

**Ultra-Deepwater Advisory Committee (UDAC) Meeting
July 24, 2007**

Meeting Minutes

November 8, 2007

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

Ultra-Deepwater Advisory Committee

I hereby certify that this transcript constitutes an accurate record of the Ultra Deepwater Advisory Committee meeting held on July 24, 2007 at the Crowne Plaza Houston North Greenspoint, Houston, Texas.



Phillip J. Grossweiler, Chair
Ultra-Deepwater Advisory Committee

8 NOV 2007
(Date)

Ultra-Deepwater Advisory Committee (UDAC) Meeting Crowne Plaza Hotel, Houston, Texas July 24, 2007

Welcome

Phil Grossweiler, Chairman of the Ultra-Deepwater Advisory Committee (the Committee) convened the meeting at 8:30 a.m. on July 24 in Houston, Texas. He opened the meeting with a "Safety Moment," taking the opportunity to relate personal safety-related experiences. Then, he presented general ground rules for the meeting which included:

- 1) Members were reminded of their agreement not to raise topics that had not been previously discussed in prior advisory committee or subcommittee meetings;
- 2) A consensus opinion by the Committee is assumed on discussion topics unless objections or counterpoints were raised at the time that an item was being discussed; and
- 3) Considering the tight schedule for activities during the day and the large number of items to be discussed, members were reminded to keep their comments brief.

Appendix 1 contains the Committee Member sign-in sheet for the meeting.

Opening Remarks

At 8:50 a.m. the Designated Federal Officer (DFO) Jim Slutz connected remotely to the meeting from Washington, D.C. via telephone to welcome the group and to explain that several important meetings on Capitol Hill had kept him from attending the Committee meeting in Houston. He thanked the Committee for their hard work and dedication as demonstrated by the output from the subcommittees. The nature of the Committee's task and the underlying urgency were discussed. Mr. Slutz explained that in order to finance the 2007 research and development (R&D) projects, Committee recommendations and the Annual Plan needed to be published prior to the end of the fiscal year. Therefore, the Committee was encouraged to work diligently to prepare their recommendations by the end of the day's meeting.

At the conclusion of his opening remarks, Jim Slutz appointed Guido DeHoratiis, U.S. Department of Energy (DOE), to act on his behalf as the DFO for the balance of the meeting.

The Chairman outlined the agenda for the day as shown in Appendix 2.

- The first session was specifically designed to give the Committee an overview of the overall scope of all the subcommittee recommendations so that potential duplication or inconsistencies could be avoided or at least identified early on in the process. It was specifically requested that discussion be held to a minimum during this session.

- During the second session, a typist recorder was assigned to transcribe Committee recommendation for display on large overhead screen. This live, continually updated wording of specific recommendations in real time helped in the ongoing development of the final statement of the Committee recommendations.

SUBCOMMITTEE RECOMMENDATIONS INTRODUCED

Interim subcommittee activities, resulting from subcommittee group discussions documented prior to the meeting, are detailed in Appendix 3. These proposed recommendations were used as the starting point for the detailed discussions. These subcommittee-proposed recommendations resulted from various e-mail exchanges and teleconferences involving those members that volunteered to participate in the separate subcommittee discussions. These subcommittee activities took place after the first meeting of the Committee on June 21st in Arlington, Virginia, and concluded the week before the second meeting on July 24th in Houston, Texas.

Access Restrictions Subcommittee Opening Brief

[See Appendix 3 for detailed Subcommittee report]

The first presentation started at 9:00 a.m., led by Ray Charles. He was acting on behalf of the Access Restrictions Subcommittee lead, Mary Jane Wilson, who was unable to attend the meeting. He noted that the subcommittee had one conference call and numerous e-mail exchanges.

Active discussion followed the presentation focusing on the best way to communicate the access restrictions. The Committee wanted to communicate their recommendations in a way that would focus on the need to acknowledge the volume of oil and gas resources that are associated with moratoria areas without drawing excessive negative reaction that might occur by recommending that moratoria be lifted. It was argued that the recommendations were statements of fact. With the extensive discussion that ensued, it was agreed that more time would be spent later in the meeting for a more detailed discussion of these points, and that these opening presentations focus on setting the stage for the day's activities by summarizing the full scope of all the recommendations.

R&D Theme Content Subcommittee Opening Brief

[See Appendix 3 for detailed Subcommittee report]

At 9:10 a.m. Richard Morrison presented an overview of the R&D Theme Content Subcommittee. No detailed discussion was entertained at this time due to the straightforward nature of the subcommittee recommendations.

Solicitation Process Subcommittee Opening Brief

[See Appendix 3 for detailed Subcommittee report]

Next Luc Ikelle was introduced to present the Solicitation Process Subcommittee results at 9:15 a.m.

During the discussion it was noted that this subcommittee's perspective was slightly inconsistent with the R&D theme subject just previously presented. It was noted that this type of inconsistent perspective was exactly the reason a quick presentation of all the subgroup work was desirable at this morning session.

In general, the Solicitation group felt that the R&D topics presented in the draft plan were too broad and would result in ineffective programmatic results as opposed to the opinion of the R&D group that sought to broaden the scope of the plan (for example include drilling and completion (D&C), Met-Ocean, expand Grand Challenge, etc.). The Solicitation group preferred to concentrate more funds on fewer projects.

On the other hand, concern was expressed that narrowing the R&D topics prematurely could block the program from pursuing potentially promising areas. As an alternative, it was suggested that the narrowing should be conducted later in the program and not before all of the potential topics could be fairly evaluated. It was also pointed out that as a practical point considering the availability of funds for the program, narrowing was a matter of practicality and prudent management. It was ultimately agreed that a record of unawarded promising projects would be maintained so that if and when funding is increased, these projects could be re-visited.

Environmental Subcommittee Opening Brief

[See Appendix 3 for detailed Subcommittee report]

The subcommittee lead for this topic, Quentin Dokken, could not attend the meeting; therefore, Larry McKinney presented the results of the Environmental Subcommittee starting at 9:30 a.m.

The subcommittee recommended the wording more strongly emphasize that any R&D proposal funded by the program must include an assessment of the potential environmental impacts of the proposed R&D and appropriate mitigation considerations.

In the discussion it was suggested that the statements on environmental recommendations acknowledge and educate on the great effort that is and has already been expended in protecting the environment while producing oil and gas. Discussion of whether or not to attribute comments in the minutes followed, and it was agreed that opinions would be expressed without attribution so as not to inhibit discussion.

