PEER REVIEW GUIDELINES FOR ARS PANEL CHAIRS AND REVIEWERS

United States Department of Agriculture

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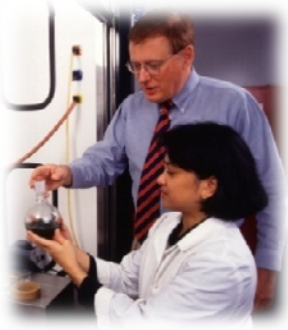
Thank you for agreeing to serve as a peer reviewer for the Agricultural Research Service Office of Scientific Quality Review (ARS, OSQR). ARS Peer Review is a unique process. While bearing some resemblances to competitive review there are important differences. These Guidelines provide an overview what is expected of peer reviewers, and how the process works.

Before beginning review, you are urged to read these guidelines. Please feel free to contact the OSQR staff if you have questions.

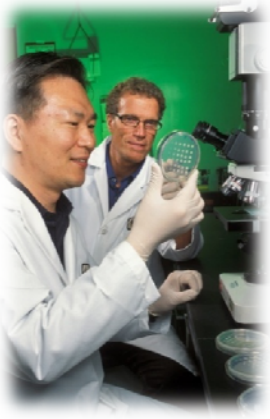
March 2014

ARS is grateful to these very busy and accomplished individuals for their service as Scientific Quality Review Officers (as of 2011, terms begin and end with the fiscal year).



Stephen O. Duke,
1999-2000

Steven C. Huber
2000-2001



Bruce Campbell (right)
2001-2002

Frank Greene
2003-2004

Jerry L. Hatfield
2005-2006

Thomas (Ed) Cleveland
2007-2008

Donald P. Knowles (left)
2009- 2010

David Marshall
2011

Joyce Loper
2011-2013

Michael Grusak
2013-2015

Peer Reviewer Guidelines for ARS Project Plans

Peer review of Agricultural Research Service (ARS) research was mandated by the 1998 Farm Bill (The Agricultural Research Extension, and Education Reform Act of 1998, Public Law 105-185). The Act calls for external reviewers to consider the scientific merit of research, its relevance in relation to established priorities, and its national or multistate significance. The review focuses on the technical quality of a proposed 5-year research plan. Reviewers are chosen for their relevant scientific expertise with the majority being from academia. They may, however, include individuals from other agencies, industry, or the non-profit sector.

ARS Project Plans

ARS projects address intramural research needs. They are intended to address specific needs, problems, or challenges rather than being "curiosity driven." Frequently they examine applied questions and issues of more immediate need to agriculture. Work is often long-term, and while direct application may not be immediate, the work is ultimately intended to address specific agricultural needs or concerns.

Plan objectives are NOT investigator-generated, but rather are assigned to research teams as part of the coordinated, problem-solving effort of the ARS National Program to which the investigators are aligned. The goals of the National Program are described in a 5-year Action Plan (these are provided to reviewers and available for each National Program at www.ars.usda.gov/research). Thus, plan objectives may set forth issues or goals that are not fully encompassed by the research. Plans, therefore, generally present subobjectives that are developed by researchers to provide more precise focus to the project.

This is NOT a competitive review, in which plans are ranked against one another to determine which will receive funding. Researchers know the resources that will be available if the plan is approved and are instructed to prepare an appropriately suitable plan. Internal review before the plan comes to review assures that the plan is within the established funding guidelines. It is the responsibility of reviewers to assess the suitability of the plan to address the stated objectives and subobjectives and, where appropriate, make recommendations for enhancement or improvement.

It is important to reiterate that ARS project plans are funded pending successful completion of review. *Successful completion of review is an absolute prerequisite prior to the release of funding and execution of the work.*

Plan Structure

ARS Project Plans are, in general, more wide ranging and somewhat less detailed than the competitive plans with which reviewers may be familiar. Page limitations coupled with the inclusion of several related, but independently functioning objectives can make detailed descriptions of work expected over five years to be constrained. While reviewers

may not find fully detailed procedures, the plan is expected to contain sufficient information to provide confidence that the research team has a clear understanding of the problems and the technologies elaborated in the plan.

