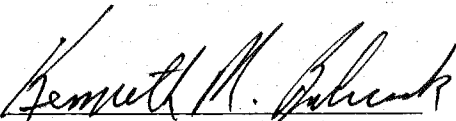



To: LTG Robert B. Flowers  
From: Environmental Advisory Board  
Date: 13 May 2004  
Subject: Independent Scientific Review


The enclosed document reflects our discussions and recommendations regarding Independent Scientific Review during meetings of the Board, and has been revised to encompass the discussions at Omaha in November.


The Board believes that increased rigor in review procedures will be essential to establishing the Corps as a world-class public engineering organization. We hope that this document, together with other recent reports referenced within, provide a foundation for the development of detailed guidance on this issue and its promotion throughout the Corps.

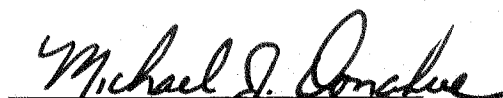
We look forward to seeing this document posted prominently on the Corps website, to its use by the Corps, and to further discussions with you and your staff regarding implementation of some of these recommendations.


  
Mr. Kenneth M. Babcock

  
Dr. Theodore L. Hullar

  
Dr. Mohamed F. Dahab

  
Dr. G. Mathias Kondolf

  
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Dr. Denise J. Reed

# Recommendations for Independent Science Review

Submitted by the Environmental Advisory Board to the Chief, USACE

13 May 2004

## BACKGROUND

Water resource development projects in the United States are increasingly complex. National goals now include economic development as well as social equity, environmental justice, and environmental restoration and sustainability combined with already highly altered and managed river and coastal systems. In many cases the problems are clear, but the solutions are less obvious. The Corps of Engineers is faced with balancing sometimes conflicting local and national goals in the face of limited budgets and public expressions that on-the-ground actions are more important than prolonged studies. In recent years, repeated calls have been made for increased technical review of the Corps' plans and projects. The Corps' planning process includes some procedures for review of project development documentation, including Independent Technical Review. For the most part these reviews are largely conducted by technical staff within the Corps, albeit external to the team conducting the planning studies.

The attention of the Chief's Environmental Advisory Board (EAB) was drawn to the issue of scientific review during their visit to the Jacksonville District in Florida during mid-October 2002 and associated briefings on the Comprehensive Everglades Restoration Plan (CERP). The Board discussed the independent science review issues inherent in this, the Corps' largest environmental restoration project, and recognized that the review issues being dealt with relate to other Corps' Districts as well. Specifically, Congress—through the Water Resources Development Act (WRDA) of 2000—had called for independent scientific review of Everglades restoration (observations in Attachment A). Separately, WRDA 2000 requested the National Academy of Sciences to conduct a study of the procedures for reviewing Corps' planning studies. The effort was managed by the National Research Council (NRC, the operational unit of the National Academies complex) and its report and recommendations (summarized in Box 1), published in 2002 as *Review Procedures for Water Resources Project Planning*, focus on the Corps' planning process but provide important insights into the general issue of independent science review.

The NRC observed that the preservation of reviewer independence and credibility requires the Corps to decide if reviewers can be "affiliated . . . with the organization for which the review is being conducted?", if "federal agencies officials beyond the Corps be allowed to serve as reviewers?" and "who will select reviewers?" NRC cautioned that "All potential reviewers carry professional and personal biases, and it is important that these biases be disclosed . . . (and) determined which biases . . . will disqualify prospective reviewers." NRC also advised that the Corps "should develop criteria for determining if review panels are properly balanced, both in terms of professional expertise as well as in points of view on the study or project at hand." Of special attention should be the "type" and "level" of review, and the "criteria for evaluating alternative review processes." The full section of their report on criteria is reproduced at Attachment B.

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

During the course of the Everglades and subsequent briefings, the EAB has explored the issue of Independent Scientific Review (ISR), encompassing natural science, social science and engineering aspects of Corps activities, and focused its attention to four issues:

- What should be reviewed and when?
- What should review include?
- Who should conduct reviews?
- How should reviews be conducted?

