



U.S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF INSPECTOR GENERAL

Science and Research

EPA Offices Are Aware of the Agency's Science to Achieve Results Program, but Challenges Remain in Measuring and Internally Communicating Research Results That Advance the Agency's Mission

Report No. 16-P-0125

March 30, 2016



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Abbreviations

CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FGCAA	Federal Grant and Cooperative Agreement Act of 1977
GAO	Government Accountability Office
GPRA	Government Performance and Results Act
NAS	National Academy of Sciences
NCER	National Center for Environmental Research
NRP	National Research Program
OIG	Office of Inspector General
OMB	Office of Management and Budget
ORD	Office of Research and Development
RFA	Request for Application
STAR	Science to Achieve Results

Cover photo: Two researchers examine a clean-burning cook stove design in a lab. STAR research contributed to the international field testing and capacity-building efforts for a separate cook stoves project. (EPA photo)

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At a Glance

Why We Did This Review

We conducted this review to determine whether the National Center for Environmental Research, within the U.S. Environmental Protection Agency's (EPA's) Office of Research and Development (ORD), makes EPA program offices aware of Science to Achieve Results (STAR) grants. We also wanted to know whether STAR grant results advance the agency's mission to protect human health and the environment. To accomplish this, we sought information on ORD's STAR goals and objectives, communication mechanisms, and information on the grant review and award processes.

STAR has awarded over \$1 billion through grants and fellowships since 1995. While STAR grants cannot serve EPA program offices directly because they are not for the direct support or benefit of the agency, STAR grants can provide incidental benefits. This report focuses on incidental benefits.

This report addresses the following EPA goal or cross-agency strategy:

- *Embracing EPA as a high-performing organization.*

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EPA Offices Are Aware of the Agency's Science to Achieve Results Program, but Challenges Remain in Measuring and Internally Communicating Research Results That Advance the Agency's Mission

What We Found

Our survey of STAR grant users within the EPA found that over 75 percent of respondents were very familiar with the STAR program, and 74 percent reported having an awareness of the impacts of STAR research on mission-oriented work within the EPA's program offices.

Although the EPA awards an average of over \$46 million annually in STAR grants, challenges remain in measuring and communicating research results.

While survey respondents were aware of the STAR program and its impacts, they suggested that ORD needs to enhance the review and award process, as well as communication associated with STAR grant research results. Process enhancements in these areas should improve the likelihood that STAR research results incorporate program office input and advance the EPA's mission.

While federal and agency requirements exist for setting goals and objectives, program accountability and reporting, ORD has not officially established defined goals and objectives for the STAR program. ORD also has not developed mechanisms beyond its current process indicators (i.e., output measures) to capture, evaluate and report on incidental benefits to the EPA from STAR research. As a result, ORD cannot demonstrate how the STAR program advances the agency's mission.

This is the fourth report to the EPA since 2000 on the need to better measure and communicate research results.

Recommendations and Planned Agency Corrective Actions

We recommend that the Assistant Administrator for ORD create pre-award procedures that ensure consideration of program office input. We also recommended that the Assistant Administrator for ORD develop and implement communication procedures that ensure updated public reporting and clearly defined internal roles and responsibilities. Further, we recommended that the Assistant Administrator for ORD formally establish goals and objectives, and establish performance measures or a mechanism to capture how completed grants have met their performance goals and provide incidental research support to program offices. The Assistant Administrator for ORD agreed with all recommendations, which are resolved and open with corrective actions pending.



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

THE INSPECTOR GENERAL

March 30, 2016

MEMORANDUM

SUBJECT: EPA Offices Are Aware of the Agency's Science to Achieve Results Program, but Challenges Remain in Measuring and Internally Communicating Research Results That Advance the Agency's Mission
Report No. 16-P-0125

FROM: Arthur A. Elkins Jr.

A handwritten signature in black ink, appearing to read "Arthur A. Elkins Jr.", is written over the printed name.

TO: Lek Kadeli, Principal Deputy Assistant Administrator for Management
Office of Research and Development

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

Within the Office of Research and Development, the National Center for Environmental Research has primary responsibility for the issues discussed in this report.

Action Required

In accordance with EPA Manual 2750, your office provided acceptable corrective actions and milestone dates in response to OIG recommendations. All recommendations are resolved and no final response to this report is required.

We will post this report to our website at www.epa.gov/oig.

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Chapter 1

Introduction

Purpose

The U.S. Environmental Protection Agency (EPA), Office of Inspector General (OIG), conducted this review to determine whether the EPA's Office of Research and Development (ORD) makes agency program offices and regions aware of Science to Achieve Results (STAR) grant results. We also wanted to determine whether STAR grant results advance the agency's mission to protect human health and the environment.

Background

Office of Research and Development

Science at the EPA provides the foundation for credible decision-making to safeguard human health and ecosystems from environmental pollutants. ORD is the scientific research arm of the EPA, and its research provides the underpinning for science and technology at the agency. ORD's research focuses on six National Research Programs (NRPs), with each led by a program director.

ORD has research laboratories, offices and centers across the country, including the National Center for Environmental Research (NCER) that administers STAR grants. NCER's mission is to support high-quality research by the nation's leading scientists and engineers that will improve the EPA's scientific basis for decisions on national environmental issues. NCER supports extramural research in exposure, effects, risk assessment and risk management, which complements the EPA's intramural research by managing competitions for various funding mechanisms, including STAR grants.

List of ORD's six National Research Programs

1. Air, Climate and Energy 	2. Chemical Safety for Sustainability 
3. Human Health Risk Assessment 	4. Homeland Security 
5. Safe and Sustainable Water Resources 	6. Sustainable and Healthy Communities 

(EPA images)

STAR Program¹

Impetus and Grant Process

During the early 1990s, the EPA's independent Science Advisory Board, the National Academy of Sciences (NAS) and other groups reviewed the status of scientific research at the EPA. The groups recommended that the EPA strengthen the quality of its scientific research, such as better balancing short- and long-term research, and taking steps to train the next generation of scientists. In response, the EPA shifted much of its funding for external research away from noncompetitively awarded cooperative agreements administered by ORD's laboratories, and placed more emphasis on competitively awarded, peer-reviewed grants. Through the STAR program, the EPA awards grants under the agency's research, demonstration and training authorities.²

The STAR competitive grant program is the primary vehicle through which the EPA funds research at eligible institutions, organizations and governments (for-profit firms are not eligible). The STAR program is made up of two components: (1) research grants; and (2) graduate fellowships in numerous environmental science and engineering disciplines. This report focuses on research grants.

STAR grants are funded through a competitive process. Request for Applications (RFAs) are prepared in cooperation with the EPA's program and regional offices, and are derived from the Strategic Research Action Plans from four of the six NRPs.³ RFA templates require that applications identify expected environmental or programmatic outputs and outcomes. NCER's application review and selection process consists of three major steps:

1. External peer review of eligible applications conducted by NCER's Policy, Planning and Review Division, using topic experts from outside of the EPA.
2. Internal programmatic review (or relevancy review) conducted by technical experts within the EPA.
3. Selection decision by the NCER Director.

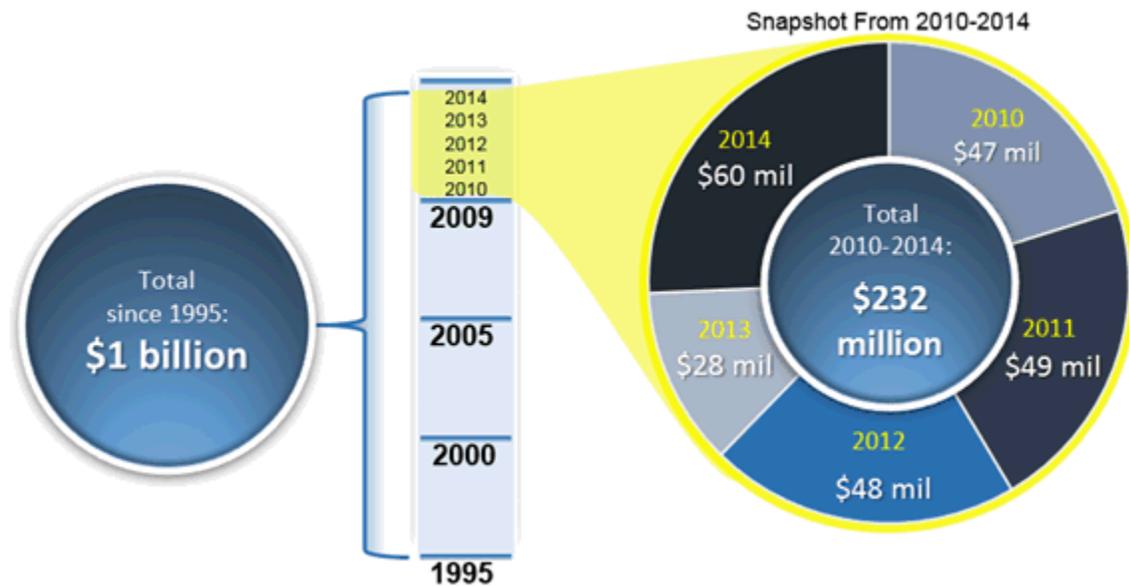
¹ ORD states that STAR grants do not constitute a program under the Government Performance and Results Act. Instead, ORD states that the grants are integrated into the six NRPs. For clarity, however, we refer to "the STAR program" throughout this report.

² ORD said these authorities include Section 103 of the Clean Air Act; Section 104 of the Clean Water Act; Section 8001 of the Solid Waste Disposal Act; Section 10 of the Toxic Substances Control Act; Section 20 of the Federal Insecticide, Fungicide and Rodenticide Act; and Section 311 of the Comprehensive Environmental Response, Compensation and Liability Act (Superfund). According to ORD, the appropriation account for STAR grants is "Science and Technology," which includes congressionally authorized transfers from the Superfund account.

³ ORD said there are RFAs that currently support all NRPs, except for two: Human Health Risk Assessment and Homeland Security.

In fiscal year 2014, STAR grant awards totaled over \$59 million (with average annual funding of just over \$46 million in the last 5 years). Since 1995, the EPA has awarded over \$1 billion through the STAR program (grants and fellowships):

Figure 1: Breakdown of STAR Grant Awards Obligated Resources by Year



Source: EPA OIG using data provided by ORD.

NCER Project Officers are generally assigned responsibilities that include the development of the RFA and the management of portfolios for funded STAR grants under that RFA. Project Officers provide technical and programmatic oversight and are designated as the EPA’s program contact with the grant recipient. Project Officers also monitor grant recipients’ progress and participate in outreach activities (e.g., webinars). Additionally, ORD uses “Matrix Interfaces”⁴ to facilitate communications among NRP and laboratory/center directors on a variety of issues related to program planning and implementation. Project Officers work with each other and Matrix Interfaces to communicate project findings.

Grants Management Requirements

STAR research grants are subject to the provisions of the Federal Grant and Cooperative Agreement Act (FGCAA) of 1977. The act distinguishes between contracts, used to acquire services or products for the direct use or benefit of the federal government, and assistance agreements (i.e., grants and cooperative agreements) that stimulate and support public purposes.

⁴ In 2010, ORD started implementing a matrix-style organizational structure (completed in 2012). The six NRPs interact with ORD’s national laboratories and centers through designated contact points known as Matrix Interfaces.

The agency’s interpretation of the FGCAA is contained in EPA Order 5700.1, “Policy for Distinguishing Between Assistance and Acquisition.” Under EPA Order 5700.1, the EPA may not award STAR research grants to obtain information to set guidelines, or for the direct incorporation into technical, policy or regulatory decisions. The agency said that these prohibitions are based on a Comptroller General opinion⁵ holding that contracts are the appropriate instruments to use when funding research projects that support EPA regulatory activities. The agency added that any uses or benefits that EPA program offices receive from STAR grants must be incidental, rather than direct as provided in EPA Order 5700.1.

The FGCAA prescribes the instrument the EPA must use—procurement contract, grant or cooperative agreement—based on the principal purpose of the transaction and the degree of federal involvement in the assisted activity.

STAR grant Project Officers within NCER are required to manage grants in accordance with EPA Order 5700.6 A2 CHG 2, “Policy on Compliance, Review and Monitoring.” This order establishes agency standards for oversight, monitoring and closeout of EPA assistance agreements, and provides for the review of compliance with applicable grants management policy and regulations. The EPA regulations found in Title 40, Part 30, of the Code of Federal Regulations (CFR), requires final reports within 90 calendar days after the expiration or termination of the grant award.⁶

NCER developed an RFA template for STAR grants. According to the template, the grant application must include a research plan (or “work plan”) that contains outputs and, to the maximum extent practicable, well-defined outcomes. NCER also developed a Project Officer Manual⁷ that includes post-award requirements. One requirement—in both the NCER Project Officer Manual and in EPA Order 5700.6 A2—is that Project Officers document review of the recipient’s progress reports to determine whether the recipient achieved the environmental outputs or outcomes described in the work plan.

⁵ 65 Comp. Gen. 605 (1986).