Projects typically contain three to five objectives and can encompass the work of several scientists or engineers. Objectives may be diverse, involving an array of issues and may include several cooperating investigators. Thus, plans do not have the narrow focus more typical of a focused competitive grant proposal. It is not unusual to have several researchers who appear to be doing individual, but related research projects within a single plan (with, for example, each responsible for a single objective). The plan should, however, provide guidance in its early pages as to how the group of objectives and research threads relate to one another.

Occasionally, one or more objectives within a plan may appear to be significantly outside the scope of the rest of the work. For example, a plan dealing with poultry processing technologies may contain an objective addressing vegetable processing because of a similarity in engineering issues rather than a common commodity focus. It is not unusual to find a seemingly "independent" objective that is not well integrated with the rest of the plan. In such cases, the plan should clearly convey that this component, while part of a larger plan, is designed to proceed independently.

Objectives frame problems that may be broader than the work presented or that have a completion horizon longer than five years. Thus, research while being *within* the scope of an objective may not fully encompass it. Resources may permit only a portion of the broader work to move forward. Further, the breadth of objectives allows research teams to develop plans within a set of objectives that are more closely aligned with their expertise.

All plans contain similar content elements but may be adjusted to accommodate the breadth and degree of independence of objectives. Thus, for example, where objectives are strongly independent of one another and grouped in a plan solely because they share a general research area, the background and approach sections may be grouped by objective so as to present a more coherent understanding of each research focus within the plan. A generalized outline of the major plan elements is presented in Figure 1.

Can panels edit or redirect objectives?

Research may address identified problems rather than "cutting edge" issues. Objectives (but not subobjectives) are developed in response to established need as outlined in the Action Plan for each National Program. Researchers are not permitted to redirect research, but are required to develop their plans in response to the stated objectives. Reviewers are asked, therefore, to treat objectives as assigned.

Figure 1. Elements of a Project Plan

While some departure from precise form is permitted, all plans should contain the following elements.

Cover Page. Includes the title of relevant National Program, Research Project Number, Research Management Unit and Location, Project Title, investigator(s) and their time (in "SY", Scientist Years), and the planned project duration.

Signatures. Indicate internal concurrence on the plan and its' readiness for review.

Project Summary. A brief description of the goals, procedures, expected outcomes, and significance of the research.

Objectives. A statement of the assigned objectives along with a description of how these integrate into the overall project. Assigned objectives may represent long term or general goals that permit latitude in the focus of research programs.

Need for Research. Describes the relevance to the ARS National Program Action Plan, the primary benefits of the research and its potential benefits.

Scientific Background. A gap analysis that should focus on relevant current literature and technology highlighting the knowledge needs intended to be addressed by the plan. May include preliminary results; coordination with other research; and applicable Congressional or Executive mandates.

Approach and Research Procedures. Describes goals/objectives, hypotheses, experimental design, and procedures. It should include contingencies as well as collaborators with clear description of their role (confirmed by letters in the appendix).

Physical and Human Resources. A brief description of the resources available to the project (i.e., facilities, major instrumentation and equipment, etc.); and, personnel not noted on the title page (technicians, postdocs, students, etc.).

Project Management and Evaluation. The plan for coordinating the research is especially important for large projects.

Milestones and Expected Outcomes. This summarizes the project and presents a timeline, milestones, and outcomes.

Accomplishments from Prior Project Period. A summary of the relevant accomplishments from recent and related ARS research.

Literature Cited. Any consistent format is permitted that includes all authors, article title, and page numbers.

Past Accomplishments. For each researcher, a brief summary is provided of their background with emphasis on accomplishments over the past 10 years that are pertinent to the proposed research; including a list of up to 20 relevant publications.

Issues of Concern Statement. Safety, health, environmental, and intellectual property requirements under 10 sets of laws are set on all ARS projects and where relevant noted here.

Appendices. These may include letters of collaboration as well as other supplementary materials.

