Unconventional Resources Technology Advisory Committee (URTAC)
October 15, 2009
Eleventh Meeting

Meeting Minutes

A Federal Advisory Committee to the U.S. Secretary of Energy

Unconventional Resources Technology Advisory Committee

I hereby certify that this transcript constitutes an accurate record of the Unconventional Resources Technology Advisory Committee meeting held on October 15, 2009.

Chris Hall, Chair
Unconventional Resources Technology
Advisory Committee

July 8, 2010
Date

Minutes of the 11th Meeting of the
Unconventional Resources Technical Advisory Committee
(Los Angeles, CA, October 15, 2009)

Call to Order

The meeting was called to order[1] by Mr. Chris Hall, Chair. He then called upon the Committee Manager (CM), Ms. Elena Melchert, DOE, to call the roll.

Committee Business

The CM confirmed that a quorum was present. It was determined that 12 of 16 Unconventional Resources Technical Advisory Committee (URTAC) members were present (Attachment 2). She then described the contents of the packet provided to each member. She also described the specific deliverables included in the packet that had been requested by both of the Energy Policy Act of 2005 Section 999D Federal Advisory Committees[2] at the last meeting[3].

The Chair responded to a question from a member wondering if members would be notified of any determination of the success or failure of projects as they reach completion. The CM explained that the Benefits Assessment Project[4] effort would be a continuous effort, and that no particular notice would be given other than during annual updates of the program in preparation for review of the annual plan. Mr. Gary Covatch, NETL, explained that final results for each project would be provided in a project summary statement posted on the NETL website, and that final reports and other products would also be linked there.

Opening Remarks

Mr. Guido DeHoratiis, DOE Acting Designated Federal Officer (DFO) thanked everyone for their subcommittee work since the last meeting[5]. He reported that no members of the public had requested to speak at the meeting, and that he had approved the agenda. He reminded everyone of the October 22, 2009 deadline for written recommendations and comments, that consensus was not required and that all comments were valued. He also reminded the members that their comments should be directed to the Secretary of Energy, that they were prohibited from making recommendations related to specific project awards, and that they were responsible for notifying the DFO of any potential conflict of interest.

The DFO then provided a legislative update. He explained that the Fiscal Year 2010 Budget Conference report included a $20 MM unconventional oil-gas-coal program to

[1] Agenda is included as Attachment 1.
[2] The Unconventional Resources Technology Advisory Committee (URTAC) and the Ultra-Deepwater Advisory Committee (UDAC) were both established pursuant to Title IX, Subtitle J, Section 999D of the Energy Policy Act of 2005 (EPAct).
[3] The items included in the member packets are included here as Attachment 3.
[4] Title IX, Subtitle J, Section 999B( ) of the EPAct requires a report on estimate of Federal royalties resulting from this research program. In order to determine this estimate, the DOE has been estimating benefits from the research program as a basis for estimating the Federal royalties.
[5] The 11th meeting of the URTAC was held September 15-16, 2009

"replace" the DOE's traditional oil program. These funds, plus $18.7 MM for methane hydrate and other congressionally directed projects had resulted in a $40 to 45 million research program for oil and gas at DOE, in addition to the Section 999 funding. He described how DOE needed input from stakeholders on how this money should be spent to achieve the goals of the legislation. He responded to a question by stating that this funding had not been requested by the DOE, and that the only funding requested by the DOE in Fiscal Year 2010 was for methane hydrates.

He described three bills that would redirect all or part of the annual Section 999 funding: a Senate Energy Bill that calls for some UDW[6] funds to be spent on an inventory of offshore resources (unlikely to see action on this bill in 2009, not moving very quickly); the House version of the Dept. of Interior Appropriations Bill that calls for deferring 2010 Section 999 funds (the Senate version does not include this language, should see final conference language on this bill soon); and a Defense Authorization Bill called for the use of Section 999 money to fund disabled retired military veterans (the final conference report includes the program but did not include language for funding it from Section 999 funds).

The Chair then reviewed the objectives of the day's meeting: to review and revise the work of each of the six Review Subcommittees and, to provide final recommendations for the Editing Subcommittee. The Editing Subcommittee would craft the final report and send it to all members for review. The teleconference meeting on October 22 would be a final meeting for each member to register their vote of approval for the final Committee report of recommendations.

The next step was for each Review Subcommittee chair to provide a brief overview of their respective reports, after which a more detailed discussion and editing session would ensue. The Chair had developed a spreadsheet[7] of comments already received from Committee members on the various Review Subcommittee reports as support for this process.

Review Subcommittee Reports

Dr. Berry "Nick" Tew, Chair, 2010 Portfolio Review Subcommittee, provided an overview of the Subcommittee's findings. In response to a question, Mr. Gary Covatch, NETL, provided some background information, stating that the Complementary and traditional research programs, and not the cost-shared program of Section 999 administered by RPSEA, were focusing on oil producing shales. The Committee agreed that there was a need for research related to oil from shale. The DFO confirmed that indeed, it was the Committee's duty to make recommendations to the Secretary of Energy on just such matters.

The Chair raised the point about the lack of geographical distribution in the awards. The Chair related that prior year annual plans had stated that while the Year 1 plan (2007) was not geographically balanced, subsequent plans would fix this problem. Then, the *2008*

[6] Ultra-Deepwater research (UDW) funded under EPAct

[7] The spreadsheet is included as Attachment 4.

Annual Plan stated that the emphasis would be on concentrating on areas where projects had already been awarded. This will perpetuate a program centered in unconventional resources in mid-continent and Appalachian regions, with no projects "on the ground" (i.e., not university or lab projects), in states like California, Wyoming, Montana, Utah, Nevada. He stated that producers are asking for the projects and the technology, and that the Secretary must ensure that this is addressed.

Ms. Sally Zinke, Chair, 2007-2008 Portfolio Review Subcommittee**,** provided a brief review of findings. The first point was that the Subcommittee felt that it is very important that they review the project portfolio and that the review needs to be as broad as possible with as many people and projects as possible. The second point was the Subcommittee felt that such a public review should be conducted in the forum of an industry symposium or similar event, as this would enhance the transfer of this technology.

A third finding was that some form of standard rating sheet be developed for assessing review. Fourth, the Subcommittee would specifically like to see technology transfer methods and deliverables included specifically as part of the project review process. They felt that performers should be more specific about the technology transfer mechanisms they should employ. Finally, geographic diversity in the project portfolio is important, both from a resource standpoint and from a program acceptance/support standpoint.

The Chair reminded the Committee that there is a Standing Subcommittee looking at the project portfolio. He recounted how RPSEA's Unconventional Resources project review held in Denver in April 2009 was a good example of using project reviews to promote technology transfer. He suggested a similar review be held on a larger scale in the form of a symposium whereby the entire industry, including the Subcommittee, could attend.

The CM reminded the Committee that the Standing Subcommittee will exist even when the Committee is out of session. The Committee may want to consider how the Standing Subcommittee will function between the time when the current URTAC term ends in August 2010 and when the next Annual Plan review is required. There was some discussion of the logistics of how Standing Subcommittee recommendations might be forwarded to the Secretary, and the need (or lack thereof) for an open, formal meeting to report back. The CM explained that the Standing Subcommittee reports to the Chair, and that it can do a lot of work for the Chair without a formal meeting of the full Committee.

Dr. Nancy Brown, Chair, Prior Recommendations Review Subcommittee, provided a brief review of their findings. She reported that they looked first at what had "fallen through the cracks." They looked at the Section 999 statute and also the RPSEA mission statement and determined that there was a need for more work related to the reduction of greenhouse gas emissions and sequestration of carbon. The Subcommittee recommended that RPSEA support a study that identifies research efforts within the Federal government and especially within DOE, to examine this area.

The Subcommittee looked at all prior URTAC committee reports and checked to see which recommendations had been followed and which had not. They also commented on the RPSEA Environmental Advisory Group's (EAG) presentation made at the last meeting and the need for clarification of several of the points made. The CM reported that Dr. Rich Haut's EAG[8] presentation was also made to the last meeting of the UDAC[9]. Included in everyone's packet is a statement of exactly what the role of EAG is within the RPSEA organization as it implements the cost-shared research program of Section 999.

The Chair commented that he had some concern that EAG's printed presentation left the impression that it was working with regulatory groups to achieve certain regulatory goals, and that these goals might not appear to be consistent with the goals of producer groups (e.g., IPAA).

Another point was made, by several members, that carbon sequestration research is a very well funded effort within other areas of the DOE and that diverting the limited resources of this program to fund similar R&D would not be a good use of funds.

Dr. Brown pointed out that the Subcommittee's real point was about the Program being mindful of the challenges faced by small producers in avoiding green-house gas emissions, and developing technologies to help them. That it was not a recommendation for the Program to undertake carbon sequestration research. Others agreed that the Committee's recommendation should explicitly state such.

Mr. James Dwyer, Chair, Technology Transfer Review Subcommittee, provided a brief review of their findings. He complimented the Knowledge Management Database (KMD) and said that it was an impressive effort of great use to the industry. There was a comment that in the area of technology transfer, that the vast majority of past committee recommendations had been implemented.

Dr. Sandra Mark, Chair, Metrics and Benefits Assessment Review Subcommittee, provided a brief review of their findings. She stated that the metrics used to assess the projects can be improved. Use of backward looking models, quantified risk and uncertainty, the NETL Benefits Assessment project being published in a peer-reviewed publication, and metrics to develop the effectiveness of technology transfer, were the recommendations of this Subcommittee.