⁶ 40 CFR § 30.51 (Monitoring and reporting program performance). The EPA said that this requirement is also included in 2 CFR Part 200, “Uniform Grant Guidance,” which is applicable to STAR grants awarded after December 26, 2014 (see 2 CFR § 200.328).

⁷ The NCER Project Officer Manual borrows from the EPA Project Officer Manual (developed by the Office of Grants and Debarment), which NCER Project Officers must also follow. However, the NCER’s Project Officer Manual contains more detail on NCER processes.

Communicating Grant Results

ORD provides information on STAR grant recipients and research results to internal and external stakeholders using various mechanisms that include: NCER's online "Research Grants/Fellowships/Small Business Innovation Research" database,⁸ social media, outreach events, public webinars, EPA and ORD newsletters, and synthesis or summary reports.⁹ According to ORD, awardees also disseminate their research results to enhance scientific and technological understanding based on the work plan provided with their grant application. Awardees communicating their research results use a variety of outlets, including peer-reviewed journal publications, public presentations, and posting of data on websites.¹⁰

EPA Science Matters Newsletter



Innovations in Air Quality Monitoring Special Issue

These are exciting times in the field of air quality measurement and monitoring. New technological advances are transforming and revolutionizing how we understand and protect air quality. [Learn more in the introduction to this special issue of Science Matters.](#) (Posted October 8, 2015)



Fenceline Monitoring

Next generation air measurement technologies are making it easier to track air pollution leaks from pipes, seals, and other areas at industrial facilities, which will help catch leaks on-site and in real time. [Read more.](#) (Posted October 8, 2015)



RETIGO: Complex Air Measurement Data Made Understandable

A new easy-to-use software program developed by EPA called RETIGO has made data analytics of environmental measurements as easy as using common spreadsheet programs. [Read more.](#) (Posted October 8, 2015)



Private, Government Collaboration Advances Air Sensor Technology

EPA and Aclima, a San Francisco-based technology company, are jointly developing new kinds of small, low-cost air pollution sensors that will provide

One of ORD's communications, the *EPA Science Matters Newsletter*. (EPA webpage image)

Responsible Office

The ORD's NCER, under the Principal Deputy Assistant Administrator for Management, has primary responsibility for the issues discussed in this report.

Scope and Methodology

We conducted our performance audit from January 2015 to January 2016, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our objective.

⁸ [NCER's database](#) is available online.

⁹ Examples of research communications can be found for [social media](#), the [newsletter](#), and a [webinar](#).

¹⁰ For an example of an awardee research publication, see *Article: Aerosol optical properties in the southeastern United States in summer – Part 1: Hygroscopic growth*, Atmospheric Chemistry and Physics 09/2015; 15(18):25695-25738. DOI: 10.5194/acpd-15-25695-2015 (from Grant #R835412 [2012 award]: "Organic aerosol formation in the humid, photochemically-active Southeastern US: SOAS experiments and simulations," posted on the [Researchgate website](#)).

We reviewed relevant materials, including prior reports, laws, regulations, policies, procedures and guidance. We interviewed key staff within NCER, including managers and Project Officers responsible for grant oversight.

To understand whether the STAR grant program adheres to requirements under the Government Performance and Results Act (GPRA) Modernization Act, we interviewed staff in ORD's Office of Program Accountability and Resource Management. We also consulted with the National Science Foundation, the National Institute of Environmental Health Sciences, and the National Oceanic and Atmospheric Administration, to learn how they measure research grant performance. Additionally, we reviewed survey results from EPA program offices (Appendix A), and conducted a literature review on various research evaluation techniques (Appendix B).

OIG Survey

To address our objectives, we developed a survey instrument and used it to measure whether ORD makes program offices aware of STAR grant results (i.e., how well grant results are communicated within the EPA) and how well STAR grant-funded research results support the EPA's mission. We did not solicit the views of the nonfederal scientific community, which ORD considers to be the primary stakeholders for STAR research grants. Our objectives focused only on agency users.

In developing the survey instrument, we received input from NCER staff, who consulted with the EPA's Office of Grants and Debarment and the Office of General Counsel. We also received input from the National Science Foundation and the National Institute of Environmental Health Sciences. We worked with NCER to judgmentally target our survey to those ORD and program office staff who would most likely have knowledge of and utilize STAR research (NCER self-selected 90 percent of the survey sample). The survey was not designed as a statistical survey and should not be used to extrapolate to the EPA overall. Categories of survey recipients included:

- RFA writing team members.
- Programmatic review panelists.
- NRP directors.
- ORD laboratory, center and office directors.
- Directors within the EPA's major media program offices.
- Regional representatives.

We sent the survey to 196 agency staff and received 70 responses (36 percent response rate). ORD employees comprised nearly 36 percent of survey respondents.

We summarize the survey results in Chapter 2 and Appendix A. Raw survey data can be found in Appendix C.

Prior Reports

Three prior reports relate to our review:

- **A 2000 report from the U.S. Government Accountability Office (GAO).**¹¹ The GAO found that STAR grant funding had generally been aligned with broadly defined priorities of the EPA, including at the ORD and agency program office levels. GAO also found that the EPA program officials varied in the extent to which they believe grant results were useful to them. GAO also reported that ORD could enhance its management of the STAR program to help ensure that grant results are readily useful to EPA program offices and that the program objectives are met.

GAO identified three areas needing improvement: (1) tracking grants to ensure that they are completed on time and have produced the research intended; (2) improving communications with EPA program offices when designing and reviewing grants for relevancy, and disseminating grant results; and (3) establishing criteria to measure program effectiveness. The EPA disagreed with GAO's conclusion and recommendation to improve STAR grant tracking, although the EPA said it did take steps to better disseminate and communicate STAR research results.

- **A joint report issued in 2000 by the Science Advisory Board and the Board of Scientific Counselors.**¹² Both boards found that the EPA should develop a comprehensive approach for the effective transfer of STAR results to agency users. The report said that measures of STAR program success relative to mission advancement should address the timeliness and dissemination of the information to users, including program offices, regional offices and EPA researchers. The report suggested that ORD consider seven metrics and data collection activities, three of which are relevant to our review:
 1. Evaluate the use of information generated by each grant relative to EPA and ORD goals. Request that grantees include in their summary reports a self-assessment of how data should or could be used to address strategic goals. This information would allow ORD to quickly assess the relevance of the research product and would force researchers to think about possible applications for their results.
 2. Evaluate citations that reference STAR project publications in EPA regulatory documents, as another measure of STAR program success with respect to the agency's mission.

¹¹ GAO, [Environmental Research: STAR Grants Focus on Agency Priorities, but Management Enhancements Are Possible](#). GAO/RCED-00-170. September 11, 2000.

¹² The Science Advisory Board and the Board of Scientific Counselors, [Review of the Science to Achieve Results \(STAR\) Program of the Environmental Protection Agency](#). EPA-SAB-EC-00-008. March 27, 2000.

3. Poll customers within and outside the agency regarding the value of STAR products. When a sufficient database of questionnaire responses have been accumulated, responses should be analyzed to see how many STAR products have had a discernible impact on EPA or other programs, and how these impacts are distributed with respect to degree of impact and size of program impacted.

The report also said that the NCER website could benefit from updating. One of the report's principal recommendations was that the agency should budget sufficient resources to have an independent organization evaluate STAR program results, effectiveness and impact. The report did not describe whether the EPA agreed with and acted upon the report's findings and recommendations. ORD said that organizational changes introduced in 2012 made the recommendations no longer applicable.

- **A 2008 NAS National Research Council report.**¹³ In response to a 2006 request from the EPA for independent assistance in developing better assessment tools, the NAS National Research Council issued a 2008 report on performance measurement to evaluate the efficiency of research and development programs. The report dealt with all EPA research in the context of the Office of Management and Budget's (OMB's) Program Assessment Rating Tool (discontinued in 2009), and was not specific to STAR grants.

Several recommendations were made, including one that called on the EPA to use expert-review panels to evaluate the investment efficiency of research programs. The report also said the process should begin by evaluating the relevance, quality and performance of the research. The report did not describe whether the EPA agreed and acted upon the report's findings and recommendations.

¹³ National Academy of Sciences, [*Evaluating Research Efficiency in the U.S. Environmental Protection Agency*](#) (2008).

Chapter 2

EPA Program Offices Are Aware of STAR Research Results, but They Suggested Enhancements to Processes and Communications

Respondents are aware of the STAR program.¹⁴ Additionally, respondents reported awareness about the impact of STAR research on mission-oriented work within EPA program offices. While respondents expressed overall satisfaction with ORD’s various outreach activities that encompass STAR research, they suggested ways to enhance awareness and improve relevancy to the EPA’s mission. Specifically in the areas of developing RFAs, conducting relevancy reviews and communicating research results. Process enhancements in these areas should improve the probability that STAR research results address program office input and contribute to advancing the EPA’s mission.

Respondents Are Aware of STAR Results and Identified Impacts From Research That Help Advance the Agency’s Mission

Over 75 percent of survey respondents were aware of the STAR program. Additionally, 74 percent of survey respondents said that they were aware of an impact STAR grant research had on their program (Table 1).

Table 1: Respondents’ reported impacts of STAR research on EPA program offices

- Supported the development of National Ambient Air Quality Standards.
- Contributed to the health and environmental self-sufficiency of tribal entities.
- Scientifically supported chemical assessments.
- Advanced the agency’s efforts on adaptation to climate change.
- Contributed to new modeling, monitoring and emission estimation methods used by the EPA and state and local governments.
- Scientifically supported the agency’s asthma program.
- Contributed to international field testing and capacity building efforts for cook stoves project.
- Scientifically supported regulations on greenhouse gases, particulate matter and black carbon.
- Contributed to the understanding of the effects of exposure to contaminants on children’s health.
- Contributed to the understanding of the economic valuation of mortality risk.



Lung anatomy related to the EPA’s asthma program. (EPA photo)

Source: OIG analysis of narrative survey responses to Questions 11 and 14.

¹⁴ Most survey respondents (over 81 percent) have been with the EPA for 10 or more years. Nearly all respondents said that they use scientific results as part of their positions within the agency.

Respondents suggested ways to build on the strengths listed above through improvements to key STAR processes and communications.

To Enhance Awareness, Respondents Suggested Ways to Improve Communication With Program Offices

Agency program offices gain awareness of planned STAR topics through the RFA development and relevancy review processes. Respondents provided a range of responses when commenting on their satisfaction with these two processes. Most respondents indicated an overall satisfaction (Appendix A, Figures 3, 4 and 5). Some respondents provided comments and suggestions to further enhance each process and raise awareness within the agency about STAR grant research.

Developing RFAs and Conducting Relevancy Reviews

According to the NCER Project Officer Manual, STAR grant RFAs are developed by writing teams that include ORD staff, as well as staff from EPA program and regional offices. The writing team develops specific topics and questions for the research being solicited, and identifies expected outputs and outcomes of STAR research projects.

The EPA's regulations for funding environmental research require a relevancy review. The regulation states: "Relevancy will be measured by program needs and priorities as defined in the agency's current planned objectives."¹⁵ The EPA's Project Officer Manual requires that the review be performed by EPA technical experts (other than the Project Officer) who are impartial, independent, and come from outside the chain of command. An external peer review is also required to judge proposals based on the scientific merit of the proposed research. The manual also states that the relevancy review, coupled with the results of the peer review, will usually provide the basis for funding recommendations. However, final funding decisions are delegated to the Approval Official (the NCER Director), who is at liberty to consider other factors as long as the factors are disclosed in the RFA (e.g., ensuring geographic equity among projects selected).¹⁶

Over 63 percent of respondents were satisfied or very satisfied with their office's involvement in the STAR RFA development process, with only 15 percent either dissatisfied or very dissatisfied.¹⁷ Some survey respondents shared their views on this process. One respondent said the "RFA development process should engage program office leadership early in the process to better align with program office priorities." Another respondent said, "RFAs are too overly generalized so as to be useful to any program office." Respondents offered additional comments, on such areas as funding more directly applicable research, and focusing more on internal

¹⁵ 40 CFR § 40.150.

¹⁶ U.S. EPA, Office of Grants and Debarment. Project Officer Manual, Version 6, page 10.

¹⁷ See responses to survey Question 8 in Appendix C.

stakeholders and supporting program office implementation by doing core research rather than engaging external stakeholders and potentially duplicating existing program office efforts.

ORD said these comments indicate that individuals do not understand limitations on the use of grants and/or current processes (i.e., that a grant program may not legally produce research for the EPA’s direct use or benefit, and that participants in RFA writing teams’ programmatic review panels could be better informed). We agree that additional communication with program offices may help alleviate these misunderstandings about the uses of STAR grants.

Comments on the relevancy review process included the need to allot more review time and to improve the review instructions and scoring process. Additional comments said the relevancy reviews:

- Had no influence on which grants get funded.
- Had no clear rules or guidance for how reviewers score and rank proposals.
- Required more time and program staff with sufficient expertise.

