# PEER REVIEW GUIDE

***Based on a Survey of Best Practices for In-Progress Peer Review***


**Prepared by the Office of Energy Efficiency and Renewable Energy (EERE)**

**Peer Review Task Force**

**August 2004**

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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**Department of Energy**
Washington, DC 20585

# Transmittal Letter from the Assistant Secretary

To: EERE Staff
From: David Garman
Subject: EERE Peer Review Guide

I am pleased to present our new guide for conducting peer reviews within the Office of Energy Efficiency and Renewable Energy. This guide provides you an important tool to assist in management of your programs. It provides a framework for conducting effective and efficient peer reviews to help strengthen program operations. And it reflects the core values of EERE—particularly our continual push for relevance and excellence in our research, development, demonstration, and deployment activities, and in our efforts to deliver the highest quality products and services. The peer review processes outlined here are very important in further improving the management of the funds entrusted to us by Congress and the President on behalf of the American people, and in demonstrating our careful use and oversight of these funds.

This guide reflects continued development of the new EERE. We reorganized EERE almost two years ago to be more streamlined, integrated, and focused; to better reflect EERE's core values; and to strengthen EERE's pursuit of its vision and mission. The task that we have before us—to "strengthen America's energy security, environmental quality, and economic vitality through public-private partnerships"—is one that requires the best of all of us: of EERE, of our partners, and of the broader community. We have done well with our partners, but this peer review guide will help take us to the next level, enlisting the broader community to provide important insights and guidance in how to move our work forward most effectively.

I am asking you to make peer review a cornerstone of the way you do business and to build it into your Multi-Year Plans and resource allocation decisions, Annual Operating Plans, and your personal performance plans. The rigorous and systematic use of peer review as outlined here will help demonstrate within DOE/EERE and the Administration, and for the American public, the seriousness with which each of us takes our mission and strives for excellence, and will aid us in implementing the most effective programs possible.

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# Transmittal Letter from the Task Force

To: The Honorable David Garman
Assistant Secretary
Office of Energy Efficiency and Renewable Energy

From: Sam Baldwin, Jim Daley, Jeff Dowd, David Howell, John Ryan, Alan Schroeder, Frank (Tex) Wilkins, and Gretchen Jordan (SNL)

We would like to submit for your consideration the attached peer review guide. In your Strategic Program Review (SPR), you identified peer review as "very important in strengthening/redirecting program activities," and you have repeatedly emphasized the importance of enlisting the broader community to help provide insight, careful quality control, and rigorous oversight of EERE's programs to improve the programs and ensure the President's and Congress's confidence in our stewardship of taxpayer funds. As you directed in your SPR, we have examined EERE and external best practices in peer review, identified the most important outcomes from the peer review process, and developed model approaches for establishing systematic peer review for EERE. This guide distills that work.

Knowing that no "one size fits all", we formed a Peer Review Task Force of staff experienced in peer review from across the EERE programs, with representatives from Technology Development programs, Business Administration programs, the Board of Directors, and external evaluation experts, as listed above. Members of the Task Force also included Ken Friedman, Amit Ronen, and Ed Wall before they took their current posts. The Task Force has listened to experts, surveyed and identified best practices in peer review in EERE, the U.S. Department of Energy (DOE), and other Federal agencies, and drafted these guidelines.

Drafts of this report were first reviewed by EERE program managers, then by external experts, with a number of useful changes resulting from criticisms and insights from both reviews. In addition to a number of positive comments in the internal review, the external experts who reviewed the guide were very positive about the quality and relevance of the guide, with seven of ten reviewers rating it overall as very good or excellent. There is also interest outside of EERE in this guide as shown by requests for copies at two external presentations of the draft, a December 2003 Washington Research Evaluation Network workshop and the 2003 annual meeting of the American Evaluation Association.

Developing peer review as a core management tool of EERE will depend on senior management's commitment to implementing the guide and on it meeting management needs for independent and objective perspectives that significantly aid management decision-making. There is still much to learn about the most effective way to meet these needs. This guide emphasizes flexibility in trying different approaches, learning what works, and communicating those lessons to others within EERE.

Further development of peer review processes is still needed to better specify best practice approaches for deployment activities and for EERE Business Management practices. The guide identifies some of the peer review challenges associated with these activities. The Task Force believes, however, that peer review of these activities is appropriate, can complement other forms of evaluation, and is needed.

This guide reflects the core principles you have identified for EERE. In particular, it reflects EERE's continued drive for excellence in the work that we do. We are excited about the contribution that EERE can make to our national and global energy needs and related economic, environmental, and security challenges, and look forward to working with you to help make peer review a significant contributor to that effort.

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# Executive Summary

Objective review and advice from peers—peer review—provides you, as managers, staff, or researchers, a powerful and effective tool for enhancing the management, relevance, effectiveness, and productivity of all of the Office of Energy Efficiency and Renewable Energy (EERE) research, development, demonstration, deployment ($RD^3$) and supporting business management programs.

The primary purpose of this guide is to provide managers and staff guidance in establishing formal in-progress peer review that provides intellectually fair expert evaluation of EERE $RD^3$ and supporting business administration programs, both retrospective and prospective.

In-progress peer review is defined as:

> *A rigorous, formal, and documented evaluation process using objective criteria and qualified and independent reviewers to make a judgment of the technical/ scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects.*

The definition is drawn from definitions used by the U. S. Department of Energy (DOE), National Academy of Sciences (NAS), the White House Office of Management and Budget (OMB), the U.S. General Accounting Office (GAO), and other Federal agencies and institutions. This definition clearly distinguishes in-progress peer review from other types of peer review, such as merit review to select winners of competitive solicitations or readiness (stage gate) reviews to determine when a technology is ready to move to the next phase of development, as well as from other management activities such as quarterly milestone reviews or budget reviews. The latter have some elements of this definition, but not all of them. Just as information from in-progress peer review will inform these other reviews and management activities, information from these others are often provided to peer reviewers as part of their process.

This guide focuses on activities that are planned, underway, or have recently been completed and does not directly cover merit review or readiness reviews, which are addressed in other EERE management procedures. In-progress peer review (or simply "peer review") findings will be considered by DOE/EERE managers, staff, and researchers in setting priorities, conducting operations, and improving projects. These peer review efforts will succeed in the long term only to the extent that they provide useful input for managers' decision-making. Addressing external pressures for evaluative information is a possible benefit but not a primary objective.

This guide provides information and examples useful for planning, conducting, and utilizing peer reviews based on best practices. Best practices are those that are (1) utilized with the most success by EERE's own programs or by other institutions, or (2) identified as such by multiple widely recognized experts outside of EERE, including experts at the GAO and OMB. From these, the Task Force determined the core principles, minimum requirements, and process for continuous improvement set forth in this guide.

The following core principles are key guides for improving EERE's practice of peer review:

- Managers and staff in EERE will provide resources and other support for the conduct of rigorous, formal, and documented review of all programs and key projects by qualified and independent peers on a regular basis (see Section 2.1).

- The review process will be tailored to the level of review (activities in an entire program, portfolio of projects, or individual project), to characteristics of the program/project being reviewed, and to the purpose and goals of the review (see Section 4.1 and following).

- Peer reviews will provide independent, program-specific feedback to improve EERE program planning, performance, and effectiveness (see Section 4.2 and following).

- EERE peer reviews will be conducted in a credible, fair, transparent manner with the highest ethical standards and at the lowest reasonable burden to the EERE community (see Section 4.1 and following).

- EERE is committed to a continuous improvement process that involves an internal forum for exchanging experiences about peer review and a mechanism for assessing progress in implementing this guide (see Section 9).

The minimum requirements for EERE's peer reviews are described below.

**Scope of Review.** All EERE programs in both Technology Development and Business Administration offices and their key projects will be reviewed by qualified and objective peers on a regular basis. This should typically cover 80-90% of $RD^3$ funding and supporting business analysis and management programs. Earmark projects will be included in the review and treated on the same basis as other activities (see Section 4.1).

**Frequency of Review.** All EERE programs and their key projects will be reviewed, on average, every two years, depending on the characteristics of the program and needs for information (see Section 4.1).

**Timely Preparation.** Preparation for a peer review will include designation of a review leader, determination of the purpose of the review and the review agenda, and communication of this information to reviewers and those being reviewed in time for them to prepare for the review (see Section 4.1).

**Core Evaluation Criteria.** Clear standards for judging the program or projects will be defined prior to the review. This includes the criteria and the kinds of evidence (data) needed to judge those criteria. At a minimum, programs will be assessed on quality, productivity, and accomplishments; relevance of program success to EERE and programmatic goals; and management (see Section 4.5 and following).

**Reviewers.** There will be a minimum of three reviewers for each discrete program element or smallest unit that is assessed and reported on. Each reviewer will be independent, competent, and objective, selected by a transparent, credible process that involves external parties. Together the reviewers will cover the subject matter. Reviewers will sign Conflict of Interest forms prior to the review and Nondisclosure Agreements if/when proprietary information is presented or discussed (see Sections 5.2).

**Plan for Collecting Reviewer Data.** Review leaders will plan ahead for how review inputs will be documented, analyzed, and reported, as well as how individual reviewer comments will be tracked while maintaining their public anonymity. The review agenda will allow sufficient time for a rigorous Question & Answer period for reviewers. Reviewers will be encouraged to support their comments with citations or data wherever possible (see Sections 4.7, 4.8, and 6.1).

**Producing the Peer Review Report.** The peer review report will reflect the full range of reviewer comments with high fidelity. The report should also include all individual inputs from the reviewers and will be reviewed by the panel chair and/or the review panel before release (see Sections 7.4 and 8.1).

**Program Manager Review and Response.** Before the report is finalized and goes to senior management, the program manager/office director will add written responses to peer reviewer findings and recommendations, including actions to be taken to improve the program (see Section 8.1).

**Peer Review Report Distribution.** The final peer review report will be promptly communicated to senior management, associated staff and researchers involved with the R&D program or project, and all persons involved in the review, and the report will be made available publicly (see Sections 7.4 and 8.1).

**Peer Review Record and Ex-post Evaluation.** A peer review record will be established at the beginning of, and maintained throughout, the review process. The record should contain the final form of all the key documents of the review for all phases of the review. An evaluation of the peer review process is necessary to aid continuous process improvement (see Section 8 and 9).

Given the diversity of EERE programs, a great deal of flexibility is provided within these requirements, and options and examples of different best practices are provided throughout this guide. This guide provides a systematic approach for making more effective use of the peer review tool.

# 1.0 Introduction

## 1.1 Background and Purpose of This Guide

Objective review and advice from peers—peer review—is one of the standard mechanisms for effective management of highly complex and/or technically challenging projects and programs and is widely used in industry, government, and academia. Experience has demonstrated that peer review is a powerful and effective tool for enhancing the relevance, effectiveness, and productivity of the Office of Energy Efficiency and Renewable Energy (EERE) research, development, demonstration, and deployment programs ($RD^3$) and business administration activities because it taps the experiences and insights of experts in the field. The March 2002 Strategic Program Review found that EERE would benefit from more systematic and rigorous application of peer review for all its programs and major management functions (see Box 1.1).

Peer review is based on the premise that the people best qualified to judge a program or project are experts in that or related fields of knowledge. Seeking advice from experts is useful in all aspects of managing a program to add to the perspective and broad knowledge of a program manager.

Peer review is essential in providing robust, documented feedback to EERE program planning. Knowledge about the quality and effectiveness of current projects and programs is essential in designing future programs and/or enhancing existing efforts (see Box 1.2).

Peer review also provides management with independent confirmation of the effectiveness and impact of its programs. For these and other reasons, peer reviews are used, for example, as part of the evidence accepted by the Office of Management and Budget (OMB) Program Assessment Rating Tool[1] (PART) (see Box 1.3).

**Box 1.1: Improving the Way EERE Does Business**

The Strategic Program Review (SPR) conducted by the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy (EERE) and published in March 2002, identified peer review as one of several actions that could be taken to improve overall EERE performance.

"Systematic peer review is very important for strengthening/redirecting program activities. The SPR found that some form of peer review is frequently and widely used, though often on an ad hoc basis and not necessarily following best practices nor with sufficient regularity." Thus the SPR recommends that EERE:

- Examine all EERE peer reviews to identify best practices;
- Identify the most important outcomes (uses) from the peer review process;
- Benchmark against best practices;
- Identify other EERE reviews that can be subsumed, thus saving staff time;
- Develop model approaches; and
- Implement consistent and systematic peer review for EERE.

*(Strategic Program Review, EERE, March 2002)*

[1] U.S. Office of Management and Budget, May 5, 2003.

This guide has been developed to raise the overall consistency and quality of the peer review process within EERE, and to reduce the burden on program managers and staff in implementing peer reviews. It lays out core evaluation criteria and consistent review processes, while retaining the necessary flexibility to conduct peer review that fits the characteristics of the program and addresses the program's need for particular information at different times for different stakeholders. Multiple examples demonstrate a variety of review processes. It provides information and examples useful for planning, conducting, and utilizing peer reviews based on best practices found in EERE, other parts of DOE, and other Federal agencies. Best practices are those that are (1) utilized with the most success by EERE's own programs or by other institutions, or (2) identified as such by multiple widely recognized experts outside of EERE, including the U.S. General Accounting Office (GAO) and OMB. Best practices improve the quality and credibility of the process and increase the opportunity for high performance by the peers in order to produce effective and useful peer review products.

**Box 1.2: Benefits of Peer Review**

"…[P]eer review stimulates competition, establishes high standards for quality, rewards productivity, and, on balance, fosters creativity and promotes fair play. When combined with energetic and visionary leadership, peer review can marshal highly competent R&D teams, focus scarce resources on the most important and potentially fruitful technical opportunities, and provide reasonable assurances to taxpayers that their Federal R&D dollars are being prudently invested."

(Galvin Report, 1995)

All parts of EERE programs will implement peer reviews of their program and key projects, and the results of these peer reviews will be made available publicly. In this document, "program" refers to a collection of activities that are unified with respect to management structure and overall goal.

Given the diversity and complexity of EERE programs, a "one-size-fits-all" approach to peer review would not be appropriate. This guide reflects the need for flexibility in tailoring the peer review to the specific program's characteristics. This includes such considerations as budget, output generated, management structure and complexity, type of program, stakeholder participation, and information needed to support management decisions, as well as complex and wide ranging technical issues.

The guide also reflects the need for flexibility within specific peer reviews. For example, there may be situations where the best peer review process minimizes the audience to ensure frank exchanges. There are other situations where a program may wish to have the review broadly open to the public (see Section 4.9). The decision is left to the program to weigh the advantages and disadvantages and to determine the best process for the particular situation. Although the guide is based on best practices within and outside of EERE, lessons learned through application of the guidelines will be assessed. The guide will be revised to reflect these lessons over time. A mechanism will be developed that includes:

- Gathering data on the implementation and use of peer reviews in EERE and lessons learned from that experience, and
- Establishing a forum where program and office managers can share peer review experiences and lessons learned.

## 1.2 EERE Review Processes

EERE is involved in a number of different types of reviews, of which in-progress peer review, the focus of this guide, is just one. EERE reviews can be generally divided into (1) DOE and EERE reviews; (2) Administration and Congressional reviews; and (3) external expert reviews and other forms of evaluation (e.g., process, market, impact, and cost-benefit evaluations).

DOE and EERE reviews include the following:

- Reviews of the budget at various stages of development—spring budget summit, DOE Chief Financial Officer (CFO) Corporate Review Budget, OMB Budget Request, and Congressional Budget Request;
- Reviews of multiyear program plans and annual operating plans;
- Reviews of monthly or quarterly financial and technical status and performance (including quarterly Joule milestones);
- DOE Inspector General (IG) reviews; and
- Reviews of annual national laboratory performance.

Administration and Congressional reviews of EERE activities include the following:

- The OMB Program Assessment Rating Tool (PART), R&D Investment Criteria (RDIC), and the OMB Budget Request and Congressional Budget Request Reviews;
- The Congressional review of the budget, including Congressional Hearings on EERE; and
- Various Congressional GAO reviews.

**Box 1.3: The Program Assessment Rating Tool**

After much review and discussion, the Peer Review Best Practices Task Force concluded that the frequent changes in external perspectives, policies, and guidances made it difficult to specifically design these Best Practice Guidelines to meet external requirements.

Instead, the Task Force chose to focus on the practices that would most effectively meet EERE management needs, with the expectation that these will also meet the "test of time." As this goes to print, the PART FY2006 guidance has become available, and it appears to align well with the recommended best practices presented in this guide. Key elements of PART 2006 include the following:

2.6 "*Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?*.... A *Yes* answer would require regularly scheduled objective, high quality, independent evaluations that examine how well the program is accomplishing its mission and meeting its long-term goals. … Evaluations should be sufficiently rigorous … To be independent, non-biased parties with no conflict of interest would conduct the evaluation. … evaluations must be appropriate to the type of program. … R&D programs also should undergo independent reviews of relevance to their agencies, fields of science or technology, or customers in addition to assessing questions of performance. These reviews should conclude with reports documenting the findings and recommendations…"

4.5 "*Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results? …*

Source: OMB Budget Data Request No. 04-31, "Completing the Program Assessment Rating Tool (PART) for the FY2006 Review Process".

External reviews include the following:

- Merit Reviews of proposals to provide input for consideration in the selection of winners of RD&D solicitations;
- In-Progress Peer Reviews; and
- Readiness Reviews, including "Stage Gate" reviews to determine when a technology or activity is ready to move to its next stage of development; "Down-Select" reviews to winnow the R&D paths pursued; and "Off-Ramp" reviews to determine if the DOE job is done and the technology can be graduated or terminated. (There is some overlap between these types of review.) Although an internal decision, there will often be external inputs.

Other forms of evaluation (expert judgment is an evaluation method) include process, market, impact, and cost-benefit evaluations. These range from customer satisfaction surveys to detailed retrospective assessments of program outputs and outcomes through case studies, statistical analyses, and other approaches.[2]

This guide focuses on in-progress peer reviews of program activities and projects and does not cover merit review or readiness reviews or other forms of evaluation—which are either governed by standard procedures already or for which improved and standardized procedures are under development separately.[3]

Research, development, demonstration, and analysis programs and projects are knowledge-based and can be reviewed in a short period by experts in the field, as conventionally done by the scientific and engineering communities. Many Business Administration programs and projects tend to be process-based, requiring more detailed, longer-term reviews for external experts to sufficiently understand the processes used and to identify ways to improve them. Expert review of Business Administration and EERE deployment programs is less common and thus the Task Force recommends that the guidelines provided here be tested in these areas in practice to determine what modifications to this guide may be needed. Deployment, communication, and other such outreach activities are customer-based, often requiring detailed external surveys and analyses as well as evaluations by experts of their broader strategies and techniques. Just as

[2] (1) Process evaluations examine the efficiency and effectiveness of program implementation processes. (2) Market evaluations focus on the determination of market baselines, and on customer needs and target markets and how they are addressed by the program in question. (3) Impact evaluations examine the extent to which particular outcomes can be attributed to the program's work rather than to other influences. Impact evaluations are the third step in understanding the causal chain beginning from the program resource inputs to the program "outputs", and then to the program "outcomes". Program "outputs" are the direct products or achievements of a program's work, such as the specific technology cost and performance realized by the program's R&D. Program "outcomes" are the broader societal benefits such as energy savings, reductions in environmental emissions, etc., that result in part from the program's outputs. These "outcomes" are influenced by many factors beyond a program's control such as private sector investments, market prices—such as for fuels and other technologies, public policies, and other factors. Impact evaluations examine the roles of these various factors. (4) Cost-Benefit evaluations examine the benefits achieved by program activities compared to the costs incurred to achieve those benefits.

