

**MEMORANDUM**

**DATE:** June 19, 2006

**TO:** Bernice Anderson, Senior Program Director for Evaluation  
Directorate for Education and Human Resources

**FROM:** Lee Zia, NSDL Program Director  
EHR Directorate

**SUBJECT:** COV for NSDL  
COI and Diversity Memo

The Committee of Visitors report for the NSDL Program was approved at the EHR Advisory Committee meeting held at NSF on May 3-4, 2006. The COV consisted of six members selected for their expertise related to the goals of the program. They provided a balance with respect to the type of institutions supported through the program, gender, and representation from underrepresented groups. The following table shows the main features of the COV's diversity.

<b>Category of COV Membership</b>	<b>No. of COV Members in Category</b>
Member of EHR Advisory Committee.....	1
Institution Type:	
<input type="checkbox"/> University.....	2
<input type="checkbox"/> Four-year College.....	.....
<input type="checkbox"/> Two-year College.....	.....
<input type="checkbox"/> K-12 School or LEA.....	.....
<input type="checkbox"/> Industry.....	.....
<input type="checkbox"/> Federal Agency.....	.....
<input type="checkbox"/> State Agency	1
<input type="checkbox"/> Non-profit, membership organization	1
<input type="checkbox"/> Informal science organization	1
<input type="checkbox"/> Independent educational consultancy	1
Location	
<input type="checkbox"/> East.....	1
<input type="checkbox"/> Midwest/North .....	2
<input type="checkbox"/> West.....	1
<input type="checkbox"/> South.....	2
Gender	
<input type="checkbox"/> Female.....	4
<input type="checkbox"/> Male.....	2
Race/Ethnicity	
<input type="checkbox"/> White.....	4
<input type="checkbox"/> Black.....	2
<input type="checkbox"/> Hispanic.....	.....
<input type="checkbox"/> Asian.....	.....
<input type="checkbox"/> Pacific Islander.....	.....

The COV was briefed on Conflict of Interest issues and each COV member completed a COI form. COV members had no conflicts with any of the proposals or files. (or, if they did, use 'Proposals and files were not available to COV members in those cases where the member had a COI and members were not allowed to participate in discussions of actions with which they had conflicts.')

**CORE QUESTIONS and REPORT TEMPLATE**  
**for**  
**FY 2005 NSF COMMITTEE OF VISITOR (COV) REVIEWS**

**Guidance to NSF Staff:** This document includes the FY 2005 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2005. Specific guidance for NSF staff describing the COV review process is described in Subchapter 300-Committee of Visitors Reviews (NSF Manual 1, Section VIII) that can be obtained at <http://www.inside.nsf.gov/od/gpra/>.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions; and (2) comments on how the results generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals.

Many of the Core Questions are derived from NSF performance goals and apply to the portfolio of activities represented in the program(s) under review. The program(s) under review may include several subactivities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the subactivities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

**Guidance to the COV:** The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the **processes** related to proposal review; and (B) the quality of the **results** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. *COV reports should not contain confidential material or specific information about declined proposals.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. It is important to recognize that the reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

*We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions.*

**FY 2005 REPORT TEMPLATE FOR  
NSF COMMITTEES OF VISITORS (COVs)**

<b>Date of COV:</b> 4/18-4/19
<b>Program/Cluster:</b> NSDL
<b>Division:</b> DUE
<b>Directorate:</b> EHR
<b>Number of actions reviewed by COV<sup>1</sup>:</b> Awards: 37 Declinations: 36 Other:
<b>Total number of actions within Program/Cluster/Division during period being reviewed by COV<sup>2</sup>:</b> Awards: 116 Declinations: 377 Other:
<p><b>Manner in which reviewed actions were selected:</b> To date there have been three main tracks to NSDL: Collections/Pathways (new in 2004), Services, and Targeted Research. The ratio of awards in these three main categories is roughly 3:2:1 overall. A random sample of 6 Collections projects, 4 Services projects, and 2 Targeted Research projects in each of the first two fiscal years plus consideration of the 4 new Pathways projects and 6 Services and 2 Targeted Research projects in 2004 produced a set of 36 awards for the committee to examine.</p> <p>In these three years the Program received approximately 500 proposal submissions with a success rate of about 20%. If the same decline/award ratio were used to generate a set of declined proposals, the committee would have had to consider 144 declinations. Hence, an equal number of declines were sampled out of each year in each track at the same 6 to 4 to 2 ratio, to produced 72 proposals for the committee to consider. The committee also examined the key NSDL "Core Integration" project that provides the technical and organizational coordination for the distributed collections and services.</p>

**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 procedures.** Provide comments in the space below the question. Discuss areas of concern in the space provided.