Direct excerpts from respondents’ comments include the following:

1. *Regarding the programmatic review of the applications that have been through peer review—this seems very pro forma for the amount of time invested. I would like the programmatic review to have some influence.*
2. *I'd like to see more transparency regarding exactly how the results of the relevancy review process are factored into ORD's final funding decisions.*
3. *A more effective review process needs to be instituted. It would make sense for the agency to treat the process more like a journal article review process where minor/major comments are given back to the principal investigators so they have an option to modify their proposal to better reflect the agency's needs.*

Regarding the first two comments, ORD said that programmatic review does feed into the funding decisions, so there is “some influence.” For the third comment, ORD said that the competitive grant process cannot be managed like a journal review process,¹⁸ which means ORD could not make the changes envisioned by the respondent.

¹⁸ ORD focused on the following quotation from the agency’s competition policy: “If necessary, after submission of proposals/applications but before final selection decisions are made, EPA personnel may have limited communications with applicants for the purpose of clarifying certain aspects of the proposal/application relating to threshold eligibility factors, for determining if the applicant will accept partial funding if selected so long as the communication is done consistent with the partial funding provisions in the announcement which includes not prejudicing other applicants, or to resolve minor or clerical/administrative issues. Such communications shall not be used to cure proposal/application deficiencies or material omissions, materially alter the proposal/application or project proposed, prejudice or adversely impact other applicants, or discuss changes to the applicant’s responses to any evaluation or selection criteria.”

Generally, the comments are consistent with what we learned from our interviews with Project Officers prior to the survey. Standard operating procedures would help to improve front-end communication with program offices, and help these offices establish and incorporate their input into RFAs, relevancy reviews and post-award progress monitoring. Moreover, per ORD comments, updating the procedures could help educate participants on the process and on regulatory requirements/limitations.

Raising Awareness by Communicating Research Results

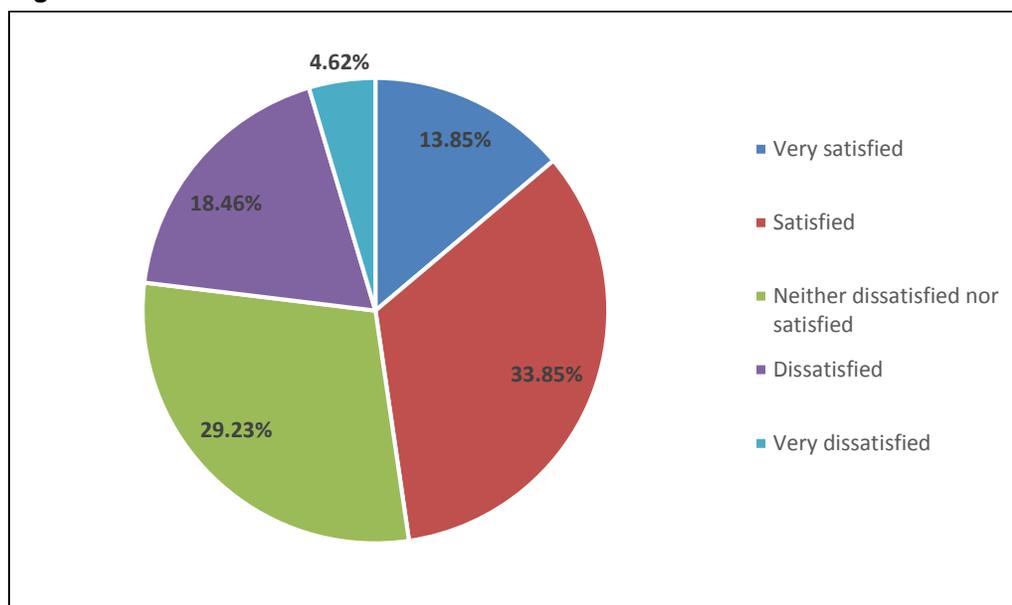
GAO's *Standards for Internal Control in the Federal Government* requires that agencies communicate information to those who need it in a form and within a timeframe that enables them to carry out their responsibilities. Prior reports by the Science Advisory Board and the Board of Scientific Counselors recommended that ORD develop and implement tools to ensure that the information and results of the STAR program are rapidly and effectively transferred to the agency and other potential users. These boards further noted that the measures of success of the STAR program relative to mission advancement should address the timeliness and dissemination of information to users, including EPA program and regional offices and EPA researchers.

To achieve the objective of supporting the EPA's mission, the STAR program must ensure that agency program and regional offices are aware of STAR results. Per their position description, Project Officers are expected to "reach out to EPA policy staff and ORD scientists to communicate the research findings from the STAR grants." However, the NCER Project Officer Manual does not list steps on how Project Officers should communicate research findings to EPA program office staff and ORD scientists. Project Officers stated that the manual may not be the best mechanism to explain communication procedures, since the manual becomes outdated quickly.

During our review, we learned that NCER has been incrementally revising its Project Officer Manual and plans to complete revisions within a year. NCER anticipates that its revisions will address the issues we identified and will result in the Project Officer Manual serving as a "one stop" resource for users.

Survey respondents indicated varying degrees of satisfaction with how STAR grant results are communicated to program offices. Over 47 percent were either satisfied or very satisfied, and 23 percent were either dissatisfied or very dissatisfied, as shown in Figure 2.

Figure 2: Satisfaction with communication of STAR results



Source: OIG analysis of survey responses to Question 15 (65 responses).

The EPA regulations found at 40 CFR § 30.51 (and, according to ORD, 2 CFR § 200.328 for awards made after December 26, 2014) require final grant performance reports 90 calendar days after the expiration or termination of the award. In addition, the STAR program requires grantees to submit annual progress reports. These reports are to contain a comparison of actual accomplishments with goals and objectives established for the period, the findings of the investigator, or both. We found that in a sample of 26 completed STAR grants pulled from NCER’s online STAR database, 19 grants (or 73 percent) lacked final reports. The lack of timely posted final reports impacts the usefulness of the database as a means of communicating STAR grant results to agency and external stakeholders.

ORD stated that using a variety of communication approaches helps to reach multiple audiences. Our survey asked respondents to identify the communication method they found most effective for learning about STAR grant research. Of the 17 communication methods listed in our survey, respondents indicated that two—social media and blogs—are least effective, and both of these methods had less than 50-percent awareness by respondents.

Just over half of all respondents (35 of 68) selected NCER’s website as one of the most effective communication methods.¹⁹ While many respondents (30 of 67) indicated that they were satisfied or very satisfied with the website, some were neutral (24 of 67) or dissatisfied (8 of 67). Additionally, five were unaware of the website.²⁰ Direct excerpts from respondents’ comments include the following:

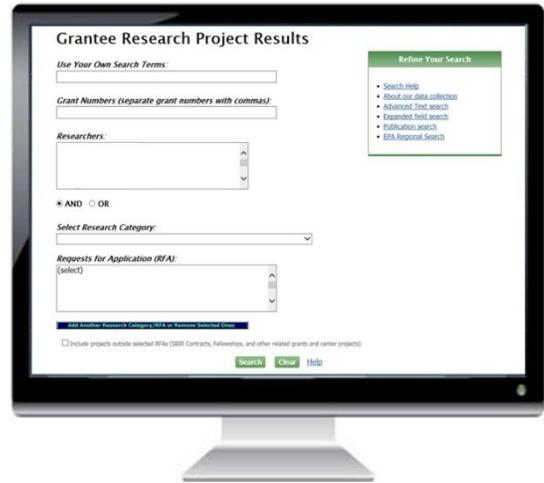
¹⁹ See Questions 16 and 17 in the full survey data provided in Appendix C.

²⁰ Ibid, at Question 17.

Survey Respondent Comments:

- *It is very hard to find useful information by searching NCER's website for a specific grant or RFA. On the other hand, websites that summarize by topic (e.g., Children's Centers, Tribal Science) are very helpful.*
- *The NCER website is wonderful when viewed by topic and almost useless when searched by RFA. Final reports, when available, are rarely complete (since many papers are published after the end of the funding period).*
- *Keeping the website accurate, up to date, and including more fact sheets, summary information is very time and staff consuming, but important!*
- *Please maintain and update NCER topical Web pages (to provide optimal content for EPA websites).*

The EPA's public RFA search Web page



Source: EPA OIG graphic.

Although used for public outreach, the online STAR database is not the official record used for compliance. Instead, grant files are used for compliance. Project Officers said that grant files often contain the progress and final reports that have not yet been publicly posted.²¹ Project Officers also said that ensuring the STAR database is consistent with grant files is something they could do better. NCER staff indicated that current resource levels have made it challenging to keep the online STAR database up to date. Since Project Officers or others must manually update the public website,²² updates have not been a top priority. NCER is currently redirecting one Project Officer to become the webmaster for the STAR database, which may improve the timeliness of updates.

This is the fourth report to the EPA since 2000 on the need to better communicate STAR research results. In our opinion, absent a formal internal communication process, and an updated online STAR database, relevant STAR grant results will not reach key environmental decision-makers and other stakeholders for use and application. NCER agrees that it can directly influence increased awareness within the EPA by communicating STAR grant results and any incidental benefits and use for providing research support to program offices.

Conclusion

Additional awareness of STAR research results and their incidental program impacts could be achieved with enhancements to STAR processes and

²¹ We did not review individual grant files for the 26 completed STAR grants sampled.

²² The EPA's different information systems (e.g., the Integrated Grants Management System and the STAR grant database) do not communicate with one another.

communications. Better program office engagement and communication can improve the probability that STAR research results—which are part of an over \$1 billion investment since 1995—will be able to address program office input and the EPA’s mission to support and stimulate the advancement of environmental science.

Recommendations

We recommend that the Assistant Administrator for Research and Development:

1. Create procedures for developing RFAs to ensure program office input is considered in the RFA development process.
2. Create procedures for conducting relevancy reviews to ensure program office input is more consistently and transparently considered in the grant selection process (to the extent permitted by the FGCAA and EPA Order 5700.1). The procedures should include a mechanism for sharing how the results of relevancy reviews impacted award decisions.
3. Develop and implement procedures to improve communications with EPA program offices regarding STAR research results. The procedures should:
 - a. Ensure that the STAR grant public website is up to date.
 - b. Revise the NCER Project Officer Manual (or develop a more dynamic tool) to reflect expectations for communicating grant results.
 - c. Clarify and define roles and responsibilities for communicating research results.

Agency Comments and OIG Evaluation

In ORD’s response to our official draft, ORD asked that we include in Chapter 2 the percentage of survey respondents who expressed satisfaction with the RFA development process, which we did.

ORD agreed with Recommendations 1 through 3, and each recommendation is resolved and open with agreed-to actions due for completion by the end of fiscal year 2017.

Appendix D includes ORD’s full response to the official draft report and the OIG’s comments on those responses.

Chapter 3

Measuring and Demonstrating Results of STAR Research Grants Need to Improve

ORD does not measure the results of the STAR research program. While there are federal and agency requirements for setting goals and objectives, program accountability, and reporting, ORD has not established clearly defined goals and objectives for the STAR program. In addition, ORD has not developed mechanisms beyond its current process indicators (i.e., output measures) to capture, evaluate and report on the incidental benefits the EPA has derived from STAR research. As a result, ORD cannot demonstrate how the STAR program advances the agency’s mission.

Federal and Agency Requirements Exist for Goal-Setting, Measuring and Demonstrating Results

GAO’s *Standards for Internal Control in the Federal Government* defines internal control as a process affected by an organization’s management and personnel that provides reasonable assurance that the goals and objectives of the organization will be achieved. Controls include the plans, policies and procedures, and methods the organization puts in place to measure and monitor progress toward achieving organizational goals and objectives. A well-defined and executed system of controls helps managers achieve desired results. (Table 2).

Table 2: Components of internal control

Control environment	Establishing and maintaining an environment that influences how objectives are defined and how control activities are structured.
Risk assessment	Assessing internal and external risks to achieving objectives.
Control activities	Establishing policies and procedures to achieve objectives and respond to risks.
Information and communication	Effectively communicating, both internally and externally, information necessary to achieve objectives.
Monitoring	Assessing the quality of performance over time, and promptly resolves the findings of audits and other reviews.

Source: OIG summary of GAO’s *Standards for Internal Control in the Federal Government*, GAO-14-704G, September 10, 2014.

Similarly, EPA Order 5700.7A1, “Environmental Results Under EPA Assistance Agreements,” requires that all competitive funding announcements for assistance agreements describe the linkage between the work intended to be accomplished and the EPA’s Strategic Plan, and contain a concise discussion of any expected outputs and outcomes. Specifically—like the

EPA Order 5700.7A1 is intended to ensure that assistance agreements are results-oriented, aligned with the agency’s strategic goals, and demonstrate achievement of environmental results and/or public health protection.

internal control standards—the order lays out a framework for EPA policy, to the maximum extent practicable, to:

- Link proposed assistance agreements to the agency’s Strategic Plan.
- Ensure that outputs and outcomes are appropriately addressed in assistance agreement competitive funding announcements, work plans and performance reports.
- Review results from completed assistance agreement projects and report on how the results advance the agency’s mission to protect human health and the environment.