[3] Merit reviews follow standard procedures governed by 10 CFR Part 600-13. Readiness, or stage gate reviews and other aspects of RD&D decision making are being reviewed, standardized, and strengthened by a separate Task Force under the EERE Management Action Plan. Certain other evaluations methodologies are being improved under other efforts.

occurs with R&D programs, expert review for business administration and deployment programs may serve as a capstone that brings together data from several sources.

In-progress peer reviews themselves include several levels of analysis and evaluation, from the project level to the program level. At the project level, the focus is on whether the "projects are being done right" and many of the reviewers have a high level of topical expertise. At the program level, the focus is on whether the "right projects are being done." This level of review can provide useful recommendations on program direction, priorities, portfolio, performance, pace, and strategies. Reviewers typically include topical experts as well as those with broader expertise, experience, and vision. These levels of review complement each other and extensive interaction between them is needed, with project-level reviews and reviewers contributing to the program-level review, and the program-level review helping guide that at the project-level. These reviews may be done simultaneously or sequentially with the results of one review contributing to subsequent efforts. Although the same guidelines could be applied in yet higher level reviews, such as across EERE or across DOE, and although such reviews have been done by high-level commissions in the past, the primary focus here is on in-progress peer reviews at the project and program levels.

In-progress peer reviews are one distinct form of evaluation. Other forms of evaluation, such as process, market, impact, and cost/benefit evaluations often use objective quantitative measurements and statistical analyses to determine the manner and extent to which programs achieve intended objectives. They are generally longer-term quantitative field studies, in contrast to peer reviews, and are most often done for deployment programs. Peer review also differs from performance measurement, which is the ongoing monitoring and reporting of program accomplishments, particularly progress towards pre-established goals. Peer review and other forms of evaluation seek, in their respective ways, to answer questions of why and how and how good, while typical performance measures answer only what happened. Peer review, other forms of evaluation, and performance measurement are complementary activities. See Appendix A for further descriptions of these data collection methods.

## 1.3 Definition of In-Progress Peer Review

In-progress peer review is defined as:

> *A rigorous, formal and documented evaluation process using objective criteria and qualified and independent reviewers to make a judgment of the technical/ scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects.*

The definition is drawn from definitions used by the DOE, National Academy of Sciences (NAS), OMB, GAO, and other Federal agencies and institutions. This definition clearly distinguishes in-progress peer review from other types of peer review, such as merit review or readiness reviews, as well as from other management activities such as quarterly milestone reviews or budget reviews. The latter have some elements of this definition, but not all of them. Just as information from in-progress peer review will inform these other reviews and management activities, information from these others are often provided to peer reviewers to consider as part of their process. In-progress peer review will be simply labeled "peer review"

throughout this guide, without further consideration of merit review or readiness reviews. The distinguishing characteristics are explained below.

**Rigorous.** Like the scientific process itself, peer review asks the right questions and the tough questions, the questions that the researchers and their management must know to make good decisions.

**Formal and documented.** Peer reviews follow prescribed phases and general steps like those shown in Figure 1.1. The process is transparent so that other peers could follow the reasoning from the questions and the discussion to the results and recommendations.

**Objective criteria.** The evaluation criteria, data examined, and definition of evidence provided by specification of that criteria are the standards for judging a program or project. Criteria are specified prior to the review.

**Qualified and independent reviewers.** In addition to being experts in the subject matter, important relationships with the program are fully disclosed and the reviewers are not so tied to the program that they would be widely perceived to provide biased opinions.

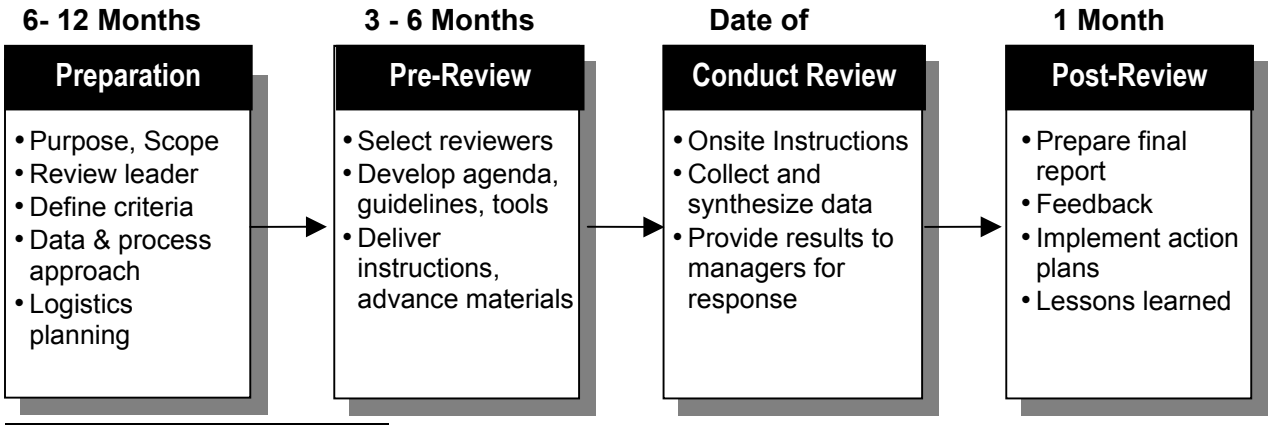
**Judgments.** Judgments provided relate to objective evaluation criteria and associated questions established for the review.

These characteristics position peer review as a unique contributor to ongoing efforts to strengthen projects and programs.

## 1.4 Organization of This Guide

This guide is organized around the key steps in the peer review process, shown in Figure 1.1 below. The appendices follow the same order and include forms that will be helpful as program managers and their appointed review leaders begin and move through the review process.

### Figure 1.1: Phases and Key Steps in the Peer Review Process[4]




[4] Preparation will take the longer period of time that is indicated if there is no history of review.

# 2.0 Responsibilities

## 2.1 Program Managers and Office Directors[5]

Program managers and office directors in both Technology Development and Business Administration (hereafter referred to as program managers) will:

- Ensure that peer reviews of their programs and key projects are conducted on a regular basis, as need for expert opinion and information warrants, but on average every two years.
- Ensure that plans for and findings of peer reviews are incorporated in programs' Multiyear Program Plans and in the individual performance plans of staff who have peer review responsibilities.
- Assign management responsibility for each peer review to a peer review leader and develop, in advance, plans for contingencies such as changes in staff.
- Approve the scope and criteria of these peer reviews, ensuring that reviews address issues that provide information for improving programs and assuring accountability.
- Formally commit with review leaders that all program peer reviews will follow the core principles and meet minimum requirements described in this guide.
- Review and respond to the draft findings and recommendations of each peer review, defining actions to improve the program as warranted and using findings when pertinent to management decisions.
- Provide a copy of the peer review report to EERE senior management including the Office of the Assistant Secretary.
- Ensure that the required peer review documentation is maintained.

## 2.2 Peer Review Leader

The peer review leader will:

- Be an EERE staff member assigned by the program manager to have administrative responsibility for carrying out the peer review.
- Establish an external review steering panel, as warranted, and to work with them (and with the review chairperson and panel members after their selection) to help design and implement the review, including helping define the scope, content, evaluation criteria and questions, data and other requirements, and to assist in the identification of the review chairperson and panel members.
- Follow the core principles and minimum requirements set forth in this guide and participate in the continuous improvement process offering lessons learned where the guidelines could be improved.

[5] See the manager's check list for conducting a peer review in Appendix B.

- Facilitate the review process which includes: implementing the process for selecting the review chairperson and the peer reviewers; helping to define the criteria and evaluation methodology; determining what data is needed by reviewers and providing that data and any other materials they request for the review; determining how the review is to be conducted; establishing and guiding contractor support for review logistics; preparing the response to the review; and completing a post-review evaluation of the peer review process (see Sections 4-8).
- Ensure that conflict-of-interest policies are followed (see Section 5 and Appendix F); that consideration is given to each reviewer; and that, overall, reviewers provide a sound, impartial, well-documented evaluation.
- Ensure that the observations and recommendations of the individual reviewers are included in full, as appropriate, in the final report and obtain signoff on the report's content by the panel chairperson and/or panel.
- Present the results of the peer review to the program manager.
- Perform all these functions conscious of the ethical dimensions inherent in each of them.

The peer review leader may choose to have many of these actions implemented by a third-party contractor who manages these responsibilities within the context of the Terms of Reference established by the peer review leader.

## 2.3 Corporate Responsibilities

The Office of the Assistant Secretary will:

- Reinforce the organization's commitment to regular, high quality peer reviews as EERE improves the way it does business. The Office of the Assistant Secretary will ensure that incentives are in place to budget for and conduct quality peer reviews, such as incorporating plans for, and the findings of, peer reviews in programs' Multiyear Program Plans and in the Individual Performance Plans of managers and staff who have peer review responsibility.
- Identify adequate resources to ensure quality reviews can be undertaken within the constraints on management and staff and help coordinate resources for peer review where this makes sense. A Peer Review Best Practices Group will be comprised of members of the Board of Directors and staff representing Technology Development and Business Administration, possibly with assistance from outside experts. This group will convene as requested by the Office of the Assistant Secretary (e.g., semi-annually) to help provide assurance that best practices in peer review are implemented in a meaningful way. The primary role of the group would be to gather necessary information and assess progress in EERE and to facilitate communication of lessons learned to program managers, senior management, and the Office of the Assistant Secretary (see Section 9).

# 3.0 Core Principles and Minimum Requirements

Peer review differs from less formal means of collecting information for program managers in that peer review is a critical, formal, and documented process with objective peer reviewers and review criteria. Objective information gathered with a high degree of rigor and quality is necessary (but not sufficient) for program managers to successfully manage. Ensuring public accountability requires an appropriately transparent peer review process. Yet, there is no "one size fits all" way of conducting peer review. The diversity of EERE programs requires considerable flexibility in how peer reviews are conducted. To ensure quality and rigor and allow flexibility, the Task Force identified the following core principles and minimum requirements as key guides for improving EERE's practice of peer review.

## 3.1 Core Principles

Managers and staff in EERE will provide resources and other support for the conduct of rigorous, formal, and documented review of all programs and key projects by qualified and independent peers on a regular basis (see Section 2.1).

The review process will be tailored to the level of review (activities in an entire program, portfolio of projects, or individual project), characteristics of the program/project being reviewed, and to the purpose and goals of the review (see Section 4.1 and following).

Peer reviews will provide independent program-specific feedback to improve EERE program planning, performance, and effectiveness (see Section 4.2 and following).

EERE peer reviews will be conducted in a credible, fair, transparent manner with the highest ethical standards and at the lowest reasonable burden on the EERE community (see Section 4.1 and following).

EERE is committed to a continuous improvement process that involves an internal forum for exchange of experiences about peer review and a mechanism for assessing progress in implementing this guide (see Section 9).

## 3.2 Minimum Requirements

**Scope of Review.** All EERE programs in both Technology Development and Business Administration offices and their key projects[6] will be reviewed by qualified and objective peers on a regular basis. This should typically cover 80-90% of $RD^3$ funding and supporting business

[6] Key projects are those that are essential to the program; for example, projects that are on the critical path for meeting the program's goals. Projects considered "key" for review might also include those that are (a) problematic for various reasons—technically, operationally, politically; (b) suggested by reviewers for review; or (c) meet thresholds in $-value or in duration—such as longer than three years. Reviewers should be made aware of other activities supported by the program and given the opportunity to review them if they so choose. Non-key activities might be examined in poster sessions at peer reviews or by other approaches. A benefit of this is that by focusing on key projects, the cost to the program and the burden on reviewers of examining in depth the many small supporting activities of a program can be reduced and there can be greater opportunity to examine the key projects in more detail.

analysis and management programs. Earmarks will be included in the review and treated on the same basis as other activities (see Section 4).

**Frequency of Review.** EERE programs and key projects will be reviewed, on average, every two years, depending on the characteristics of the program/project being reviewed and needs for information (see Section 4.1).

**Timely Preparation.** Preparation for a peer review will include the designation of a review leader, determination of the purpose of the review and the review agenda, and communication of this information to reviewers and those being reviewed in time for them to prepare for the review (see Section 4.1).

**Core Evaluation Criteria.** Clear standards for judging the program or projects will be defined prior to the review. This includes criteria and the kinds of evidence (data) needed to judge on those criteria. At a minimum, programs will be assessed on quality, productivity and accomplishments; relevance of program success to EERE and programmatic goals; and management (see Section 4.5 and following).

**Reviewers.** There will be a minimum of three reviewers for each discrete program element or smallest unit that is assessed and reported. Each reviewer will be independent, competent, objective, and selected by a transparent, credible process that involves external parties.[7] Together, reviewers will cover the subject matter. Reviewers will sign Conflict of Interest forms prior to the review and Nondisclosure Agreements if/when proprietary information is presented or discussed (see Sections 4.2 and 5).

**Plan for Collecting Reviewer Data.** Review leaders will plan ahead for how review inputs will be documented, analyzed, and reported, as well as how individual reviewer comments will be tracked while maintaining their public anonymity. The review agenda will allow sufficient time for a rigorous Question & Answer period for reviewers. Reviewers will be encouraged to support their comments with citations or data wherever possible (see Sections 4 and 6).

**Producing the Peer Review Report.** The peer review report will reflect the full range of reviewer comments with high fidelity. The report should also include all individual inputs from the reviewers and will be reviewed by the panel chair and/or the panel before release (see Sections 7.4 and 8.1).

**Program Manager Review and Response.** Before the report is finalized and goes to senior management, the program manager/office director will add written responses to peer reviewer findings and recommendations, including actions to be taken to improve the program (see Section 8.1).

**Peer Review Report Distribution.** The final peer review report will be promptly communicated to senior management and all persons involved in the review, including

[7] EERE partners in R&D or technology deployment efforts may participate in peer reviews, if qualified, as appropriate, but care must be taken to ensure that their participation as reviewers on the Panel, for example, does not raise potential conflicts of interest.

researchers of an R&D program or project, and the report will be made available publicly (see Sections 7.4 and 8.1).

**Peer Review Record and Ex-post Evaluation.** A peer review record will be established at the beginning of, and maintained throughout, the review process. The record should contain the final form of all the key documents of the review for all phases of the review. An evaluation of the peer review process is necessary to aid continuous process improvement (see Sections 6 and 8).

Given the diversity of EERE programs, a great deal of flexibility is provided within these requirements, and options and examples of different best practices are provided throughout this guide. Peer review provides managers, staff, and researchers an important tool for improving EERE program and project performance and productivity in order to accomplish the EERE mission.

# 4.0 Preparation: Purpose, Criteria, and Process

The preparation for a peer review needs to begin well in advance of when the results of the review are needed, depending on the complexity of the review (see Box 4.1).[8] An example of a time line is shown in Appendix D.

## 4.1 Purpose and Scope of a Peer Review

The first step in preparation is to determine the purpose and scope of the review within the context of other review and management activities. Improving program management and demonstrating public accountability, providing an honest independent technical review of the projects and program, and communicating the value of the programs to the larger public are all potentially important outcomes of peer reviews.

**Box 4.1: Preparation**

- Define the scope (projects and/or subprograms to be included).
- Identify and prioritize information purposes and data needed when.
- Establish the timeline for the review.
- Establish the review leader.
- Establish role of review chairperson.
- Define the evaluation criteria and review questions.
- Identify budget and timing constraints and begin determining review logistics.
- Define data collection and analysis processes.
- Identify the audience to be present – Public vs. Closed review

The primary intent of EERE peer review is to provide information that assists program managers and staff, as well as researchers and others, in their efforts to improve program performance.[9] The timing of when the report becomes available to provide useful input is therefore also important. For example, reviews in the winter can provide input for spring budget development; reviews in the spring can provide input for spend plans developed over the summer and implemented in the fall at the beginning of a new fiscal year.

Reviews may be prospective (looking forward and assessing plans or likely success) or retrospective (evaluating what has already happened), and often have elements of both. Peer review recommendations, combined with other data, help provide the basis on which managers:

(1) Decide to select, continue, modify, or redirect program portfolios;

(2) Assess program performance and productivity;

(3) Identify closures or new opportunities;

[8] Six months is likely to be sufficient time to prepare if (a) peer review has become routine and facilities are readily available, or (b) if a small number of projects are being reviewed and it is known that there are a sufficient number of qualified reviewers available.

[9] Note that information provided by peer reviews should be used as input by management but should not be seen as required actions by management. Managers necessarily have a much broader perspective of the full range of challenges facing their program than external reviewers and have the responsibility to respond appropriately.

Peer reviews may also,

(4) Strengthen the community around a subject area (e.g., subject areas such as research, deployment, or business management); and/or

(5) Provide critical information to a program that is under particularly close congressional scrutiny or has major problems previously identified.

Deciding what to review and when to review it should be done on a multiyear basis, although unforeseen circumstances may also require review on an ad hoc basis. The EERE minimum requirement is that all programs and key projects be assessed, on average, every two years. In general, all projects in a given topical portfolio will be considered for review, regardless of their stage of maturity, with the primary focus on the key projects, typically comprising 80-90% of the program budget, and earmarks. Peer reviews may be held multiple times over the course of a project—to determine if initial assumptions and directions are reasonable, to identify possible mid-course corrections, and to determine if objectives were met.

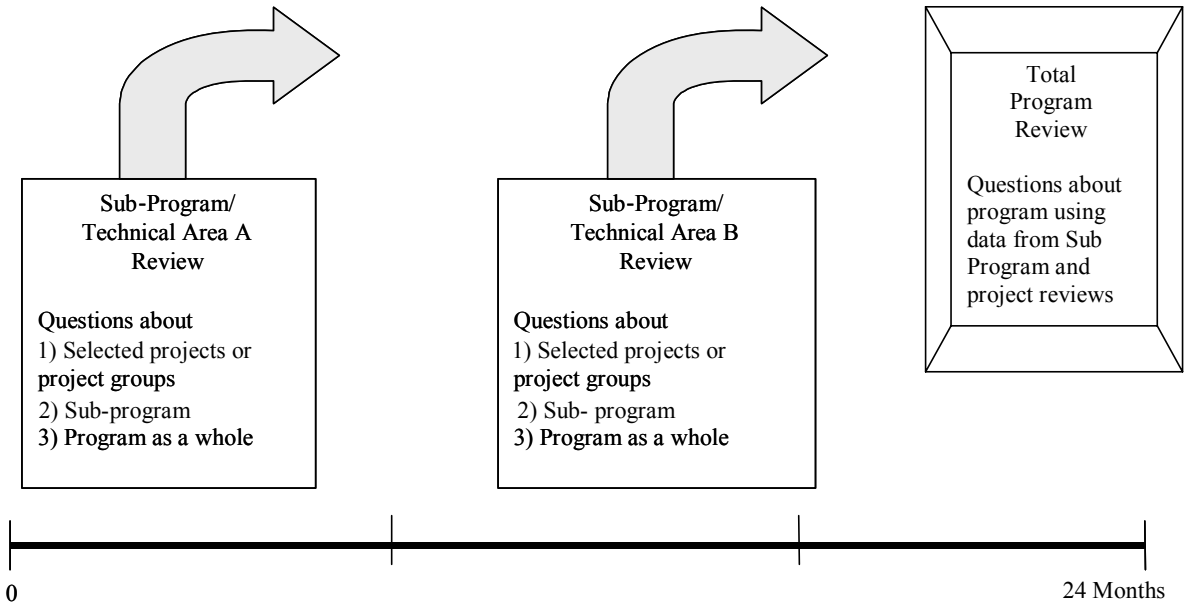
The intent of focusing on "key" projects is to reduce the cost to the program and the burden on reviewers of examining in depth the many small supporting activities of a program. Selecting key projects may provide the opportunity to examine the more important projects in greater detail. Key projects are those that are essential to the program; for example, this would include projects that are on the critical path for meeting the program's goals. Projects considered "Key" for review might also include those that are (a) problematic for various reasons—technically, operationally, politically; (b) suggested by reviewers for review; or (c) meet thresholds in dollar value or in duration—such as longer than three years. In addition to key activities, earmarks will be included in the review and treated on the same basis as key activities. Reviewers should be made aware of other activities supported by the program and given the opportunity to review them if they so choose, either in the current review or a future review. Non-key activities, other than earmarks, might be examined in poster sessions at peer reviews or by other approaches.

