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An Evaluation of Technical Review of Federal Laboratory Research: Findings from a US Department of Energy Technical Review Pilot

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An Evaluation of Technical Review of Federal Laboratory Research: Findings From a US Department of Energy Technical Review Pilot

Pulse Power Program, Sandia National Laboratories
Solar Thermal Electric Program, Sandia and National Renewable Energy Laboratories
1996-1997

Gretchen Jordan, Computational Reactive Processes, 8345
Glenn Kuswa, Enhanced Surveillance and Data, 12365
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ABSTRACT

Recommendations for improving the process for expert panel reviews of technical and programmatic aspects of science and technology programs are provided based on an evaluation study of pilot reviews for two programs at Sandia National Laboratories. These reviews were part of a larger Technical Review Pilot for the U.S. Department of Energy (DOE). Both the Sandia Pulse Power program and Solar Thermal Electric program (a virtual lab with NREL) reviews used the recommended four DOE review criteria, but motivation for the review and the review process differed. These differences provide insight into recommendations for ways to improve the review of DOE's multi-faceted technical programs. Recommendations are: 1) Review when the program has specific need for information or validation. There is no "one size fits all" correct time or reason to review technical programs. 2) Tailor the four DOE criteria to the program and its need for information and explain them to the Review Panel. 3) Pay attention to the review process. Spend more time in preparation and pre-review and on briefings on the review outcomes. 4) Evaluate reviews to determine how to do them better. The survey instrument is provided for those who wish to modify it for their own use.

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Overview

This paper provides recommendations on improving the process for expert panel reviews of technical and programmatic aspects of science and technology programs, based on an evaluation study of pilot reviews for two programs at Sandia National Laboratories as part of a larger Technical Review Pilot for the U.S. Department of Energy (DOE). The paper describes the impetus for the Review Pilot and the objectives and characteristics of the program reviews. Evaluation findings about the review process, review criteria, and outcomes of the each review are discussed and compared. Finally recommendations are made for future technical reviews.

History and Objectives of DOE Technical Review Pilots

One of several recommendations of the Galvin Commission on DOE management of its laboratories and programs was to investigate the notion that technical programs were over-reviewed. The DOE organizational structure is such that both program offices at headquarters and regional field offices are responsible for evaluations of technical program performance. The lack of coordination of reviews and the number of reviews was seen by the Commission as perhaps unnecessary expenditure of resources. Many headquarters' program managers conduct program reviews at least annually, either with on-site visits or by having relevant persons travel to Washington, DC. Pre-proposal peer review is completed for some technical work, as is expert panel or peer review of work in progress. Regional Field Office personnel complete at least annual laboratory appraisal of technical work and management practice. At Sandia about one third of the laboratories' technical programs are self-assessed annually with validation by DOE program managers to determine technical program performance. A completed review cycle takes three years. Expert or peer review is included in self assessment, if available, but not required. Whether and when to conduct expert or peer review is determined by program managers and their management chain.

To improve its management practices and in response to the commission report, the DOE instituted three pilots on its oversight functions, one of which was the Technical Review Pilot. The need for the pilot was questioned by laboratory technical program managers who did not believe the current system for technical reviews was burdensome. Indeed they welcome technical review by Headquarters as an opportunity for exposure with their customers. At DOE's request, technical review pilots were established at Sandia National Laboratories (Sandia), Argonne National Laboratory and the National Renewable Energy Laboratory (NREL).

The DOE Technical Review Pilot Committee set the objectives for the reviews with the intent of submitting reviews and lessons learned to the DOE Research and Development (R&D) Council. It was hoped that the reviews could be conducted at a higher level of management and funding than current reviews, that the Assistant Secretary or Director of the DOE office would share responsibility for the review, that the review would result in recommendations for improvement, and be incorporated in the DOE Field Operations Office responsibility for contract performance measures. Joint planning of reviews by DOE and laboratory management was considered one way of both reducing the number of reviews, thus reducing the time spent by scientists and engineers in preparing and presenting information for multiple reviews, and increasing communication across the Department. Ultimately, a more effective review process might be expected to improve the quality and effectiveness of the R&D.

Performance-based contracting is part of larger changes in the review environment. There has been a call for more careful selection of experts or peers to ensure objectivity to counter criticism of "old boy networks," and to allow different points of view to be represented. Also the criteria on which technical programs are judged are broader than the quality of the science and technology. Increasingly evaluative criteria include questions of relevance, impact and management practices.

Characteristics of the Sandia and Sandia/NREL Reviews

Sandia completed two separate reviews for the pilot. The Pulse Power program held an expert review in Spring 1996, since its program needs could not wait for the official start of the Technical Review Pilot. The Solar Thermal Electric Program, joint with NREL and part of the new virtual Sun*Lab, held an expert review in January 1997 in conjunction with the semi annual DOE program review. These two programs are different and their motivations for review and the review process itself were different, as summarized in Table 1 below. The differences may provide additional insight into recommendations for ways to improve the review of DOE's multi-faceted technical programs.