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<sup>1</sup> To be provided by NSF staff.

<sup>2</sup> To be provided by NSF staff.

<b>QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCEDURES</b>	<b>YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE<sup>3</sup></b>
<p>1. Is the review mechanism appropriate? (panels, ad hoc reviews, site visits)</p> <p>NSDL should make certain that the reviewers/panel ask how does this project fit into the larger NSDL program and how it meets the mission/purpose of NSDL.</p> <p>The COV recommends that NSDL develop an online tutorial for reviewers/panelists. MERLOT has a proposal for training that might be transferable. This training should be specific to the program, and include components such as a glossary of terms specific to digital libraries. Another issue—It's difficult to get to the solicitation from the NSDL web page because it is on the NSF home page. We had to go to Google to find it.</p>	<p>YES</p>
<p>2. Is the review process efficient and effective?</p> <p>The review of individual projects appears to be both efficient and effective. However, the COV could not assess the effectiveness of the contributions that the individual projects make within the context of a coherent Program that responds to NSDL goals and objectives.</p>	<p>YES, BUT</p>
<p>3. Are reviews consistent with priorities and criteria stated in the program's solicitations, announcements, and guidelines?</p> <p>The NSDL has tightened up the solicitation criteria over the 5 year period, with major change between 2003-2004. The COV recommends that further improvements be made in the presentation of the Program statement and its goals. Senior management Program Officers, PI's, and others must be able to clearly state the mission and goals. There is a clear statement of mission and goals of the NSDL in the Annual Reports that were provided, but there was no comparable clarity during our discussions. At every step in the process, people need to be able to articulate clearly what the Program is, how projects—individually and in the aggregate—contribute to the Program's goals and objectives, what has been accomplished, and what still needs to be done, and how it will be accomplished. We were unable to find this in any of the documents, nor were we able to elicit this information during our discussions with staff.</p> <p>NSDL needs to narrow its market focus. To say that the target audience is "all learners" is not effective, particularly for an early-stage venture. NSDL leadership needs to identify its primary and secondary target audiences, find out what they want and need, and respond to those. At the present time, the primary customers seem to be the PI's. This was essential in the beginning, but after 5 years, there needs to be a shift in the emphasis to the "end users." Making</p>	<p>YES, BUT</p>

<sup>3</sup> If "Not Applicable" please explain why in the "Comments" section.

<p>presentations to professional conferences, writing articles in professional journals, and posting listserv notices are insufficient means of marketing to communities like classroom teachers, parents, and lifelong learners. COV recommends development of a marketing and communication strategy and tactics—a communications program—that will get the word out to each of the key NSDL constituencies, present and prospective.</p>	
<p>4. Do the individual reviews (either mail or panel) provide sufficient information for the principal investigator(s) to understand the basis for the reviewer's recommendation?</p> <p>Yes, COV felt that the process provides solid feedback to PI's. COV recommends that NSDL create an opportunity through the individual and panel reviews, to indicate where each project fits into the overall Program. We recommend that NSDL add this as an aspect of the review profile, forcing the reviewers—and staff--to think about program integration at every step in the process.</p>	<p>YES</p>
<p>5. Do the panel summaries provide sufficient information for the principal investigator(s) to understand the basis for the panel recommendation?</p> <p>The COV recommends adding to the panel discussion a component of how the individual proposed project fits into the overall program.</p>	<p>YES</p>
<p>6. Is the documentation for recommendations complete, and does the program officer provide sufficient information and justification for her/his recommendation?</p> <p>The COV recommends that NSDL provide panels information on how the grantees are notified of results, what information is provided to those who are not awarded grants, and what assistance is provided to those individuals and institutions who represent important constituencies whose proposals were reasonably well-ranked but were declined so they might develop more competitive proposals in the future.</p>	<p>YES</p>
<p>7. Is the time to decision appropriate?</p> <p>Time to decisions is appropriate.</p>	<p>YES</p>
<p>8. Discuss any issues identified by the COV concerning the quality and effectiveness of the program's use of merit review procedures:</p> <p>Comments: Our one concern is the failure to document where and how each project fits into an overall coherent NSDL Program.</p>	



**A.2 Questions concerning the implementation of the NSF Merit Review Criteria (intellectual merit and broader impacts) by reviewers and program officers.**

Provide comments in the space below the question. Discuss issues or concerns in the space provided.