Committee "Consensus" Considerations

At the conclusion of the opening briefs, the discussion facilitator reminded all participants that for the follow-on detailed discussion session, three categories of consensus would be acknowledged:

- *Consensus* is achieved when all members agreed to the recommendations;
- A *majority agreement* is where more than half of the members agreed on a position; and
- A *minority opinion* where less than half of the members agreed on a position.

The Committee broke for 15 minutes and reconvened at 10:00 a.m.

Before the group initiated detailed discussions on the R&D themes topic, Chris Haver of Research Partnership to Secure Energy for America, (RPSEA) Ultra-Deepwater Manager, requested permission from the Chair to present opening comments aimed at clarifying RPSEA's strategic approach to R&D program development. He sought to clarify a point of discussion held by many Committee members that had surfaced during the earlier session.

Mr. Haver explained that while it is true that the RPSEA Technical Advisory Committees (TAC) identified 33 theme areas (as had been noted by the Committee several times), the RPSEA Program Advisory Committee reviewed all TAC recommendations and only approved 20–23 themes for the 2007/2008 program. This translates to about 9–12 themes per year, which is generally in line with the UDAC Committee recommendations on the appropriate numbers of themes.

Furthermore, the program slated for consideration in 2007 included three non-research projects that were technology transfer-related and several lower cost technology seed grants and student design projects.

Also, it is anticipated that the value of the largest projects would approach \$4–6 million, again, in line with the subcommittee earlier recommendations.

Finally, the Committee had been concerned about the limited funds dedicated to drilling and completions, and in response it was noted that 20–25 percent of the funds involving 3–4 projects were related to drilling and completion projects.

In effect, the RPSEA draft annual plan that was presented to the Committee at its June meeting was a snapshot of the progress made up to that time and was not the Consortium's final recommendations. In conclusion, Chris Haver hoped that his remarks were of use to the Committee in clarifying RPSEA's recommendations.

Detailed Discussions and Development of Final Recommendations

The final detailed recommendations endorsed by the full Committee are presented in Appendix 4. It is intended that these meeting minutes serve to provide additional background on the final recommendations and the rationale for the modifications to the subcommittee recommendations. The minutes also communicate the sense of the Committee that may not be clear when reading recommendations alone.

R&D Themes Content

At 10:15 a.m. Richard Morrison was introduced to lead the discussion on the R&D themes content.

The first point of the discussion focused on the recommendations dealing D&C. Considering Chris Haver's prior comments that 25 percent of the research funds were dedicated to D&C, it was then agreed that the word "significantly" could be deleted in the phrase recommending "significant increase emphasis on D&C." Although the recommendations were intended to deal with the draft annual plan, in which case "significantly" would be appropriate, it is possible that readers could interpret the "significantly increase" to apply to the current plan which would not be the Committee's intention. The discussion culminated with the decision to eliminate the word "significantly."

It was also noted that the issues in the D&C area were not only cost-related; but also dealt with the efficiencies and effectiveness of D&C and the ability to recover and produce the resources. At that point, a Committee vote was held and it revealed that there was consensus agreement on the recommendation dealing with D&C. The other recommendations in this subsection were accepted as presented with minor editorial changes.

The next recommendation dealt with the priority of the “Grand Challenge” R&D efforts. The “Grand Challenge” concept relates to transformational technologies, which if developed successfully, are capable of “leapfrogging” conventional R&D pathways. Examples of this concept include developing technologies that allow drilling 20 miles in a horizontal direction to minimize the environmental footprint of conventional oil and gas facilities or developing innovative technologies that support development of a sea floor-based drilling rig. Putting the “20 mile horizontal drilling” into perspective, currently horizontal drilling can reach distances of up to 3–4 miles in offshore areas and 10 miles in onshore areas. Not only do these technologies provide for minimizing environmental impact, but they also provide for economic exploration and production schemes are not possible with today’s technologies.

The Committee reordered the recommendations in this section to make it clear that the main point was for the program to target the focus of the R&D program toward major breakthroughs instead of simply achieving incremental improvements. All of the other discussion points followed from this concept.

The next topic dealt with the allocation of funds to the Grand Challenge projects. The subcommittee recommended 20 percent as a minimum and some members questioned why it wasn’t higher, say 50 percent or 100 percent. Many members expressed a wide range of opinions on this subject and in an effort to help focus the Committee’s discussions, Elena Melchert (UDAC Committee Management Officer) suggested that the Committee take a broader view of the goals. It was finally agreed that the Committee should provide general guidance that the R&D program should concentrate more effort on long-term vs short-term oriented projects. After a Committee vote, the majority opinion recommended a minimum of 20 percent of R&D funds be dedicated to Grand Challenge-oriented projects. It was agreed that it was sufficient for the Committee to provide broad guidance in this area and not to be overly prescriptive. The Committee also noted that another annual review would be conducted next year at which time further recommendations could be made if deemed appropriate. A minority opinion was proposed and accepted that a definitive percentage of funding did not need to be specified. Rather, the wording which reflected the recommendation of the Committee toward more emphasis on major breakthroughs verses merely achieving incremental improvements was deemed sufficient advice to the Secretary.

The recommendation dealing with the importance of continuing to conduct industry workshops was retained, although it was shifted to the last position in the section as opposed to the originally proposed first position. This reflected the proper priority for this recommendation held by the Committee.

The next topic of the R&D Theme Content Subcommittee dealt with R&D Portfolio Balance. The essence of this recommendation reflected the Committee's sense that the R&D program should 1] concentrate the R&D program in fewer areas to avoid dilution of limited funds, and 2] be focused on long-term, applied science type applications as opposed to a short-term focus. The Committee was of the opinion that industry was capable of addressing these near-term, enabling, and enhancing technologies. This section was retained as originally proposed for the most part. Chris Haver's introductory comments helped the Committee to better understand the RPSEA plan and they were comfortable with the explanation given relative to the number of themes and the concern over dilution of R&D funds.

The only major discussion point focused on the definition of basic and applied research, and the Committee finally agreed that the role for the Section 999 research was on applied research as opposed to basic research. The rationale for this distinction is that all of the R&D contemplated under the scope of the Section 999 program had specific applications in mind (i.e., oil and gas exploration and production) and therefore the Committee judged that the concept for "basic research" did not apply to the oil and gas R&D program.

