**National Science Foundation**
**Directorate for Education and Human Resources**

**Staff Response**
**Informal Science Education Program**
**Committee of Visitors Report**

September 2005

**Division of Elementary, Secondary, and Informal Education**

The Informal Science Education (ISE) program staff wish to thank the Committee of Visitors (COV) for its thorough and supportive report.  We are especially pleased by the Committee's comprehensive efforts to assess the operation and impact of this large-scale program that represents the Agency's major vehicle for promoting public scientific literacy through a broad range of projects that encompass exhibits, media (broadcast, print, and web), and community involvement.

The staff response focuses directly on issues bearing on the COV's charges (1) to assess the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions and (2) to comment on how the outputs and outcomes generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

This report is divided into four major parts:

- A.  merit review procedures;
- B.  program management;
- C.  award portfolio; and,
- D.  program impacts.

In reviewing the COV report, staff found that some recommendations and comments overlapped.  In these instances, staff took the initiative to combine responses.  The numbers in brackets cited below (e.g., "[A.1.1]") refer to relevant sections of the COV Committee report.

**A.  Merit Review Procedures.**

The COV noted in its report that ISE's review mechanisms are extremely well suited to the tasks [A.1.1]; that the merit review process is efficient [A.1.2]; and that the process, as orchestrated by Program Officers (POs) seems strictly and appropriately (if not impressively) implemented to meet all ISE goals [A.1.8].  It noted that merit review panelists were appropriately balanced between scientists with content expertise and experienced practitioners within the informal science education field [A.1.1] and that POs are very careful in meeting desired characteristics of geographic, institutional, gender, and ethnic diversity [A.2.3].  In addition, the COV stated that individual reviews were, at most times, comprehensive and written in such a way as to provide helpful comments to assist PIs [A.1.4].  In general, the COV states that the overall quality of the reviews is strong and, in almost every case, addresses both merit review criteria [A.2.1].

Staff are pleased that the COV finds that the ISE program appropriately and effectively applies NSF review mechanisms and processes.  The program makes a continuous and concerted effort to ensure that panels embody requisite expertise and broadly reflect diversity of the field. In special cases, ISE also uses *ad hoc* reviews to supplement panel expertise in those cases where additional independent review is required to address specialized content, production, or

research knowledge.  Orientation for both experienced and new panelists (described below) helps to produce reviews and panel summaries that are not only thorough, but also responsive to the NSF merit review criteria.  Panelists are encouraged to keep in mind that reviews are written for the benefit of the Principal Investigator (PI) in order to ensure that feedback assists in improving project quality.

The COV made three general observations pertaining to the merit review process intended to ensure consistency of reviewer responses; institutionalize panel formation; and improve documentation of panel composition for subsequent COV review.

1. ***COV Recommendation to Improve Reviewer Responsiveness and Consistency***.  **The COV noted that, in some cases, reviewers were minimally responsive to the criteria and lacked consistent format and/or content [A.2.1], which are neither helpful to the PO or the PI [A.1.4].   In isolated cases, it found reviews to be written unprofessionally or limited to brief, unsupported statements of general or muted praise [A.2.2].  The COV noted that, in some reviews, diversity was sometimes not addressed at all [A.2.4].**

***Program Response***:  The COV acknowledged that less than optimal reviews might be inevitable if there is a goal to bring in new reviewers [C.4].  New reviewers are a required element of diversity for our panels since they bring new expertise to the program, as well as draw in potential PIs and provide professional development for the field.  New reviewers may comprise up to 40 percent of any individual panel.

Weak reviews, however, neither help NSF in its decision process, nor the PI in strengthening project development or subsequent proposal submission.  ISE works hard to strengthen the support it gives to reviewers.  Efforts are made to release proposals with sufficient lead-time so that reviewers can prepare their reviews prior to coming to the panel meeting.  An ESIE handbook guides reviewers, screen-by-screen, through NSF's electronic systems to facilitate entry of reviews into FastLane.  In addition, ISE panelists receive, in advance, a customized guide for preparing their reviews, including frequently asked questions, a suggested template, and a sample review.  Finally, at the panel's orientation session, program staff remind reviewers of the importance of explicitly addressing the National Science Board (NSB) merit review criteria (i.e., intellectual merit, broader impacts) and how to interpret each criterion for the ISE program.  As noted by the COV, most panelists successfully adhere to these directions.  ISE staff will continue to review its procedures and counsel panelists individually in cases when weak reviews are identified prior to final submission into FastLane.