The RFA template used for the STAR grant program states that each grant application must include a research plan (or “work plan”) containing well-defined outputs and, to the maximum extent practicable, well defined-outcomes. NCER also developed a Project Officer Manual²³ that includes post-award requirements. One requirement—in both EPA Order 5700.6 A2 CHG 2, “Policy on Compliance, Review and Monitoring,” and the NCER Project Officer Manual—is that Project Officers document review of the recipient’s progress reports to determine whether the recipient achieved the environmental outputs or outcomes described in the work plan.

ORD Does Not Have Official Goals and Objectives for STAR Program

ORD does not have officially defined goals and objectives for the STAR program. This prevents ORD from demonstrating how research results contribute to the agency’s mission. However, we found a number of references to the STAR program’s purpose, goals and objectives in various sources, as follows:

Excerpt from the STAR program website—

The program engages the nation’s best scientists and engineers in targeted research that complements EPA’s own outstanding intramural research program and those of our partners in other federal agencies.

Excerpt from the Catalogue of Federal Domestic Assistance²⁴—

The objectives of the STAR program are to (1) support research to determine the environmental and human health effects of air quality, drinking water, water quality, hazardous waste, toxic substances, and pesticides; (2) identify, develop, and demonstrate effective pollution control techniques; and (3) support research to explore and develop strategies and mechanisms for those in the

²³ The NCER Project Officer Manual borrows from the EPA Project Officer Manual (developed by the Office of Grants and Debarment), which NCER Project Officers must also follow. However, the NCER Project Officer Manual contains more detail on NCER processes.

²⁴ This is a directory of the various federal programs, projects, services and activities that offer financial and nonfinancial assistance and benefits to the American public.

social, governmental, and environmental arenas to use in environmental management decisions.

*Excerpt from GAO's September 2000 Report*²⁵—

The three objectives of the program are to (1) ensure that the agency involves the best non-EPA scientists in its research efforts, (2) provide useful research support to the agency's program offices, and (3) train a cadre of environmental scientists for the future.

We asked the NCER Director to provide us with the goals and objectives of the STAR program. He did not provide us with any STAR program goals. He stated that the multiyear research described in each of the NRP's strategic research action plans includes scientific questions and priorities that are reflected in STAR grant RFA topics. ORD said that even though the RFAs include descriptions of how funding opportunities fit within the agency's strategic architecture, RFAs are not written with the expectation that the work funded, by itself, will meet a specific goal or objective.

The Director agreed that the GAO characterization of the STAR program's objectives (noted above) still applies as an activity-level description. However, the Director went on to say this description does not refer to GPRA Modernization Act goals and objectives of the STAR program under ORD's matrix management structure.

The various references and interpretations have a common thread—the STAR program's research should be aligned with the agency's mission. Since the STAR program serves a number of purposes, ORD said it does not believe the differing quoted statements concerning STAR objectives to be in conflict with one another, but rather are complementary. However, the lack of an official version of STAR goals and objectives could cause confusion among stakeholders and complicate efforts to measure performance. As such, ORD should formally articulate STAR goals and objectives. Stated goals should make it clear that STAR grant results can only provide incidental benefits to the agency.

Current Performance Measures Do Not Demonstrate Incidental STAR Grant Results That Advance the Agency's Mission

One objective of the STAR program, as identified by GAO and acknowledged by NCER, is to provide useful research support to EPA program offices. While we recognize that this support should be incidental, NCER has not established performance measures related to this objective. ORD has established output measures for its six NRPs generally (not STAR in particular). These output measures focus on the percent of products completed on time and the percent of

²⁵ See Footnote 11 for the report citation.

planned research outputs delivered to clients.²⁶ ORD negotiated these output measures—which it refers to as process indicators—with OMB and annually reports on them as part of the agency’s requirements under the GPRA Modernization Act. While selected STAR grant products are rolled into the calculation of these general output measures,²⁷ it is unclear how these outputs can be used as proxies for measuring the incidental benefits of STAR grants.²⁸

ORD’s performance reporting occurs at the NRP level and not the individual STAR grant level. ORD indicated that its decision to aggregate STAR grant activities into the NRPs has complicated ORD’s ability to differentiate STAR research results from internal and external research. ORD said performance measures that directly link STAR research results to support for the development or evaluation of EPA program policies or regulations could violate the FGCAA. In addition, ORD directed us to review EPA Order 5700.1, “Policy for Distinguishing Between Assistance and Acquisition,” and the Comptroller General decision described in Chapter 1. However, we believe those references pertain to the use of contracts or grants for direct or indirect benefits and do not preclude ORD from evaluating the usefulness of its research investments.

During a meeting with ORD directors and staff, they explained that in the past NCER has used bibliometrics and citation analysis²⁹ on STAR grant-funded research as indicators of performance. However, NCER no longer uses these tools due to their perceived limited value and the amount of resources involved in tracking them. Furthermore, we learned that the outputs of some STAR grants are not necessarily translatable into peer-reviewed published research. Even though a particular grant has few or no published articles, it does not necessarily mean the grant was not successful.

Our literature review on research evaluation techniques found that bibliometrics and citation analysis alone are not good measures of quality research. We found consensus that these tools should be coupled with other measurement techniques, such as expert review, synthesis studies and user surveys. Our literature review

²⁶ The number of products and outputs stems from a collaborative process between NRP directors and ORD’s laboratory/center/office directors.

²⁷ Currently, ORD has 15 GPRA performance measures. To calculate output measures for the percent of products completed on time and the percent of planned research outputs delivered to clients, ORD maintains a tracking database (the Research Management System). The database contains data on selected products from NRPs and national laboratories and centers, including NCER. Some of NCER’s products are derived from STAR research (76 percent as of August 2015).

²⁸ Various prior reports by the National Academy of Sciences, GAO, Science Advisory Board, and Board of Scientific Counselors have found that STAR research should enable the EPA or other regulators to implement better risk assessment and management decisions.

²⁹ The National Oceanic and Atmospheric Administration central library defines bibliometrics as the quantitative analysis of academic publications. Using academic publications as a data source, bibliometric analysis attempts to answer questions about academic research that leads to a better understanding of how that research is produced, organized, and interrelated. Bibliometrics also attempts to evaluate academic publications and sets of publications—by author, research group, institution, or country—based on the number of citations the publications have received.

also found that developing measures for research programs is difficult for a number of reasons, including those listed in Table 3.

Table 3: Research evaluation challenges

- The pool of knowledge that grant research contributes to is difficult to define and measure because it encompasses discoveries that come through unpredictable paths and at uneven intervals.
- Outcomes take a long time to appear. Estimates for outcomes range from 10 to 50 years after initial research. Ultimate outcomes (e.g., improved human health) involve multiple steps and actors.
- Many studies contribute to aggregate knowledge but are not designed to be used in policy decision-making, except indirectly. Attribution is difficult because regulations, legislation and policy rarely cite the evidence or research upon which they are based.
- Lack of direct attribution linking research to outcome measures stems from the lack of properly coded/searchable electronic databases that can establish linkages to the primary literature/grant support and policy outcomes.
- Research can impact a variety of dimensions, such as informing policy or educating society. There is no agreed-upon weighting of the relative importance of these dimensions, making it difficult to judge disparate kinds of research, and to determine what works better and why.

Source: OIG analysis based on references cited in Appendix B.

Challenges measuring research outcomes are not unique to the EPA. Other research agencies that we benchmarked³⁰ struggle with this as well. To confront these challenges, agencies take advantage of surveys, outcome-coded grant result databases, systematic synthesis reports, and transition planning³¹ to ensure that research results are used. Of these examples, we found that NCER does conduct synthesis reports on STAR-funded research; however, this kind of retrospective analysis is done on an ad hoc basis and is not used to assess program performance.

ORD has not heeded suggestions from prior NAS reports to use expert-review panels to consider the performance of research programs such as the STAR program. ORD has also not taken suggestions from the Science Advisory Board and the Board of Scientific Counselors with regard to setting aside resources for retrospective analyses on the extent to which STAR research is used to support decision-making. ORD staff said they may consider using expert-review panels. Moreover, the results in Chapter 2 demonstrate that a survey instrument could provide NCER with a tool to obtain information on how the STAR program performs, and help to identify any patterns or trends in program performance.

³⁰ We consulted with the National Science Foundation, the National Institute of Environmental Health Sciences, and the National Oceanic and Atmospheric Administration.

³¹ In its *Policy on Research and Development Transitions*, the National Oceanic and Atmospheric Administration integrates transition planning into agency planning by identifying and articulating strategic goals, objectives and annual priorities into the planning phase of budget, execution and evaluation processes.

An established survey could then act as a metric and highlight outcomes of the STAR program.

EPA Order 5700.7A1 states that it is EPA policy to report on whether grant results advanced the agency's mission to protect human health and the environment. While the order requires program offices to report significant results from completed grants, we are not aware of NCER having a formal reporting process when it comes to STAR results.

Conclusion

Agency policy, and government regulations and guidance, require well-defined goals, objectives and performance measures. The EPA is accountable to taxpayers for establishing clear STAR goals and objectives, and reporting on the performance of the agency's investment. Since 2000, this is the fourth report to the EPA about the need to better measure research results. Despite challenges in accounting for research results, performance measures should be established to reflect how completed STAR grants provide incidental research support to the EPA. Absent a way to systematically capture and evaluate STAR research results, ORD is unable to demonstrate how the STAR program advances the agency's mission.

Recommendations

We recommend that the Assistant Administrator for Research and Development:

4. Establish goals and objectives for the STAR program.
5. Establish performance measures or a mechanism to capture and report out on how completed STAR grants have met their performance goals and provide incidental research support to program offices.

Agency Comments and OIG Evaluation

The bulk of ORD's response to our official draft report focused on Chapter 3 and ORD's concern that our report obfuscates the principal purpose of STAR grants to stimulate and support advances in environmental science and engineering at nonfederal research institutions. In contrast, our review focused on the secondary purpose of incidental benefits, and we note that scope throughout our report. ORD's comments also noted its process indicators, which we added to Chapter 3. ORD suggested editorial revisions, which we made as appropriate.

ORD agreed with Recommendations 4 and 5, and each is resolved and open with agreed-to actions due for completion by the end of fiscal year 2017. Appendix D includes ORD's full response to the official draft report and the OIG's comments on those responses.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS						POTENTIAL MONETARY BENEFITS (in \$000s)	
Rec. No.	Page No.	Subject	Status ¹	Action Official	Planned Completion Date	Claimed Amount	Agreed-To Amount
1	15	Create procedures for developing RFAs to ensure program office input is considered in the RFA development process.	O	Assistant Administrator for Research and Development	6/30/17		
2	15	Create procedures for conducting relevancy reviews to ensure program office input is more consistently and transparently considered in the grant selection process (to the extent permitted by the FGCAA and EPA Order 5700.1). The procedures should include a mechanism for sharing how the results of relevancy reviews impacted award decisions.	O	Assistant Administrator for Research and Development	6/30/17		
3	15	Develop and implement procedures to improve communications with EPA program offices regarding STAR research results. The procedures should: <ul style="list-style-type: none"> a. Ensure that the STAR grant public website is up to date. b. Revise the NCER Project Officer Manual (or develop a more dynamic tool) to reflect expectations for communicating grant results. c. Clarify and define roles and responsibilities for communicating research results. 	O	Assistant Administrator for Research and Development	9/30/17		
4	21	Establish goals and objectives for the STAR program.	O	Assistant Administrator for Research and Development	3/31/17		
5	21	Establish performance measures or a mechanism to capture and report out on how completed STAR grants have met their performance goals and provide incidental research support to program offices.	O	Assistant Administrator for Research and Development	9/30/17		

¹ O = Recommendation is open with agreed-to corrective actions pending.
C = Recommendation is closed with all agreed-to actions completed.
U = Recommendation is unresolved with resolution efforts in progress.

