



OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

Science to Achieve Results (STAR) Fellowship Program Needs to Place Emphasis on Measuring Results

Report No. 2003-P-00019

September 30, 2003

Report Contributors:

Manju Gupta
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Abbreviations

| | |
|-------|---|
| DOD | Department of Defense |
| EPA | Environmental Protection Agency |
| MAI | Minority Academic Institutions |
| NCER | National Center for Environmental Research |
| NIEHS | National Institutes of Environmental Health Science |
| NRC | National Research Council |
| NSF | National Science Foundation |
| OIG | Office of Inspector General |
| OMB | Office of Management and Budget |
| ORD | Office of Research and Development |
| S&E | Science and Engineering |
| STAR | Science to Achieve Results |



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

September 30, 2003

MEMORANDUM

SUBJECT: Science to Achieve Results (STAR) Fellowship Program
Needs to Place Emphasis on Measuring Results
Report No. 2003-P-00019

FROM: Jeffrey K. Harris /s/
Director for Program Evaluation, Cross-Media Issues

TO: Paul Gilman
Assistant Administrator, Office of Research and Development

This is our final report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This evaluation report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. This evaluation report represents the opinion of the OIG, and the findings contained in this report do not necessarily represent the final EPA position. Final determinations on matters in this evaluation report will be made by EPA managers in accordance with established resolution procedures.

On July 23, 2003, the OIG issued a draft report to EPA for review and comment. We received the Agency's response to the draft report dated September 15, 2003. The Agency generally agreed with the findings and recommendations, with the exception of the report's approach to the collection of demographic data and the issue of diversity.

The Agency provided a number of comments on various aspects of our report, along with a Corrective Action Plan describing actions already taken and a time line for additional actions it has committed to undertake. We include EPA's comments in Appendix D. Our detailed evaluation of those comments is presented in Appendix E. In addition, we made appropriate changes to the draft report in response to EPA's technical comments that are not attached.

Action Required

In accordance with EPA Manual 2750, you are required to provide this office with a written response within 90 days of the final report date. The response should address all recommendations. For corrective actions planned but not completed by the response date, please describe the actions that are ongoing and provide a timetable for completion.

We have no objection to the further release of this report to the public. Should you or your staff have any questions, please contact me at (202) 566-0831 or Manju Gupta, Project Manager, at (202) 566-2478.

For your convenience, this report will be available at <http://www.epa.gov/oig/>

Attachment

Executive Summary

The Environmental Protection Agency (EPA) established the Science to Achieve Results (STAR) Fellowship Program to provide funds to graduate students to encourage them to obtain advanced degrees and pursue careers in environmentally related fields. The program is administered by EPA's National Center for Environmental Research (NCER). To determine the overall effectiveness of the program, we sought to identify specific performance measures, performance data, and internal evaluations established by NCER to assess the results of the fellowship program. We attempted to analyze the demographic composition of the students applying and entering the program. Additionally, we identified similar fellowship programs at other Federal agencies and compared approaches to assessing program effectiveness and tracking applicant and recipient demographic characteristics.

Results in Brief

Program Performance. NCER did not place emphasis on determining the results and achievements of its STAR Fellowship Program. NCER primarily focused on selecting the fellows and awarding the grants, without determining whether the program's goals were being achieved. NCER did not establish relevant performance measures, nor collect performance data on the accomplishments of the STAR Fellowship Program. Consequently, the success of the program in having recipients pursue environmentally related fields cannot be measured.

Program Demographic Data. NCER did not place emphasis on collecting and analyzing demographic data in administering the STAR Fellowship Program. NCER's main focus has been on selecting top quality candidates. Since 1999 the Minority Academic Institutions (MAI) Fellowships have been part of the STAR Fellowship Program. There is outreach to the MAIs, and NCER considers the MAI fellowships to address the need to attract minority applicants and fellows. However, NCER has not consistently collected nor analyzed the demographic data of the STAR/MAI applicants nor fellows. Without adequate demographic data, it is not possible to determine whether the program has been successful in attracting and selecting a diverse pool of fellows.

Other Fellowship Programs. Review of similar fellowship programs at three other Federal agencies disclosed that performance of fellowship programs can be measured and tracked and that diversity among applicants and recipients is routinely monitored.

Recommendations

We recommend that the EPA Office of Research and Development (ORD) direct NCER to expand the focus of the STAR Fellowship Program regarding measuring results. This should include conducting internal reviews, selecting meaningful performance measures, and maintaining necessary data on fellowship applicants and recipients. We also recommend that ORD direct NCER to collect, maintain, and review the demographic composition of the STAR applicant pool and the fellows selected, and adjust outreach efforts accordingly. Further, we recommend adoption of certain successful procedures used by other Federal agency fellowship programs.

Agency Comments and OIG Response

In its response to our draft report, the Agency agreed to our recommendations related to establishing Performance Measures and the need for data collection and analyses, tracking the fellows after completion of the program, and some of the procedures used by other agencies. EPA prepared an action plan, including action officials and due dates for each recommendation. However, EPA did not agree with our comments on diversity and need for outreach to minorities outside of the MAI program. EPA suggested we remove the chapter on diversity and include the recommendation for collecting demographic data with other recommendations in Chapter 2. We have made some modifications to the report in response to EPA's request, but did not remove Chapter 3 on diversity and the collection of demographic data. EPA's comments are in Appendix D, and our evaluation of those comments is in Appendix E.

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Chapter 1

Introduction

Purpose

The objective of this evaluation was to determine whether the Science to Achieve Results (STAR) Fellowship Program established by the Environmental Protection Agency (EPA) Office of Research and Development (ORD) has been effective in encouraging promising students to obtain advanced degrees and pursue careers in environmentally related fields, and to determine the demographic profile of the applicants and fellows, who are selected to become the future generation of the environmental work force. Specifically, we sought to:

- Identify the specific performance measures used by ORD to evaluate the STAR Fellowship Program.
- Identify the demographic profile of the applicant pool, and compare it with the demographics of the fellowship recipients.
- Compare the STAR Fellowship Program with similar fellowship programs at other Federal agencies.

Background

EPA established the STAR Research Grants Program in 1995, in response to specific needs identified by Congress. The STAR program, administered by ORD's National Center for Environmental Research (NCER), is made up of three components: (1) Focused Requests for Applications; (2) Exploratory Research; and (3) STAR Graduate Fellowships, including the Minority Academic Institutions (MAI) Fellowships. This report only addresses the third component.

STAR Fellowship Program

The STAR Fellowship Program provides funds to graduate students in environmentally related fields at colleges and universities across the country. Fellowships are awarded to competitively selected students for Master's and Doctorate programs in physical sciences, biological sciences, and engineering. NCER describes the objective of the STAR Fellowship Program as:

To encourage promising students to obtain advanced degrees and pursue careers in environmentally related fields. . . . This program will benefit both the public and private sectors which will need a steady stream of well-trained environmental specialists if our society is to meet the environmental challenges of the future.

Approximately \$10 million of the STAR Grants Program has been devoted annually to the STAR Fellowship Program. EPA has spent approximately \$69 million to fund over 800 STAR and MAI Fellows at 168 United States colleges and universities from 1995 through 2001. NCER did not put out Request For Applications for STAR Fellowship awards for fiscal 2002 because funding for the program was not included in the EPA budget. However, funding of \$9.75 million was restored for the fiscal 2003 budget year. There is continuing uncertainty about the level of funding for the fellowship program in the future.

Minority Academic Institutions Fellowships

ORD established the MAI Graduate/Undergraduate Student Fellowship Programs in response to Executive Order 12320 (September 15, 1981), “to strengthen the capacity of historically black colleges and universities to provide excellence in education.” Based on White House Initiatives, the list of participating minority institutions grew to include Hispanic Serving Institutions, Tribal Colleges, Alaskan Native Serving Institutions, and Native Hawaiian Serving Institutions. The MAI fellowships were administered under the National Consortium for Graduate Degrees (GEM program) until 1998, at which time NCER took the programs over as part of the STAR Fellowship Program. The goal of the MAI programs is to assist eligible minority academic institutions in providing education and training to fellows interested in pursuing environmental careers and to strengthen environmental research programs at these institutions. An applicant’s eligibility is based on attending a minority academic institution, without consideration being given to the applicant’s race or ethnicity.

