan Economic Development Corporation, Minnesota, Mississippi, New Jersey Research and Development Council, New York State Department of Taxation and Finance, New York State Economic Development Authority, North Carolina, North Dakota Department of Commerce, Ohio, Oklahoma, Pennsylvania, South Carolina, Southern Growth Policies Board (representing Alabama, Arkansas, Georgia, Kentucky, Louisiana, Missouri, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia), and Utah.

Information and statistics from the Survey also are supplied to internal NSF organizations. For example, survey statistics are used in the "Research and Development: National Trends and International Linkages" and "Industry, Technology, and the Global Marketplace" chapters of the Congressionally mandated *Science and Engineering Indicators* series, a biennial report in which the National Science Board continues its effort to describe quantitatively the condition of U.S. science and research. Survey results are also included in NSF's annual *National Patterns of R&D Resources* tabulations.

International Users

The international community uses R&D spending information as part of its comparisons of the economic performance among nations. U.S. R&D statistics are compiled in a format that can be compared with those of other countries. These statistics are transmitted to the Organization for Economic Cooperation and Development (OECD) that relies on the Survey as its primary source for comparative industrial R&D statistics for the United States. Also, survey statistics are used by multi-national committees and subcommittees studying and developing the North American Industry Classification System (NAICS) and North American Product Classification System (NAPCS).

Other international and foreign entities that have requested statistics on U.S. industrial R&D expenditures include the Brazilian National Council for Scientific and Technological Development, Canadian Ministry of Treasury and Economics, CARSA (Spain), Central Research Institute of the Electric Power Industry of Japan, Delegation of the European Communities, Deloitte-Touche Tohmatsu (Japan), Department of State and Regional Development (Australia), Department of Technology Policy (Austria), European Commission's Joint Research Center, French Embassy, French Federal Institute of Research, Embassy of Finland, Embassy of Germany, Hungarian Academy of Sciences, The Impact Group (Canada), Industry Canada, Instituto Nacional de Estadistica (Madrid), London School of Economics, Natexis Capital (France), National Technology Agency of Finland, Natural Sciences and Engineering Research Council of Canada, Office of Pharmaceutical Industry Research (Japan), Oxford Institute for Energy Studies, Puerto Rico Planning Board, Office of the Representative of the Republic of Taiwan, Queens University (Canada) Research Center for Advanced Science and Technology (Japan), Royal United Services Institute for Defence and Security Studies (UK), Statistics Canada, Statistics Quebec, VM Institute (Japan), and the Universities of Auckland, Campinas (Brazil), Melbourne, Quebec, Shanghai, Sussex, and Tokyo. Domestic research organizations focusing on international issues also have requested survey statistics. These organizations include the U.S. Council for International Business and the Center for Strategic and International Programs.

Industrial Users

Although the primary purpose of the Survey is to provide accurate statistics for well-informed public policy decisions, industrial users also benefit from the survey figures. There is a special obligation to keep the Survey relevant to industry users particularly because industry personnel spend time answering the annual survey form. Firms and trade associations in all industries, whether large or small in terms of R&D performance, are interested in making intra-industry comparisons, as well as comparing other industries' performance with their own.

Each year the NSF and Census Bureau receive many requests for R&D information from industrial users of the statistics. Some of the industry users who have requested information are AT&T, Bayer, Bell Atlantic, Bellcore, Blue Cross/Blue Shield, Boeing, Chevron, Conoco-Phillips, Control Data, DuPont, Eastman Chemical, Eli Lilly, Environmental Sciences, Inc., Ethyl, Exxon, Fisher Scientific, Ford, General Electric, General Motors, Glaxo, Google, GTE Technologies, Hearst, H.J. Heinz, IBM, IBM-Canada, Illinois Power Company, Intel, Kodak, Lockheed-

Martin, McDonald-Douglas, Merck, Mid-Atlantic Healthcare, Parke-Davis, Pfizer, Potlatch, Pratt and Whitney, South California Edison, Taratec, Unext, WEFA Petroleum, Weyerhauser, and Xerox.