The COV also noted that reviewers sometimes do not address diversity.  We agree that this issue is important.  In the ISE solicitation, reaching underserved audiences is specifically identified as program-specific "Additional Review Criteria."  In addition, in 2002, the NSB issued additional guidance on how to interpret this criterion with *Notice 127, Implementation of New Grant Proposal Requirements Related to Broader Impacts Criterion*.  This document, in conjunction with the ISE panel orientation process, provides guidance to reviewers on how to substantively address this important issue.  We will continue to emphasize this point for each proposal under consideration.

2. ***COV Recommendation to Institutionalize Panel Formation.***  **The COV noted that staff guidance and leadership is critical to success in recruiting strong panels; however, it is not always possible to count on this so the process needs to be better institutionalized [A.2.2].**

***Program Response:*** The Division of Elementary, Secondary, and Informal Education (ESIE) has always followed a rigorous procedure (including professional development for program officers) for ensuring that each program's merit review panels are comprised of relevant expertise for projects considered, as well as balance across important dimensions (e.g., geography, new versus experienced reviewers, sector). The procedure includes the following steps:

- POs review the entire set of submissions and place them in panels according to category of project, content, and other identifying characteristics. After panels are set, POs finalize decisions on requisite expertise and identify reviewers and alternates.

- Each reviewer on a PO's panel is entered into a Reviewer Grid that highlights major criteria that must be balanced, including professional experience (e.g., exhibit design, media production); content expertise; organization type; gender; ethnicity; geography; and prior ISE panel experience.

- For competitions held by ISE over the period of this COV (FY 2002-2004), the proposed list of panelists (including alternates), along with CVs and Reviewer Information Sheets (which include contact information, a summary of expertise, and NSF reviewer history) had to be approved by the ISE Section Head and Division Director to ensure that appropriate reviewer balance had been achieved. For purposes of efficiency, a recent decision was made to defer ultimate responsibility for approving expertise and diversity of panels to the Section Head.

The 2005 COV was provided a sample Reviewer Grid when more details were requested on this process. In the future, the final review grids for each merit review panel by year of competition will be provided as documentation for the COV, as well as the complete listing of merit reviewers across panels for each year of competition.

***3. COV Recommendation to Improve Panel Documentation.*** **The COV indicated that the entire selection process (such as how is the panel assembled, when is a Division Head's sign-off required, etc.) should be documented or at least described and available for review by the COV panelists [A.3.5]. It also noted that more documentation of the selection and orientation of reviewers would be helpful [A.5.1].**

**Program Response:** The process described in the previous response is documented through electronic and paper records for each ISE competition. Documentation for each panel includes a complete listing of proposed panelists and alternates, accompanied by Reviewer Information Forms, curriculum vitae, and a final list of panel participants with contact information. The latter listing is distributed to the entire group upon arrival at NSF.

As described in detail in the response to Question 1, reviewer orientation involves complementary steps at multiple points in the process:

*Prior to Panel*: Reviewers receive the ESIE Panel Reviewer Handbook on general procedures for submitting reviews, the ISE Reviewer Handbook with specific instructions on writing reviews for the ISE program, and individual guidance from POs via e-mail or phone, as requested.

*Panel Orientation at NSF*: Reviewers are provided an overview of the program, requirements of the solicitation, further details on the review process (including instructions for preparing a Panel Summary); and responses to specific questions about interpretations of program guidelines and review issues.

*During Panels*: POs provide guidance and answer questions raised by reviewers on the panel process and proposal-specific review issues.