IMPLEMENTATION OF NSF MERIT REVIEW CRITERIA	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE <sup>4</sup>
<p>1. Have the individual reviews (either mail or panel) addressed both merit review criteria?</p> <p>The COV felt that reviews were better at addressing the intellectual content component than the broader impact component. In some instances, reviewers just parroted back what the proposal said. NSDL and reviewers need to demand greater attention to the broader impact component if NSDL is to achieve its mission. Program officers need to take leadership in strengthening the broader impact statement in all aspects—both in the development of the proposal and in the panel evaluations. The assessment criteria for the broader impact criterion are very broad, making assessment problematic. In reviewing proposals, we found that many times the proposals did not speak to broader impacts in any measurable manner. Having a clear understanding of the desired broader impacts of the NDSL is critical to its success. We believe this ambiguity may reflect the lack of clarity and agreement on who the end-users (the customers) are and on what impacts the Program is trying to make and how it will measure them.</p>	NO
<p>2. Have the panel summaries addressed both merit review criteria?</p> <p>See above. Yes, but with much greater emphasis on intellectual content. More attention needs to be paid to the broader impacts.</p>	YES/NO
<p>3. Have the <i>review analyses</i> (Form 7s) addressed both merit review criteria?</p> <p>Yes, but we have the same concern with the broader impact component. Comments are very brief and in some cases there is no mention of the broader impact component at all. In many others, the response is “boiler plate.”</p>	YES/NO
<p>4. Discuss any issues the COV has identified with respect to implementation of NSF’s merit review criteria.</p> <p>Because of the nature of the program, NSDL is in a position to and should take leadership</p>	

<sup>4</sup> In “Not Applicable” please explain why in the “Comments” section.

within NSF in creating a model for evaluating and promoting the importance of the broader impacts of STEM fields on society at all steps in the program process from solicitation, to implementation, to evaluation, to decisions on project proposals. The inability to describe the NSDL Program pointedly and compellingly—its goals, objectives, customers, and desired impacts and how those will be measured—contributes to the problems that the proposal writers and reviewers have.

**A.3 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 <sup>5</sup>
<p>1. Did the program make use of an adequate number of reviewers?</p> <p>For the task of reviewing the proposals, yes. Workload was shared reasonably well as long as people come prepared. Our concern is not with the number of reviewers. It is with their diversity and the diversity of the institutions and end-user communities they represent. This concern is expressed in a number of places in this report.</p>	YES
<p>2. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>The COV believes there should be a greater diversity of expertise among the reviewers. K-12 teachers, free-choice learning educators, expertise in the private sector are all relatively under-represented on the panels, and college and university faculty are relatively over-represented.</p>	YES
<p>3. Did the program make appropriate use of reviewers to reflect balance among characteristics such as geography, type of institution, and underrepresented groups?</p> <p>The distribution of male and female is good, but there is a predominance of Caucasians. With 40% of the projects (as reported to us) targeting K-12, there don't seem to be very many K-12 reviewers, particularly K-12 classroom teachers. While we recognize it is difficult for teachers to get release time, NSDL may have to (1) make adjustments to their panel review dates to get teachers after they are out of school, (2) increase the funds available to the panel so that schools could hire substitute teachers to replace the teachers on a panel, (3) or create other options to bring in this group of users. College and University faculty are well-represented.</p> <p>Striving to include representatives from HBCU and minority serving institutions on panels would enhance their participation in the entire process. Overall the reviewers need to be linked to the NSDL target audiences. The COV recommends adding a column to the reviewers list to identify underrepresented</p>	NO

<sup>5</sup> If “Not Applicable” please explain why in the “Comments” section.