After the break, Mr. Ming provided some additional detail on the role of the EAG within the RPSEA process at the request of the CM. The concern of the Committee is the perception that EAG might be representing itself as speaking for all producers. He clarified that EAG does not represent all producers, and that EAG does not specifically advocate for independent producers or anyone else. The EAG only works with non-RPSEA groups to hold events (e.g., workshops, forums, etc.). The deliverables that the EAG produces may become recommendations to RPSEA that could be reflected in the draft annual plan.

[8] RPSEA Environmental Advisory Group (EAG)
[9] Ultra-Deepwater Advisory Committee (UDAC)

Mr. Chris Hall, Committee Chair and Chair of the Executive Summary & Policy Subcommittee, then provided a brief report. There was some discussion among the members about the need to expand the statement on national security to address the important role of natural gas. There was also some comment on tax treatment of intangibles and that it was not only an issue for small producers but also for large independents and majors. Percentage depletion is an issue for the smaller producers.

Discussion and Development of Recommendations

Each subcommittee recommendation was reviewed, restructured, and reworded until the members agreed that it truly reflected their findings and represented the best statement of their recommendations. There were no instances of minority opinions; all of the revisions were agreed to by the entire group.

The Chair outlined the task of the Editing Subcommittee, scheduled to meet the following day to complete a final draft of the three work products.

The Committee Manager presented a brief overview of the Committee Calendar and next steps, including instructions for the October 22, 2009 conference call to perform a final review and approval of the Committee's report of written recommendations.

Upon completion of this final business, the meeting was adjourned.

Attachments

	Presenter	**Topic**
1	For the Record	Meeting Agenda
2	For the Record	Committee Members and Meeting Participant Attendance
3	For the Record	Meeting Packet Contents
4	For the Record	Spreadsheet of Comments Received by the Chair

Attachment 1

Department of Energy
Washington, DC 20585

Unconventional Resources Technology Advisory Committee
11th Meeting, October 15, 2009
Crowne Plaza Los Angeles Airport
5985 West Century Boulevard, Los Angeles, CA.
Meeting Room: Salon A

AGENDA

7:30 a.m. PDT	*Continental Breakfast/Check-In*	*Members & Public*
8:00	**Call to Order** / Welcome / Meeting objectives Overview of the approved agenda	Chris Hall, Chair
8:10	**Committee Business**: Verify quorum for the DFO; Update of delivery on action items from last meeting; Review of meeting packet contents;	Elena Melchert, DOE Committee Manager
8:25	**Opening Remarks** Deadline for written recommendations and comments; Legislative and budget update;	Guido DeHoratiis Designated Federal Officer Acting Deputy Assistant Secretary for Oil and Natural Gas
8:35	**Subcommittee Reports***	Chris Hall

2010 Program	Nick Tew
2007-2008 Portfolio Assessment	Sally Zinke
Prior Recommendations Review	Nancy Brown
Technology Transfer	James Dwyer
Metrics and Benefits Assessment	Sandra Mark
Policy	Chris Hall

* *Subcommittee Lead presentations = 10 minutes plus 5 minutes for clarifying questions.*

10:00	**BREAK**	
10:15	**Discussion and Development of Recommendations** *45 min. per topic*	Chris Hall and Facilitator
12:00 pm	**LUNCH**	
1:00	Continue Discussion and Development of Recommendations	
2:30	**BREAK**	
2:45	Continue Discussion and Development of Recommendations	
3:30	**Executive Summary and Cover Letter**	Chris Hall
4:00	**Instructions to the Editing Subcommittee**	
4:15	**Committee Calendar and Next Steps** October 22, 2009 12th Meeting	Elena Melchert
5:00	**Adjourn**	Chris Hall

APPROVED: _____ 10/6/09
Guido DeHoratiis, Designated Federal Officer — Date

Attachment 2

Unconventional Resources Technology Advisory Committee Meeting
Sign-In Sheet - October 15, 2009

Last Name	First Name	Organization	Sign
Anderson	A. Scott	Environmental Defense Fund	**UNABLE TO ATTEND**
Brown*	Nancy J.	Lawrence Berkeley National Laboratory	
Cavens	Jessica J.	EnCana Oil & Gas (USA)	**UNABLE TO ATTEND**
Daugherty	William S.	NGAS Resources, Inc.	**UNABLE TO ATTEND**
Dwyer	James P.	Baker Hughes	
Hall	Jeffrey D.	Devon Energy Corporation	
Hall	J. Chris	Drilling Production Co.	
Hardage*	Bob	University of Texas at Austin	**UNABLE TO ATTEND**
Julander	Fred C.	Julander Energy Company	
Levey*	Raymond A.	University of Utah	
Mark	Sandra D.	Black Hills Exploration and Production	
Mohaghegh*	Shahab D.	West Virginia University	
Sparks	Don L.	Discovery Operating, Inc.	
Tew	Berry H. "Nick"	State Oil and Gas Board of Alabama	
Weiss	Janet	BP America, Inc.	
Zinke	Sally G.	Ultra Petroleum	

Total Members = 16

QUORUM = 9

Confirmed attendees = 12
Regrets = 4

* Special Government Employee

Unconventional Resources Technology Advisory Committee Meeting
October 15, 2009

DOE Staff Roster

U.S. Department of Energy – Office of Oil and Natural Gas

Guido DeHoratiis Acting Deputy Assistant Secretary	Designated Federal Officer
Elena Melchert Program Manager for Section 999	Committee Manager

National Energy Technology Laboratory

Gary Covatch	Strategic Center for Natural Gas & Oil
Ginny Weyland	Strategic Center for Natural Gas & Oil

Technology & Management Services, Inc.

Karl Lang	Meeting Minutes Recorder/Facilitator
Rob Matey	Meeting General Support
Giovanni Ferdinand	Registration Support

Unconventional Resources Technology Advisory Committee Meeting
Sign-In Sheet - October 15, 2009

Name	Organization	Phone	E-mail
Bob Siegfried	RPSEA	281 785-2990	rsiegfried@rpsea.org
[redacted]			
Mike Ming	RPSEA	281-313-9555	mming@rpsea.org

Attachment 3

2008 RPSEA SubContracting Awards								
	6/17/2010							
				Project	RPSEA	Cost	Start	End
		Lead Performer	PI	Cost	Cost	Share	Date	Date
Unconventional Program								
08122-05	Barnett and Appalachian Shale Water Management and Reuse Technologies	Gas Technology Institute	Dr. Thomas D. Hayes	$3,140,000.00	$2,500,000.00	$640,000.00	8/11/2009	8/10/2011
08122-15	Novel Gas Isotope Interpretation Tools To Optimize Gas Shale Production	California Institute of Technology	William A Goddard	$1,549,965.00	$1,190,000.00	$359,965.00	8/28/2009	8/27/2012
08122-35	The Environmentally Friendly Drilling Systems Program	Houston Advanced Research Center (HARC)	Richard C. Haut	$2,800,071.02	$2,199,895.02	$600,176.00	7/24/2009	7/23/2012
08122-36	Pretreatment and Water Management for Frac Water Reuse and Salt Production	GE Global Research	James Silva					
08122-40	Stratigraphic Controls On Higher-Than-Average Permeability Zones In Tight-Gas Sands, Piceance Basin	Colorado School of Mines	Dr. Jennifer Aschoff	$139,018.00	$111,216.00	$27,802.00	7/22/2009	7/21/2011
08122-45	Coupled Flow-Geomechanical-Geophysical-Geochemical (F3G) Analysis of Tight Gas Production	Lawrence Berkeley National Laboratory	George J. Moridis					
08122-48	Sustaining Fracture Area and Conductivity of Gas Shale Reservoirs for Enhancing Long-Term Production and Recovery	Texas Engineering Experiment Station/Texas A&M University System	Dr. Ghassemi, Ahmad	$2,020,030.00	$1,615,000.00	$405,030.00	9/14/2009	9/13/2009
08122-53	Multiazimuth Seismic Diffraction Imaging for Fracture Characterization in Low-Permeability Gas Formations	University of Texas at Austin - Bureau of Economic Geology	S. Fomel					
08122-55	Evaluation of Fracture Systems and Stress Fields Within the Marcellus Shale and Utica Shale and Characterization of Associated Water-Disposal Reservoirs: Appalachian Basin	The Bureau of Economic Geology, The University of Texas at Austin	Bob A. Hardage	$1,275,000.00	$1,020,000.00	$255,000.00	9/29/2009	9/29/2012
			UR TOTAL	**$10,924,084.02**	**$8,636,111.02**	**$2,287,973.00**		
Small Producers Program								
08123-02	Field Demonstration Of Alkaline Surfactant Polymer Floods In Mature Oil Reservoirs Brookshire Dome, Texas	Layline Petroleum 1, LLC	Chris Lewis					
08123-07	Mini-Waterflood: A New Cost Effective Approach to Extend the Economic Life of Small, Mature Oil Reservoirs	New Mexico Institute of Mining and Technology	Thomas Engler	$402,467.00	$313,751.00	$88,716.00	8/5/2009	8/4/2011
08123-10	Electrical Power Generation from Produced Water: Field Demonstration of Ways to Reduce Operating Costs of Small Producers	Gulf Coast Green Energy	Robin Dahlheim					
08123-12	Evaluation and Modeling of Stratigraphic Control on the Distribution of Hydrothermal Dolomite Reservoir away from Major Fault Planes	Western Michigan University	G. Michael Grammer					
08123-16	Development Strategies for Maximizing East Texas Oil Field Production	UT Austin - Bureau of Economic Geology	Fred Wang					
08123-19	Application to Improved Oil Recovery for Small Producers Commercial Exploitation and the Origin of Residual Oil Zones: Developing a Case History in the Permian Basin of New Mexico and West Texas	University of Texas of the Permian Basin	Dr Robert C. Trentham	$961,934.00	$630,934.00	$331,000.00	7/8/2009	7/7/2011
			SP Total	**$1,364,401.00**	**$944,685.00**	**$419,716.00**		