National Research Council Report

The National Research Council (NRC) of the National Academies of Science in April 2003 completed an independent assessment, sponsored by ORD, of the STAR Research Grants Program.¹ The NRC established a committee for the review made up of representatives from universities, environmental groups, the American Chemistry Council, and a State environmental protection agency. The committee was charged to assess the program and “recommend ways to enhance the program’s scientific merit, impact, and other benefits.” The report describes the STAR Fellowship Program as “a small component of the overall STAR program whose goals and objectives differ from those of the main research grants program.” In evaluating the fellowship program, the committee found, “although the program publishes on the NCER website information about all the students receiving fellowships, it does not gather systematic information to track the status of past and currently funded fellows to assess the impact of the STAR program on their careers. To gather information on the influence of the fellowship program,

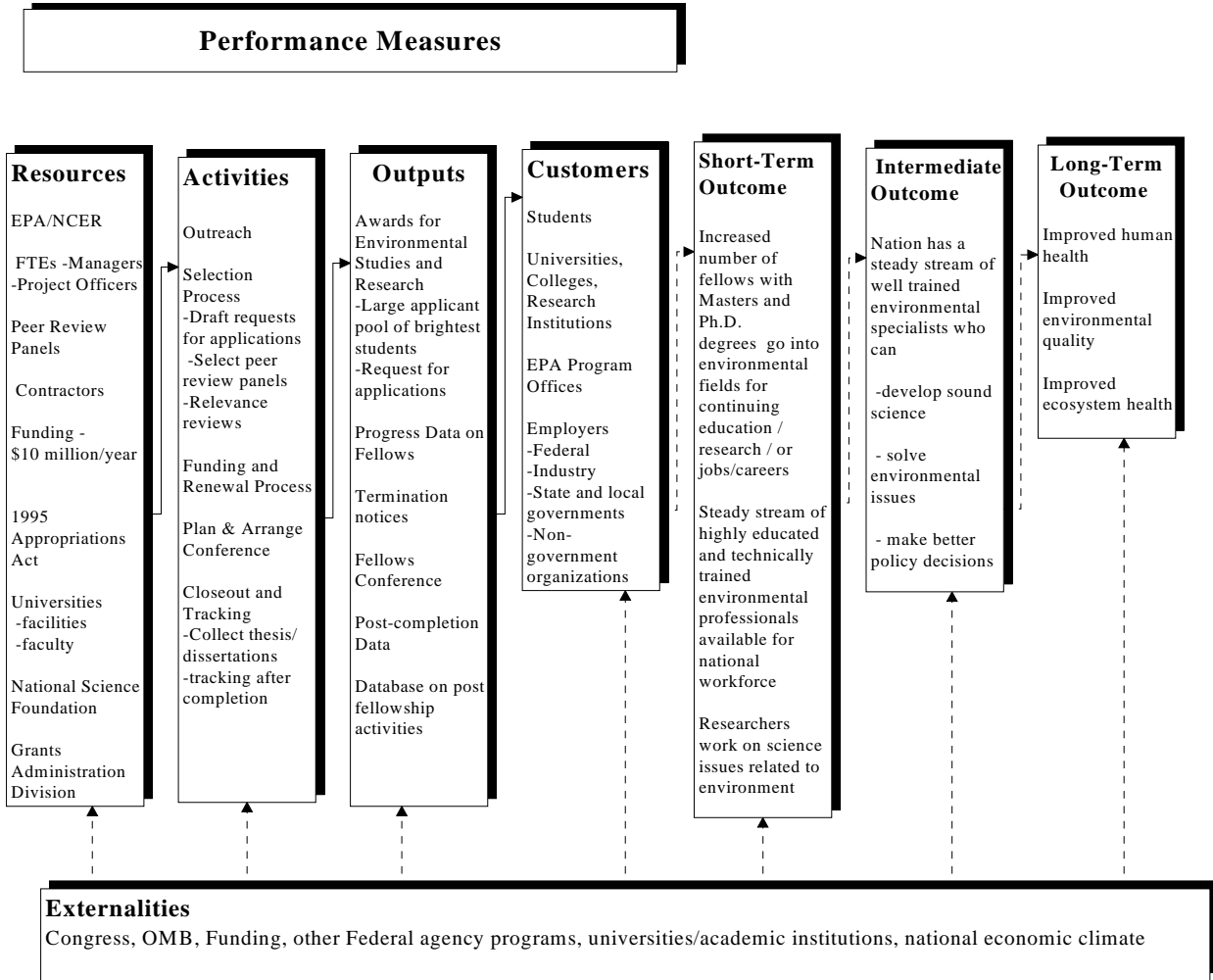
¹ The Measure of STAR Review of U.S. Environmental Protection Agency’s Science to Achieve Results (STAR) Research Grants Program, National Research Council of the National Academies, April 2003.

the committee contacted more than 100 STAR fellows who were initially funded in 1995 and 1996 and who would have completed their graduate work.” The NRC reported that nearly 90% of the former fellowship recipients they contacted remained in the environmental field. The committee’s report concluded, “Given the nation’s continuing need for highly qualified scientists and engineers in environmental research and management, the STAR fellowship should be continued and funded.”

Logic Model Depicting Design of STAR Fellowship Program

Figure 1-1 represents a logic model that illustrates the general design of the STAR Fellowship Program, and how it is intended to support EPA and ORD.

Figure 1-1: Logic Model Depicting STAR Fellowship Program Design



The logic model places the fellowship program in the larger context of ORD and EPA goals, and the conceptual links between the goals of fellowship program and ORD's and EPA's goals. It shows what the program does, the resources used for its activities, and the customers it is designed to serve with its outputs. The model illustrates the links between design, implementation, and outcomes, and contrasts design outcomes and program manager priorities. Details on the content of the logic model are in Appendix A.

The design of the STAR and MAI fellowships are similar, with minor differences. Therefore, we are only presenting the STAR logic model, and the differences are discussed in Appendix A as appropriate.

Scope and Methodology

We began our review on September 19, 2002, and completed field work on April 25, 2003. We conducted our work in Washington, DC. We performed our review in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States.

In order to determine the degree to which the objectives of the STAR (including MAI) Fellowship Program were met, and how it contributes toward ORD and EPA goals, we reviewed the design of the program for logic and completeness by preparing a logic model. We obtained information through web sites and program files, reviewed the NRC report, and conducted interviews with ORD staff. We shared a draft of the logic model and the explanatory notes (Appendix A) with NCER managers, and received their comments, which we have incorporated as necessary. We selected a random sample of fellowship files for review. The results of the review of files are in Chapters 2 and 3. We also reviewed the fellowship programs for three other Federal agencies (Department of Defense, National Science Foundation, and National Institutes of Environmental Health Sciences) for comparison and documenting their procedures (Chapter 4).

We have reported the data on demographics as provided by NCER staff in Chapter 3, but did not independently test the accuracy of the data. Our analyses were limited because NCER has not collected data systematically on demographics, or on jobs/careers/activities after completion of fellowships.

Regarding prior coverage, we reviewed prior EPA Office of Inspector General (OIG) Report No. 2002-P-000002, "Design for Objective 8.4 Could Be Improved by Reorienting Focus on Outcomes," dated November 21, 2001.

Additional details on our scope and methodology are in Appendix B.

Chapter 2

Emphasis Needs to Be Placed on Measuring Results of Program

NCER did not place emphasis on determining the results and achievements of its STAR Fellowship Program. NCER primarily focused on selecting the fellows and awarding the grants, without determining whether the program's goals were being achieved. Consequently, the success of the program in having recipients pursue careers in environmentally related fields cannot be measured and evaluated because NCER did not collect sufficient performance measurement data. This is consistent with the observation in a prior report² that "ORD focuses primarily on outputs. Placing greater focus on outcomes rather than the steps taken to achieve outcomes could result in more valuable benefits being realized."

Sufficient Data Not Collected

Based on our review of a sample of 50 randomly selected files for STAR Fellowship Program recipients from 1995 through 1999 (10 folders for each year), we concluded that NCER did not collect sufficient information to determine whether fellows obtained an environmentally related degree or pursued an environmentally related career. Most program activities dealt with selecting the fellows and dispensing resources.

Specifically, we found that NCER did not track the fellows after termination of their fellowship. This was despite the fact that fellowship terms and conditions require fellows to notify the EPA project officer of all employment for at least 3 years after graduation. When fellows fail to report, EPA does not have a procedure in place to collect the data. In our initial meetings with NCER staff, we were told that NCER planned to track fellowship recipients' career choices and professional activities as related to the environment for 5 years. However, when we searched the folders to check how much information was collected on the employment or professional activities of the fellows after 3 years, we did not find any information in the files for completed fellows on post completion activities, such as career/jobs.

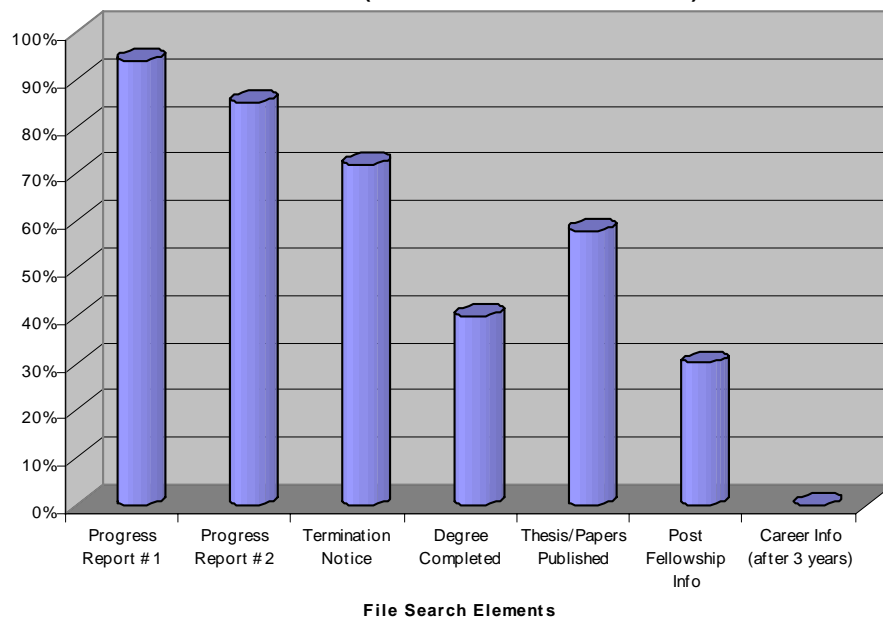
Information on degree completion, thesis completion, and publications could be used as interim or partial measures of fellowship success, and we sought to determine whether NCER was collecting this type of data as well. We found

²Design for Objective 8.4 Could be Improved by Reorienting Focus on Outcomes, OIG Report No. 2002-P-000002, November 21, 2001.

