

SUPPORTING STATEMENT

for

Higher Education Research and Development Survey

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LIST OF ATTACHMENTS

Attachment 1: FY 2010 Higher Education R&D Survey questionnaire

Attachment 2: FY 2010 FFRDC R&D Survey questionnaire

Attachment 3: FY 2009 Higher Education R&D Survey pilot contact materials

Attachment 4: Comment letter from the Council on Governmental Relations (COGR)

Attachment 5: Changes to FY 2010 Higher Education R&D Survey

Attachment 6: FY 2010 Higher Education R&D population screening questionnaire

Attachment 7: FY 2009 Higher Education R&D Survey questionnaire (pilot test)

Attachment 8: FY 2009 Higher Education R&D Survey pilot test debriefing report

Higher Education Research and Development Survey Supporting Statement

A. JUSTIFICATION

This request is for a three-year revision of the previously approved OMB clearance for the Survey of Research and Development Expenditures at Universities and Colleges (Academic R&D Survey). The Academic R&D Survey was last conducted for FY 2009. The OMB clearance for the Academic R&D Survey will expire on August 31, 2011.

Conducted annually since FY 1972, the survey collects information on R&D expenditures by academic field as well as by source of funds. The results of the survey are primarily used to assess trends in R&D expenditures across the fields. This information is vital for federal, state, and academic planners in order to make decisions on future R&D funding priorities. Between 2007 and 2010, the survey underwent a full-scale redesign of both content and methodology. A new web survey was developed and pilot tested with 40 academic institutions during the FY 2009 survey. The FY 2010 survey cycle will be the first full fielding of the redesigned survey, now called the Higher Education R&D (HERD) Survey¹, and methodology (Attachment 1).

The survey is an annual census of the universities and colleges meeting eligibility criteria plus federally funded research and development centers--FFRDCs. The National Science Foundation (NSF) is now requesting approval to collect these data for the FY 2010-2012 survey cycles.

1. Need for Data Collection and Legislative Authorization

Approval to conduct the HERD Survey is being requested under The National Science Foundation (NSF) Act of 1950, as amended. Public Law 507 (42 U.S.C. subsection 1862) sections 3(a), (6), and (7) directs the Foundation:

- (6) "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 and
- (7) to initiate and maintain a program for the determination of the total amount of money for scientific and engineering research,....."

The HERD Survey provides essential data on the resources devoted to research and development in the higher education sector where over one-half of the Nation's basic

¹ For the remainder of this document, the term "HERD Survey" refers to both the past Academic R&D survey and the new data collection.

research is conducted. The survey provides both summary data on R&D resources, by source and discipline, and data on individual institutions.

Results of this survey are combined with other NSF data for the federal and business sectors to arrive at national levels of R&D spending, as required by the NSF Act cited above. In 2008, the university sector accounted for approximately 13% of the total R&D performed in the United States, and FFRDCs accounted for an additional 4% of the estimated \$398 billion spent on S&E R&D. Without information from the HERD Survey, NSF policymakers and planners, as well as other policymakers in the Executive Branch, Congress and the states, would have an incomplete and inaccurate understanding of the Nation's R&D activities. Furthermore, the data from this survey are used in conjunction with information from other surveys of academic science and engineering (S&E)—such as the Survey of Graduate Students and Postdoctorates in Science and Engineering and the Survey of Scientific and Engineering Research Facilities—to provide the background statistics that are critical for obtaining a meaningful understanding of research activities in the academic sector.

Additionally, the population of academic institutions surveyed in the HERD Survey serves as the universe for a related survey effort mandated by the United States Congress: the previously-mentioned Survey of Scientific and Engineering Research Facilities (Section 108, Public Law 99-159 [1986]).

NSF utilizes a subset of questions (Attachment 2) to collect R&D performance data and the funding sources from all FFRDCs (39 FFRDCs in FY 2009). According to responsibilities assigned to the NSF in 1990 under the Federal Acquisition Regulations as recorded in the Federal Register (vol. 55, no. 24, February 5, 1990), the NSF “maintains a list of FFRDCs... and information on each FFRDC, including sponsoring agreements, mission statements, funding data, the type of R&D being performed...” The data collected through this survey are used to inform the public on individual FFRDC R&D expenditures and to provide information on this sector's contribution to the national R&D total.