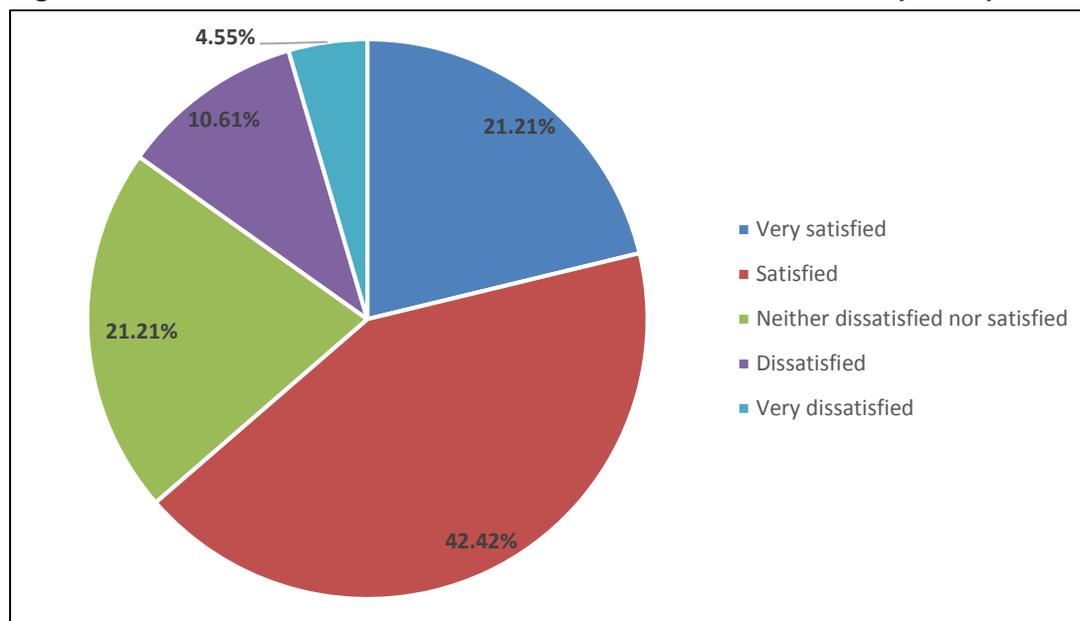
Survey Results and Feedback on STAR Grant Program

Sample excerpts of statements from survey respondents:

- *I think that the STAR grant program is a wonderful extramural program that lets very experienced and talented up-and-coming researchers work on issues of direct relevance to the EPA.*
- *The EPA's STAR program provides valuable and relevant environmental and human health research that would not happen any other way.*
- *The STAR grant program can and should be an essential piece of being forward-looking and setting a strong foundation of research efforts to position the agency to address challenging issues.*
- *The STAR program is a very important and impactful program.*
- *This program is supporting state academic institutions in an era of dwindling federal support for science.*

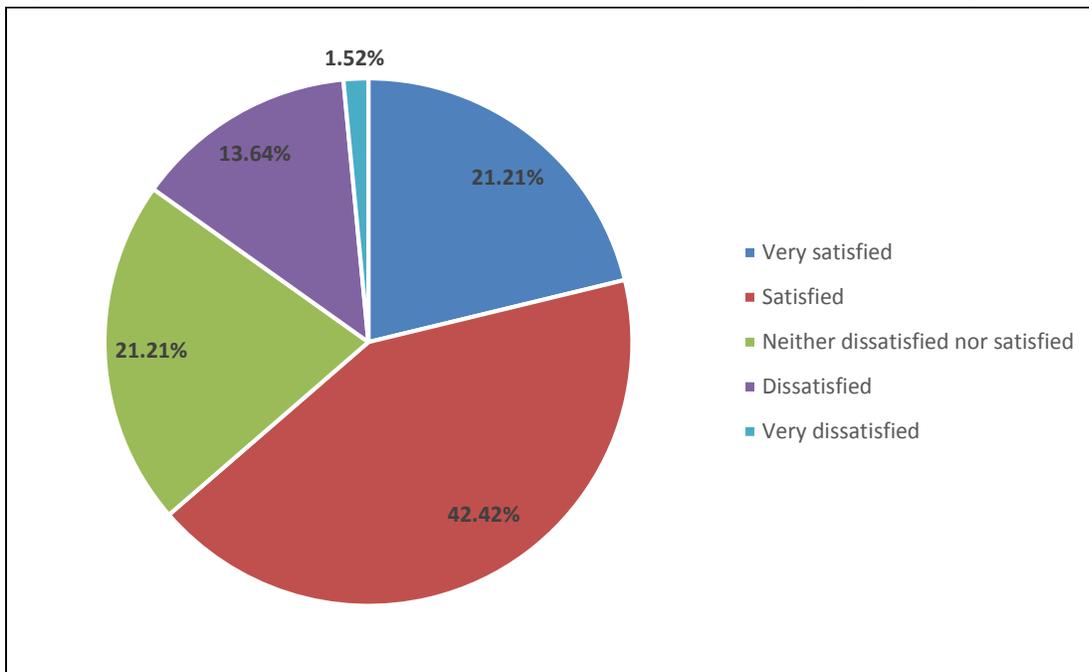
Survey respondents also indicated overall satisfaction with the RFA development and relevancy review processes, as shown in Figures 3 and 4.

Figure 3: Satisfaction with their office's involvement in the RFA development process



Source: OIG analysis of survey responses to Question 8 (66 responses).

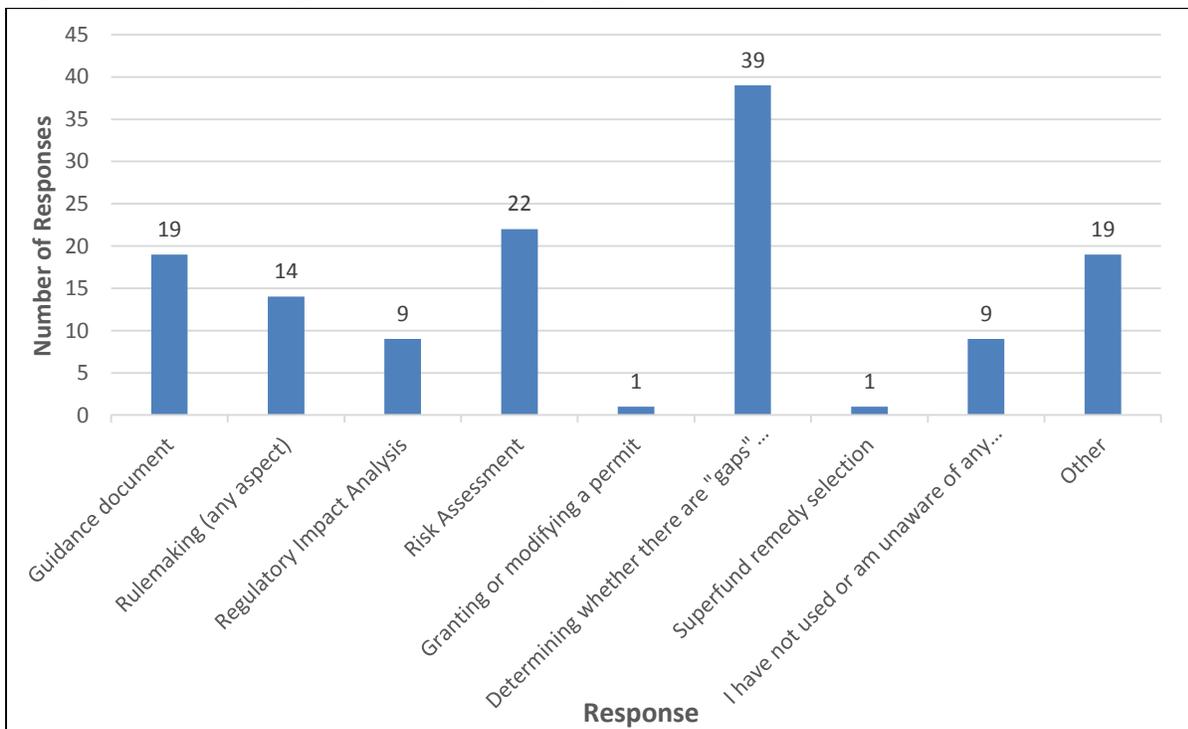
Figure 4: Satisfaction with their office's involvement in the relevancy review process



Source: OIG analysis of survey responses to Question 8 (66 responses).

Respondents provided examples of how they have used STAR research, as shown in Figure 5.

Figure 5: Use of STAR grant research in agency products



Source: OIG analysis of survey responses to Question 9.

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Raw Data From STAR Survey Responses

Question 1: Please select the AA-ship or Region in which you currently work.

	Percent	Number
Office of Air and Radiation	18.57	13
Office of Chemical Safety and Pollution Prevention	4.29	3
Office of Enforcement and Compliance Assurance	1.43	1
Office of Research and Development	35.71	25
Office of Solid Waste and Emergency Response	2.86	2
Office of Water	10.00	7
Region 1	2.86	2
Region 2	0.00	0
Region 3	0.00	0
Region 4	1.43	1
Region 5	1.43	1
Region 6	0.00	0
Region 7	2.86	2
Region 8	1.43	1
Region 9	0.00	0
Region 10	4.29	3
Other (please specify)	12.86	9
Total		70
<i>"Other" responses omitted to preserve confidentiality.</i>		

Question 2: Please indicate your career level within EPA.

	Percent	Number
Early Career (0 to 5 years)	4.29	3
Mid-Career (6 to 10 years)	14.29	10
Senior Career (greater than 10 years)	81.43	57
Total		70

Question 3: Please select the position(s) that best describes your current job function. Select all that apply.

	Percent	Number
Program Implementation Staff (e.g., Policy Analyst, Communications, Human Resources, Budget)	11.43	8
Technical Staff (e.g., Scientist, Engineer, Economist)	52.86	37
First Line Supervisor (e.g., Branch Chief, Project Manager, Team Lead)	20.00	14
Second Line Supervisor (e.g., Division Director)	4.29	3
Third-Line Supervisor (e.g., Office Director)	15.71	11
Other (please describe)	15.71	11
Total		70
<i>"Other" responses omitted to preserve confidentiality.</i>		

Question 4: Do you routinely use scientific results in your job?

	Percent	Number
Yes	98.57	69
No	1.43	1
Total		70

Question 5: Do you use journal articles and other primary scientific sources?

	Percent	Number
Yes	94.20	65
No	5.80	4
Total		69

Question 6: Please indicate how familiar you are with ORD's Science to Achieve Results (STAR) grant program managed by the National Center for Environmental Research (NCER).

	Percent	Number
Very familiar	75.71	53
Somewhat familiar	20.00	14
Not familiar	4.29	3
Total		70

Question 7: Please indicate whether you have participated in any of the following activities related to the STAR program. Select all that apply.

	Percent	Number
I have been invited to participate, support and/or provide input to the grant process through meetings, emails and discussions.	86.36	57
I have participated on a Request for Application (RFA) writing team.	72.73	48
I have participated on a STAR grant programmatic (or relevancy) review panel.	77.27	51
I have attended an RFA kickoff meeting.	59.09	39
I have worked closely with a STAR grantee on their grant funded research via cooperative agreement.	18.18	12
I have attended meetings in which STAR grant research has been discussed.	86.36	57
I have attended a webinar and/or progress meeting on a STAR grant.	71.21	47
I have accessed the online STAR database for information on grant progress and/or results.	53.03	35
I have not participated in any of these listed STAR activities.	0.00	0
Other (please describe)	9.09	6
Answered		66
Skipped		4
<i>"Other" responses omitted to preserve confidentiality.</i>		

Question 8: Please rate your satisfaction with your office's involvement with the following:

The STAR grant Request for Application (RFA) development process.

	Percent	Number
Very Satisfied	21.21	14
Satisfied	42.42	28
Neither Dissatisfied or Satisfied	21.21	14
Dissatisfied	10.61	7
Very Dissatisfied	4.55	3
Answered		66
Skipped		4

The review of STAR grant applications as part of recommending applications for funding.

	Percent	Number
Very Satisfied	21.21	14
Satisfied	42.42	28
Neither Dissatisfied nor Satisfied	21.21	14
Dissatisfied	13.64	9
Very Dissatisfied	1.52	1
Answered		66
Skipped		4
<i>Additional comments omitted to preserve confidentiality.</i>		

Question 9: Please indicate whether you have used STAR grant research results by selecting all of the EPA products STAR research has supported. Select all that apply.

	Percent	Number
Guidance document	28.79	19
Rulemaking (any aspect)	21.21	14
Regulatory Impact Analysis	13.64	9
Risk Assessment	33.33	22
Granting or modifying a permit	1.52	1
Determining whether there are "gaps" in the scientific literature	59.09	39
Superfund remedy selection	1.52	1
I have not used or am unaware of any EPA products STAR research has supported.	13.64	9
Other (please describe)	28.79	19
Answered		66
Skipped		4
<i>"Other" responses omitted to preserve confidentiality.</i>		

Question 10: Have you ever cited STAR grant research results in an agency product (e.g., Risk Assessment, Regulatory Impact Analysis, guidance)?

	Percent	Number
Yes	61.40	35
No / Not sure	38.60	22
Answered		57
Skipped		13
<i>Additional comments omitted to preserve confidentiality.</i>		

Question 11: Has STAR grant research had an impact on your program?

	Percent	Number
Yes, I am aware of an impact STAR grant research has had on my program.	74.24	49
No, I am not aware of a contribution to my program.	25.76	17
Answered		66
Skipped		4
<i>Additional comments omitted to preserve confidentiality.</i>		

Question 12: Which statement(s) best match the impact STAR grant research has had on your program?

	Percent	Number
Contributed to EPA's work (underlying the program's mission) toward education and communicating environmental science to the public.	63.27	31
Enhanced the scientific knowledge of EPA staff charged with shaping the direction of your program.	81.63	40
Provided important background information for guidance documents, risk assessments, rulemakings or similar activities.	55.10	27
Contributed to program effectiveness in a minor way.	8.16	4
Answered		49
Skipped		21

Question 13: Have research results produced by STAR grants had a quantitative or qualitative impact on any of the following relevant to your program? Select all that apply.

