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• **Research**
• **Partnership to**
• **Secure Energy**
• **for America**
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Ultra-Deepwater Program
FACA Meeting
Christopher Haver
C. Michael Ming
Washington, D.C.
September, 2008

Secure Energy for America

RPSEA Members

Centre for Marine CNG
- Newfoundland, Canada



Current Members 
Pending Members 

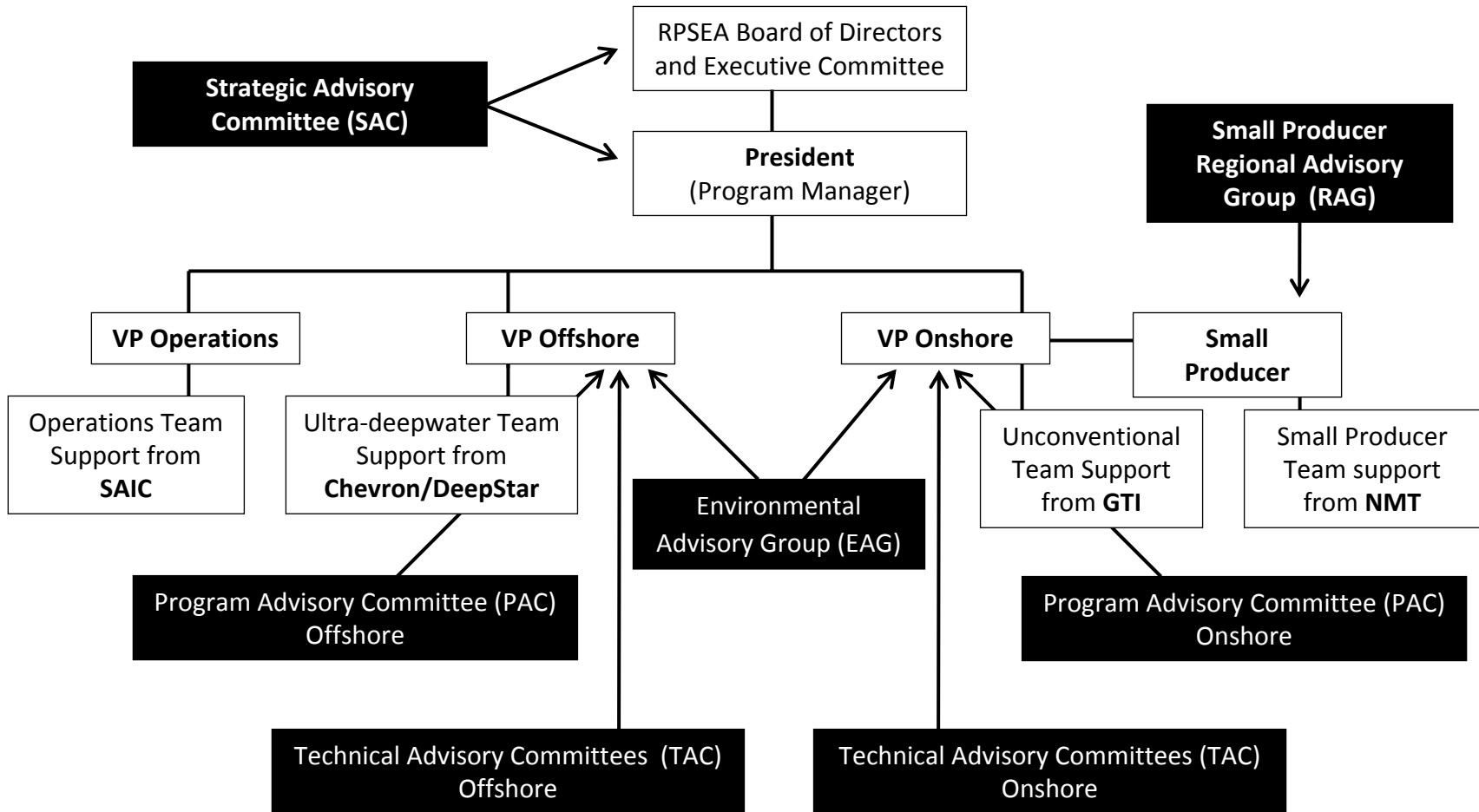
Acergy US
Acute Technology Services
Anadarko
Apache
Apex Spectral
B P America
Baker Hughes
BJ Services
Cameron/Curtiss-Wright EMD
Carbo Ceramics
City of Sugar Land
ConocoPhillips
CSI Technologies
Det Norske Veritas (USA)
Energy Valley