The Met-Ocean recommendations were retained as originally proposed except that it was felt that the concept of "low hanging fruit" was not appropriate. Although the Met-Ocean concept did not directly impact on oil and gas reserves or resources, it was unquestionably a significant factor in the design, construction, and operation of marine facilities and thus, was broadly supported.

The last subsection dealt with the concept for Characterizing Resource Potential. The Committee felt that the results of the R&D program should be broad and applicable to the areas currently not open for access. The Committee also felt that the 1 percent target for new resources was overly conservative and that it would better serve the purposes of the R&D program to state a more ambitious goal. It was agreed that this subject could be revisited in next year's annual plan review.

Access Restrictions

At 11:00 a.m. the Access Restrictions Subcommittee recommendations were brought up for discussion by Ray Charles. This topic drew significant discussion on the subject of offshore basins currently under drilling moratoria or subject to significant development restrictions. Although it was generally agreed that significant additional oil and gas resources may exist in these moratoria or restricted areas, to many Committee members it seemed that it could be counterproductive for the Committee to focus too much attention on this point as it could detract from the vital and important messages in other parts of the document. In effect, the Committee agreed that this subject has and will continue to be the topic of significant and vigorous debate, but that it served no useful purpose for this Committee to make strong, pointed recommendations on this subject. It was felt that the whole report could be criticized for taking on a political tone on these access restriction areas.

It was argued; however, that factual statements are not political. It was pointed out that as independent consultants, the Committee was obligated to make factual recommendations that include clear cut priority steps that can be taken to ease the

security and supply issues relating to petroleum imports. It was noted that there are currently 43 million acres in domestic ultra-deepwater areas under active exploration, production, or available for leasing, whereas there are 377 million acres in ultra-deepwater areas under moratoria constraints. Although acreage itself does not indicate existence of resources, the analysis does point to the fact that some of the energy supply issues that our country faces are self-imposed.

At the conclusion of the discussion on this topic, the Committee was of the majority opinion that the Section 999 plan would be better served if it avoided drawing attention to politically charged subjects. Therefore, after a Committee vote, it was agreed that the point about geographical moratoria areas would be retained only as a minority opinion.

The Committee did retain the subcommittee recommendations pertaining to streamlining and expediting access consideration as it applies directly to the R&D programs and furthermore they recommended a maximum 90-day period for R&D project application approval from the Minerals Management Service (MMS). The original proposal was for a 30-day period which was felt to be too aggressive and perhaps unachievable.

The Committee agreed that the last paragraph starting with “Secondly the UDAC Access Restrictions Subcommittee” was redundant and not appropriate. This section dealt with applying estimates of the impact of new technology on moratoria areas.

Finally it was agreed that the subcommittee designation “Access Restrictions” would be relabeled “Access” to further deemphasize the politically charged nature of that topic.

The Committee broke for lunch at 12:10 p.m. and reconvened at 1:10 p.m.

Solicitation Process

The solicitation process discussion was led by Luc Ikelle.

The major concern expressed by the subcommittee related to a desire to narrow the scope of solicitations and concentrate funding on fewer projects and to avoid wasted effort on the part of the R&D community. Also, the opening comments by Chris Haver aided in clarifying some of the concerns.

The first recommendation dealing with target number of projects and cost was de-emphasized by the Committee. It was agreed that it was best to leave some discretion for RPSEA to manage the process as opposed to being overly prescriptive. Furthermore, Chris Haver's earlier comments seemed to reduce the priority on this issue as compared with the subcommittee original assessments.

The second recommendation addressed the theme focus. RPSEA's earlier comments were in line with the recommendation on numbers of themes, so that wording was removed. Also, there was considerable debate about the solicitation process and the desire to avoid wasted effort on the part of the R&D organizations, particularly if it is known that a project would not be awarded. One way of resolving this issue was to use a pre-screening process as a mechanism for early identification of projects that are award candidates. It was acknowledged that this is a difficult area to deal with at the advisory committee level and it was agreed that, at a minimum, a record of projects that were not awarded would be maintained for future reference. The recommendations

dealing with development of weighting factors were endorsed and the wording was retained as proposed by the subcommittee.

The third recommendation dealt with the goal of minimizing the time lag between exploration and production and additional effort towards higher levels of cost sharing. These recommendations were retained with minor editing suggestions.

The fourth and fifth recommendations dealt with somewhat unrelated subjects and were restructured. It was decided that those dealing with intellectual property rights would be retained as a separate item under the solicitations section, item number 4. Other recommendations in this section dealing with overall R&D project management, program efficiency items and pre-screening of solicitations were merged into the second recommendation as it was more consistent with solicitation efficiency goals.

In several cases, the group was reminded that the reference to RPSEA would be changed to referencing DOE in order to clarify that the Secretary of Energy has the ultimate responsibility for the entire program.

To provide additional background on this complicated subject, it was decided by the Committee that the detailed record of the subcommittee e-mail communications would be provided in a separate appendix to the minutes. Those records are provided under Appendix 5.

The discussion on the solicitation process concluded at 2:30 p.m.

Environmental Recommendations

This section, as presented by Larry McKinney, was adopted essentially as proposed by the Environmental Subcommittee with some clarification and editing to make the recommendations stand out from the introductory and background discussion items. The subcommittee recommended, and the Committee agreed, with the strong wording requiring any R&D proposal funded by program must include an assessment of the potential environmental impacts of the proposed R&D and appropriate mitigation considerations.

The subcommittee also recommended that wording be inserted in the Committee's recommendations highlighting the fact that the ultra-deepwater activity is exposing previously little-known biological communities where basic knowledge is limited. Opportunities to expand the knowledge base should be identified so that resource development strategies can be developed to minimize the negative impact on those ecosystems. Protocols should also be developed for assessing the impact of seeps and similar phenomena on the biological communities. The subcommittee also sought to ensure that appropriate response plans were established to address environmental scenarios including both natural disasters and industrial incidents. Examples of natural events included hurricanes, earthquakes, and blowouts whereas industrial incidents included catastrophic incidents at offshore facilities and oil spill risks. The subcommittee strongly supported Met-Ocean initiatives which would serve to reduce the risks involved in the design, construction, and operation of new ultra-deepwater exploration and production facilities.