In addition to industry researchers who utilize the R&D statistics directly from the NSF website and publications, there are many who use the Survey's tabulations in their own trade reports. For example, *Chemical and Engineering News*, a publication of the American Chemical Society, prints a special yearly supplement on R&D in the chemical industry that is based on the Survey's statistics. It also prints many tables verbatim, citing NSF as the source. A yearly special issue of *Research and Development* magazine publishes survey tables and an analysis of current R&D trends based on interviews with research directors as well as conversations with NSF staff.

Other trade publications that regularly print statistics directly from the Survey include *Aerospace Facts and Figures* (Aerospace Industries Association), *Industrial Research and Development Facts* (Industrial Research Institute), and *Physics Today* (American Institute of Physics). Other trade associations that have contacted NSF include the American Chemical Council, American Entrepreneur Association, American Forestry and Paper Association, American Iron and Steel Institute, American Power Association, American Society for Engineering Education, Center for Automotive Research, Elsevier Engineering Information, Inc., Gas Operations Innovation Alliance, Manufacturers' Alliance, National Center for Manufacturing Sciences, Natural Gas Supply Association, Pharmaceutical Research & Manufacturers of America, Refractories Institute, and the Small Business High Tech Institute. Consultants to trade associations and industry also contact NSF. Among them have been: Booz-Allen Hamilton; Boston Consulting Group; DRI, Inc.; J. Orban and Company; Mayer, Brown, Rowe, and Associates; McKinsey and Company; Northstar Economics, Inc.; PricewaterhouseCoopers; SRI International; Stroock and Stroock and Lavan LLP; Waldman Associates; William Blair and Company; and the William Burn Company.

Unions also consider industrial R&D statistics relevant to their members' well-being. NSF has received requests from the United Auto Workers, the International Brotherhood of Printers and Xerographers, and the International Union of Brick Layers and Allied Craftsmen.

The survey statistics also are used by research organizations devoted to the study of industry, R&D, science and technology and related topics. These organizations include the Academy of Technology Entrepreneurs and Innovators; Boston Analytics, Competitiveness Policy Council; Corporation for Enterprise Development; Council for Chemical Research;

Council on Competitiveness; Information Technology and Innovation Foundation, National Academy of Sciences' Academy of Engineering, Committee on National Statistics, National Research Council, and Board on Science, Technology, & Economic Policy; National Economic Research Association; Potomac Knowledgeway Project; Research and Development Council; United Technologies Research Center; The Urban Institute, and World Wildlife Federation. The statistics also are the basis for R&D spending projections published by the Battelle Memorial Institute.

Other Users

Research undertaken at universities on innovation and economic growth has relied on the detailed R&D time series from the Survey. Research projects that have utilized R&D statistics obtained from the Survey have been conducted at many colleges and universities including American, Clemson, Columbia, Georgia Institute of Technology, Georgia State, George Mason, Georgetown, George Washington, Harvard, Harvard Business School, Kansas State, Lehigh, Macalester, Marshall, Michigan State, New York University Stern School of Business, Ohio State, Pennsylvania State, Princeton, Purdue, Rutgers, Texas A&M, Tufts, the Massachusetts Institute of Technology, Southern Methodist University, the Virginia Polytechnic Institute, Yale, and the Universities of California, Delaware, Florida, Georgia, Maryland, Michigan, Minnesota, New York, North Carolina, Oregon, Pittsburgh, South Carolina, Tennessee, Texas, and Wisconsin.