Objectives of both Sandia pilots were to

- develop a more effective review process,
- minimize time spent in preparation and presentation but maintain a quality process
- reduce review costs,
- increase joint review planning with DOE,
- utilize the four DOE performance criteria,
- (for Sun*Lab) investigate ability of an expert panel to provide a high quality review by participating in two day annual review already scheduled by the program office.

The Programs and Their Motivation to Review

The two programs are similar in size, both with budgets between $20 and $25 million dollars per year. The Pulse Power review concentrated on a single technical area of fundamental research, pulsed power-based programs, in a single laboratory, Sandia, and the focus was to evaluate the technology status and plans in light of the DOE Science-Based Stockpile Stewardship program requirements. The issue of great interest to the program was programmatic, that is, demonstrating the relevance of the program to the DOE mission. In contrast, the Solar Thermal Electric program review was a regularly scheduled programmatic review of all facets of this research, development, and demonstration program. In addition to management complexity because the program is co-implemented by Sun*Lab, the program has extensive collaboration with industry. The Solar Thermal Electric program was being a "good citizen" to participate, and was under the impression that the issues and give-and-take discussion of interest to them during their regular semi-annual review, with an additional one-half day on management issues, could be addressed with an expert panel session present.

The Review Process

Both expert panels were chosen to represent a broad array of relevant technical and management experience, with persons who nevertheless could be counted on to provide objective opinion on the process, progress, and success of the programs. The Pulse Power Program was in a phase of rapid transition to a new technical approach that was giving huge performance advancements and providing intense competition to approaches under consideration at other laboratories. There were 16 reviewers for the Pulse Power program who were broken into sub panels to review specific technical aspects of the program. In contrast, given budget constraints and different program needs in a relatively stable environment, there were five reviewers for the Solar Thermal Electric program who necessarily functioned as one group. The Pulse Power reviewers were not pre approved by DOE prior to the review because there was a very short time period, but there is no reason to believe they would not have been approved. In fact, the panel included some direct DOE participation. The characteristics of the Solar Thermal Electric panel were approved by DOE and recommendations of the American Society for Mechanical Engineers (ASME) were sought.

An outside contractor managed the Pulse Power review while the Solar Thermal Electric program managed its own review. Four groups took one of the DOE criteria each and scored the entire Pulse Power program on that criteria. At the request of the Headquarters program manager, the Solar Thermal Electric program was reviewed in five segments: Power Tower Systems, Dish/Engine Systems, STE Systems Analysis and Advanced Research, Test and Research Facilities, and Program Management. All four criteria were applied to each segment as well as to the program as a whole. Each review committee

member reviewed an individual program segment, and the group evaluated the program as a whole.

In addition to applying the four criteria the review committees were asked to assign a numerical score consistent with word descriptors ranging from unsatisfactory to outstanding. Strengths and weaknesses were to be provided. Both panels presented preliminary findings in exit interviews with laboratory and DOE managers and had final written reports of the review findings.

Table 1. Characteristics of Program Reviews

Characteristic	Pulse Power	Solar Thermal Electric
Program Size	$20M	$24M
Complexity	single laboratory with limited, but increasing, collaboration	two labs, "Virtual" implementation with industry involvement
Where on research spectrum	research and application to weapons performance	research, development, and demonstration
Area of R&D reviewed	single technical focus, defense-related with some "pure" research interest	research and development, four applied energy technical areas plus program management
Previous reviews	infrequent, high cost, expert review, and annual reviews by DOE program office	semi annual reviews by DOE program office, an expert review in 1992
Review Structure	expert panel review	semi annual program and expert panel review
Panel number, expertise	16, technical with management experience, some with specialized knowledge	5, technical and managers of technical programs
Primary issue of Review	relevance of program to mission and ways to improve mission accomplishments	expert opinion on program direction and effectiveness
Review materials	presentations, tour, conversations with technical staff	strategic and operating plans, self assessment, customer survey, presentations, tour
Evaluation criteria	four DOE criteria, each group addressed one	four DOE criteria, each person addressed all four

Review Criteria

Both reviews used the criteria defined by DOE for evaluating performance during annual laboratory appraisal of performance. These criteria were developed with input from industry and research stakeholders particularly for performance based contracts. The Pulse Power program provided a three page letter from the DOE official that oversees Sandia's program performance describing the four criteria in some detail, while the Solar program provided specific questions of interest to them under each of the four criteria based on the same three page DOE document. The criteria, with very brief descriptions

of the aspects included in each, are as follows:

- Quality of the Science, Technology and Engineering: quality as judged by peers and sustained achievement in advancing knowledge, emergence of innovative technologies.

- Relevance to DOE Mission and Other National Needs: supports specific program thrusts, is having an impact on science, or the economy or the environment.