These issues are addressed within the context of recent Corp's experiences with independent review, including reviews involving the National Academies through its National Research Council.

### **RECENT CORPS' EXPERIENCES**

The U.S. Army Corps of Engineers has had several recent experiences with various types of independent review. These can be grouped broadly into those convened by the NRC and those assembled by the Corps using external contracts directly or through a third party (Attachment C). The NRC reviews include the ongoing Committee on the Restoration of the Greater Everglades Ecosystem (CROGEE), which provides scientific guidance on restoration of the greater Everglades; a review by the NRC's Ocean Studies Board of the Louisiana Coastal Area Study; and an NRC review of the Upper Mississippi River-Illinois Waterway Restructured Navigation Study. Expert panel approaches by the Corps have included an Independent Technical Review (ITR) and Special Analysis of the American River (CA) Long Term Study; Folsom Dam Mini-Raise (CA) to address six technical questions; an external independent review (EIR) for the Delaware River deepening project; two technical review teams to evaluate a reassessment of the Columbia River Channel Improvement Project; and the National Technical Review Committee (NRTC) to assist development of the Louisiana Comprehensive Area Study (LCA).

### **DISCUSSION**

The Chief of Engineers' Environmental Advisory Board (EAB) reviewed the NRC recommendations (Box 1) and is in agreement with them. The EAB further reviewed the recommendations in relation to various aspects of Corps practice. Our observations are provided through four questions:

- What should be reviewed and when?

Corps projects come in different sizes, purposes, costs, complexity, and settings. Each (and all) can affect whether a project should be reviewed. Defining in-out criteria is difficult, but useful starting points are complexity of the project and extent and significance of impacts, along with probabilities of success/failure. Projects can be reviewed during pre-implementation (to assure highest scientific and technical validity for what is proposed) and during post-implementation (to

**Box 1. NRC Recommendations on Review Procedures for Water Resources Project  
Planning**

Reviewers should not be selected by the Corps, and they should not be employed by the Corps.

Reviews should be overseen by an organization independent of the Corps, *e.g.*, NAS.

An Administrative Group for Project Review (AGPR) should be legislatively established within the Corps for two purposes only: determining what needs independent review, and the appropriate level of independent review.

The decision regarding the degree of the review's independence should be open to review upon petition by interested parties.

A Review Advisory Board should be established to provide periodic review of the AGPR mandate, structure, and decision-making processes.

The Corps should be included at some level within all reviews.

Review results should be presented to the Chief of Engineers (COE) before a final decision is made.

Results should be available to the Public.

The COE should respond in writing to each key point in the report of a review panel.

Reviews should be initiated early enough in the Corps' study process so that review results can be meaningfully incorporated into the planning study or project design.

Review panels should not become too strongly attached to their reports and become defenders of their recommendations. The composition of review panels can be changed during the oversight period to avoid this.

Internal review panels should usually consist of a balance in the number of Corps' professional staff and experts independent of the Corps.

In external reviews, the Corps may nominate, but should not select the reviewers.

Reviews should be conducted to identify, explain, and comment upon assumptions that underlie analyses, as well as to evaluate the soundness of models and methods.

A review panel should be instructed to not present a final judgment on whether a project should be constructed or whether a particular operations plan should be implemented, as the Corps is ultimately responsible for this final decision.

Congress should provide resources to the Secretary of the Army to help implement these recommendations.

From *Review Procedures for Water Resources Project Planning*, National Research Council, Washington, DC, 2002, pp. 70-72.

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

determine if the best science is being used in evaluating progress and impacts). The EAB recommends that independent review be extended to address pre-implementation planning of a project in addition to review of the project's post-implementation, thus providing a cradle-to-grave approach, all designed to improve understanding and effectiveness through the project's life cycle. This approach is essential because implemented projects, *especially those that are part of a system of related projects*, will likely be recurrently revisited to assure that they are being operated in accord with changing water resources realities.

- What should review include?