The tone was adjusted to recognize that protection is part of the fundamental design of new technology. Environmental concerns have been given an ever-increasing priority

by industry and drilling and production of oil and gas are dealt with in a proactive and environmentally responsible manner. It was also pointed out that many of the recommendations were already covered by the RPSEA draft annual plan (see page 89 in the Draft Annual Plan). Nonetheless, the subcommittee suggested heightening the visibility and priority of the environmental protection requirements and the Committee agreed.

The Committee took a short break at 3:10 p.m. and reconvened at 3:20 p.m.

Final Recommendations and Report

During the break, all of the recommendations were printed so that the Committee could view the recommendations in totality to ensure that they were integrated as smoothly as possible into one consistent format and approach.

At 4:10 the Committee began review of the executive summary and the draft cover letter proposed by the Chair.

The Committee authorized the Chair to oversee the final editorial enhancements to the document along with correcting of typographical errors and formatting inconsistencies. However, it was understood that no changes in the content of the recommendations were allowed after the Committee concluded discussions.

At 4:50 p.m. the Committee reviewed the cover letter to the Secretary of Energy, which featured a high level review of the Executive Summary that was adopted by the Committee.

Carryover Issues

At 5:05 p.m. Bill Hochheiser, UDAC Committee Management Officer, solicited feedback from the Committee on recommendations for future meetings. The comments and suggestions recorded included:

- 1) For next year's meeting, schedule more front end time to avoid the tight schedule at the conclusion of the process.
- 2) Avoid having RPSEA develop their plans in parallel while the Advisory Committee is evaluating progress and preparing recommendations for future direction.
- 3) Many members felt that although the Committee proceedings were intensive, the group did successfully achieve its objectives and members were generally satisfied with the end product.
- 4) It was suggested that next year an editorial subcommittee be assigned to draft the final recommendations of the Advisory Committee at the end of the proceedings.

Phil Grossweiler further suggested that members should feel free to communicate any other remaining points by e-mail or by phone.

Public Comment

At 5:10 p.m. Phil Grossweiler called for public comments and as none were offered, the Committee adjourned.

Committee Report Complete – Adjourn

At the conclusion of the meeting a final hard copy record was made available to all members and a final transmittal letter was signed by the Chair for the record.

Appendix 1

Ultra-Deepwater Advisory Committee Attendees July 24, 2007

Ultra-Deepwater Advisory Committee Meeting
Sign-In Sheet - July 24, 2007

Last Name	First Name	Organization	Sign
Abadie	Kent F.	Shell Exploration & Production Company	
Bland	Ronald G.	Baker Hughes Drilling Fluids	
Dokken	Quenton R.	Gulf of Mexico Foundation	
Fowler*	Joe R.	Stress Engineering Services, Inc.	
Grossweiler*	Phil	M&H Energy Services	
Idelchik	Michael	General Electric Company	
Ikelle*	Luc T.	Texas A&M University	
Judzis	Arnis	Schlumberger, Inc.	
McKinney	Larry D.	Texas Parks & Wildlife Department	
Modiano	Albert	U.S. Oil & Gas Association	
Morrison	Richard L.	BP America Inc.	
Seamount, Jr.	Daniel T.	Alaska Oil & Gas Conservation Commission	
Shoham*	Yoram	Society of Exploration Geophysicists	
Slatt*	Roger M.	University of Oklahoma	
Totten	Thomas N.	J. Ray McDermott	
Tranter	Paul M.	Transocean, Inc.	
Wiencke	Paul M.	Research Council of Norway	
Wilson*	Mary Jane	WZI Inc.	
Charles	Ray	Exxon Mobil Exp. Company	

* Special Government Employee

Appendix 2

Agenda

Ultra-Deepwater Federal Advisory Committee
Concord Room, Crowne Plaza Houston North Greenspoint, Houston, TX, 77060
July 24, 2007

- 7:30 Registration and Continental Breakfast
- 8:30 **Welcome** [Phil Grossweiler, Chair]
- 'Safety Minute'
 - Ground rules for session
- 8:45 **Opening Remarks** [Jim Slutz, DFO]
- Review Committee responsibilities and expected outcomes
- 9:00 **Recommendations Introduced *** [Phil Grossweiler, Chair]
- Discussion leaders for each subgroup introduce recommendations
 - Chair introduces draft report and discusses process for uniting recommendations and preparing executive summary
- 10:00 Break
- 10:15 **Fine Tune/Organize Committee Comments for Access and R&D Theme Content Subgroups** [Phil Grossweiler, Chair and Dan Seamount, Vice Chair]
- Discuss content and wording of recommendations and other comments
 - Determine level of agreement on recommendations (Consensus vs. Majority Agreement vs. Minority Opinion)
- 12:00 Lunch
- 1:00 **Fine Tune/Organize Committee Comments for Solicitation Process and Environmental Subgroups** [Phil Grossweiler, Chair and Dan Seamount, Vice Chair]
- Discuss content and wording of recommendations and other comments
 - Determine level of agreement on recommendations
- 2:45 Break (print current version of draft report)
- 3:00 **Individual Time to Review Draft for Final Comments**
- 3:15 **Finalize Report** [Phil Grossweiler, Chair and Dan Seamount, Vice Chair]
- Integrate any final comments
 - Finalize document layout
 - Discuss and finalize Executive Summary
- 4:30 **Carryover Issues** [Sabine Brueske, Facilitator]
- Lessons learned, considerations for future advisory meetings
- 4:45 **Public Comment**
- 5:00 **Committee Report Complete, Adjourn**

Appendix 3

Initial Subcommittee Recommendations

At the June 21st meeting the following Sub Groups and schedule was established for developing the Subgroup analyses and reports.