<p>populations—persons with disabilities, etc.—to facilitate this aspect of the review.</p> <p>NSDL needs to broaden the reviewers to include representation from other parts of the stakeholder community—informal science (free-choice learning), publishers, etc.</p>	
<p>4. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>NSDL has demonstrated they have a process for resolution of conflicts of interest, and confidentiality issues appear to be well handled.</p>	<p><b>YES</b></p>
<p>5. Discuss any issues the COV has identified relevant to selection of reviewers.</p> <p>In a non-disciplinary program with a broad and diverse range of potential target audiences, it is a challenge to have the new reviewers understand and appreciate the goals of the program and the driving forces behind its creation. On the other hand, it is important to ensure freshness of the review panels. Effective panels need an appropriate balance. To achieve this, all NSDL panels need to include new people and experienced reviewers. We would suggest that NSDL consider a rotational program with people being on a panel for perhaps a 3-year period, so that the panel would have a mix of new people and people knowledgeable about the Program. Initial appointees to the panel could have staggered terms so that not all would rotate off at once. New panelists should be given a more in-depth orientation to the program, which might include an online tutorial.</p> <p>We recommend greater diversity of panelists in ethnicity and in target audiences of the NSDL. If NSDL is going to work with others to disseminate NSDL products, they need to consider how to integrate those communities into the overall process.</p> <p>NSDL should look for new and innovative ways to cultivate reviewers. These might include online solicitation, on-campus recruitment, providing support to hire substitute teachers to free up K-12 teachers, etc.</p> <p>NSDL might consider sending out reviews (perhaps 4) from the prior year, with an explanation of the review process, and then spend the first morning of the panel meeting reviewing these jackets to let new panelists get a calibration of how the process works. Such a process is used to great benefit by the National Research Council for their fellowship programs. It could be done with even one proposal, and in less time.</p>	

**A.4 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.

<p align="center"><b>RESULTING PORTFOLIO OF AWARDS</b></p>	<p align="center"><b>APPROPRIATE, NOT APPROPRIATE<sup>6</sup>, OR DATA NOT AVAILABLE</b></p>
<p>1. Overall quality of the research and/or education projects supported by the program.</p> <p>To the best of our knowledge the quality of the projects is high. Looking at the portfolio of proposals, we lack adequate data and information to judge the impact of the projects themselves individually or in the aggregate, and how they contribute to the overall NSDL Program. The Program Officer stated that the final reports are private documents, and are not released to the public. NSDL should look for options to make these proposals and reports, which are different from those of other NSF programs, public.</p>	<p align="center">APPROPRIATE/ MAYBE</p>
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p>In general, it looks like the size and duration of projects are appropriate for their scope Staff reviews the budgets very carefully.</p>	<p align="center">APPROPRIATE</p>
<p>3. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• High risk projects?</li> </ul> <p>Two perspectives on “high risk” arise. First, the ultimate success of NSDL depends on broad usage of its services and products by diverse communities of users. This requires taking risks on individuals and institutions that do not have a strong record of grant getting, if NSDL is to reach the communities they represent. We found little evidence of this. Many of the grant recipients are “repeaters.” NSDL could expand involvement and cast a broader net by getting underrepresented individuals and institutions involved on review panels, by encouraging collaborations of existing grantees with new underrepresented institutions, by involving them in proposal- and program-development workshops, etc. The COV notes that in the area of collaboration, the NSDL and reviewers need to ensure that partnerships are true partnerships, and not be in name only to increase the probability of securing funding.</p> <p>The other aspect of high risk is technology. With the shift toward usage and usability—i.e. toward the customers—NSDL will have to define high risk in relation to usage and usability.</p>	<p align="center">NOT APPROPRIATE</p>

<sup>6</sup> If “Not Appropriate” please explain why in the “Comments” section.