EPAct2005 Small Producer Projects Timeline (Awarded 2007-2008 Projects)

10/6/2009

Year	Project (Linked to Summary)	Performer	M-08	J-08	J-08	A-08	S-08	O-08	N-08	D-08	J-09	F-09	M-09	A-09	M-09	J-09	J-09	A-09	S-09	O-09	N-09	D-09	J-10	F-10	M-10	A-10	M-10	J-10	J-10	A-10	S-10	O-10	N-10	D-10	J-11	F-11	M-11	A-11	M-11	J-11	J-11	A-11	S-11
2007	Field Site Testing of Low Impact Oil Field Access Roads: Reducing the Environmental Footprint in Desert Ecosystems	TEES					Start																								End	R											
2007	Preformed Particle Gel for Conformance Control	University of Missouri, Rolla				Start																							End	R												
2007	Near Miscible CO2 Application to Improve Oil Recovery for Small Producers	University of Kansas	Start																								End	R														
2007	Enhancing Oil Recovery from Mature Reservoirs Using Radial-jetted Laterals and High-volume Progressive Cavity Pumps	University of Kansas				Start																								End	R											
2007	Cost-Effective Treatment Of Produced Water Using Co-Produced Energy Sources For Small Producers	New Mexico Tech (NMIMT)				Start																								End	R											
2007	Seismic Stimulation to Enhance Oil Recovery	Lawrence Berkeley National Laboratory				Start																								End	R											
2007	Reducing Impacts of New PIT Rules on Small Producers	New Mexico Tech (NMIMT)				Start																																			End	R
2008	Field Demonstration Of Alkaline Surfactant Polymer Floods In Mature Oil Reservoirs Brookshire Dome, Texas	Layline Petroleum 1, LLC																																								
2008	Mini-Waterflood: A New Cost Effective Approach to Extend the Economic Life of Small, Mature Oil Reservoirs	New Mexico Institute of Mining and Technology																Start																							End	R
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2008	Application to Improved Oil Recovery for Small Producers Commercial Exploitation and the Origin of Residual Oil Zones: Developing a Case History in the Permian Basin	University of Texas of the Permian Basin															Start																							End	R	

R = Report

From: Melchert, Elena
Sent: Wednesday, September 30, 2009 10:03 AM
Subject: RE: URTAC additional project and program information

Dear URTAC Member:
An action item identified during the last meeting involved the detailed project descriptions used in the Benefits Assessment Project. A request was made that the members receive these "2-pagers" as they were called.

The Benefits Assessment Project is speeding toward its delivery date in November, and part of the process includes update of the 2-pagers. Therefore, the specific '2-pagers' are not available for distribution.

However, the URL the NETL project website below has the detailed project descriptions sought by the members. There are 1-page abstracts on each project in the 2007 and 2008 "portfolio", and there is a more detailed project description for the projects in the 2007 Portfolio.

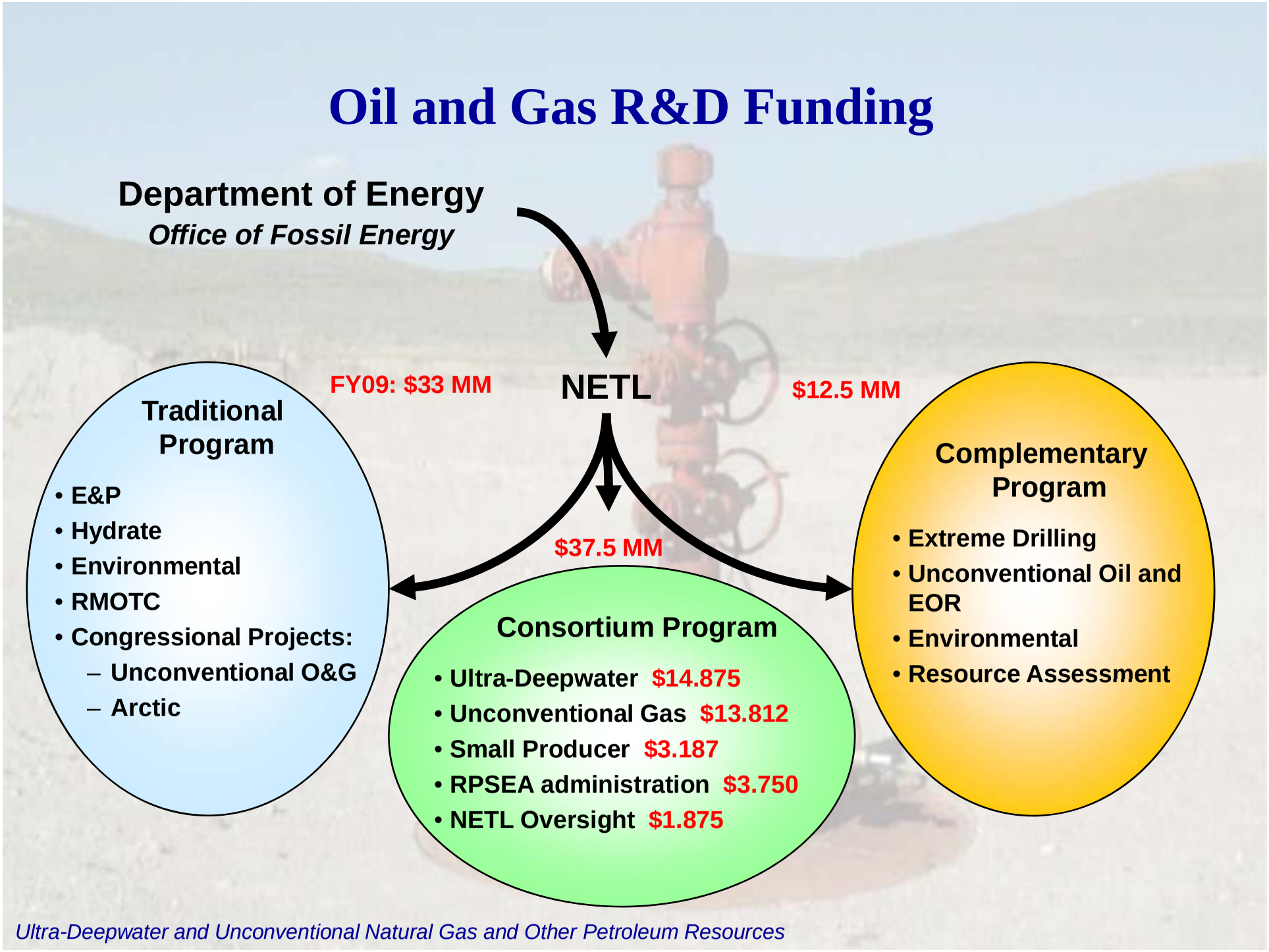
The link to the detailed project descriptions on the NETL website is:
http://www.netl.doe.gov/technologies/oil-gas/EPAct2005/Projects/Index.html#UNG

These project descriptions are easily viewed on the screen and may also be printed out.

We trust that this satisfies the action item. If there are any questions, please call me.