	Percent	Number
Human health benefits.	56.06	37
Environmental benefits	48.48	32
Knowledge relevant to EPA's mission.	54.55	36
The effectiveness of state, tribal or local government environmental programs.	21.21	14
The regulated community's understanding of the importance of environmental protection.	22.73	15
I am unaware of an impact.	25.76	17
Answered		66
Skipped		4

Question 14: Please describe these impacts in more detail.

	Number
Answered	48
Skipped	22
<i>Additional comments omitted to preserve confidentiality.</i>	

Question 15: Considering that STAR grant research results have the potential to impact your program in various ways (e.g., peer-reviewed journal articles, nonfederal stakeholder information and tools, etc.), how satisfied are you with the following?

The usefulness of STAR grant research results to you or your program.

	Percent	Number
Very Satisfied	30.77	20
Satisfied	29.23	19
Neither Dissatisfied nor Satisfied	27.69	18
Dissatisfied	7.69	5
Very Dissatisfied	4.62	3
Answered		65
Skipped		5

The communication of STAR grant research results to you or your program.

	Percent	Number
Very Satisfied	13.85	9
Satisfied	33.85	22
Neither Dissatisfied nor Satisfied	29.23	19
Dissatisfied	18.46	12
Very Dissatisfied	4.62	3
Answered		65
Skipped		5

Question 16: Please check the communication mechanisms you find (or would find) most effective to learn about STAR grant research. Select all that apply.

	Percent	Number
Email updates	63.24	43
STAR grant website/grant database	51.47	35
Webinars	75.00	51
Direct communication with program office management	36.76	25
Direct communication with program office staff	50.00	34
ORD Annual Reports	20.59	14
ORD Research Compass	20.59	14
EPA "Science Matters" newsletter	41.18	28
Social media	4.41	3
Press release/desk statements	19.12	13
Fact Sheets	45.59	31
Blogs	7.35	5
Synthesis or summary reports	51.47	35
Program portfolios	22.06	15
ORD's Research Management System (RMS) database	10.29	7
Engaging with the grant recipient and their awarded university	45.59	31
Outreach/announcement events coordinated with other EPA offices and regions	36.76	25
All investigator "Kick-Off" and annual progress meetings	52.94	36
Other (please describe)	11.76	8
Total		68
<i>"Other" responses omitted to preserve confidentiality.</i>		

Question 17: Please provide feedback on your level of satisfaction with each of the following ORD outreach activities (that encompass STAR grant research).

STAR grant website/grant database.

	Percent	Number
Very Satisfied	8.96	6
Satisfied	35.82	24
Neither Dissatisfied nor Satisfied	35.82	24
Dissatisfied	2.99	2
Very Dissatisfied	8.96	6
Not Aware	7.46	5
Answered		67
Skipped		3

Webinars.

	Percent	Number
Very Satisfied	17.91	12
Satisfied	23.88	16
Neither Dissatisfied nor Satisfied	38.81	26
Dissatisfied	4.48	3
Very Dissatisfied	0.00	0
Not Aware	14.93	10
Answered		67
Skipped		3

Direct communication with program office management.

	Percent	Number
Very Satisfied	7.46	5
Satisfied	16.42	11
Neither Dissatisfied nor Satisfied	25.37	17
Dissatisfied	13.43	9
Very Dissatisfied	2.99	2
Not Aware	34.33	23
Answered		67
Skipped		3

Direct communication with program office staff.

	Percent	Number
Very Satisfied	8.96	6
Satisfied	17.91	12
Neither Dissatisfied nor Satisfied	26.87	18
Dissatisfied	11.94	8
Very Dissatisfied	4.48	3
Not Aware	29.85	20
Answered		67
Skipped		3

ORD Annual Reports.

	Percent	Number
Very Satisfied	1.49	1
Satisfied	13.43	9
Neither Dissatisfied nor Satisfied	44.78	30
Dissatisfied	5.97	4
Very Dissatisfied	1.49	1
Not Aware	32.84	22
Answered		67
Skipped		3

ORD Research Compass.

	Percent	Number
Very Satisfied	2.99	2
Satisfied	17.91	12
Neither Dissatisfied nor Satisfied	37.31	25
Dissatisfied	2.99	2
Very Dissatisfied	1.49	1
Not Aware	37.31	25
Answered		67
Skipped		3

EPA “Science Matters” newsletter.

	Percent	Number
Very Satisfied	4.48	3
Satisfied	35.82	24
Neither Dissatisfied nor Satisfied	29.85	20
Dissatisfied	5.97	4
Very Dissatisfied	0.00	0
Not Aware	23.88	16
Answered		67
Skipped		3

Social media.

	Percent	Number
Very Satisfied	0.00	0
Satisfied	2.99	2
Neither Dissatisfied or Satisfied	25.37	17
Dissatisfied	4.48	3
Very Dissatisfied	0.00	0
Not Aware	67.16	45
Answered		67
Skipped		3

Press release/desk statements.

	Percent	Number
Very Satisfied	4.48	3
Satisfied	11.94	8
Neither Dissatisfied nor Satisfied	34.33	23
Dissatisfied	7.46	5
Very Dissatisfied	4.48	3
Not Aware	37.31	25
Answered		67
Skipped		3

Fact Sheets.

	Percent	Number
Very Satisfied	7.46	5
Satisfied	11.94	8
Neither Dissatisfied nor Satisfied	34.33	23
Dissatisfied	5.97	4
Very Dissatisfied	1.49	1
Not Aware	38.81	26
Answered		67
Skipped		3

Blogs.

	Percent	Number
Very Satisfied	0.00	0
Satisfied	10.45	7
Neither Dissatisfied nor Satisfied	17.91	12
Dissatisfied	5.97	4
Very Dissatisfied	1.49	1
Not Aware	64.18	43

Synthesis or summary reports.

	Percent	Number
Very Satisfied	5.97	4
Satisfied	22.39	15
Neither Dissatisfied nor Satisfied	20.90	14
Dissatisfied	8.96	6
Very Dissatisfied	2.99	2
Not Aware	38.81	26
Answered		67
Skipped		3

Program portfolios.

	Percent	Number
Very Satisfied	4.48	3
Satisfied	13.43	9
Neither Dissatisfied nor Satisfied	20.90	14
Dissatisfied	7.46	5
Very Dissatisfied	5.97	4
Not Aware	47.76	32
Answered		67
Skipped		3

ORD's Research Management System (RMS) database.

	Percent	Number
Very Satisfied	0.00	0
Satisfied	8.96	6
Neither Dissatisfied nor Satisfied	38.81	26
Dissatisfied	7.46	5
Very Dissatisfied	8.96	6
Not Aware	35.82	24
Answered		67
Skipped		3

Engaging with the grant recipient and their awarded university.

	Percent	Number
Very Satisfied	10.45	7
Satisfied	16.42	11
Neither Dissatisfied nor Satisfied	25.37	17
Dissatisfied	13.43	9
Very Dissatisfied	2.99	2
Not Aware	31.34	21
Answered		67
Skipped		3

Outreach/announcement events coordinated with other EPA offices and regions.

	Percent	Number
Very Satisfied	11.94	8
Satisfied	17.91	12
Neither Dissatisfied nor Satisfied	17.91	12
Dissatisfied	10.45	7
Very Dissatisfied	4.48	3
Not Aware	37.31	25
Answered		67
Skipped		3

All investigator “Kick-Off” and annual progress meetings.

	Percent	Number
Very Satisfied	22.39	15
Satisfied	29.85	20
Neither Dissatisfied nor Satisfied	19.40	13
Dissatisfied	4.48	3
Very Dissatisfied	1.49	1
Not Aware	22.39	15
Answered		67
Skipped		3
<i>“Other” responses omitted to preserve confidentiality.</i>		

Question 18: Do you know the ORD liaison, or the liaison for a specific National Research Program, for your office?

	Percent	Number
Yes	86.57	58
No	13.43	9
Total		67

Question 19: If you wanted to provide input on potential research topics for STAR grants, how would you go about doing so or who would you contact? Select all that apply.

	Percent	Number
Attend National Research Program webinar	20.90	14
Attend National Research Program outreach meeting	26.87	18
Contact ORD/National Research Program liaison	68.66	46
Inform supervisor	16.42	11
I don't know	17.91	12
Other (please describe)	14.93	10
Answered		67
Skipped		3
<i>“Other” responses omitted to preserve confidentiality.</i>		

Question 20: Keeping in mind that agency resources are limited, are there any important research topics that, in your view, are not currently being supported but should be (e.g., any critical gaps in EPA's knowledge)?

	Percent	Number
Yes	61.19	41
No	11.94	8
No opinion / don't know	26.87	18
Total		67

Question 21: Please provide suggestions on topic areas the STAR grant program should consider funding (i.e., those that would fill critical gaps in EPA's knowledge).

	Number
Answered	41
Skipped	29
<i>Additional comments omitted to preserve confidentiality.</i>	

Question 22: Please provide any suggestions on ways the STAR grant program could be improved or successful activities that the STAR grant program should continue or expand.

	Number
Answered	38
Skipped	32
<i>Additional comments omitted to preserve confidentiality.</i>	

Question 23: Please provide any suggestions on the ways the STAR program could be more responsive to the needs of the nonfederal stakeholders (including state, tribal and local regulators) for your program.

	Number
Answered	26
Skipped	44
<i>Additional comments omitted to preserve confidentiality.</i>	

Question 24: Is there any other feedback that you have about the STAR grant program that we did not ask in the questions above?

	Number
Answered	19
Skipped	51
<i>Additional comments omitted to preserve confidentiality.</i>	

Agency Response to Official Draft Report and OIG Comments



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

FEB 18 2016

OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Response to Office of Inspector General (OIG) Draft Report on EPA Science to Achieve Results (STAR) Grants—OIG Project Number OPE-FY15-0017

FROM: Lek G. Kadeli
Principal Deputy Assistant Administrator, ORD

TO: Patrick Gilbride, Director
Science, Research, and Management Integrity Evaluations

Thank you for the opportunity to respond to the OIG draft report, entitled, "Science to Achieve Results (STAR) Program Has Awareness Within EPA but Challenges Remain in Measuring and Communicating Research Results." Both ORD and EPA are committed to: (a) ensuring that STAR grants continue to be relevant to EPA's mission; (b) continuing to align STAR Request for Applications (RFAs) with the Agency's Strategic Plan, the Strategic Research Action Plans and the associated national research programs; and (c) measuring results of STAR grants in a manner that is consistent with federal statutes and policies and that reflects the best practices of federal agency research grants programs.

We appreciate the OIG review of the effectiveness of STAR grants and whether STAR grant results advance the agency's mission to protect human health and the environment. We agree with the OIG finding that STAR research results help EPA achieve its mission. This is consistent with previous reviews by the National Academies of Sciences, EPA's Science Advisory Board (SAB), and ORD's Board of Scientific Counselors (BOSC).

We agree with the OIG team's description of research evaluation challenges on page nineteen of the draft OIG report and with the OIG finding: "Challenges measuring research outcomes are not unique to the EPA. Other research agencies that we benchmarked struggle with this as well." The US Government Accountability Office (GAO) also identifies challenges for managing and evaluating research:

- “We recognize the difficulty in developing Government-wide guidelines that will yield uniformity in the use of grants, contracts, and cooperative agreements.”¹
- “We have reported that determining the specific outcomes resulting from federal research and development has been a challenge that will not be easily resolved.”²

Recognizing the significance of these challenges, the Offices of Research and Development, Grants and Debarment, and General Counsel agree that it is important to communicate clearly and accurately to readers of the final OIG report to avoid inadvertent misunderstandings about the context for the OIG recommendations. To help accomplish this goal, this memorandum identifies and describes additional information, corrections, and clarifications that our three offices recommend for the final version of the OIG report.

The draft OIG report makes five recommendations to further strengthen the effectiveness of the STAR grants and their results. Table 2 presents ORD actions and timeframes designed to (a) enhance the current strong foundation of STAR grant practices and procedures and (b) respond to the five OIG recommendations.

OIG Comment #1: We made suggested report edits as appropriate.

Although it is outside the scope of the OIG recommendations, ORD recently has requested that the National Academy of Sciences (NAS) develop a report that will recommend optimal approaches to use in the assessment of the scientific merit and impact of STAR grants and their results. This NAS study also will further strengthen current STAR grant practices and procedures. Publication of the NAS report is expected in 2017.

We appreciate your team’s engagement with ORD on the STAR competitive grants and the management of STAR grant funding opportunities. The team’s review assessed how STAR grants are currently used to advance the Agency’s mission; the business processes used by NCER to comply with the vast number of federal, agency, and ORD grant requirements; how ORD integrates STAR grants into its research portfolio and national research programs; the communication of grant results to other EPA programs and offices; and the communication of STAR grant activity outputs and measures with the Office of Management and Budget. We understand that executing each of these areas efficiently is essential to effective STAR grants and welcome the opportunity afforded to us by your team to provide comments and recommend edits within the shared materials during the course of the review.