The frequency of review is a balance across many factors, several of them mentioned in the definition of "key" project. More frequent reviews increase the staff burden and leave less time to implement the recommendations of the previous review, but may provide more timely input for management decision-making; less frequent reviews require more effort to update and validate the identification of potential reviewers and may allow more shorter term projects (e.g. less than three years) to slip through without ever undergoing a review. The frequency of review may also vary with the level reviewed, with projects reviewed more frequently and programs less so. Several programs currently conduct full reviews annually. Another option might be for a portion (e.g., half) of the projects in a program to be reviewed one year and the remainder the second year, and then for these to be rolled up into a higher level program review in the third year, recognizing that some updating of the earlier reviews might be required. A third option might be for projects to be reviewed on a two or three year cycle at which time the peer reviewers could recommend selected (e.g. problematic, sensitive) projects to be reviewed in the next year or so, e.g. at the midterm before the next normal review cycle. Conversely, a project or project portfolio that peers have thought was doing very well in two consecutive reviews might be allowed to shift to a longer review cycle or to skip one review cycle.

The overall scope and boundaries of an individual peer review will vary. A specific review may focus on information needs at the project, portfolio of projects, or program levels, or at more than one level. It is important to define the smallest unit reviewed and the largest unit reviewed, that is, the breadth and depth of programmatic, technical, and management issues to be assessed, because this determines the frequency and length of the review, the reviewer expertise needed and the breadth of reviewer perspectives required, and what material is presented and covered in the agenda. Funding and timing constraints will also influence the scope. The review chairperson, once appointed, should have a say in the scope of the review

These reviews may be done simultaneously or sequentially with the results of one review contributing to subsequent efforts. An approach commonly used is to rotate peer reviews across sub-program or key activity areas, and use this information during a review of the entire program, so that over the period all program areas have been carefully reviewed. When a sub-program is being reviewed, it is important that questions be asked in the context of the overall program, although this does not substitute for a review structured to look at the entire program. The rotating sub-program and program review approach is shown in Figure 4.1. The individual review cycle is part of a broader review plan that should be built into the MYPP.

## Figure 4.1: Example of Rotating Sub-Program Reviews to Cover Entire Program




At the project level, the focus is on whether the "projects are being done right" and many of the reviewers have a high level of topical expertise. At the program level, the focus is on whether the "right projects are being done." These levels of review complement each other and extensive interaction between them is needed, with project-level reviews and reviewers contributing to the program-level review, and the program-level review helping guide that at the project-level. Other considerations include the type of review questions asked (see Section 4.6), selection of reviewers (see Section 5), and use of reviewer-to-reviewer interaction (see Section 6.1).

## 4.2 Independence of the Review

The definition of peer review and the EERE core principles and minimum requirements all stress that achieving a high level of independence is crucial to success of the review. The essential component of this is the independence of the reviewers themselves and their ability to maintain objectivity. However, the level of independence in managing and executing the peer review process is also important. These two aspects are related in that the perception of independence may depend on demonstrated independence of the peer review process itself. Process independence depends on the level of control by independent external groups.

The review leader and the program manager should decide at the outset the desired level of independence and the degree of external control for the review. To a large degree, this decision requires a conscious trade-off between two often competing goals.

If a key goal of the peer review is to achieve the highest possible level of perceived independence, then the review should be turned over to an outside group for management and execution, following appropriate guidance from DOE/EERE on the scope of the review and the criteria for evaluation.

If key goals include high efficiency and effectiveness of the process, more rapid response times in completing the peer review to aid relevance of the review to program decisions, and staff buy-in and implementation of results, then the review should be managed with an appropriate level of direction and support from the Program, while still ensuring the independence of the peer reviewers themselves.

The appropriate balance between these goals varies among EERE programs. Some programs require a greater degree of perceived independence due to their funding levels, higher levels of external scrutiny from particular individuals or groups, or other factors. Other programs may be better served with some degree of internal direction to ensure the review process yields timely results for management consideration. An appropriate level of internal direction is one in which the program manager provides substantial guidance in framing the scope and approach of the review, the timelines for conducting the review, and other key issues in order to best meet his/her management needs. However, the peer reviewers are still selected per the process described in Section 5 to ensure independence, and the overall peer review is still guided by the core principles, minimum requirements, and evaluation criteria described in this guide.

A peer review conducted entirely by an outside group can potentially still meet the needs of the DOE/EERE program manager, if DOE/EERE is able to have some influence over the scope, approach, and timeliness of the review, and if the review meets the core principles, minimum requirements, and evaluation criteria of this guide, including transparency, freedom from bias, and quality control. In such cases, particular attention needs to be given to ensure that the external process is open, that detailed notes or transcripts from discussions are made available, and that mechanisms for correcting faulty information at any point in the process are available. Although perhaps reassuring to external critics, experience has shown that totally independent reviews often provide less value to the program. Reasons for this include that reviewers—who are relatively unfamiliar with the program—often focus on tangential issues of interest to themselves but of less value to the program managers, and that such review processes are often higher cost, slower in response, lack adequate internal quality control, lack adequate expertise,

lack transparency, and sometimes rely on consensus to a degree that enables a single determined individual to significantly shift and bias the outputs of the overall panel.

## 4.3 Review Leader

A review leader from the program office or EERE should be appointed by the program manager to facilitate the review process, which includes selecting a review panel chairperson and peer reviewers per the approaches described below, and as discussed in Section 2.2 (Roles and Responsibilities). The review leader is always a member of EERE staff and works with and in support of the panel chairperson.

The review leader could decide to establish a steering panel composed of external and possibly some internal EERE (non-program) staff. This steering panel would (1) consult with internal and external experts and stakeholders to develop broad perspectives in the design and implementation of the review; (2) help define the review process and evaluation criteria, and (3) help select the review chairperson, as well as possibly other members of the review panel. Use of a steering body can further increase the independence of the review process. In general, involving a variety of expert and stakeholder perspectives in the design of the review also ensures that the review will be more credible and useful.

## 4.4 Role of the Chairperson

The chairperson of the review is an objective, unbiased, and independent expert from outside the program being reviewed. The review chairperson serves a unique and important role that can begin as early in the review process as he/she is selected, including the selection of the members of the peer review panel. Areas where the chairperson provides direction, oversight, and possibly final decisions can include the following:

- Selection of reviewers;
- Establishing review criteria;
- Establishing the content and scope of material submitted by research teams;
- Ensuring independence of the panel members during the review and the independence of the review more generally;
- Facilitating the review process, or guiding a professional facilitator if one is used;
- Ensuring that the review is focused on substance; and
- Overseeing the production of the peer review report and signing off on the final report.

Given the responsibilities of the review chairperson, it is not necessarily the most credentialed technical expert that is desirable, but rather someone with knowledge of the field and a high level of management and meeting skills, including the ability to handle disruptive individuals[10] (although an outside facilitator can help to smooth the process).

[10] For particularly controversial issues, it may be useful to define and discuss the chairperson's authorities to manage such situations in advance.

## 4.5 Evaluation Criteria

A peer review requires evaluation against pre-established criteria. For example, if the program manager wants the peers to assess whether or not the program is doing quality research, "quality" and what constitutes "low" or "high" quality should be defined for the reviewers and those being reviewed. Criteria, and the evidence implied by the specification of those criteria, form the basis for the ratings and the narrative critique of each review. It is important that those planning the review think ahead about what to ask of the reviewers and to how they will use the information reviewers will provide in response. If the response to a review question could not provide the basis for future action, asking the question would be a wasted effort.

The criteria and related standards for judging any aspect of the program reflect the program's definition of success and characteristics of the program or projects. For example, a high risk and potentially high pay-off project or program that is addressing a complex technical problem is judged differently than one that has the goal of solving a relatively specialized problem related to performance of an existing technology. It is important that reviewers understand the program's intentions with regard to level of desired risk, timing of benefits, and other important dimensions of "success" so they can judge projects and programs accordingly. Otherwise, there is often a tendency to support more traditional projects at the expense of innovative ones.

The criteria should focus on the right questions and the tough questions, the questions that most need to be discussed by an objective, expert group. Criteria and associated questions need to be stated as clearly and succinctly as possible to reduce the likelihood that reviewers will use their own interpretation.

**Table 4.1: Comparison of EERE Core Criteria and the FY 2002 R&D Scorecard**

| OMB R&D Scorecard | EERE Core Criteria |
|---|---|
| Accomplishments | Quality, Productivity, and Accomplishments |
| Relevance,<br>Relevance of future research | Relevance |
| Approach to performing,<br>Technology transfer/ collaboration | Management |

** U.S. DOE R&D Scorecard (April 15, 2002)*

### *EERE Core Evaluation Criteria*

There are a few criteria that are often recommended and used by the DOE, OMB, NAS, and others. Although programs may choose to define additional criteria, at a minimum all EERE programs are expected to use the following three criteria (referred to as "core criteria"). The three core criteria are the following:

**Quality, Productivity, and Accomplishments.** Quality, as used here, is primarily a measure of the inputs: the quality of the technical approach, the quality of the people, and the quality of the facilities and other resources involved. Productivity is a measure of the activity underway and outputs: what has been achieved and what is the value of the program's output compared to costs. This criterion examines if projects and programs are making progress in meeting targets and goals commensurate with funding levels and degrees of risk. Accomplishments are a measure of the outputs: what has been achieved. This

criterion allows evaluation of projects at different stages of development—from beginning to end—and determines how well the mission and goals are being achieved.

**Relevance.** Relevance means that the program or set of activities provide an important actual or potential contribution to the Program's and the Department's mission, goals, or strategy, and to society. For most activities, this means that activities address current known or anticipated technical, market, or policy barriers, or business management or communications support challenges. There could be some longer term, high risk research where specific contributions are not yet well-defined or known.

**Management.** The management criterion examines how well projects and programs are managed. This includes the quality of program portfolio selection and planning (past and future), how well resources are applied and are leveraged (e.g., in public-private partnerships), and the effectiveness of program execution as well as program integration aimed at improving outputs and overall program delivery. The assessment should try to distinguish between what was under program management control and what was beyond it (external influences).

These three criteria compare favorably with the OMB R&D Scorecard criteria (see Table 4.1).

Another factor frequently considered, but not included here as a core evaluation criterion, is impact. Impact can be considered at two levels for R&D: the impacts on the R&D goals themselves—more generally described as the research outputs; and the impacts of the results of the research on the broader market or policy arena—more generally described as outcomes. The first, research outputs, is addressed by the quality and productivity criterion. The term "impacts" will be used here for the second, research outcomes, as the impacts on broader market and policy areas. Assessing impacts often requires evaluations, modeling, or other analyses specifically designed for that purpose and are not possible within the scope of the peer review itself. For results already realized, impact is best assessed by evaluations described in Section 1. Such evaluations should also consider how much of the observed impacts can be attributed to program activities. Potential future impacts are best assessed through detailed benefits modeling, as done by EERE in response to the Government Performance Results Act (GPRA). Where available, such impact evaluations or benefits projections are important inputs for peers to consider as they review the projects and programs.

**Overall Assessment.** In addition to specific criteria, reviewers should always be asked to provide an overall assessment. This picks up important points that may have been missed in addressing the defined criteria and also provides an overall summary. For example, the overall assessment typically includes the question "Please provide your general overall impressions?" as well as multiple general questions, such as the following examples of R&D-related questions:

- "Please identify overall strengths and weaknesses."
- "What areas of research or other work could be ended or modified; what new areas or directions could be added?"
- "Identify changes that may have occurred in the research context (markets, policy, competing technologies, etc.) that might alter the planned targets or goals?"

It should be noted that although all EERE programs will be assessed on these core criteria, and any additional criteria established for the review, the importance of individual criteria would vary depending on the review purpose and characteristics of the program or program element. Programs that choose to use numerical rating systems may choose to assign weights to criteria, as discussed in Section 7.3 and Appendix K. These weights would vary depending on the characteristics, goals, and timeframe of the program.

## 4.6 Review Questions

Each of the EERE core criteria and additional criteria for which the program seeks review input can be stated as questions for the reviewers in terms specific to the project or program. There may be one question for each criterion that provides the definition of that criterion, or several specific questions may be asked for each. An advantage of asking specific questions is that it makes it easier for the reviewer to do the job requested of him/her. The type of question will vary depending on the level of the review (project, sub-program, or program) and the type of program (research, technology development, deployment, analysis, or business administration). Questions should go as deep and as technical as necessary to meet management information and decision-making needs. Examples of review questions are provided in Tables 4.2 and 4.3 below for the various criteria and in Appendix C.

### Table 4.2: Illustrative Specific Review Questions – Project Level

| Evaluation Criteria | **Illustrative Specific Review Questions – Project Level** (will NOT be applicable for all projects) |
|---|---|
| *Quality, Productivity, and Accomplishments* | • Are the resources (e.g. people, facilities) put to the task of high quality and sufficient to meet goals?<br>• Are the technical and/or organizational approaches used in the project, including integration with other projects, appropriate for achieving the stated goals?"<br>• Is there a steady record of accomplishments? Is this good value for the money? |
| *Relevance* | • Does the project address an important technical, policy, or business management need?<br>• Are the project's goals appropriate for the mission?<br>• How valuable will the products produced by the project be to the customer?<br>• Do/will results from the project translate into real energy savings or supply? |
| *Management* | • How well were last year's plans for the project carried out and what are the technical, policy, or business merits of future plans?<br>• Are changes in project direction or emphasis based on clear, robust and documented decision processes?<br>• Does the project plan include off-ramps (decision points where the project could be ended.) |

At the program level, some representative questions might take the form listed below.

## Table 4.3: Illustrative Specific Review Questions – Program Level

| Evaluation Criteria | Illustrative Specific Review Questions – Program Level (will NOT be applicable for all programs) |
|---|---|
| *Quality, Productivity, and Accomplishments* | • Assess the overall balance and adequacy of the research agenda and portfolio to meet its technical goals. Are key areas of research getting enough emphasis?<br>• Are research activities moving at an appropriate pace to meet technical goals? Are technical milestones realistic and achievable? |
| *Relevance* | • Does the program address the EERE or DOE mission, an important technical, policy, or business management need?<br>• Do/will key activities and projects from the program's portfolio, taken together translate into real energy savings or supply?<br>• Are changes in program direction desirable given current technical and market conditions? |
| *Management* | • How well were last year's program plans carried out and what are the technical, policy, or business merits of future plans?<br>• Are changes in program direction or emphasis based on clear, robust and documented decision processes?<br>• How well has the program team leveraged resources (funds, capabilities) by teaming with private companies and other organizations?<br>• How well does the program address the structural relationship (integration) across subprograms and between projects? |

As part of a two level review process involving the "roll-up" of project/subprogram reviews to total program level review, reviewer comments of the project level questions in Table 4.2 should be made available as input to reviewers who address the program level questions in Table 4.3.

## 4.7 Logistics and Review Budget Considerations

Often the size and scope of the program or project determines the venue for the peer review. Scheduling the event using public facilities (hotels, conference centers), meal planning, and audiovisual requirements, all should be completed well in advance of the actual meeting.

Typically, meeting logistics are one of the major costs of a peer review for DOE/EERE. Table 4.4 shows there is a wide range of costs for peer reviews. Expenditures vary depending on the number of projects reviewed, the number of reviewers, whether the meeting is open to the public, and the length of the review. Ways of controlling the cost of the review meeting include the following:

- Structuring the agenda carefully so that the agenda is focused and people's time is used efficiently, and
- Making maximum use of teleconferences, videoconferences, and other electronic media to prepare the review panel. This is particularly helpful when international reviewers are involved.

Often an honorarium is paid to reviewers depending on time spent, as well as reimbursement of travel expenses. This is particularly true if the same reviewers are used more than once. Federal employees cannot be reimbursed for their time, while academics and consultants usually are. A typical honorarium is $500 per day.

### Table 4.4: Examples of Costs in EERE Peer Review Experience (circa 2001-2003)

| EERE Peer Review | Total Cost | Number of projects Reviewed | Cost per Project Reviewed |
|---|---|---|---|
| Program A | $250,000 | 131 | $1900 |
| Program B | $150,000 | 40 | $3800 |
| Program C | $100,000 | 25 | $4000 |
| Program D | $70,000 | 30 | $2300 |
| Program E | $65,000 | 25 | $2600 |
| Program F | $50,000 | 13 | $3800 |
| Program G | $28,000 | 18 | $1600 |

For some programs, the complexities and costs of conducting peer reviews might be reduced by utilizing an identified EERE common support contractor for peer review logistics and related activities. A single contractor could provide continuity and consistency across time and reviews. The contractor could work with those who have ongoing reviews to maintain institutional memory and provide tutorials to others, in each case tailoring review logistics to meet the needs of individual programs. This support would reduce the cost and burden of review, simplify the tracking of progress, and aid in the sharing of lessons learned. To help ensure fidelity to the core principles of the guidelines presented here, the contract for this work could be re-competed after a set period, say 4-5 years. For other programs, these benefits may be outweighed by the specialized knowledge and experience that other contractors have developed over the years in managing peer reviews for particular programs or topical areas. Also, it may be a good idea to rotate contractors providing logistics support to keep the review process fresh and objective.

At least one program has in the past defrayed costs by turning the peer review effectively into a large conference and charging attendees (other than the peer reviewers) a conference registration fee. If such an approach is considered, careful attention should be given to allow waivers of registration fees so that stakeholder groups such as nonprofits or others are not inadvertently excluded by the cost of registration.

## 4.8 Data Collection and Analysis

Once the purpose, scope, criteria, and questions of the review have been determined, attention turns to the review process itself. Questions addressed are the format for the review, the data collected and provided to the reviewers, and how the reviewers' analysis will be collected.