<p>4. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Multidisciplinary projects?</li> </ul> <p>From our assessment, the NSDL portfolio has an appropriate number of multi-disciplinary projects.</p>	<p>APPROPRIATE</p>
<p>5. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Innovative projects?</li> </ul> <p>The COV is defining innovation as: (1) development of new technologies/tools, (2) translation of existing ideas or technologies to new applications or (3) extensions to New audiences. We found that the NSDL has an appropriate balance, but as mentioned elsewhere in this document, we would like to see more emphasis on (3)—extensions to new audiences.</p>	<p>APPROPRIATE</p>
<p>6. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Funding for centers, groups and awards to individuals?</li> </ul> <p>There appears to be a good mix across these categories; one that is appropriate for the NSDL Program. The center of gravity should be towards collaborative initiatives rather than towards individuals.</p>	<p>APPROPRIATE</p>
<p>7. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Awards to new investigators?</li> </ul> <p>Given the relative newness of the program, we are not concerned about this issue, but it is something that the next COV should re-visit. They should be given the data needed to undertaken an analysis of the distribution of awards between new NSDL investigators and repeat NSDL investigators.</p>	<p>APPROPRIATE</p>
<p>8. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Geographical distribution of Principal Investigators?</li> </ul> <p>Based on where the grants were awarded, it appears that the geographic distribution of the PI's was good. It was interesting to note the wide variance in funding from state to state, with Colorado and New York receiving significantly greater funding than any other state. This could be due because these two states had the institutions with the Core Integration Projects.</p>	<p>APPROPRIATE</p>
<p>9. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Institutional types?</li> </ul> <p>MSIs and free-choice learning institutions are under-represented for the period reviewed. It is important for the success of NSDL that there be a broad distribution of end-users. One good strategy for accomplishing this is to broaden the community of applicants. This will require a combination of</p>	<p>NOT APPROPRIATE</p>

<p>strategies: reduce barriers to entry, raise awareness of the NSDL program, through better and targeted marketing, and through coaching of individuals and institutions important to the success of NSDL but that have little experience in grantsmanship. NSDL should strongly consider a program-within-a-program for minority-serving institutions (e.g. the CREST program model), and find ways to include more free-choice learning institutions. Both of these groups are important to the future of NSDL and their participation needs to be increased. There are models for doing this within other federal agencies such as NEH and IMLS. Planning grants and workshops may encourage underrepresented institutions to participate.</p>	
<p>10. Does the program portfolio have an appropriate balance of:</p> <ul style="list-style-type: none"> <li>• Projects that integrate research and education?</li> </ul> <p>The COV defines research in the context of the NSDL to be the development of new tools and resources that facilitate access to information to promote learning. Within that context we believe the program has an appropriate balance of projects that integrate research and education.</p>	<p>APPROPRIATE</p>
<p>11. Does the program portfolio have an appropriate balance:</p> <ul style="list-style-type: none"> <li>• Across disciplines and subdisciplines of the activity and of emerging opportunities?</li> </ul> <p>Yes.</p>	<p>APPROPRIATE</p>
<p>12. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>See above.</p>	<p>NOT APPROPRIATE</p>
<p>13. Is the program relevant to national priorities, agency mission, relevant fields and other customer needs? Include citations of relevant external reports.</p> <p>It is not clear from the portfolio of projects that there is a clear Program. The annual reports provide clear mission/purpose statements, but the connections of the projects to these Program goals and objectives are not well defined. We had to try to tease out the connections of the projects to national priorities, agency mission, and to the Program, and we were not always able to do this. The solicitation should require statements of how each project will meet the NSDL and NSF goals/priorities. Existing NSDL projects should be asked to retrospectively provide these connections. Questions in the section Proposal Review Process—Additional Review Criteria--could help grant proposal writers develop these connections. But, the criteria do not state unambiguously that such a statement of connections is required. A specific statement should be added requiring that the grant proposal writer include a statement that documents what NSDL and National goals are</p>	<p>DATA NOT AVAILABLE</p>

addressed in the proposal. Of course, for this requirement to be effective, these goals must be clearly articulated in the program solicitation.	
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14. Discuss any concerns relevant to the quality of the projects or the balance of the portfolio.

The phrase “Program portfolio” is used throughout this section. It is not clear that there is a Program portfolio. A Program portfolio implies that there is a Program with a clear set of measurable goals and objectives to guide the investment philosophy for the portfolio. We saw little evidence of a Program Portfolio with these attributes.

The 2002 COV commented that “it may have been difficult for NSF staff to focus panelists’ attention on the question of ‘fit with the program’ because panelists’ understanding of what the NSDL is still emerging” (FY2002 NSDL COV, p. 3). We find that this situation continues in 2005. This fundamental flaw will be a major barrier to developing a sustainable NSDL program in the long-run. Just doing an orientation for the panelists is not sufficient. Clearly conveying the Program goals and objectives must be integrated into the entire process—solicitations, panels, proposal evaluations, awards, presentations, etc.

Management needs to continually map out projects against Program goals and objectives to determine how well they align with goals and objectives, their degree of coherency, redundancy, any major lacunae, etc. And, as stated elsewhere in this section every PI needs to make explicit how his/her proposed project maps against Program goals and objectives.