Of course, the Corps must evaluate project characteristics, outputs, and effectiveness relative to project goals. Planning for the post-implementation phase of a project should thus include plans for ongoing monitoring and evaluation and as-built reviews of project effectiveness. Such evaluations are an important part of improving Corps' planning and implementation. They are vital to any project implemented in an adaptive management framework or in the face of significant uncertainty regarding environmental conditions. Subjecting such evaluations to independent scientific review, especially when they are part of adaptive management, is crucial to maintaining stakeholder support for changing management approaches or structure operations post project implementation.

- Who should conduct reviews?

All review panels should be convened by entities that are independent, free from conflict of interest and bias, not advocates or opponents, and experience in administration of peer review. NRC procedures, or equivalent, should be used for assessing bias and conflicts of interest of all reviewers. This does not limit the Corps to using the National Academies. Other institutions with these attributes exist around the country, many with knowledge of regional issues that could be of particular benefit in assembling review panels. For example, the California Council for Science and Technology, and similar expertise-based regional organizations, might meet these criteria, as might professional associations. Concerns regarding the responsiveness and timeliness of review bodies are real, and planning scientific review into project development on a more routine basis will alleviate the need for "emergency" reviews and allow review conveners greater ability to be responsive to the Corps' needs.

Generally speaking, pre-implementation planning stage for a project, which includes various studies, analysis, and research, should seek to include embedded external scientists in the process as early as possible, including for the scoping process. This is an important concept that can add substantively to the scientific integrity of the project. Although this issue is not specific to independent science review, the EAB believes that by building scientific integrity into projects from the beginning, many of the problems currently being identified in later review stages can be avoided. Involving embedded scientists can help assure that the Corps is guided to thoroughly incorporate the interests and views of all major stakeholders and also used the most informed scientific understanding. Using embedded scientists should be incorporated by the Corps separate from the need to perform independent science review of the final product.

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

- How should reviews be conducted?

The EAB supports the recommendations of the NRC panel on this issue. If the Corps is to conduct independent scientific review as a routine part of its procedures, standards regarding independence of the reviewers and the process must be maintained. Critically important is that the review and response process must be transparent. The EAB agrees with the NRC that the review should be directed to the COE. However, there should be iterations of review and response between the Corps and reviewers as necessary to ensure a thorough understanding of review recommendations.

### **RECOMMENDATIONS**

The EAB recommends that the recommendations provided in the National Research Council's report, *Review Procedures for Water Resources Project Planning* (Box 1), be adopted by the Corps. Based on the discussion above, the EAB also recommends that the NRC recommendations be supplemented as follows:

- Independent review by objective outside experts be applied to those projects that are more costly, complex, controversial, or large scale.
- External scientists should be embedded in pre-implementation planning to provide additional scientific integrity and add to scientific understanding for the project.
- The NRC recommendations be extended to address post-implementation processes to embrace the life cycle nature of the Corps' business.
- External scientific expertise should be engaged in the project development process as early as possible to benefit to Corps' planning and improve products. This is separate from, and in addition to, the need to perform independent science review of the final product.
- The review and the response should be readily available to all interested parties.
- Review procedures should provide for iterations of review and response between the Corps and reviewers as necessary, and an audit trail should be established to track any such exchanges.

## **ATTACHMENT A**

### **CERP OBSERVATIONS**

- In the absence of a guiding and universally agreed upon scientific and networked review process, entities may assume the review mission and produce reports or reviews of reports with questioned utility and, thereby, lack of acceptance of same.
- The debate should not focus on who is best suited to perform the independent scientific review, but on how it should be performed.
- A widely accepted process or methodology to conduct independent scientific review is needed that has the following characteristics:
  - It should not be vested in only one place or in one organization.
  - The process methodology should be designed so it may be administered independent of the originator of the work under review.
  - "Independent" and the context of this independence must be defined. Is independence based on the characteristics of individuals, an agency or an association with an organization? Are there other criteria and principles in play that should be described?
  - The process should rely on the strategic selection of reviewers and not be self-selecting. It should not be a process that requires agency representation as a driving factor in the selection of reviewers.
  - The process must be designed to let peer reviewers succeed (proper amount of time, funding, proper framing of questions and issues to be addressed, and appropriate background information).
  - The subject matter suitable for an independent review should be identified, such as: models, precedent setting scientific reports, emerging technologies, innovative approaches, policy implications (these may be scientific as well as social and economic issues), and issues that address uncertainty.
  - The process should have provisions for various levels or rigors of review. In other words, the effort applied should be suitable or matched to the issue in question.
  - The process should have reiterative feedback loops that permit communication between the reviewers and the originators of the items under review. Disagreement may remain between those performing the review and authors of the reviewed items. However, the process must be accepted as a fair forum to reveal legitimate differences in professional opinion.

