FY 2009 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: Thursday, September 10 & Friday, September 11, 2009
Program/Cluster/Section: Research on Gender in Science & Engineering (GSE)
Division: Human Resource Development
Directorate: Education & Human Resources
Number of actions reviewed: 42 **Awards:** 21 (12 Research, 3 Extension Services, 6 Diffusion of Research-Based Innovation) **Declinations:** 21 (15Research, 2 Extension Services, 4 Diffusion of Research-Based Innovation**)** **Other:** The GSE program counts collaborative proposals as one (1) award. Seven (7) GSE jackets are collaborative proposals in the sample. They are all research proposals and are highlighted in all charts.
Total number of actions within Program/Cluster/Division during period under review: 175 proposals **Awards:** 55 (30 Research, 7 Extension Services, 18 Diffusion of Research-Based Innovation) **Declinations:** 120 (79 Research, 15 Extension Services, 26 Diffusion of Research-Based Innovation) **Other:** Information on Awards & Declines represents actions in full proposal panels. The GSE program also holds preliminary panels for research & extension services tracks. Preliminary panel information in presented separately in section A.1. Full proposal panel information is presented throughout COV template.
Manner in which reviewed actions were selected:

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question**.** Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE[1]
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: For the period under review, the GSE managed the majority of preliminary and full proposals through the panel review process. The program also made use of mail reviews to handle a small number of proposals it received out-of-cycle. Reductions in travel budgets led the GSE to put a moratorium on site visits. This freeze has been in effect since FY2006. The COV has concerns about the effects of this strategy over the long term. While site visits are important to projects across all GSE funding tracks, they are especially critical for Extension Services Projects in their third year of operation. Fourth and fifth year funding for Extension Services projects is contingent on performance from year one through year three. In lieu of site visits for Extension Services projects, the GSE is currently using reverse site visits to meet these needs. The COV understands the logistical challenges that come with visiting multiple sites associated with Extension Services projects. We also concede that reverse site visit model might be operationally more efficient and cost effective at the present time. The COV recommends that GSE allocate funds in the budget to cover site visits as well as reverse site visits.	**YES**
2. Are both merit review criteria addressed a) In individual reviews? YES b) In panel summaries? YES	**YES**

[1] If "Not Applicable" please explain why in the "Comments" section.

c) In Program Officer review analyses? YES Comments: The COV finds both criteria – intellectual merit and broader impacts – were reasonably addressed at three levels of the proposal review process: individual reviews, panel summaries, and in the review analyses prepared by program officers. It is the Committee's position that the question of whether or not both criteria are addressed is not as meaningful today as it was fifteen years ago when the dual criteria were not as well established in NSF policy and procedure. Moreover, current policy (PAPP Guide Part I) states that NSF will return any proposal that does not address both intellectual merit and broader impacts without review. The Sample GSE Template for Research Proposal Panel found on the GSE COV Files CD further supports our position. The template format expressly requires individual reviewers and those charged with preparing panel summaries to evaluate how the proposed project meets each criterion. Although the template provides more guidance on rating a proposal's intellectual merit, reviewers must also assess broader impacts in order to complete the process. In addition, program officers prepare review analyses based on the proposals themselves and on panelists' responses both of which **must** address intellectual merits and broader impacts. Accordingly, the COV believes that a "Yes" response is the only possible answer to this question as it is currently written. The Committee recommends that the NSF consider what merit review criteria-related issues it now wants to address and to formulate a new question or series of questions that would facilitate a more substantive assessment of how individual reviewers, panels, program officers, and even PIs address intellectual merit and broader impacts in the context of proposals. The Committee sees this activity as an agency-wide NSF initiative.	

3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals? Comments: As part of our review, the Committee discussed how merit review criteria are perceived and weighted in the proposal preparation and review process. Although the intellectual merit and broader impacts criteria are structured in the proposal as being of equal weight, the COV finds that in practice, this is seldom the case. Individual reviewers consistently provide more extensive and varied comments on the strengths and weaknesses related to a proposal's intellectual merit than those related to broader impacts. This is true for both awarded and declined proposals across all three GSE program tracks – Research, Diffusion, and Extension Services.	**YES**

While it makes sense that reviewers would comment more substantively about intellectual merit when assessing Research-focused proposals, the COV thinks this scenario is potentially problematic for projects in the Diffusion and Extension Services tracks. In looking at this more closely, the following questions come to mind: How effectively are PIs and panels currently talking about broader impacts? How do we appropriately weight broader impacts for non-Research focused projects? How can we better instruct PIs and panelists to assess a project's broader impacts? The COV challenges the NSF to revisit how intellectual merit and broader impacts are considered and weighted across NSF programs and for projects within individual program tracks. The Committee sees this as an agency-wide strategy, not just a GSE program strategy.	
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: Generally speaking, panel summaries do provide sufficient information for a PI to understand the basis for the panel's recommendation. Even so, the COV finds that the panel summaries are less effective as a means of providing rationale for consensus (or lack thereof) than for summarizing the individual views of panel members. While summaries have the potential to work as consensus tools (e.g., all reviewers must concur with the summary statement), their results are often less impressive. The COV feels panel summaries sometimes default to covering all comments about intellectual merit and broader impacts without providing a true and clear rationale for a proposal's rating.	**YES**
5. Does the documentation in the jacket provide the rationale for the award/decline decision? Comments: The electronic and paper jackets are well organized and provide sufficient documentation from several sources to support the award/decline decisions.	**YES**
6. Does the documentation to PI provide the rationale for the award/decline decision? Comments: The COV finds that documentation given to PIs provides the rationale for the award or decline decision. The Committee would like to reiterate the value of providing all applicants with detailed and constructive feedback on all aspects of their proposals. This is especially true for first-time PIs as well as those whose proposals are declined. PIs who wish to refine their proposals and resubmit at a later date would benefit greatly from specific feedback on the strengths and weaknesses of their original proposals.	**YES**