20 out of 50 files (40 percent) included information on degree completion, and 29 out of 50 files (58 percent) included completed theses or papers published.

Figure 2-1 provides a breakdown of the type of information collected by NCER included in the files. This includes progress reports for the first and second years (Progress Reports #1 and #2, respectively), termination notices,³ an indication of degree completed, whether a thesis or paper was published, post-fellowship information in general, and whether career information for the first 3 years after fellowship termination was included.

**Figure 2-1: STAR Fellowship Program - Summary of File Review
(% available in files 1995-1999)**



Lack of Evaluation System and Performance Measures

NCER had not established a system of internal evaluations to assess the performance of the fellowship program. NCER management stated that no internal evaluations of fellowship programs had been conducted. However, they view the statistics on the number of people applying each year and the competitive acceptance rate (approximately 10 percent of applicants receive fellowships) as indicators of program success. As noted earlier, this does not indicate the number of recipients who pursue careers related to the environment, which is the ultimate goal of the program.

³ Details in Appendix A, in “Close-out and Tracking” section.

Also, NCER had not established performance measures necessary for monitoring and reporting the program's accomplishments. A key aspect of results-based management is setting meaningful performance measures. By way of performance measurement, NCER only reviews the number and quality of applicants. However, the number and quality of those selected for awards only indicate what goes into the program; they do not measure the *results* of the fellowship program or the difference the program makes in creating the next generation of environmental specialists. To determine that information, such performance measures as degree completion rates, jobs and careers pursued after fellowship, publications, and academic appointments should be tracked and assessed over time.

NCER did not collect relevant data necessary for performance measurement and analyses, as well as for making necessary changes for improvement. It is not possible to determine how well a program is working or what it is achieving without collecting data dealing with the stated program goals, which in this case were students obtaining advanced degrees and pursuing careers related to environmentally related fields.

NRC Study Noted Similar Issues

A study coordinated by the NRC at the request of ORD (see Chapter 1) noted similar issues. The NRC report noted that the STAR Fellowship Program does not gather systematic information to track the status of past and currently funded fellows to assess the impact of the STAR program on their careers. While the study noted the selection process ensured selection of high quality applicants, it also noted NCER did not collect information on degree completion rate or on how many of the fellowship recipients who completed graduate work went on to work in environmental sciences. The NRC study recommended that EPA may want to collect information on publications and other products of fellowship recipients to document the success of the program.

Recommendations

We recommend that the Assistant Administrator of ORD direct NCER to take the following actions to effectively measure for results:

- 2-1. **Conduct Internal Evaluations:** Periodic in-house evaluations of the program need to be performed by management to determine whether resources are being allocated to yield successful outcomes, and to identify areas that need improvement. Regular evaluations performed in-house and by external panels are important parts of a program design. Results of these evaluations will provide the basis for making appropriate changes to strategies, objectives, or areas of emphasis.

- 2-2. **Establish Performance Measures:** NCER needs to develop performance measures appropriate for measuring the outcome of the fellowship program. The measures should be cost effective, and aligned with EPA's and ORD's environmental goals. They should provide accurate and timely information for providing a coherent and clear picture of what the resources spent are producing short- and long-term. Based on review of other studies of fellowship programs, some traditional measures for evaluating fellowship programs include:
- a. Percentage of fellowship recipients who obtained advanced degrees.
 - b. Number of fellowship recipients who have completed graduate work and are working in environmental fields.
 - c. Number of fellowship recipients who have completed degree programs with at least one peer-reviewed publication, or have attained career placements in research programs or acquired tenure track positions.
 - d. Professional productivity in the form of scholarly publications, professional presentations, and procurement of research grants.
- 2-3. **Collect Data:** Data on fellows completing the program must be collected regularly and analyzed, in order to properly assess the effectiveness of the program. The availability of adequate data serves as the cornerstone for the above-mentioned recommendations, since the availability of data will allow appropriate outcome-oriented performance measures and evaluations to be applied to the fellowship program.

Agency Comments and OIG Response

ORD agreed with our recommendations to conduct internal evaluations, establish performance measures, and collect data. However, while ORD indicated that the appropriate data is currently being collected, we generally did not find that to be the case, and ORD needs to take further action in this area. ORD's comments are in Appendix D, and our evaluation of those comments is in Appendix E.

Chapter 3

Demographic Information Not Systematically Collected

NCER has not placed emphasis on evaluating the demographic composition of the applicant pool, and of the fellows selected, who will be trained to become the next generation of environmental professionals through STAR fellowships. Even though having a diverse pool of applicants and fellows is not an objective of the STAR Fellowship Program, inherent in NCER's objective of meeting the need for a steady stream of well-trained environmental specialists is EPA's commitment to a diverse work force that includes participation of women, under-represented minorities, and people with disabilities. NCER considers the MAI program to be its response to the need to address diversity. However, the purpose behind the MAI program under a White House Initiative is to assist in expanding minority academic institutions' capacity to provide quality education. The eligibility for a MAI fellowship is attending an institution that has been recognized as an historically minority academic institution, not the student belonging to a minority group. Moreover, since NCER did not collect demographic information consistently, it was not possible to provide a demographic profile of the program. By the same token, it is not possible for NCER to objectively demonstrate whether the STAR and MAI efforts are successful in attracting women and traditionally under-represented minorities.

Need for Increasing Diversity in Science and Engineering Workforce

There have been many recent reports on the business need for increasing diversity in the science and engineering workforce. We noted two such recent studies that have emphasized the need to tap into talent from groups that are under-represented in the Science and Engineering (S&E) workforce:

- One study⁴ notes that: "The demographics of the United States are changing. Women and minorities make up 60 percent of the total workforce, but they are dramatically under-represented in S&E. Women comprise 46 percent of the workforce but only 23 percent of the S&E labor force. African Americans and other ethnic minorities constitute 24 percent of the total population but only 7 percent of the S&E labor force. This means the majority of Americans are under-represented in S&E." The study also notes

⁴ Envisioning a 21st Century Science and Engineering Workforce For the United States: Tasks for University, Industry and Government, Report to the Government-University-Industry Research Round Table, National Academy Press, ISBN 0-309-08856-9 (2003).

the lack of adequate and reliable data that could be applied for policy making purposes.

- A second report⁵ was issued from a forum organized by the National Academy of Engineers Committee on Diversity in the Engineering Workforce, with representatives of corporations that have been recognized for their successful diversity programs. The first and foremost concern expressed in the study was the need for talented workers and the difficulty of finding enough qualified personnel. Other issues were the competitive advantage of having a diverse workforce, and the recognition that engineers from different ethnic, gender, and cultural backgrounds bring unique and valuable life experiences to the workplace and encourage creative approaches to problem solving and design.

In our review of other fellowship programs, we found that increasing diversity in the future generation of workforce is included as one of the objectives of some fellowship programs. The data are collected, analyzed, and used in making changes in the outreach if necessary (Chapter 4).

Collecting and Monitoring Demographic Data Important for Assessing Successful Outreach

NCER did not consistently collect or analyze demographic data for applicants, nor the fellows selected, since increasing diversity in the applicants or fellows is not a stated objective of the STAR Fellowship Program. The main emphasis of the program is on selecting highly motivated and talented students interested in environmental fields, from different geographical regions. In response to our questions on diversity and demographic data, NCER managers told us they address the issue of diversity through the MAI fellowships. However, the eligibility for a MAI fellowship is based on attending a MAI institution, rather than the ethnicity or gender of the applicant or fellow. The goal of the MAI program, in place since 1981 as a result of a White House Initiative, is to strengthen the capacity of MAIs – institutions that have historically been attended predominantly by minority students – to provide excellence in education. A highly competitive minority candidate who is not enrolled in a recognized MAI does not meet the eligibility criteria for a MAI Fellowship.

Moreover, NCER did not collect or maintain a database on the demographics of the STAR and MAI program applicants, nor of those receiving fellows, in 1995-1998. In 1999, NCER established a database that includes information on the gender and ethnicity of applicants and fellows. Even after that, the information was not complete, as shown in following charts. According to NCER managers,

⁵Diversity in Engineering: Managing the Workforce of the Future, National Academy Press (2002).

the reason for incomplete information is because it is provided by applicants on a voluntary basis. Moreover, NCER has not placed emphasis on maintaining the database on diversity in the STAR Fellowship Program. As seen in the following charts, there are gaps in the recipient data. The fellows are in contact with NCER staff, thus the data can be collected from them to complete the database.