The HERD Survey is one of several surveys directed to universities and colleges collected by the Division of Science Resources Statistics (SRS), the federal statistical agency with responsibility for statistics on the nation's S&E enterprise located within NSF. These data have been integrated along with survey data from the Department of Education's National Center for Education Statistics (NCES) and other data sets into an on-line S&E resource data system, WebCASPAR. WebCASPAR provides an extensive and growing data library with multi-year statistics on the state of higher education in general and academic S&E resources specifically. WebCASPAR can be accessed at the NSF/SRS web site: <http://webcaspar.nsf.gov>. The data in WebCASPAR provide basic information for planning and policy formulation regarding academic science and engineering resources.

2. How, by Whom, and for What Purpose the Information Is to Be Used

Federal Uses

The HERD Survey meets many information needs for federal policy makers. The data are used in policy formulation, implementation and evaluation, budget analyses, congressional hearings, program planning, and annual publications mandated by Congress. The information is provided to Congress, the Office of Management and Budget, and the Office of Science and Technology Policy through published reports, briefings by the NSF Director and staff, and in special tabulations.

The National Science Board, the Director of NSF, and NSF program directors and managers use the HERD Survey data for long-range planning and policy formulation. Specific uses include the following:

- (1) The NSF Office of Integrative Activities uses R&D expenditure data to help assess the need for and the impact of special NSF programs in the Office of Experimental Programs to Stimulate Competitive Research.
- (2) Data from the HERD Survey are incorporated into NSF's periodic analytical report, *National Patterns of R&D Resources*, and the National Science Board's biennial report, *Science and Engineering Indicators (SEI)*. The *SEI* report is mandated by Congress (42 U.S.C. 1863, Section 4(j)), as follows:

"The Board shall render to the President and Congress, no later than January 15 of each even numbered year, a report on indicators of the state of science and engineering in the United States."
- (3) Data on HERD expenditures are used in conjunction with other data sources for maintaining current information on funding, staffing, and impacts of the Nation's scientific, engineering, and technological activities. The data and related reports may be found on the NSF/SRS website at <http://www.nsf.gov/statistics/>.
- (4) The Bureau of the Census, Department of Commerce, uses data from the HERD Survey and other NSF surveys in its annual *Statistical Abstract of the United States*.
- (5) The Bureau of Economic Analyses, Department of Commerce, uses data from the HERD Survey and other NSF surveys in its R&D satellite account.

Professional Societies and Foundation Uses

Representative data users in this category include: the American Association for the Advancement of Science, the Association of Public and Land-grant Universities, the Association for Institutional Research, the National Research Council, the Council on Governmental Relations, the Association of American Universities, and the National Council of University Research Administrators.

State Uses

State governments frequently request R&D expenditures statistics that are unavailable from state records for cross-state comparisons. The data are requested regularly by individual state government agencies (such as state boards of higher education in Maryland, Ohio, and Texas) and by national and regional state government organizations (such as the National Governors Association and the Southern Governors Association).

The data are also used in the compilation of the annual *Science and Engineering State Profiles* published by SRS.

University Uses

Universities extensively utilize the data for their own purposes. Requests for the data are received from numerous individual institutions, as well as from national academic organizations. Specifically, SRS has an agreement with the Association of American Universities' Data Exchange Group to provide them with more timely and comprehensive data from the HERD survey. Institutional Profiles (summary reports containing institution-specific trend data on key data elements from several NSF surveys) are available electronically on the web (<http://www.nsf.gov/statistics/profiles/>).

Public universities and colleges often use R&D expenditures data in studies demonstrating the economic benefits of instruction and research to state legislatures.