A first and fundamental decision to be made by the peer review leader and the review chairperson (once selected) is what format to use for collecting the expert review input. The most common format in EERE is the independent expert panel that has a chairperson, meets in person with program staff and researchers, and generates written review opinions containing the individual review findings and recommendations. A second format to be considered is a group of external reviewers that does not meet in person but has a chairperson that sends out review guidelines and materials to the group, collects the data by mail or email, and writes a summary report of the group responses with a final review by the group.[11] A third format combines these two to hone in on the specific questions to be addressed in a panel session. Materials are sent to reviewers by mail and comments received back. The questions that are addressed in the face-to-face meeting, and the data collected and presented, respond to the areas of concern found in the earlier written review.

Whichever format is used, and whoever writes the report, responses of the individual reviewers and any summary of those opinions must be thoroughly and accurately reflected in a final report because the expert judgment is both the primary data collection and data analysis method.

When the format is a panel of experts, there is the question of whether a consensus will be sought or not. It should be noted that the Federal Advisory Committee Act (FACA)[12] allows agencies to form panels that provide consensus reports only under special circumstances (see Box 4.2). Thus, the review panel should not be required to arrive at a consensus opinion nor rating unless the review is turned over to an external contractor or the panel is one already formed under FACA. In fact, it is often preferable not to press for a consensus as the discussion of differences of opinion often brings out important facts.

**Box 4.2: Compliance with the Federal Advisory Committee Act**

FACA requires: advisory committees that have been formed to be formally established and follow prescribed rules as set forth in 5 U.S.C. App 2; that timely notice of meetings be published in the Federal Registry and other forms of public notice be used; that interested persons be permitted to attend meetings (with some exceptions); and that detailed minutes and records of documents be kept and made available for public inspection and copying.

FACA requirements apply to EERE peer reviews that are conducted by a formally established Federal Advisory Committee or by an Agency-based Federal Advisory Committee. This is a group that

a) is established, controlled, or managed by DOE/EERE;
b) has a fixed, standing membership with defined purpose and agenda; and
c) is directed to provide collective or consensus recommendations, rather than individual advice.

FACA does not apply to contractor-run peer reviews, where the contractor establishes, controls, or manages the peer review process.

Source: FACA website; and EPA Peer Review Handbook, Science Policy Council, 2000, Section 2.8

[11] This type of review is useful for internal reviews "where structural program issues are paramount and need resolution or improvement, and where comparison with other programs is not the major focus" [Kostoff, 1998, "GPRA Science and Technology Peer Review"]

[12] Those who wish to pursue consensus will need to meet the requirements of FACA. See http://www.fido.gov/facadatabase/ or http://www.archives.gov/federal_register/public_laws/acts.html.

A second decision is what information to collect and provide for the reviewers prior to the review. The data collected must be sufficient for reviewers to judge the set of activities against the standards that have been set by the definition of the criteria and the specific questions. The data includes material that is provided prior to the review and during the review. A balance must be struck between having too much data (because of resources required to collect and review it) and not having enough data. To the extent possible, the burden on researchers should be minimized by using materials already developed or planned for other purposes, rather than developing new materials just for the peer review. Depending on the type of program, data can include the following:

- Information sheets describing the program or project mission, goals, and targets and milestones (and for the higher level "total program" reviews, including data on how funding is allocated across key activity areas);
- Summary project reports, plans, and budgets;
- Principal investigator or project manager presentations;
- Lists of publications or patent applications and the results of citation analysis;
- Customer surveys, available impact studies;
- Various reports prepared by other external groups such as the IG, GAO, NAS or others; and/or
- Any additional data and information reviewers may request.

A third decision to be made by the peer review leader and chairperson is whether the program wants to have responses and ratings collected in a format that provides quantitative data. Rating techniques are discussed in Section 6.1.

The important point is that the review leader (and review chairperson) should make decisions by "beginning with the end in mind" of what management decisions need to be made in order to picture the desired report, and then develop the data collection and analysis plan and the tools to develop and display it in the desired manner.

## 4.9 Public Versus Closed Review Sessions

A determination needs to be made early in planning about whether or not the public will be invited to be present or participate in the review sessions. There are positive and negative aspects of having the public present. It is up to the peer review leader in consultation with the program manager and others to decide whether or not to have reviews that are open or closed to the public, or to employ a combination of the two.

Those in favor of having open-to-the-public reviews suggest that having the review meeting open can:

- Help sharpen the questions raised;
- Improve the transparency of the peer review process;

- Help improve or legitimize the technical or management approach;
- Strengthen integration networks for research, deployment delivery, or business management;
- Broaden public learning by providing an opportunity for individuals—and competitors—to hear first hand what others are accomplishing and how they manage their work; and
- Encourage participants to improve performance due to the pressures of presenting publicly to their peers.

Relying primarily on open sessions does not preclude closed session at certain times. For example, reviewers may meet with the key researchers in a closed session for discussion of proprietary data, and the reviewers often meet by themselves at the end of the session for discussion. In many cases, open meetings can also be preserved even when the work has involved proprietary, business sensitive, or confidential information. This can be done simply by not disclosing such information and instead charging the reviewers with determining whether a project is (a) well managed and (b) producing results that justify its existence and continuation. Neither of these requires presenters to disclose sensitive information about how results were obtained. Reviewers are instructed to believe the presenters unless natural laws are violated, or there is some compelling reason to think the claimed results are incorrect or impossible. Since reviews occur at least every two years, on average, no one could long benefit by falsifying results. Experience in the High Temperature Superconductivity (HTS) program with this approach has been uniformly positive.

Public sessions also create the opportunity for public comment, such as by providing separate written comment following the session or even asking questions if there is time available following completion of the peer reviewer's questions. Such public comment can provide an additional useful input, and can be an important outlet for the public.[13]

More information on the logistics of holding an open review can be found in the Peer Review Process Handbook of the HTS program, as listed in the references.

Those warning against having the public present suggest that this may:

- Bring into the review people with personal motives and biases that detract from the review purpose,
- Inhibit candor on the part of both reviewers and those being reviewed,
- Increase the cost of the review,
- Inhibit the time available for the review panel, and
- Limit consideration of proprietary data (see counter argument above).

[13] The draft OMB Peer Review standards for regulatory science, August 29, 2003, page 11, call for the opportunity for public comment. As most EERE work is not regulatory in nature, this is not generally a requirement for EERE, but this can be a useful additional element of the peer review process.

If, in fact, proprietary data is presented, then every participant in the session must sign a Nondisclosure agreement. Only the reviewers need to sign a Conflict of Interest form.

It is important that when a closed session is held, that transparency be assured by making publicly available detailed notes or even transcripts—without attributions or proprietary information—from the meeting. This provides a mechanism for external parties to correct inaccurate or misleading information and to improve public understanding of how particular conclusions were drawn. Reviewers should also be encouraged to provide expanded comments of how they arrived at their conclusions. Opportunities should be provided for responding to any critiques during closed sessions. As the provision of transcripts or detailed notes can be time-consuming and expensive, methods for reducing this overhead should be explored.

The issue of open versus closed meetings will be revisited in the future when further experience can help clarify which approach works best under particular conditions.

## 4.10 Use of Contractors to Implement a Peer Review

FACA does not apply to contractor-run peer reviews, where the contractor establishes, controls, or manages the peer review process. In this case, it is necessary for the EERE program to ensure that when a contractor runs a peer review for a program office, that the planning and execution of the review is established, controlled or managed by the contractor or outside organization. This means that the EERE program *should not* provide to the contractor a suggested peer review format, not select reviewers, not invite experts to participate in the review, nor take control of the agenda or run the meeting. At the request of the contractor, the EERE program could prepare the technical and background information to be provided by the contractor to peer reviewers. The program can provide comments to the contractor as necessary to verify completion of the peer review work assignment, but should not seek to modify any of the contractor's conclusions that are the result of the peer review process. In a contractor-run peer review that follows these considerations, the contractor can use the terms "collective" and "consensus" when reporting reviewer recommendations. It should again be emphasized, however, that consensus reports can lose important perspectives and/or be pulled in particular directions by determined individuals.

# 5.0 Pre-Review: Selection of Reviewers

Peer review results depend greatly on the quality of reviewers and the process by which they are selected (see Box 5.1). The two most important things for competent and credible peer reviewers are that (1) the selection process is such that peer reviewers are selected primarily on the basis of necessary expertise in the subject area under review, and (2) peer reviewers disclose to agencies any conflict of interest prior to being selected, and do not participate in any portion of the review where they have a conflict of interest. These are discussed below.[14] Identifying and selecting high quality peer reviewers is also a very time-intensive process; part of the ongoing effort to improve the peer review process will be devoted to developing mechanisms that reduce this effort for the peer review leader and others.

**Box 5.1: Pre- Review.**
**Reviewer Selection Process**

- **Step 1:** Define expertise and perspectives needed
- **Step 2:** Define criteria of selecting reviewers
- **Step 3:** Develop a list of possible reviewers and nominate
- **Step 4:** Gather background information
- **Step 5:** Develop initial selection list
- **Step 6:** Select the chairperson and reviewers from list of nominees

## 5.1 Nomination and Selection of Peer Reviewers

It is important to establish a clear process for the nomination and selection of peer reviewers that includes what is done, how it is done, and who does it. Steps in this process include the identification, nomination, and selection of the chairperson and reviewers. As discussed in Section 4.2, there are tradeoffs between an appropriate level of EERE direction and support of the selection process and having external parties such as the NRC or other contractors fully control the process.

Rather than recommend a single best practice for selecting reviewers, this guide provides a few options and encourages programs to offer or test additional options and then share the process and the circumstances in which the option was, or was not, successful. *It is not acceptable and is not an option, however, to have only internal involvement in the nomination and selection process.*

[14] OMB Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information (2001) set as general criteria for competent and credible peer review the following: (a) peer reviewers be selected primarily on the basis of necessary technical expertise, (b) peer reviewers be expected to disclose to agencies prior technical/policy positions they may have taken on the issues at hand, (c) peer reviewers be expected to disclose to agencies their sources of personal and institutional funding (private or public sector), and (d) peer reviews be conducted in an open and rigorous manner. OMB's August 29, 2003, Draft Peer Review Standards for Regulatory Science under Executive Order 12866 state that "Peer reviewers will be selected primarily on the basis of necessary scientific and technical expertise. When multiple disciplines are required, the selected reviewers should include as broad a range of expertise as is necessary. When selecting reviewers from the pool of qualified external experts, the agency sponsoring the review will strive to appoint experts who, in addition to possessing the necessary scientific and technical expertise, are independent of the agency, do not possess real or perceived conflicts of interest, and are capable of approaching the subject matter in an open-minded and unbiased manner. Factors relevant to whether an individual satisfies these criteria include whether the individual: (i) has a financial interest in the matter at issue; (ii) has, in recent years, advocated a position on the *specific* matter at issue; (iii) is currently receiving or seeking substantial funding from the agency through a contract or research grant (either directly or indirectly through another entity, such as a university); or (iv) has conducted multiple peer reviews for the same agency in recent years, or has conducted a peer review for the same agency on the same *specific* matter in recent years."

The steps in the selection process offered here include the following.

**Step 1.** Define expertise and perspectives needed. The peer review leader, working with staff, the external steering group, if any, and others, examines the entire program portfolio and selects the slate of projects to be reviewed. In general, all projects in a given topical portfolio will be considered for review, regardless of their stage of maturity, with the primary focus on the key projects and earmarks, typically comprising 80-90% of the program budget. Small supporting projects could be excluded or addressed separately in supplemental written materials or poster sessions.

All activities should be identified for the peer review chairperson and panel members, after their selection, and the opportunity provided for them to identify additional projects they believe appropriate to include in the review.

For the projects selected for review, the peer review leader and others then: review the technical content of each project individually and for the set of activities as a whole; identify common technical disciplines among projects and unique aspects of each project; and identify the expertise needed for the review. The need for an appropriately broad and balanced spectrum of expertise and perspectives across the final panel will typically require multiple sources of nominations. A matrix might be drawn up that indicates the various expertises needed for the areas being reviewed across the top, and various perspectives or characteristics desired down the side (see Box 5.2). Reviewers meeting the qualifying standards for individual reviewers are then chosen because they fill a need for the panel as a whole. For example, reviewers would be selected who represent diversity in backgrounds and experience sufficient so the panel collectively covers the range of expertise required. This is especially important for program level reviews.

**Box 5.2: Balancing Expertise on the Peer Review Panel**

**The most important aspect of "balance" is to include the range of respected intellectual perspectives in the scientific and technical community. Considerations in developing "balance" also include:**

- Balance between technical specialists and multi-disciplinary types, while ensuring adequate coverage of critical technical disciplines for each project and the overall program;
- Balance between academic, industrial, national laboratory, governmental, and non-governmental organization perspectives, as well as that of customers;
- Balance between "old hands" and "young bloods";
- Gender balance;
- Geographic balance, possibly including international expertise and perspectives;
- Balance across time, maintaining some continuity with prior peer reviews; and, in some cases, if appropriate,
- Balance across interest groups, including representation from environmental, labor, and other organizations, particularly for higher, program-level reviews.

**Step 2.** Define the qualifying criteria for selecting reviewers. The peer review leader, working with staff, the external steering group, if any, and others establishes qualifying criteria that individuals should meet for selection to the peer review panel. These qualifying criteria include:

- In-depth knowledge of the subject area for which he/she is being selected. It is important that this knowledge has been "demonstrated" in terms of publications, patents, professional awards or positions, or other recognized credentials in the subject area.

- That reviewers have no real or perceived conflicts of interest (see Section 5.2).

When seeking nominations, it is important that the criteria for selection of reviewers be clearly presented.

In addition to satisfying the qualifying criteria, it is desirable that reviewers be people who are motivated to speak out, who have knowledge and perspectives that the program may not have, and who will challenge the program to improve.

Also, review panels should be structured to ensure peer review activity is undertaken by at least three experts for each smallest unit being assessed to reduce the risk that an unfounded individual perspective dominates the assessment and recommendations. More than three reviewers is often desirable to bring in a broader range of expertise, experiences, and perspectives, and to further reduce the risk that a single individual could inappropriately dominate the review. At the higher program-level review, the need for balance across the panel, for a broader range of expertises, experiences, and vision, and other factors will motivate having many more than three reviewers, more typically in the range of 8 to 15.

**Step 3.** Develop a list of possible reviewers and nominate. The peer review leader, working with the external steering group and/or others, develops an initial list of candidate chairpersons and reviewers that meet Step 2 criteria using approaches such as the following.

- Arranging for several independent, external, and objective groups familiar with the program to nominate candidates. These external groups might include, for example, research institutions (including universities or university associations, such as the National Association of State Universities and Land-grant Colleges, and not-for-profit laboratories), management institutions (including public agencies), professional societies, or Advisory Boards, such as the Biomass Research and Development Technical Advisory Committee.[15]

- Identifying candidate chairpersons and reviewers from experts identified in a bibliometric search of the published literature on the topic, or from their roles in research or management institutions or professional societies.

- Employing a co-nomination approach for identifying and nominating reviewers, where reviewers are selected from those nominated by more than one external expert in the relevant field.[16]

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[15] Although the Biomass Research and Development Technical Advisory Committee, the State Energy Advisory Board, and the Hydrogen Technical Advisory Panel have been formed as FACA committees for EERE, their recommendations for peer reviewers do not create a FACA requirement on the peer review.

[16] The co-nomination approach to reviewer nomination and selection typically goes through the following steps. First, The peer review leader develops a diverse initial list of recommended experts in the field(s) (Level 1). Second, these Level 1 experts are asked to identify or nominate other experts in his/her area of expertise, Third, a Level 2 list is developed by identifying names that appear on more than one list, either from Level 1 experts or between Levels and 1 and 2. Fourth, if no multiple recommendations appear, Level 2 experts are asked to nominate experts in order to create a new Level 3, and the process is repeated. The peer review leader selects for nomination experts who have been nominated by more than one expert and completes a preliminary assessment of possible

- Selecting the review chairperson, following the procedures below, who then nominates candidate reviewers.

- Contracting with a third party to run the peer review, including selecting the reviewers, following approaches such as the above).

For R&D programs, it would also be useful in many cases to have on the peer review panel experts from related DOE Office of Science programs to provide important basic science inputs and to help build the bridge between EERE and those programs. Similarly, individuals from the investment community—venture capitalists, investment bankers, etc.—would be useful to include to provide perspectives on how to guide the technologies towards successful market entry.[17] International experts might also be included in appropriate cases, possibly using video conferencing technologies to avoid travel expenses.

Candidates from previous reviews are a good source for participants in a future review. Generally speaking, it is helpful to have some portion of a review panel carryover from one review to the next. There is a trade-off, however, between continuity to provide institutional memory and turnover to ensure new perspectives. Having exactly the same membership for multiple reviews could give the appearance of a standing committee that has additional requirements under FACA. Best practice suggests that one-third to one-half of a review panel be carried over from one review to the next.

**Step 4.** Gather background information. The peer review leader develops information on the candidate chairpersons and reviewers using approaches such as the following:

- Reviewing the performance of reviewers in past reviews, noting who did or did not meet selection criteria based on this experience.
- Contacting candidates to determine their general interest and availability; sending them project summary descriptions to further identify interests and possible conflicts; and requesting from them and reviewing self-assessment forms (see Appendix E).
- Obtaining staff and/or public input, as appropriate, to identify candidates that may have known biases or other issues. Considerable care is needed here to prevent gathering of materials or other input that could unfairly or inappropriately characterize an individual and to make sure that the privacy act or other concerns are not raised.

In some cases, those partnering with EERE may also be involved at some appropriate level, making sure that this does not create a real or perceived conflict of interest.

**Step 5.** Develop initial selection list. The peer review leader, working with the external steering group, the panel chairperson (after selection) and/or others, assembles an initial list of nominees from the above candidates, by using the available information about the candidates to

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conflicts of interest for these. One risk of this approach is inadvertently ending up with nominees that have similar perspectives, since they co-nominated each other. This requires some attention to ensure a broad-based panel is developed. This approach does, however, provide a unique independent process for nominating reviewers.

[17] Individuals from the financial community may be identified through the network developed by the NREL Enterprise Growth Forum, various venture networks, state incubator organizations, and others.

decline candidates where their self-assessment or possible conflicts-of-interest raise substantial concerns, but taking into account the OMB criteria (see footnote above) that necessary scientific and technical expertise is primary. It is important to note that biases or "conflicts of interest" can occur for those financially or otherwise unconnected with the program—such as those threatened by the technical advances or policy consequences—as well as for those who are financially involved with the program or related activities.

**Step 6.** The peer review leader facilitates the selection of the chairperson and Reviewers from the list of nominees by working with the external steering group, the chairperson (after selection) and/or others, using processes such as the following:

- Arranging for independent, external, unbiased, objective university, professional society, or other groups familiar with the program, as identified above, to select the chairperson and/or the reviewers from the nominees.
- Selecting from the nominees the review chairperson, who then chooses the rest of the reviewers.
- Identifying the chairperson and the reviewers based on a co-nomination process among the candidates, as described above.
- Using an independent, unbiased, objective contractor to select from the nominees either directly, or in collaboration with the steering group, independent, external, unbiased universities, professional societies, or others.

The selection process should be carefully and fully documented to ensure transparency, as other aspects of the peer review process are, and included in the final peer review report.