**A.5 Management of the program under review.** Please comment on:

1. Management of the program.

NSDL seems to have the standard NSF structure with a Lead Program Officer coordinating the efforts of a group of associated program officers along with a small support staff. As noted elsewhere in this report, the COV believes that the Program could be improved through outreach to provide guidance on proposal preparation. The present procedure is largely reactive. We understand that travel budgets are limited, which makes outreach difficult, but sequestering of a small amount of project funds for this purpose could go a long way in enhancing development of a sustainable NSDL Program.

Management and leadership of the NSDL is a formidable challenge because NSDL is a non-traditional program for NSF. There are few models for this program. NSDL provides NSF with a leadership opportunity. The opportunity—the challenge—is to demonstrate that NSF can function effectively as an incubator and then “spin off” programs for scaling up to sustainable independent ventures. The NSF-NSDL leadership team has had to manage through the tensions in leadership between the CI team and the larger PI community of the last 18 months, while still managing this major grant program. They have made important modifications to the program such as developing the new Pathways component of the NSDL Program. The COV believes that the operational management of NSDL is excellent.

One major issues for this COV is the failure of NSDL leadership to respond to several major issues raised by the last COV. One particular concern for us is the lingering issue of the lack of Program clarity, and its role in project evaluation. Specific projects need to clearly fit into the NSDL Program.

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

The management of NSDL is responsive to digital libraries and the use of digital libraries in education. The program manager welcomes solicitations in a range of topics. Many of the relevant communities, however are not aware of the program, and they have not been sought out aggressively by management. This is due in part to the lack of focus on articulating clear goals which makes it hard for potential applicants to know if NSDL would be an appropriate source of funding.

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

We found little evidence of a structured program planning and prioritization process that guided the development of the portfolio. This is particularly distressing in light of the specific recommendations of the April 2002 COV. We concur with their recommendations that NSDL should require all projects to track usage, undertake evaluations, and define the program by fitting the projects into the program.

4. Additional concerns relevant to the management of the program.

NSDL should commission a major evaluation of the program by an external evaluator. Questions to

be addressed should include:

- Do the projects meet the goals and objectives of NSDL?
- What are the criteria for inclusion of data and information in the NSDL portal?
- What type of quality assistance is provided to those developing proposals and is it effective?

The evaluation should also include a thorough assessment of the dissemination system/promotion system to meet the objective of providing quality STEM education for all students, and to serve as a resource for lifelong learning. These are just a sample of the types of elements that should be included in the evaluation. This similar to a comment made in the 2002 COV report.

## **PART B. RESULTS OF NSF INVESTMENTS**

NSF investments produce results that appear over time. The answers to the first three (People, Ideas and Tools) questions in this section are to be based on the COV's study of award results, which are direct and indirect accomplishments of projects supported by the program. These projects may be currently active or closed out during the previous three fiscal years. The COV review may also 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. Incremental progress made on results reported in prior fiscal years may also be considered.

The following questions are developed using the NSF outcome goals in the NSF Strategic Plan. The COV should look carefully at and comment on (1) noteworthy achievements of the year based on NSF awards; (2) the ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcomes; and (3) expectations for future performance based on the current set of awards. NSF asks the COV to provide comments on the degree to which past investments in research and education have contributed to NSF's progress towards its annual strategic outcome goals and to its mission:

- To promote the progress of science.
- To advance national health, prosperity, and welfare.
- To secure the national defense.
- And for other purposes.

Excellence in managing NSF underpins all of the agency's activities. For the response to the Outcome Goal for Organizational Excellence, the COV should comment, where appropriate, on NSF providing an agile, innovative organization. Critical indicators in this area include (1) operation of a credible, efficient merit review system; (2) utilizing and sustaining broad access to new and emerging technologies for business application; (3) developing a diverse, capable, motivated staff that operates with efficiency and integrity; and (4) developing and using performance assessment tools and measures to provide an environment of continuous improvement in NSF's intellectual investments as well as its management effectiveness.