What if one objective is weak?

While not common, there are times when an otherwise strong plan contains an objective or subobjective that is weak or poorly described. In such cases it is the task of the panel to weigh this against the other parts of the plan in coming to a final score. Such a plan may score high with specific recommendation to address or eliminate the weakness or, alternately, may score low if it is felt that the weakness seriously jeopardizes the strength of the rest of the plan.

Peer Reviewers

Knowledgeable reviews are the cornerstone of this process. Thus, we work closely with panel chairs in the selection of their reviewers and to assure that the nature of plans and what is expected of reviewers is clear. The Agency is strongly committed to maintaining the strength, integrity, and independence of its review process.

Orientation. Panels receive an online briefing on the process and their responsibilities. The relevant National Program Leader also may provide an overview of the National Program. The staff of the OSQR is also always available to address further questions.

Confidentiality. ARS project plans may include detailed information about research strategies and existing or anticipated research results. *The Agency considers research plans, review documents, and review discussions to be proprietary information of a confidential nature.* Thus, all participants sign a Confidentiality Agreement before receiving materials for review. The Agreement is a legally binding document. Under penalty of law reviewers may not copy, quote, or otherwise use material gained during the Peer Review Process. Reviewers may not disclose or discuss information in project plans with colleagues or others. **At the conclusion of the review, all electronic or paper copies of plans and associated materials must be erased or destroyed.**

Anonymity of Reviewers. Panel chairs are publicly known. Their written statements on a panel's experience become part of a publically available report. However, the other panelists are anonymous and their identities are treated as confidential. ARS does not publish a year-end or similar summary list of reviewers. Panelists are asked to respect the anonymity of their fellow reviewers both during and after completion of review.

Conflicts of Interest. All potential reviewers are examined for conflicts of interest. However, reviewers may realize potential conflicts that were not evident before their assignment to a panel. Reviewers are asked to alert the OSQR should they feel that there is a potential issue. Conflict of interest guidelines encompass four general areas. It is stressed that these are general guides and specific circumstances may preclude an issue being a source of conflict.

Collaboration: Planning and/or conducting of joint research or coauthorship of publications or grant applications within the past four years. Employee relationship within the last 4 years.

Student/Mentor Relationship: An undergraduate, graduate, postdoctoral advisor, or similar relationship within the past eight years.

Institutional Affiliation: Sharing the same institution with the researchers, particularly if from the university or college department with which the ARS researchers are affiliated.

Financial Gain: The potential to receive direct financial gain or the holding of financial interests that are affected directly by the research.

Writing Project Plans

When preparing plans, researchers receive extensive guidance on proper formatting and composition of plans. The overriding emphasis is for a clear, concise, and easily-read document. The guidelines are summarized in Figure 1. Further detail may be found in the Peer Review Handbook available at http://www.ars.usda.gov/osqr. While these reflect the usual format, researchers are permitted to alter the organization if they believe it will improve the clarity of the document.

Page Limits. Project plans are subject to page limit guidelines based on the full time equivalent ("SY" in ARS parlance) of researcher time devoted to the work (as noted on the plan cover page).

2 or fewer SY = 15 pages
2-3.9 SY = 20 pages
4-6.9 SY = 25 pages
7 or more SY= 30 pages

These page limits apply to the sections "Objectives" through the "Approach and Procedures". Up to the equivalent of an additional four (4) pages is allowed for figures and tables. Conformation to this is monitored by Areas before submission for review. All plans provided to reviewers have been approved with regard to their page lengths.

The Review Process

The ARS review is more analogous to review of a manuscript than a competitive grant application. While all plans receive an overall Action Class Score, it is the comments and recommendations from review panels and the requirement that these be addressed by research teams which make this process unique.

The Scientific Quality Review Officer (SQRO) functions much like a journal technical editor, assuring thorough and complete response to reviewer concerns. Within this analogy the panel's results may be seen to fall within three broad areas.

1. **No Revision Needed.** Similar to the recommendation of a reviewer that a paper be published as presented. There may be recommendations for future consideration but nothing is needed to be added or changed for the plan to move forward (certified).