In addition, inquiries are regularly received from the news media. Inquiries have been received from: *Aviation Daily, Business Week, Chemical & Engineering News, Chemical Week, Chicago Tribune, DRI/McGraw-Hill Publications Co., Elsevier Science Publishing, Forbes, flatironreport.com, Fortune, Indianapolis Star, Information Week, Journal of Commerce, Los Angeles Times, Manufacturer, Manufacturing News, Modern Maturity Magazine, National Geographic, Newsweek, New York Times, Owner-Manager Magazine, Physics Today, Research & Development, Research and Technology Management, Science, Science & Government Report, USA Today, U.S. News & World Report, Wall Street Journal, Washington Post, and Washington Times.*

And finally, Internet sites continue to link with the Survey's results. These linkages are usually not known, but three of the organizations that have contacted NSF for information regarding the Survey are economy.com, globalinsights.com, and NineSigma.com.

The list below shows the type of requester and the percentage of industry R&D information requests received via telephone and email from each

group during CY 2006. The "NSF and type of organization undefined" category includes, but is not limited to, requests from inside NSF, libraries, and students below the university level. The percentages below **do not** include visits to the NSF website.

<u>Type of User</u>	<u>Percentage of requests</u>
Federal and State government	25 %
University	22
NSF and type of organization undefined	14
Research and nonprofit	9
Trade association	8
Consultants	6
Media	5
Foreign government and international research	5
Industry	4
Congressional	2

In summary, each item in the Survey has been the subject of research by someone interested in industrial R&D performance. Although the consumers of the R&D statistics from the Survey are diverse, there is one common element underlying all the uses of the survey statistics—an attempt to gain a better understanding of some aspect of the nation's scientific and technological resources. The detailed statistics provided by the Survey are the most complete set of elements for assessing the impact of R&D on industrial development and the nation's economy.

Information quality is an integral part of the pre-dissemination review of information disseminated by the Census Bureau (fully described in the Census Bureau's Information Quality Guidelines). Information quality is also integral to information collections conducted by the Census Bureau and is incorporated into the clearance process required by the Paperwork Reduction Act.

3. Use of Information Technology

Explanatory materials accompanying the survey forms will notify respondents that they may obtain information on the Survey, request a filing extension, or, for companies sent the abbreviated survey form, Form RD-1A, that perform no R&D, complete their reporting requirement by using the toll-free Touch-tone Data Entry (TDE) system. The TDE system consists of a series of voice mail options directing respondents according to the nature of their request.

The majority of companies sent the Form RD-1A do not perform R&D. The burden on these respondents has been lessened by allowing them to fulfill their reporting obligation by calling the TDE number, enter their identification number and, using their telephone keypad, report that they do not conduct R&D. Forty percent of Form RD-1A companies that responded to the 2005 survey used the TDE system (results for the 2006 cycle are not available).

Respondents can also request a filing extension via TDE. The filing extension is included as part of the company's reporting record by the next business day, so that no unnecessary reminder letters are sent until after the extension date. A pre-approved maximum extension date is included in the system. Respondents who request a later date are given the maximum extension date and instructed to stay on the line if they prefer to speak with a Census Bureau staff member.

Finally, respondents can request a duplicate survey form via TDE. The request is automatically transmitted to the processing office the following business day and a duplicate survey form is sent to the respondent within another business day. Since the Census Bureau has begun sending a copy of Form RD-1A with every monthly follow-up of companies that were originally sent Form RD-1A, the likelihood of these respondents needing to request a duplicate form has decreased dramatically.

In an effort to further reduce burden on respondents, the Census Bureau continues to use the Computerized Self-Administered Questionnaire (CSAQ) system, which allows respondents to complete the survey form electronically and submit it via the Internet. The Census Bureau offers the CSAQ as a reporting option for all large and small companies. Approximately 15 and 17 percent of the Form RD-1 companies in the 2004 and 2005 surveys respectively, chose to report electronically. Three percent of the Form RD-1A chose to report electronically in 2005 which was the first year of this option for RD-1A respondents.

Respondents can download the CSAQ version of the survey form from the Internet. Then, they enter their data on the CSAQ on-line, print a hard copy for their files, and transmit the information via the Internet. The CSAQ not only allows respondents to take advantage of technological improvements in data collection, but because of the edits imbedded in the CSAQ, respondents can review and correct reported data before sending them to the Census Bureau. Since CSAQs do not require clerical screening or data keying by the Census Bureau, the data can be loaded into the survey database immediately, saving both time and expense. The Census Bureau expects to continue to provide the CSAQs as a reporting alternative to the paper form for the foreseeable future.