7. Is the time to decision appropriate? Comments: Over the past three (3) years, GSE consistently met the NSF-wide Annual Performance Goal that for seventy percent (70%) of proposals, applicants would be informed about funding decisions within six months of proposal receipt or deadline or target date (whichever is later). The COV commends the program for consistently meeting this performance goal. In FY2006 and FY2007, NSF informed more than ninety percent (90%) of all applicants about funding decisions within six (6) months. Although still within the time-to-decision target, the COV made note of a small slip in dwell time in FY2008 when seventy-nine percent (79%) of all applicants were notified of funding decisions within six months. Even with the increase in dwell time, all GSE applicants received funding information within nine months. The "time-to-decision" change in FY2008 most likely points to one or more of the following factors: the complexity of specific proposals that require more time to review; the demands of a rigorous preliminary and full proposal review process; or administrative, managerial or resource issues. The COV suggests that GSE program staff monitor dwell times in FY2009 and FY2010 to see if this trend continues. If it does, then the COV recommends that an effort be made to ascertain the cause(s) and find appropriate solutions to resolve or reduce their potential negative impact on dwell times.	**YES**

8. Additional comments on the quality and effectiveness of the program's use of merit review process:

The COV's review shows that the GSE carefully, thoroughly, and consistently executed review methods, merit criteria, and documentation processes across awarded and declined proposals. The COV also finds a reasonable level of consistency in the quality of individual reviews and panel summaries, although we see opportunities to strike a better balance when weighting a project's intellectual merit and broader impacts potential as well as more effectively using panel summaries as a consensus tool. The Committee commends the GSE for its comprehensive, well thought out guidelines and instructions that help reviewers assess proposals prior to funding and project initiation. We also support the GSE's decision to use reverse site visits for ongoing projects in the Extension Services track after budgets for site visits were cut. All these efforts support the merit review process in ways that positively impact the overall quality of GSE merit review and by extension, the overall quality of the program portfolio.

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE[2]
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: The reviewers represented a range of appropriate areas of expertise and qualifications. Reviewers also reflected diverse disciplinary and professional backgrounds including Education, Education Policy, Educational Psychology, Curriculum and Teaching, Science and Society, Information and Technology, Gender Studies, Women's Studies, Mathematics, and the Sciences (including but not limited to Anthropology). Given the different foci of funding tracks in the GSE program, careful attention was paid to the appropriate matching of reviewer qualifications and the goals of the particular program funding area. For example, reviewers (e.g., practitioners) with Extension Services expertise were included on Extension review panels, while researchers with gender studies and science and engineering backgrounds most often reviewed research proposals.	**YES**
2. Did the program use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups? Note: Demographic data is self-reported, with only about 25% of reviewers reporting this information. Comments: The COV recognizes the great strides made by GSE to diversify the composition of the program's reviewer pool. GSE successfully met the challenge to find male reviewers with expertise in gender studies. In fact, the percentage of male reviewers increased from five percent (5%) or one (1) male reviewer in FY2006 to thirty percent (30%) or eight (8) male reviewers in FY2008. Increased representation of review panelists from diverse ethnic groups also significantly improved between FY2006 and FY2008. In FY2006, almost all reviewers were white. By FY2008, Hispanics, American Indians, and African Americans comprised a considerable presence in the reviewer pool. In fact,	**YES**

[2] If "Not Applicable" please explain why in the "Comments" section.

underrepresented groups in the STEM fields totaled forty-six percent (46%) of all GSE reviewers. The COV also commends the program for its efforts to bring in scholars, researchers, and practitioners from a number of different organizations beyond research institutions. In FY2006, the majority of reviewers came from Research I institutions. By FY2007 and FY2008, less than half of the reviewer pool came from Research I institutions. Individuals from Tribal Colleges, nonprofit organizations, and other types of academic institutions made up a growing number of reviewers. Although the data shows that reviewers now represent a solid cross-section of underrepresented groups, institutional types, and geographical regions, there are ongoing opportunities to diversify the reviewer pool. The COV suggests that the GSE focus its efforts on increasing the participation of reviewers from community colleges and minority-serving institutions (MSIs). In addition, although the seventy-six (76) individuals who served on full proposal panels between FY2006-FY2008 represented twenty-six (26) states, thirty-four (34) panelists or nearly forty-seven percent (47%) came from five (5) states: New York, (9) Virginia (8), California (7), Alabama (5), and Massachusetts (5). A stepped up effort to add or increase representation from underrepresented states – especially those in the Mountain States region – is highly recommended. Arizona was the only state in this region to have representatives in the reviewer pool.	
3. Did the program recognize and resolve conflicts of interest when appropriate? Comments: The Conflict-of-Interest (COI) and Confidentiality Statement for NSF Panelists clearly outlines the potential institutional, personal, and other affiliation or relationship conflicts that could impact on an individual's ability to serve on a panel. Given the thoroughness of the COI guidelines, the COV assumes that the GSE program recognizes and resolves COIs in an appropriate and timely manner. It was difficult for the COV to determine the extent to which past COIs were resolved because details were limited.	**YES**
4. Additional comments on reviewer selection: Generally speaking, the selection of reviewers has been balanced and representative, particularly after FY2006. In order to maintain and increase this level of diverse participation, the COV recommends that the GSE program continue to make targeted recruitment and selection strategies aimed at underrepresented groups, geographical regions, and institution types a high priority.	

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE[3], OR DATA NOT AVAILABLE
1. Overall quality of the research and/or education projects supported by the program. Comments: Research and education projects funded by the program cover a wide spectrum of themes that are clearly in line with GSE's mission and also reflect the NSF's research investment priorities. GSE projects demonstrate both breadth and quality. The COV finds that research projects investigate issues spanning the education pipeline from elementary education to higher education. Within higher education, research studies address issues related to diverse types of institutions (e.g. junior colleges, historically Black Colleges and Universities (HBCUs), Tribal Colleges, etc.). Many GSE projects operate within learning environments – involving teachers as well as students, in formal and informal learning environments including mentoring. Others operate outside of learning environments to assess distribution of, and possible correlation among, the ranges of variables associated with gender differences in STEM attitudes in school, career choice, and career retention. In both categories, projects have been high quality in all basic parameters: the institutions supervising and/or managing the projects; the credentials and expertise of PIs; the demographic and disciplinary range of collaborative participants and meaningful target learner groups ("meaningful" in the sense of adequately representing the ultimate target demographic group for the GSE program as a whole: girls and women) in STEM fields of study and research.	**APPROPRIATE**
2. Does the program portfolio promote the integration of research and education? Comments: Between FY2006 and FY2008, eighteen (18) of thirty (30) awards or sixty percent (60%) of the total went to dissemination, outreach and research–based innovation projects. This represents a balanced portfolio of research and education efforts.	**APPROPRIATE**

[3] If "Not Appropriate" please explain why in the "Comments" section.