2. **Minor or Moderate Revision Needed.** Essentially this is an editorial monitoring of revision. There are some things that need to be add-

ed or addressed, but the panel is confident that there is adequate overall expertise and understanding, and the SQRO--like a technical editor—can monitor and assure that these are addressed before certifying the plan.

3. **Major Revision or the plan is Not Feasible.** The panel needs to review the plan again after the issues identified have been addressed. Thus, there is *less confidence* or clarity on how the researchers will respond to the panel's concerns. Plans remaining at this level after revision fail review.

In summary, for Action Class Scores of No, Minor, or Moderate Revision, the SQRO assures that review comments and recommendations are completely and thoroughly addressed before certifying the plan; or (rarely) they can decline to certify the plan (failure) in the event that it is concluded that identified issues cannot be satisfactorily resolved.

For those plans scoring Major Revision or Not Feasible, the panel will review the revised plan and researcher responses and provide a new Action Class Score. If that outcome is No, Minor, or Moderate Revision, the SQRO assumes responsibility as above. If the plan does not achieve this level, it fails review.

Reviewer Responsibilities

Each panel member is typically assigned one plan for which they serve as primary reviewer and one as secondary reviewer. Primary and Secondary reviewers both read the plan and provide detailed written comments on a form provided for that purpose. These completed reviews are requested by the OSQR 5-7 days in advance of the online panel meeting.

Each reviewer should read all the other plans for their panel, in preparation for discussion. For these other plans (those for which a panel member is not assigned as the primary or secondary reviewer) an optional Reviewer Comment Form is provided, should there be specific issues they feel should be addressed in the review. This should also be sent to the OSQR 5-7 days in advance of the online panel meeting.

Primary and Secondary written reviews will be requested by OSQR five to seven days before your online meeting.

Primary and Secondary reviews are combined into a draft Panel Recommendation Report. This is sent to the panel 1-2 days before their meeting and is reviewed and edited by the panel during the online discussion.

Traveling panels. On rare occasions a panel may travel to and meet at the OSQR offices in Beltsville, Maryland. In these cases, the Primary Reviewer prepares the final Panel

Recommendation Report following panel discussion and before departure from the meeting. In some cases the OSQR may alter this format and, if so, you will be informed at your panel briefing and in writing.

Review Criteria

Written reviews of the plans address three criteria: adequacy of approach and procedures; probability of successfully accomplishing the project objectives; and merit and significance of the work.

Adequacy of Approach and Procedures

The review should encompass:

- Whether the hypotheses and/or plan of work are well conceived.
- Whether the experiments, analytical methods, and approaches and procedures are current, appropriate, and sufficient to accomplish the objectives.
- How the approach or research procedures could be improved.

This is typically the longest portion of the review (2 to 4 pages). Reviews are organized by objective/Sub-objective and address strengths and recommendations for improvement. Consistency of this format simplifies the task of assembling a consensus draft. Guidelines for this format are on each review form.

Probability of Successfully Accomplishing the Project Objectives

This evaluation is typically briefer than the preceding section, running one to a few paragraphs, and need not be ordered by objective. The section considers the feasibility of the project including:

- The probability of success in light of the investigator or project team's training, research experience, preliminary data if available, and past accomplishments.
- Whether the objectives are both feasible and realistic within the stated timeframe and with the resources proposed.
- Whether the investigators have adequate knowledge of the literature as it relates to the proposed research.

By its long-term nature, ARS research may take on greater risk than that seen in competitively awarded projects.

By its nature ARS research may include approaches that are unusual, nontraditional or have a high risk of failure. While such creativity is strongly encouraged, plans should clearly indicate understanding of such "outside the box" approaches.

Merit and Significance

This assesses the likely impact of the research.

- Will the project, if successful, enhance knowledge of a scientifically important problem?
- Will the project lead to the development of new knowledge and technology?
- Are there other data/studies relevant to this research effort?
- If applied research, is it of value to customers or stakeholders?