From *Independent Scientific Review on the Everglades and South Florida Ecosystem Programs*, Issue Paper No. 1, Jacksonville District, U.S. Army Corps of Engineers, 25 October 2002.

**ATTACHMENT B**

**NATIONAL RESEARCH COUNCIL CRITERIA FOR EVALUATING ALTERNATIVES**

Several different review processes could be formulated for review of Corps' water resources project planning studies. Several different criteria must be considered in weighing these alternate approaches to review. The degree of independence from influence by the Corps of Engineers is a preeminent criterion, as it is strongly related to a review's credibility. The process by which reviewers are nominated and selected is also important, as it will affect a review's independence and credibility. The affiliation(s) of the group or individuals selecting the reviewers is a key issue, as are the affiliations and backgrounds of the reviewers themselves. Issues related to conflicts of interest and biases may arise in connection with review processes within federal agencies such as the Corps of Engineers, and care must be taken to minimize these concerns. There is also the challenge of selecting review panels that are viewed as credible and balanced, but that also have adequate knowledge of the Corps' often highly complex planning guidance and analytical methods.

Independence of review begins with the nomination and selection of reviewers. Credibility of this process does not necessarily require that the selection process be totally divorced from the Corps for all decisions. For example, the Corps should be allowed to nominate panelists for an independent review panel, but it should not select them. In fact, some degree of participation by the Corps in the review will generally help increase the review's usefulness, even in fully independent reviews. The Corps should help inform the review panel of a planning study's key assumptions and methods, and it should discuss with the panel ways in which the panel's findings might be most useful. The fact remains, however, that in large, controversial projects, a review's credibility will be a function of the distance between the reviewer selection process and the Corps. To reiterate, the two most important considerations in establishing a review panel's independence are (1) who selects the reviewers, and (2) who the reviewers are.

If the purpose is to improve the quality of Corps' water resources project planning studies, the results of review will be more useful to the Corps before it prepares a final recommendation on a planning study. Comments from reviewers can be addressed before a final project recommendation is made public. If a review is primarily intended to provide to Congress and the public a fully independent judgment about a project proposed by the Corps, the review could be deferred until after the Corps' recommendation.

In addition to informing Congress and the public, the review should also assist the Corps in the process of reaching its final recommendation. Results of review should thus be directed to the Corps, usually to the COE, before the Chief develops a final decision. This recommendation does not imply that results of a review should be provided confidentially to the COE. In fact, review panel reports should be made public and should be incorporated in the record of the project that is sent to the Office of Management and Budget (OMB) and Congress. The COE should also address each key finding or recommendation in the report, either by agreeing and stating what steps will be taken in response, or by disagreeing and rebutting the comments.



**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

Reviews should not duplicate other review processes required by law or included within normal executive functions of the government. The Fish and Wildlife Coordination Act of 1934, the National Environmental Policy Act, and other statutes require external review of Corps' projects by select parties. Comments from other agencies may identify the need for review to provide advice on particular issues, but the review should not duplicate studies of other agencies. In addition, OMB routinely reviews Corps' planning studies for consistency with Administration goals and priorities before those studies are included in the budget proposed by the Administration.

The group that selects reviewers for Corps' projects should be knowledgeable of the Corps' mission, its statutory authorities and related administrative regulations, and other planning and evaluation procedures. The Corps operates within authorities and directives given to it by Congress, and it has a set of guidelines and regulations that provide a decision-making framework. That framework leaves considerable discretion to Corps' staff as they execute the steps in the planning process. Review panels should thus include experts familiar with the guidance and regulations under which the Corps operates, or have them available as a resource. To ensure that review panels have this knowledge, the group selecting reviewers should be familiar with the community of external water resources experts with knowledge of the Corps' decision-making and planning framework or able to draw on individuals who can provide the needed expertise.