Demographic data on the number of fellowship applicants and those actually receiving a fellowship is provided by race (Table 3-1 and Figures 3-1 and 3-2) and by gender (Table 3-2 and Figures 3-3 and 3-4). As demonstrated by the “Blank” columns in the tables, demographic information on race and gender was not available for more than half of the STAR Fellowship Program recipients. Therefore, the information is of limited usefulness regarding trends, or to assess whether any changes need to be made to increase minority applicants. Further, NCER has not collected data on the participation of applicants or fellows by people with disabilities in the fellowship program. As discussed further in Chapter 4, other agencies place greater emphasis on collecting and analyzing demographic data.

Table 3-1: Profile of STAR Fellowship Program Applicants/Recipients by Race/Ethnicity

| RACE | White | | African Am. | | Hispanic | | Asian | | Native Am. | | Blank | | Total | |
|-------|-------|------|-------------|------|----------|------|-------|------|------------|------|-------|------|-------|------|
| | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. |
| 2000 | 546 | 17 | 33 | 1 | 27 | 1 | 28 | 1 | 9 | 0 | 653 | 87 | 1,296 | 107 |
| 2001 | 924 | 64 | 40 | 1 | 50 | 3 | 46 | 4 | 5 | 0 | 332 | 28 | 1,397 | 100 |
| Total | 1,470 | 81 | 73 | 2 | 77 | 4 | 74 | 5 | 14 | 0 | 985 | 115 | 2,693 | 207 |

App.: Applicants
Rec.: Recipients

* Funding to provide new fellowships was not provided in 2002.

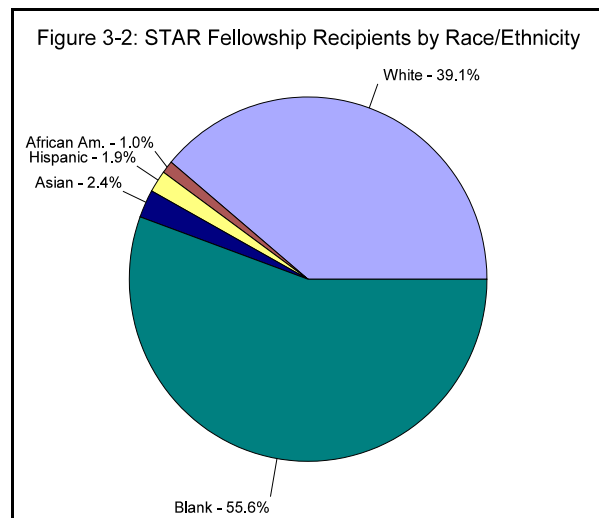
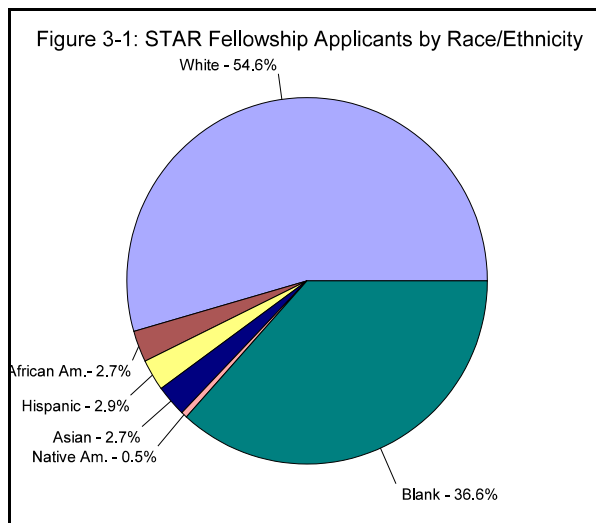


Table 3-2: Profile of STAR Fellowship Program Applicants/Recipients by Gender

| GENDER | Male | | Female | | Blank | | Total | |
|--------|-------|------|--------|------|-------|---------|-------|------|
| | App. | Rec. | App. | Rec. | App. | Rec. ** | App. | Rec. |
| 2000 | 583 | 11 | 698 | 17 | 15 | 79 | 1,296 | 107 |
| 2001 | 550 | 33 | 746 | 41 | 101 | 26 | 1,397 | 100 |
| Total | 1,133 | 44 | 1,444 | 58 | 116 | 105 | 2,693 | 207 |

App.: Applicants
 Rec.: Recipients

* Funding to provide new fellowships was not provided in 2002.

** The numbers were provided by NCER. The greater number of blanks for recipients compared to applicants shows the database was not updated for recipient information.

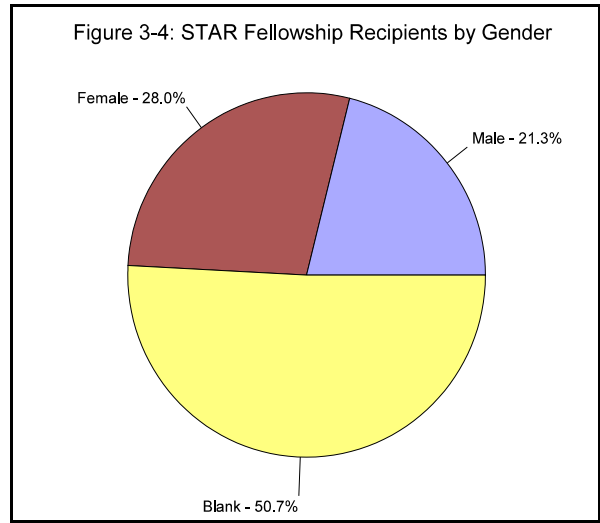
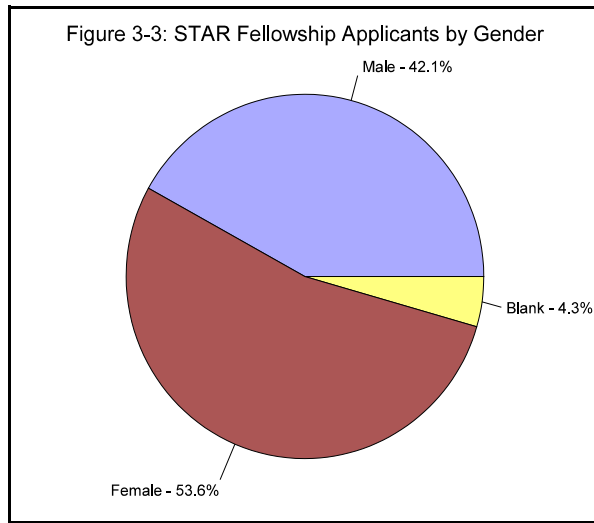
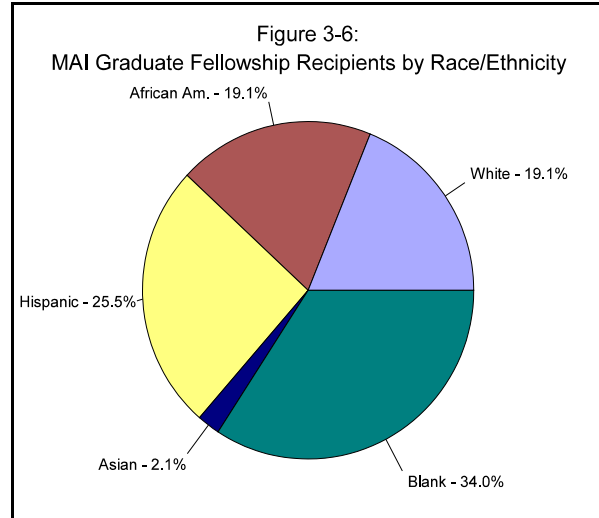
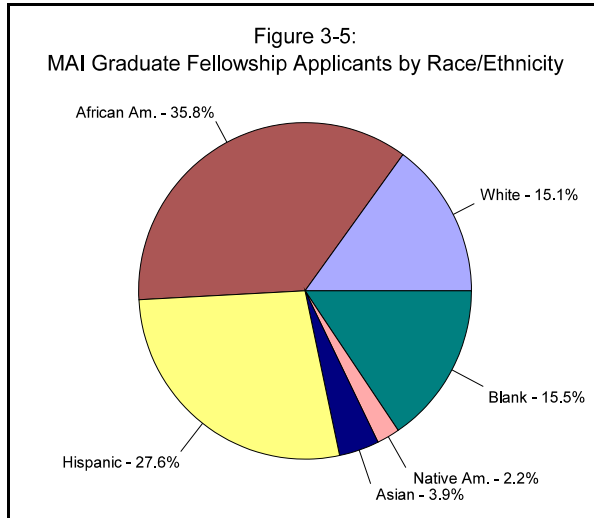


Table 3-3 provides demographics for the MAI graduate fellowship program applicants and recipients, and Figures 3-5 and 3-6 provide illustrations. It should be noted that an applicant's eligibility for an MAI fellowship is based on an applicant's attending a minority academic institution rather than the applicant's race or ethnicity.