Products of the Review

Following review, researchers receive an *assessment* of the whole plan, which determines how the remainder of the review process will proceed (see below). In addition, there is an *advisory* document that is the panel's consensus of the strengths, needs, and opportunities for improvement.

Action Class Score (Assessment)

The Federal Advisory Committee Act requires that OSQR receive from each panelist an independent Action Class Score representing their opinion of the plan's quality. The panel chair also provides a score for each plan. These scores are numerically averaged to determine an overall Action Class for the plan. In general, the Action Class reflects the degree of revision needed to improve the overall scientific quality of the project plan. The Action Classes are defined below (see also Appendix 1).

No Revision Required. No revision is required, but minor changes to the project plan may be suggested.

Minor Revision Required. The project plan is feasible as written, and requires only minor clarification or revision to increase quality to a higher level.

Moderate Revision Required. The project plan is basically feasible, but requires changes or revision to the work on one or more objectives, perhaps involving alteration of the experimental approaches, in order to increase quality to a higher level and may need some rewriting for greater clarity.

Major Revision Required. There are significant flaws in the experimental design and/or approach or a lack of clarity which hampers understanding. Significant revision is needed.

Not Feasible. The project plan, as presented, has major flaws or deficiencies, and cannot be simply revised. Deficiencies exist in approach, experimental design, presentation, or expertise, which make it unlikely to succeed.

Consensus Review (Advisory)

The narrative consensus review is the panel's communication to the research team. Indi-

vidual reviewer comments are not provided. This is based on the Primary and Secondary reviews, other written reviewer comments, and the panel discussion.

Writing a Review

With the plans, Primary and Secondary reviewers receive forms on which they are to place their comments related to the above three review criteria. *An email 5 to 7 days before the panel meeting will request that these completed forms be sent back to OSQR.*

To aid in preparing the final comments, the forms request a standard format for the Approach and Procedures criterion, which typically occupies the largest portion of the review document, as follows:

- Begin with one to several introductory paragraphs describing the project and summarizing the overall impression of the plan. Provide general comment on both the overall strengths and, if present, deficiencies of the plan. This should set the overall tone for the panel's consensus opinion, noting in general the strengths or weaknesses that the rest of the review will make clear. Where there are significant concerns, it is especially important to alert the reader here. Exceptional strong plans should also be acknowledged.

- By objective or sub-objective, assess the pieces of the project providing an overall assessment followed by the strengths and recommendations for improvement ("weaknesses") of the plan as presented. These comments should be sufficiently detailed to provide the research team direction as they revise their plan. You should provide guidance on deficiencies but resist the temptation to redesign the work as this is the responsibility of researchers as they respond to your review.

Some Review Tips

Do Use: This project needs _____ equipment because….
Don't Use: The Panel is not sure whether the project has sufficient funds to purchase _____...
(Budget is not part of this review)

Do Use: This project would benefit from the expertise of Dr. _____ at the_____ ARS location. We suggest a collaboration between…..
Don't Use: Dr. _____ should be reassigned to _____ARS location…
(OSQR reviews do not assess agency issues)

Do Use: The project is relevant to the National Program Action Plan….
Don't Use: The National Program Action Plan should/should not include _____ goals…..
(The Action Plan is established through a different process and is not reviewed by OSQR panels)

For the next two criteria (Probability of Success; Merit and Significance), an overall assessment is sufficient unless there are specific issues that must be addressed within one or more objectives or sub-objectives.

In preparing a review, the following also are important.

- Use third-person statements rather than first person ("I", "me", or "my"). These will need to be edited out of the consensus document.
- Clearly differentiate between substantive and minor criticisms.
- Provide suggestions for correction of problems that your panel considered substantive.
- When citing other research, provide references or other documentation.
- Avoid direct commentary that might be misconstrued as an *ad hominem* attack on the individual scientists.

Response to Reviewers and Revisions

Unique to this process is a requirement that researchers respond in writing to reviewer comments. It is, thus, not surprising that for nearly all reviews (even where the final score is "No Revision Needed") there are issues or questions for which the researchers must provide a response.