4. **Efforts to Identify Duplication**

The Census Bureau and NSF jointly assess results of discussions with major respondents who also participate in other conducted surveys to avoid possible duplication of R&D data collection. In addition, the Census Bureau and NSF maintain close liaison and share information with other Government agencies that have an interest in R&D statistics to ensure that duplication of data collection does not occur.

The Survey is the only annual survey measuring total national industrial R&D spending. Only partial data on R&D expenditures and R&D scientists and engineers employed by U.S. companies are collected by the Securities and Exchange Commission (SEC) on Forms 10-K and 10-Q and these data are not aggregated to a national total. In addition, privately held companies, regulated utilities, transportation companies, and companies with only small amounts of R&D spending do not report R&D expenditures to the SEC.

Occasionally, various interested groups, such as the Aerospace Industries Association, Pharmaceutical Manufacturers Association, and the Industrial Research Institute conduct R&D canvasses of their own members. These studies cannot, however, be used as the basis for national R&D totals, nor do they have the variety of R&D detail necessary for policy decisions. There is, therefore, no other source for the R&D data collected by the Survey.

5. **Minimizing Burden**

To minimize burden, over 90 percent of the companies selected for the Survey are asked to respond to the Form RD-1A, the abbreviated version of Form RD-1. Further, only companies with five or more paid employees are asked to participate in the Survey. The descriptive codes and information on the Business Register (BR) (formerly the Standard Statistical Establishment List (SSEL)), the basis for the Survey's sampling frame (see Section B.1.), are used extensively to select minimal samples in industries that traditionally do not perform R&D. See also A.3. above for a discussion of how burden is minimized through electronic reporting for

¹In some cases, the new items (e.g., amount of R&D contracted out and performed abroad) have been reported well by respondents and are retained because the quality of the resulting statistics has been high; in other cases, some items (e.g., R&D by product field and energy and pollution abatement R&D) have not enjoyed high response rates, produce low quality statistics, and have been dropped from the Survey as detailed in the Request for OMB Review covering the CY 1999-CY 2001 cycles of the Survey. Recent additions, as detailed in the last Request for OMB Review, include questions relating to R&D distributed by technology area (biotechnology, materials processing, software engineering, and nanotechnology), R&D performed by outside organizations by type of organization, and the employer's cost of fringe benefits for R&D personnel.

small firms that are selected for the Survey.

6. Consequences of Less Frequent Collection

During 1999 and 2000, the National Academy of Sciences (NAS) conducted an NSF-sponsored portfolio review of NSF's statistical program and published the results in a report entitled *Measuring the Science and Engineering Enterprise-Priorities for the Division of Science Resources Studies*². Among the aspects of the NSF statistical program that were reviewed was the consequence to Federal program or policy activities if data collections, including the collection by the Survey, are not conducted or are conducted less frequently, and the technical or legal obstacles to reducing burden. A recommendation to discontinue the Survey or to collect industrial R&D data less frequently was not included in the Academy's report. Also, the importance of an annually updated series has been emphasized recently because of the linkage with the BEA FDI and USDIA data and inclusion of an R&D satellite account in the System of National Accounts administered by the BEA.

7. Special Circumstances

This information collection will be conducted in a manner consistent with OMB guidelines and there are no special circumstances.

8. Consultations Outside the Agency

On May 30, 2007, the Census Bureau published a notice in the Federal Register (Vol 72, pages 29958-9) inviting the general public and other Federal agencies to comment on plans to submit this request. We received two comments during the comment period. One, we deemed irrelevant to the collection and the other was a letter expressing strong support for continuing the collection of the survey data.