Four Recommendation Areas:

- Environmental
- Solicitation Process (includes: Success Measures, Technology Transfer)
- R&D Theme Content (includes: Prioritization, Timing Near/Long Term, Grand Challenges, and Drilling)
- Access

Schedule

- 7/6 – Recommendations to leaders
- 7/11 – Compilation of list sent to sub-team
- 7/13 – Sub-team conference call
- 7/17 – Consolidation list sent to all
- 7/24 – Meeting in Houston

Treatment of Non-Consensus

In situations where members were divided, the following categorization was used:

Majority Agreement – 50% or greater of Committee members were in agreement with the statement

Minority Opinion – fewer than 50% of Committee members were in agreement with the statement

SUBGROUP TOPICS AND MEMBERS

Four Topic Areas:

R&D Theme Content (includes: Prioritization, Timing Near/Long Term, Grand Challenges, and Drilling)

Lead – Slatt

Members – Charles, Fowler, Bland, Judzis, Ikelle, Morrison, Grossweiler, Shoham, Tranter

Solicitation Process (includes: Success Measures, Technology Transfer)

Lead – Ikelle

Members – Idelchik, Abadie, Totten

Environmental

Lead – Dokken

Members – McKinney, Wilson, Modiano, Grossweiler, Shoham

Access

Lead – Wilson

Members – Charles, Seamont

R&D Theme Content Recommendations

- Drilling
 - Significantly increase emphasis on drilling and completions.
 - Define D&C as a Crosscutting and Grand Challenge technology.
 - D&C is one of major costs in expanding to Ultra Deep Water. Emphasize initiatives to reduce D&C costs.
- Grand Challenge
 - Conduct Workshops with specific objectives of ensuring holistic AND highly innovative approaches are developed.
 - Increase emphasis on R&D initiatives which achieve major breakthroughs vs. simply achieving incremental improvements.
 - Budget at least 20% of resources toward achieving Grand Challenge / Game Changing breakthroughs.
- R&D Portfolio balance
 - Consolidate the number of themes and individual R&D projects to minimize dilution of effort.
 - Increase emphasis on long-term vs. short-term priorities. *Industry is comfortable with and usually willing to fund short term needs.*
 - Increase emphasis on basic and applied science vs. development activities. *Industry has a successful track record of internally funding development needs.*
 - Identify and Prioritize on Key Leveraging and Cross Cutting Technologies vs field specific needs.
 - Identify, in early phases of R&D, projects with broad industry support to increase leverage of money, people resources and public support.
- Met-Ocean Criteria (separate from environmental theme)
 - Structure and select initial R&D project(s) to achieve broad support and participation across industry and the appropriate Federal agencies. *Worthy of significant effort. “Low hanging fruit” in these activities.*

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- Characterize Resource Potential
 - Develop an R&D solicitation with specific objective of assessing and documenting broad potential to add new resources in areas not currently open for access.
 - Establish more aggressive targets for resource capture within existing areas of access. *Emphasize this point to any potential constituencies opposed to moving forward with the R&D Program.*
 - Identify the key technology levers needed to capture additional resources. Further define leveraging technologies as applicable to either the regions currently open for access or to regions not currently open due to political restrictions.

Solicitation Process Recommendations

Recommendations of the solicitation subteam

Kent Abadie, Michael Idelchik, Luc Ikelle, Thomas Totten,

RECOMMENDATION 1

We recommend that the solicitations and awards of RPSEA focus on big ideas with a wide scope of applications and the greatest impact on unlocking UDW resources. In other words, RPSEA must focus on science and technologies, big challenges that the UDW industry may perceive today as risky and long term.

- Target R&D projects likely to achieve a significant cost reduction in UDW resource development
- Funding: \$1–4 MM/year per project plus cost-sharing
- Number of projects per year: 5 to 8
- Development of a mechanism for managing the R&D projects to reduce risk of failures

RECOMMENDATION 2

We recommend that a prioritization be carried out to reduce the current 33 or so themes to six or fewer. The reduced list of themes must be the focus of solicitations and of most awards.

- Further development of theme-selection processes to direct the program toward the most impactful technological development
- A development of weighting factors for proposal selection. Include in weighting: assessments of potential size of payout, if successful; probability of success. In essence, develop at least qualitative assessments of expected value of each R&D project.
- A focus on extremely difficult technological challenges

- Consideration of a preselection to optimize the time and effort of the potential investigators

RECOMMENDATION 3

More emphasis must be placed on development (monetizing) of existing UDW discoveries to ensure that the lag between development and exploration is as small as possible.

- With development, we then know that UDW discoveries are economically viable and therefore a real asset to the nation.
- Use the cost-sharing component to fullest extent possible to improve the funding level of development projects, which are likely to be far more expensive than exploration.

RECOMMENDATION 4

The request for proposal (RFP) must clearly state Intellectual Property and technology rights of participating service companies, or of principal investigators and the sponsoring institution of principal investigators as well as the conditions associated with these rights.

- If RPSEA sticks with long-term projects, which may just enable new technology development, the issue may go away.
- Time to technology transfer (= project to risk) has to be reflected in the sequencing of projects and the level of project funding to create a “projects funnel” in which with active projects, as completed, are replaced by and stand-by projects ready to be issued.

RECOMMENDATION 5

Prescreen all potential projects and issue RFPs for only those projects for which RPSEA intends to award a contract. Minimize/eliminate time to prepare (and burden vendors with responding) RFPs which will not likely be awarded.

Notwithstanding above, since the entire R&D plan will be in the public domain, consider advising potential vendors to submit Unsolicited Proposals with estimates of potential benefits for any projects listed in the overall plan.

Environmental Recommendations

Any proposal funded under the Ultra-deepwater Program Element must include an assessment of the potential environmental impact of the research *and* the technology or action that the proposal would create or enhance. Additionally, possible mitigation of impact(s) should be addressed

Our basic knowledge of biological communities that might be affected by ultra-deepwater exploration and development activities is very limited. Expanding that knowledge base will be important in designing exploration and development strategies that will minimize or avoid adverse impacts to those communities

Ecological impact survey techniques should be developed and adopted to ensure that ultra-deepwater ecosystems that might be affected by E&P activities can be readily identified. Protocols for assessing those ecosystems, especially ones associated with seeps and similar phenomena, should be developed that do not impede E&P activities but that compliment them in a way that timely decisions can be made to minimize any potential adverse impact

Met-Ocean – Expanding industry knowledge base in this area would have significant environmental benefits such as establishing new design criteria for exploration, drilling and production activities and platforms that would minimize potential for accidental discharges, etc. This is a cross cutting theme which is also addressed by the other Task Groups.

Addressing potential environmental disaster scenarios will eventually be required, both to satisfy requirements of regulatory agencies and the concerns of the general public. The triggering events which should be considered include: blowouts, hurricanes/earthquakes, catastrophic accidents at offshore facilities, and risk of spills. These analyses are not needed initially, but the R&D program should, in subsequent years develop studies to include:

- Update any existing studies with benchmarks of progress by industry to reduce risks due to blowouts,
- Update, if currently available, or prepare a grass roots study of environmental impacts to GOM infrastructure losses due to recent hurricanes.
- Prepare a risk analysis, using best available risk assessment techniques, to demonstrate to all potential stakeholders that any/all future developments in ultra deep water can be managed at acceptable levels of risk. This study should include extensive peer review.