Recent changes in the prioritization of GSE subdivisions may further encourage this integration. For instance, the new emphasis on funding programs that do not primarily serve students, but that instead engage students as both test and control group participants in research studies, is likely to enhance integration of research and education by engaging classroom teachers in research projects and researchers in classroom environments. The simultaneous shift in emphasis from the Research subdivision to the Extension Services model subdivision could have a similar impact.	
3. Are awards appropriate in size and duration for the scope of the projects? Comments: The GSE program portfolio between FY2006-FY2008 is consistent with the award sizes and durations stated in the annual GSE solicitation for the same period. The Committee also notes that the majority of awards are for multiyear projects and many represent collaborations between two and four year institutions. The COV found it somewhat challenging to assess "appropriateness" of the awards in terms of size, duration, and scope of GSE projects because the referent is unclear. The Committee considered several approaches on how future COVs could better assess the appropriateness of awards. We think the following information would be helpful: • Actual awards amounts compared to the amounts requested by the PI. • Additional or other external funding (if any) that the PI secured and that contributed to the project's completion. • How the GSE's budget allocations and awards granted relate to the pool of meritorious awards that would all be funded if "unlimited funds" were available. Having access to data at this level of detail would enable future COVs to make a more fully informed assessment of an award's "appropriateness." It would also make it easier to know how budget allocations impact the GSE program and its goals, and how future recommendations for budget increases might or might not have a bearing on GSE program goals, outcomes, and impact.	**APPROPRIATE**
4. Does the program portfolio have an appropriate balance of: • Innovative/potentially transformative projects? Comments: Yes, the portfolio includes an appropriate balance of innovative and potentially transformative projects. As part of our review, the Committee discussed what constitutes "transformative research" and the ongoing	**APPROPRIATE**

challenges of defining and quantifying it. The National Science Board defined it as "research that has the capacity to revolutionize existing fields, create new subfields, cause paradigm shifts, and lead to radically new technologies."[1] The COV contends that many of the projects funded by GSE are far more potentially transformative and innovative than some of the "pure research" projects funded by other NSF directorates. This is because the results of GSE projects have the potential to change the processes of scientific research, education, and policy in NSF and in the American scientific and engineering community at large. Programs like GSE that focus on "broader impacts" as their strong points of innovation have the potential to impact NSF and the larger scientific/science education community in fundamentally significant ways. It is also the Committee's position that within the current GSE portfolio, there are additional outstanding research projects that have not been recognized or identified as transformative but which we find merit the designation. We think this situation extends beyond the GSE program and therefore recommend that it is best to address issues surrounding transformation and innovation at the agency level. [1] "*Enhancing Support of Transformative Research at the National Science Foundation*," National Science Board, NSB-07-032, 2007, page 1.	
5. Does the program portfolio have an appropriate balance of: • Inter- and Multi- disciplinary projects? Comments: Twenty (20) grants were awarded to inter- and multidisciplinary projects between FY2006-2008. These funded projects focused on more than one disciplinary area and included PIs and Co-PIs who represented a range of intellectual interests and backgrounds. Inter- and multidisciplinary collaborations among these investigators (e.g., human development and mechanical engineering, biological physics and education, civil engineering and higher education) created innovative projects and crosscutting approaches. The GSE portfolio included seven (7) grant awards that shared co-funding with other NSF programs including Engineering Education, the Office of International Science and Engineering, Research in Disabilities Education, and the Division of Research on Learning in Formal and Informal Settings (Program Evaluation). Co-funded projects were not awarded in FY2008.	**APPROPRIATE**
6. Does the program portfolio have an appropriate balance considering, for example, award size, single and multiple investigator awards, or other characteristics as appropriate for the program?	**APPROPRIATE**

Comments: On the whole, the GSE portfolio reflects a balance of projects that are appropriate for the program in terms of award size, single and multiple investigators, and many other factors. The COV would find it helpful to know how often large, well established institutions (and PIs at said institutions) collaborate with and/or mentor PIs at institutions such as Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), etc. While there are a number of collaborative GSE projects, it was difficult for the COV to determine from the format of the data provided how often this type of collaboration occurs.	
7. Does the program portfolio have an appropriate balance of: • Awards to new investigators? Comments: The GSE program portfolio has an appropriate balance of awards to new investigators. Over the three-year period FY2006-FY2008, the percentage of awards granted to new investigators averaged forty-five percent (45%). In FY2006, twenty-six percent (26%) of awards went to new PIs. This number jumped substantially in FY2007, when new PIs received sixty percent (60%) of the awards. The FY2008 award cycle was particularly well balanced, with fifty percent (50%) of awards going to new PIs and the remaining fifty percent (50%) to established researchers.	**APPROPRIATE**
8. Does the program portfolio have an appropriate balance of: Geographical distribution of Principal Investigators? Comments: The program portfolio represents a reasonable balance of geographical distribution of principal investigators (PIs) although there are significant opportunities for improvement. Relatively few awards have been made to regions generally considered as “underrepresented” in federal scientific efforts, most of which are active in EPSCoR efforts. Three states with high minority populations – Alabama, Oklahoma, and Mississippi – that had not received grants in FY2003-FY2005 were still without grants in FY2006-FY2008. PIs from twenty-one (21) states across the U.S. received awards between FY2006-FY2008. The twelve (12) states with multiple awards are: Massachusetts (8), New York and Maryland (6 each), California (5), Pennsylvania, Minnesota, Michigan, Delaware, and Colorado (3 each), and Indiana, Virginia, and Florida (2 each). Moreover, nearly fifty percent (50%) of all awards went to PIs in four (4) states: Massachusetts, New York, Maryland, and California. Given the target demographics for GSE, it would be both worthwhile and meaningful to escalate PI recruitment efforts in EPSCoR program states and in states with large numbers of students enrolled in	**APPROPRIATE**