## 5.2 Conflict of Interest and Nondisclosure

Individuals with a conflict of interest in particular areas generally should not participate as reviewers in those areas of the peer review. The concern is that a reviewer's personal affiliations and involvement in particular activities could indicate that they lack the impartiality required for the peer review. Directly identifying possible conflicts of interest is an awkward process in the science and engineering culture, which has largely based its peer review processes, such as for scientific journals, on an implicit honor system. The challenge here is to balance explicit identification of conflicts of interest without implicitly damaging the traditional honor system, while avoiding legalistic transaction overheads. The effort here is intended to provide a mechanism to flag potential conflicts that could raise questions of objectivity in the public arena that a potential reviewer might not be sensitive to or aware of.

Although their involvement in the activities listed below and in Appendix F is not necessarily grounds for exclusion from the peer review, it is important that the nominee or reviewer declare these activities to the review leader prior to the review so that conflict of interest can be considered. Upon reading an individual's disclosure of potential conflict of interest, the peer review leader would flag the possible conflict of interest and contact the person to get more detail. Then the review leader would make a determination on whether or not to include that person as a nominee to be a reviewer on parts or all of the review because of real or perceived conflicts of interest.

Affiliations or activities that could potentially lead to conflicts of interest may include the following:

- Work or known future work for parties that could be affected by the individual's judgments on projects or program developments that the individual has been asked to review;

- Any personal benefit the individual might gain (or benefit of their employer, spouse or dependent child) in a direct or predictable way from the developments of the program/ projects they have been asked to review;

- Any previous involvement the individual has had with the program/projects they have been asked to review, such as having participated in a solicitation to the program area that was subsequently not funded, or having a professor, student, or collaborator relationship with the program or its research staff;

- Any financial interest held by the individual (or their employer, spouse, or dependent child) that could be affected by their participation in this review; and

- Any financial relationship the individual has or had with DOE/EERE, such as participation in research grants or cooperative agreements.

All peer reviewers must sign a Conflict-of-Interest form prior to the beginning of the review process. This form is available in Appendix F of this guide. By signing the form the reviewer is certifying that he/she will not participate in the review of any part of a project/program review that involves a particular matter in which the reviewer has a conflict of interest or where a reasonable person may question the reviewer's impartiality, unless other factors—such as technical expertise—motivate the review Chairperson to request the individual's participation.

In addition, during the review the reviewer should agree to disclose any actual or perceived conflicts of interest as soon as the reviewer is aware of the conflict. If the review is underway and a conflict of interest is disclosed, the review leader should probably exclude that individual's opinion from the summary assessment, retaining written comments that may be helpful to the program manager. In any case where a reviewer is used who indicates a possible conflict of interest on the form or at the review, the review leader should take a moment to prepare a memo for the file explaining briefly the nature of the conflict and the benefit to the program of having this person be part of the review should there be a question about this later.

Additionally, every participant (the audience, as well as the reviewers) in a closed session where proprietary information will be discussed or presented must sign a Nondisclosure agreement. An example agreement is found in Appendix G, but the actual form to be signed will generally be that of the firm that is protecting its proprietary information. Also, all sensitive data must be marked as such. When the peer review includes an evaluation of proprietary information, having the proper nondisclosure agreements in place protects the information from public disclosure under the Freedom of Information Act (FOIA).

# 6.0 Pre-Review: Evaluation Tools and Preparation Materials

In addition to securing the meeting space and associated logistics and identifying and selecting reviewers, pre-review preparation includes developing evaluation guidelines and tools and developing and distributing preparation materials to the reviewers and those being reviewed.

## 6.1 Evaluation Guidance and Tools

Both the review panel and the presenters should clearly understand the objectives and guidelines for the review as well as the specific evaluation criteria that will be addressed. The review leader and chairperson should determine how the projects/program would be rated and distributed to both reviewers and those being reviewed a written description (evaluation guidelines) of the evaluation method. These guidelines should describe the purpose and scope of the review, the evaluation criteria and questions, data to be presented, and how the data will be collected from reviewers, analyzed and reported. An example is provided in Appendix H.

**Box 6.1: Pre-Review. Tools and Materials**

- Develop guidelines and tools for the review (project information, evaluation form).
- Identify and provide presenters and reviewers with materials in time to prepare.
- Establish a Peer Review Record

A great deal of valuable information is received from reviewers in the exchange during a panel session. A summary of opinions is captured in narrative form at the end of the review session. In addition to capturing in narrative (qualitative) form the opinions of the reviewers, this guide recommends that all reviews use a rating system of some sort. This does not have to be a numerical rating system. Ratings collected similarly across reviewers provide a way of summarizing the opinions of the reviewers. While even a well defined rating system may be interpreted slightly differently by reviewers, this summarization is likely to be perceived as more accurately reflecting the sum of opinion than is a narrative summary by the review leader or a group other than the reviewers themselves. The ratings also provide a way of comparing across projects or sets of activities when the same panel is reviewing multiple projects or sets.

A clear description of the rating system[18] is an important element of the evaluation guidelines provided to reviewers. For example, a rating system could be a word scale, from "poor" to "outstanding" with all criteria having equal weight, or the system may be more complex. The three key decisions involved in designing the appropriate rating system are:

- Determining whether it is qualitative or quantitative, the level of precision that is appropriate, its feasibility given the criteria and data involved, and what is actually required of it considering the decisions that the ratings inform;

[18] Scales should include an appropriate number of scale positions to permit reliable differentiations among projects (at least five steps (0-4) and not more than 11 steps (0-10)). Preferably scales should include "zero," or "unacceptable," at the low end of the scale to offer reviewers a position that indicates a complete absence of merit relative to the criterion being rated.

- Determining how to rate projects relative to the core criteria, which includes considerations of how to get consistency across individual reviewers and sub-program reviews, and could include considerations of scales and weights; and
- Deciding whether panel discussion about ratings is to be encouraged or avoided, with awareness of the FACA restrictions regarding a group consensus (see Section 4.8, Box 4.2).

Generally, the peer reviewers will individually provide an overall rating of the project and/or program taking into consideration all the review criteria. The review leader could develop an overall rating for the highest level of program structure reviewed (project, groups of projects, or program) as well as ratings for each criterion separately. These ratings help managers identify thresholds for action and to more specifically focus program improvement.

The Evaluation Form provided in Appendix J has a rating system for each of the EERE Core criteria and also asks for written explanation and comments. An example of a summary tally sheet is provided in Appendix K for when a numerical rating system is used and multiple projects are reviewed by the review panel. Another example is the Superconductivity Program peer review process that assigns weights and uses the rating scale of 0 to 10 connected to adjectives of "not adequate" through "excellent." For rating on the more specific questions, the superconductivity program provides a short statement and asks reviewers to indicate the degree to which they agree with that statement (strongly disagree to strongly agree). The Chemical Visions Program review rating scale uses a 5-point word scale (called anchors) with a sentence describing what would be true for each of the 5 ratings.

It is important to recognize that a single number does not adequately reflect the many dimensions of the program considered by the peer review. It is also important to recognize that ratings across different peer review panels and groups of projects cannot generally be compared without careful study to determine how to anchor the scales and normalize the results (see Box 6.2).

If there are multiple project or subprogram reviews within a program that are phased over time or performed by different panels in the same time frame, it helps to have one reviewer who is part of the series of reviews to help calibrate differences across the panels. For example, a reviewer present at the subprogram review would represent that sub panel on the overall panel reviewing the entire program.

These concerns also apply to how review comments and ratings about a program will be considered across time. There is a need to provide some continuity and consistency, perhaps by having some reviewers serve on successive panels, and by the program presenting results from different time periods.

The comparability of ratings across peer reviewers and peer review groups requires that all reviewers use the rating scale in the same way. Thus, it is imperative that the scale be well defined so that all reviews are calibrated in the same way and an adjective or numerical rating will represent the same cognitive appraisal by different reviewers. When multiple projects are being reviewed by the same reviewers and some evaluation criteria are more important to a particular program element than to others, it may be appropriate to assign weights to each criterion according to the importance of that criterion to the program element. Then when

weighted ratings on criteria are summed across criteria, the sum will reflect more accurately the peers' assessments. The same may hold true for questions within a criterion. If the evaluation criteria are weighted, the peer review participants are provided with a clear description of the relative importance of each criterion.

Reviewer-to-reviewer interaction, for example in a special closed session to discuss their preliminary rating and then finalize each of their individual ratings, can improve the quality of the review findings. This discussion can be useful for clearing up misconceptions or bringing in new information. Such interactions may be particularly important at the higher level program review in order to better understand the full range of issues. The review chairperson needs to ensure that no one reviewer dominates the ratings discussion and to make clear that consensus is not expected. The ratings of each reviewer provide important perspectives that the program may find useful. Ratings are to be included in the reviewer's report on an individual reviewer basis.

**Box 6.2: Challenges of Reviewing Across Program Elements**

Great care should be taken if peer reviews are used to compare program elements. If comparisons are done, reviews need to be conducted in a consistent manner; for example, mechanisms must be provided to reasonably normalize review findings if results of different review panels are to be compared. Best practice suggests there should be normalization and standardization of ratings across panels and program elements to ensure the programs are compared fairly and accurately. Where program elements are similar, the same reviewers can be used. For widely different program elements this is not possible.

Rating severity and biases across reviewers should be investigated and corrections applied for differences. Any composite indices of value should be methodologically sound and credible and take into account program characteristics and strategic value to program goals. Retrospective impacts may have a small weight for a new program, for example, and a larger weight for a program that has operated for sufficient time to have an impact.

## 6.2 Materials for the Reviewers

So that the peer review is fair, credible, useful, and cost effective, the review leader should provide adequate and timely preparation materials to the peer review panel (via the panel chair) and to the presenters. Data collection and planning are discussed in Section 4.8. Preparation materials need to be relevant to the objectives and review criteria. Within these materials there should not only be the relevant project-specific technical materials but also clear information about the mission of the work being performed, the planned goals that the work will accomplish, and the schedule, with the key intermediate milestones. Review leaders, in consultation with the review chairperson, can be selective in what materials are sent and keep the program descriptions concise since an excessive amount will go unread. However, it is important that any data and information requested by reviewers be provided to them (unless there are confidentiality concerns). For large, multi-project or higher level program reviews, the review leader may want to establish a Website that contains useful information that participants can access.

To help ensure the provision of appropriate materials to reviewers, it is useful to provide detailed instructions to the presenters appearing before a panel review. These instructions could outline

the minimum requirements for material to be covered and a common content and format for that portion of the material.

Appendix I shows the standard data elements collected for each project in a review. Based on the Superconductivity Program's experience, materials should be delivered 2–3 weeks prior to the actual review to give the reviewers time to familiarize themselves with the projects that are to be presented. This includes an advance copy of the project summaries, reviewer instructions, evaluation forms for each project, an agenda, and overall program evaluation packaged specifically for the reviewer.

## 6.3 Peer Review Record

The peer review record is established at the beginning and maintained throughout the review process. The record should contain all the key documents of the review. This record is an important part of transparency of the process and will aid EERE in efforts to continually improve its peer review process. The following documents could be included:

***Preparation Stage:***

- ❑ Name of Review Leader
- ❑ Brief description of projects/program being reviewed
- ❑ Evaluation criteria and review questions
- ❑ List of data collected and presented
- ❑ Data Collection and Analysis Plan
- ❑ Review Timeline
- ❑ Copy of the detailed budget for the review
- ❑ Copy of the review Agenda

***Pre-Review Stage:***

- ❑ Description of the reviewer nomination and selection process
- ❑ Name, affiliation, and background of each reviewer
- ❑ Guidelines sent to reviewers with criteria, etc.
- ❑ Project Information Sheet prepared by Principal Investigator for each reviewed project
- ❑ Copies of other data and materials provided and presented to reviewers
- ❑ Signed Conflict of Interest forms for each reviewer
- ❑ Signed Nondisclosure agreement for each reviewer, when needed

***Conduct of Review Stage:***

- ❑ Copies of all slide presentations given by the Principal Investigator
- ❑ Completed written comments from each reviewer
- ❑ Completed evaluation forms to obtain feedback to improve the peer review process
- ❑ Review Report (if prepared by panel)
- ❑ Review report prepared by review leader and chairperson for the program manager

***Post-Review Stage:***

- ❑ Program response added to the Peer Review Report
- ❑ Summary report on the findings of the evaluation of the peer review process
- ❑ Status reports from program manager (or Principal Investigators) on actions taken in response to the peer review findings

# 7.0 Conduct of the Review

## 7.1 Onsite Instructions to Peer Reviewers

Having provided reviewers with written direction prior to review, it is recommended that the review leader or chairperson reinforce guidelines orally at the opening of the review. This will ensure that the reviewers are clear on what is being asked of them and clarify the purpose of the particular peer review. This provides time to settle any outstanding reviewer concerns or questions before the review begins.

Reviewers are instructed to keep all evaluations strictly confidential during and after the review. The specifics of on-site instruction depend on choices made by the review leader, review chairperson, and/or group. However, in general, reviewers could be instructed to:

- Read and understand the evaluation criteria and peer review procedures,
- Evaluate each program element (except those that present a conflict of interest or an appearance of a conflict),
- Prepare preliminary comments on the merits of the project/program in accordance with the peer review evaluation criteria,
- Be prepared to discuss each project and/or the program at the meeting or assign a rating or ratings that reflect the reviewer's opinion of the merit of the project/program in accordance with the specific evaluation criteria, and
- Complete the post-review evaluation form (see Section 8).

**Box 7.1: Conduct of the Review**

- Provide final, onsite instructions to peer reviewers.
- Facilitate the review effectively to keep on point and schedule.
- Collect evaluation data from the reviewers at the completion of the peer review.
- Analyze and synthesize evaluation results, including statistical analysis where appropriate.
- Develop review documents and report.
- Provide results to managers, who will add a response for inclusion with the report that is delivered to senior management.

## 7.2 Facilitating the Review

The function of the chairperson for the review is to be the technical lead, ensuring the information requested is obtained and documented in the review report. It is very important that the review chairperson control group dynamics and ensure that all points of view are heard. The review chairperson does not have to be responsible for logistics. It would be helpful to assign a non-technical person (possibly a contractor) to work with the review chairperson to handle these logistics during the review. That person could act as timekeeper, for example, advising the presenters when the allotted time is about to expire. Additionally, this person can ensure that all reviewers have paper copies of the presentations as well as a set of any standardized review forms.

General procedures during the meeting are the following:

- A program official provides an overview of the program.
- Program projects are individually presented.
- Following each presentation or group of presentations, the chairperson begins a question and answer period during which individual reviewers ask questions of presenters (normally principal investigators for R&D programs).
- When a reviewer requests clarifying information, the chairperson ensures that is provided, if appropriate.
- At scheduled times on the agenda, the chairperson will request each member to individually prepare quantitative or qualitative ratings and narrative critique for the program and each program element that is the subject of review. This may be preceded by a discussion session with only the reviewers present.
- Complete the reviewers' draft summary report.

There needs to be a balance struck between getting abstract details and getting an overview of the materials, but there is frequently to be superficial and insufficiently detailed and rigorous. Probing questions should be encouraged wherever possible. Depending on the level of the review (project or program) the depth and amount of coverage vary. In general, higher cost and/or more complex projects may require more presentation and discussion time.

Open question-and-answer periods following each presentation allow for clarification and for better understanding of what was presented and helps the reviewer thoroughly evaluate the material and its significance. Experience has shown that a good rule of thumb is that the time needed for question-and-answer sessions for a presentation is at least one-half the presentation time, and preferably as long as the time allotted for presentation. Ample time for discussion is likely to create opportunities for increased reviewer-presenter exchange and produce greater rigor in the review process. Reviewer-to-reviewer interactions can also provide very valuable informal exchanges. These might not be appropriate to include in the formal report, but can greatly assist individual researchers or teams in their efforts. Providing time to assist such interactions can be quite useful.

Getting the right presentation person is often a compromise, as the person most skilled at the presentation may not be the person best able to answer technical details. The recommended approach is to get the "best person" who can answer the types of questions likely to be fielded.

## 7.3 Analysis and Summarization of Evaluation Data

The reviewers' project and/or program evaluation forms are either collected at the completion of the peer review or are forwarded to a designated contact within a specific time period (no more than one week). An example of a project evaluation form is provided in Appendix J. It is essential that written comments be received from all peer reviewers and that an official record of these comments is delivered by the review chairperson or designee to the review leader. While it may be true that better judgments are offered if the reviewers have additional time to think about what they have heard, in practice reviewers are busy people and when reports are not completed prior to leaving the review it becomes more difficult to complete the review in a timely manner.

Once the reviewers' assessments are in the hands of the review leader, the next step is to prepare the review results for presentation to the program manager. The responsibility of preparing the peer review report rests with the review leader in consultation with the review chairperson. Objectivity is ensured because the review leader is required to disclose in the peer review report the reviewers' comments as they were provided. It is also appropriate to let reviewers see and comment on any reporting of their opinions not generated by themselves. Tabulating results and compiling comments is an important part of the review process because the information presented to management will aid in decision making. Summarizing may include preparing a summary statement for each program or project, as well as calculating summary ratings and an evaluation summary sheet, if appropriate.

Calculating review ratings will, of course, depend upon the rating system chosen by the review leader and/or panel. The calculations may vary from simple to complex. An example of a fairly elaborate calculation of review ratings and rankings is shown in Appendix K. The reviewer's rating decisions are collected and entered into a spreadsheet format. The narrative comments are then transcribed and compiled, using the same evaluation form originally provided to the reviewers. Appendix L discusses the potential benefits of using information technology to shorten the time required for collection and analysis of reviewer ratings.

The peer review could be broadened in several ways, ranging from soliciting reviews by mail, or even having additional reviewers review the draft report. The purpose of this additional review would need to be clear, however, and preferably established in advance so that it didn't appear that a program was looking for reviewers who would "give the right answer."

Concurrent with the review leader's preparation of the review summary or after it is complete, the reviewers' assessments are provided to the program manager for response prior to the report being given to senior management. The response to the review is discussed in Section 7.4. The reviewers' assessments and recommendations for each program element reviewed, as well as the review leader's summary and the program manager's response, become part of the official peer review report and record.

## 7.4 The Peer Review Report

The peer review report provides managers with an independent assessment of the program's productivity, relevance, and management. The report should include the following features when applicable:

- Program/project identification, description, and budget;
- A narrative summarizing the salient features of the comments of the individual reviewers and their primary reasons for their judgments;
- Support of conclusions with specific observations;
- Summary of reviewers' rating or assessment on each individual criteria as well as the overall assessment;
- Actionable recommendations aimed at improving program performance, including areas where further study is desirable;

- As appropriate, comments on the status of recommendations made at prior reviews; and
- Appendices with the full text of reviewer input.

The review chairperson concurs and signs off on the report, which is often also sent to reviewers for review of the record of their own response. After this report is concluded, but before the report is distributed beyond the program, the program management develops and adds their response to reviewers' comments and recommendations (see Section 8.1).