Access Restrictions Recommendations

The UDAC supports policy efforts which would provide broader (both geographic and geologic) access to U.S. resources to help meet America's growing energy needs. Increasing access will benefit the American economy and consumers by diversifying our nation's sources of energy supply and increasing energy security

The directives of 999A and 999B are to increase the supply of natural gas and other petroleum products through “research, development, demonstration, and commercialization of ultra deep water technologies while improving safety and minimizing environmental impacts.”

In order to carry out this mission the projects funded through the research and development phases will: require flexible access to apply new breakthrough technologies, special expedited access should be provided to qualifying experimental demonstration projects; once efficacy is proven the breakthrough technology project can continue to operate to allow further study while additional access will be granted through a normal review cycle. Approval from MMS will be required in a timely manner. It is recommended that under the Sec. 99A (e) the Secretary of Energy consult with the

Secretary of Interior to develop an “Experimental Memorandum of Understanding”,¹ which provides:

- 1) An application for an experimental demonstration project will be filed with MMS and approved within 30 days of application.
- 2) The application will provide for a discreet demonstration period with a discreet reporting schedule, which include:
 - a. safety improvement assets
 - b. environmental impact improvements
- 3) In the event that the demonstration project is successful, the project will apply for a permit to extend the scope of the operation.
- 4) The demonstration project may continue to operate and gather data while the greater development of the project is permitted.
- 5) In the event the demonstration is unsuccessful, the applicant will immediately remove all of the demonstration equipment.

Secondly, the UDAC Access Subcommittee recommends that each breakthrough technology project that is funded through this program should analyze the applicability to all waters of the U.S. including estimates of increased reserves of oil and gas. The analysis should include applicability in various Met-Ocean conditions and geographic locations. In waters having a moratorium, the analysis of applicability should address how the breakthrough technology mitigates those historic environmental and safety issues (blowouts, spills, hurricanes potential, tides, etc.) that led to the moratorium.

Increased access needs to be for both oil and gas resources – restricting access to one source of energy is not realistic given the physical combination of hydrocarbon deposits. Any highly specialized constraints limiting a project to only oil or gas will disincentivize technology development due to the difficulty in predicting pre-drilled conditions.

The Secretary of Energy and the Secretary of Interior should jointly report the applicability analysis to Congress with recommendations to alter or retain moratorium areas based on the research results.

¹ This concept is similar in principle to EPA approved Experimental Exemption for new technologies.

Appendix 4

Executive Summary and Final Committee Recommendations

These findings and recommendations are at a strategic level and address the overall quality of the plan and provide general guidance regarding setting priorities and execution of the plan through the projected 10 year horizon.

Findings:

Successful execution of this R&D Program will materially contribute to U.S. supply of oil and gas well 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 ultra-deepwater development.

The Plan and the processes followed in developing it were professionally done and inclusive, with a significant infusion of industry knowledge. The combined Management Team (DOE, RPSEA and its extended network of industry resources) is uniquely qualified to plan and execute this complex 10 year R&D undertaking.

The Committee recognizes that the program consortium, Research Partnership to Secure Energy for America (RPSEA), is in the final stages of completing the detailed plans for the first two years of the R&D efforts. We have confidence that their planning will implement the program consistent with our recommendations.

Recommendations:

With regard to overall priorities the committee recommends:

- Providing more emphasis on achieving *Grand Challenge* R&D breakthroughs.
- Targeting R&D projects likely to achieve a significant increase in value through cost reduction and increases in efficiency and technology effectiveness in ultra-deepwater resource development.
- Properly ranking potential projects and limiting project awards to only the most highly rated projects, because the available funding will be limited relative to the list of potential projects outlined in the plan.
- Enhancing the focus on environmental issues.
- Allocating sufficient effort to assessing and demonstrating the likely benefit of these R&D efforts in capturing additional resources in areas currently not open for access.

Detailed recommendations are provided below.

R&D THEME CONTENT Recommendations

The Committee recommends the following:

- Drilling and Completions (D&C)
 - Increase emphasis on D&C.

- Clearly define D&C as a Crosscutting and Grand Challenge technology.
- Emphasize initiatives to reduce D&C risk and increase technology effectiveness. *D&C is one of major costs in expanding to Ultra Deep Water.*
- Grand Challenge
 - Emphasize R&D initiatives which achieve major breakthroughs vs. simply achieving incremental improvements.
 - *Majority Agreement:* Budget **at least** 20% of resources toward achieving Grand Challenge / Game Changing breakthroughs. A Grand Challenge is defined as a transformational technology (refer to page 108 of Draft Annual Plan).
 - *Minority Opinion:* Percentage not needed in second bullet above.
 - Continue to conduct Workshops with specific objectives of ensuring holistic AND highly innovative approaches are developed.
- R&D Portfolio balance
 - Consolidate the number of themes and individual R&D projects to minimize dilution of effort.
 - Increase emphasis on long-term vs. short-term priorities. *Industry is comfortable with and usually willing to fund short term needs.*
 - Increase emphasis on applied science vs. product development activities. *Focus should be on areas where industry is not funding.*
 - Identify and Prioritize on Key Leveraging and Cross Cutting Technologies vs. field specific needs.
 - In early phases of R&D process, select and execute projects with broad industry support to increase leverage of money, people resources and public support.
- Met-Ocean Criteria (separate from environmental theme)
 - Structure and select initial R&D project(s) to achieve broad support and participation across industry and the appropriate Federal agencies. *Worthy of significant effort.*
- Characterize Resource Potential
 - Develop R&D projects which build on past studies, with the specific objective of assessing and documenting broad potential to add new resources in areas not currently open for access. *The results of this effort should be widely disseminated.*
 - Establish more aggressive technology-enabled targets (> 1%) for resource capture within existing areas of access. *Emphasize this point to any potential constituencies opposed to moving forward with the R&D Program.*

- Identify the key technology levers needed to capture additional resources. Further define leveraging technologies as applicable to either the regions currently open for access or to regions not currently open due to restrictions.