minority-serving institutions (MSIs). One approach to successfully addressing this challenge might be to set up a formal mentoring program that encourages experienced PIs and institutions to team up with institutions and new PIs from EPSCoR states, MSIs, and heavily urban or rural areas in locations not currently served or reached by GSE projects. Along with ensuring more geographical diversity in the GSE portfolio, a structured mentoring approach could potentially enhance participation by underrepresented groups and ensure the appropriate balance of project awards across partnerships, consortia, institutional types, and individuals.	
9. Does the program portfolio have an appropriate balance of: • Institutional types? Comments: Generally speaking, yes. Thirty-five (35) of fifty-five (55) proposals or sixty-three percent (63%) of all proposals funded by the GSE program between FY2006-FY2008 were awarded to doctoral granting research institutions. Approximately thirty percent (30%) were awarded to nonprofit educational institutions outside of higher education. Awards to community colleges, minority-serving institutions (MSIs), and non-PhD granting institutions continue to be underrepresented. The COV strongly recommends the GSE program focus attention on increasing the submission of proposals from these underrepresented institutions.	**APPROPRIATE**
10. Does the program portfolio have an appropriate balance: • Across disciplines and sub disciplines of the activity? Comments: GSE funded projects reflect a healthy balance of diverse disciplinary backgrounds and project activities. Multiple areas of expertise in the social and behavioral sciences, engineering, education, and the physical sciences are represented in the program portfolio. Among funded research projects between FY2006 and FY2008, approximately thirty-five percent (35%) of PIs and Co-PIs were from educational fields and twenty-three percent (23%) represented the science and engineering disciplines. Research projects related to the social and behavioral disciplines (e.g., psychology and sociology) made up the remaining forty-two percent (42%) of the GSE portfolio.	**APPROPRIATE**
11. Does the program portfolio have appropriate participation of underrepresented groups? Comments: The COV finds that GSE awards to women and ethnic minority groups are	**APPROPRIATE**

made proportionately to the number of prospective female and minority PIs that applied for funding between FY2006-FY2008. Women apply for and serve as PIs or Co-PIs for the majority of funded projects in the GSE portfolio. Between FY2006-FY2008, ninety-four point five percent (94.5%) or fifty-two (52) of fifty-five (55) awards went to projects with female investigators. In terms of submissions only during the same time period, the proportion of programs with and without female participation was ninety-six point three percent (96.3%) and three point seven percent (3.7%) respectively. GSE efforts to increase the number of funded projects from minority PIs have met with variable success despite ongoing outreach efforts to attract underrepresented researchers and practitioners. Consequently, ethnic minorities serving as PIs or Co-PIs was ten percent (10%) in FY2006, forty-two point five percent (42.5%) in FY2007, and fourteen percent (14%) in FY2008. In terms of submissions, thirty-seven (37) of one hundred seventy-six (176) proposals or twenty-one percent (21%) included participation by ethnic minorities. The COV encourages the GSE program officer and staff to continue efforts to bring more underrepresented researchers into the program. We applaud GSE's participation in regional grant conferences and other venues where they might reach underrepresented groups.	
12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports. Comments: Broadening participation is integral to the mission of NSF and as such, GSE is a critical component of this effort. In addition, the development of a strong, diverse, and technically competent workforce continues to be a national priority as evidenced by the recent *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (COMPETES*) signed into law in August 2007. And even more recently in April 2009, President Obama eloquently described the importance of science and a scientifically educated citizenry to the future of this nation during a presentation to the National Academy of Sciences. The mission and role of GSE is central to this enterprise.	**APPROPRIATE**
13. Additional comments on the quality of the projects or the balance of the portfolio: The COV is pleased to see that many projects in the GSE portfolio include the participation of women and girls from underrepresented ethnic and racial groups. We encourage GSE to continue with this focus and expand it further to include projects that explicitly examine issues that are relevant to women and girls from specific ethnic and/or racial groups as well as within group differences in constructs of interest.	

We also think that it is important to learn more about how early childhood learning environments impact girls' efficacy and dispositions toward science and engineering. The COV strongly recommends that GSE consider expanding its portfolio to include more funded projects that focus on girls' social and cognitive development in the early school years (K-3). The Committee believes that increasing the knowledge base and its practice implications in this area has the potential to positively influence the participation of girls and women in STEM fields. Early education is also a potentially important transition point that should be included with other important leverage points that GSE has increasingly focused on, such as middle school to high school, and community colleges to four-year institutions.

The COV recommends that GSE aim to increase the number of community college to four-year college transition projects in the portfolio. It is our position that community college to four-year college transition projects furthers GSE's interest in providing access to science and engineering. This is especially true for ethnic minorities who are disproportionately enrolled in community colleges. Over half of Latino students in higher education study at community colleges. Unfortunately, community college students are less likely to obtain bachelor's degrees in all fields including STEM fields of study compared to students who attend four-year institutions immediately after high school. While the reasons behind this are not completely clear, they are most likely associated with the process of transitioning and transferring course credits in STEM-related subjects. Dual enrollment and articulation agreements between community colleges and four-year institutions have been shown to ease these transition problems.

A.4 Management of the program under review**. Please comment on:**

1. Management of the program.

Comments:

The COV recognizes the GSE program staff for the excellent job it does in managing a large and diverse portfolio with limited staff resources. Overall management of the program is very strong. The program officer, hired in October 2005, has embraced the many and varied challenges that come with managing the GSE program. She has played a significant role in growing and enhancing the GSE program during the time period (FY2006-FY2008) reviewed by this Committee.

During our review, the COV learned that budget restrictions led to a freeze on site visits beginning in FY2006. To mitigate the loss of in-person contact, the program officer made stepped up interaction with substantial numbers of PIs and prospective PIs by phone and during outreach meetings a priority. The two publications, *New Formulas for America's Workforce 2* and *New Tools for America's* Workforce are both impressive and useful. Hiring a part-time science assistant in FY2007 was a positive step. We applaud these efforts.