The following sections of this memorandum describe: (1) suggested language for several “At a Glance” corrections and clarifications; (2) additional information, corrections, and clarifications needed in the final version of the OIG report; (3) changes in the report’s language that will improve the clarity of the OIG recommendations; and (4) ORD actions and timeframes that respond to each OIG recommendation.

¹ GAO, “Agencies Need Better Guidance for Choosing among Grants, Contracts, and Cooperative Agreements,” GAO-GGD-81-88, page 22 (Washington, D.C.: September 4, 1981).

² GAO, “Managing for Results: Key Steps and Challenges in Implementing GPRA in Science Agencies,” GAO/T-GGD/RCED-96-214 (Washington, D.C.: July 10, 1996).

We request that you include the entirety of this response memorandum as an Appendix to the OIG final report.

1. “At a Glance” Corrections

Based on the information, corrections, and clarifications described in sections 2 and 3 of this memorandum, Table 1 suggests alternative language for the “At a Glance” page that will implement some, but not all, of the changes we recommend.

Table 1. “At a Glance” Corrections and Clarifications

1	<p><u>“What We Found”</u> The sentence in the green text box is not accurate: “Although EPA awards an average of over \$46 million annually in STAR grants, the agency cannot demonstrate whether the grant results provide useful research support to program offices.”</p>	<p><u>Suggested language:</u> “EPA awards an average of over \$46 million annually in STAR grants, and ORD measures results using process indicators about research progress and publications.”</p> <p>OIG Comment #2: We revised the green box to say, “Although the EPA awards an average of over \$46 million annually in STAR grants, challenges remain in measuring and communicating research results.” This aligns with our report title.</p>
2	<p><u>“What We Found”</u> A new sentence needs to be added at the beginning of the first paragraph to communicate important statutory and policy context.</p>	<p><u>Suggested language:</u> “This report and the OIG survey focused on incidental benefits of STAR grant results to EPA rather than on the principal purpose of STAR grants—which is to stimulate and support research in environmental sciences and engineering that advances EPA’s mission at eligible non-federal research institutions.”</p> <p>OIG Comment #3: We emphasized our focus on incidental benefits in the “Why We Did This Review” section of the At a Glance.</p>
3	<p><u>“What We Found”</u> A new sentence needs to be added at the end of the first paragraph to communicate missing findings.</p>	<p><u>Add new sentence:</u> “Over 63% of respondents were satisfied or very satisfied with their office’s involvement in the STAR RFA development process with only 15% either dissatisfied or very dissatisfied.”</p> <p>OIG Comment #4: Because this pulls data from our survey results in Appendix C, we added the suggested text to our section in Chapter 2 on the RFA development process.</p>
4	<p><u>“What We Found”</u> The following sentence requires correction “We also found that ORD does not measure the results of the STAR program.”</p>	<p><u>Suggested language:</u> “ORD collects systematic management process indicators of STAR results that implement OMB guidance about measures.”</p> <p>OIG Comment #5: Our report already describes output measures that ORD negotiated with OMB. We added the term “process indicator” where we already referred to output measures in the At a Glance and Chapter 3.</p>

5	<p><u>“What We Found”</u> The following sentence requires correction: “While federal and agency requirements exist for setting goals and objectives, program accountability and reporting, ORD has not officially established defined goals and objectives for the STAR program.”</p>	<p><u>Suggested language:</u> “While STAR grants comply with federal and EPA requirements for internal controls, accountability, and reporting, ORD has not established and consistently used a single official statement that specifically communicates goals and objectives for STAR grants.”</p> <p>OIG Comment #6: Chapter 3 notes that we found that the STAR program does not comport with federal internal control requirements (namely, to establish clear goals and objectives). We note that here ORD agrees that it has not established and consistently used a single official statement that communicates goals and objectives.</p>
6	<p><u>“What We Found”</u> The following sentence should be deleted because it is not substantiated by the survey results: “As a result, ORD cannot demonstrate overall program results and cannot demonstrate the extent to which the STAR program—an over \$46 million annual investment—provides useful research support to agency program offices.”</p>	<p><u>No replacement sentence is needed.</u> Survey results validate the importance of STAR research results to EPA program offices. The survey results show that 74% of respondents are aware of an impact of STAR grant research on their programs. The survey also indicates 61% of respondents had used STAR research results in EPA guidance documents, rulemaking, risk assessments, or regulatory impact analysis.</p> <p>OIG Comment #7: The survey we administered shows that respondents were aware of an impact of STAR grant research on their programs, but absent our survey ORD would not have a mechanism to report those results. Moreover, the full scope of our assignment—not just our survey results—drew us to our conclusions. Thus, we did not make this full suggestion, but did revise the sentence to say, “As a result, ORD cannot demonstrate overall program results of its over \$46 million annual investment.”</p>
7	<p><u>“What We Found”</u> The following sentence should be changed: “ORD also has not developed mechanisms to capture, evaluate and report on incidental benefits to the EPA from STAR research.”</p>	<p><u>Suggested language:</u> “ORD has not developed measures or mechanisms beyond its current process indicators to capture, evaluate and report on incidental benefits to EPA from STAR research.”</p> <p>OIG Comment #8: We did not make this full suggestion, but added the term “process indicator” where we already referred to output measures in the At a Glance and Chapter 3.</p>

2. Additional Information, Corrections, and Clarifications Are Needed

The following nine subsections describe additional information, corrections, and clarifications that our three offices recommend be integrated into the final version of the OIG report:

- 2.1.** The draft OIG report includes statements about STAR results such as “... provides useful research support to agency program offices” in the *What We Found* and the *Recommendations* sections of the “At a Glance” summary preceding the report and in the first paragraph of Chapter

3. We recommend that these statements be replaced in every instance with the following language in the final OIG report: "... provides incidental benefits to EPA."

In our judgment, statements in the draft OIG report such as "... provides useful research support to agency program offices" create two significant problems. First, such statements inadvertently may mislead readers of the OIG report who do not understand the Federal Grants and Cooperative Agreement Act (FGCAA) and a related decision by the Comptroller General (65 Comp. Gen. 605 [1986]). Second, such statements do not adequately take into account EPA's legal position. We describe the basis for this conclusion in subsection 2.2 below.

OIG Comment #9 (reordered text and thinned out GAO material): While we understand ORD's concerns, we disagree with the magnitude of concern. We believe the changes made adequately take into account the EPA's legal position by stressing our focus on "incidental benefits" throughout our report.

Moreover, the language cited ("provides useful research support to program offices") is from the 2000 GAO report. At that time, the EPA did not object to GAO's characterization in the agency's comments on GAO's draft report, wherein the agency said that there is "no inherent contradiction ... within a grants program that is working to support the agency's mission and simultaneously working to advance the basis of our understanding of complex environmental issues." Additionally, as we noted in Chapter 3, ORD NCER agreed with GAO's language when we asked about GAO's prior report during our review.

2.2. We appreciate the efforts of the OIG team to address our concerns about the focus and methodology of the OIG evaluation of the STAR program. However, as described below, the Office of Research and Development, Office of Grants and Debarment and Office of General Counsel continue to have significant reservations about the focus of the draft OIG report on the need for the STAR grants to "provide research support to EPA program offices." That focus overlooks the principal public purpose of grants, as mandated by the FGCAA, to stimulate and support advances in environmental science and engineering at non-federal research institutions as opposed to producing research for EPA's direct use or benefit.

First, the draft OIG report fails to recognize the substantial risks of violating the FGCAA that EPA would face if STAR grants are primarily geared towards demonstrating that "... grant results provide useful research support to [EPA] program offices" as urged in the *What We Found* and the *Recommendations* sections of the "At a Glance" summary preceding the report and on page twenty of the draft OIG report. This creates the perception that STAR grants are principally for the direct use of EPA programs. It would violate the FGCAA to suggest, as the draft OIG report does, that ORD should ensure that STAR grants produce results that directly support the development of EPA regulations. The EPA interpretation of the FGCAA is reflected in *EPA Order 5700.1 Policy for Distinguishing between Assistance and Acquisition* which precludes the use of grants to directly support program office decision-making. That prohibition was established in response to the Comptroller General's finding in 65 Comp. Gen. 605 (1986) that EPA improperly awarded a financial assistance agreement to directly support the Agency's regulatory program. While EPA agrees with the OIG that under EPA Order 5700.1 EPA program offices may derive "incidental" benefits from STAR grants in the regulatory process, it would be

inappropriate for EPA to allow those secondary considerations to drive grant selection and administration.

The relationship between permissible incidental benefits from STAR grant activity and improper direct use of STAR grants to support the EPA's regulatory activities is a delicate one. For example, it would be consistent with the FGCAA for ORD, when formulating topic areas for STAR research grants, to consider knowledge gaps in a particular environmental area that may potentially be the subject of future EPA regulation. OGC has also advised ORD that program offices may consider and cite published STAR grant-funded studies in regulatory decisions to the same extent as any other published scientific work. Nonetheless, OGC has advised that ORD not design STAR Request for Applications or make grant selections intended to directly fulfil EPA's regulatory needs by, for example, evaluating existing regulations or producing data for the principal purpose of supporting rules EPA is formulating. The draft OIG report does not adequately take into account the EPA's legal position.

Based on OIG recommendations in the draft OIG report, OGD believes there is potential for EPA offices, Congress, and other external stakeholders to misunderstand the requirements of FGCAA. Although STAR award officials are personally accountable for ensuring that STAR grants comply with the FGCAA, the OIG recommendation 1 (that program offices be afforded more influence over the design of RFA's and selection of grant recipients) particularly when combined with OIG recommendation 5 (that ORD develop STAR grant performance measures based on the extent to which STAR grants incidentally benefit EPA programs) will inevitably lead to pressures on ORD and OGD to push the legal boundaries for awarding STAR grants beyond the limits of the FGCAA. We recognize that OIG acknowledges in recommendation 2 that STAR selection decisions must be consistent with the FGCAA. However, even with that acknowledgement the emphasis of the draft OIG report on making sure STAR grants are useful to EPA program offices may inadvertently undermine our efforts to give a wide berth to potential FGCAA violations. It is likely to create expectations among EPA program offices, Congressional appropriators, and external stakeholders that STAR grants are primarily intended to "provide useful research support" to EPA itself.

Second, the draft OIG report does not explain why the OIG's evaluation is focused extensively on enhancing and measuring the incidental benefits of the STAR program to EPA programs. As noted above, the principal purpose of STAR grants is to stimulate non-federal research which furthers EPA's mission to advance the state of knowledge in environmental science and engineering. Consistent with that purpose, a complete evaluation of the STAR program would involve obtaining Information Collection authorization from the US Office of Management and Budget under the Paperwork Reduction Act to conduct a survey of the primary "customers" of STAR funding—non-federal research institutions. Absent such a survey, the OIG's recommendations for enhancing STAR grants are based only on the views of a non-statistical sample of EPA employees regarding a secondary purpose of STAR grants.

OIG Comment #10: The focus of our report was not on the need for the STAR grants to “provide research support to EPA program offices.” As we noted in **OIG Comment #9** above, that language was in a 2000 GAO report that we asked about as part of our review. We found that ORD is not measuring either the principal purpose to stimulate and support advances in environmental science and engineering at nonfederal research institutions, or the secondary purpose of incidental benefits. We reviewed the latter given our purview as the EPA’s OIG; however, we note that the two purposes are not mutually exclusive. Additionally, our report does not urge the EPA to risk violating the FGCAA, nor does our report say that ORD should ensure that STAR grants directly support regulatory development. The regulatory development language in our report stems from a 2000 report by the Science Advisory Board/Board of Scientific Counselors that we cite in the “Prior Reports” section of Chapter 1. Chapter 1 also mentions the Comptroller General finding and EPA Order cited in ORD’s response above. Lastly, we made the scope of our survey clear to ORD when we worked with it on the content and recipient list. As the office managing the STAR program, we encourage ORD-NCER to undertake the “complete evaluation” it describes and survey its primary customers. This would be responsive to the recommendation from the 2000 Science Advisory Board/Board of Scientific Counselors report that we note in Chapter 1, which said ORD should “Poll customers within and outside the agency regarding the value of STAR products.”

- 2.3.** The final version of the OIG report should highlight the fact that EPA Order 5700.1 serves as a principal EPA-wide internal control for procedures related to grants and cooperative agreements. In the draft version of the report, this important information is not disclosed in Chapter 1 or in the section of Chapter 3 that reviews *Standards for Internal Control in the Federal Government*. We recommend that you mention the important role of EPA Order 5700.1 in these two sections of the final report.

OIG Comment #11: We did not make this change, as our report already adequately describes the EPA order.

- 2.4.** The final OIG report also should highlight, in Chapter 3, the fact that NCER has provided the OIG with extensive evidence of systematic management activities, data, and indicators that NCER develops and collects to comply with EPA Order 5700.1 and with related internal controls such as EPA Order 5700.6 A2CHG 2.

