




Department of Energy
Washington, DC 20585

April 9, 2008

MEMORANDUM

TO: STEVEN J. ISAKOWITZ
CHIEF FINANCIAL OFFICER

FROM: JAMES A. SLUTZ 
ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY
OFFICE OF FOSSIL ENERGY

SUBJECT: Benefits Assessment Plan for the EPO Act Section 999, Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Consortium-Administered R&D Program

The *2007 Annual Plan* for the above program included discussion and comments on the benefits associated with the program. Attached is the plan for assessing the benefits resulting from the Consortium-administered elements of the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research & Development Program.

The plan describes our efforts to: develop the methodology, set up an independent panel to review and vet the methodology, test and validate the methodology, conduct the initial analyses, subject the analyses to independent merit review, and present the first set of program benefits.

If you have any questions, please call Ms. Elena Melchert or Mr. Bill Hochheiser of my staff at 202/586-5095.



Assessing Benefits of the 2005 EPACT, Subtitle J, Section 999 Consortium R&D Program

1. Introduction

DOE will undertake a comprehensive benefits analysis that evaluates a full range of impacts stemming from the program over the next few decades. This comprehensive effort, including integration of the estimated increase in royalty payments, if any, is the focus of this document.

2. Benefits Identification

The methodology to be developed for assessing benefits should account for key impacts that can be measured, estimated or inferred from historical data and models of future performance. The various types and categories of benefits can be characterized by a *benefits matrix* and the methodology should reflect these types of information.

In 2001, a National Research Council (NRC) committee conducted a retrospective study¹ of the benefits of some of the energy efficiency and fossil energy programs in the U.S. Department of Energy (DOE). As part of its study, the NRC committee developed a methodological framework for estimating these benefits. Following the NRC report, a conference was organized by Oak Ridge National Laboratory to discuss ways of adapting and refining the NRC framework for possible use by DOE offices to help plan and manage their R&D.² This matrix below defines this general framework.

Benefits Matrix

	Past	Future	
	Realized	Projected	Option Cases
Economic			
Environmental			
Security			
Knowledge			

The rows reflect the Section 999 R&D program's strategic objective: to provide direct economic, environmental, and security benefits, or to provide knowledge that can indirectly lead to these benefits. The columns reflect *when* the benefits occur (past in the sense that once R&D results begin to have an impact, measured benefits will be realized) and future in that expected benefits will need to be estimated. Initially of course, all benefits will be estimated future benefits. Given the range of future scenarios in terms of the parameters that directly impact measured benefits (e.g., oil and natural gas prices, or the rate of commercialization of a new technology), a number of option cases or scenarios will need to be constructed reflecting varying degrees of certainty.

Many participants in the Oak Ridge conference suggested that *knowledge* is a core mission of both basic science and applied science R&D programs managed by DOE, as well as of some of the energy resource programs. Also, many participants thought that various types of knowledge are enablers of innovation. They suggested that knowledge could be viewed as a third dimension

¹ National Research Council's Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, 2001, *Energy Research at DOE: Was It Worth It?*, Washington, DC: National Academy Press, July.

² Lee, R., et al., 2003, "Estimating the Benefits of Government-Sponsored Energy R&D: Synthesis of Conference Discussions," Oak Ridge National Laboratory, March.

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of the matrix to convey the idea that various types of knowledge contribute to other types of benefits.

The notion that knowledge is a benefit that needs to be accounted for has been supported by recommendations made by the Federal Advisory Committees formed to advise the Secretary on this program. They have specifically called for DOE to create a “knowledge management database” that will archive all of the data and analytical products that are created by the various research efforts during the course of the research and to implement a process to push this knowledge out to end users as soon as possible.

While it will be difficult to quantify benefits that accrue as the result of knowledge being made available to other researchers (e.g., when EPACT Section 999 research data provides knowledge that eliminates the need for another researcher to perform a similar experiment, provides an insight that leads that person to redirect their work in a more fruitful direction, or provides evidence that certain alternatives do not work, etc.), an effort to track the use of this knowledge and determine its benefit to individual end users will be considered as the overall methodology is being developed.

3. Validation Process

A method for validating the estimated benefits associated with the application of specific Program-developed technologies will be incorporated into the overall process. This may include “before-and-after” estimates from the operators involved with demonstrating a technology, market penetration estimates and “case histories” from service companies involved in commercializing a Program-developed technology, or via inputs from RPSEA Consortium members and other operators that apply the technology in the field.

Depending on the specific R&D project and the nature of the technology being developed, this validation process may involve actual measured data or best-available estimates. It will be important to make every effort to include operators/companies that are not directly involved in the project in this validation process, although the level of detail such companies can supply may be hindered by the proprietary nature of some of the data involved.

This portion of the methodology may draw from models for estimating such long-term benefits that have been employed in the past by DOE as well as models used in other industries where assessments of long-term R&D benefits are needed to justify near-term R&D investments.

The methodology will need to be well-grounded in an understanding of the nature and speed of technological innovation and uptake within the domestic U.S. oil and gas industry. Part of this understanding may come from consultations with technology experts within the RPSEA advisory committee and Federal Advisory Committee membership.

4. Independent Review

An independent critical review of the benefits assessment *methodology* and data requirements is planned prior to the methodology being finalized. This independent review will include a panel of experts, the members of which are not associated with the R&D performers yet collectively are well-recognized for their knowledge in the following areas:

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- Assessment of benefits from R&D investments
- Economic evaluation of oil and gas investments
- Technology trends in oil and gas exploration and development
- Methods for assessing the impact of industrial activity on national economies

5. 2008 Milestones for Methodology Development

Includes regular discussions/briefings with RPSEA staff and HQ staff

April

- Discuss options and planned approaches to benefits analysis, including data requirements from R&D contractors, with RPSEA staff and HQ staff.
- Initiate identification of the models, methods, approaches, and data requirements available for completing the assessment

May

- Complete evaluation of strengths/weaknesses of various approaches to benefits assessment including their applicability to the Section 999 R&D program
- Select a preferred approach for conducting the benefits assessment

June

- Begin process of identifying and contacting prospective members of an independent panel of reviewers (for September merit review)
- Vet preferred methodology and data requirements [informal process]

July

- Conduct initial *validation testing* of the preferred benefits assessment methodology
- Continue planning for a merit review

August

- Modify assessment methodology based on earlier *validation testing* and [informal] review comments
- Complete materials for September merit review of the benefits assessment methodology

September

- Subject the benefits analysis methodology and data requirements, including those related to estimating increases in royalty collections to an independent merit review

October

- Revise/finalize benefits analysis methodology plan based on results of the formal merit review
- Begin to develop baseline resource/technology information for each benefit category
- Begin purchase or acquisition of data and other model inputs as needed, based on final reviewed methodology

November

- Finalize and submit the benefits assessment methodology to HQ
- Complete draft Royalties Report to Congress (2nd baseline report)

December

- Deliver a final *Royalties Report to Congress* to HQ

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REFERENCES

- Lee, R., G. Jordan, P. Leiby, B. Owens, J. Wolf, 2003, "Estimating the Benefits of Government-Sponsored Energy R&D: Synthesis of Conference Discussions" (a summary of discussions at a conference held on March 4 and 5, 2002 in Arlington, Virginia, organized by Oak Ridge National Laboratory and sponsored by the Office of Energy Efficiency and Renewable Energy; Office of Fossil Energy; Office of Nuclear Energy, Science and Technology; and Office of Science of the U.S. Department of Energy), March.
- National Research Council's Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, 2001, "Energy Research at DOE: Was It Worth It?," Washington, DC: National Academy Press, July.