Media Uses

HERD expenditures data are well reported by the press, including the *Washington Post*, the *New York Times*, the *Chronicle of Higher Education*, *Science*, *Chemical & Engineering News*, *USA Today*, and the *Wall Street Journal*.

International Uses

The Organization for Economic Cooperation and Development (OECD) has requested that NSF provide HERD data annually for use in their periodic publications and for international comparisons of total R&D efforts. Other foreign users include the Association of Universities and Colleges of Canada and the National Institute of Science and Technology Policy in Tokyo, Japan.

3. Consideration of Using Improved Technology

The HERD Survey is a web-based data collection effort, although respondents to the survey may use an alternative approach, by downloading a PDF or Excel version of the form. The response via the web was 99.9 percent in FY 2009. The vast majority of respondents have welcomed the web version of the survey for the ease of submission and error resolution capabilities. Respondents are electronically sent the survey package, including a letter of

introduction, survey instructions and related materials (see Attachment 3 for the FY 2009 pilot contact materials).

Reporting burden is stable or potentially reduced when the survey population is constant and institutions are accustomed to providing the data requested. In the case of this survey, most respondents have established automated systems for assembling the requested data. In addition, the survey questions are intended to be as consistent as possible with the principles of financial accounting followed by institutions of higher education. Generally, these data are readily available from year-end financial records and other records maintained regularly by most institutions. To obtain the full set of data requested in the survey, business officers of some institutions must sometimes consult with multiple respondents, including heads of departments, research administrators, and other academic officials of the institution.

The web version of the survey has a real-time monitoring system, which allows NSF to monitor data, response status, and comments from respondents. From the perspective of the respondents, the web version is more convenient and simplifies the survey (e.g., by automatically calculating totals). NSF benefits from the use of the web version by receiving improved data quality.

4. Identification of Duplication

The HERD Survey collects essential information on the financial resources allocated to research and development by universities and colleges. There are no other statistical sources of comprehensive national data for this information.

The U.S. Department of Education/National Center for Education Statistics' (NCES) Integrated Postsecondary Education Data System (IPEDS) finance survey series is related in that it collects data on a full range of financial resources and expenses in institutions of higher education including research expenses, while the NSF HERD Survey requests data on research and development expenditures. However, the IPEDS survey does not collect the following information requested by the NSF survey: (1) separately budgeted R&D expenditures (as defined by OMB Circular A-21, revised) by field, source of funding, and character of work; and (2) current fund expenditures for research equipment by field. NSF regularly consults with the NCES to ensure that the information sought by the HERD Survey is unavailable from other sources.

The Association of University Technology Managers (AUTM) collects annual data on university technology transfer activities such as patents filed and licensing revenues. The survey also asks for total R&D expenditures to be reported. However, the survey is only administered to approximately 200 AUTM member institutions and does not cover the full population of research-performing universities and colleges. It also does not collect any detailed data on the fields or types of R&D expenditures.

5. Small Businesses Involvement

The survey universe consists entirely of universities and colleges that perform research and development and of federally funded research and development centers (FFRDCs). There is no small business involvement.

6. Consequences of Less Frequent Surveying

Academic R&D expenditures data were collected on a biennial basis for the period 1964 through 1972. The NSF Director and the National Science Board subsequently determined that annual information about academic R&D resources was necessary to support informed programmatic and policy analysis.

The availability of national totals of R&D resources on an annual basis provides a current and timely overview of the status of science and engineering activity in each sector of the economy. Given the sophistication and pace of science and technological development worldwide, it is anticipated that the need for annual data on national R&D expenditures will continue.

The experience of NSF staff, academic advisory group members, and workshop participants indicate that survey respondents prefer to report a consistent set of data items on an annual basis. Many universities and colleges have automated their record keeping systems, facilitating their ability to respond to NSF on an annual cycle. These automated record systems reduce considerably the time required to assemble and report information needed for NSF concerning sources of R&D support, R&D expenditures by field, etc. Thus, collecting consistent data annually considerably reduces respondent burden for academic institutions with automated data systems, since the database and software are retained and kept current. Many responding academic institutions have indicated that if the data were to be collected on a less frequent basis, the database and related software might not be maintained, resulting in increased burden.