The way researchers respond to reviewer comments is the same regardless of the Action Class Score received. There is, however, a difference in who is responsible for assessing if the response is sufficient, which depends upon the score received. Responses for plans receiving No, Minor, or Moderate Revision scores are reviewed by the Officer who, when and if satisfied that the responses are adequate, may certify the plan. While the Officer may request additional work by researchers on the response, their decision to certify a plan is not guaranteed and is contingent on securing a satisfactory response.

For plans with Major Revision or Not Feasible scores, the responses, along with the revised project plan, are re-evaluated by the original reviewers. This re-review is done only once and ends with a new scoring by the panel. If this is Moderate Revision or better it is the responsibility of the Officer to assure appropriate compliance before certification, as above. *Plans that receive a second Major Revision or Not Feasible score fail and cannot be certified or further revised.* Your panel will be discharged at the conclusion of the re-review meeting.

The question at re-review is: "Does this address the issues as indicated in your initial review?"

Form of the Response.

Once the panel has completed review and provided their consensus recommendations, the Officer reviews these and inserts **"ARS Response Boxes"** into the text at places where there is request for further information, a question, or need for the researchers to comment. It is the responsibility of the research team to address the stated issues wherever a

box appears. For each response there must be three elements:

1. Direct answer or comment on the issue;
2. Indication of location (page) where a change is made to the plan, if done.; and
3. The above changes/additions marked in **bold** in a revised plan**.**

The review comments with the completed responses and the revised plan are provided to the SQRO or panel (depending upon the initial score) for evaluation.

Final Questions "Everyone" Asks…

How much time should I expect to spend on the reviews?
Most reviewers report that they spend 4-6 hours on each in-depth review, sometimes longer. We encourage you to start early.

A plan has one or more scientific vacancies, how am I to assess that?
In tight budget times this is a challenge. Where possible, we urge research teams to put together a plan and seek assistance from others in developing those parts that would fall to the vacant position. If, when the position is filled, the new individual departs significantly from that plan, their portion of the work may be subject to a new, external review.

This plan is somewhat short on detail and lacks a fully detailed literature review.
Researchers are subject to page limitations when preparing their plans. We urge them to provide a "gap analysis" that cites the principal literature rather than an extensive literature review so as to reserve enough of their page limit for the approach and procedures. Nonetheless, with a five year plan, large team, and multiple objectives and subobjectives the detail possible within the allowed pages can be constrained.

Why are there no budgets in these plans?
The focus of this review is the scientific and technological soundness of the plan. The budgets for this research have already been set, but will not be released unless the plan successfully completes review. While it would seem reasonable to review the budgets, there are many factors in addition to scientific considerations that go into arriving at the budget and which are beyond the scope of this review. Finally, the assessment of the availability of adequate funding is the responsibility of Research Leaders and Area Offices and is part of the internal review that plans receive before submission for review.

Can we change the plan's objectives to better match the proposed work?
Objectives are often broader in scope than the research so as to allow the scientist room to exercise originality and creativity. It is preferred, therefore, to ask for greater clarity on how the objective is being addressed rather than to narrow its scope. Where research proposed does not match, in some way, the objective, the corrective action to recommend is in the research plan itself and not the objective.

In some plans, one objective appears to be an "outlier." Why is it there?
There are often important reasons why a seeming outlier is part of a project plan and it is the responsibility of those preparing the plan to provide the context for each of the objectives. If this is not clear you are encouraged, as part of your review, to ask the researcher to provide it. There are times when mandates or stakeholder needs necessitate a specific "side activity" within a plan. This is part of the nature of intramural research.

Can we score the projects by objective vs. assigning one score to the entire plan?
No, the projects are designed to operate as a unified entity. The final score can reflect your assessment of the relative importance of strong and weak portions of the plan. It is important to remember that even for those plans receiving a good score, ANY recommendations made by the panel must be thoroughly and completely addressed in a revised plan before it can be certified.