- Program Performance and Management: priorities are established, progress documented, milestones met

- Operation of Major Research Facilities: fiscal responsibility, usage, satisfaction of customers.

Analysis Of The Two Pilot Reviews

Analysis of Sandia and Sandia/NREL technical review pilots was done using three sets of information: Observation of each review, analysis of survey results from about a third of the participants and users of review results, and exit interviews and informal comments after the review.

The objective of the evaluation was to assess the
- strengths and weaknesses of elements of the review process,
- usefulness of the review criteria,
- outcome and value of the review, and
- overall satisfaction and suggestions for improvement.

About one third of the participants, 28 persons in all, returned the mail survey sent by the authors shortly after the Solar Thermal Electric review and 8 months after the Pulse Power review. 12 of the respondents had participated in Pulse Power review and 16 in the Solar Thermal Electric review. To see how representative the respondents were of all the participants, we looked at respondents' role in the review itself, their relationship to the program, and roles played in the program being reviewed. We concluded that respondents were a fairly representative mix. Half of the respondents were presenters, 9 were reviewers, 7 were users of review findings, and 3 were observers, with some having more than one role. Twenty of the 28 respondents were directly involved with the programs, either as sponsors, laboratory program staff, or industry collaborators, a fact that demonstrates knowledge of the program but also a "stake" in the outcome of the review. Finally, about half of the respondents were researchers and the other half were managers, sponsors, users and collaborators of program facilities and services.

The Review Process:

Figure 1 shows what survey respondents thought about how well the review purpose was defined, whether the right mix of reviewers was used, the degree of collaboration between DOE and field, the amount of customer input available to the reviewers, and whether access to staff was easily obtained by the reviewers. The bar indicates the average response, with agree a "5" and disagree a "1". There was a standard deviation of about 1.0 for most answers.

The Pulse Power respondents were very pleased with definition of the review purpose, in contrast to the Solar Thermal Electric program which on average neither agreed nor disagreed that the review purpose was well defined. Solar Thermal Electric respondents were also less convinced the right reviewers were chosen. Some thought the team was excellent, mentioning they were open, honest, unbiased, and provided a diversity of perspectives that really helped understand the program and its future. Others thought the reviewers were not top quality, therefore the review was not top quality. Customer input and access to staff were rated very good in both, while DOE and field collaboration, an objective of the pilot, was one of the least well done of all the elements for both reviews.