Reviewers may find themselves in disagreement with the results of Corps' planning studies. These results may have been driven by specific regulations or guidelines, or they may have resulted from staff exercising discretion within the regulations and guidelines. Reviewers should aim to draw distinctions between criticisms of the regulations and guidelines and criticisms of how well the Corps conformed to planning guidance.

Finally, any arrangement for implementing a review process should consider the implications for staff and supporting resources. Some reviews may entail a greater number of reviewers than others, some reviews might be conducted by videoconferencing or by mail, and some meetings might employ a professional facilitator. Some arrangements might entail a large staff with the full complement of skills necessary to review projects in detail, while others may be more selective in the aspects of decisions that will be reviewed.

As it moves to implement a more thorough and credible review process to meet contemporary and future water resources management challenges, the Corps should consider a wide variety of criteria and options. In creating an institutional mechanism to help facilitate a revised review process, the Corps should ensure that the following functions, responsibilities, and capabilities are established for the review process: recruit and maintain quality review panels, gather information from stakeholders, prepare high-quality draft feasibility studies in a timely fashion, arrange for external and internal reviews, receive the Corps' responses to review recommendations, and follow up with inquiries regarding Corps' actions based on review recommendations, where appropriate. Full coverage of these items will require a significant and sustained level of resources.

From *Review Procedures for Water Resources Project Planning*, National Research Council, Washington, DC, 2002, pp. 50-52.

ATTACHMENT C

U.S. ARMY CORPS OF ENGINEERS CURRENT AND RECENT EXPERIENCES  
WITH INDEPENDENT SCIENTIFIC REVIEW

National Academy Reviews

- ***Committee on Restoration of the Greater Everglades Ecosystem (CROGEE)*** – The South Florida Ecosystem Restoration Task force was established by section 528(f) of WRDA 1996 (Public Law 104-303). In response to a long-standing request of its Science Coordinating Team for a peer review program, in 1999 the Chief of Engineers (COE) entered into agreement with the National Research Council (NRC) to establish CROGEE to provide scientific overview and technical assessment of the many complicated, inter-related activities and plans occurring at federal, state and nongovernmental levels. The committee provides strategic assessments and guidance, as well as focused advice on topics of importance to the restoration efforts when appropriate. As of March 2003, CROGEE had met twelve times, aided by a Science Coordinating Team liaison group. See <http://www.sfrestore.org/crogee> for more on this ITR process.
- ***Louisiana Coastal Area Study*** – The Ocean Studies Board of the NRC has been contracted by the State of Louisiana, in partnership with the New Orleans District, to review the Louisiana Coastal Area Study. The panel will evaluate the goals and approaches described in the draft plan being developed to restore coastal Louisiana. Specifically, the committee will address the following questions: 1) Are the strategies outlined in the draft plan based on sound scientific and engineering analyses and are they appropriate to achieve the goals articulated in the plan? What other approaches might be considered? 2) Are the priorities for implementation of elements within the plan appropriate? How might these elements be phased in over time? 3) What major questions need to be answered to support implementation of the plan? How can these information gaps be filled? 4) In light of the substantial financial resources that would be required to implement the plan, what are the potential benefits of Louisiana's coastal restoration to the national economy and the nation's interests?

The starting date for the project was November 2002 and the original intent was for a final report will be issued approximately 16 months after initiation of the panel's deliberations. Delays in release of the LCA study have resulted in postponement of the NRC panel report.