The COV noted that, in recent years, panels have done a better job adhering to program priorities and criteria [A.1.3]. We attribute some of this success to the revision of the program solicitation that occurred in 2004, which requires PIs to address explicitly "impact, innovation, and collaboration" within proposed project activities. Because of the importance of this process in ensuring well-balanced panels that lead to quality merit review, we will provide more complete documentation for future COVs.

## B. Program Management

The COV noted that ISE is committed to organizational excellence and has been able both to track results of its investments and articulate best practices for the field (particularly for exhibitions). It acknowledged the superb work of POs in maintaining an efficient, fair, and productive process despite increasing staff workload [A.5.1]. It notes that thoroughness and strict adherence to ISE criteria of merit and goals of diversity and outreach is a hallmark of ISE Program Officers [B.4]. The COV was impressed that the program has so comfortably exceeded NSF's organization goal of having more than 70 percent of its funding decisions completed within six months of proposal submission [A.1.7].

ISE program staff appreciate the recognition given by the COV of their dedication. Their performance reflects, in part, the senior-level management experience that ISE staff bring from not-for-profit organizations. Its POs treat merit review, proposal processing, and post-award management as steps in a professionally-run, customer-focused "business." They constantly seek ways to make processes more user-friendly and efficient within the context of the overall NSF system.

**1. *COV Recommendation to Increase ISE staff size.* The NSF staff does an excellent job in handling a significant increase in the number of proposals, but more staff needs to be assigned to this area. It is recommended that this program be allocated more POs and support staff [A.1.8].**

**Program Response:** ISE is the only program within ESIE that maintains two preliminary proposal and full proposal competitions a year. Within the current fiscal environment, its budget has remained stable and, in FY 2006, will likely be the largest program within ESIE. To respond to this sustained, high level of activity, ISE as other programs in ESIE has capitalized on increases in productivity resulting from NSF's evolving electronic processing systems, as well as increased use of external reviewers, experienced with the program, in the preliminary proposal process. Earlier this fiscal year, ISE was provided a dedicated Science Education Assistant (SEA) who assumed an Assistant Program Officer role until her recent departure from NSF. To address the issue of ISE's increasing workload, ESIE reallocated one of its existing PO positions to ISE. That individual will assume responsibility for the growing portfolio of education technology, web, and research projects. Thus, the total number of POs in ISE is now seven, covering exhibit/museum (2), media (2), youth/community (2), and education technology/research (1). This new position should aid the program in handling its increasing workload.

Additional staff may be warranted in the future should the program continue to experience growth in proposal submission and programmatic demands. Typically, handling proposals and awards is only a part of the day-to-day responsibilities of a PO. ISE Program Officers play many other internal and external roles, including (1) responsibility for other program

4

efforts (e.g., Communicating Research to Public Audiences [a component of ISE] and the Information Technology Experiences for Students and Teachers program); (2) responsibilities in cross-directorate activities (e.g., Nanoscale Science and Engineering Education--a recent, large-scale effort with NSF's research directorates that includes individual projects and a $20 million Nanoscale Informal Science Education network linking science centers across the nation with nanoscale science and engineering research centers); (3) responsibilities in cross-agency activities (e.g., International Polar Year); and (4) serving on NSF, EHR, and ESIE committees. The Division continues to monitor workloads of POs across programs with the intent of achieving relative balance while ensuring program effectiveness.

A posting is imminent for a Program Specialist, an advanced technical staff position, that will assist in administrative responsibilities for ISE, and Science Education Analyst support to address program needs for portfolio analysis and development of special reports synthesizing information on program impacts.

***2. COV Recommendation to Increase Staff Travel.*** **The COV noted that ISE staff should be given greater opportunities to conduct outreach to underserved audiences, to seek new panelists at science and media conferences, as well as to identify, review, and assess new and innovative projects within the award portfolio [B.4]. It stated that travel budgets for POs are currently inadequate and expressed concern that the post award management allowed by site visits does not sufficiently safeguard the millions of dollars invested in ISE's awards [A.3.5].**

**Program Response:** Due to the nature of staffing within informal science institutions, most ISE program staff are hired as government employees (rather than IPAs) and supported out of NSF's Salaries and Expense (S&E) account that is limited for the Foundation as a whole. The ISE program, ESIE, and the EHR Directorate have no control over this allocation. At the beginning of the year, ESIE provided an initial allocation to each of its S&E POs of approximately $3,000 with priority given to one professional conference and site visits to either exemplary and/or troubled projects. In FY 2005, ISE staff ultimately was able to spend an average of $4,800 each.