FIGURE 1
Elements of the Review Process

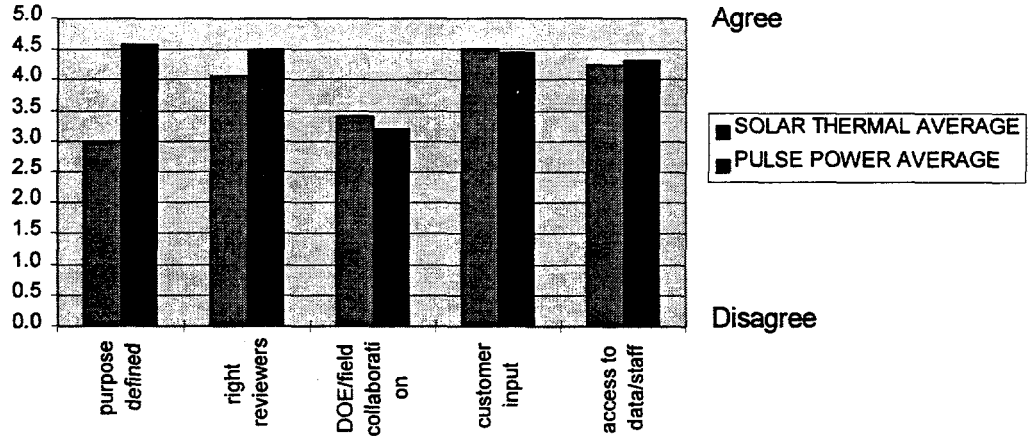
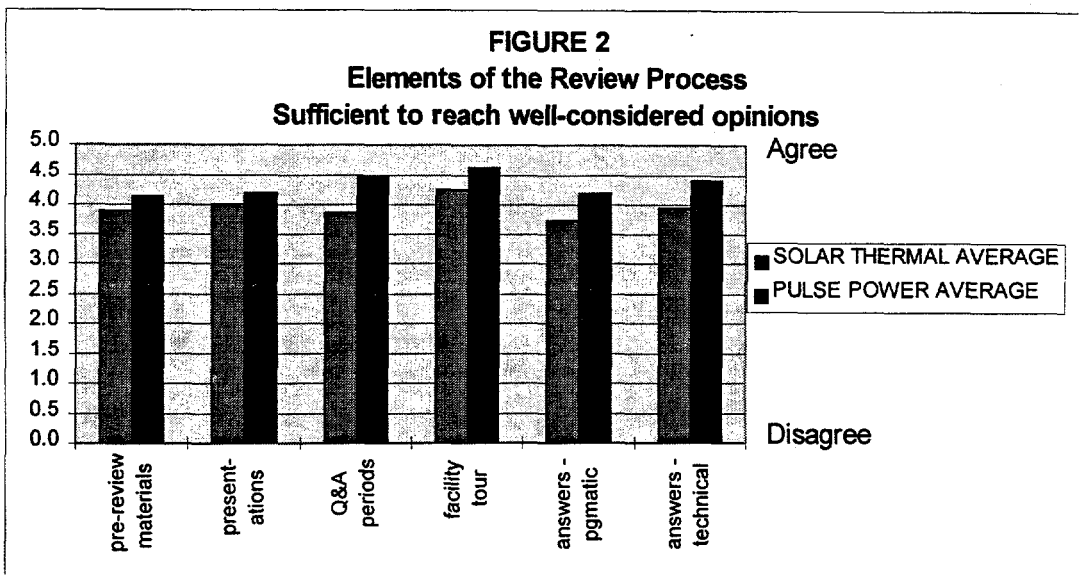
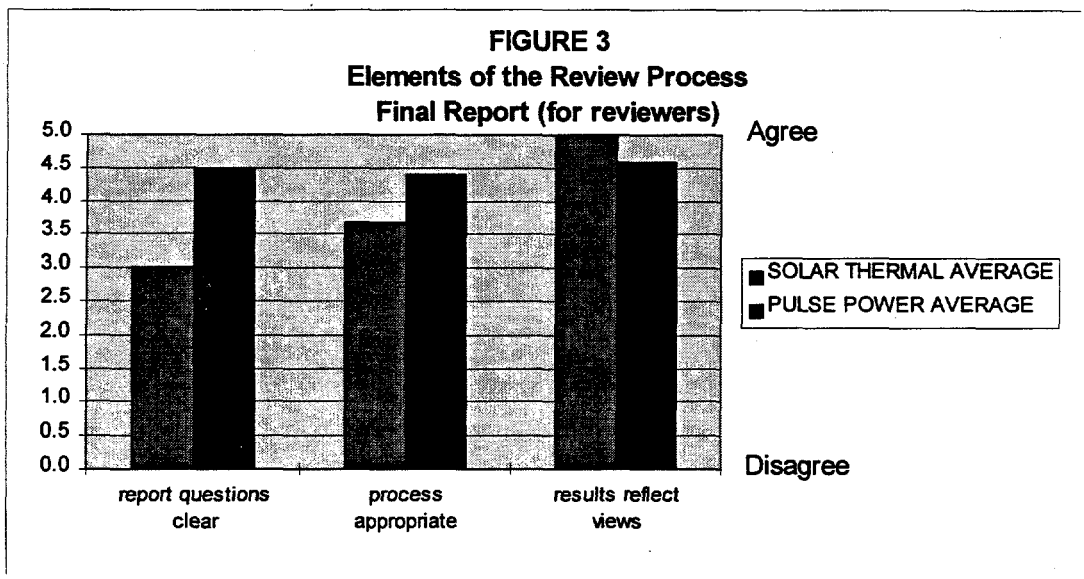


Figure 2 shows opinions on more of the elements of the review process: pre-review materials, presentations, questions and answer (Q&A) periods, facility tours, answers to programmatic questions and answers to technical questions. Pulse Power respondents scored their review higher in every category but both reviews scored high. Not shown here are the logistics of the reviews. Neither review had difficulties with travel arrangements or entry to classified facilities.



Reviewers were also asked to evaluate the final report process. As shown in Figure 3 both panels thought the final report reflected their views. There was slightly less agreement that the review report process was appropriate. The Solar Thermal Electric respondents did not agree that the report questions were clear or unclear, while almost all Pulse Power respondents agreed the questions were clear.



Strengths of the Pulse Power review process mentioned in an open-ended survey question were (1) the credentials of the committee - all were senior DOE and DOD managers who either have major responsibilities in area of concern, or by virtue of past assignments extensive knowledge of the nuclear program, and could judge the utility of the Sandia Pulse Power program; (2) openness of discussions and quality of technical presentations, (3) and the responsiveness of the Sandia presenters and the committee members during preparation of the review report. For Solar Thermal Electric, strengths were (1) good selection of reviewers with broad, diverse knowledge and experience base (not all agree

with this), (2) the review team was small enough to interact well but didn't have a lot of undesirable overlap, (3) the DOE/Laboratory partnership, (4) the opportunity for candid assessment of program strengths and weaknesses, and (5) the willingness of staff to share information.

Weaknesses of the survey process mentioned by at least one Pulse Power participant were that the review focused on top-level issues only and thus had limited technical depth, and there was not enough time for the review process. Some Solar Thermal Electric participants also thought the time frame for formulating their review comment was short. One thought the reviewers should present their results to the staff so the staff can have direct feedback. Another suggested cutting down on the amount of information presented during the review.