The reporting format should ensure confidentiality of the individual reviewer's ratings and comments so reviewers are encouraged to be candid. Evaluator confidentiality may be preserved by disassociating the individual ratings and comments contained on the evaluation forms from the reviewer's identity.[19] The review panel's rating decisions could be transcribed into a spreadsheet/table format and the narrative comments compiled for each project evaluated without revealing the identity of an individual reviewer. Proprietary information should be protected according to standard DOE/EERE procedures. Care must be given not to include any proprietary information in the peer review report. This does not preclude careful reporting of the evaluation results for a project in which proprietary information was disclosed.

The peer review report will be made available publicly. While there are concerns about that, there are ways to mitigate these concerns and the benefits for transparency generally outweigh the negatives in the opinion of the Peer Review Task Force. Even if it were not publicly released by the program, the peer review report will most likely be accessible to the public through the Freedom of Information Act. The major concern is that making the report public will decrease the candor of reviewers and/or cause reviewers to say only positive things about the program. In the experience of the Superconductivity Program peer review, presenters and reviewers have been outspoken even in their open reviews. Others use a two-tiered reporting process, with an oral debrief at the end of the review and a written report. Sensitive detailed information could be relayed in the oral briefing. Also if there has been good communication as the review process unfolds, it may be possible for the program to be able to report progress toward meeting a challenge at the same time the challenge is revealed in the public review report. Another concern is that if proprietary data is discussed the confidentiality of that information could be compromised. This can be avoided if rules are followed for marking all proprietary data, which should not be in the review report in any case.

[19] A list should be maintained by the program, but not circulated publicly, that identifies each reviewer with their comments because if the peer review someday became part of litigation, the discovery process would ask for this information.

# 8.0 Post-Review Activities

## 8.1 Finalizing the Program Response and Follow Up Actions

It is important that the appropriate experts/staff/managers are consulted on the review findings and have time to discuss and respond before the report is provided to senior management. Review leaders and program managers should attempt to respond to findings and recommendations and develop initial action plans within two weeks of receiving the reviewers' report, while the discussion is fresh in everyone's mind. This should be done in a clear and transparent process. The response could be developed at a post-review meeting after both program management and the project teams have had sufficient time to review the peer review results and then discuss the overall outcomes of the review and actions for the coming year.

**Box 8.1: Post-Review Steps**

- Consult with appropriate experts/ staff/ managers on the review findings within two weeks of receiving the reviewers' report.
- Prepare a written response to the peer review comments.
- Package review report and the program response for distribution.
- Make the report available to the public.
- Track and regularly follow up on actions based on peer review results.
- Formally thank reviewers.
- Evaluate the peer review process itself, including identifying lessons learned.
- Complete logistics, including the peer review record.

Part of the consideration of peer review findings can be analysis of what has persisted and what trends are present between the present review and past reviews. In many cases it could also include an examination of reviews across related programs, subprograms or similar sets of activities.

The program manager should prepare a memo or other written record that responds to the peer review comments and specifies acceptance or, when appropriate, rebuttal and non-acceptance of these findings. Key issues would be identified as well as a timeline for implementing actions taken in response to specific review comments or recommendations. Action planning is a key step that is often lost in the press of daily business, but change rarely occurs if attention is not given to post-review follow-up. An example of a form for program response to peer review is shown in Appendix M.

The review report and the program response are packaged into one document for distribution to program and senior management and to the principal investigators, project team, and/or other presenters. This enables effective decision-making by all parties involved.

As stated in Section 3.2—Minimum Requirements— "Reports will be promptly communicated to senior management and all persons involved in the review." The report will also be made available to the public (see Section 7.4).

After information needed from the review has been provided to those who need it, the program then needs to track and regularly follow up on actions. Documentation on actions taken and progress and results will likely be requested as part of the next peer review. It is recommended that programs make peer review response tracking a routine part of management practice. Appendix N provides an example of a form for peer review response tracking.

Finally, it is important that reviewers be formally thanked for their efforts by the program and any agreed upon payment provided. As participation as a peer reviewer is often not recognized by their institutions—for example, universities focus on the individual's publications—it is also often useful to formally thank senior management in the institution itself for the work provided by the reviewer.

It is also strongly recommended that the review leader describe to the reviewers how EERE responded to the results of the review in a clear and transparent way, including how the project/program was changed or why the comments were not used. This could be done by providing them with a copy of the review that includes the program response. Or it could be a separate effort. It probably will not include a point-by-point response to recommendations, but will include at least a reasonably detailed description of the internal process of discussion and decisions. This description would include a caveat that addressing every recommendation may not be feasible because implementation may depend on negotiations with contractors, cost implications, etc. This feedback will help ensure that reviewers feel their efforts are well spent and they will be more likely to participate in future reviews.

## 8.2 Evaluating the Peer Review Process

EERE has planned for continuous improvement as it moves to a more systematic and consistent application of peer review. To aid this process improvement, the peer review leader should ensure that an evaluation of the peer review is completed on-site at the end of the review or forwarded to a designated person within a specific period (no more than one week). The recommended evaluation questionnaire is available in Appendix O. The peer review leader may wish to supplement the completed post-review evaluation questionnaire with informal but documented discussion about the review process and what worked and did not work. This could be done on-site in an informal meeting called by the review leader with the reviewers and review chairperson and with those who have been reviewed. The following aspects of the peer review, with responses analyzed separately for reviewers, the reviewed, and program staff, are covered by the recommended questionnaire:

For all participants:

- Elements of the process (purpose, reviewer credentials, presentations, frequency)
- Evaluation criteria (realistic for types of purposes, clear, sufficient)
- Greatest strengths and weaknesses of the process
- Comments on how the process can be improved

For reviewers and principal investigators only:

- Adequacy of data provided, opinion of the resulting report

For staff from program office under review:

- Contributions and burden of the review, ideas for reducing the burden
- Costs compared to benefits

# 9.0 Continuous Improvement in Peer Review

This guide has been developed to raise the overall consistency and quality of the peer review process within EERE, and to reduce the burden on program managers and staff in implementing peer reviews. The goal is to make it a cost-effective management tool that assists program managers and senior management in their efforts to improve EERE's work. A successful peer review is not necessarily one that gives the project/program a good "bill of health," but is one that helps the program redirect its activities in a more productive way where appropriate. This guide begins that process. Continuous improvement in the peer review process will be a key factor in achieving success.

The commitment to continuous process improvement involves:

1) Establishing a mechanism to enable assessment of the progress being made in applying best practices in peer review in EERE and utilizing the results,

2) Establishing a forum for active exchange of experiences with peer review, and

3) Gathering information on progress, experiences, and lessons learned to periodically provide feedback to program managers, office directors, and higher management on where to update and improve the best practices guide.

**1) Establishing a mechanism to enable assessment of the progress being made in applying best practices in peer review in EERE and utilizing the results.**

An *ad hoc* Peer Review Best Practices Group, comprised of representatives from the Board of Directors, Technology Development and Business Administration staff, and possibly with assistance from outside experts, will convene periodically (e.g., semi-annually) to help act as consultants and coaches, learning best practices as these appear and disseminating that information throughout EERE.

The primary role of the Best Practices group will be to gather information necessary to assess EERE progress toward implementing the core principles and minimum requirements of this guide, and lessons learned about best practices that may be incorporated in updates of the peer review guide. The group will work cooperatively with the programs and offices to periodically prepare a progress report for the Office of the Assistant Secretary. To assist peer review process improvement, it will be useful to have some members of the Best Practices Group attend program peer reviews. After five years this Best Practices Group could be sunset at the discretion of the Office of the Assistant Secretary if the judgment is that only occasional consultancy and review activity is needed.

**2) Establishing a forum for active exchange of experiences with peer review**

Programs are encouraged to share among themselves, and other EERE staff, their practical experiences with planning, designing, and executing peer reviews. The Best Practices group will play a role in helping to facilitate periodic peer review exchange.

**3) Gathering information on progress, experiences, and lessons learned to periodically provide feedback to program managers, office directors, and higher management on where to update and improve the best practices guide.**[20]

Two fundamental questions are "How will EERE know there has been program improvement due to the peer review process outlined in the guide?" and "How can we ensure that information on best practices for in-progress peer review is continually updated and shared?" The kinds of information that could be gathered to help address these questions are in Table 9.1.

## Table 9.1: Issues and Indicators for Continuous Improvement

| Information | Indicator |
|---|---|
| Occurrence of peer reviews – the degree to which peer reviews are being implemented by the programs | Number of peer reviews completed over 2-3 year period<br>Percent of programs completing peer reviews |
| Facts about each peer review for summary statistics and context for best practice designation | Costs, purpose, scope |
| Coverage and quality of peer reviews – degree to which minimum requirements (Section 3.2) for peer review are implemented in a program's review process | Measurements obtained from post-review evaluation<br>Peer review document review and occasional direct observation by the Best Practices Group |
| Programs/projects adequately adjust resources/milestones to accommodate review comments, retaining focus on desired programmatic outcomes | Analysis of program's response in peer review reports |
| Usefulness of peer review to programs and program improvements influenced | Measurements from post-review evaluation and interviews with program managers |
| Effectiveness/efficiency of the reviews in light of the intervals between reviews and other evaluation | Interviews with program managers and principal investigators/staff |
| What worked and what didn't for different types of programs, reviews, and review objectives? | Identified listing of lessons learned obtained from analysis of the post-review evaluation and periodic interviews with program managers and their peer review leaders. |
| Programs' recommendations for any needed improvement in peer reviews as actual experience is gained | Listing of recommendations to improve procedures based on actual experiences and in what contexts these apply |
| Extent to which a peer review is viewed as a management tool by EERE managers and staff. | Changes in perceptions of, attitudes toward, and practices of peer review as a useful management tool based on periodic interviews with program managers and peer review leaders. |

[20] An information collection strategy will be developed that does not burden the programs/offices.

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# APPENDICES

# PEER REVIEW GUIDE

*Based on a Survey of Best Practices for In-Progress Peer Review*

# Appendices

## Preparation



## Pre-Review Activities



## Conduct of Reviews



## Post-Review Activities

# A. Comparison of Peer Review, Performance Measurement and Program Evaluation[1]

Below is a description of three complementary mechanisms used to collect information for performance measurement, in-depth program evaluation studies, and (in-progress) peer reviews. These mechanisms are employed to varying degrees by R&D, deployment, and business management programs. These three mechanisms differ in their underlying characteristics and in the kinds of evaluative questions they address. Specific examples of how each mechanism applies to deployment activities are provided.

| | Performance Measurement | In-depth Program Evaluation[2] | Peer Review |
|---|---|---|---|
| **Definition** | Performance measurement is the ongoing monitoring and reporting of program accomplishments, particularly progress towards pre-established goals.<br>It is an exception, but findings from Peer review and other evaluation studies can be performance measures, especially for R&D programs. | An assessment, through objective measurement and statistical analysis, of the manner and extent to which programs achieve intended objectives.<br>Peer Review is one method used for evaluation. | A rigorous, formal and documented evaluation process using objective criteria and qualified and independent subject matter experts to make a judgment of the technical/ scientific and/or business merit, the actual and anticipated results, and management of programs or projects.[3] |
| **Methods** | Program activity counts and records, engineering estimates | Statistical sample surveys, case studies, experimental design studies, bibliometrics, expert judgment, etc. | Expert judgment (including assessment of available performance measures and other evaluation studies) |
| **Timing** | Implementation is quick; e.g., quarterly or annual basis | Implementation is slow; 6-12+ months | Implementation is slow; 6-12+ months |
| **Frequency** | Continuous | Periodic | Periodic |
| **Cost** | Low | Low-to-high | Low-to-high, depending on review scope |

[1] Prepared by Jeff Dowd (EERE/DOE), Gretchen Jordan (Sandia), Marty Schweitzer (ORNL), June 26, 2003
[2] This includes process, market needs, outcome and impact, and cost-benefit & cost-effectiveness evaluations. [GAO: Hwww.gao.gov/special.pubs/gg98026.pdfH]
[3] Source: EERE In-Progress Peer Review Guide, March 2004

| | Performance Measurement | In-depth Program Evaluation | Peer Review |
|---|---|---|---|
| **Focus** | Inputs, outputs, outcomes<br>What happened? | Process, outputs, outcomes, impacts.<br>How, who and why? | Process, outputs, relevance<br>Expert opinion on what, how, why |
| **Examples for deployment programs** | Weatherize 123,000 homes in FY03 [Target Met].<br><br>Recruit 500 additional retail stores, 5 additional utilities and 3 additional manufacturers bringing the total number of stores marketing ENERGY STAR appliances to 7,000. [Target Met] | Using data from a number of recent evaluations that examined the results achieved by various state energy efficiency and renewable energy programs, estimates of the energy savings achieved per SEP activity were developed for 14 of the 20 program areas. | A peer review using experts to review a draft multi-year planning report or strategy for deployment activities.<br>Peer review of impact and market studies by experts, including review of study method before the conduct of a study and review of results report afterward. |

# B. Manager's Checklist for Conducting a Peer Review

This checklist is designed to help managers identify key actions that need to be performed to effectively plan, design, implement and follow-up on a peer review. The checklist is based on the recommended practice described in the EERE Peer Review Guide. Completing the checklist helps managers efficiently work through the many steps and decision points necessary for achieving success with the peer review process.

**1. Title of Program/Subprogram/Project Under Review:**

_____

**2. Program/Subprogram/Project Manager:**

_____

## Preparation

***Peer Review Leadership***

- ❑ Choose a peer review leader for the project and a review steering committee if more participation and oversight is warranted. *(Note: The peer review leader is the person responsible for planning and implementing the peer review.)*
  Name of peer review leader: _____
  Alternate peer review leader:
- ❑ Plan to establish a role for, and recruit, a review chairperson *(Note: The chairperson assists in the selection of members of the review panel, helps define evaluation criteria and questions, and helps provide independent oversight of the process.)*
- ❑ Review the EERE R&D Peer Review Guide

***Scope, Purpose and Evaluation Criteria***

- ❑ Identify the purpose of the peer review and the information needed from the review (e.g. what budget or other decisions will be made based on the outcome of the review).
- ❑ Prepare draft evaluation criteria and review questions (criteria and questions to be finalized once review chairperson is chosen).
- ❑ Define the scope of the peer review, including determination regarding which sub-programs and projects of the program will be reviewed.
  Program components to be peer reviewed: _____
- ❑ Establish timeline for review
- ❑ Define the data collection and analysis processes
- ❑ Identify audience to be present – public vs. closed review

**Program Manager's/Office Director's Concurrence (and Steering Committee, if applicable) on Purpose of Evaluation Criteria:**

**Name: _____ Date of Concurrence:_____**

**Costs and Preliminary Logistics**

- ❑ Identify resources available for the peer review:
  - Funding Source: *B&R Number* _____
  - Location: _____
  - Logistic Support & Other Contractors:_____
- ❑ Determine the review date and work deadlines.

  **Date of Review: _____ Preparation Start Date: _____**

  **Final Report Due Date: _____**
- ❑ Develop a detailed budget for the review.
- ❑ Draft the agenda for the review considering constraints of potential peer reviewers, logistics, decision and work deadlines.
- ❑ Set up a formal peer review record or file. (see Separate Peer Review Record Checklist below)
- ❑ Reserve venue and meeting space.
- ❑ Have a data collection and analysis plan – a process for collecting information for reviewers and from reviewers.

**Program Manager's/Office Director's Concurrence on Review Timeline, Budget, and Data Collection & Analysis Plan:**

**Name:_____ Date of Concurrence:_____**

## Pre-Review Activities – Selection of Reviewers

- ❑ Determine the expertise required for the peer review.
- ❑ Define criteria and determine the process by which peer reviewers will be nominated and selected. (must include input from external parties, e.g., professional societies, co-nomination)
- ❑ Develop a list of possible reviewers and nominate
- ❑ Gather background information
- ❑ Develop initial selection list
- ❑ Consider potential conflicts of interest when reviewing candidates for the review chairperson and review panel.
- ❑ From the candidate list, facilitate selection of a review chairperson, and have that person sign a DOE/ EERE Conflict of Interest form and Non-disclosure agreement (where applicable).

Name of Chairperson: _____

- ❑ Facilitate the selection of the peer reviewers and formally invite them to participate. (working with the review chairperson and/or steering committee)
- ❑ Have the DOE/EERE Conflict of Interest form signed by all peer reviewers.
- ❑ Have the EERE Non-disclosure agreement signed by all peer reviewers, where applicable.

## Pre-Review Activities – Logistics, Evaluation Tools, Preparation Materials

***Logistics and Costs***

- ❑ Secure equipment, food, hotel rooms, etc.
- ❑ Confirm peer reviewer participation.
- ❑ Publicize the Peer Review date.
- ❑ Identify the Principal Investigators, presenters.

***Develop evaluation guidelines and tools***

- ❑ Finalize the evaluation criteria and questions (working with the review chairperson)
- ❑ Determine the length of time required for the review and the minimum amount of time the peer reviewers will be given to ask questions during each session.
- ❑ Draft and finalize the peer review agenda.
- ❑ Develop standardized guidelines for Project Information Sheets for the projects under review and issue to the Principal Investigators.
- ❑ Develop slide presentation guidelines and issue to the Principal Investigators.
- ❑ Develop and provide guidance for reviewers.
- ❑ Develop a rating system (if applicable) and the evaluation forms needed by reviewers and the review chairperson.

***Materials Obtained and Sent to Reviewers***

- ❑ Provide the peer reviewers with evaluation guidelines, Project Information Sheets, and other essential documents, data, and information for them to prepare for the review.

## Conduct of the Review

***On-Site Instructions***

- ❑ Repeat review guidelines to reviewers and answer any questions.

***Facilitation of Review***

- ❑ Discuss with review chairperson the need to monitor interactions among participants to be certain all perspectives are heard, and effectively manage time.
- ❑ Have someone facilitate logistics of session(s) so the chairperson can concentrate on the technical aspects of the review.
- ❑ Distribute and collect on-site the completed questionnaire for evaluating the peer review process.

***Analysis and Summarization of Evaluation Data***

- ❑ Obtain written comments and/or forms from all peer reviewers before they leave.
- ❑ Obtain clarification or additional information from the peer reviewers if necessary.

- ❑ Summarize and consolidate reviewer ratings and comments.

## Post-Review

- ❑ Provide draft report to review chairperson and reviewers to check for accuracy and completeness.
- ❑ Provide Review Report to program manager for response.
- ❑ Consult with appropriate experts/ staff/ managers on the review findings within two weeks of receiving the reviewers' report to identify program responses and actions where warranted.
- ❑ Complete the Program Manager's response to review findings (or Steering Committee's response, if applicable) and issue direction to Principal Investigators.
- ❑ Add the program response to complete the Final Review Report.
- ❑ Distribute the Final Review Report to the program, EERE senior management, and to Principal Investigators.
- ❑ Track and document progress and impact of program actions.
- ❑ Formally thank reviewers for their efforts.
- ❑ Analyze and summarize the completed evaluation questionnaires of the peer review process.
- ❑ Complete logistics, such as organizing all documentation of the peer review for the record.