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

**B.1 OUTCOME GOAL for PEOPLE: Developing "a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens."**

Comments:

**B.2 OUTCOME GOAL for IDEAS: Enabling “discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.”**

Comments:

**B.3 OUTCOME GOAL for TOOLS: Providing “broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation.”**

NSDL has funded development of new and innovative tools and resources to support teaching and learning such as the University of Michigan’s Idea toolkit. And, it funded development of subject-specific Pathways projects that integrate content and services to provide a rich resource enabling innovation and learning through discovery. An example is the Middle School Science/Math Portal by the Eisenhower National Clearinghouse. The Core Integration team has implemented the resource discovery system, making available the metadata for collections and items available through the web. ASKNSDL is a virtual reference service available through Syracuse that provides online reference service to users. The COV was told that NSF has adopted the NSDL as the model for an education resource for the NSF website, providing services to the NSF community as a whole.

**B.4 OUTCOME GOAL for ORGANIZATIONAL EXCELLENCE: Providing “an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.”**

NSDL staff and the Sustainability Standing Committee (SSC) have been exploring future directions and organizational models consistent with those directions for the NSDL Program. This is discussed elsewhere in the report.

## **PART C. OTHER TOPICS**

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

**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.**

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

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

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

Question 1: Characteristics and functions, personnel of the managing committee:

Over its first five years, NSDL has created an impressive set of individual projects and an impressive community of PI expertise. These were essential initial steps to ultimate success, but now they are not enough. The NSDL is not yet a Program and it has not yet identified and developed a community of end-users. This is the challenge that the NSDL must now confront head on if it is to succeed.

The COV recommends development of one or more case studies based on specific target markets that could provide a solid continuing customer base. These case studies should be part of a larger effort to explore how NSDL can position itself over the next few years as an enterprise that is ready to be "spun out" of NSF, to be acquired, or to be transformed through some model to a separate sustainable entity. NSF has been an ideal home for the first stage development of the NSDL, but is not a good permanent home for a mature NSDL. We recommend that NSDL-NSF leadership convene a brainstorming session with a group of CEOs, or former CEOs, who have had experience in creating new companies and transitioning them successfully, and perhaps unsuccessfully, from the start-up stage to a more mature sustainable stage.

This session should take place only after NSDL-NSF leadership is able to articulate more clearly a vision for a mature NSDL—its qualities, customers, etc. We are not suggesting that even after separating from NSF that there be a "clean break." A transitional period will be required with some level of support still coming from NSF, and we think that NSF might be looked to on a sustained basis as a potential source of competitive funding for leading-edge research. A variety of models/scenarios will need to be developed. SBIR might be helpful in developing potential models and in helping organize the proposed brainstorming session. Members of the COV expressed willingness to suggest and recruit CEOs who might be appropriate. Some of the steps that we think will need to be accomplished are listed below:

- Develop a clear and compelling vision and mission statement.
- Define your target markets/segments—primary and secondary.
- Undertake market research and collect data on what your customers want and need. The longitudinal studies suggested in the 2002 COV report would provide valuable information in a market research/needs assessment. Create an NSF cross-directorate working group, perhaps in partnership with SBIR, to work with NSDL Program Officer to help outline a business plan for spinning off NSDL.
- Develop a Program proposal.
- Develop a business plan.
- Bring in an advisory group of not-for-profit and for-profit CEOs, and former CEOs from the information industry, publishing and other appropriate industry sectors to identify and explore alternative business models. Get a good mix of people; one that also represents the desired community of end users for NSDL information and services.

#### Question 2: User Community/audiences.

NSDL needs to identify what communities it wants to serve. At least initially, the concept of “all learners” is too broad. NSDL needs to segment the market, identify primary and secondary audiences, find out their needs and wants, and then deliver information and services that fulfill those needs and wants. NSDL needs to develop a few compelling customer case studies. It needs some “raving fans” who are not PI’s, but are end users. NASA has demonstrated the power of doing this and may be a good model.

NSF has systemic initiatives programs—Rural, Urban, State level STEM initiatives—that NSDL should use to take advantage of connections that these programs already have established. NSDL might consider forming partnerships with programs like the ALA to train school librarians, who would train other librarians. A “train the trainer” program could increase visibility of NSDL among end users more quickly and effectively than a series of “one offs” with customers. Other programs to consider linking with include: local 4-H, Girl Scouts/Boy Scouts, ASTC, AZA, etc.