For the Solar Thermal Electric review the most often mentioned weakness was the conflicting needs between the internal semi-annual review and the external review. The review did not address the issues of programmatic progress needed for the semi annual review. The two purposes confused the review team to some degree. One reviewer thought the combination meant the presentations were too technical, another that questions from the review panel did not adequately cover technical issues usually covered. One suggested that the panel went well beyond the scope of the review and presenters were not prepared, nor should they have covered some of the questions asked. A suggestion was to separate the reviews, splitting external from internal review. You could have the panel attend the technical review, and then convene to direct questions based on what was presented.

Program managers for each review reported costs of the review. The Pulse Power review took considerable time in preparation but less in presentation than previous reviews, and the preparation was judged useful by senior managers. The manager of the Solar Thermal Electric review stated that the preparation time was about the same, and the review was one-half day longer than the typical semi-annual review in order to add necessary background on the program for the review panel. An additional review to replace the technical semi-annual review may be needed which would negate the savings from one review instead of two. Obviously, the more reviewers the more expense, and having a contractor manage the review and draft the report for the review panel, as was done for Pulse Power, adds to the expense.

The Review Criteria

Figure 4 shows respondents' overall opinions of the four DOE criteria used to evaluate their programs. Pulse Power was slightly more positive about the definition and usefulness of the criteria than the Solar Thermal Electric respondents. Pulse Power found the combination of program and technical criteria useful and more than four out of five agreed that the criteria were realistic for assessing the program overall. One called the combination a "stroke of genius", another a quantum step improvement over past technical-only reviews. The Solar Thermal Electric respondents appear to be more

neutral in their satisfaction with combining the two types of issues within one review with average agreement of 3.2. This average has the largest standard deviation of any question on the survey, indicating strong feelings both for and against combining technical and programmatic criteria.

FIGURE 4
DOE Review Criteria

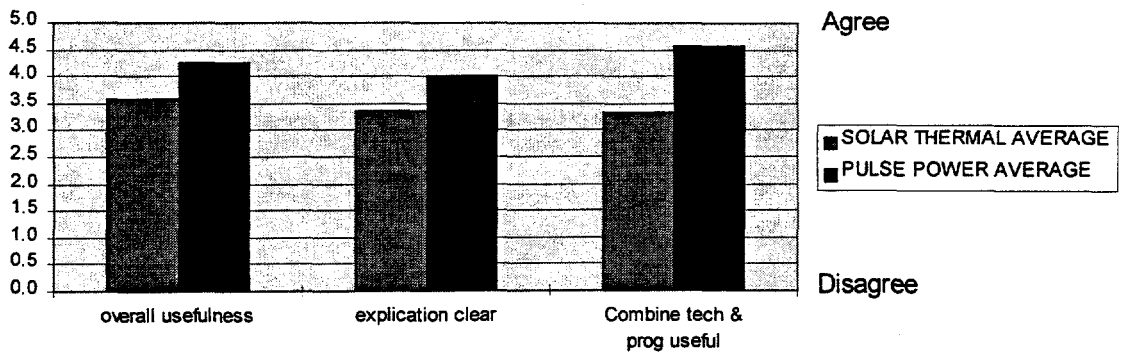
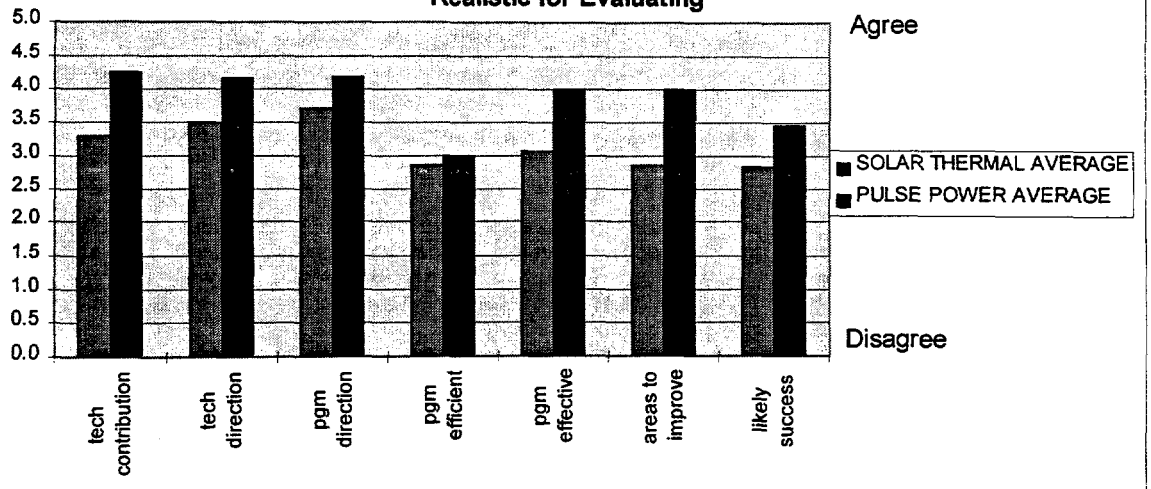