Until more resources do become available, ISE Program Officers will continue to use participation in professional conferences to serve multiple purposes—making presentations on the ISE program, meeting with PIs and prospective PIs, and making site visits to grantees in the conference region. At the same time, the program is seeking other means to reach out and interact with the field. For example, ISE recently contracted with *WebEx* to conduct a three-month pilot program for web conferencing. The first conference will target prospective PIs in states where ISE currently does not have active awards, orienting prospective PIs to the ISE solicitation and encouraging submission of proposals. Other types of web conferencing applications will be explored as well. For larger-scale awards (e.g., the Nanoscale Informal Science Education network), ISE will pursue opportunities for reverse site visits in which PIs and lead personnel/partners travel to NSF to discuss progress with program staff.

***3. COV Recommendation to Improve Award Documentation.*** **The COV noted that there were instances in which correspondence between the PO and PI regarding panel questions, budget negotiations, etc., was not present, organized chronologically, and/or easy to follow despite the fact that, when it did exist, attention to detail in back-and-forth communication between PO and PI was impressive [A.1.6]. The COV noted that paper jackets were not always easy to navigate [A.1.8] and could be better organized [A.5.1].**

**Program Response:** Program staff agree that paper jackets make it difficult to capture and organize project documentation. The expanded use of e-Jacket across NSF should help address this issue for the future. Declinations, for example, are no longer maintained as paper jackets and, hopefully, when fully integrated with the finance system, NSF will have permission to migrate awards into a fully electronic environment. In the future, completion of the new COV module in e-Jacket should make it easier for COV members to find and access project information, including e-mail correspondence and files that now can be readily uploaded from each PO's computer.

*4. COV Recommendation to Continue Decrease in Dwell Time.* **The COV noted that there were a few isolated examples of excessive dwell time – extending beyond NSF's six-month processing goal [A.1.7]. Efforts should be made to further decrease time between application submission and selection [A.5.1].**

**Program Response:** In FY 2005, ISE processed 93 percent of its proposals within six months, as compared to 92 percent for ESIE as a whole, 83 percent for the EHR Directorate, and 76 percent for NSF overall. Even with additional staff, it will be difficult to compress this timeframe further because of time needed for POs to form panels based on the proposals submitted; for panelists to review proposals in advance of meeting; for the program to determine portfolio balance based on highly rated proposals after the panel; and for POs to process declinations and negotiate awards. In general, decisions that extend beyond six months involve proposals that require extensive negotiation or are not submitted against full proposal submission dates, e.g., planning grants and Communicating Research to Public Audiences (CRPA) projects. CRPA projects are generally processed through *ad hoc* mail review for which timely receipt of reviews requires more extensive hands-on program follow up. ISE will investigate the feasibility of creating deadlines for these categories of projects so as to make their processing more efficient. ISE does remain committed to increasing its efficiency and will continually seek opportunities for improvement.

*5. COV Recommendation to Develop an e-Business System.* **The COV recommended development of an end-to-end system that provides for effective and efficient business practices across the life of a proposal/project [C.4].**

**Program Response:** In FY 2003, ISE and ESIE senior management, as well as representatives from the NSF Division of Grants and Agreements and the Division of Information Systems, worked together to design a fully integrated, user-focused, web-based end-to-end (e-Business system) that could encompass proposal development and review, award/post-award monitoring, and portfolio analysis and reporting. This system would have addressed a number of the concerns raised by this COV, including leveling of the playing field for small institutions and new PIs by integrating content-specific help and "answer gardens" into a web-based response system tied to the program solicitation. It would have helped both PIs and reviewers focus on the specific ISE merit review criteria. At the same time, the system would have enabled POs to devote greater attention to higher order tasks such as post-award stewardship and portfolio management through capabilities allowing for the aggregation and analysis of information across the program. While ISE and EHR were willing to invest in development of this prototype effort, NSF deferred action pending the uncertainties resulting from the federal government's current efforts in developing an e-Government system. ISE is continuing to seek ways to implement aspects of this e-Business system in a manner consistent with overall NSF and government-wide plans.