Solicitation Process Recommendations

We recommend that the solicitations and awards focus on big ideas with a wide scope of applications and the greatest impact on unlocking ultra-deepwater (UDW) resources. In other words, research must focus on science and technologies, big challenges that the UDW industry may perceive today as risky and long term.

- Target R&D projects likely to achieve a significant increase in value through cost reduction and increases in efficiency and technology effectiveness in UDW resource development. *We would consider the selection of less than ten projects to be consistent with this general recommendation.*
- Develop specific metrics for monitoring the probability of success of projects.

We recommend that a prioritization be carried out to narrow the focus of the solicitation. The narrowing should take place using the following guidelines:

- The solicitation process should direct the program toward development of technologies that will have the highest impact.
- Develop weighting factors for proposal selection that include assessments of potential size of payout and probability of success. In essence, develop at least qualitative assessments of expected value of each R&D project.
- Prescreen all potential projects and issue request for proposals (RFP) for only those projects for which RPSEA intends to award a contract. Minimize/eliminate time to prepare proposals which will not likely be funded.
- Create a “projects funnel” in which active projects, as completed, are replaced by stand-by projects ready to be issued.

Although we are recommending a narrowing of the focus of the solicitation, we value the work that has been done. We recommend that R&D projects that do not make the final list for solicitations still be part of the public record, as the exploration and production industry and academia may find them useful in developing proposals to alternative funding agencies.

We recommend that more emphasis must be placed on research projects related to development of UDW discoveries to ensure that the lag between exploration and development is as small as possible. With development, we then know that UDW discoveries are economically viable and therefore a real asset to the nation. *Use the cost-sharing component to the fullest extent possible to improve the funding level of R&D development technologies.*

We recommend that the RFP must clearly state the intellectual property and technology rights of participating parties, as well as the conditions associated with these rights.

Environmental Recommendations

Our basic knowledge of biological communities that might be affected by ultra-deepwater exploration, development and production activities is limited. Expanding that knowledge base will be important in designing strategies that will minimize or avoid adverse impacts to those communities. Such activity would be a valuable compliment to this program. As the resources of the ultra-deep ocean are explored and developed we will need to expand our ability to identify potential concerns quickly and efficiently.

Ecological impact survey techniques should be developed and adopted to ensure that ultra-deepwater ecosystems that might be affected can be readily identified. Protocols for assessing those ecosystems, especially ones associated with seeps and similar phenomena, should be developed that are compatible with exploration, development and production activities.

It will also be important to address potential environmental scenarios involving natural disasters and industrial accidents, both to satisfy requirements of regulatory agencies and the concerns of the general public. The triggering events which should be considered include: blowouts, hurricanes/earthquakes, catastrophic accidents at offshore facilities, and risk of spills. These analyses are not needed initially, but the R&D program should, in subsequent years develop studies to include:

- Update any existing studies with benchmarks of progress by industry to reduce risks due to blowouts,
- Update, if currently available, or prepare a grass roots study of environmental impacts to GOM infrastructure losses due to recent hurricanes.
- Prepare a risk analysis, using best available risk assessment techniques, to demonstrate to all potential stakeholders that any/all future developments in ultra deep water can be managed at acceptable levels of risk. This study should include extensive peer review.

The Committee makes the following recommendations:

Any proposal funded under the Ultra-deepwater Program Element must include an assessment of the potential environmental benefits/impact of the technology or action that the proposal would create or enhance. Additionally, the environmental benefits and possible mitigation of negative impact(s), if any, should be addressed (both impacts related to the research itself and to the wider application of the technology that is developed).

Expand the industry knowledge base in the Met-Ocean area, especially related to ultra-deep waters. This would have significant environmental benefits, such as establishing new design criteria for exploration, drilling and production activities and platforms that would minimize potential for accidental discharges, etc. This is a cross cutting theme which is also addressed by the other Task Groups.

Access Recommendations

The directives of EPACT 999A and 999B are to increase the supply of natural gas and other petroleum products through “research, development, demonstration, and

commercialization of ultra deep water technologies while improving safety and minimizing environmental impacts.”

We recommend that each breakthrough technology project that is funded through this program should analyze the applicability to all waters of the U.S. This should include developing updates to estimates of increased reserves of oil and gas in restricted areas. The analysis should include applicability in various Met-Ocean conditions and geographic locations. In waters having a moratorium, the analysis of applicability should address how the breakthrough technology mitigates those historic environmental and safety issues (blowouts, spills, hurricanes potential, tides, etc.) that led to the moratorium. We recommend that the Secretary of Energy and the Secretary of Interior jointly report the applicability analysis to Congress.

Minority Opinion (start): The UDAC recommends, in addition to the base R&D efforts developed under the Plan, policy efforts which would provide broader (both geographic and geologic) access to U.S. resources to help meet America’s growing energy needs. Inputs to the policy making process should consider the following points:

- Additional resource development can occur as it does across America today in an environmentally responsible manner. Energy development and environmental protection can and should continue to coexist.
- Potential for additional resource capture would have a significant impact on U.S. jobs and reductions in U.S. Current Account Deficits. Cumulatively there are likely a few “Prudhoe Bays” out there in currently restricted areas.
- The recently published National Petroleum Council Report indicates likely near term worldwide supply challenges in meeting projected demand. It appears that even with best possible scenarios for developing alternate energy sources and conservation, supply will be short. Incremental production from areas currently restricted from access can have a material impact on worldwide supply and result in downward pressure on oil and gas prices. (*Minority Opinion end*)

In order to carry out this mission the projects funded through the research and development phases will require flexible access to apply new breakthrough technologies. Special expedited access should be provided to qualifying experimental demonstration projects; once efficacy is proven the breakthrough technology project can continue to operate to allow further study while additional access will be granted through a normal review cycle.

It is recommended that under EPACT Sec. 999A (e) the Secretary of Energy consult with the Secretary of Interior to develop an “Experimental Memorandum of Understanding”,² which provides:

- 6) An application for an experimental demonstration project will be filed with Minerals Management Service (MMS) and approved in less than 90 days of application.
- 7) The application will provide for a discreet demonstration period with a discreet reporting schedule, which include:

² This concept is similar in principle to EPA approved Experimental Exemption for new technologies.

- a. safety improvement assets
 - b. environmental impact improvements
- 8) In the event that the demonstration project is successful, the project may apply for a permit to extend the scope of the operation.
- 9) The demonstration project may continue to operate and gather data while the greater development of the project is permitted.