Figure 5 shows opinions on how realistic the four DOE criteria were for assessing the following seven aspects: technical contribution, technical and program direction, program efficiency and effectiveness, determination of areas to improve, and likelihood of program success. For five of the seven aspects that were reviewed, Pulse Power rated agreement that the criteria were realistic for judging as 4 on a 5 point scale, compared to Solar Thermal Electric which rated all but one aspect less than 3.5. There was a broad range of opinion on the review criteria for both programs, however, with some expressing dissatisfaction with them. Neither program thought the criteria did as well at determining program efficiency as they did other aspects. There was more agreement among Solar Thermal Electric participants that the criteria were useful for programmatic questions than for technical questions, particularly technical contribution.

FIGURE 5
Review Criteria
Realistic for Evaluating

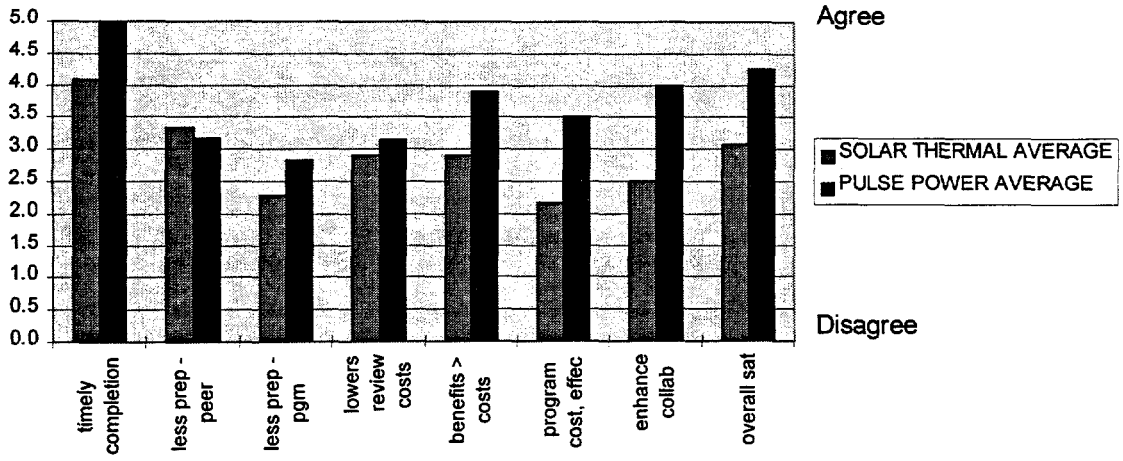


A few concerns about the criteria and their application were expressed in survey and informal comments. While some of the Pulse Power participants thought providing these criteria really helped focus the committee on important issues, others felt the four criteria were far too broad and vague to be addressed directly, or were not objective enough to measure. One suggested that DOE provide guidelines or standards for the application of the measures. Others suggested that while the criteria were appropriate and worthy questions, they should not be used to the exclusion of other criteria. Which level of decision maker can judge criteria such as relevance was also questioned. One commented that the review content did not address these topics uniformly.

Review Outcomes and Value

Figure 6 below shows the responses to survey questions on outcome and value of the review. The figure shows that the Pulse Power participants were more satisfied with the review process overall than were the Solar Thermal Electric participants. While both thought the reviews were completed in a timely fashion, most Pulse Power participants agreed with the statement that the benefits of the review outweighed the cost and the Solar Thermal Electric participants neither agreed nor disagreed with the statement. Neither saw the review as either lowering program cost or increasing efficiency, but the Pulse Power participants were agreed that the review resulted in enhanced collaboration. Solar participants disagreed that the review was less costly than previous program reviews, but were neutral in comparing costs to previous peer reviews.

FIGURE 6
Outcome and Value of the Reviews



Strengths cited by Pulse Power survey respondents were that the review required preparation that served to focus program thinking about the future, forced internal thinking and prioritization, and provided immediate feedback to Sandia programs from an outside point of view. The review brought attention to high level in DOE, DOD, and the laboratory regarding review conclusions, and showed where the program fit in the larger DOE program, accomplishing the initial motivation for the review. Examples of decisions that would be influenced by the Pulse Power review include (1) program technical balance with Sandia, (2) program linkages increased with other laboratories and initiatives, (3) program focused more on meeting customer needs, (4) enhanced understanding by DOE headquarters of the role of Sandia pulsed power in its overall mission, (5) downsizing the ion project while increasing z-pinch effort, and (6) whether and how to proceed with development of a radiation facility for stockpile stewardship.