## Documentation of Peer Review – Items to retain for the record

Program Manager's/Office Director's Concurrence on Peer Review Record:

Name: _____ Date of Concurrence: _____

***Preparation Stage:***

- ❑ Name of Review Leader
- ❑ Brief description of what program elements will be reviewed
- ❑ Evaluation criteria and review questions
- ❑ List of data collected and presented
- ❑ Data collection and analysis plan
- ❑ Review timeline
- ❑ Copy of the detailed budget for the review
- ❑ Copy of the review agenda

***Pre-Review Stage:***

- ❑ Description of the reviewer nomination and selection process
- ❑ Name, affiliation, and background of the review chairperson and each reviewer
- ❑ Guidelines sent to reviewers with criteria, etc.
- ❑ Signed Conflict of Interest forms for the review chairperson and each reviewer
- ❑ Signed Nondisclosure agreements for the review chairperson and each reviewer and audience where applicable
- ❑ Project Information Sheet prepared by Principal Investigator for each reviewed project
- ❑ Copies of other data and materials provided and presented to reviewers

***Conduct of Review Stage:***

- ❑ Copies of all slide presentations given by the Principal Investigator
- ❑ Completed written comments from the review chairperson and each reviewer
- ❑ Completed evaluation forms used to obtain feedback on ways to improve the peer review process
- ❑ Review Report (if prepared by panel)
- ❑ Review Report prepared by review leader and chairperson, as forwarded to program manager

***Post-Review Stage:***

- ❑ Program response added to complete the Final Review Report
- ❑ Summary report on the findings from the evaluation questionnaire on the peer review process
- ❑ Status reports from program manager (or Principal Investigators) on actions taken in response to the peer review findings

# C. Examples of Review Questions

These questions were pulled from a number of EERE evaluations by the Peer Review Task Force and organized to show how questions for assessing a "program" differ from questions for assessing projects that make up that program. Most of the examples provided are for R&D programs. The suggestion in this guide is that project reviews also ask questions about the relevant program, so this expert judgment information

| Review Criterion | Level of Review | | |
|---|---|---|---|
| | **Project-level Reviews** | | **Program-level Reviews** |
| **Quality, Productivity, Accomplish-ments** | What is the quality of research so far?<br><br>Are the methods used/proposed based on sound science?<br><br>Are the experimental and analytical methods used appropriate?<br><br>What is the level of insight and innovation demonstrated in relation to requirements of the project?<br><br>Are technological risk factors effectively assessed?<br><br>Are key research areas in the project receiving sufficient emphasis?<br><br>Are papers, reports & other publications, awards and patents resulted from the project of high quality?<br><br>Are technical goals and milestones realistic?<br><br>Are the project's goals and milestones being adequately pursued?<br><br>Is adequate progress made with achieving planned targets?<br><br>Will project meet its objectives as currently budgeted and scheduled?<br><br>Value of project relative to programmatic costs? | | **Portfolio balance:**<br><br>Is the overall program portfolio appropriately balanced to achieve program goals?<br><br>Is the research effort across the portfolio adequate?<br><br>Is the portfolio sufficiently balanced and focused on the most fruitful avenues to reach the program's goals?<br><br>Are key research areas in the program's portfolio receiving sufficient emphasis?<br><br>Are the program's technical approaches appropriate for achieving the goals, research direction and/or market timing and needs?<br><br>**Quality of team:**<br>What is the overall quality of the research and teams, and the adequacy of facilities?<br><br>**Progress:**<br>Do [collective] results indicate significant progress toward achieving The program's mission & goals?<br><br>What is the rate of progress in meeting planned objectives & schedule? Is it sufficient? |

| Review Criterion | Level of Review | | |
|---|---|---|---|
| | **Project-level Reviews** | | **Program-level Reviews** |
| **Relevance** | Is the importance of the project to the energy area, problem or need sufficiently high to justify the work?<br><br>Does the project adequately address industry [partner] goals?<br><br>Is the project relevant to programmatic goals?<br><br>Does the project adequately address a specific identified technical or market problem or need? | | Is the program's work appropriately relevant to EERE & DOE mission and other national goals?<br><br>Are the program's goals appropriate for its mission?<br><br>Did scientific & technical advances from the program's research translate into real energy savings? |

| Review Criterion | Level of Review | | |
|---|---|---|---|
| | **Project-level Reviews** | | **Program-level Reviews** |
| **Management** | **Resources:**<br><br>Is the project appropriately funded to meet its goals?<br><br>**Planning and Implementation:**<br>Is the project integrated with other projects in the program?<br><br>How would you assess the quality of R&D planning so far?<br><br>Is project planning coordinated with industry or other stakeholders?<br><br>How well is the project being implemented?<br><br>Are there unintended (+/-) consequences (e.g., health, safety, & environmental issues) of the technology that are not being addressed?<br><br>**Teaming:**<br>How well has the project team leveraged resources (funds, capabilities) by teaming with private companies & other organizations? | | **Resources:**<br>What is the value of program relative to its costs?<br><br>Is the program appropriately funded to meet its goals?<br><br>**Planning and Implementation:**<br>How would you assess the quality of the program's multi-year planning (MYPP) so far?<br><br>How well was last year's plan implemented?<br><br>What is quality of proposed future plans?<br><br>Are changes in program direction or emphasis based on clear, robust and documented decision processes?<br><br>**Teaming:**<br>How effective is R&D integration among organizations to leverage resources? |

| Review Criterion | Level of Review | | |
|---|---|---|---|
| | **Project-level Reviews** | | **Program-level Reviews** |
| | | | Is technology transfer effectively managed?<br><br>Do adequate teaming arrangements to facilitate technology transfer exist?<br><br>**Research Integration:**<br>How well does the program address the structural relationship between projects?<br><br>How effective is R&D integration across projects? |

# D. Sample Peer Review Timeline

**This example is based on practices recommended in the EERE Peer Review Guide (If a program has NO history of peer review the timeline probably will be the longer period defined here.)**

## 6 – 12 months prior to review date

***Preparation***

- Assign peer review leadership
- Identify review purpose, evaluation criteria and questions (draft), scope, budget, and review timeline
- Define data collection and analysis plan and start Peer Review Record

## 3 – 6 months prior to review date

***Pre-Review Activities – Selection of Reviewers***

- Determine the expertise required for reviewers and the process for nominating and selecting reviewers, review chairperson
- Consider potential conflicts of interest when reviewing candidates
- Facilitate the selection of the review chairperson and peer reviewers
- Have reviewers sign the EERE Conflict of Interest form and, where applicable, the Nondisclosure agreement

## 3 – 6 months prior to review date

***Pre-Review Activities – Logistics, Evaluation Tools, Preparation Materials***

- Secure facilities, confirm participants, publish date
- Finalize agenda, evaluation criteria and questions, prepare evaluation guidelines and tools
- Obtain materials from presenters and other data and send to reviewers 2 months prior

## Day(s) of Review

***Conduct of the Review***

- Repeat review instructions on site
- Ensure facilitation of review
- Collect written comments and analyze and summarize evaluation data
- Disseminate and collect on-site the questionnaire for evaluating the peer review process

## 0 – 1 month after review date

***Post-Review***

- Provide draft Review Report to program manager
- Review peer review findings with program staff to identify response and actions
- Complete the Program Manager response
- Package the response with the review in a Final Review Report and distribute
- Establish a plan to track and document progress and impact of program actions
- Analyze, summarize and distribute the results of the post-review evaluation questionnaire of this peer review process

**Successful Peer Review Implemented**
Track and document progress and impact of program actions

# E. Reviewer Areas of Expertise - Self-Assessment and Suggestions

This form may be sent to potential reviewers who have been suggested but are not known to the program. It is particularly useful if there are a number of different projects or technical areas being reviewed. Requesting a curriculum vita is also recommended.

The [NAME of Program] is holding an In-Progress Peer Review in [Month/Year] in [city, state, country]. The Program Manager is seeking expert opinion on the following criteria:

a) Quality, Productivity, and Accomplishments of the [program/subprograms/projects] being reviewed.
b) Relevance of the [program/subprograms/projects] to the [program mission].
c) Management of the activities.
d) Other.

We are seeking reviewers who have both the necessary subject matter expertise in the areas reviewed and an overall panel that covers various perspectives. We are interested in knowing whether you believe you are a good match for these requirements. We would also like to receive your recommendations for others whom you think would be.

1. For each of the following technical areas that will be included in the Review, please indicate how sufficient you feel your level of subject matter expertise is to review this area.

| [Subject Area] | Your level of subject matter expertise | | |
|---|---|---|---|
| | Low | Moderate | High |
| [Subject A] | | | |
| [Subject B] | | | |
| [Subject C] | | | |
| [Subject D] | | | |

2. Please recommend other persons you know to be experts in any of these subject matter areas.

| [Subject Area] | Name | Telephone/ Email |
|---|---|---|
| | | |
| | | |

3. Please provide us with a copy of your curriculum vitae or resume.

# F. DOE/EERE Conflict-of-Interest Policy and Form

It is important for programs to be aware of expert reviewers' possible conflicts of interest. *Having a conflict of interest in one area does not necessarily exclude a person from serving as a reviewer.* This agreement must be completed by individuals prior to their participation in EERE peer reviews. This policy and agreement have been formulated based on advice from the DOE General Counsel's Office and recognize that (1) expert reviewers of programs in-progress do not make funding decisions and (2) programs often must balance perceived conflict of interest and the need for expert advice from a small community of experts.

## Please forward this form, along with your Curricula Vita (if you have not already done so), to the DOE review leader.

You have been nominated by DOE/EERE to serve as a Peer Reviewer for [Name of Program/Subprogram/Project]. Your participation in this review will be greatly appreciated. However, it is possible that your personal affiliations and involvement in certain activities could pose a conflict of interest or create the appearance that you lack impartiality in your evaluations and recommendations for this peer review. In order to assess if you have a real or perceived conflict of interest in regard to the program/projects that will be evaluated in this peer review, please complete the information below. This information will be reviewed by the peer review leader in order to identify potential conflicts of interest and assure that you are not placed in a position to review and evaluate projects that may present the appearance of partiality.

### SECTION 1: AFFILIATIONS, ACTIVITIES AND PROGRAM INVOLVEMENT

At the end of this section you will be asked to list those specific projects or areas on the agenda where a conflict or appearance of conflict could exist and explain the nature of that conflict. A conflict in one area does not necessarily exclude you from serving as a reviewer in another area. The review leader may call you for more information.

Affiliations or activities that could potentially lead to conflicts of interest may include the following:

a) Work or known future work for parties that could be affected by your judgments on projects or program developments that you have been asked to review.

b) Any personal benefit you (or your employer, spouse or dependent child) might gain in a direct or predictable way from the developments of the program/projects you have been asked to review.

c) Any previous involvement you have had with the program/projects you have been asked to review, such as having participated in a solicitation to the program area that was subsequently not funded, or having a professor, student, or collaborator relationship with the program or its research staff.

d) Any financial interest held by you (or your employer, spouse or dependent child) that could be affected by your participation in this matter.

e) Any financial relationship you have or have had with DOE/EERE such as research grants or cooperative agreements.

**Personal involvement with the research program or with other DOE program areas.**

| | Yes | No |
|---|---|---|
| I previously was involved in research funded by this program/project. | _____ | _____ |
| I participated in a solicitation from this program/project. | _____ | _____ |
| I reviewed this program/project previously. | _____ | _____ |
| I am a former professor or student of a Principal Investigator. | _____ | _____ |
| I previously collaborated with the Principal Investigator in a research activity in program/project area. | _____ | _____ |

| Project or technical area on review agenda | Nature of conflict of interest |
|---|---|
| | |
| | |
| | |
| | |

***(continue on another sheet if necessary)***

## SECTION 2: CONFLICT OF INTEREST AGREEMENT

### CONFLICT OF INTEREST AGREEMENT

This agreement must be completed by individuals prior to their participation in EERE peer reviews. Please contact *(contact info for agency peer review official)* to discuss any potential conflict of interest issues at your earliest convenience, but no later than _____.

I have reviewed the information contained on this form and to the best of my knowledge I have disclosed any actual or potential conflicts of interest that I may have in regard to the program/projects that I have been nominated to evaluate. In addition, prior to my participation as a peer reviewer, I agree to disclose any actual or perceived conflicts of interest as soon as I am aware of the conflict.

_____ _____

Signature Date

_____

Printed Name

# G. Peer Review Nondisclosure Agreement

A Nondisclosure agreement should be signed by each reviewer prior to the program sending review materials if sensitive or proprietary information will be provided reviewers or discussed during the review. Everyone, not just reviewers, attending a review session where the material is discussed or presented should sign a nondisclosure agreement. In most cases, the nondisclosure agreement will be that of the company, institution, or individual protecting its information. Below is a DOE form.

I agree to use the information revealed during review of the …

[project description *** Program provides information]**

… only for Department of Energy (DOE) assessment purposes and to treat the information which may be confidential in nature in confidence. **The specific type of information considered proprietary is:**

**[* Program provides information.]**

If in the course of this program/subprogram/project review, I do acquire or have access to any information, data, or material which is business confidential, proprietary, or otherwise privileged, and is so indicated in writing, I agree that such information will not be divulged to any person or any organization or utilized for my own private purposes or in any manner whatsoever, other than in the performance of this program/subprogram/project review:

1. without the prior written permission of the disclosing party or the contracting officer for the work being evaluated, or

2. until such information, data, or material is first publicly disseminated by the DOE or its contractor or grantee performing the work, or

3. is or becomes known to the public from a source other than me, or

4. is already known to me or my employer as shown by prior records, whichever event shall first occur.

_____
(Signature)

_____
(Name)
Printed or Typed

_____
(Date)

# H. Guidelines for Peer Reviewers and Chairpersons

**Example:** Here are headings of a package that would be sent to reviewers giving them an overview of the program to be reviewed and instructions for the review process. Send these guidelines to those being reviewed also.

You are asked to provide intellectually fair and disinterested expert evaluation of research sponsored by the [Program/Office]. This evaluation will be considered by DOE managers in setting program priorities and will be used by program managers and researchers to improve their programs and projects.

**Project Mission and Goals:** It is important that you understand the mission of this program and the general goals. Your review should be conducted with the program mission and relevant goals in mind.

- ***Mission*:**
- ***Research Goal*:**
- ***Research Goal*:**

The **review criteria** you are being asked to use are:
[EERE core criteria and others, if applicable]

The following criteria definitions will apply:
[EERE core criteria and others, if applicable]

**Materials and data provided**:
[List]

**Evaluation Forms** for each project to be reviewed are provided. Please "**discriminate**" by clearly rewarding excellent work with high ratings and giving lower ratings to work you feel should be modified. Evaluation forms should be returned when you are finished.

**Consensus:** A consensus is not requested for the review. We encourage panel discussion of the relative merits of each project, but want the individual evaluation of each reviewer.

Your comments are extremely valuable and **anonymous** – your name will be listed as a reviewer but attribution of your comments will not be made to either the project/program manager and staff or to DOE management.

**At the conclusion of the peer review meeting, we ask that you not depart from the meeting without handing in your comments.**

# I. Materials Provided by Programs to Reviewers

Here is a suggested outline to send to those being reviewed when asking them to provide information for the review. It would need to be modified for Business Administration and Deployment programs.

## PROJECT DESCRIPTION

**1. Project Title: _____**

**2. Principal investigator:** Name, organization, address, phone, fax, e-mail

**3. Other Participating Organizations:** Name, organization

**4. Project Schedule:**

1. Initiation Date
2. Dates of Intermediate Phase Completions or Go/No-Go Points
3. Original Expected Completion Date

**5. Statement of Problem:** Briefly describe the problem that this project addresses. Clearly state the importance of solving the problem in terms of its relationship to DOE mission.

**6. Project Objectives:** Describe the specific project objectives (derived from statement of work).

**7. Project History & Relationships:** Relate this project and its objectives to past work (if the project is a continuation or extension of earlier work). Describe how this project relates to other projects being funded by DOE (to the extent this is known by the Principal Investigator).

**8. Technical Approach:** Briefly describe the technical concept or research strategy and how this project is addressing the problem, including technical performance goals and the applicability across the industry. Identify scientific or technical issues currently being addressed and their significance.

**9. Technical Work Plan:** Briefly describe project work plan, schedules and list contributions of each participating organization. Include experimental design, techniques used, approach to data analysis, key equipment and facilities, etc.

**10. Technical Problems/Barriers:** Briefly describe technical barriers or problems (including key technical hurdles, performance requirements for economic competitiveness, theoretical limits, regulatory requirements for commercialization/implementation, etc.) and how they are being addressed.

**11. Status of Milestones:** Discuss progress in achieving each technical milestone as scheduled in the original project plan. Discuss any variances and how they are being addressed.

**12. Commercialization Plans:** Describe end-use application, competing technology assessments, regulatory evaluations, patentability assessments, market assessments, cost-benefit analyses, commercialization plan, and progress towards commercialization including intellectual property agreements or formal commercialization agreements.

**13. Efficiency Improvement Metrics:** Describe the original estimates and any revised estimates for improving energy efficiency, reducing emissions, enhancing productivity, reducing costs, and/or reducing materials usage, which will directly result from this project.

**14. Project Output:** Provide information relative to the project output which includes at least the following:

1. Major recent accomplishments with supporting data and their significance. (Emphasize products or results under the current contract or grant.)

2. Bibliography of publications emanating from this project.

From the bibliography, select no more than 5 of the most recent, significant publications in the professional or scientific literature and submit 12 copies of each to supplement the Project Summary. It is permissible to include manuscripts that have been submitted for publication but not yet accepted or published. Please mark on such manuscripts their precise status, for example, "submitted to Journal of Applied Physics on February 1, 2003 and undergoing review."

**15. Budget Tables:** Include total project funding by source, including nature of cost sharing. Was the project on budget (hours and dollars)? If not, what were the reasons for budget variances and how was the project plan modified? Discuss personnel and other environmental changes and show how they affected the performance of the project. Discuss any variances in the project budget and/or plans and how they were addressed. Provide the following in a table format:

1. Cost and Schedule Milestones and Variances. In other words, show the breakdown of how all the money was spent in course of the project and compare with original budget. Show total cost share direct and in kind by prime and by each partner.
2. Level of effort in person-months by the PI and key personnel.
3. Level of effort by consultants and sub awardees.
4. Materials and permanent equipment leased or purchased.

**16. Principal Project Personnel:** Identify the important technical contributors to the project (name, organization, address, telephone, fax, and E-mail), including the Principal Investigator, and provide the following information for each:

1. Role in the project.
2. Principal areas of research and expertise.
3. An indication of the percentage of time, or annual hours, each devotes to the project.
4. Education.
5. Relevant professional employment history, including a list of the institutions, dates employed, and positions held.
6. Relevant professional activities and honors.
7. Relevant publications not emanating from this project. (Do not include extensive lists of publications of little relevance to the project being evaluated.)

Please provide the following should reviewers request more information:

a) Internet addresses where additional relevant information is located
b) Name and contact information
c) Ideas for site visits, tours, video conference, face to face contact during a review

# J. Peer Reviewer Project/Program Evaluation Form

This sample Peer Review Evaluation Form would be filled out by reviewers after the presentations and before leaving the review site. This form would be modified depending on the specific questions addressed in the review. The rating scheme may also be modified, for example, to use a five part scale such as very poor, marginal, average, good, and very good.

**Reviewer #: _____** **Date of Review: _____**
**Project/Subprogram/Program:**

_____

**Instructions:** Reviewers individually rate the program/subprogram/project using three criteria, provide an overall project rating, and add supporting comments for each. The rating scale for each is composed of integer values from one to ten, with the ends of the scale representing seriously deficient and outstanding attributes, respectively. If more space is required for comment, please use the comment continuation sheet.