Table 3-3: Profile of MAI Graduate Fellowship Applicants/Recipients by Race/Ethnicity

| RACE | White | | African Am. | | Hispanic | | Asian | | Native Am. | | Blank | | Total | |
|-------|-------|------|-------------|------|----------|------|-------|------|------------|------|-------|------|-------|------|
| | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. | App. | Rec. |
| 2000 | 3 | 0 | 28 | 2 | 15 | 1 | 1 | 0 | 5 | 0 | 11 | 5 | 63 | 8 |
| 2001 | 8 | 0 | 27 | 5 | 26 | 9 | 2 | 0 | 0 | 0 | 11 | 5 | 74 | 19 |
| 2002 | 24 | 9 | 28 | 2 | 23 | 2 | 6 | 1 | 0 | 0 | 14 | 6 | 95 | 20 |
| Total | 35 | 9 | 83 | 9 | 64 | 12 | 9 | 1 | 5 | 0 | 36 | 16 | 232 | 47 |

App.: Applicants
Rec.: Recipients



Recommendation

We recommend that the Assistant Administrator of ORD direct NCER to take the following action regarding diversity:

- 3-1. **Collect and Analyze Demographic Data.** NCER needs to systematically collect and analyze data on relevant demographic information (race, gender, persons with disabilities) of applicants and incoming fellows, and adjust outreach efforts as needed to increase the pool of applicants of certain demographic subsets that may be under-represented in the fellowship program.

Agency Comments and OIG Response

ORD did not agree with our comments on diversity and the need for additional outreach to minorities outside of those attending MAIs, and suggested we remove the chapter from the report and include our recommendation on collecting demographic data in Chapter 2. We have not removed the chapter, but have made some modifications to make it clearer that our main concern was that ORD did not have sufficient demographic data regarding diversity. ORD's comments are in Appendix D, and our evaluation of those comments are in Appendix E.

Chapter 4

How Similar Federal Agency Fellowship Programs Evaluate Effectiveness and Monitor Diversity

We compared EPA's STAR Fellowship Program with similar fellowship programs at other Federal agencies, and noted some procedures at those other agencies on how to meet and evaluate goals that EPA might be able to apply. While the STAR Fellowship Program has been in existence since 1995, other fellowship programs have existed for much longer. To compare the design, execution, and assessment of comparable programs, we met and consulted with program coordinators of fellowship programs at three other agencies to discuss their programs and gathered information on procedures that could be applied to EPA. Those three other agencies, as well as the particular program we reviewed for each, were:

- **Department of Defense (DOD):**
National Defense and Science Engineering Graduate Fellowship
- **National Science Foundation (NSF):**
Graduate Research Fellowship
- **National Institutes of Environmental Health Science (NIEHS),
part of the National Institutes of Health:**
National Research Service Awards Institutional Training Grants

To present a comprehensive picture of the other fellowship programs, we are presenting information on the organization/management of fellowship programs, diversity, and evaluation/tracking. We collected, but did not independently verify, the information provided by program representatives. Information on the selection process and project officers can be found in Appendix C.

Organization/Management of Fellowship Programs

Goals

In line with the goal established for EPA's STAR Fellowship Program to "encourage promising students to obtain advanced degrees and pursue careers in environmentally related fields", all three fellowship programs have broadly stated goals for their programs that aim to help increase and/or produce the next generation of scientists and engineers by providing selected fellows with funding for graduate-level studies at academic institutions across America. The goals for the three other programs are in Table 4-1.

Table 4-1: Goals for Other Agency Programs

| DOD | NSF | NIEHS |
|---|---|--|
| "Increasing the number and quality of our Nation's scientists and engineers." | "Aims to ensure the vitality of the human resource base of science, mathematics and engineering in the United States and to reinforce its diversity." | "To support research training opportunities for individuals . . . who are training for careers in specified areas . . . pertinent to the environmental health sciences." |

Evaluation and Tracking

All the fellowship programs have tracking systems that depend heavily on the voluntary participation of fellows and academic institutions. They have developed procedures to collect and analyze information to evaluate the performance of their program. They make adjustments and improvements to their objectives, outreach, data collection, and resource allocation based on the results of their analyses.

DOD tracks data on diversity of applicants and fellows selected annually. NSF has maintained a detailed database with demographic data of all applicants and fellows from the beginning of its Graduate Research Program, established in 1952.⁶ Further, NSF participates in an annual Survey of Earned Doctorates, which can be used to track completion rates and time to degree of fellows by gender, ethnicity, and discipline. NSF sponsors a large-scale evaluation of its fellowship program by an external entity once every 10 years to objectively evaluate how effectively the program is achieving its goals. NSF redefines its objectives according to the outcome of the study. As part of evaluating the institutions for continued funding, NIEHS requires the academic institutions to track the students for 10 years after completion of fellowship, and if this requirement is violated the institution is denied continued funding. Details are in Table 4-2.

⁶ National Science Foundation Graduate Research Fellowship Program Final Evaluation Report, WestEd, September 2002.

Table 4-2: Evaluation/Tracking by Other Agency Programs

| DOD | NSF | NIEHS |
|---|---|--|
| <ul style="list-style-type: none"> • The closeout package contains a survey that asks for contact information, date of completion, dissertations / publication title(s), name of academic advisor, name of doctoral institution, current employer, current position, information on other Federal research money received, and feedback on the program • 75 percent response rate to the survey • Survey compiled into a report every year | <ul style="list-style-type: none"> • Has maintained a database of fellows since the beginning of the program in 1952 • Tracks completion rates at the doctorate level annually • Sponsors an extensive evaluation of the fellowship program once every 10 years to objectively evaluate how effectively the program is achieving its goals | <ul style="list-style-type: none"> • To receive continued funding, academic institutions are required to track students for 10 years after completion • Tracks students that later become National Institutes of Health grantees • Piloted a web-based system for tracking as a response to Office of Management and Budget's paperwork reduction requirement |

Diversity

The fellowship programs reviewed in this section all use different approaches in their efforts to increase diversity in their respective programs. DOD does not incorporate diversity into the selection process, basing selection solely on academic merit. Nonetheless, they collect the data and report on the demographics of the applicants and fellows to headquarters. NSF makes efforts to increase the presence of under-represented minority groups in the applicant pool by focusing outreach and recruiting toward professional minority organizations and attracting best quality minority students from academic institutions. As part of the National Institutes of Health, NIEHS requires academic institutions to have a plan and a report on recruitment and retainment of minorities in place at the time of application. NIEHS also has a separate minority fellowship program. EPA's STAR Fellowship Program does not incorporate diversity in the selection process, but has the MAI Programs. Details are in Table 4-3.

Table 4-3: Diversity Efforts for Other Agency Programs

| DOD | NSF | NIEHS |
|---|---|--|
| <ul style="list-style-type: none"> • Diversity is not considered in selection process, selection is strictly based on merit • Drafts a report documenting the number of minorities who applied and are selected; also documents information on gender figures | <ul style="list-style-type: none"> • Has been more active in focusing outreach efforts toward professional groups that cater to under-represented minorities and minority academic institutions to increase presence of minorities in applicant pool • Looking at encouraging minorities attending top research schools to apply to program | <ul style="list-style-type: none"> • There is a requirement in the grant application that stipulates all institutions need to have a written plan for recruitment and retention of minorities (statistics demonstrating implementation of the plan are evaluated by peer reviewers) • Also has a separate program of individual fellowships for under-represented minority doctoral candidates |

Recommendations

Based on our review of other fellowship programs and a comparison against the STAR Fellowship Program, we recommend that the Assistant Administrator of ORD direct NCER to take the following actions to improve the STAR Fellowship Program in relation to evaluation and tracking:

- 4-1. **Include a Post-Fellowship Survey:** In line with the practice utilized by DOD, NCER could include a survey-type form to the termination package. A survey that asks the fellows to provide important post-fellowship information could increase the response rate of fellows considerably, as opposed to allowing fellows to voluntarily submit information. The termination notice currently used by NCER asks only for termination date, expected date of degree completion, and “additional comments.” The survey, in addition to asking for the information already on the termination notice, would ask for post-fellowship contact information, information on thesis and published papers, and post-fellowship employment plans and information.
- 4-2. **Conduct Comprehensive External Studies:** In addition to conducting regular internal reviews of the program, as recommended in Chapter 2, NCER could incorporate extensive external reviews of the program, performed periodically. NSF subjects its fellowship program to a comprehensive study by an external contractor every 10 years. Such reviews expose the program to “outside” perspectives and recommendations that may not be manifested through in-house studies. In this manner, the

program can avoid being stove-piped into a certain mode of practice and will be made more dynamic, as it incorporates up-to-date fellowship practices.

- 4-3. **Track Research Grant Recipients:** NCER could track the number of fellows who go on to apply for and receive research grants from EPA in a manner similar to that done by NIEHS. The process would be an in-house tracking mechanism that could be easy to implement.

In relation to increasing diversity, we recommend that the Assistant Administrator of ORD direct NCER to:

- 4-4. **Increase Outreach Outside MAI.** NCER could be more active in outreach efforts to under-represented minorities (outside of its current MAI efforts) to increase diversity in the applicant pool. There are several strategies used by NSF to increase diversity that NCER can use, including focusing outreach efforts toward minority-based professional organizations and toward under-represented minority groups at top research schools across the country.

Agency Comments and OIG Response

ORD agreed to recommendations related to establishing performance measures and the need for data collection and analyses, tracking the fellows after completion of the program, and considering some of the procedures used by other agencies. ORD prepared an action plan, with action officials and due dates for each recommendation. However, ORD did not agree with our comments on diversity and need for outreach to minorities outside of MAIs, as discussed in Chapter 3. We have made some modifications to the report in response to ORD's comments. ORD's comments are in Appendix D, and our evaluation of those comments are in Appendix E.