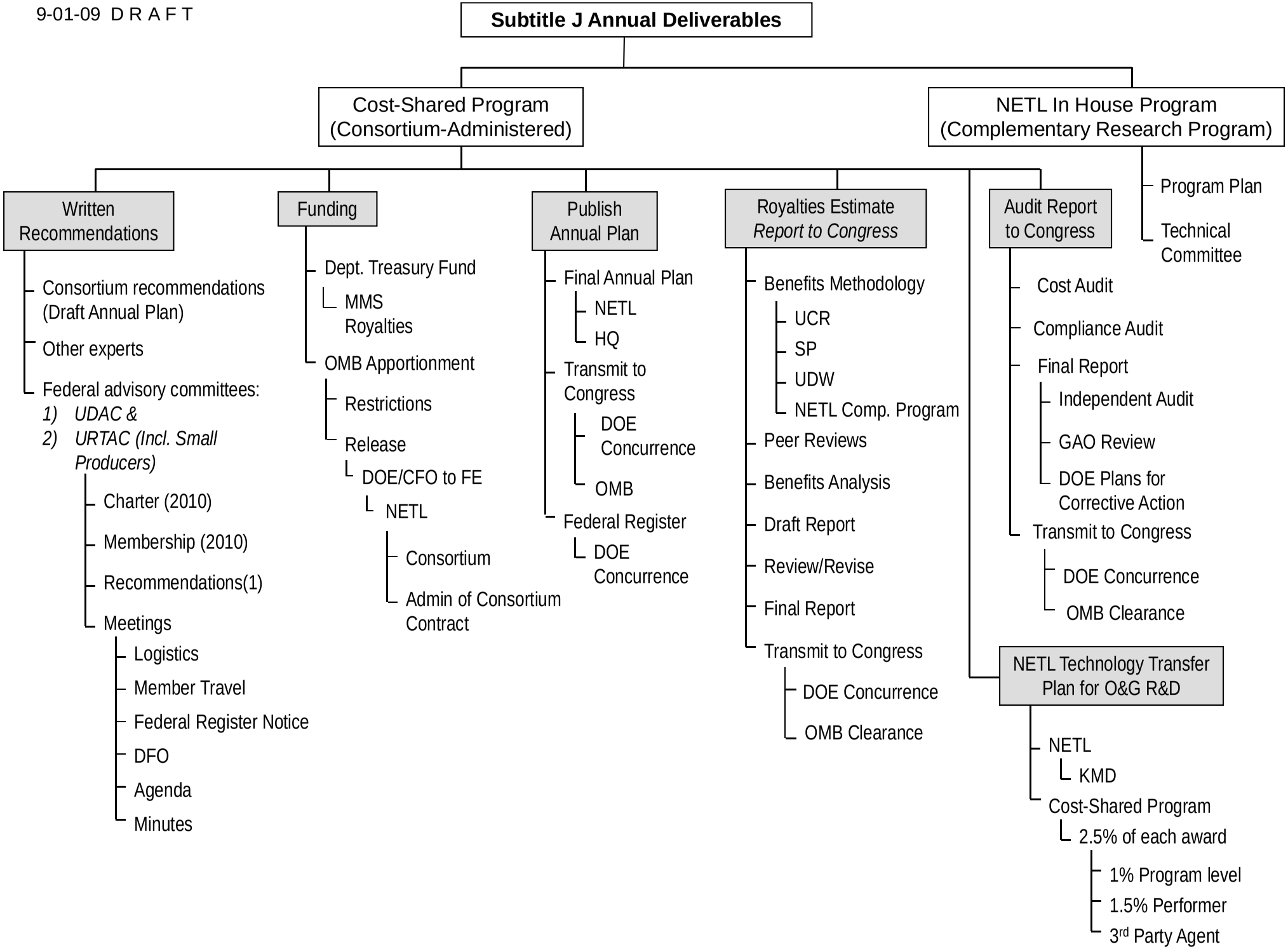
Thank you,
Elena Melchert
Committee Manager

Oil and Gas R&D Funding



Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources

9-01-09 D R A F T



Note 1: Addressed by various oil and gas R&D program areas: Subtitle J, Traditional Program, Complementary Program

Attachment 4

TABLE OF CONTENTS

EXECUTIVE SUMMARY / POLICY
REVIEW OF PAST RECOMMENDATIONS

Consists of two parts:

1) Executive Summary and Policy Statements

2) Review of Past Recommendations:

   a) For consideration of content to be carried forward into this year's report, including
      i) Recognition of elements of plan that have been implemented,
      ii) Recommendations on items to continue to be stressed,
      iii) Stressing items not addressed by the program to date.

   b) Note on color coding of the Review of Past Recommendations: The recommendations from the Committee's reports (2007, 2008, 2009) have been marked up with the following highlights:
      i) **Green:** Recommended actions have been or are being implemented. Great! The DOE/NETL/RPSEA should be recognized for following through on our recommendations.
      ii) **Yellow:** Some action is being taken. These items might be worth re-stating in the current report so that they don't drop through the cracks.
      iii) **Red:** Items where no action has been taken and is warranted.

DRAFT

EXECUTIVE SUMMARY/POLICY SECTION:

The following are general topics that can be inserted into the Executive Summary/Policy Section. This section will be expanded at the Los Angeles meeting as information is drawn from the input from the the Sub-Groups.

National Security (Sandra Mark)

Development of domestic energy sources enhances national security in a military sense as well as in economic benefit. While energy independence is not likely in the near-term, our reliance on imported oil and gas, which comes from unstable areas of the world, poses a real threat to the welfare of our country. Research which is specific to domestic unconventional resources should allow us to grow a wedge of new energy, providing some protection from future disruptions. This has already been demonstrated in the Intermountain West which is now the largest natural gas supply region in the country, having increased by 70% in the last decade and currently supplying 25% of the nation's natural gas needs. It must be emphasized that the much of the technology necessary to extract this new energy supply has been contributed by research funded by the Energy Policy Act of 2005 (EPAct).

Return on (Research) Investment (Sandra Mark)

For every dollar spent on managing oil and natural gas development, the federal government receives $20 in taxes and royalties. As mentioned before, much of the research made possible by EPAct has addressed the challenges of producing gas and oil that is contained in various impermeable deposits beneath public lands in the Western US. The federal regulatory process holds up the exploration and development of these leases, preventing or delaying the economic reward that the federal government and the nation's taxpayers should enjoy from the research.

Tax Incentives (Sandra Mark)

In order to implement technology resulting from EPAct research, tax incentives such as expensing intangible drilling costs must continue to be available to domestic producers. Furthermore, it is recommended that new incentives for small producers (which are significant users of technology) be available in the early stages of technology application.

Environmental Information (Sandra Mark)

It is essential that the elected officials responsible for approving funding for energy research understand that environmental concerns are addressed at every step. For example, the technique of hydraulic fracturing or "fracing" has long been recognized as a method to access oil and gas in impermeable formations. Past and future EPAct research has done a great deal to improve this technology. The recent allegation that fracing threatens drinking water supplies appears to be unfounded, considering that there has been 60 years of safely implementing the technology. Such concerns distract regulators away from other activities that are truly high risk, and are unnecessary since the activity is already regulated by local, state, and federal regulations.

There has been significant effort by all parties (DOE/NETL and RPSEA) to implement many of the recommendations made by the URTAC reports for the previous draft annual plans (2007, 2008 and 2009). Thus the cumulative effect of the URTAC over the last few years is showing and has led to significant improvements in the plan. Specifically:

- The importance of Technology Transfer has been addressed by both RPSEA and DOE/NETL. DOE is to be specially commended on providing the additional program funding needed for an effective TT program through the complimentary program.
- NETL has implemented a Knowledge Management Database that is being rolled out to industry and is being exceptionally well received.

Secure funding of the Section 999 program continues to be a significant concern. The Administration's proposal to repeal funding is very detrimental to the conduct of an effective program. The 2010 Draft Annual Plan speaks for the value of the program…..

It is the expert and professional opinion of the URTAC that the program as implemented has a measurable return on investment; it is well implemented, leveraged and reviewed. It is well worth the nominal investment for the producer and the country.

The reinvestment of royalty revenues in the Section 999 program is a responsible expenditure; just as any private landowner needs to actively manage their minerals so as to maximize the value of their asset.

POLICY

2008 Executive Summary Finding:

- The Committee has confidence that the program consortium, Research Partnership to Secure Energy for America (RPSEA), will continue to implement the program consistent with our recommendations.
- The Federal government has the opportunity and responsibility to provide leadership in helping coordinate, develop and disseminate the results of research and development programs in the area of Unconventional Resources and related to Small Producers for public benefit and National security.

(2007: Exec Summary: Finding) Successful execution of this research and development (R&D) program will materially contribute to U.S. supply of oil and gas both today and beyond the 10 year R&D horizon. It is the consensus of this Committee that the resource potential impacted by this technology program is significant and of major importance to the Nation. There is a critical need for a sustainable and consistent approach to the technology challenges facing unconventional resource development.

2008: Executive Summary Finding:

- The general public and many elected leaders are apparently unaware of the importance of domestic oil and gas production in supplying the country's energy needs; without it we will not be able to provide sufficient energy to satisfy the increasing demand during the next ten years or longer. It will take at least that long for some of the alternate renewable resources to come on line in meaningful quantities. We believe that anything that can be done to ensure the responsible development of our domestic petroleum resources is essential to help bridge this gap.
- Successful execution of this research and development (R&D) program will materially contribute to U.S. supply of oil and gas both today and beyond the 10 year R&D horizon. It is the consensus of this Committee that the resource potential impacted by this technology program is significant and of major importance to the Nation. There is a critical need for a sustainable and consistent approach to the technology challenges facing unconventional resource development.
- The Committee believes the Plan and the procedures followed in its development to be professional and inclusive, with a significant infusion of industry knowledge.
- These Independents are faced with unique and ever more difficult technical challenges in developing new unconventional resources, yet they often lack the means to undertake R&D programs. Therefore, the Federal government has a responsibility to provide leadership and to help fund and disseminate the results of R&D programs for public benefit

2008 Program funding:
The Committee recommends the following for annual funding levels:

- full funding of the Section 999 program at the $50 million annual level now set by the 2005 Energy Policy Act, plus

2009 Plan: Policy:

- As an advisory committee, the URTAC's focus is on commenting on the Unconventional Natural Gas, Other Petroleum Resources and Small Producers Program 2009 Draft Annual Plan. Nevertheless, URTAC would like to identify outside influences and issues which could adversely impact domestic oil and gas production with the hope that they can be addressed by the Department of Energy or elsewhere in carrying out the elements of the Section 999 Program.

2007 Plan: The Committee believes that if the FRederal government does not sponsor research like this, much of it will not happen.