GE/Vetco
Greater Fort Bend Cnty EDC
Groundwater Services
Halliburton
HARC
Houston Offshore Engineering
Houston Technology Center
Knowledge Reservoir
Marathon
Merrick Systems
Nalco
NanoRidge Materials

Nautilus International
Noble Energy
Oxane Materials
Petris Technology
Petrobras America
Quanelle
Rice University
Rock Solid Images
RTI Energy Systems
Schlumberger
Shell Exploration & Production
Simmons and Co.
StatoilHydro

Stress Engineering
Technip
Technology Intl.
Tejas Research
Tenaris
Texas Energy Center
Titanium Engineers
Total USA
University of Houston
VersaMarine Engineering
Weatherford

A Small Organization, A Large Network



Well over 1,000 experts have participated in this process!

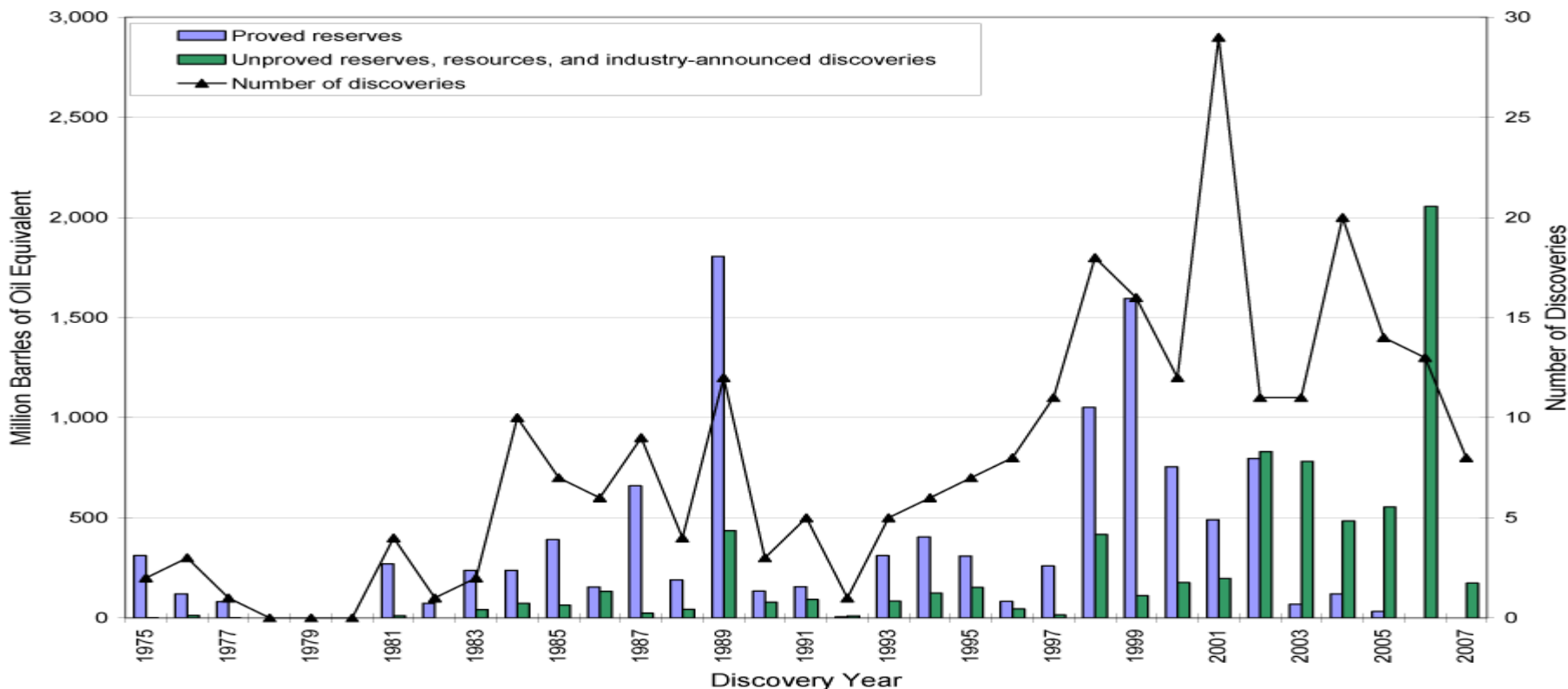


Contents

- UDW situation update
- 2007 UDW program review and status
- 2008 UDW program review and status
- 2009 UDW Annual Plan
- Technology Transfer