Outside Consultations on Data by NSF: NSF's Directorate for Social, Behavioral, and Economic Sciences (SBE) maintains an outside Advisory Committee to provide expert advice on data collection and other survey-related activities. This committee of outside experts meets several times annually to provide advice and guidance concerning current and emerging science and technology policy issues and the kinds of data collection methods and analyses that would help illuminate them. Further, in late 2001 NSF's Division of Science Resources Statistics (SRS) sought a comprehensive review of the portfolio of activities that comprise the SRS Research and Development Statistics Program (RDS). NSF awarded a

² National Academy Press, Washington, DC, 2000. Note that NSF's Division of Science Resources Studies is now the Division of Science Resources Statistics.

sole source cost reimbursement, no fee contract to the National Academy of Sciences (NAS) to review existing R&D data collection systems and relevant literature in the field, commission appropriate papers, identify gaps in current methodology, and hold workshops on its findings. Work began in January 2002 and was performed primarily by the Committee on National Statistics (CNSTAT) with contributions by the Board on Science, Technology and Economic Policy (STEP). An assessment was made of the content, coverage, focus, substance and methodology of data collection and analyses on research and development and related science and engineering activities. The assessment included a review of current and necessary statistical and measurement issues, including (but not limited to) sampling design, periodicity, construct validity and respondent burden. The Committee addressed how the current RDS data collection system can be improved to reflect the changing nature of research, development, and innovation, and include recommendations on the issues of composition, structure, sourcing and location, particularly in the context of the industrial R&D and federal funds surveys, covering the majority of U.S. R&D funding and performance. CNSTAT appointed a panel of experts representing the fields of statistics, survey research, economics, data analysis, research policy, and research and development to review current data collection systems and methodology, and to hold a workshop on R&D measurement methodology.³ NAS' National Research Council (NRC) independently reviewed the CNSTAT interim report to "provide candid and critical comments that will assist the institution [NAS] in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge." The final report detailing overall findings and recommending priorities and options for revised or enhanced..."R&D data collection and acquisition activities" was published in early 2005.⁴

NSF plans to continue to obtain outside advice on the design and conduct of the Survey and to fund measured quality improvement initiatives that call upon outside resources for input as part of the continuing overall redesign effort.⁵

Outside Consultations on Data by the Census Bureau: Recommendations resulting from periodic meetings of the Census Advisory Committee of Professional Associations are evaluated and implemented as appropriate. The American Economic Association (AEA) component of the Committee targets areas of potential enhancements to the Survey, and the Census Bureau, with NSF input, responds to these as staffing and resources permit. Also, with NSF input, the Census Bureau regularly conducts nonresponse evaluations and suggests ways to revise survey forms or streamline collection and processing.

9. Paying Respondents

No payments or gifts are given to respondents of the Survey.

10. Assurance of Confidentiality

The Census Bureau has the authority to offer confidentiality to respondents. A notice at the top of each survey form announces to the respondent: "By Title 13, U.S. Code, **YOUR CENSUS REPORT IS CONFIDENTIAL**. It may be seen only by persons sworn to uphold the confidentiality of the Census Bureau information and may be used only

³ The panel includes Lawrence D. Brown (chair), Meirs Busch professor in the Department of Statistics at the Wharton School of the University of Pennsylvania; John L. Adams, a senior statistician with the RAND Corporation; Barbara A. Bailar, statistical consultant and former Associate Director for Statistical Standards and Methodology at the Census Bureau; Wesley M. Cohen, professor of economics and management at the Fuqua School of Business at Duke University; Fred Gault, the director of the Science, Innovation, and Electronic Information Division at Statistics Canada; Jay Hakes, director of the Jimmy Carter Library and Museum; Brownwyn Hall, professor of economics in the Department of Economics at the University of California, Berkeley; Christopher T. Hill, vice provost for research and professor of public policy and technology at George Mason University; Steven Klepper, professor of economics and social science in the Department of Social and Decision Sciences at Carnegie Mellon University; Joshua Lerner, the Jacob H. Schiff professor of investment banking at the Harvard Business School; Baruch Lev, professor of accounting and finance at the Stern School of Business of New York University; Gary McDonald, retired head of the Mathematics Department of General Motors Research and Development Center; Michael McGeary, political scientist with the Institute of Medicine and other units of the National Academy of Sciences; Thomas J. Plewes, study director and former associate commissioner for employment and unemployment statistics of the Bureau of Labor Statistics; Nora Cate Schaeffer, professor in the Department of Sociology at the University of Wisconsin, Madison; and Richard Valliant, senior research professor at the University of Michigan and professor in the Joint Program on Survey Methodology at the University of Maryland.