Input for Logic Model Depicting STAR Fellowship Program

The logic model presented in Chapter 1 places the STAR Fellowship Program in the larger context of ORD and EPA goals. It shows what the program does and the resources used, and illustrates the links between design, implementation, and outcomes. It also contrasts design outcomes and program manager priorities. Logic models for the STAR and MAI fellowship program are similar, which is why the logic model in Chapter 1 is only for the STAR Fellowship Program. When there are differences between the two programs, they are both addressed in this appendix.

Resources

Resources include the human and financial resources, and other inputs, needed to support the program.

STAR Fellowships. EPA has funded approximately 100 STAR fellows a year, at approximately \$10 million per year, since 1995. The staff involved with the fellowship program varies from year to year, with approximately seven project officers and two managers. Also, support is provided by the EPA Grants Administration Division, which administers the awards based on NCER's recommendations. Other resources include contractors; universities (facilities and faculty); panels of scientists for evaluating the applicants; and other Federal agencies that collaborate with NCER, such as NSF.

MAI Fellowships. The MAI Program provides up to \$34,000 per year for a maximum of 2 years for Master's level fellows and 3 years for Ph.D. candidates. Since 1998, the program has accepted 58 graduate fellows – 28 for Masters and 30 for Ph.D. programs. The students attended 24 MAIs, which were historically Black, Native American, Hispanic, and Alaskan Indian. The MAI Undergraduate Fellowship Program provides funds up to \$17,000 per year for fellows' junior and senior years; since 1995, the program has accepted 90 fellows.

Activities

Activities indicate the specific actions and tasks needed to produce the program's outputs. The main activities of the fellowship program deal with outreach, selection, fellowship conferences, close-out, and tracking.

Outreach. NCER announces the STAR Fellowship Program request for applications on its web site and through posters and letters to universities, and at conferences.

Selection Process. NCER has established a two-step selection process consisting of an external peer review and a relevance review. Once the applications are received there is a process of peer review of applications by external experts. The reviewers consider academic records, recommendations, and career goals of applicants. More applications are marked "excellent" than EPA can fund. The final decision is made by NCER staff according to such criteria as achieving a balance of fellowship among universities, disciplines, and emphasizing applications in disciplines that EPA considers particularly important to its science mission.

Funding and Renewal Process. NCER project officers prepare a funding package for each candidate, and send it to the Grants Administration Division, with recommendations to make appropriate fellowship awards. The duration of the STAR fellowship is not to exceed 2 and 3 years for Master's degree and Ph.D. programs, respectively. According to the terms of the agreement, students must furnish progress reports from their academic advisors at the end of each year for renewal of the fellowship the following year. Project officers collect annual progress reports from fellows' institutions and recommend renewals to the Grants Administration Division.

Close-out and Tracking. The fellowship program was designed to track the fellows for 3 years after completing the fellowship. NCER is to track the fellows at the termination of the fellowship by collecting completed Termination Forms from fellows. According to the terms of the agreement, upon completion of the fellowship, the fellows must complete and send to the Financial Management Center the Fellowship Termination Notice (EPA Form 5770-9). A copy of that notice is to also be sent to NCER, along with any thesis, dissertations, and published works that result from the fellowship program. The form requires information on the type of fellowship, degree sought, date degree received or expected, and mailing address after termination of fellowship. In addition, the form also provides space for additional remarks, in which fellows or their sponsors can provide feedback on how NCER can improve the operation of the EPA Fellowship Program.

Fellowship Conferences. Planning and arranging for annual conferences for the fellows with guest speakers, and providing opportunities for fellows to share their research.

Outputs

Outputs are the products, including goods and services, provided to the program's customers. The outputs of NCER's activities are:

Awards For Environmental Studies and Research. NCER provides fellowship awards for approximately 10 percent of all applicants through its highly competitive selection process. NCER announces the request for application, and opportunities for fellowships to the students, universities, and research institutions, which results in a large number of applications from high quality students. Through MAI fellowships, NCER provides funds to strengthen the capacity of minority institutions to participate in environmental studies and research.

Annual Conferences for Fellows. NCER has held six annual conferences for fellows since 1996. The proceedings of the annual meetings are published as a detailed report. The conference provides opportunities for fellows to meet with other fellows, share their project information through posters, and meet with representatives from EPA program offices. Program office representatives can look for fellows suitable for recruitment into EPA upon completion of the fellowship.

Progress Data on Fellows. NCER collects progress reports to gather information on fellows meeting academic requirements, before continuing next year's funding. They track the fellows through completion of the program, by collecting the termination forms and papers and thesis completed.

Post-Completion Data. The fellowship program is designed to track the fellows after completion, in order to ascertain whether they entered an environmental career after fellowship. The fellowship terms and conditions require the fellows to agree to notify the EPA project officer of all employment for at least 3 years after graduation. The program can consolidate the information on the termination forms into a database of degree completion, thesis completed, jobs, careers chosen, and post-fellowship contact information. Such a database can be of great value to EPA program offices, researchers, and industry, as potential researchers and employers.

Customers

Customers are the users of the program's outputs. The customers of the STAR Fellowship Program include students and universities, to further education opportunities; and EPA program offices, other Federal offices, State and local governments, industry, and non-governmental organizations, which are potential employers of the future environmental specialists coming out of the fellowship program.

Outcomes

Short-term Outcomes. These outcomes indicate changes in customers knowledge, skills, and aspirations, followed by changes in customer actions or behavior. The short-term outcome of the fellowship program is an increased number of people with graduate-level degrees in environmental fields, who continue in higher studies or research, or work in government, industry or academia.

Intermediate Outcomes. These outcomes can be defined as environmental changes resulting from customer actions. Intermediate outcomes of the fellowship program would result from more informed policy decisions and solutions to current and future environmental issues, provided by a steady stream of well-trained environmental specialists nationwide. As part of being a national leader in environmental research, ORD has a role in developing the next generation of environmental specialists.

Long-Term Outcomes. Such an outcome is to support the overall EPA mission of providing better human health and a healthier ecosystem. Continued use of sound science, better policy in government and the private sector, over a long period of time, will result in a cleaner environment and improved human and ecosystem health.

Externalities

Externalities are factors that impact the program but are outside its control. The program needs to be aware of them. Although the program cannot control these factors, they can influence some of them. Some of the externalities for the fellowship program are Congress; Office of Management and Budget (OMB); other Federal agencies' programs; universities and other academic institutions; and other factors, including the national economy.

Performance Measures

A program design must include certain meaningful measures that can show the progress toward or attainment of results. Need for performance measures has been emphasized by the Government Performance and Results Act and OMB, to ensure accountability of Federal programs. As noted in Chapter 2, NCER has not established clearly defined performance measures for the fellowship program, which is why no entries for performance measures are included in the logic model provided. NCER is in the process of developing performance measures.

Details on Scope and Methodology

To determine the degree to which the objectives of the STAR and MAI Fellowship Programs were met, and how they contributed toward ORD's and EPA's goals, we did the following in three areas.

- (1) To identify the specific performance measures used by EPA/ORD/NCER to evaluate the STAR Fellowship Program, we:
 - Reviewed the design of the fellowship program for its logic and completeness. We used the logic model as a tool to document the full spectrum of the fellowship program, documenting the resources; program activities and processes; outputs; customers using those outputs; and short-term, intermediate, and long-term outcomes. We obtained information from the web site, through interviews with NCER staff and managers, and by reviewing program files. We shared the logic model (Figure 1-1, Chapter 1) and explanatory notes (Appendix A) with the NCER managers, and have incorporated their comments as appropriate.
 - To understand the processes used by NCER to implement the program, obtained information from discussions with NCER managers and staff, who also provided us with data and files on fellows. We met with four NCER project officers, the Director of the STAR Fellowship Program, and the Director of NCER.
 - Reviewed a randomly selected representative sample of 50 fellowship files – 10 files for each year – out of a total of 587 files from 1995 through 1999. We selected seven markers of progress and indicators of success that cover the total program from beginning (Resources and Activities) to the end (Results/Outcomes) and used these markers for evaluation. These markers were: Progress Report #1 at the end of year one, Progress Report #2 at the end of year two in a 3-year fellowship, completed Termination Notice (EPA Form 5770-9), Degree Completed, Thesis/Papers Published, Post-Fellowship Information, and Career Information (after 3 years).
 - Coordinated with the NRC staff conducting the review of STAR Research Grants, and attended the public sessions at the NRC, to share the information and discussions about the STAR Program. The discussions included presentations made by EPA managers, as well as presentations made by representatives from NSF, NIEHS, Department of Energy, and Department of Agriculture, who have environmental and other research grants and fellowship programs similar to EPA's STAR Research Grants Program
 - Reviewed the NRC report issued at the completion of the review of EPA's STAR Grants Program and noted the main approach and recommendations provided.