Increasing Lag Between Discovery and Development

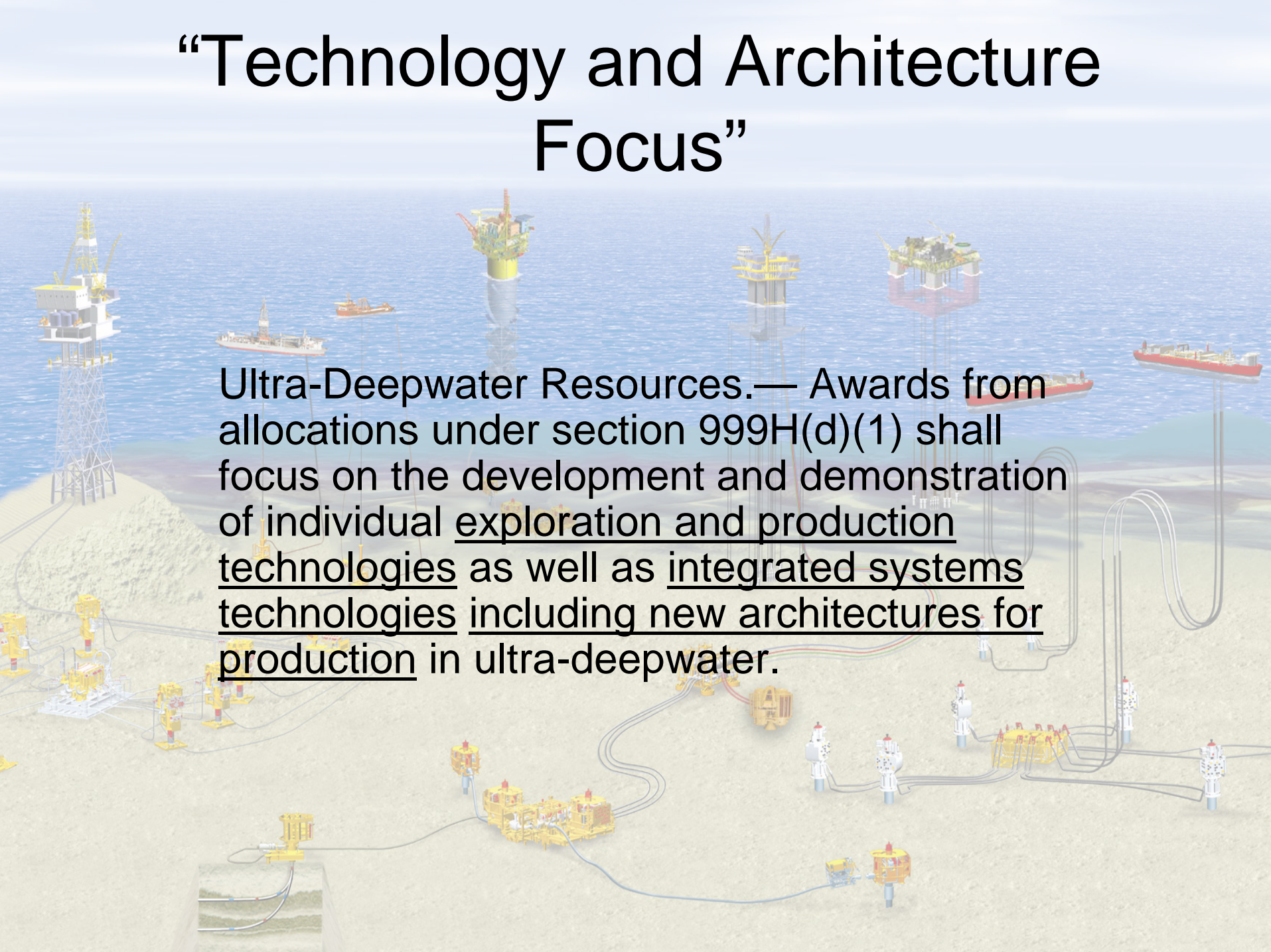
Proven Reserves Add Value



Number of deepwater field discoveries and new hydrocarbons found (MMS