OIG Comment #12: We disagree that ORD provided “extensive evidence” to dispense with our findings in Chapter 3. We worked with staff in ORD’s Office of Program Accountability and Resource Management to understand how ORD developed the two output measures in place for each ORD research program: the percent of research products completed on time, and the percent of planned research outputs delivered to clients. We also worked with ORD staff to understand how the STAR program is interwoven with ORD’s Strategic Research Action Plans. Additionally, we pulled information from ORD’s Research Management System database and met with ORD accountability staff to verify NCER products. However, when we asked ORD for verifiable information on outcomes/results, we were provided anecdotes on how STAR grant results led to positive outcomes rather than verifiable data; for example, how STAR grant results led science and health professionals to connect environmental air quality to cardiac health in addition to pulmonary health. ORD staff noted that outcomes, such as the particulate matter example, are hard to measure, and we noted those challenges in Chapter 3 as well.

- 2.5. The final OIG report also should highlight, in the section of Chapter 3 entitled *Federal and Agency Requirements Exist for Goal-Setting and Performance Reporting* (page 15 of the current OIG draft), the fact that NCER has provided OIG with evidence that it collects systematic indicators of the research contributions from each STAR grant—both during and at the conclusion of the grant. These STAR grant research contributions include a final report as well as information about any peer-reviewed research publications that occur before the expiration of the grant period of performance.

OIG Comment #13: See OIG Comment #12 above. Per ORD’s earlier comments, we added the term “process indicator” where we already referred to output measures in the At a Glance and Chapter 3.

- 2.6. The final OIG report also should highlight the fact that these NCER management indicators include “process indicators” that meet the OMB definition of measures in its Circular A-11 (2015). OMB defines a process indicator as: “A type of measure that indicates how well a procedure, process, or approach is working (e.g., timeliness, accuracy, completion).”³

OIG Comment #14: Per ORD’s earlier comments, we added the term “process indicator” where we already referred to output measures in the At a Glance and Chapter 3.

- 2.7. Based on the information in sections 1.4 – 1.6 above, the final OIG report should change the incorrect conclusion—found in the “At a Glance” section and in the first paragraph of Chapter 3 (page 15) of the draft report—that “ORD does not measure the results of the STAR research program.” Instead, the final OIG report should include the correct conclusion that “NCER has

³ OMB Circular A-11 (2015) Part 6, Section 200.21 Definitions.

provided OIG with information about systematic management process indicators of STAR results. These process indicators implement OMB guidance about measures.”

OIG Comment #15: As noted in OIG Comment #12 above, our review focused on outcomes/results, though our report notes the process indicators (output measures) ORD describes in both the At a Glance and Chapter 3.

- 2.8. We agree with the OIG team’s decision to administer an OIG survey to EPA employees who have participated in the development of STAR RFAs and relevancy reviews or who use scientific results—including STAR grant results. We also agree with two important points about the design of the OIG survey communicated on page five of the draft OIG report:
- The survey was not designed as a statistical survey and its results should not be extrapolated to EPA overall, and
 - The survey was not designed to obtain the views of the primary “customers” of STAR grants—the non-federal research institutions and their stakeholders in the nonfederal scientific community.

Chapter 2 in the draft OIG report presents and describes the results of the OIG Survey. The title of this chapter is “*EPA Program Offices Are Aware of STAR Research Results and Suggested Enhancements to Processes and Communications.*” The first sentence in this Chapter is: “*Respondents are aware of the STAR program.*”

Based on analysis of the data from the OIG survey presented in Appendix C of the draft OIG report, we recommend that the following new sentence should be added immediately after the first sentence: “*Over 63% of respondents were satisfied or very satisfied with their office’s involvement in the STAR RFA development process.*” The survey data supporting this new sentence are found on page 27 in the responses to survey question 8. The reason we recommend adding this sentence is that this feedback is important—and is not suggested by the current title of Chapter 2.

OIG Comment #16: Because this pulls data from our survey results in Appendix C, we added the suggested text to our section in Chapter 2 on the RFA development process.

- 2.9 The draft OIG report states on page twenty “ORD has not heeded suggestions from prior National Academy of Sciences reports to use expert-review panels to consider the performance of research programs.” This statement is not correct. In fact, in the early 2000’s, ORD requested that BOSC review the ORD research programs. Starting about 2004, BOSC subcommittees conducted full reviews, and less extensive “mid-cycle” reviews, of ORD research programs on a regular basis until 2010, when the GPRA Modernization Act of 2010 was passed by Congress. These BOSC reviews addressed both intramural and extramural facets of the ORD research programs. Below are quotes from two BOSC reports that illustrate attention to STAR grants in the BOSC reviews:

Human Health Research Program

“The childhood and the asthma components of LTG [Long Term Goal] 3 have been highly productive, with particular note of the extramurally funded (jointly with NIEHS) Children’s Centers and the intramurally based research program on the developmental (pre-natal and early childhood) origins of adult diseases. This successful performance can be measured in peer-reviewed journal and governmental publications, as well as in practicable applications, such as the “Relative Moldiness Index.”

--*Review of the Office of Research and Development’s Human Health Research Program at the U.S. Environmental Protection Agency, Final Report, 2009*

Clean Air Research Program

“The research presented to the BOSC related to health and exposure is unquestionably of high quality, based on the extensive bibliometric analysis, the content of the posters and other materials presented, and Subcommittee interactions with both intramural and extramural researchers. Reflecting the funding associated with Particle Centers and the regulatory importance of enhanced understanding of the health implications of PM, many of the significant scientific advancements were associated with the biological plausibility of PM health effects, the public health benefits of air pollution reductions, and atmospheric modeling addressing the complexities of secondary aerosols and other constituents.”

--*Review of the Office of Research and Development’s Clean Air Research Program at the U.S. Environmental Protection Agency, Final Report, 2009*

In 2011 and subsequent years, ORD sought the advice of the SAB and BOSC in a major effort to restructure its national research programs. The result is the current six national research programs. New subcommittees of the BOSC have been established to advise ORD on these six national research programs, including both the intramural and extramural components. Initial meetings of these new BOSC subcommittees were held in 2015. ORD plans to engage with the BOSC on how to improve assessment of the research programs.

As mentioned earlier in this memorandum, ORD has recently requested that the National Academy of Sciences (NAS) develop a report that recommends optimal approaches to use in the assessment of the scientific merit and impact of STAR grants and their results. Publication of the NAS report is anticipated in 2017.

OIG Comment #17: The Board of Scientific Counselors subcommittee reviews cited are broad-based on ORD’s research programs generally, and neither focused exclusively on STAR.

3. Changes Will Improve the Clarity of the OIG Recommendations

We are concerned that the presentation of some OIG recommendations does not appropriately convey NCER’s current oversight of its STAR grants. For example, the results of STAR grant funded research are an integral part of the ORD national research programs. This is well demonstrated by the OIG survey result that 82 percent of the question twelve survey respondents indicated that STAR grant research “enhanced the scientific knowledge of EPA staff charged with shaping the direction of your program.”

In addition, OIG recommendation 1 directs NCER to: “Create procedures for developing RFAs...” This recommendation creates the impression that NCER has no procedures already in place for developing STAR requests for applications (RFAs) and does not ensure program office

input into the development of the RFAs. In fact, NCER has written guidance for developing RFAs and can provide documentation of consistent inclusion of interested program and regional office staff members on the RFA writing team. NCER proposes to update its current written procedures to incorporate the standard practice of program and regional office input.

As a third example, recommendation 5 directs NCER to, “Establish performance measures or a mechanism to capture and report out on how completed STAR grants have met their performance goals and provide incidental research support to program offices.” While documenting how STAR grant research results provide incidental research support to program offices is commendable, the implication is that NCER should consider the incidental benefits of STAR grant research results to be of primary importance. This would create a legal perception issue that NCER values the incidental benefit of STAR grants over the primary public purpose benefit. Nonetheless, we acknowledge that there are communication limitations resulting from the current practice of documenting how STAR grants have achieved NCER process measures on a grant-by-grant basis. We propose to develop a new communications document to summarize information regarding each RFA.

Regardless of specific issues with the OIG draft report, the OIG review and the continuous coordination with your team during the review has created an opportunity to clarify and refine NCER processes and guidance materials, gain ORD agreement about OIG findings and recommendations, and implement actions that we believe will help NCER strengthen communication about STAR grant results.

OIG Comment #18: We note in Chapter 1 that NCER developed an RFA template for STAR grants. However, as we note in Chapter 2, NCER STAR Project Officers said in interviews with us that having standard operating procedures would help improve communications with EPA program offices. We concur with NCER’s plan to update its oversight tools to incorporate the practice of program and regional office input. Also, our report does not imply that documenting incidental benefits takes primary importance over a STAR grant’s public purpose benefit.

4. ORD Actions and Timeframes Respond to Each of the OIG Recommendations

As explained in the previous sections, ORD respectfully requests that the OIG reframe its report findings, recommendations, and conclusions to include accurate information and findings. Despite these significant concerns, ORD generally agrees with the five OIG’s recommendations regarding STAR grants presented in the draft OIG report. Table 2 (below) describes proposed ORD actions and timeframes that respond to each OIG recommendation.

OIG Comment #19: As we note in Chapter 1, we conducted our performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our objective. We revised text as appropriate based on ORD's comments in response to our official draft report. We noted ORD's concurrence with our recommendations, and ORD's planned corrective action milestone dates (we used the last date of the quarter ORD cited in our status table in the report). We believe ORD's planned actions address the intent of our recommendations. All recommendations are resolved and open with corrective actions pending, and no final response to our report is required.

Table 2. ORD Actions and Timeframes Respond to Each OIG Recommendation

No.	OIG Recommendation	Responsible Office	ORD Action(s)	Estimated Completion Date
1	Create procedures for developing RFAs to ensure program office input is considered in the RFA development process.	ORD	Working with ORD NPDs, NCER will update current written standard operating procedures (SOP) to formalize the current standard practice of RFA development that includes program and regional office input and assistance.	3 rd quarter FY 2017
2	Create procedures for conducting relevancy reviews to ensure program office input is more consistently and transparently considered in the grant selection process (to the extent permitted by the FGCAA and EPA Order 5700.1). The procedures should include a mechanism for sharing how the results of relevancy review impacted award decisions.	ORD	NCER is finalizing a written SOP for its relevancy reviews that includes information regarding how relevancy review information is to be incorporated into the grant selection process. The SOP will provide guidance on information to be routinely shared with reviewers including limitations on the use of grants per FGCAA and EPA Order 5700.1, as well as explain how relevancy review results will be incorporated into the grant selection process.	3 rd quarter FY 2017

3	<p>Develop and implement procedures to improve communications with the EPA's program offices regarding STAR research results. The procedures should:</p> <ul style="list-style-type: none"> a. Ensure that the STAR grant public website is up to date. b. Revise the NCER Project Officer Manual (or develop a more dynamic tool) to reflect expectations for communicating grant results. c. Clarify and define roles and responsibilities for communicating research results. 	ORD	<p>NCER is developing and implementing SOPs to improve internal communications under ORD's new matrix structure of STAR grant research results to EPA program and regional offices.</p> <ul style="list-style-type: none"> a. NCER's communications team is analyzing current processes for updating the NCER database with STAR grant progress and final reports. NCER will establish an SOP to assure these updates are provided in a timely manner, as well as a method for identifying missing reports for timely follow-up leading to receipt and posting. b. NCER will coordinate and work with all involved staff leads (NCER, ORD, NPD) including communications, MIs, and POs to identify best practices to fulfill needs for communicating grant results and developing an SOP for grant research results communications. c. The NCER SOP for communicating grant results will clarify and define roles and responsibilities, as well as ensure that they align with the roles and responsibilities outlined in ORD's Matrix Structure. 	4 th quarter FY 2017
4	<p>Establish goals and objectives for the STAR program.</p>	ORD	<p>NCER will clarify the goals and objectives of the STAR grants that can be consistently used for various audiences.</p>	2nd quarter FY 2017
5	<p>Establish performance measures or a mechanism to capture and report out on how completed STAR grants have met their performance goals and provide incidental research support to program offices.</p>	ORD	<p>NCER, in collaboration with the NPDs, will establish a new SOP (including a communications plan) for documenting ORD L/C/O, program office, and regional office participation in the identification of RFA topics (and funding decisions) to assist EPA in advancing its mission; how individual grants are expected to fulfill the purpose of the RFA; and ultimately presenting how the funded grants met the RFA and individual grant performance measures. This document will not provide information on how STAR grants provide incidental research support to program offices; however it will provide information on how program and regional offices have worked with ORD to identify research areas of concern with regard to EPA meeting its mission and how those areas of concern have been addressed by STAR grant research results.</p>	4 th quarter FY 2017

Should you or your staff have any questions related to EPA's Office of Research and Development's responsibilities for these recommendations, please contact Heather Cursio at (202) 566-2327.

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