There are still opportunities to strengthen the management of the program. First, the COV has serious concerns about the lack of staff resources allocated to support a dynamic and demanding program. The program continues to be run by one program officer with a shared program assistant. In keeping with and expanding on the recommendations made by the previous COV, we strongly urge the NSF to fund a rotator position, and if possible, additional support staff to assist the GSE program officer. Given the breadth and depth of the current program officer's experience in the Research funding track, the Committee thinks it would be advantageous for the individual who fills the rotator position or for new support staff to have backgrounds and experiences that more closely align with program needs in the Diffusion and Extension Services tracks.

Among the strengths of the GSE program has been its use of preliminary proposals to provide prospective PIs with substantial feedback and to discourage weaker project concepts. This approach led to higher quality full proposals, which translated into higher quality projects, and ultimately contributed to the program's overall success rate. The COV was very interested to learn that GSE plans to test-drive a "Letter of Intent" (LOI) process in place of the standard preliminary proposal process during FY2009. Although the COV understands that the LOI process will most likely lead to short-term conservation – saving time, money, and reviewer resources – the Committee is concerned about the potential decline in the GSE program's overall success rate. The COV is also concerned that the shift to the LOI process may further burden the already stretched resources of the program staff. The COV recommends the GSE staff carefully monitor the program to determine the extent to which the shift from preliminary proposals to LOIs positively or negatively impacts the program. Moreover, the Committee suggests that GSE program management define what an acceptable level of decline would be, and when and if the permanent replacement of preliminary proposals with LOIs would be deemed too costly to the program.

We would also like to "revisit" the issue of site visits and their role in the GSE program. As we acknowledge in our response to question A.1.1, the COV understands the costs and logistical challenges related to site visits and that the reverse site visit model might be an operationally more efficient and cost effective way to address the needs of Extension Services projects at critical stages and when travel budgets are tight. Site visit teams typically comprise the project, NSF staff and experts from the field representing a number of different organizations. One concern the Committee

has about permanently replacing site visits with reverse site visits is that site visits offer a component of networking and collaboration-building that reverse site visits can't match. Site visits "plug" the project team into the larger community in important ways that does not happen when the project team alone visits the NSF. While we agree that a reverse site visit is a better option than no visit at all, we encourage the NSF to reconsider and budget for site visits, particularly for Extension Services projects.

2. Responsiveness of the program to emerging research and education opportunities.

Comments:

The redirection of the funding tracks has created a dynamic mix of investigators. The COV is pleased to note that current projects represent a highly diversified number of theoretical and methodological perspectives including stereotype threat, social cognitive career theories of gender, as well as both quantitative and qualitative approaches. Panels have also been adjusted to better reflect the various disciplines and approaches among their members and have resulted in a highly desirable, multidisciplinary mix of reviewers.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

The Program Officer seems to have a good understanding and vision for the interaction of the various portfolio components, as well as connections to additional gender-related funding opportunities in other NSF programs and divisions. The COV commends GSE leadership for redirecting the program away from direct interventions and toward a more dynamic combination of funding tracks. The redirection has resulted in a number of exciting funding opportunities since the previous COV. The Committee reviewed data that validates the overwhelming response and substantial interest in the GSE Research funding track. The numbers of high quality proposals submitted for consideration further demonstrate the benefits of a rigorous program planning and prioritization process.

We are also pleased to see that the Extension Services track is generating interest from the GSE community. The COV was disappointed to learn the Diffusion of Research-based Innovation track is an underutilized component of the GSE program. We suggest that program staff step up efforts to better market and attract higher quality and more diverse proposals. Focused outreach to members of the GSE community and webinars to help publicize Diffusion opportunities also merit further consideration.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

The COV team commends the GSE program staff for its overall responsiveness to previous COV comments and recommendations. The Committee was particularly impressed by the ongoing efforts and progress made in the following areas: diversifying the reviewer pool, nurturing a research project portfolio that is robust, cutting edge, and increasingly multidisciplinary, funding more projects by first-time PIs, supporting more geographically, institutionally, gender, and ethnically diverse

projects, and funding projects that focus on critical transition points in STEM education and careers.

The previous COV suggested that GSE implement a plan for evaluating the results of their funded projects, as well as organizing their results for dissemination. The *FY07 Annual Division Report (ADR)* noted that the program granted a SGER award to an experienced evaluator to generate a logic model and accompanying evaluation strategy. The Committee understands that this project has not adequately provided the information that GSE needs to know and that new evaluation mechanisms are being sought. We strongly encourage the GSE to move forward with this critical endeavor.

5. Additional comments on program management:

PGELIST, an electronic mailing list (listserv) appears to be an excellent yet not fully tapped resource for the GSE community. GSE grantees have used it in the past to advertise events, new products, and to exchange ideas. Given existing staffing levels, the COV is curious about the resources required to maintain, update, or potentially expand the use of the PGELIST. To avoid confusion, it might also make sense to rename the mailing list “GSELIST” so that it corresponds to the acronym for the current program name.

The COV would find it helpful to know how the number of proposals the GSE program processes on an annual basis compares to other NSF programs.

PART B. RESULTS OF NSF INVESTMENTS

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The NSF mission is to:

- promote the progress of science;
- advance national health, prosperity, and welfare; and
- secure the national defense.

To fulfill this mission, NSF has identified four strategic outcome goals: Discovery, Learning, Research Infrastructure, and Stewardship. The COV should look carefully at and comment on (1) noteworthy achievements based on NSF awards; (2) ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcome goals; and (3) expectations for future performance based on the current set of awards.

NSF investments produce results that appear over time. Consequently, the COV review may include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made.