2008 Program Funding:

- The Committee recommends the following for annual funding levels:
  - a one-year addition of a second $50 million (as proposed by H.R. 4156) and
  - ultimate amendment of Section 999 to raise annual funding to a total of $150 million from royalties, based on continuing Program success.
- The Committee recommends the following for Section 999 program duration:
  - Congressional clarification that the "sunset" provision will last through at least 2017 (rather than being cut off in 2014) and
  - ultimate amendment of Section 999 to extend the program funding and "sunset" provisions to 2030, based on continued Program success.
- The Committee strongly recommends that the program reach out broadly to all oil and gas producing regions of the United States.

2008 Program: Plan Recommendations:

- OMB should respect the technical expertise of the industry and academic contributions that are reflected in the Plan and limit its reviews to policy issues.
- RPSEA, NETL, and DOE headquarters should weigh the findings, analyses, timetables, and recommendations of National Petroleum Council in their report FACING THE HARD TRUTHS ABOUT ENERGY: A Comprehensive View to 2030 of Global Oil and Natural Gas, 2007,
- The DOE needs to be actively involved in Federal, state and regional decision-making processes that may result in regulations that impact development of oil and gas resources, to ensure that larger national energy needs are taken into account.

2009 Plan: Policy:

- Oil and gas will continue to provide a significant amount of energy to the United States during the next 20 years, even with significant efforts to increase alternative and renewable resources. Therefore, every effort must be taken to ensure that petroleum resources are developed to the maximum extent possible. A national goal of recovering an additional 30% of the existing reserves is achievable and warranted.

- The Federal Government oil and gas Research and Development (R&D) and Technology Transfer (TT) programs are extremely important for maximizing domestic production for many reasons: (1) Federal programs serve to develop and transfer technologies that are not proprietary and thus are available to all producers, both large and small; and (2) as a major landowner and tax recipient, the government should actively manage its minerals and revenue streams. Participating in R&D and ensuring the effectiveness of TT mechanisms is an important undertaking to fulfill this responsibility and to be an effective steward.
- The creation of a multi-department study (e.g., Energy, Commerce, and Interior) to bring together existing information and to assess the potential of the domestic oil and gas industry to meet the nation's energy needs is warranted, so that oil and gas can make its contribution. Such a study could also be tasked to assess the impediments to resource development and the effects of changes in tax treatments.
- The Federal Government become actively involved as an advocate of domestic oil and gas production. This could be accomplished by the Department of Energy through their own outreach efforts or through entities (e.g. the Interstate Oil and Gas Compact Commission (IOGCC)). Failure to take action could result in the loss of access to reserves and production capability, off-setting any benefit provided by R&D and Technology Transfer efforts.

PROGRAM

2008 Plan: Program Solicitations:

- It is important to encourage collaborative efforts between producers and partners (e.g., universities, service companies) at the outset of writing the proposals,
- The 2008 plan needs to ensure that all potential solicitations are considered and consortia are encouraged by the application process.

2008 Plan: Other Petroleum Resources:

- The DOE planning team should include activities designed to address these technology gaps in the 2009 RPSEA solicitation and/or the 2009 Complementary program.

(2007: Recommendation)
Production Research:

- Extend life of existing reservoirs
- Extend life of existing wellbores through fluid loss additives, behind pipe pay identification, etc…
- Advance cementing practices and technology: reduce microannulus development
- Emphasis as a focus area in the solicitation for proposals under shale gas and tight sands: comprehensive characterization of the geological, geochemical and geophysical framework of unconventional resources plays, particularly emerging plays.

(2007 Recommendation): Program:

- The Sec 999 speaks of two Unconventional onshore resource categories: natural gas resources and "other petroleum" resources. The 2007 Plan seems to exclude "other petroleum" resources" as a topic. The draft plan contemplates no R&D awards by the Consortium for "other petroleum" during the first year.

2007 Recommendation: Exploration Research:

- Exploration in Emerging and/or Frontier Basins with an Emphasis on the Characterizatin of Shale Gas Reservoir Systems.
- Improve strategic planning process for exploration R&D: the Committee encourages additional investigative efforts, including workshops and surveys with an emphasis on shale gas to complement the existintg strategic plan. More specifically, this process hould focus on Exploration technologies deemed critical by representatives from industry.

2007 Program: Plan Metrics and Funding:

- The committee strongly recommends extending the program to all oil and gas producing regions of the United States. While individual grant projects in the first year may be situated in one region, plans should be announced early in the program to place projects in other regions.
- The technology transfer component should extend to various regions of the country starting in the first year.

2008 Plan: Program Solicitations:

- The 2008 plan should increase its solicitation focus on the areas which may have been under-addressed in the response to the 2007 solicitation, including but not limited ~~to water management~~, drilling, stimulation and completion practices.
- Either through workshops, pre-solicitation advice, proposal writing seminars or other means, applicants need to be encouraged to respond and be assisted with proposal preparation in order to ensure potentially worthwhile proposals are not disqualified for technicalities.
- RPSEA, NETL, and DOE headquarters should objectively assess what dividends the Section 999 program might reap from greater flexibility in solicitation and contract negotiation.
- The Program should include solicitation of research projects to develop innovative models for technology transfer.

2008 Plan: Other Petroleum Resources:

1. As part of the planning process for the 2009 Section 999 plans (both RPSEA and Complementary Programs), the DOE planning team should continue to review assessments of the domestic onshore "other petroleum" resource base (inclusive of but not necessarily limited to heavy oil, tar sands and fractured oil shales) and identify an initial set of technology gaps that would advance activities in this area.

2009 Plan: Research Focus:

- In order to be comprehensive, the Draft Annual Plan needs to include research related to shale gas and oil, coal gas, heavy oil, unconventional oil and environmental issues.
- The research areas be expanded to include:
    - Geosciences as applied to exploration, drilling, stimulation, and re-stimulation:
        - Developing surface-based and borehole-based technologies that identify drilling sweet spots
        - Characterizing fracture attributes (orientation, intensity, openness, and type of fluid)
        - Optimizing the position and orientation of vertical and horizontal well bores
        - Determining stress fields
        - Improving the design and implementation of hydraulic fracturing
    - Basin analysis and real-time resource exploitation:
        - Characterizing geological, geochemical, geophysical, and operational parameters that differentiate high-performing areas or fields
        - Developing and demonstrating techniques to analyze large volumes of data in real-time for application during unconventional resource development
        - Developing real-time simulation and modeling of reservoirs
    - Stimulation and Completion:
        - Developing stimulation methods that require less water and other fluids to be injected into the subsurface
        - Developing stimulation methods that result in a lower volume of treatment fluids produced to the surface

        - Demonstrating approaches for improved treatment, handling, re-use and disposal of fluids produced and/or used in field operations
        - Improving fracturing and stimulation techniques in gas and oil shales
    - Novel concepts
        - Enhancing coal gas production over time
        - Developing biological, reservoir engineering / hydrological methods.
    - Other Petroleum Resources
        - Heavy oil, tar sands, tight oil sands and oil shales

2009 Plan: Program: Near Term Impacts

- An emphasis needs to be placed on evaluating funded projects to document “early success”. Those developments need to be rolled out to the industry as soon as possible (prior to completion of the research) to encourage industry support. This will also allow for early assessment of the technology transfer process and identify areas for improvement.

- Encourage researchers to be knowledgeable of prior or on going research within the industry, academia and national labs. This includes placing emphasis on solicitations which leverage technologies developed by other industries.
- The plan needs to ensure, that along with long term research, some short term projects with potential for early application are emphasized.

TECHNOLOGY TRANSFER:

(2007: Recommendation)
Technology Transfer:

- The Technology Transfer component of the program needs to be better formalized.
- Program should consist of both technical forums with prblished proceedings and web based Knowledge Management database.
- All TT should be a part of an on-going program, as isolated TT efforts for individual R&D projects have proven to not be as effective as those done as part of an on-going coordinated effort.
- Leverage funding by use of existing programs for the TT component of the DOE program whenever possible, such as PTTC. Fewer dollars would have to be spent than that required to maintain separate program. There would also be a wider dissemination of information.
- Technology transfer funding needs to be effectively leveraged all aspects of the program to ensure a maximum benefit by augmenting and concentrating available funding resources.

2008 Program: Technology Transfer:

- For any R&D program to be successful, its TT component must be implemented early, coordinated and used often. The 2008 Plan should include a strong, timely, proactive TT framework.
- Partnerships with existing TT mechanisms (i.e.: especially recognized programs such as the Petroleum Technology Transfer Council (PTTC)) should be encouraged, thereby ensuring that they are in place to carry out the TT needs of the program.
- Consideration should be given to coordination of TT between the Consortium program and DOE traditional R&D programs. A principal need of Small Producers is TT in the form of workshops, seminars and demonstrations. Funding needs to be specifically allocated for TT independent of the specific projects or else it will not be done in an effective manner. The current Plan does not provide for this.
- A strong recommendation is to supplement funding from other sources such as the NETL Complementary Program, so that at least $750,000 is set aside for overall TT dissemination

2009 Program: Technology Transfer:

- The Advisory Committee commends DOE, NETL and RPSEA for the actions taken in implementing prior committee recommendations. Both the Consortium and Complementary Programs provided a very comprehensive response to the need to develop a robust technology transfer program and knowledge management system.