reserves, MMS resources, and industry-announced discoveries).

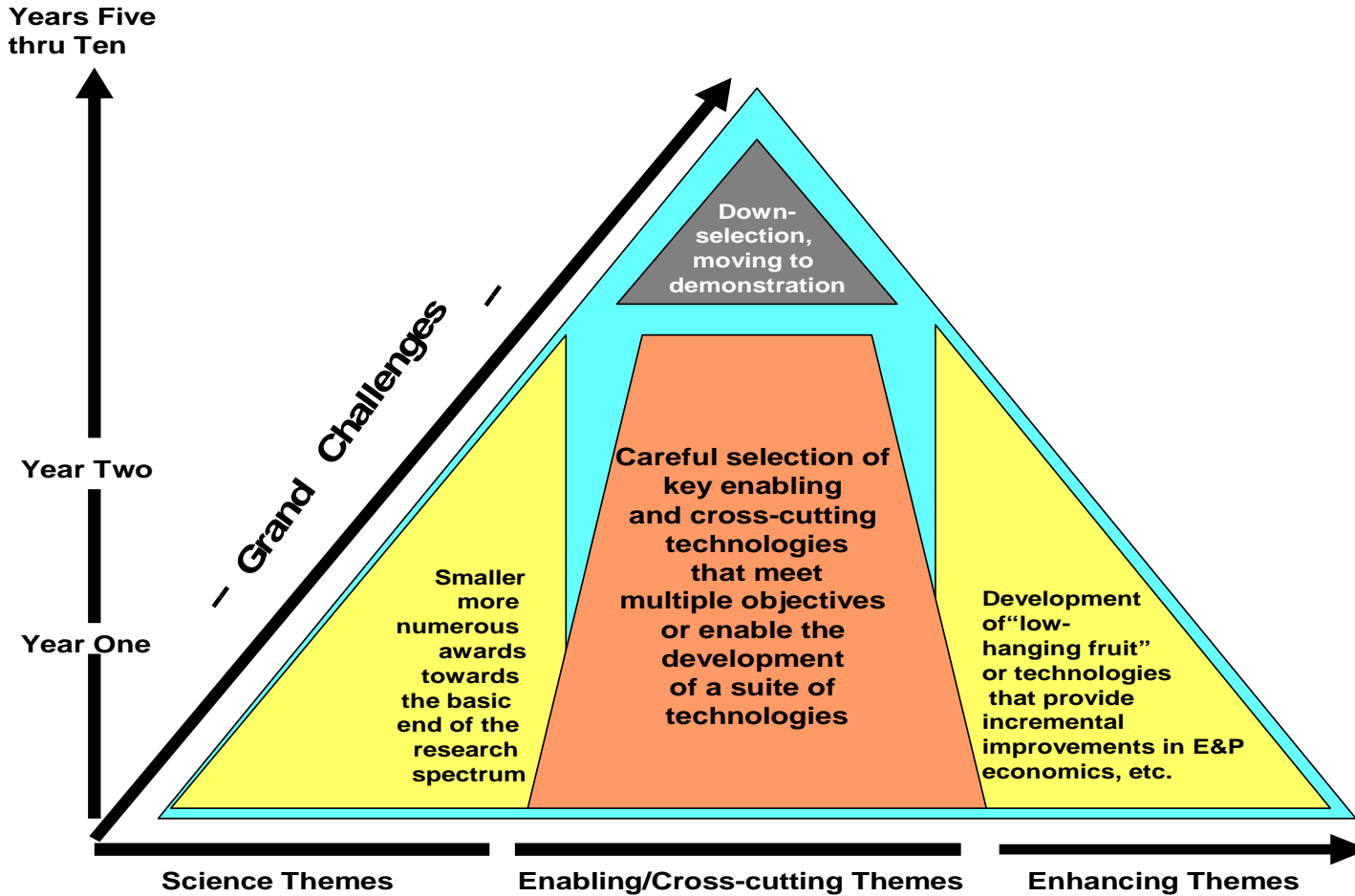
MMS Report 2008-013: Deepwater Gulf of Mexico 2008, America's Offshore Energy Future