For the Solar Thermal Electric Program, the review helped people take a fresh look at the program from state and national points of view. Senior managers found the validation of the program by objective parties with diverse viewpoints extremely valuable and thought comments well reflected the balance of the program. One observer of many Sandia reviews said that this was the richest review he had seen. Most of the review panel advice dealt with programmatic rather than technical issues, in part because the workings of the virtual Sun*Lab laboratory and difficulties experienced on one of the larger projects captured the panels attention.

Overall Satisfaction with the Review

As shown in more detail in Figure 6 the Pulse Power program review participants were more satisfied overall with the review than were the participants in the Solar Thermal

Electric Review, judging on responses to the survey and informal data collected after the reviews. The exit interview for Solar Thermal was, however, more positive about the outcome of the review than the survey showed. The drivers of satisfaction and dissatisfaction appear to be associated with the review producing benefits greater than costs, the usefulness of combining review of technical and programmatic success, and the extent to which the purpose and scope of the review were clear. 10 of 11 Pulse Power survey respondents would recommend this review process to others. Only half of the Solar Thermal program would recommend the process to others, stating they would recommend this type of review for expert peer review but not as replacement for semi annual technical program review.

Recommendations for Improvements:

Based on our analysis of informal and survey data on the review process, criteria, and outcomes of the pilot reviews of two different technical programs at Sandia National Laboratories, the authors make the following recommendations to the Laboratory and the Department of Energy:

Review when the program has specific need for information or validation, and make this purpose and scope clear throughout the process. Periodic review is good. It forces introspection and provides opportunity to inform outsiders of work and plans. When the focus is on helping make impending and timely decisions, the reviews will be useful for both program improvement as well as accountability. There is no "one size fits all" correct time or reason to review technical programs. One might usefully apply a set of criteria to determine when reviews are desirable because guidance is needed or necessary because "risk" is high. The criteria could include aspects such as rapid program growth, changes in personnel, level of visibility, and size of opportunity or vulnerability.

Tailor the four DOE criteria to the program and its need for information. The DOE criteria are useful, but need to be used with careful explanation and an emphasis that matches the motivation for the review. If the program being reviewed does not provide this explanation and emphasis, the review panel will spend time on the task that might be better spent on the review itself.

Pay attention to the review process, including the careful selection of reviewers, expectations for the review, and feedback on results of the review. Spend more time in preparation and pre-review reading, less in presentation, and more in questions. Extensive briefings on the review outcomes to program customers and staff appears to be very useful.

Evaluate reviews to determine how to do them better. At least until we learn how to better review technical programs in this changed climate where both programmatic and technical criteria are important, evaluations such as the DOE Technical Review Pilot and the evaluation presented here of the Sandia pilots are worthwhile.

We encourage others to modify the survey in the Appendix for their purposes and to communicate results with us and others who are interested in improving technical review and thereby our technical programs.

This review is included as part of a Technical Review Pilot Program carried out by the U.S. Department of Energy and some of its laboratories. Through the Pilot Program we seek information that can be applied widely in the DOE to improve effectiveness of reviews. Your answers to the questions below and any additional comments you may wish to provide will be very useful in this quality enhancement process. The distribution of this survey is quite small, and 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, even though such comments may not be specifically solicited.

Thank you in advance for taking a few minutes to provide your input by responding to the items that you believe apply to your role in the review.

Please return to Gail Hughes , MS-1367, at Sandia before February 21, 1997.

Sincerely,

Glenn Kuswa, MS-0127, Sandia Dept. 4231, 505-844-6015
Gretchen Jordan, MS-0749, Sandia Dept. 6217, 703-247-3611

If you would like a compilation of conclusions and recommendations to be derived from this Pilot Review and Program please so note here and supply your address. Results will be available in March 1997.

____ Yes, send me conclusions from the Pilot Program.

Send to: (Your name and address)

_____

_____

_____

_____

ELEMENTS OF THE REVIEW PROCESS

A-1	Purpose and scope of review were well defined.	*disagree* *1 2 3 4 5* *agree*	*N/A*
A-2	The reviewers had proper mix and depth of credentials for the purpose of the review.	*disagree* *1 2 3 4 5* *agree*	*N/A*
A-3	Collaboration between DOE headquarters, field office and program office in planning the review was more than in previous program or peer reviews.	*disagree* *1 2 3 4 5* *agree*	*N/A*
A-4	The quality, breadth, depth, and presentation of the following was sufficient to reach well-considered conclusions:	*disagree* *agree*	
	1. Pre-review materials	*1 2 3 4 5*	*N/A*
	2. Presentations	*1 2 3 4 5*	*N/A*
	3. Question and answer periods	*1 2 3 4 5*	*N/A*
	4. Facility tour	*1 2 3 4 5*	*N/A*
	5. Answers concerning programmatic questions	*1 2 3 4 5*	*N/A*
	6. Answers concerning technical review questions	*1 2 3 4 5*	*N/A*
A-5	There were problems with:	*disagree* *agree*	
	1. Classification	*1 2 3 4 5*	*N/A*
	2. Proprietary data	*1 2 3 4 5*	*N/A*
	3. Citizenship	*1 2 3 4 5*	*N/A*
	4. Facility access.	*1 2 3 4 5*	*N/A*