2008 Program: Technology Transfer:

- Technology transfer (TT) must be designed as a fundamental part of any Research and Development (R & D) program; all too often it is left as an afterthought to be dealt with at the end of the program. The TT requirements must be planned before any R&D grants are awarded; if the TT component is not addressed until the end of projects there will be little effective dissemination of information, resulting in overall marginal benefit at best.
- Researchers need to provide results in an understandable format that is useful to small operators who do not have research or large professional staffs.
- Research project guidelines need to clearly define how TT is to be accomplished; TT efforts should not be limited to published papers in highly technical journals and websites. It needs to be "pushed" to producers who will benefit from its implementation.
- Researchers need to have a clear understanding that TT needs to be at least partially funded by their research contract; and that the effective accomplishment of this component determines whether or not their project was a success.

2007 Recommendation: Technology Transfer:

- Technical forums should provide information of interest to the widest audience of producers possible for maximum dissemination (national coverage)
- The TT component of the program should be to satisfy the "metric of measurement of success" of extending the program to all petroleum producing regions of the United States.
- The most beneficial use of funds for the Small Producer Program is for technology transfer. The Small Producer component of the Program provides the opportunity to extend the program to a much larger audience whose needs are vastly different than those of larger producers. However, with the limited resources abailable, significant changes need to be made to the proposed program:
    - The funding for the Small producer Component should concentrate on producer education, and be focused on on-going regional problem identification and technology transfer to solve existing problems.
    - Given the limited resource s available, R&D shouldn't be a focus of this component of the program. R&D projects sholdn't be developed with just "small producers" in mind; R&D benefits all producers.

2009 Program: Technology Transfer:

- . It is imperative that technology be transferred effectively to all producers, especially small producers.

KNOWLEDGE MANAGEMENT DATABASE:

(2007 Recommendations): Knowledge Management Database:

- A Knowledge Management (KM) Database resource needs to be established and maintained.
- The preservation of data from the R&D projects and Technology Transfer program must be retained in a database for maximum dissemination (both near and long term) to the end users. Elements of a successful database resource should include:
  - DOE should identify funding for the creation of a database or customization of an existing database as a repository for the information created.
  - Project requirements should specify that a portion of the 2.5% TT funding component be used to create information to be input into web-based Knowledge Management database.
  - The RPSEA should be required to ensure that R&D results be put into a Knowledge Management database to serve as a resource of technology for producers.
  - KM should have the following aspects: be web-based, user sign-in and password (requires registration but open to public); standard template format for input; subject matter review process; a knowledge push and/or community notification system to stimulate and maintain interest; and expected criteria for success.
  - Existing petroleum technology transfer databases such as the one already developed by the Petroleum Technology Transfer Council (PTTC) should be used to the maximum extent possible to reduce development and maintenance costs.

2008 Plan: Knowledge Management Database:

- The results of any research projects must be captured and preserved as part of a national database available to everyone. This will maximize the benefit of the R&D program funds invested

2009 Plan: Technology Transfer:

- The plan should specifically outline the steps necessary to communicate the results of the research and technologies developed. Specifics should include:
  - Communication to industry of the existence of a Knowledge Management System.
  - Organization of the communication plan such that it has the widest possible dissemination yet leverages the networking ability around basins.
  - Access protocol to the Knowledge Management System so as to provide the necessary metrics to monitor and evaluate the system.
  - Implementation of supply chain improvements to provide greater access and to minimize the costs for small producers.
- The Knowledge Management System of the Unconventional Resources and Small Producer Program should be linked as soon as possible to other knowledge management resources, including other programs managed by DOE (such as the Ultra Deepwater Program). The databases should have a similar taxonomy look and feel.

- The Section 999 Plan stipulates that a portion of every research project be dedicated to technology transfer. The Advisory Committee recommends that this effort not be done solely within the individual projects but through established knowledge management and technology transfer systems, thereby leveraging the funding by consolidating the efforts and maximizing the benefits to the end users.

2009 Plan: Knowledge Management Database:

- When awards are made, RPSEA must clearly identify the expectations of researchers for the dissemination of information for use in the knowledge management system and technology transfer efforts, including implementation of the consolidated knowledge management and technology transfer systems.
- Utilize the latest and most appropriate-to-task communication technologies to launch and promote the Knowledge Management System, including electronic resources such as web based seminars and computer based education systems. These are proven cost effective systems to deliver or push information to the communities that can best benefit.
- Once a knowledge management system has been developed, metrics are necessary to evaluate and communicate successes. The program should consider:
  i) Knowledge management entries
  ii) Readership or subscription trends and totals
  iii) Multiple user or access trends and totals
  iv) Transfer successes, case studies, and testimonials
  v) Peer review functionality
- The program should utilize organizations and conferences to promote the knowledge management system and technology transfer process. The program should focus on early knowledge application and transfer successes by communicating these successes through the consortium system itself as well as outside organizations, industry publications and conferences. The database cannot replace the effectiveness of regionally focused workshops organized through local producers and small producer organizations. These must be worked in tandem.

ENVIRONMENTAL & REGULATORY:

(2007: Exec Summary: Recommendation)
The Committee recommends the following guiding principles: Water and Environmental Management:

- Catalogue (identify, compile and compare) existing technology and solutions for treating produced waters.
- Develop new or improve on existing technologies to treat and reuse produced water in an economical and "fit for purpose" manner. The purposes, not in order, include: petroleum operations (e.g., fracturing and drilling fluids and cementing), agriculture, industrial processes, or other potentially beneficial uses.
- Develop fracturing and drilling fluids (in that order) capable of tolerating treated produced water and recycled fracturing fluid based water.

(2007: Exec Summary: Recommendation)
The Committee recommends the following guiding principles: Production Research:

- Integrate CO2 sequestration/enhanced recovery
    - The program incorporate one or more elements regarding the sequestration of carbon dioxide along with enhanced recovery efforts
    - Program managers should consult with national laboratories and other industry experts to determine how best to integrate R&D activities regarding sequestration with the larger DOE program.

2007 Recommendation: Exploration Research:

- Minimize the Exploration Footprint: The Committee recommends soliciting proposals in the area of exploration technology research that will reduce surface disturbance and infrastructure development, prioritize and reduce the number oif drilling locations and promote greater drainage efficiency and strive to reduce water impacts for unconventional resources. Take the lessons learned from developed field s and apply them to the exploration phase of new plays. The results of greater understanding and better characterization of developing plays will be more orderly development process and ultimately a minimal footprint.

2009 Plan: Environmental:

- Resource development and environmental responsibility are important objectives that should be addressed together; environmental responsibility is a fundamental aspect of resource development.
- Water Management
    - Developing methods for the treatment of produced water and fracturing fluids at intermediate and high total dissolved solids (TDS) in order to minimize the potential impact on natural water resources
- Environmental:
    - Developing site selection criteria that minimize the surface footprint and the impact of drilling and production operations

- Developing surface mitigation methods applicable to all environments
- Developing technologies to recycle water

(2007: Exec Summary: Recommendation)
The Committee recommends the following guiding principles:
Water and Environmental Management:

- Minimize impacts to natural and cultural resources, sustain biodiversity, and use these considerations in the criteria for project selection
- Minimize fresh water usage and encourage use of recycled fluids.
- The improvements to development opportunities comprising the thrust of the Plan should be with an explicit view to minimizing impacts to natural and cultural resources and sustaining biodiversity, and these considerations will be used in the critieria for project selection.

(2007: Exec Summary: Recommendation)
The Committee recommends the following guiding principles: Inter-Agency and Other Stakeholder Coordination:

- Coordinate with Federal and State resource entities such as the U. S. Fish and Wildlife Service, Bureau of Land Management, U.S. Forest Service, State Environmental Agencies and State Resource Agencies.
- Timely release of research results by Federal agencies (including DOE, EIA, and USGS) to the oil and gas exploration and development community, can advance understanding of unconventional resources. We recommend an examination o whether agency regulations or policies may so impede such releases as to merit a "best practices" research solicitation.

2009 Plan: Environmental Concerns:

- DOE with Department of Interior establish an entity of work with various parties including industry, NGOs, state regulators, other federal agencies and others to explore mechanisms to balance environmental responsibility and resource development concerns.
- Water Management:
  - Developing techniques to minimize the volume of water produced to the surface
- Environmental:
  - Developing technologies for detection and capture of emissions from unconventional oil and gas operations
  - Assessing environmental impact and viability of oil shale production.

(2007: Exec Summary Recommendation)
Regulatory:

- Regulatory barriers should themselves be a subject for research, as well as considerations in the R&D process.
- Organizae and bring together key individuals from academia, regulatory entities, non-governmental organizations and industry, for ne-day brainstorming session(s) to identify key regulatory barriers/issues.
- Catalogue (identify, compile, and compare) regulatory barriers/issues (Federal, state, or local) relating to unconventional gas development.

- Identify and recommend regulatory best practices that can serve as flexible models for other governmental bodies to develop rules that allow unconventional gas resources to be produced effectively and efficiently.

2008 Program: Technology Transfer

- The Program needs to identify, capture and document Best Practices identified during the R&D projects so that they can be incorporated into the TT program. Special emphasis should be placed on identifying Best Practices in critical areas such as environmental protection (including minimizing footprint and conserving or mitigating for biodiversity impacts) and reduction of wastes.

METRICS & BENEFITS:

2007 Plan: The Committee recommends the following guiding principles: Exploration Research:

- Metrics should be established to measure the success of the program. A committee of industry and other stakeholders should be established for this purpose.