A project plan is scientifically sound but poorly written. Should I consider it a good plan? When scoring the project, how much weight is put on poor presentation?
Each project plan you review should demonstrate a high likelihood of success without requiring that you make inferences or assumptions. If the plan inadequately presents the information you need, in order to apply the review criteria, we ask that you address the inadequacy in your peer review. Depending on the type of presentation flaw, you'll need to judge which action class is most appropriate. The goal is a plan that is both scientifically sound and well-presented.

May I call or visit with the research teams to discuss their project plans?
No. All the information you need to complete your review should be enclosed in the plan. If you have specific questions, contact the Peer Review Coordinator or Scientific Quality Review Officer.

Can I establish collaboration with the scientists associated with these plans?
Yes, after your review obligations are completed. We ask, however, that you keep your involvement with this peer review confidential, especially with regard to the identity of other members of the panel.

Once the panel has finished its initial discussions is my job as a reviewer over?
Not necessarily. If any plans in your panel received a Major Revision or Not Feasible it is very likely that they will be revised for a second review. The panel convenes again to conduct an on-line re-review, typically 2-3 months after the initial review. At the close of the re-review panel meeting, regardless of the outcome, the panel will be discharged and their review obligations will be complete. Should no plans score below Moderate Revision, the panel is discharged at the conclusion of the initial meeting.

Appendix

Guide for Action Class Assessment of project plans. This is advisory and should not be seen as a rigid structure. Plans often do not fall neatly into one of these categories, but have some objectives that are well defined and others that are less so. It may be necessary for reviewers to balance what they believe to be the relative significance of strong or weak portions of the plan in coming to a final Action Class decision.

Action Class	Approach & Procedures	Probability of Success	Merit & Significance
No Revision Required	The project plan is well conceived and clearly articulated.	Research team has needed training and experience.	Outcomes are important to the national interest and fit the National Action Plan.
	The project directly addresses the stated research goals.	Approach is reasonable with necessary staff, equipment, and facilities.	Project will lead to new knowledge and technology, or produce results of value.
	Procedures and methods are appropriate and sufficient.	Research team is aware of the current literature in the area.	Similar research is not being conducted elsewhere.
Minor Revision Required	The project plan is generally well conceived and all of the approaches are sound.	The research team has the training and experience to accomplish the goals.	Outcomes are important to the national interest and fit the Action Plan.
	The project addresses the stated research goals.	The approach is generally reasonable. Equipment and facilities are available.	Project will lead to new knowledge and technology, or produce results of value.
	Minor changes to one or more experimental approaches are suggested, and may involve modifications or alterations.	The research team is aware of current literature in the area.	Similar research is not being conducted elsewhere.
Moderate Revision Required	The project plan is generally sound, but perhaps not clearly articulated.	The research team has most of the training and experience necessary, but some areas could be strengthened. One or more approaches needs some modification.	Outcomes are important to the national interest and fit the National Program Action Plan.
	The approaches may need some modification to better fit the stated goals.	Most necessary equipment and essential facilities are in place but some aspects could be strengthened.	The project has potential to lead to new knowledge and technology, or to produce results of value.
	Revision may involve changes to approaches.	The research team is aware of most current literature.	Similar research may be conducted at other locations.

Major Revision Required	The approach to one or more of the objectives may not address the stated goals.	The research team may lack some important aspects of training or expertise.	One or more of the outcomes may not significantly impact the National Action Plan.
	Major revision to the plan for one or more objectives may be necessary. The plan is poorly written and constructed.	Several approaches are not in line with resources. Critical equipment, facilities or tools are not yet available. The research team is not aware of significant current literature.	The project plan as written may not lead to new knowledge or new technology.
Not Feasible	The approach and procedures for one or more objectives have major flaws or inadequate approaches.	The research team has substantive deficiencies in essential expertise or required facilities.	One or more of the outcomes may not significantly impact the National Program Action Plan.
	The procedures are unrelated to the stated goals.	The research team is unaware of current activity and literature.	As written, the project plan will not lead to new knowledge or technology.

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