⁴ National Research Council (2005). *Measuring Research and Development Expenditures in the U.S. Economy*. Panel on Research and Development Statistics at the National Science Foundation, Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

⁵ SRS and Census' Economic Directorate of Census have been engaged in a significant redesign of the Survey of Industrial Research and Development. NSF has done extensive background work, starting with the CNSTAT report *Measuring Research and Development Expenditures in the U.S. Economy*. NSF hosted numerous meetings/workshops with external data users both in the federal government and outside and has conducted a number of recordkeeping visits to companies to understand what is collectable. To better understand the issues in the present survey, NSF has done extensive review of both the statistical and subject matter aspects of it. Current plans for the redesigned survey call for four core modules which will comprise the fixed elements. Over time there may be rotation of some of these modules and occasional topical modules included. Much of this rotation work is still in the planning stages. NSF and Census are currently conducting cognitive interviews to test the new content, and will continue to do so through May 2008 (these interviews have been included in a generic clearance submitted by Census). In order for the new data to be included, and actually be a centerpiece of the 2012 Science and Engineering Indicators report, NSF has required delivery of results from the redesigned survey in December 2010. To ensure this delivery, there are a number of groups composed of Census and SRS staff working on components of the redesigned survey---such as content testing, instrument development, frame creation, sampling methodology, edit, imputation and estimation methodology, etc. For the extensive questionnaire redesign and potential expansion of the methods of responding, NSF is consulting with Dr. Donald Dillman of Washington State University, a noted survey methodology expert and scholar, on best approaches.

for statistical purposes. Further, copies retained in respondents' files are immune from legal process."

In our cover letter (see Attachment 1), we inform respondents that the Survey is mandatory.

11. Justification for Sensitive Questions

There are no questions on the Survey that are commonly considered sensitive.

12. Estimate of Hour Burden

The Census Bureau and NSF do not expect the sample size to change significantly. Approximately 3,500 companies will receive Form RD-1 (see Attachment 2) and 28,500 companies will receive Form RD-1A (see Attachment 3) for a total sample of 32,000 companies. As mentioned in Item 1, the request to add Item 13 from the RD-1 Form to the RD-1A Form will result in a change in burden for the RD-1A. The Census Bureau estimates that the Form RD-1A will now require 1.5 hours to complete (up from the previous one hour) and the Form RD-1 will require eight hours to complete. Burden is estimated to be 70,750 hours per year, an average of 2.2 hours per company surveyed, an increase of .4 hours compared with the previous request.

Based on informal discussions with respondents during site visits, while gathering information for cognitive studies, and during other previously cleared contacts, in general, a response to the Survey is developed in large firms jointly by one R&D junior executive and one accounting department junior executive and in smaller firms by one accounting department executive. Assuming wage rates of \$100.00 and \$50.00 per hour for these two categories of employees, the dollar cost of the average burden hours per firm will be \$600.00 ((((\$100.00+\$50.00)/2)x 8) for completion of the Form RD-1 and \$75.00 (\$50.00 x 1.5) for completion of Form RD-1A).

13. Estimated Cost to Respondents

We do not expect respondents to incur any cost other than that of their time to respond. The information requested is of the type and scope normally carried in agency records and no special hardware or software is necessary to provide answers to this information collection. Therefore, respondents are not expected to incur any capital and startup costs or systems maintenance cost in responding. Further, purchasing of outside information collection services, if performed by the respondent, is part of usual and customary business practices and not specifically required for this information collection.