Furthermore, federal, institutional, and major data users have strongly expressed their need for R&D data on no less than an annual basis. Because NSF policies have a national impact, the timeliness of the data used to formulate policy, budget, and planning decisions is critical.

7. Special Circumstances

No special circumstances.

8. Federal Register Notice & Consultation with Persons Outside the Agency

An announcement of the NSF request for clearance was published in the Federal Register on Friday, March 26, 2010 (Volume 75, Number 58) (See Attachment 4). NSF received four public comments in response to the announcement.

One comment came from Ms. Jean Public of Whitehouse Station, NJ who objected to the information collection. Ms. Public had no specific suggestions for altering the data collection plans other than to discontinue them entirely. Because the comment does not pertain to the collection of information on the required forms for which NSF is seeking OMB approval, NSF is proceeding with the clearance request.

Another comment came from Rachel Blanchard Carpenter at The Brookings Institution. She requested a copy of the HERD pilot test instrument and instructions which were provided to her.

A third comment came from Bob Mullen at the University of Maryland. He requested a copy of the FY 2010 survey instrument. Because the draft of the instrument was not ready at the time of his request, NSF provided a copy of the pilot questionnaire and told him the final 2010 questionnaire would be sent to all institutions later this summer once OMB clearance was obtained.

A final comment came from Tony DeCrappeo and David Kennedy with the Council on Governmental Relations (Attachment 5). They expressed general support for the survey and highlighted two issues for further consideration. The first point was a request for the NSF to carefully weigh the administrative burden of the additional survey items in evaluating the first year of the full rollout of the survey, and to be open to making additional changes should the burden prove too great. NSF has already taken into account the administrative burden expressed by the pilot institutions and eliminated four of the pilot test questions from the FY 2010 survey. NSF will continue to monitor institution concerns during the FY 2010 survey and make adjustments to the survey as necessary in subsequent years.

The second point was a request for more information regarding why the breakdown of institutional funds in Question 1 remains confidential. Confidentiality has been promised from the beginning of data collection for this sub-item in 1978 because many institutional respondents expressed hesitance at releasing information on the unreimbursed indirect costs and cost sharing portion of their R&D expenditures total. The main concerns were that (1) since many institutions do not "book" such expenses in their accounting systems, they were concerned about releasing such estimates that could not be tracked back on a project-by-project basis, and (2) the information would be used to justify lowering indirect cost reimbursement on grants, or to judge public institutions by how well they recovered indirect costs on R&D projects. Respondents felt that both uses would be inappropriate and misleading, because of the variety of types of projects and sponsors represented within the total. Because certain agencies cap their indirect cost reimbursement well below a

normal institutional negotiated rate, some amount of unreimbursed costs is necessary and expected. NSF asked about retaining the confidentiality of these sub-items on the redesigned HERD survey during our recent site visits, cognitive testing, and during the pilot test. The majority of respondents preferred keeping the confidentiality for the reasons stated above.

Over the past three years as part of the major survey redesign project, NSF has conducted over 30 institution visits, 40 telephone debriefings at the conclusion of the FY 2009 pilot test, and has also held several workshops and panels with respondents and regular data users. These meetings provided a wealth of information on the impact of the survey's current and planned data requests upon academic respondents. Copies of the summary reports from these activities are available upon request.

9. Payments or Gift to Respondents

There will be no payments or gifts to respondents.

10. Assurance of Confidentiality

In general, assurances of data confidentiality are not provided to respondents to the HERD Survey. All items on the questionnaire are reported at the institutional level except for the breakdown of institution funds within question 1 (institutionally financed organized research, institution cost sharing, and unrecovered indirect costs), and the amount of recovered vs. unrecovered indirect costs in question 14. These items will be presented only as aggregate totals in resulting publications. The following confidentiality statement, covering these excepted survey items, will be included on the questionnaire:

"Information from confidential items is NOT published or released for individual institutions; only aggregate totals will appear in publications. In accordance with the National Science Foundation Act of 1950, as amended, and other applicable federal laws, your responses will not be disclosed in identifiable form to anyone other than agency employees or authorized persons."