2007 Plan: Plan Metrics and Funding:

- The Committee recommends development of metrics by which to measure the success of the program that go beyond those that are required by statute (e.g., impact on Federal royalty revenues) to include others that may be of concern to various stakeholders. Metrics of program successes must serve purposes of both inernal assessment and outside review, such as:
    - Increased resources and reserves (both technically recoverable resources and increased economic reserves due to apolication of new technologies and reduced operating costs).
    - USA jobs retention and/or growth.
    - Environmental: reduced footprint and reduced emissions.

(2007: Exec Summary: Recommendation)
The Committee recommends the following guiding principles:
Plan Metrics and Funding:

- The program should extend to all oil and gas producing regions of the U.S.
- The deposit of full $50MM of no-year, non-appropriated funds into the Ultra-Deepwater and Unconventional Resources Fund must continue

2007 Plan: Metrics Needed:

- Increased identified resource endowment in areas where they are not well quantified and reduced uncertainly of resource volume.
- Increased recovery factor of oil in place due to apolication of new technologies.
- Increased revenues to operators and royalty owners and, consequently , increased revenues to the local, state and Federal government.
- Oil and gas production contribution to Gross Domestic Product
- Off-setting of imports of oil and gas and, consequently, on improved Balance of Payments.
- Technology exposure consisting of number of case studies developed, tedchnology transfer events held and number of producers exposed to technologies that will result in production of additional reserves.

2010 DRAFT ANNUAL PLAN RECOMMENDATIONS

COMMENTS ON THE 2010 PLAN

Subcommittee Members: Jeff Hall (Head), James Dwyer, Jessica Cavens, Don Sparks, Bob Hardage, Nick Tew

The Advisory Committee is pleased that its recommendations have been addressed with responsive changes and incorporated into the plan. It is the opinion of the URTAC that the program as implemented has a measureable return on investment, is well implemented, leveraged and will provide significant value for the nominal investment.

Additional comments are:

- The plan should emphasize development of techniques to adequate cement across intervals with water flows.

- The plan should address development and improvement of re-stimulation techniques

- The plan should emphasize research to determine the quality of source potential of oil and gas bearing shales from logging.

- The plan should continue to emphasize development of technologies to utilize non potable water for fracture stimulation and subsequent treatment of the recovered waters for reuse.

- The plan should emphasize methods to effectively produce oil from shales.

Other specific comments (corrections or improvements to the document) are:

- p. 24, next to last paragraph--instead of 615 BCF, they mean 615 TCF
- p. 28, 1. b. iii.--I would change this to read "Characterize fracture development and attributes (controls on development, orientation, ..."
- p. 28, 1.b.iv.--change to "Develop methods to understand and optimize
- p. 28, 1.b.v.--now redundant to above
- p. 30, g.--I would add another bullet, to wit "Methods for comprehensive characterization of shale gas reservoir quality from physical rock data (cores, etc.) using petrographic, physical, geochemical and other appropriate analyses."
- p. 30, i.--Most of this is redundant, both internally and with other sections. I know that it is important to get the environmental piece in, but should be crafted better.
- p. 31, first paragraph, last sentence--change to read "...to partner with universities, state geological surveys and similar entities, and service companies, who are familiar with this process."

2007, 2008, 2009 PROGRAM PORTFOLIO REVIEW

DOE URTAC: 2010 DRAFT ANNUAL PLAN REVIEW

"2007, 2008, 2009 PORTFOLIO REVIEW" SUB-GROUP RECOMMENDATIONS:

1. The project portfolio review should be continued as an integral part of the process, and should expand to encompass an annual review of as much as possible of the entire portfolio of active and recently completed projects. The existing Portfolio Review Sub-Committee should continue to serve in order see that this recommendation is carried out. Nevertheless, the maximum number possible of Committee members should participate in the Project Portfolio Review process.

2. The project review process should be done in conjunction with an industry symposium or other such event sponsored by the DOE/NETL so as to facilitate both Tech Transfer to the producing community and consistency and consensus of the URTAC reviewers.

3. A rating sheet should be designed for URTAC portfolio reviewers which specifies and provides measurement of deliverables, progress, timing, tech transfer, budget, and demonstration of industry partnerships. At the time of review, each project should provide a one page summary in common format detailing project specifics.

4. The Section 999 program should include as a requirement that specific Tech Transfer methods and measurables should be required for each project; furthermore, metrics of program success should include the evaluation that this has been accomplished.

5. The project review needs to require geographic diversity as it relates to producing regions, maximum national exposure and specific inclusion of small producer projects. Currently, the projects are focused on specific regions while not impacting the remainder of the oil producing areas of the country.

KNOWLEDGE MANAGEMENT & TECHNOLOGY TRANSFER

Knowledge Management

In previous reports, the Unconventional Resources Technical Advisory Committee recommendations were such that a more modern and accessible knowledge management database was critical to the success of the Unconventional Resources and Small Producer programs. In the 2007 URTAC committees' report, a web based system was identified as needed to disseminate research and development activities, lessons learned and knowledge management around Unconventional Resources and Small Producer Programs (Section 999) to those communities. The vision was such that after such a database was completed it could be extended to other oil and gas research programs.

Such a knowledge repository has an almost limitless potential to the oil and gas and environmental interests around not only Unconventional Resources but other Department o f Energy programs. Considering the savings or payback realized by similar private industry databases the payback could exceed the annual cost of the Unconventional Resources, Small Producer and Deepwater programs in 3-5 years.

Since the original recommendation was made in the 2007 plan NETL has taken the responsibility to develop such a system called the Knowledge Management Database (KMD). All the committee's requirements have not only been met but exceeded by this new web enabled database. The KMD system is scheduled for public launch in October of 2009. By the time this report is submitted to the Secretary of Energy this database will be available at **www.netl.doe.gov/KMD**. The components of this new KMD include:

- Program Status
    - **A list of projects goals, objectives, status, accomplishments, reports and key personnel contact information**
- The RPSEA Consortium R&D Program
    - **57 project summaries currently available on the NETL Internet**
- NETL Complimentary R&D Program
    - **Drilling under extreme conditions**
    - **Environmental impacts of oil and natural gas development**
    - **Enhanced and unconventional oil recovery**
    - **Resource assessment**
- Ongoing DOE Oil And Gas Programs

- Other Related Research Products Generated by the Traditional Oil and Gas Research Program At The NETL SCNGO (e.g. Gas Shale Research)

In addition to these requested attributes. The system will also include:

- Search Tools for NETL's CD/DVD document and "historical arcive" database
- GIS and ArcGIS functionality – mapping of US O&G information and geographical databases.
- Xcelsius models providing visualization of O&G information and more importantly access to Outer Continental Shelf Models that provide information on water resources and environmental data pertaining to drilling in the Allegheny National Forest.

In this annual review URTAC wishes to recognize those involved in the development of the database. This undertaking not only involved a tremendous amount effort and commitment from the authors but was achieved with very little budget allocation.

Proposal to potentially strike this paragraph:
In the previous committee's reports it was recommended that 2% of the value of each Research and Development project awarded be allocated to Knowledge Management and outreach programs. The Knowledge Management Database (KMD) has been developed using less that ½% of allocated budget. In addition to a Knowledge Management Database (KMD) the remainder of the allocation was to go to education and outreach programs utilizing third parties. With the success of this KMD program the committee recommends that this allocation be reversed and 1 ½ % be allocated to further KMD web based platform developments while ½% is allocated to education efforts though third parties.

METRICS AND BENEFITS MEASUREMENT

Metrics & Benefits Assessment Subcommittee of URTAC
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Metrics & Benefits Assessment

The ultimate value of the DOE research is its significant contribution to the economic well being and the energy security of the nation. While the past and proposed research focuses are compelling and appropriate to advance these benefits, the metrics used to assess the projects can be improved. It is suggested that "backward-looking" models and fuzzy logic be utilized, risk and uncertainty be quantified, the NETL Benefits Analysis be published in a peer-reviewed paper, and metrics be developed to assess the effectiveness of technology transfer.

Findings Pertaining to Benefits Assessment

For decades the DOE has recognized the energy security benefits of domestic oil and gas exploration and development. As oil imports have increased over the years, so has our vulnerability to supply disruptions that could have an adverse affect on daily life as we know it. Other countries are using their energy assets as leverage to negotiate financial and political objectives and the U.S., through research programs like this, can limit its exposure to the problems of supply disruption. As for natural gas, thanks to new technology, much of it developed or enhanced by EPAct research, the U.S. is now almost completely natural gas independent. It is apparent that research which is specific to domestic unconventional resources should continue to allow us to grow a wedge of new energy, thus providing us with some protection from the dangers associated with our dependency on foreign oil.

Economic security and fiscal well-being of the country are closely linked to energy supply; improving that supply through new technology directly or indirectly benefits all sectors of the economy. The Potential Gas Committee announced in June that it estimates that the U.S. has 2,100 TCF of technically recoverable natural gas, up 35 percent in two years. With such a strong resource base, greater use of natural gas through technology and application will strengthen economic security by development of a domestic resource, reduce our dependence on imported oil, and reduce pollution (CO2), hydrocarbons, aerosols and their precursors.

Recommendations for Metrics Improvements

A "backward-looking" model should be constructed to assess how past technology successes have resulted in increased reserves and/or production. Since data for previous projects funded by DOE are available the current benefit analysis technique can be

calibrated and tested with such data. DOE may select any project that it sees fit in order to perform such analysis. Given the fact that several of the parameters that are involved in the newly developed technique include parameters that require assumptions, previously completed programs can help in identifying the most appropriate and realistic assumptions for the model.