- ***The Upper Mississippi*** – The U.S. Army Corps of Engineers entered into an agreement with the NRC to conduct a review of the Upper Mississippi River-Illinois Waterway Restructured Navigation Study. The feasibility study for improvements to the waterway system was initiated in 1993 but was significantly restructured in 2001 in response to concerns over the direction of the study and associated public controversy. The guidelines for restructuring the study were based on recommendations in a February 2001 report by the NRC and input of a Federal Principals Group (established by the COE) consisting of Washington-level representatives from the U.S. Department of Agriculture, U.S. Fish and Wildlife Service, Environmental Protection Agency, the Maritime Administration, and the Corps. The

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

restructured study is focused on both the need to achieve navigation efficiency and ecological integrity with a goal of an environmentally sustainable navigation system. The NRC review will be conducted by an expert committee of approximately 13 members with a breadth of expertise including aquatic ecology, agricultural and transportation economics, water resources planning, systems engineering, public policy, econometrics, transportation, watershed science, hydrologic engineering and system operations, from academia, industry, consulting, government, and/or non-governmental organizations. The committee review is parallel to other study activities, providing input at key study decision points, and conducted in accordance with NRC Review Procedures for Water Resources Project Planning. The committee first met in September 2003.

**Other Expert Panel Approaches**

- **Raising Folsom Dam** – The COE authorized preparation of an After-Action Report to identify and record the lessons learned from performing an Independent Technical Review (ITR) and Special Analysis (SA) of the American River Long Term Study, CA (Folsom Dam Mini-Raise), and to make recommendations regarding similar reviews in the future. The feasibility report recommended raising the existing Folsom Dam by seven feet to add flood control storage, and thereby reduce the risk of flooding in the city of Sacramento, California. While finalizing the Chief's Report to Congress, the COE received a letter from Congressman Don Young (R-AK) which questioned (1) the technical adequacy of the design, (2) the accuracy of the cost estimate, and (3) the advisability of signing the Chief's Report before his questions were resolved. In response, the Director of Civil Works expedited an ITR to resolve Mr. Young's questions within 4 weeks. HQ oversaw the engineering firm Quest Structures, which had an existing IDIQ contract with Louisville District. Quest Structures recruited a rock mechanics expert and a cost engineering expert from Project Time and Cost, Inc. to perform the ITR. The ITR satisfactorily resolved five of the six questions raised by Congressman Young. The remaining question, the cost of stabilizing the dam to perform the Mini-Raise, was not addressed because the contractor did not have sufficient time to evaluate this issue. The Deputy Director of Civil Works had the Deputy Chief of the Engineering and Construction Division lead a technical team of about thirty senior experts in dam engineering (structural, geotechnical, engineering geology, and seismic analysis and design), completing a report in ten days.

The Deputy Director of Civil Works reported to Congressman Young these findings of the ITR and SA: (1) COE was able to respond by assembling a superbly qualified team; (2) The basic problem that triggered the need for such an urgent response was an ineffective Independent Technical Review process, which should have raised these issues before the feasibility report left the district. Doing effective ITR in the districts is common sense and requires a willingness to follow establish policy contained in ER1110-2-1150 (13 August 1999); until this is the norm, such problems can reoccur; and (3) COE was also lucky in that the high profile of the issue allowed COE to recruit expert consultants with top credentials, who agreed to dedicate effort on short notice, Louisville District had just completed an IDIQ contract with Quest Structures, and the field geologist during the construction of Folsom Dam had done a superb job of mapping the foundation and describing the foundation

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

treatment, which allowed a composite foundation map to be developed for the Special Analysis Report in just a few days.

It is unlikely that other districts would be equally fortunate, or even that other dams in the Corp's Sacramento District would have similarly good data available. Fixing the ITR process requires the following actions: (a) Educate the districts about the requirements of an ITR and ER1110-2-1150; (b) Require that each decision document include an ITR certification in accordance with ER1110-2-1150 signed by the appropriate functional chiefs and project manager; (c) Clearly state COE's intention to return all decision documents that are submitted without proper certification; (d) Emphasize the value of using regional technical resources to accomplish an effective ITR; and (e) Incorporate the lessons learned from the last Command Staff Inspection the North Atlantic Division, focused on ITR and the Quality Control/Quality Assurance process.