14. Costs to the Federal Government

We expect the total cost to the Federal Government (including the planned methodological research) to be approximately \$2,600,000 per year. This cost is shared by the Census Bureau and the National Science Foundation.

15. Reason for Change in Burden

The increased burden results from plans to add Item 13 from the RD-1 Form to the RD-1A Form during the next clearance period to cover methodological and survey quality improvement efforts.

16. Project Schedule

During the first quarter of each year the Census Bureau mails survey forms to collect R&D data for the previous year. In succeeding months, several follow-up contacts are made by mail and telephone to companies that have failed to respond to the initial request.

These data are tabulated by the Census Bureau and results are reviewed by Census Bureau and NSF for accuracy, completeness, and consistency with the time series. Preliminary tabulations with statistics from the largest R&D performers are produced in early summer for internal technical review and to formulate projections for NSF's *National Patterns of R&D Resources* series. Final results of the Survey are available to the public in two annual releases. Before the end of June of the following year (eighteen months after the reference period), in a NSF *SRS InfoBrief* (titles vary each year) and, later in the year, in a detailed statistical table report entitled *Research and Development in Industry: 200x*. The *InfoBrief* formally announces the availability of the survey statistics. It is a two to four page issuance that contains analyses of selected survey results, descriptions of recent survey methodology changes, and some statistics in tabular form. The detailed statistical table report contains the complete set of tables produced from the Survey. The *InfoBrief* is available on paper and both reports are available on the Internet. Analyses of the survey data also appear in several other NSF reports, including *Science and Engineering Indicators* and *National Patterns of R&D Resources*. All published data from the survey are available on the Census Bureau's website which links to the NSF website.

Historical statistics from the Survey are available electronically via NSF's Industrial Research and Development Information System (IRIS) (<http://www.nsf.gov/statistics/IRIS>). IRIS is an online interface to an historical database with more than 2,500 statistical tables containing all industrial R&D data published by NSF for 1953-1998 from the Survey.⁶

The database was developed for use by the science, engineering, academic, industrial, and policy-making communities to build knowledge of the historical trends and inform current discussions about the levels of industrial R&D.

Before the development of the database, tabulations from surveys prior to 1991 were available only on paper because electronic versions of the annual reports exist only for 1991 through the latest cycle of the Survey. These reports are available on the Division of Science Resources Statistics web site at <http://www.nsf.gov/statistics/industry>. NSF plans to develop a database for post-1998 survey statistics.

The IRIS system resembles a databank more than a traditional database system. Rather than firm-specific microdata, it contains the most comprehensive collection of historical national industrial R&D statistics currently available. IRIS contains over 2,500 tables in Excel spreadsheet format that are easily accessible either by defining various measures (e.g., total R&D) and dimensions (e.g., size of company) of specific research topics or by querying the report in which the tables were first published. IRIS does not contain microdata because of the Title 13 assurance, which prohibits publication or release of data or statistics that may reveal information about individual respondents. Consequently, as in many of the tables published on paper and on the Internet, some estimates in the spreadsheets have been withheld to avoid possible disclosure of information about operations of individual companies. Also, the system houses already-prepared spreadsheets that track about two dozens major survey items from the first to the last years they were part of the Survey. Again, the system is designed to make these longitudinal tables available via the user-friendly IRIS system.

17. Request to Not Display the Expiration Date

The expiration date of OMB approval will be displayed on survey forms.

18. Exceptions to the Certification

The collection of information for the Survey complies with 5 CFR 1320.9 without exception.

⁶The database contains statistics only through 1998. The reason for this is that NSF's industry R&D statistics for 1953-1998 were classified using the same industry coding scheme, the Standard Industrial Classification (SIC) system. Beginning with the statistics from the 1999 survey, the North American Industry Classification System (NAICS) is being used. To give data users a bridge between the two coding systems, several tables that reclassify SIC industries for 1997 and 1998 into the new NAICS industries are included in *Research and Development in Industry: 1999*.