Once again, NSDL needs to define its target markets, both primary and secondary, find out what they want, and then deliver. PI’s are not the target market in a mature NSDL. Moving forward will almost certainly result in pushback from PI’s and the CI team, but it needs to be done and it is the responsibility of NSF-NSDL leadership to do it.

PI’s need to be more active in contributing their outputs and outcomes in ways that can be turned into stories about how NSDL facilitates learning across STEM fields by providing access to appropriate information and services. NSDL needs to develop a portfolio of compelling case studies of how this has been done. There are IMLS projects that tell the stories publicly and that might be good models. All good stories involve people (or other animals). Tell how schools are using and benefiting from NSDL. Someone has to be accountable for collecting these stories and for telling them. The Chemistry Division in NSF has a process for telling stories. These individual NSDL stories need to be woven into a larger story of the NSDL, and these need to be put on the NSDL website.

Each proposal needs to address how it addresses NSDL goals and objectives and NSF goals.

## SOME SUMMARY OBSERVATIONS

We want to take this opportunity to reinforce a number of statements scattered throughout this form. And, we recommend that the NSDL leadership team go back and re-read the recommendations made by the 2002 COV and other advisory committees. Most of our concerns have already been expressed. They have not been adequately responded to.

Management and leadership of the NSDL, clearly a non-traditional program within the NSF culture, has been and continues to be a challenge. This challenge is manifested clearly in the leadership tensions that have arisen between the Core Integration team and the larger PI community.

Our concerns are not with the individual proposals and the resulting projects. Nor are our concerns with the management of the operations of the process from receipt of the proposals, through evaluation, and resulting awards. Our concerns begin farther upstream. They begin with the failure to articulate a compelling vision and mission and to use those to formulate a Program with clear goals and objectives; goals and objectives that guide the solicitation of proposals that would result in a portfolio of projects that form the basis of a coherent program in alignment with Program goals and objectives. After five years, the NSDL is still a collection of projects, and not a coherent Program.

This must be done promptly. It is disappointing that many of the same concerns we are expressing were expressed by the first COV, and more recently by the Sustainability Standing Committee meeting of November 2004. The responses to these reports have been unimpressive.

The first order of business for the leadership and management of the NSDL is to commission an external evaluation that focuses on development of a strategic plan that would include the following components:

- A compelling vision and mission that would lead to a Program portfolio with a coherent set of projects
- Criteria for accepting entries into the NSDL to ensure quality
- Mechanisms for providing technical assistance to under-represented categories of institutions (e.g. MSIs and free-choice learning institutions) and individuals (e.g., persons with disabilities) important to the success of the NSDL, e.g. MSIs and free-choice learning institutions
- Mechanisms for expanding the inclusiveness of the NSDL at all steps in the process
- Mechanisms that would provide effective dissemination and promote usage of the NSDL and its products and services. While we applaud the appearance of publications in the scholarly literature, these are normally not the venues that the end-users read.

The COV identified four strategic priorities that we believe NSDL must do.

1. Create a clear compelling vision and mission for NSDL. This is the responsibility of NSDL-NSF leadership. This responsibility can not be delegated to any PI committee, although it will be important to get their buy-in. This must be developed and articulated on every possible occasion. We are not advocating this, but an example might be: "NSDL is a transformational mechanism for bringing about change in the effectiveness of the teaching and learning of STEM." Staff must be able to articulate the vision and mission statements just this succinctly. The urgency in doing this was pointed out in the 2002 COV report and by Carol Minton in an e-mail to the Sustainability Standing Committee on 30 November 2004 in which she stated:

There is an "...urgency to develop a concise mission statement." Other critical components in a transitional strategy include:

- a. Define stakeholders; develop target markets
  - b. Develop the plan for transition into next structural phase of NSDL
2. Implement NSDL program evaluation. NSDL needs to commission a comprehensive and rigorous program evaluation. This should include:
    - a. an evaluation of the portfolio of projects to analyze how they contribute to achieving the goals and objectives of the NSDL Program, to identify what is missing, etc.
    - b. The projects should be mapped against goals and objectives to ensure alignment and coherency.
  3. Ensure diversity in all aspects of the program: reviewers, institutions, customers, content, projects, etc.
  4. Do a market analysis and a needs assessment to identify and evaluate primary and secondary audiences and their needs and wants. Create a comprehensive marketing and communications plan to get and to stay close to the customers.

**SIGNATURE BLOCK:**

NSDL COV

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Chair