- ***Comprehensive External Independent Review Of Delaware River Main Stem and Channel Deepening Project*** – At the request of Congress, the General Accounting Office (GAO) conducted a review of the Delaware River deepening project, which was subsequently published as GAO report 02-604. This report concluded that the economic analysis of the Delaware River channel-deepening project contained a number of material errors. Among the GAO recommendations were that the Corps should prepare a new and comprehensive economic analysis of the project's benefits and costs and engage an external independent party to review the revised economic analysis to ensure that it accurately and fairly represents the expected benefits and costs of the proposed project. To meet the external independent review (EIR) recommendation, the Corps contracted through an existing Institute for Water Resources indefinite quantity contract with a private, for-profit contractor. The IWR contract was used to expedite the review process. The contractor was encouraged to engage outside experts in economics and maritime navigation to complete the review. Three experts were selected by the contractor with little input from the Corps. The EIR panel tasks included providing: (1) an initial review assessment of the reanalysis; (2) a final review following comments from the Corps; and (3) a summary of overall review conclusions and recommendations. A significant procedural problem during the EIR was that the "final report" was not available to the EIR panel to review at the time. Additionally, the panel found that the reanalysis report "...did not yet provide a sound basis for Federal investment decision-making." Faced with this conclusion, the Corps conducted additional analyses to address the EIR panel concerns and produced a second comprehensive reanalysis report. The same panel was then engaged to review the second reanalysis. The panel found that the analysis still needed specific corrections. However, it concluded that if the corrections were made that the report would "...provide a reliable basis for economic justification..." for the project. At this point a third party pointed out some facts and issues not adequately considered in the second reanalysis. Some of the concerns were related to the needed corrections noted by the EIR panel although some were in addition. This resulted in a third reanalysis and a third EIR panel review that is currently underway.
- ***Columbia River Channel Improvement Project*** – Following a reassessment of the economic and environmental information reported in the Integrated Feasibility Report and Environmental Impact Statement for the Channel Improvement Project, in August 2002, the Corps convened two technical review teams to evaluate (in a written report published

**Recommendations for Independent Science Review of the Environmental Advisory Board  
Submitted by the Environmental Advisory Board to the Chief, USACE, 13 May 2004**

September 2002) (1) the reasonableness of the assumptions and conclusions of the cost-benefit analysis for the 43-foot channel, and (2) whether the data were used properly in the overall analysis. This review approach was adopted because of the need for a timely, objective review. The NRC approach was not chosen because of the usually long time frame and relatively high costs, and because its reviews usually focus on large-scale scientific questions of national importance rather than project specific questions such as the accuracy of an economic justification. The Northwest Power Planning Council's Independent Economic Advisory Board was not used because of its lack of expertise specific to navigation. The Corps selected members of the review panel, with the facilitator (RESOLVE) interviewing the prospective panelists to determine their interest, availability, and qualifications, seeking stakeholder comments on the approach. Each panel had at least three members (the benefits panel had four) qualified to objectively assess the technical adequacy of the cost-benefit analyses. The Benefit Review Team members included demonstrated expertise in deep draft navigation (grains, container shipping), inland navigation, knowledge of navigation's role in the Pacific Northwest regional economy, and a general understanding of the water resource policies and procedures used in navigation analyses. Qualifications of Cost Review Team members included demonstrated expertise in navigation channel construction, operation and maintenance, cost estimating, and knowledge of the cost estimating software. The Corps incorporated many of the panel's comments in the Final Supplemental Integrated Feasibility Report and Environmental Impact Statement. Overall, both the Cost Panel members and Benefit Panel members were satisfied with the Corps' response to their comments.

- **National Technical Review Committee, (NRTC)** – The NRTC was formed in April 2002 by the New Orleans District of the U.S. Army Corps of Engineers as an scientific technical committee to assist the Corps and the State of Louisiana to develop the Louisiana Comprehensive Area Study (LCA). The purpose of the NRTC is to enhance technical quality and scientific credibility in the LCA study. The NRTC is composed of nine technical experts to provide a geographically and technically diverse suite of national experts, selected to exclude federal and state employees. NRTC selection was determined after a list of candidates was prepared in February 2002 by an ad hoc working group chaired by the Corps' Engineer Research and Development Center. Members included representatives from the New Orleans District, EPA, USGS, Louisiana DNR, academic institutions and the Coalition to Restore Coastal Louisiana. The NRTC has met six times and is scheduled to meet again during 3-5 November 2003.