ELEMENTS OF THE REVIEW PROCESS (continued)

For Reviewers: (Others may answer)

A-6	Customers of the program under review were identified and input from those customers was considered in the review.	*disagree*	*1*	*2*	*3*	*4*	*5*	*agree* *N/A*
A-7	Reviewers had adequate access to research staff or other sources of additional data, if desired.	*disagree*	*1*	*2*	*3*	*4*	*5*	*agree* *N/A*
A-8	When considering the final report:	*disagree*						*agree*
	1. Questions to be addressed were clear.		*1*	*2*	*3*	*4*	*5*	*N/A*
	2. Process for developing final report was appropriate.		*1*	*2*	*3*	*4*	*5*	*N/A*
	3. Result was/will reflect the views of the reviewers.		*1*	*2*	*3*	*4*	*5*	*N/A*
A-9	Travel arrangements and amenities were satisfactory.	*disagree*	*1*	*2*	*3*	*4*	*5*	*agree* *N/A*

What was the greatest strength of the review process?

_____

_____

_____

What was its greatest weakness?

_____

_____

_____

Comments on the review process:

_____

_____

_____

REVIEW CRITERIA

B-1 The four criteria upon which the review was organized were realistic for evaluating the program for--

	disagree				*agree*	
1. Overall performance	*1*	*2*	*3*	*4*	*5*	*N/A*
2. Technical contribution	*1*	*2*	*3*	*4*	*5*	*N/A*
3. Technical direction	*1*	*2*	*3*	*4*	*5*	*N/A*
4. Program direction	*1*	*2*	*3*	*4*	*5*	*N/A*
5. Program efficiency	*1*	*2*	*3*	*4*	*5*	*N/A*
6. Program effectiveness	*1*	*2*	*3*	*4*	*5*	*N/A*
7. Areas for improvement	*1*	*2*	*3*	*4*	*5*	*N/A*
8. Likelihood of success	*1*	*2*	*3*	*4*	*5*	*N/A*

B-2 Explication of the questions within the four criteria was clear and sufficient.

disagree *1 2 3 4 5* *agree* *N/A*

B-3 Combining review of technical and programmatic success improved the usefulness of the review for me.

disagree *1 2 3 4 5* *agree* *N/A*

Any added comments would be particularly useful here because the four criteria are expected to be broadly used for the review of DOE technical programs. To remind you, the criteria were:

*Quality of science and technology
*Programmatic performance and management
*Relevance to national needs
*Science and engineering value of major facilities

OUTCOME AND VALUE OF THE REVIEW

C-1 The review was completed in a timely manner. *disagree* *1 2 3 4 5* *agree* *N/A*

C-2 The review took less time in preparation and presentation: *disagree* *agree*

1. Than previous peer reviews *1 2 3 4 5* *N/A*
2. Than previous program reviews *1 2 3 4 5* *N/A*

C-3 This process for review reduced costs for the review. *disagree* *1 2 3 4 5* *agree* *N/A*

C-4 The benefits of the review outweighed the cost. *disagree* *1 2 3 4 5* *agree* *N/A*

C-5 The review will lower program cost or enhance program efficiency. *disagree* *1 2 3 4 5* *agree* *N/A*

C-6 The review will result in enhanced collaborations. *disagree* *1 2 3 4 5* *agree* *N/A*

C-7 The review will influence program decisions. Please give examples of decisions that may be influenced.

_____

_____

_____

C-8 Overall, how satisfied are you with the review process? *very unsatisfied* *5 4 3 2 1* *very satisfied* *N/A*

C-9 Would you recommend this review process to others and apply it to other programs? *yes* *no* *N/A*

C-10 How would you improve the review process? Please explain:

_____

_____

_____

DEMOGRAPHIC QUESTIONS

D-1 What was the context of your role in the review? (may check more than one)

__ Reviewer on the review panel
__ Observer (attended the review, but non-participant in review process or presentation)
__ Presenter directly representing the program under review
__ Presenter representing collaborators with program being reviewed
__ Steering group for the review process
__ User of the review findings
__ Other (please state) _____

D-2 What is your affiliation?

__ Government agency directly sponsoring the program under review
__ Government agency with interest in the sponsored work
__ Academe
__ Industry directly involved in the program under review
__ Industry with interest in the work under review
__ National or other government lab whose program is under review
__ National or other government lab not being reviewed
__ Other (please state--consultant, retired employee, public, etc.) _____

D-3 What is your usual occupational relationship to the program?

__ Researcher employed in the program at the lab being reviewed
__ Lab official above the level that oversees the actual conduct of R&D
__ Sponsor of the research, such as government program manager or senior official
__ Facility user, partner, or collaborator with the lab program being evaluated
__ Other: _____

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