11. Sensitive Questions

There are no sensitive questions in the HERD Survey. Data are collected on an institutional level.

12. Estimated Response Burden

Data for FY 2008 were collected from 725 institutions and FFRDCs expending at least \$150,000 in separately budgeted R&D in S&E. The FY 2009 survey was sent to 763 institutions and FFRDCs. The full FY 2010 survey will be sent to 753 institutions and FFRDCs (all FFRDCs and institutions reporting at least \$150,000 in R&D expenditures on the FY 2009 survey).

High response rates have consistently been obtained: in FY 2007 the response rate was 96.9%, in FY 2008 it was 98.5%, and in FY 2009 it was 97.4%.

The regular FY 2009 academic and FFRDC R&D surveys completed by 746 institutions was estimated to require 24 hours and 4 hours, respectively, based on previous burden reports supplied by respondents (see Table A-12.1).

Table A-12.1. Previously Reported Burden Hours per Respondent to the Academic R&D Survey

Year	Doctorate- granting institutions	Master's- granting institutions	Bachelor's degree institutions	FFRDCs
FY 1999	20.8	13.0	7.5	9.4
FY 2000	21.0	12.0	10.5	9.2
FY 2001	30.2	11.9	9.0	12.1
FY 2002	28.7	14.9	12.2	4.5

Excluding two outlier institutions, the average burden report for the 40 institutions in the FY 2009 HERD pilot test was 60 hours: 17 hours of one-time programming and 43 hours of annual reporting burden.

The FY 2010 HERD data collection will not include as many questions as the HERD pilot data collection. Based on the pilot debriefings, NSF removed four questions on proposals and awards, bringing the question total from 23 to 19. NSF also decided not to pursue pilot testing of the Intellectual Property and Commercialization module which was included in the previous OMB clearance request for the FY 2009 surveys, and as such those questions will also not be included in the FY 2010 survey.

Although NSF did not request a question by question accounting of burden hours from the pilot respondents, based on the pilot debriefing discussions we estimate a twenty percent reduction in both one-time programming and recurring burden hours due to the elimination of these questions. Thus, a total of 48 burden hours per respondent is assumed for the FY 2010 HERD survey, 14 hours of one-time programming burden and 34 hours of recurring burden. A reduction in burden is assumed for the FY 2011 and FY 2012 survey cycles as the one-time programming is completed by each institution. However, NSF is conservatively

estimating an average annual burden of 48 hours. Assuming a growth in the population as a result of the FY 2010 population screening (see below), NSF is estimating that an average of 850 institutions will be asked to complete the full HERD survey annually, times an historical average response rate of 95% resulting in 808 responses, for an estimated annual respondent burden of 38,784 hours.²

A more extensive population screening is also planned as part of the HERD data collection for FY 2010 in order to identify new academic institutions with non-S&E R&D expenditures. This screening will request total R&D expenditures by sources of funding (Question 1) from each institution. More information about this screening is provided in Section B.

The HERD population screening survey is estimated to take no more than 2 hours to complete, and up to 1,995 4-year and above institutions will be asked to complete it for the FY 2010 cycle.³ Although NSF has not previously undertaken a screening of this magnitude and thus does not have historical data on response rates, every reasonable effort will be taken to obtain a response rate of at least 80%. A conservative estimation of the burden assumes a 90% response rate (or 1,796 responses) for a total of 3,592 hours. The burden will be reduced for cycles FY 2011 and FY 2012, as the number of institutions requiring screening is expected to be significantly reduced. However, since the future reduction in institutions is unknown, NSF is using the total of 3,592 hours as the annual burden estimate.

The FFRDC version of the survey will also be expanded to include one additional question on cost categories (HERD survey question 14) and NSF is estimating an increase in burden of 2 hours, adding to a total of 6 hours per respondent or 234 hours, to accommodate this change. The FFRDC survey has historically obtained 100% response from the population of FFRDCs.