## C. Award Portfolio

The COV noted that the overall quality of funded projects is excellent, the portfolio balanced, and the quality maintained through close oversight by competent staff [A.1.1, A.4.1, A.4.14]. It acknowledged efforts to reach broad audiences and a variety of communities and indicated that an increasing number of proposals appear to authentically address and serve underrepresented audiences [A.4.12]. The COV was especially supportive of ISE efforts to push the field with respect to the evaluation and disability access for Web sites; to merge research and education into all supported activities; to increase attention to underserved audiences; and to promote projects from emerging sciences and areas of special interest such as mathematics [A.5.1]. It also acknowledged the program's support for development of new practices and tools, use of new materials and methods, testing of new theories and knowledge, and the research and evaluation of key issues, policies, and practices to gain insights and identify questions [A.5.3].

Program staff appreciate the COV's assessment of the quality of the awards portfolio. Every aspect of the "business" process--from development of the solicitation that focuses on strategic impact, innovation, and collaboration; to guiding PIs in development of competitive proposals; to recruiting and orienting expert reviewers; to recommending award of a balanced portfolio of projects with greatest potential impact on the field--is focused on this desired outcome. Checks and balances are present throughout this process and the final set of award recommendations represents a consensus decision by ISE Program Officers that is ultimately concurred by the Division Director. As noted, advancing the field, reaching broad and underserved audiences, requiring multiple forms of evaluation, and other criteria are integral to the process.

*1. COV Recommendation to Continue Project and PI Distribution.* **The COV noted that ISE should make every effort to increase the number of different PI's, while maintaining high quality proposals [Exec Summary]. ISE's portfolio shows a greater concentration within a few states than is desirable. Despite noticeable improvement in geographic balance between 2002 and 2005** [A.3.3, C.4]**, the COV would like to see a broader distribution of projects, especially in exhibits and media, with respect to PIs [A.4.8].**

**Program Response:** All aspects of portfolio diversity are a priority for Program Officers. ISE has substantially revised its solicitation and taken other steps to broaden geographic diversity and level the playing field. The current solicitation (NSF 05-544) reduces emphasis placed on numbers of people reached as the measure for project impact, a criterion that tended to exclude small regional institutions. The new focus on strategic impact, innovation, and collaboration encourages a broader range of institutions to develop projects that advance the field. The increased stress on collaboration further broadens institutional participation, as does the added emphasis on projects that reach professional, as well as public audiences. In addition, to lessen the influence of the largest institutions, ISE has, for the first time, set "three" as the maximum number of proposals for which any one institution can serve as lead in a given competition and has set a maximum of "one" proposal per PI for any given Preliminary or Full Proposal competition. Geographic diversity does play a significant role in helping determine the ISE awards portfolio among those proposals most highly rated by reviewers. Over time, it is hoped that program efforts to increase capacity of the field will broaden the pool of organizations and the ability of PIs nationally to develop and implement ISE projects.

To help familiarize more institutions with the program and to encourage them to consider submitting proposals, ISE worked with the Association of Science-Technology Centers (ASTC) to present a Proposal Development Workshop in December 2004. To the same end, POs in ISE make presentations at regional and national conferences. As noted previously,

ISE has contracted with *WebEx* to pilot-test a series of web conferences targeting new PIs in states where ISE currently has no grantees.