Utilize fuzzy logic to turn words into numbers so that vague or uncertain concepts may be quantified. Fuzzy Set Theory has been defined as the science of calculating with words. Since many of the parameters used in the benefit models are semantic in nature use of fuzzy set theory may prove quite useful in order to address the vagueness and uncertainties that are associated with the parameters that are used in this methodology.

As suggested by other reviewers, risk and uncertainty should be an important component of the benefits calculation. Instead of providing one number for recoverable resources or increased production, give a range of values. A model of this type involves many input variables that are each uncertain and as such are responsible for propagating uncertainties to the model output variables like cost savings. It would be useful to determine the variables that model output has the greatest sensitivity to, and determine how uncertain each of these is. The extremes of these uncertainties could then be used as input to determine how the output variables would be affected. This could be done with three or four of the most significant input variables to put some error bounds on the output, or a full Latin Hypercube Monte Carlo treatment could be conducted. The model output would be more credible if this were to be done. However, this approach should be used with caution. While there are scientific benefits for multiple point projections and analysis, they can also be used to tear down a study based on the low point curve.

Publish the NETL Benefits Analysis in a peer-reviewed paper to add credibility to the analysis and to improve the methodology. Having the research peer-reviewed indicates that experts in the field have judged the work worthy to appear in a peer reviewed archival journal. Conscientious reviewers make suggestions that improve the paper either through clarification or by detecting errors. Review also lends credibility to the work because it indicates that the research community has judged the research product favorably. Review would strengthen the credibility in the methodology used to estimate of cost savings that this study has estimated. An archival publication of high status is preferred. FLC News might be considered as another possibility; a recent article on the GAO study on DOE program metrics and technology transfer (TT) addressed continuing problems.

Because the importance of technology transfer is recognized in the program, there should be a metric developed which measures how the program is being implemented so as to insure that it is reaching the oil and gas producing community as it should through adequate technology transfer.

ENVIRONMENTAL

Report of Environmental Sub-committee

1) The Committee should review prior URTAC recommendations to determine if there are any points which should be re-visited.

One of the issues that we have paid little attention to is greenhouse gas emissions and sequestration of carbon. This is mandated by the statute. The 2010 draft report on page 54 states:

(a) *In General*.--The Secretary shall carry out a program under this subtitle of research, development, demonstration, and commercial application of technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production, including addressing the technology challenges for small producers, safe operations, and environmental mitigation (including reduction of greenhouse gas emissions and sequestration of carbon).

And RIPSEA's response to the statute is:

RPSEA Mission, Goals and Objectives
The primary mission of RPSEA with regard to Section 999 of EPAct is to administer a program of *"research, development, demonstration, and commercial application of technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production, including addressing the technology challenges for small producers, safe operations, and environmental mitigation (including reduction of greenhouse gas emissions and sequestration of carbon)."*

In response to the above, and as a first step, the committee recommends that RIPSEA support a study that identifies the various research efforts sponsored by the Federal Government and especially by DOE in this important area. It should also identify research in the area that needs to be performed specifically for the sequestration of greenhouse gases emitted from the production of oil and gas from Unconventional Resources. For example, there is an active program at NETL in this area and two Energy Frontier Research Centers in the Office of Science concerned with carbon capture and sequestration. The RIPSEA study should seek to leverage areas of common interest and identify gaps in these efforts to determine niche area of research, if they exist, that are important for the development of Unconventional Oil and Gas. RIPSEA should direct resources to the niche areas. RIPSEA should also continue to monitor research progress in this area beyond their initial studies.

The committee has voiced concern that geographic balance in the program is lacking.

Other areas of importance noted in previous reports that have not received appropriate attention are:

From the 2007: Executive Summary Recommendation
Regulatory:

- Regulatory barriers should themselves be a subject for research, as well as considerations in the R&D process.
- Organize and bring together key individuals from academia, regulatory entities, non-governmental organizations and industry, for one-day brainstorming session(s) to identify key regulatory barriers/issues.
- Catalogue (identify, compile, and compare) regulatory barriers/issues (Federal, state, or local) relating to unconventional gas development.
- Identify and recommend regulatory best practices that can serve as flexible models for other governmental bodies to develop rules that allow unconventional gas resources to be produced effectively and efficiently.

From the 2008: Executive Summary Recommendation associated with Technology Transfer (TT)

- The Program needs to identify, capture and document Best Practices identified during the R&D projects so that they can be incorporated into the TT program. Special emphasis should be placed on identifying Best Practices in critical areas such as environmental protection (including minimizing footprint and conserving or mitigating for biodiversity impacts) and reduction of wastes.

From the 2008 Executive Summary and 4) Other Petroleum Resources

- For the 2009 Section 999 plan, the DOE should assess "other petroleum" domestic onshore resources and identify an initial set of technology gaps which need to be addressed. This should include pure upstream plays that are economically and environmentally challenged.

From the 2009 Executive Summary:

During the RPSEA solicitation process, the research proposals should identify technologies, methods or applications to minimize environmental impact in areas such as produced water and reuse, air quality and climate, and surface disturbance (including reclamation); how well the proposals cover this should be considered in the evaluation process.

The committee recommends that research areas be expanded to include:

5) Environmental:
a) Developing site selection criteria that minimize the surface footprint and the impact of drilling and production operations
b) Developing surface mitigation methods applicable to all environments
c) Developing technologies to recycle water
d) Developing technologies for detection and capture of emissions from unconventional oil and gas operations

e) Assessing environmental impact and viability of oil shale production.

Finally in the 2009 report, the Environmental sub-committee drafted a proposal that sits in Appendix A concerned with mapping. It is:

APPENDIX A
ENVIRONMENTAL POLICY RECOMMENDATION

Issue

Access to oil and gas resources on public lands and federal waters is typically impeded for years by land use decisions made outside of the DOE, and a process for permitting that allows special interests to greatly influence outcomes. In addition, acquiring access to unconventional resources on public lands is an inefficient process that can stop development all together or make access/development too costly to pursue. Competing land use initiatives are on the rise. Development delays are a key energy security issue. Unconventional resources can be developed on public lands by application of appropriate technology in an environmentally responsible manner as evident by responsible development on private lands. The temporal footprint impacts based on well-founded science should feature more in multiple use decision making. While this dilemma directly affects the energy security of the US, the Committee recognizes that a solution is larger than the mandate of the DOE.

Proposal

With the variety and demand of uses increasing on our public lands, new mechanisms are needed to create a framework that will optimize development and other uses, including conservation. Addressing the issues around multiple land use requires a reasoned and sound scientific approach that integrates the views of the various users and governing bodies. Conservation of scarce or sensitive biological resources can occur in conjunction with land-use activities that meet the energy, social, and economic needs of people. The Committee recommends that the DOE work with various parties including other federal agencies (this Committee recommends the inclusion of the Department of the Interior), industry, NGOs, state regulators, and others to explore/develop mechanisms to resolve these
conflicts. These mechanisms should more fully incorporate the industry's ability to effectively develop in an environmentally responsible manner founded on sound science.

Comments of the presentation of the Chair of the RIPSEA Environmental Committee:

RPSEA Environmental Action Committee (EAC): Elements of the new RPSEA EAC efforts to engage and collaborate with environmental action groups can be advantageous in carrying out the environmental objectives outlined in Sec.999; however, extreme caution should be taken so as not to enter into agreements on regulatory matters that would otherwise be the prevue of other oil & gas producer groups and/or
forums. Failure to heed this admonition could cause loss of industry support of the RPSEA program with catastrophic consequences. (It is reasonable and appropriate to

engage environmental groups to better understand their issues and concerns. It is my opinion that it is the intent of the Sec.999 program to develop & prove through R&D, Demonstration and TT better operational standards that reduce environmental impacts to be used by all producers; however, it should not be the authority or objective of the program to enter into agreements to change policy or regulations.) CH 9/15 X

Comments of the presentation: RPSEA Environmental Advisory Group

Slide two is important because it shows the charges of the various committees as they relate to RPSEA. Why is our charge so different from the Ultra-Deepwater TAC? Is there a need to clarify and comment on this? Also, we do not review proposals for RPSEA. I suggest we take a very careful look at that slide, create one that better reflects our charge and efforts.

General comments on RIPSEA Environmental Committee Presentation:

Much of this presentation is directed toward the Ultra-Deepwater program with much less attention given to the Unconventional Resources Committee. The presentation for our committee should be more focused on the Unconventional Resource efforts.

There is an effort to look broadly at other Federal and State research efforts in environmental sciences that might impact on the program that RPSEA manages. This is commendable, but the survey is incomplete. Notably absent are the efforts of DOE, NSF, US Geological Survey and state efforts like CARB and NESCAUM. This survey is a good first step. The RPSEA staff should refocus this from the very general to the specific, and examine issues of complementarities. Answer the question: What is it that is important to the industry and government in the Unconventional Resource Area that is not being done by these other agencies? They should direct their program to these things and leverage the others. RPSEA will not leverage this research without knowing the specifics of the various programs.

The DOE has focused considerable resources on global climate. the Multi-agency global change effort is examining climate change on a regional basis, and a report on regional climate change in the US was just released. There is hardly any mention of these issues in the presentation. Since greenhouse gas emissions and sequestration are covered in the statute, there should be some effort directed to this.

The 2020 Vision slide needs specifics; it is too general.