- (2) To identify the diversity of the applicant pool, and compare it with the demographics of the fellowship recipients, we:
- Requested demographic data from the NCER staff responsible for maintaining the demographic profile of the STAR Fellowship Program applicant pool and those who received a fellowship award. The information is provided by applicants voluntarily, resulting in many gaps in the data. We analyzed the data received. We were not able to perform trend analyses on participation of under-represented minority groups because NCER did not have data for years prior to 1998, and there were many gaps in the data since 1999 (Chapter 3). We note a scope limitation due to lack of data availability.
 - Requested similar demographic information regarding the MAI fellowship, regarding race and gender, because NCER uses the MAI fellowship to address diversity. We reported the data received.
 - Have presented the demographic data for both the STAR and MAI programs (Chapter 3), as provided by NCER. We did not independently test or verify the data provided by NCER.
 - Reviewed literature on workforce analyses and on under-representation of women and minorities in S&E labor force, and on the business need for increasing diversity in the S&E labor force.
- (3) To identify and compare the STAR Fellowship Program with similar fellowship programs at other Federal agencies, we:
- Reviewed fellowship programs of agencies with established fellowship programs, and followed up with the project officers from DOD, NSF, and NIEHS, to obtain and document the procedures developed and used by these agencies and provide recommendations to EPA as appropriate. The DOD program reviewed is managed by the American Society for Engineering Education, a non-profit organization. NIEHS is an institute within the National Institutes of Health.
 - Researched the literature of available evaluations of fellowship programs – some public and some private – and literature on the feasibility of evaluating research programs, as well as the appropriate criteria for such programs, as recommended by OMB, National Academies, and academic evaluators.

Additional Information on Other Fellowship Programs

Selection Process

All of the fellowship programs reviewed have incorporated peer review panel systems for their selection processes, and each has unique criteria in place to select only the top candidates (DOD: academic scores; NSF: two-merit criteria). EPA's STAR Fellowship Program uses peer reviewers in the selection process. EPA also uses many criteria in selecting awardees, including: geographic distribution across States, distribution among universities, projected environmental workforce needs, relevance of research proposal to EPA's mission, and availability of funds. A summary of the selection process for the three other programs is in Table C-1.

Table C-1: Selection Processes for Other Agency Programs

| DOD | NSF | NIEHS |
|--|--|--|
| <ul style="list-style-type: none"> • 120 professionals review and rank applications • Highly-ranked list sent to DOD for selection • Selection based on academic scores | <ul style="list-style-type: none"> • Utilizes two merit criteria ("intellectual" and "broader impacts" criteria) • Contractors conduct initial screening to check for completeness and eligibility • Each application is read and graded by two independent experts from a panel and the top 40 percent are read over by a third expert | <p>Selects academic institutions/ programs to dispense grants to individual students (selection based on peer reviews, priority scores, institution's plans for recruitment and retention of minorities, and the quality of the institution)</p> |

Project Officer Duties

All the programs have project officers working directly with the fellowship programs to track progress of fellows and administer funding during the duration of the individual fellowships. Compared to the fellowships reviewed, EPA's STAR Fellowship Program has the most project officers involved in the fellowship program (six to eight). The STAR Fellowship Program pairs fellows

to appropriate project officers in accordance with the officers' background and expertise and the topic area of fellows' research. Details are in Table C-2.

Table C-2: Project Officer Duties for Other Agency Programs

| DOD | NSF | NIEHS |
|---|---|---|
| <ul style="list-style-type: none"> • One project manager works with two to three assistants • Tracks fellows' academic progress during the fellowship by receiving transcripts from schools and progress reports from academic advisors | <ul style="list-style-type: none"> • Two project officers, one deals with application review process and the other with post-award administration • Heavily involved with administering funds with institutions and fellows and collecting Activities Reports | <ul style="list-style-type: none"> • Number of project officers not available • Select academic institutions and research programs based on peer reviews, priority scores, etc., and provide for extensions when needed |



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
RESEARCH AND DEVELOPMENT

September 15, 2003

MEMORANDUM

SUBJECT: Response to the Office of Inspector General's Draft Audit Report #2001.001545

FROM: Paul Gilman /s/ *Paul Gilman*
Assistant Administrator (8101R)

TO: Jeffrey K. Harris
Director for Program Evaluation
Cross-Media Issues
Office of Inspector General (2460T)

Thank you for the opportunity to review the draft evaluation report #2001.001545. I do not concur with the analysis or conclusions on diversity in the report. The report should be substantially rewritten to remove any discussion on diversity and Chapter Three should be withdrawn. (See **OIG Response 1, Appendix E**) I concur with the findings and recommendations that pertain to performance measures in your assessment of the Science to Achieve Results (STAR) Fellowship Programs that are managed by the National Center for Environmental Research (NCER.) These are improvements we began implementing before the program was eliminated from the agency's budget for 2002.

Diversity

We do not concur with the findings, recommendations, or results-in-brief in the report related to diversity. A primary basis for our nonconurrence is the incorrect assertion in the report that one measure of effectiveness of the STAR Fellowship Program should be "increasing the diversity in the next generation of the environmental work force" (see the *Purpose* section at page 1, lines 5-6.) The report correctly acknowledges that increasing diversity in the applicant pool is not a specific goal of the STAR Fellowship Program, but then illogically concludes that the program has not achieved this outcome. Measuring the performance of the fellowship

program in an area that it does not have as a goal is analogous to failing a student for a course he never took. (See **OIG Response 2, Appendix E**)

The obstacles to increased diversity at the graduate level begin very early in the education process. Solving these problems will require efforts at all educational levels in this country and cannot be solely remedied by programs which deal with the end of the educational pipeline. The applications to the STAR program must come from the existing population of science and engineering graduate students. Though we are limited by the current ethnic/racial distribution of students in science and engineering programs (S&E), we actually attract a more diverse group of fellows than the population in the S&E labor force. Data cited in the draft report illustrate this point: “Women comprise 46 percent of the workforce but only 23 percent of the S&E labor force. African Americans and other ethnic minorities constitute 24 percent of the total population but only 7 percent of the S&E labor force.” The population of our fellows is **more** diverse, with an average of approximately 60% women and 12% minority students in the STAR program in the most recent year, and about 70% women and 58% minority students in the combined Minority Academic Institutions (MAI) programs. (See **OIG Response 3, Appendix E**)

We have always been committed to making this program available and accessible to minority students. (See **OIG Response 4, Appendix E**) For example, we currently conduct considerable outreach to ensure that under-represented groups are aware of all of our programs, including the STAR and MAI fellowships. We have recruited additional minority reviewers as part of our peer review process. We have targeted outreach efforts for both programs to the institutions and professional organizations that serve minorities because the percentage of under-represented groups at these organizations is much higher than in the total pool of science graduate students.

In 1999, we revised the MAI graduate fellowship program to mirror the process and provisions of the STAR program. We also increased the number of fellowships awarded. These changes were intended to increase capacity at MAIs as well as awareness of under-represented groups. The chapter as written does not recognize the MAI programs as valid outreach efforts to under-represented groups. We believe that the MAI programs are valid and effective outreach programs, and they represent the most efficient use of staff time for outreach to minority groups. (See **OIG Response 5, Appendix E**)

We agree with the recommendation to collect and analyze demographic data on our applicants and fellows and we will evaluate other federal efforts in this regard. (See **OIG Response 6, Appendix E**) We recommend eliminating the diversity chapter of the report and including the collection and analysis of demographic information among the activities you recommend in Chapter Two under Performance Measures. (See **OIG Response 7, Appendix E**)

Performance Measures

OIG found that NCER has focused its efforts on developing excellent solicitations and selecting the best candidates to receive fellowships. The report recommends that NCER should place additional emphasis on reporting outcomes of the program. Now that the program is

established and running smoothly, we agree that we should tie our performance measures more to outcomes. We began such efforts in 2001, but halted them when the program was eliminated from the Agency's 2002 budget. With the program operational once more, we are again focused on this task.

Chapter Two makes three recommendations pertaining to performance measures:

1. **Conduct Internal Evaluations:** ORD completed the first such evaluation in May 2003. (See **OIG Response 8-A, Appendix E**) One of the first outcomes of that internal evaluation was a series of contacts with program offices and regions, to gain their perspective on the disciplines that will be needed to address emerging science questions in the future. We have also redoubled our efforts to develop an effective post-fellowship tracking system that can be managed with the resources currently available. Another result of the internal evaluation was an analysis of the fellowship provisions and recommendations for changes that make the program more competitive with other federal programs.

2. **Establish Performance Measures:** ORD agrees with the recommendation to establish performance measures and to ensure that we track them. We also agree with the measures that you suggest we track, including successful completion of the degree program, relevant papers published, and postgraduate pursuit of an environmentally related career. We had included these measures in our previous tracking plans. (See **OIG Response 8-B, Appendix E**)

3. **Collect Data:** The report discusses data collection at two points in the program: (1) during the fellowship, including termination, and (2) after the fellowship, including three years of follow-up on graduation and career progress.

A. Data Collection During the Fellowship: OIG staff studied 50 files for STAR recipients during the years 1995 - 1999, the first four years of the program, and reported that the files usually contained annual reports, but often lacked information regarding graduation dates, publications, and post-fellowship activities. The following information is currently collected from all students who are concluding their fellowships:

- a. Name of degree and date expected or conferred.
- b. Name and address of post-fellowship employer or postdoctoral advisor.
- c. Post-fellowship contact information, including address, telephone, e-mail, and alternate contact person.
- d. Electronic copies of all publications, including dissertations, published, submitted, or in press.
- e. A full bibliography of publications over the life of the fellowship.