**2.** _COV Recommendation to Collect and Analyze Data_.  **The COV noted that if the use of collaborations and partners is to be viewed as a way of addressing the geographic imbalance, appropriate data has to be collected and given to the next COV in order to demonstrate that the benefits of this NSF program are truly widespread [A.4.8].**

**Program Response:**  While NSF's electronic data systems are becoming increasingly sophisticated, the current narrative-based submission process makes it difficult to capture data.  Absent an end-to-end, e-Business system, ISE has been working with a contractor to develop a database designed to capture critical project information that includes a _"baseline report"_ at the time of the award; _"annual reports"_ that demonstrate yearly progress against the baseline; and a _"final report"_ that documents both intended and unanticipated impacts of the project.  In addition to identifying geographic locations of the grantees, these reports will capture locations of all project partners, and just as importantly, the locations of all sites that benefit from the project.  A preliminary study carried out by an intern this summer indicated far greater geographic reach than indicated by the grantee institutions alone.  ISE partners and outreach sites are located in every state, in addition to those projects such as television, radio, and web that have intrinsic national reach.

**3.** _COV Recommendation to Provide Summative Evaluations._  **The COV noted that, in many cases, projects were completed before summative evaluations could be completed. While evaluation is clearly an important factor in proposal review, the results of evaluation were generally not available for review either in jackets or through a link to the ISE-supported Web site, informalscience.org [A.4.2].**

**Program Response:**  The current solicitation (NSF 05-544) requires a summative evaluation for every project grant proposal and requires that it be posted to [www.informalscience.org](www.informalscience.org) or another ISE-designated site upon conclusion of the project.  The program added this requirement so that PIs can more easily build upon the lessons learned from prior related work, a process that is essential to the development of the field overall.  In those cases, where the summative evaluation is not complete prior to the end of the grant period, the PI can request a no-cost extension to the duration of the award.

**4.** _COV Recommendation to Better Define Terms._  **The COV recommended that NSF come up with an appropriate term and better definition for "high risk" or "bold" research [A.4.3] and to a lesser extent the term, "multidisciplinary" research [A.4.4, Executive Summary].  The COV would be better positioned to determine appropriate balances if terms were better defined and related data was more accessible [A.5.1].**

**Program Response:**  ISE agrees that these terms would benefit from clarification, especially as they apply to education projects.  The COV Template was designed for all NSF programs – both disciplinary research and education.  As such, it provides a special challenge to education programs.  It is anticipated recent changes to the ISE guidelines that require PIs to address innovation will make development of this definition easier for ISE, and that the program will be able to provide exemplars of such projects for future COVs.

## D.  Program Impacts

The COV noted that the next generation of scientists, engineers, and technologists might be sitting in front of television sets right now watching one of several NSF-funded TV series.  As a result, one could say that efforts of ISE Program Officers may be responsible for creating our future workforce [B.1]. It acknowledged program efforts to widely disseminate results across the fields represented in the ISE community and its accomplishments in building a community of

scholarship in informal science education. Thus, its best practices are shared so that NSF-funded efforts are multiplied and broadly impact a number of communities [B.1].

The ISE staff appreciate recognition of program efforts to stimulate interest in science and engineering, along with pursuit of careers in these fields, among young people across the nation. In addition to impacts on public audiences, as noted, ISE has placed increased emphasis on developing professionals as a means to strengthen the nation's infrastructure for informal science education through new approaches, strategies, and systems, as well as greater sharing of current best practices in the field.

### 1. *COV Recommendation to Continue Development of Scholarship.* **NSF should continue to develop the scholarship of the informal science education field, encouraging practitioners to share insights [Executive Summary, C.1].**

**Program Response:** Developing scholarship has become a priority for ISE, as demonstrated by the added proposal category of professional audiences; the requirement that all proposals advance the theory or practice of informal science education in addition to serving audiences directly; and the requirement that proposed projects demonstrate how they build on prior related work and relevant educational research. As noted earlier, several years ago, ISE funded development of the Web site, www.informalscience.org (under "Conceptualizing and Assessing Web-based Informal Science Learning (ESI-0125652), University of Pittsburgh), which includes ISE project evaluation studies and a searchable database of research articles on informal learning.