To assist the COV, NSF staff will provide award "highlights" as well as information about the program and its award portfolio as it relates to the three outcome goals of Discovery, Learning, and Research Infrastructure. The COV is not asked to review accomplishments under Stewardship, as that goal is represented by several annual performance goals and measures that are monitored by internal working groups that report to NSF senior management.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: "*Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."*

Comments:

The GSE portfolio features a broad range of high quality projects that have discovery as the primary strategic outcome goal. The following research projects illustrate NSF's outcome goal for discovery:

NSF Award Numbers: 0332582
Award Title: GSE/RSE Gendered Pipelines? Sex Segregation in Engineering and Math/Computer Science Fields of Study
PI Name(s): Maria Charles and Karen Bradley
Institution Name(s): University of California – San Diego, Western Washington University

The project is a study of gender representation in numerous fields of science and engineering in 44 diverse countries worldwide. This study discovered that "gender segregation is [statistically significantly] greater in more advanced industrial contexts" and that "gender-differentiated curricular preferences" seem to be "cultivated within affluent postindustrial societies." This certainly challenges the dominant paradigm of "advanced cultural development leads to greater gender equity" that informs science and technology research and education in the U.S. The study summary goes on to specifically document that countries with higher GDPs ("as a measure of economic development")

are *less* likely to have women in the fields of engineering and natural science, but *more* likely to have women in humanities, social sciences, and health-related fields. The authors point to several possible causes for the proportional decline of women in engineering and natural science in countries that are more economically developed.

NSF Award Numbers: 0652559/0429109
Award Title: GSE/RES Girl's Science Practices in Urban High Poverty Communities
PI Name(s): Angela Calabrese Barton and researchers
Institution Name(s): Michigan State University and Teachers' College of Columbia University

Dual award 0652559 and 0429109 is another project that addressed the strategic outcome goal for discovery and took place "within" a learning environment. This study merged girls' social worlds with the classroom scientific world in an elementary school setting and discovered that it not only created "bridges between the two worlds (social and school science), but also blended and merged these worlds to create a new hybrid space that supported the girls in leveraging their out of science class identities and experiences leading to deeper science learning." Story telling and creating "authentic products" were two of several processes that led to increased test scores and increased "profiles" (participation) in science class for girls in the program.

The COV finds that in addition to meeting the outcome goal for discovery, each project also has the potential to be highly transformative, yet neither has been identified as transformative in their summary highlights. Refer to Section A.2.4 and C.3 for additional Committee feedback on the GSE portfolio and potentially transformative or innovative projects.

B.2 OUTCOME GOAL for Learning: "*Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.*"

Comments:

The mission of GSE is to *support efforts to understand and address gender-based differences in science, technology, engineering, and mathematics (STEM) education and workforce participation through research, the diffusion of research-based innovations, and extension services in education that will lead to a larger and more diverse domestic science and engineering workforce*. This is a clear alignment with the outcome goal for learning. The breadth of the GSE funded projects is impressive, ranging from projects addressing barriers and supports for girls and women pursuing STEM degrees and careers to projects addressing inclusive STEM literacy for all. The following projects illustrate GSE's outcome goals for learning:

NSF Award Number: HRD 06-31754
Award Title: WISSC via Web: A Dissemination Project making GSE Research Useable for Practitioners Supporting Women in STEM Studies and Careers
PI Name(s): John Horan and Gail Hackett
Institution Name(s): Arizona Sate University

This project is particularly noteworthy since it is often difficult for gender-equity practitioners to ground their interventions in research findings. Often the practitioner is a scientist who is not familiar with or does not have access to research findings in the social sciences or education. The PIs estimate that 60,000+ teachers, counselors, and school leaders in the state of Arizona will be reached with national dissemination to follow.

NSF Award Number: 0332903
Award Title: Creating a Model Undergraduate Research Experience to Promote Diversity in Engineering and Computer Science Fields
PI Name(s): Drs. Deborah Estrin, Christine Borgman, Linda Sax, and Karen Kim
Institution Name(s): Center for Embedded Networked Sensing (CENS) at the University of California-Los Angeles

This project aims to broaden the participation of women in STEM by investigating factors, particularly undergraduate research, which retains them in undergraduate STEM programs.

NSF Award Number: 0217110
Award Title: 4 Schools for Women in Engineering: University Collaborative Effort Infuses Engineering and Gender-Equitable Practices into the Middle School Curriculum
PI Name(s): Dr. Katherine Ziemer and colleagues
Institution Name(s): Northeastern University, Tufts University, Worcester Polytechnic Institute, and Boston University

The findings from this project imply that exposing science teachers to gender-equitable classroom practices and engineering concepts and careers from STEM professionals can foster girls' interests toward STEM fields and careers.

B.3 OUTCOME GOAL for Research Infrastructure: "*Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.*"

Comments:

The role of GSE in building research capability appears to be most promising with grants that develop, implement, and assess the impact of experimental tools and strategies. Among the projects that illustrate GSE's outcome goal for research infrastructure is one that designed innovative computer programs and collaborative programming approaches for girls and have shown increases in girls' computer skills, confidence in working with computers, and ability to problem solve with information technology (0217221). Other experimental tools such as anthropomorphic interface agents (computer generated human animations) can be effective social models for under-represented girls and positively influence them to pursue STEM fields. Project reference:

NSF Award Number: 0217221
Award Title: Girls Creating Games: Increasing Middle School Girls' Interest in Technology
PI Name(s): Jill Denner
Institution Name(s): ETR Associates

A substantial number of proposals funded by GSE focus on innovative research that addresses both individual and contextual factors associated with women and girls involvement in STEM educational paths and careers. Funded projects have addressed instrumentation (0607081), the utilization of computer games to increase girls' interest and participation in the field of information technology (0624549, 0217221) and virtual environments that enable high school girls to increase their math self-efficacy (0522634). Project reference:

NSF Award Number: 0607081
Award Title: GSE/RES Assessing Women in Student Environments (AWISE): Moving Assessment of Women Studying Engineering in the Classroom

PI Name(s): Rose Marra
Institution Name(s): University of Missouri – Columbia

NSF Award Number: 0624549
Award Title: Girls Creating Games: Cafe Universo
PI Name(s): Steven Bean
Institution Name(s): ETR Associates

NSF Award Number: 0217221
Award Title: Girls Creating Games: Increasing Middle School Girls' Interest in Technology
PI Name(s): Jill Denner
Institution Name(s): ETR Associates

NSF Award Number: 0522634
Award Title: GSE/RES Learning Companions as Change Agents: Improving Girls' Self-efficacy Beliefs in Learning Math / Math Girls: Providing a Girl-Friendly Virtual Environment to Build Girls' Positive Attitudes toward Learning Math
PI Name(s): Yanghee Kim
Institution Name(s): Utah State University

The COV suggests increased focus and continued support for technological innovations in GSE funding.