In the event the demonstration is unsuccessful, the demonstration equipment would be removed or abandoned as appropriate and in accordance with all applicable rules and regulations.

Appendix 5

Detailed Background of the Solicitations Process Subcommittee Deliberations

Introduction:

The task of this subcommittee was to review the solicitation process as so far articulated by RPSEA and to make recommendations for improving and strengthening this process. Following up on the discussion at the June 21 UDAC meeting in Washington D.C., various e-mails and phone calls in early July, and the teleconference on July 13, which all the subcommittee's members participated in, we developed the following four recommendations:

- The solicitation and awards processes must focus on big ideas with a wide scope of applications and the greatest impact on unlocking ultra-deepwater (UDW) resources.
- The number of themes opened for solicitation must be reduced from 33 or so to six themes or fewer. Most of the awards must be made to proposals related to these themes.
- More emphasis must be put on the development of UDW discoveries to ensure that the lag between development and exploration is as small as possible.
- The RFP must clearly state the technology rights of principal investigators or the managing institutions of principal investigators as well as the conditions associated with these rights.

Let us expand a little bit more on the thinking behind these recommendations.

Recommendation 1: Big ideas

In the DOE/NETL-2007/1283 documents, RPSEA captures quite well the fact the exploration and development of UDW resources pose huge scientific and technological challenges for which the current technology is either inadequate or largely inefficient. The current incremental approaches to these problems are unlikely to achieve the goals set for RPSEA of identifying, discovering, and developing more than 500 MMBOE in the ultra-deepwater of the Gulf of Mexico in the next 10 years. So we see RPSEA's role as that of (i) identifying and encouraging emerging ideas with great potential for unlocking UDW resources and (ii) accelerating the development of these ideas in technology. For these reasons, we recommend that RPSEA fund about five to eight projects that are up to the challenge—projects that can lead to significant reductions in the cost of UDW resource development, for example. Moreover, we recommend a significant level of funding for the projects selected, about \$1 to \$4MM per year and per project, before adding the cost-sharing component.

- Target R&D projects likely to achieve a significant cost reduction in UDW resource development
- Funding: \$1-4 MM/year per project plus cost-sharing
- Number of projects per year: 5 to 8
- Development of a mechanism for managing the R&D projects to reduce risk of failures

Because we are here dealing with long-term projects that will generally be perceived as risky, based on today's knowledge, the monitoring of these projects is very important, especially after the first year. However, this monitoring must be developed now to ensure that some of its components are known to potential investigators as soon as possible. Here are some suggestions for the development of mechanisms of monitoring (or management) of projects:

- Development of interim goals and measures to monitor and guide the program elements on the technology-development staircase.
- (i) Process of follow-up funding, (ii) termination of funding, (iii) program-element evaluation during the early and mid-stages of the technology development lifecycle, etc.
- Project management: Technical tailgate reviews on a yearly basis, with go/no-go decision-making authority.
- The access of academic projects to deep-water wells and other UDW infrastructure and technologies for demonstration, if necessary.

Recommendation 2: Themes

Right now the RPSEA has a list of 33 themes for potential solicitations. We recommend that a prioritization take place to reduce this number to six or fewer. The prioritization process must seek to retain themes that can direct potential proposals toward the most impactful UDW technological development.

This prioritization is also very useful to potential investigators. It allows optimization of their efforts in writing proposals or in passing on solicitations which are not well connected to their research or background. Also, RPSEA can introduce a preselection process to prevent a large number of IPs going through a full-fledged proposal with few chances of success for many.

Now that the 33 themes are part of the public record, a white paper can be used to announce and describe the prioritization of these themes.

In addition to the prioritization of the themes, we also propose that RPSEA develop weighting factors for evaluating the proposals.

Although we are recommending a reduction of the UDW themes that RPSEA has developed so far, we deeply value the work that has been done in assembling these themes. So we recommend that the themes which may not make the final list for solicitations still be part of the public record, as the E&P industry and academia may find them useful in developing proposals to alternative funding agencies.

- Further development of theme-selection processes to direct the program toward the most impactful technological development
- A development of weighting factors for proposal selection, including assessments of potential size of payout, if successful; probability of success. In essence, develop at least qualitative assessments of the expected value of each R&D project.
- A focus on extremely difficult technological challenges
- The project-selection process should include the project rating, which is based on agreed-upon business goals, the time for technology transfer, and breadth/crosscutting of the potential technology impact.
- A preselection to optimize the time and effort of the potential investigators; prescreening of all potential projects and issuance of RFPs for only those projects for which RPSEA intends to award a contract. Minimize/eliminate time to prepare (and burden vendors with responding) RFPs which will not likely be awarded. Notwithstanding the above, since the entire R&D plan will be in the public domain, consider advising potential vendors to submit unsolicited proposals with estimates of potential benefits for any projects listed in the overall plan.

Recommendation 3: Emphasis on UDW development

Figure 2.1x of DOE/NETL-2007/1283, which captures UDW exploration and development in the Gulf of Mexico, shows a significant gap between development and exploration. There is still a lot to be done in exploration in order that UDW discoveries reach the 500 MMBOE target of this program, so it is important that development keep pace. While the new discovery may affect oil prices in the short term, it is only actual development that will have a real impact on the energy security of the country. So we recommend that emphasis be put on UDW development in the solicitation and award processes.

- With development, we then know that UDW discoveries are economically viable and therefore a real asset to the nation.
- Use the cost-sharing component to fullest extent possible to improve the funding level of development projects, which are likely to be far more expensive than exploration.

Recommendation 4: Technology rights

The RPSEA program is unique in at least one interesting way: it directly invites input and proposals of E&P companies in its processes and deliberations, including major companies. As these companies see successful research and development programs as one of their key competitive advantages in the marketplace, it is important for these companies that the issue of technology transfer and technology rights, in particular, be clearly described in the solicitation as well as in the award letters. That's why we recommend to RPSEA that the requests for proposals must clearly state the technology rights of principal investigators or managing institutions of principal investigators as well as the conditions associated with these rights.

- If RPSEA sticks with long-term projects, which may just enable new technology development, the issue may go away.
- Time to technology transfer (= project to risk) has to be reflected in the sequencing of projects and the level of project funding to create a “projects funnel” in which active projects, as completed, are replaced by stand-by projects ready to be issued.