More recently, ISE has supported conferences (and related proceedings) intended specifically to further scholarship in the field. These include "Best Practices in Science Exhibition Development" (ESI-0227627, Exploratorium), "Crafting and Evaluating Interactive Educational Websites (ESI-0439102, Cornell), and "In Principle, In Practice: The Second Annapolis Conference on Museum Learning" (ESI-0318868, Institute for Learning Innovation). The latter conference, in particular, consolidates and synthesizes current research about museum learning and will produce a peer-reviewed supplemental issue for the journal, *Science Education,* as well as a book published by AltaMira Press that will discuss implications for practice, evaluation, and research. A complementary award, "The Status of Research on Learning Science within Informal Education Settings" (ESI-0448163, National Academies of Science), assembles ISE experts to examine the status of research on STEM learning in informal education settings and to conceptualize key issues for a potential synthesis study that would inform researchers, practitioners, and policymakers, as well as suggest future research directions. ISE is also exploring, at this time, feasibility of soliciting proposals for an ISE Learning Resource Center, based on a model developed by ESIE's Information Technology Experiences for Students and Teachers (ITEST) program, whose primary focus would be developing scholarship in the field.

### 2. *COV Recommendation to Organize Principal Investigator Meetings.* **The COV specifically recommends that ISE call one or more meetings of Principal Investigators, whose attendance might be expanded to encourage participation of potential PIs [Executive Summary]. The COV views such meetings as being an excellent way to foster the development of a more scholarly, sharing tradition in this field [C.1].**

**Program Response:** ISE fully agrees that a comprehensive PI meeting is essential to building a robust and cohesive community of practice among its awardees and the field in general. Two recent examples of successful PI meetings included a meeting of Youth and Community projects (October 2004), which included After School Centers for Exploration and

New Discovery (ASCEND) projects that are managed by ISE and supported with H1-B Visa Fees. This meeting included opportunities for networking among individuals implementing youth and community grants, but also among PIs of media and exhibition projects, as well as cross-directorate programs. The ITEST program, successor to ASCEND, held a PI meeting in February 2005 with the objectives of sharing lessons learned and getting PIs to view their projects as part of a collective body of work that has potential for tremendous impact on the field. In addition to information gathered from these two meetings, an ISE Summer Intern surveyed ISE grantees about potential topics that they would find most beneficial for future PI meetings. Based on this input, ISE is planning another PI meeting in 2006. The idea of inviting potential PIs to the meeting is intriguing and will certainly be considered.

*3. COV Recommendation to Encourage Research Projects.* **The COV recommends that ISE continue to encourage submission and funding of research projects [C.1], including evaluation requirements that have increased understanding of what makes projects effective. The COV suggests that results could be further enhanced by encouraging the inclusion of a research component on learning in awarded projects as a way to build better understanding about how people learn in informal settings, thereby strengthening service to society [B.2].**

**Program Response:** ISE and certainly the field at large recognize that high quality research is needed to advance the field and build scholarship. In recent years, research agendas for the field have been proposed in peer-reviewed journals such as *Science Education* and the *Journal of Research in Science Teaching.* Unlike higher education institutions that require research as a condition for professional advancement, museums and science centers do not place as much emphasis in this area. As more and more institutions expand their staffs to include researchers who specialize in informal learning and make scholarship a priority, we anticipate that the body of work devoted to learning in informal science education settings will increase. NSF is helping to make this happen in a number of ways. In addition to ISE projects that focus on audience research (see C.1 above), ISE jointly funds the Center for Informal Learning in Schools (CILS, ESI-0119787), a project supported by ESIE's Center for Learning Teaching program. CILS—a partnership of the Exploratorium, the University of California-Santa Cruz, and Kings College, London—supports graduate research and examines the interface between informal learning in museums and formal learning in schools.

Research projects *per se* comprise a relatively small portion, about three percent, of active ISE awards. It should be noted, however, that the random sample of projects and portfolio summary provided to the COV does not entirely reveal the extent to which research is included in ISE's portfolio. With the introduction of strategic impact as a review criterion, projects now more frequently include a research component in addition to evaluation. For example, in "Partnership of Playful Learners" (ESI-0452550, Chicago Children's Museum), research in conjunction with exhibition design will be carried out on how adult scaffolding can enhance learning by children. Finally, programs within the Division of Research, Evaluation, and Communication also within the EHR Directorate, have historically funded research in informal learning, including projects that are co-funded by ISE.