This information is compiled into a master spreadsheet. At present, fellows are followed for at least one year after they leave the program and NCER is investigating ways to follow them over the long term. (See **OIG Response 8-C, Appendix E**)

B. Data Collection After the Fellowship: We agree that fellows should be followed closely after they complete the fellowship, to determine whether they continue in

environmental careers after graduation. We are investigating procedures used by other federal agencies in order to collect this information for the STAR fellowship recipients and comply with existing regulations, such as the Paperwork Reduction Act. (See **OIG Response 8-D, Appendix E**)

How Other Agencies Evaluate Effectiveness:

We appreciate the work of your staff to locate similar fellowship funding organizations and compare approaches. Several of the suggestions made in the draft report appear workable for the STAR Fellowship Program. In particular, we like the idea of tracking fellows who go on to obtain STAR grant awards. We also like NSF's approach of conducting an extensive evaluation of the fellowship program every ten years. Since the STAR program will reach the ten-year mark in 2005, we have begun planning for the first such review of our program. As part of that process, we will work with representatives from the other agencies to develop and implement procedures that would enhance the operation of the STAR program. (See **OIG Response 9, Appendix E**)

Attachment 1 contains our consolidated, page-specific comments, which we offer for incorporation in the final report. We have included our corrective action plan as Attachment 2 to the draft's recommendations. The final report should reflect those recommended actions that ORD has already completed. If the final report removes all discussion on diversity and the corresponding recommendation as we have requested, we believe the report can be closed out upon issuance.

Thank you for the opportunity to review and respond to this draft report. Should your staff have questions or require further information, please have them contact Arnold Bloom at 202-564-6687.

Attachments (2)

OIG Response to Agency Comments on Draft Report

We have provided responses to the main comments provided by the Agency. The text of Agency response is provided as Appendix D. The Agency comments are numbered and in bold italics, followed by the OIG responses.

1. The report should be substantially rewritten to remove any discussion on diversity and Chapter Three should be withdrawn.

We have revised the draft report to incorporate some of the Agency's suggestions. We consider the discussion of the demographic composition of the applicants and fellows a relevant consideration within EPA's commitment to having a diverse workforce. The issues related to demographics and diversity are discussed in more detail below in Nos. 2 through 7.

Diversity (Chapter 3)

2. A primary basis for our nonconcurrence is the incorrect assertion in the report that one measure of effectiveness of the STAR Fellowship Program should be "increasing the diversity in the next generation of the environmental work force" (see the Purpose section at page 1, lines 5-6.) The report correctly acknowledges that increasing diversity in the applicant pool is not a specific goal of the STAR Fellowship Program, but then illogically concludes that the program has not achieved this outcome. Measuring the performance of the fellowship program in an area that it does not have as a goal is analogous to failing a student for a course he never took.

We modified the language of the report to clarify our objectives for looking for demographic information on the STAR applicants and fellows. Our objective was to provide a demographic profile of the applicants and fellows, since EPA has a commitment to have a diverse workforce, and the goal of the STAR Fellowship Program is to develop the environmental work force of the future. However, despite repeated efforts, we were not able to obtain sufficient demographic information from program managers. No data were collected prior to 1999, and since 1999 data have not been collected consistently. The lack of data from 1995-1998 and gaps in the data even in recent years indicates that NCER did not place an emphasis on the collection and documentation of participant demographic characteristics.

Increasing diversity in fellowship programs is considered important by all three of the other fellowship programs we reviewed (Chapter 4). Two of the three programs make increasing diversity a stated objective or criteria. All three of them collect and analyze the data, and adjust outreach efforts based on the results of analyses. None of them limit outreach to MAI; each seeks minority applicants from top-ranking universities.

The draft report acknowledged that increasing diversity was not a stated objective of the STAR Fellowship Program, and recommended collecting demographic data so that NCER can evaluate the demographic composition of the applicants and fellows. The conclusion was not that NCER failed in increasing diversity, but rather that the lack of adequate demographic data inhibits the program from determining whether it has been successful in attracting and selecting a diverse pool of applicants and making the program accessible and available to minority students.

3. The population of our fellows is more diverse, with an average of approximately 60% women and 12% minority students in the STAR program in the most recent year, and about 70% women and 58% minority students in the combined Minority Academic Institutions (MAI) programs.

The data on which these statements are based was never shared with the OIG. In order to complete our analyses, we requested demographic data on applicants and recipients on several occasions from NCER Managers. We have presented the data we received in tables and figures in Chapter 3. Figure 3-3 shows combined numbers of applicants as about 54 percent female, 42 percent male, and 4 percent unknown. Figure 3-4 shows the data on recipients as about 28 percent female, 21 percent male, and 51 percent unknown.

4. We have always been committed to making this program available and accessible to minority students.

NCER can demonstrate this commitment clearly if it collects data and maintains a database on applicants and fellows. The issue we highlight in the report is the need for collecting, maintaining, and analyzing demographic data.

5. The chapter as written does not recognize the MAI programs as valid outreach efforts to under-represented groups. We believe that the MAI programs are valid and effective outreach programs, and they represent the most efficient use of staff time for outreach to minority groups.

The fellowships awarded to MAI in response to the White House Initiative serve a useful purpose of improving the quality of education at institutions that have historically provided education to minority groups. There is a higher number of minorities in schools recognized as MAI. This program has been in existence since 1981, before the STAR program was established. In addition to the contribution of the MAI, NCER might be able to attract additional high caliber minority applicants from top ranking institutions. The brightest minority candidates, who may not be enrolled in an MAI, are ineligible for the MAI Fellowships. Eligibility for a MAI Fellowship depends on the institution being recognized as MAI, rather than the student being from a minority background. As illustrated in Table 3-3, in 2002, only 5 of the 14 MAI fellows (where race/ethnicity data was recorded) were non-white.

6. We agree with the recommendation to collect and analyze demographic data on our applicants and fellows and we will evaluate other federal efforts in this regard.

We note that ORD agreed with our main point – that it needs better demographic data.

7. We recommend eliminating the diversity chapter of the report and including the collection and analysis of demographic information among the activities you recommend in Chapter Two under Performance Measures.

We concluded that a discussion of the need to collect and analyze participant demographic data in Chapter 2 under Performance Measures could lead to the perception that increasing diversity was an explicit performance goal on the STAR Fellowship Program. We chose not to alter the draft report format but to modify the text in Chapter 3 to address concerns.

Performance Measures (Chapter 2)

8-A. Chapter Two makes three recommendations pertaining to performance measures:

1. Conduct Internal Evaluations: ORD completed the first such evaluation in May 2003.

This information was not shared with us prior to the response to draft report, even at our June 2003 exit meeting with NCER managers.

8-B. 2. Establish Performance Measures: ORD agrees with the recommendation to establish performance measures and to ensure that we track them. We also agree with the measures that you suggest we track, including successful completion of the degree program, relevant papers published, and postgraduate pursuit of an environmentally related career. We had included these measures in our previous tracking plans.

The Agency agrees with the recommendation. The Corrective Action plan has designated an Action Official and a due date of January 2004. The previous tracking plans were not discussed at any of the meetings during our field work.

8-C. Data Collection During the Fellowship.

... The following information is currently collected from all students who are concluding their fellowships:

- a. Name of degree and date expected or conferred.*
- b. Name and address of post-fellowship employer or postdoctoral advisor.*
- c. Post-fellowship contact information, including address, telephone, e-mail, and alternate contact person.*
- d. Electronic copies of all publications, including dissertations, published, submitted, or in press.*
- e. A full bibliography of publications over the life of the fellowship.*

This information is compiled into a master spreadsheet. At present, fellows are followed for at least one year after they leave the program and NCER is investigating ways to follow them over the long term.

During our field work, NCER provided five spreadsheets – one for 1995-1998 and one each for 1999, 2000, 2001, and 2002 (MAI only). The spreadsheet for 1995-1998 had very little useful information on items a, b, c, d, or e. The spreadsheets from 1999, 2000, 2001, and 2002 had information on item a. (name of degree and date expected or conferred), but there was no information on b, c, d, or e. NCER did not share with us any spreadsheets that collected name and address of post fellowship employers or post doctoral advisors. The Termination Letter also asks for some followup information, but we did not see any spreadsheet completed from the information based on that information.

8-D. Data Collection After the Fellowship: We agree that fellows should be followed closely after they complete the fellowship, to determine whether they continue in environmental careers after graduation. We are investigating procedures used by other federal agencies in order to collect this information for the STAR fellowship recipients and comply with existing regulations, such as the Paperwork Reduction Act.

The Agency agrees with the recommendation to collect data during, and track the careers of, the fellows after completion of fellowship. The goal of the program is to encourage students to obtain advanced degrees, and pursue careers in environmentally related fields. In order to measure the outcomes of the program, it is essential to track the fellows through degree completions, and track the careers followed upon completion.

How Other Agencies Evaluate Effectiveness (Chapter 4)

9. We appreciate the work of your staff to locate similar fellowship funding organizations and compare approaches. Several of the suggestions made in the draft report appear workable for the STAR Fellowship Program.

The Agency agrees with some of the approaches used by other agencies for tracking the fellows after completing the fellowship program. The information gathered by NCER at the time of completion in the tracking form should also be organized in a database that can be used for analyses and program evaluation. At the time of field work, the information was stored in individual folders of the fellows, but there was no database that could provide the information provided in the Termination Forms.

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