PART C. OTHER TOPICS

C.1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

The COV is troubled by the lack of progress made in the Broadening Participation Partnership Initiative in the Diffusion of Researched Based Innovation funding track. It was disappointing to learn that GSE received limited response to this important incentive program and that proposal submissions included very few “bona fide” or “authentic” partnerships. We understand that GSE is looking at options for retooling or perhaps even terminating this initiative. The COV encourages the GSE to identify the root cause(s) of why the initiative is not working before making a decision to drop it. For example, is there something about the context of the Diffusion track that could account for the lack of proposals with authentic and meaningful partnerships? Or is the problem related to the incentive?

In contrast, the number of proposals in the Research funding track contain partnerships and they do so without monetary or other incentives. One possible explanation for this is that almost all research projects in the portfolio focus on issues related to underrepresented girls and young women in science. Targeting underrepresented populations may be an important factor in developing partnerships and collaborations between diverse types of institutions. The COV strongly encourages GSE to consider including a focus on underrepresented girls in the new solicitation for Diffusion proposals. We also suggest that GSE explore the possibility of establishing a planning grant to facilitate stronger proposals in this area.

Another area of concern for the COV is the absence of a formal GSE mentoring program. While the COV recognizes the challenges of setting up a mentoring program while balancing other program priorities, the Committee strongly believes that a mentoring program would help GSE achieve specific program targets including: improving the geographical distribution of GSE projects, increasing participation of underrepresented groups across program tracks and projects, and balancing project awards across partnerships, consortia, institution types, and individuals. It is our position that a GSE mentoring program would provide opportunities for experienced PIs and institutions to partner with people and institutions in EPSCoR states, from people and institutions with high enrollments of underrepresented groups including HBCUs and TCUs, and from deeply urban or highly rural areas of states that are not currently served or reached by GSE projects. We encourage the GSE to make a formal mentoring program a priority.

GSE is on the right track with its increased attention on translating project findings to practitioners working with girls and young women. Sites of practice including classrooms, after school programs, and organizations, stand to realize tremendous benefits from the use of feedback loops between researchers and practitioners. While there have been some collaborations as a result of these efforts, the COV encourages even more collaboration. Based on our review, it appears that Extension Services and Diffusion projects carry the load of translating research to practice, while Research projects pay limited attention to bridging activities. The COV would like to see additional research projects that focus more on connecting to practitioners, which in turn, could lead to more effective collaborative proposals with diverse partnerships.

C.2. Please provide comments as appropriate on the program’s performance in meeting program-specific goals and objectives that are not covered by the above questions.

During our review of the *Update to the NSF Response to the COV Report*, the Committee noted the previous COV’s recommendation concerning evaluation and promotion of the GSE program. GSE responded that it is exploring evaluation activities and options, and that dialog with the community is

an integral and essential part of this process. The 2009 COV supports the GSE efforts to develop and implement an appropriate evaluation strategy and plan. In addition, the COV strongly recommends that results of research and other projects funded by GSE be included in and applied to the process of creating and formatting new evaluation criteria, deciding how to inform potential PIs of those criteria through program solicitations and other means, and developing strategies for evaluation system implementation.

C.3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

The GSE's continued focus on retention is laudable. While the COV supports this effort, we also encourage not only the GSE but also the NSF to define retention more broadly and beyond graduation numbers. When NSF asks PIs to increase the numbers of underrepresented students in STEM, it is necessary but not sufficient to earn the degree. Students must also have viable GPAs and ideally associated academic experiences (e.g. study abroad, student teams, leadership in student organizations, internships) in order to become full practitioners in their respective STEM fields.

The COV also spent significant time discussing the relative weights given to the merit criteria – intellectual merit and broader impacts – with respect to different programs within the NSF. One of the things we noted was that impact-oriented programs tend to offer more high risk challenges to established systems of operation, including the NSF. High impact can also be perceived as threatening or endangering. Given GSE's charge to help change the environment in all fields of STEM education and to make the community more inclusive with respect to gender, the results of the projects it funds are going to challenge existing paradigms. This is also true of other impact-oriented programs (including those that focus on enhancing inclusivity of other underrepresented groups). The COV suggests that it might be useful for the NSF to establish a committee or panel that regularly "harvests" results of projects funded by such programs with the express intention of investigating those that could be "in the field" of NSF's own operations. Those that prove effective should be considered when new policies and even new strategic goals are developed. We also believe that program managers would be an integral part of this process because they are most familiar with the program's goals and how those are being achieved through the portfolio of projects.

In our response to question A.3.4, the COV asserted that many high quality studies funded by GSE have the potential to be highly transformative to both the research and education communities. Yet for some reason, a significant number of studies that produce potentially transformative results are not flagged as "transformative" in their summary highlights, nor are their results used to modify processes and goals within GSE itself, much less the NSF. Are the guidelines as to what constitutes transformative research clear and transparent to program managers and investigators? When was the last time the guidelines were reviewed? The COV challenges the program and the agency to find out why the most powerful impacts of the research it supports are not being transferred through the pipeline into the larger scientific community as a whole or to NSF policy and processes. The Committee finds it is extremely important for the most paradigm-challenging results of projects funded by an impact-oriented program such as GSE, be periodically harvested and reviewed by NSF staff at the highest levels, with serious attention paid to implementing changes in NSF policies and processes as a result of what has been learned. It seems highly unlikely that these projects can impact the larger scientific and education communities if they are overlooked by the NSF.

Two examples of studies that the COV feels have the potential to be highly transformative are: Award number 0332852, Dr. Maria Charles of the University of California, San Diego, and Karen Bradley of Western Washington University; and dual award 0652559/0429109, Dr. Angela Calabrese Barton and researchers at Michigan State University and Teachers College of Columbia University.