A summary of the annual burden estimates is included in the table below. At an estimated cost of \$31 per hour (based on the Bureau of Labor Statistics May 2009 average hourly wages for “Financial Analysts” and “Budget Analysts” within NAICS 611300 - Colleges, Universities, and Professional Schools), the total annual cost to respondent institutions is \$1,320,910 (or approximately \$500 per institution).

Table A-12.2. Annual Burden Estimates

Category	# of Responses	Respondent Burden	Total Burden Hours	Total Cost Burden
HERD population screening of institutions	1,796	2	3,592	\$111,352
HERD survey	808	48	38,784	\$1,202,304

² In order to more accurately estimate the burden for future years after the initial implementation of the redesigned HERD survey, NSF is requesting permission to collect burden hours on the questionnaire in the FY 2011 and FY 2012 surveys.

³ Based on the number of 4-year institutions listed for 2008-09 in Table 265, Degree-granting institutions, by control and type of institution: Selected years, 1949-50 through 2008-09, *Digest of Education Statistics*, U.S. Department of Education National Center for Education Statistics.

FFRDC survey	39	6	234	\$7,254
Total annual burden	2,643	-	42,610	\$1,320,910

Since FY 2010 will be the first year in which institutions with both S&E and non-S&E R&D spending are eligible for inclusion in the survey, NSF is unable to predict the growth of the survey population in FY 2011 and FY 2012. However, if the population exceeds the annual estimate above, a clearance amendment will be submitted to OMB.

13. Estimate of Annual Cost Respondent Burden

Not Applicable. There are no capital or startup costs to the respondents to the HERD Survey.

14. Estimate of Annual Cost to Federal Government

The estimated annual cost of the FY 2010-FY 2012 HERD Surveys to the federal government is \$1,005,625. See table below for how this estimate was derived.

Annual HERD Survey Federal Government Costs

	FY 2010	FY 2011	FY 2012
Data collection and processing contract (total contract cost prorated over 3 survey cycles)	\$890,000	\$890,000	\$890,000
HERD survey manager (1.0 person years)	\$112,224	\$115,591	\$119,059
Total	\$1,002,224	\$1,005,591	\$1,009,059

15. Changes in Burden

Changes in burden hours and federal government costs are a result of the redesign and expansion of the HERD survey and the additional HERD population screening survey. A complete listing of the changes and additions to the survey can be found in Attachment 6.

16. Schedules for Data Collection and Publication

Due to the extensive changes in the FY 2010 questionnaire, NSF plans to send a preview copy of the FY 2010 survey to all institutions surveyed in FY 2009 as soon as OMB clearance is obtained. This will be sent electronically to each institution's survey contact and president by late summer 2010.

The FY 2010 survey will begin with the screening survey in late fall 2010. The full HERD and FFRDC surveys will be sent electronically to all institutions in the FY 2009 survey population and meeting our R&D expenditures threshold of \$150,000 in November 2010 with a due date of February 25, 2011. Actual closeout of the survey will be approximately mid May 2011, in order to allow time for late responses, corrections, and updating of previous years' data.

The contractor is responsible for all data collection and processing activities, including editing data submissions to resolve errors. For FY 2010, the same procedures will be used as those used for FY 2009 survey. For the FY 2010 survey, following the closeout of data collection in May 2011 the contractor will generate inflator/deflator factors to impute for non-response, based on data reported by responding institutions. After closeout, data for non-respondent institutions will be machine-imputed using an imputation plan developed and approved by NSF.

The data from the FY 2010 survey will be analyzed in an SRS Info Brief to be published in the winter of 2011. A report containing all of the detailed statistical tables, *Higher Education Research and Development Expenditures: Fiscal Year 2010* subsequently will become available on the web.

17. Displaying the OMB Expiration Date

The OMB number and expiration date will appear on the survey form.

18. Exceptions in Item 19 on Form 83-I

No exceptions sought.