## Q1. Quality, Productivity, and Accomplishments

Reviewers assess the overall quality, productivity, and record of accomplishments of the project (or set of projects/activities) or program. For quality and productivity, this includes assessment of:

a) Quality -- the composition and quality of the resources engaged, including people and facilities. Considered are the team members' honors and awards, their relevant experience relevant, and the balance of appropriate skills (including collaborators). [For example: A project team may be outstanding, strong, balanced and experienced; good but would benefit from additional skills; require strengthening; or have serious shortcomings.]

b) Productivity -- the level of productivity in work underway is assessed by looking at accomplishments and the value of the accomplishments compared to costs. This includes achievement against planned goals and objectives, technical targets, awards, or other success measures typical for the type of activity (such as publications, citations, patents, licenses, prototypes passing requirements tests). [For example: The levels of productivity may have been exceptional, extensive, reasonable under the circumstances, marginal, or have little evidence of progress.]

**Quality:** Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**

**Very low quality** **Very high quality**

**Supporting Comments:**

_____

_____

_____

_____

**Productivity:** Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**
**Low productivity** **High productivity**

**Supporting Comments:**

_____

_____

_____

_____

**Accomplishments:** Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**
**No accomplishments** **Many accomplishments**

**Supporting Comments:**

_____

_____

_____

_____

## Q2. Relevance

Reviewers assess the importance of achieving the project's objectives in terms of actual or potential contribution to the broader program and Department mission, goals, or strategy and to society. In many cases relevance also means that the set of activities addresses known technical or market barriers and that tasks being performed are able to demonstrate actual or potential contributions to lowering one or more of those barriers.

Levels of relevance could be: of central importance to larger program goals or strategy, of significant importance, of general importance, weakly support the program goals or strategy, or of doubtful or peripheral importance.

**Relevance to Mission, Goals, or Strategy and to Society:**

Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**
**Not Very Relevant** **Very Relevant**

**Supporting Comments:**

_____

_____

_____

_____

**Relevance to Technical and/or Market Barriers:**

Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**

**Not Very Relevant** **Very Relevant**

**Supporting Comments:**

_____

_____

_____

_____

## Q3. Project/Subprogram/Program Management

The management criterion examines how well projects and programs are managed. This includes quality of research planning (past and future), and program execution which may include effective research integration, good application and leveraging of resources.

Management may be judged as: expert and innovative approach with exceptional execution, logical approach and effective execution, reasonable approach and appropriate execution with room for improvement, or an approach with key shortcomings and poor execution.

Circle the appropriate number for your rating.

**1 2 3 4 5 6 7 8 9 10**

**Very Poor** **Outstanding**

**Supporting Comments:**

_____

_____

_____

_____

## Q4. Overall Impressions

Please provide your general overall rating of the project/subprogram/program, followed by comments.

**Overall Rating**

**Circle the appropriate number for your rating.**

**1 2 3 4 5 6 7 8 9 10**

**Very Poor** **Outstanding**

**Supporting Comments:**

Areas of comment include (a) overall strengths and weaknesses, (b) areas of research or analysis that could be deleted, (c) new areas or directions that could be added, and (d) changes that may have occurred in the research context (markets, policy, competing technologies, etc.) that might alter the planned targets or goals.

# K. Sample Rating Summary Sheet

Modified to accompany to EERE Peer Review Guide (2004) from THE PEER REVIEW PROCESS HANDBOOK, An Implementation Manual Based on the Superconductivity Program Experience, EERE, September 2002
Ratings never stand alone. They should always be accompanied by the valuable narrative comments of reviewers (see Section 6.1 in the Guide).

| Lab Presenter | Project A | | | | | | Project B | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q | R | M | other | O | Total[1] | Q | R | M | other | O | Total[1] |
| **REVIEWERS** | | | | | | | | | | | | |
| **Reviewer 1** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 2** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 3** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 4** | xx | xx | xx | xx | xx | xx | | | | | | NR |
| **Reviewer 5** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 6** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 7** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 8** | xx | xx | xx | xx | xx | xx | | | | | | NR |
| **Reviewer 9** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Reviewer 10** | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx |
| **Average Total** | xx | xx | xx | xx | xx | **xx** | xx | xx | xx | xx | xx | **xx** |
| **High Rating** | | | | | | xx | | | | | | xx |
| **Low Rating** | | | | | | xx | | | | | | xx |

Criteria: Q = Quality/Productivity/Accomplishments R = Relevance, M = Management, O = Overall

[1] Total may be a weighted average.

# L. Information Technology for Peer Reviews

The use of information technology, such as Groupware software, has the potential to significantly improve the efficiency and overall value of the peer review process. Information technology brings real time data entry, screen sharing, data manipulation, and statistical analysis capabilities to the peer review process. Individual reviewers can enter anonymous review and rating data, and the peer review leader can compute summary rating statistics to share with them in a timely manner. This increased information handling can free up reviewer time to permit additional time allocation for important reviewer-to-reviewer or reviewer-to-principal investigator interactions.

The application of Groupware in the peer review process is not new. Ronald N. Kostoff has successfully applied network-centric peer review at the Office of Naval Research.[4] The table below compares a groupware-based peer review with the traditional review process.

| Traditional peer review: | Network-centric peer review:* |
|---|---|
| • Data input is via the evaluation form completed during the Q&A session or shortly thereafter.<br>• Each reviewer completes their evaluation during the session, and the individual and summary result for the panels are computed at the end of each presentation day or after the review has concluded. | • All the members of the on-site audience are linked by Group-Ware information technology. All data input is mechanized, and instantly recorded.<br>• Each reviewer completes their evaluation during the session using the groupware. During the presentations, the reviewers enter final ratings and any additional comments they believe are important based on last-minute observations or insights. Individual and summary results for the panel are made available in real-time and routed back to each individual for further discussion. |
| • Statistical analysis of reviewer comments (summary and integrative statistics, as well as aggregating comments) typically is not available instantly or in time for use in onsite panel discussion.<br>• Reviewers could meet in closed session to discuss their preliminary reviews. However, during closed session discussion, reviewers often do not have access to the full statistical analysis of ratings for the panel. | • Statistical analysis of reviewer comments is completed onsite to provide useful performance data quickly.†<br>• To complement the groupware tool, reviewers could meet in closed session to discuss the preliminary reviews and once the interactive cycle is complete, they may make final changes to their individual review comments and ratings. The groupware technology would enable reviewers to have access to the full statistical analysis of ratings for the panel. |

*[Sources: www.inform.nu/Articles/Vol2/v2n1p11-18.pdf and Kostoff, R.N., 2001 Network Centric Peer Review, Office of Naval Research]

† The Group-Ware algorithms will have computed each program's statistics (panel averages for each evaluation criterion rating, etc) and any desired integrative statistics over multiple program groups as well. All these numerical results will be displayed graphically to all the on-site audience. The Group-Ware will have also aggregated the additional comments, and these comments will be displayed to all the participants. Both the ratings and the comments will be discussed for each evaluation criterion for each program presented. The central panel will then rate each evaluation criterion for each program presented, and these final program and integrative statistics will be displayed in real-time.

[The Groupware] had two components: computing summary and integrative statistics, and aggregating comments. Both these features operated in real-time. The immediate summary and integrative statistics feedback provides for high efficiency discussions, and its value increases as the number of programs reviewed and the number of experts used increase. The comment aggregation is valuable for documentation purposes. For an on-site panel, comment aggregation has little value, can serve to bias reviewers' initial comments, and can be a distraction to some reviewers. For reviewers from remote locations, comment aggregation should prove to be of substantial value." [Source: Kostoff, R.N., 2001 Network Centric Peer Review, Office of Naval Research**]**

[4] Kostoff, R.N., 2001 Network Centric Peer Review, Office of Naval Research.

# M. Peer Review Response Reporting

This is an example format for recording the program manager's response to reviewer comments. This can be done in a separate memo, but at least a summary of the response is also included in the Peer Review Report.

**Template and Example: Reviewer Comments and Program Responses**

| Summary Reviewer Comments | Program Response |
|---|---|
| **From the Biomass Program Review, 2002** | |
| **Comment 1**<br>Give higher priority to feedstock-related activities, and improve communication regarding these projects with other Biomass Program research activities, as well as with USDA. | While strategic decisions have been made within the Office of Energy Efficiency and Renewable Energy (EERE) with regard to feedstock research that effectively limits the scope of the Programs undertakings in this area, the Program agrees that feedstock resource supply, sustainability, logistics, and processing research are an important part of bioenergy research. It is committed to continuing to improve communication among the Program's research areas and working on feedstock and related issues with USDA. |
| **Partnership for a New Generation of Vehicles<br>Response to the NRC's 6th Peer Review Report Recommendations** | |
| **Comment 1**<br>**RECOMMENDATION:** PNGV should continue to work on cell chemistry of lithium battery systems to extend life and improve safety, while continuing to lower costs. Performance and cost targets should be refined as overall vehicle systems analysis determines the optimal degree of vehicle hybridization. | **RESPONSE:** As recommended by the Committee, lithium battery chemistry development aimed at extending life, improving safety and reducing cost, is continuing. The PNGV battery cost and performance targets have been refined periodically, based on (informal) direction from the proprietary vehicle development efforts. PNGV is considering the development of collaborative vehicle-level cost, performance, and fuel economy models. It may be possible to determine more optimal hybrid vehicle configurations from such models, and the battery performance and cost -targets could then be further refined. |
| | |

# N. Peer Review Response Tracking

**Program Name: _____ Date of Report _____**

Example (continued from Appendix M)

| | Action Item | Relevant Reviewer Comment(s) | Action Owner | Progress to Date |
|---|---|---|---|---|
| **From the Biomass Program Review, 2002** | | | | |
| 1 | improve communication among the Program's research areas and work on feedstock and related issues with USDA | Give higher priority to feedstock-related activities, and improve communication regarding these projects with other Biomass Program research activities, as well as with USDA. | [name] | [narrative] |
| 2 | | | | |
| **Partnership for a New Generation of Vehicles Response to the NRC's 6th Peer Review Report Recommendations** | | | | |
| 1 | Consider the development of collaborative vehicle-level cost, performance, and fuel economy models | Performance and cost targets should be refined as overall vehicle systems analysis determines the optimal degree of vehicle hybridization. | [name] | [narrative] |
| 2 | | | | |

# O. Recommended Instrument for Evaluating the Peer Review Process[5]

## [Peer Review Event Name, Date, Location]

### DOE Office of Energy Efficiency and Renewable Energy

### Questionnaire for Evaluating the Peer Review Process

EERE is committed to continuous improvement in its peer review progress. This questionnaire to evaluate the peer review process is designed to produce post-review information that can be applied to improve the effectiveness of future reviews.

**INSTRUCTIONS**

Please take a few moments to fill out the questionnaire and return it to the registration desk.

Your answers to the questions below and any additional comments you may wish to provide will be very useful in this quality enhancement process. We will be able to pay full attention to all responses and comments. Any opinions expressed will not be attributed to specific individuals. You should feel free to add written comments to any of the questions.

Thank you in advance for taking a few minutes to provide your feedback.

Sincerely,

*[Signature of Program Manager]*

*Printed Name of Program Manager, DOE [Name of Program]*

[5] Adapted to fit this guide from the evaluation form used in "An Evaluation of Technical Review of Federal Laboratory Research: Findings from a US DOE Technical Review", SNL Report Number 98-1227, 1998.

## A. DEMOGRAPHIC QUESTIONS

**A-1.** What was your role in the review?

__ Peer Reviewer
**[ANSWER ONLY SECTIONS B & C]**

__ Presenter of a program activity or project under review (non-program office presenter)
**[ANSWER ONLY SECTIONS B & D]**

__ Presenter of a program activity or project under review (program office staff)
**[ANSWER ONLY SECTIONS B & D]**

__ Attendee, neither Reviewer nor Presenter
**[ANSWER ONLY SECTION B]**

**A-2.** What is your affiliation?

__ Government agency directly sponsoring the program under review
__ National /government lab, private-sector or university researcher whose project is under review
__ In an industry directly involved in the program under review
__ In an industry with interest in the work under review
__ Government agency with interest in the work
__ National /government lab, private-sector or university researcher not being reviewed, but who has an interest in the work
__ Other (please specify, e.g., consultant, retired employee, public, etc.) _____

## B. QUESTIONS B-1 THROUGH B-14 FOR ALL ATTENDEES

**B-1** Purpose and scope of review were well defined.

*disagree* *agree*
*1 2 3 4 5*

**B-2** The quality, breadth, and depth of the following were sufficient to contribute to a well-considered review:

*disagree* *agree*

1. Presentations *1 2 3 4 5*
2. Question & Answer periods *1 2 3 4 5*
3. Answers provided concerning programmatic questions *1 2 3 4 5*
4. Answers provided concerning technical questions *1 2 3 4 5*

**B-3** Enough time was allocated for presentations.

*disagree* *agree*
*1 2 3 4 5*

**B-4** Time allowed for the Question & Answer period following the presentations was adequate for a rigorous exchange.

*disagree* *agree*
*1 2 3 4 5*

**B-5** The questions asked by reviewers were sufficiently rigorous and detailed.

*disagree* *agree*
*1 2 3 4 5*

**B-6** What questions should have been asked but were not?

**B-7** There were no problems with:

*disagree* *agree*

1. Classification of projects (project groupings) *1 2 3 4 5*
2. Quality/level of the information presented *1 2 3 4 5*
3. Proprietary data *1 2 3 4 5*

____ *N/A*

**B-8** The frequency *(insert the planned frequency of review – e.g., annual, biennial, etc. )* of this kind of formal review process for this program/subprogram is:
___ about right
___ too frequent
___ not frequent enough

**B-9** The review was conducted smoothly. *disagree* *agree*
*1 2 3 4 5*

**B-10** What was the most useful part of the review process?

**B-11** What could have been done better?

**B-12** Overall, how satisfied are you with the review process? *very unsatisfied* *very satisfied*
*1 2 3 4 5*

**B-13** Would you recommend this review process to others and should it be applied to similar DOE programs? O *yes* O *no*

**B-14**. Please provide comments and recommendations on the overall review process.

## C. QUESTIONS C-1 THROUGH C-12 FOR PEER REVIEWERS ONLY

| | | |
|---|---|---|
| **C-1** | Information about the program/subprogram /projects under review was provided sufficiently prior to the review session. | *disagree* *1 2 3 4 5* *agree* |
| **C-2** | Review instructions were provided in a timely manner. | *disagree* *1 2 3 4 5* *agree* |
| **C-3** | The information provided in the presentations was adequate for a meaningful review of the projects. | *disagree* *1 2 3 4 5* *agree* |
| **C-4** | The evaluation criteria upon which the review was organized were clearly defined and used appropriately. | *disagree* *agree* |
| | 1. Quality, Productivity, Accomplishments | *1 2 3 4 5* |
| | 2. Relevance | *1 2 3 4 5* |
| | 3. Management | *1 2 3 4 5* |
| | 4. Other (1):_____ | *1 2 3 4 5* |
| | 5. Other (2):_____ | *1 2 3 4 5* |
| **C-5** | Explanation of the questions within the criteria was clear and sufficient. | *disagree* *agree* |
| | 1. Quality, Productivity, Accomplishments | *1 2 3 4 5* |
| | 2. Relevance | *1 2 3 4 5* |
| | 3. Management | *1 2 3 4 5* |
| | 4. Other (1):_____ | *1 2 3 4 5* |
| | 5. Other (2):_____ | *1 2 3 4 5* |
| **C-6** | The right criteria were used to evaluate the project(s)/program. | *disagree* *agree* |
| | 1. Quality, Productivity, Accomplishments | *1 2 3 4 5* |
| | 2. Relevance | *1 2 3 4 5* |
| | 3. Management | *1 2 3 4 5* |
| | 4. Other (1):_____ | *1 2 3 4 5* |
| | 5. Other (2):_____ | *1 2 3 4 5* |
| **C-7** | During the review process, reviewers had adequate access to principle investigators, research staff, or requested sources of additional data. | *disagree* *1 2 3 4 5* *agree* |
| **C-8** | The number of projects I was expected to review was | *disagree* *agree* |
| | a. Too many | *1 2 3 4 5* |
| | b. Too few | *1 2 3 4 5* |
| | c. About right | *1 2 3 4 5* |

| | | |
|---|---|---|
| **C-9** | The reviewers in my session had the proper mix and depth of credentials for the purpose of the review. | *disagree* *agree*<br>*1 2 3 4 5*<br>____ *Don't know their credentials* |
| **C-10** | There were no problems with the numerical rating schemes used. | *disagree* *agree*<br>*1 2 3 4 5*<br>____ *N/A* |
| **C-11** | Altogether, the preparatory materials, presentations, and the Question & Answer period provided sufficient depth of review. | *disagree* *agree*<br>*1 2 3 4 5* |
| **C-12** | When considering the final reporting of recommendations:<br>1. Process for developing final reporting was appropriate.<br>2. Enough time was allocated for reviewers to deliberate before recording review comments. | *disagree* *agree*<br>*1 2 3 4 5*<br>*1 2 3 4 5*<br>____ *N/A* |

## D. QUESTIONS D-1 THRU D-9 FOR PRESENTERS ONLY

**D-1** The request to provide a presentation for the review was made sufficiently prior to the deadline for submission.

*disagree* *agree*
*1 2 3 4 5*

**D-2** Instructions for preparing the presentation were sufficient.

*disagree* *agree*
*1 2 3 4 5*

**D-3** The evaluation criteria upon which the review was organized were clearly defined and used appropriately.

*disagree* *agree*

1. Quality, Productivity, Accomplishments — *1 2 3 4 5*
2. Relevance — *1 2 3 4 5*
3. Management — *1 2 3 4 5*
4. Other (1):_____ — *1 2 3 4 5*
5. Other (2):_____ — *1 2 3 4 5*

**D-4** Explanation of the questions within the criteria was clear and sufficient.

*disagree* *agree*

1. Quality, Productivity, Accomplishments — *1 2 3 4 5*
2. Relevance — *1 2 3 4 5*
3. Management — *1 2 3 4 5*
4. Other (1):_____ — *1 2 3 4 5*
5. Other (2):_____ — *1 2 3 4 5*

**D-5** The right criteria were used to evaluate the project(s)/program.

*disagree* *agree*

1. Quality, Productivity, Accomplishments — *1 2 3 4 5*
2. Relevance — *1 2 3 4 5*
3. Management — *1 2 3 4 5*
4. Other (1):_____ — *1 2 3 4 5*
5. Other (2):_____ — *1 2 3 4 5*

**D-6** During the review process, reviewers had adequate access to principle investigators, research staff, or requested sources of additional data.

*disagree* *agree*
*1 2 3 4 5*

**D-7** The reviewers in my session had the proper mix and depth of credentials for the purpose of the review.

*disagree* *agree*
*1 2 3 4 55*

____ *Don't know their credentials*

**D-8** There were no problems with the numerical rating schemes used.

*disagree* *agree*
*1 2 3 4 55*
____ *N/A*

**D-9** Altogether, the preparatory materials, presentations, and the Question & Answer period provided sufficient depth of review.

*disagree* *agree*
*1 2 3 4 5*