C.4. Please provide comments on any other issues the COV feels are relevant.

The COV is pleased that the program is funding an increasing number of partnership projects. To ensure the successful collaboration of current and future partnerships, it is imperative that PIs understand the two-way nature of collaboration. There are a number of ways that the GSE could facilitate this understanding and ensure more effective collaboration between and among project partners. The COV suggests that GSE consider the following: incorporating explicit guidance in solicitations, creating and distributing a collection of best practices, providing targeted technical assistance, developing and offering a planning grant, and establishing a formal mentoring program for prospective PIs and institutions.

C.5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV commends the NSF and GSE staff for the breadth, depth, and overall quality of resources that were provided to support the COV review process. The Committee would also like to acknowledge and thank the NSF leadership and staff and the GSE program officer and staff for their responsiveness and hospitality during the onsite session.

Except for the technical writer, none of the external experts – neither the COV Chair nor the panelists – had previously served on a COV. The Committee came up with a number of suggestions that could potentially enhance the COV process for future first-time Chairs and panelists as well as those with previous experience. While we understand that time limitations and the confidential nature of COVs might limit the NSF's ability to implement one or more of our suggestions, we appreciate the opportunity to share our ideas.

The Committee agrees that the COV Introductory Webinar provides an efficient means to introduce participants to fellow COV team members and to key program and other support staff. While the presentation touches on the general COV process, we think the Webinar could do an even better job of orienting a COV team about what to expect during the two-day session at NSF. We think the technical writer should attend the COV Webinar and perhaps facilitate a short "real world" discussion about the onsite session. The COV also recommends that the Webinar include a brief review of the annotated COV Report Template to familiarize participants with the report format and how the information on the CD relates to the COV report. While the Committee agreed that receiving resource materials in electronic format (CD) was helpful and environmentally friendly, the majority said they were overwhelmed by the shear volume of information on the CD and didn't know where to get started.

Some COV members thought it would be helpful to pre-select a few review questions during the Webinar with the option to do "background" work in advance of the onsite session. We recognize that selecting or requiring pre-work could open the door to other issues that the NSF would prefer not to address. If pre-selection is not a viable option, then the Committee recommends that COV organizers encourage participants to come to the onsite session having read, at minimum, the following documents: the *previous COV Final Report, NSF Response to the COV Report*, and, if available, the *Update to the NSF Response to the COV Report*.

If the *Update to the NSF Response to the COV Report* is not available at the time of the Webinar, then it is imperative for the COV team to have a copy of this report no later than the start of the onsite COV meeting (beginning of Day 1). All members of the Committee agreed that the team would have benefited greatly from reviewing this report at the start of Day 1 rather than at the start of Day 2. The information in the report was extremely useful and would have been a logical kickoff to

our review process. The group felt that we lost valuable time on Day 1 researching information that was readily available in the report.

With respect to the size of the COV team, the group agrees that while three would be the ***absolute minimum*** number of panelists required to maintain the integrity of the COV process, the overall process and outcome would be better served by five or six panelists, a full-time Chair (counted as one of the panelists) and the technical writer. The three-person panel and shared Chair format of the GSE COV significantly increased each team member's workload, made it more challenging for participants to realistically serve as both primary and secondary reviewers, decreased the time available for group collaboration and discussion, and rushed the preparation of the team's presentation to the NSF on Day 2. Moreover, the COV does not think that the bundled format is the most suitable format for the COV Chair or the team. The Chair felt that splitting time between the GSE and RDE teams limited her participation in key discussions with both groups. If the NSF continues with the three panelists and shared-Chair COV format, then perhaps the onsite session could be expanded to two and one-half days, This would allow two full days for review and a half-day for team review, presentation preparation, and wrap up.

In terms of the COV format and report template, one team member felt strongly that the structured format of the COV Report template and the limited time for review severely inhibited discussions about critical issues among the participants. This same COV member felt that the current approach shortchanged the review process and could result in a COV report that achieves about eighty-percent (80%) of its potential. That said, the majority of the team thought that the COV format and report template helped to guide and focus the review process, kept the team on track, and enabled the group to produce a working draft of the COV Report at the conclusion of the two-day session.

The COV encourages the NSF to consider our suggestions as it looks for ways to fine-tune the quality and effectiveness of the COV process.

Additional Thoughts About the COV Process

One COV member felt more strongly than others that the review process could benefit from significant modification or retooling and that the results of projects funded by programs such as GSE should be a significant part of that effort. Her thoughts about the process are documented below:

It is appreciated that that the question-resource link-answer block format of the COV review process is intended to streamline the work and shorten the time panelists spend at NSF (and away from research and/or teaching commitments). However, as is so frequently the case, ease of use and power are inversely proportional – and in this case, the ease of use and streamlined process short-circuit panel dialog and discussion that could provide the powerful ideas for substantive change that NSF actually wants from its COV process. While most panelists who come to NSF are short on time, it is also the case that they frequently participate because they care about the scientific community and how it operates. That means they come to NSF and participate in its panel system precisely because they want to have an impact. Many also feel they benefit, personally and professionally, from the discussions about critical issues they have with colleagues during such review meetings. These discussions – about the ways NSF's goals are or are not adequately expressed through its programs and policies and how discrepancies may or may not indicate places for further exploration and possible change; about the relationship between intellectual merit and broader impacts criteria in different programs and how perceptions of those differences impacts the activities NSF supports; about how the relationships between different groups (e.g. scientists and engineers in academia and research, scientists and educators at well-established or affluent schools and those at impoverished or less powerful institutions, scientists who focus primarily on research and those who focus primarily on education) – potentially impact the policies and processes of NSF itself in ways that are highly desirable. Yet they require time and an open format that permits discussions to develop

outside the literal “boxes on a page” that constrain the process at present. Finally, more thorough reformatting of the COV process could potentially include: providing an alternative template to structure and guide work (as opposed to this one), changing the nature of the process in a more fundamental way (starting with group brainstorming to identify key issues that need attention), or identifying alternative (innovative) ways of approaching the review system entirely.

SIGNATURE BLOCK:

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