“Technology and Architecture Focus”



Ultra-Deepwater Resources.— Awards from allocations under section 999H(d)(1) shall focus on the development and demonstration of individual exploration and production technologies as well as integrated systems technologies including new architectures for production in ultra-deepwater.

RPSEA Program Development Strategy





Significant Demand for UDW Technology Funding

April, 2007

120+ Project Ideas
\$300 MM

June, 2007

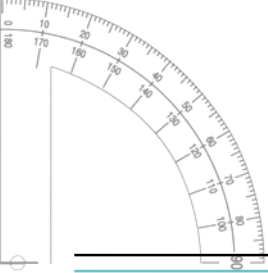
70 Project Ideas
\$175 MM

July, 2007

26 Project Ideas
\$30 MM

RPSEA 2007 & 2008 Projects

2007 UDW projects



Project	Project Title	Number of bids	Selected	Award (RPSEA max)
DW1201	Wax Control	3	University of Utah	\$400,000
DW1301	Improvements to Deepwater subsea measurements	2	Letton Hall Group	\$3,564,000
DW1302	High Conductivity Umbilicals	2	Technip	\$448,000
DW1401	Composite Riser for UDW High Pressure Wells	3	Lincoln Composites	\$1,680,000
DW1402	Deepwater dry tree system for drilling production	4	FloTec / Houston Offshore	\$936,000
DW1403	Fatigue Performance of High Strength Riser Materials	2	SwRI	\$800,000
DW1501	Extreme Reach Development	2	Tejas	\$200,000
DW1603	Design investigation xHPHT, SSSV	6	Rice Univ.	\$120,000
DW1603	Robotic MFL Sensor; monitoring & inspecting risers		Rice Univ.	\$120,000
DW1603	Hydrate Plugging Risk		Tulsa Univ.	\$120,000
DW1603	Hydrate Characterization & Dissociation Strategies		Tulsa Univ.	\$120,000
DW1701	Improved Recovery	2	Knowledge Reservoir	\$1,600,000
DW1801	Effect of Global Warming on Hurricane Activity	1	NCAR	\$560,000
DW1901	Subsea processing System Integration	2	GE Research	\$1,200,000
DW1902	Deep Sea Hybrid Power Systems:	1	HARC	\$480,000
DW2001	Geophysical Modeling Methods	2	SEG	\$2,000,000

summary

32

Ultra-Deep Water Project Selections

DW 1801: Effect of Global Warming on Hurricane Activity
NCAR

DW 1401: Composite Riser for UDW High pressure Wells –
Lincoln Composites

DW 1603: Flow Phenomena in Jumpers
University of Tulsa

DW 1603: Hydrate Characterization & Dissociation Strategies
University of Tulsa

DW 1201: Wax Control
University of Utah

DW 2001: Geophysical Modeling Methods
SEAM Corporation

DW 1403: Fatigue Performance of High Strength Riser Materials Subjected to Sour Environments
SW Research Institute

DW 1402: Deepwater dry tree system for drilling production in the GOM
Flo Tec & Houston Offshore

DW1301: Improvements to Deepwater Subsea Measurements
Letton-Hall Group

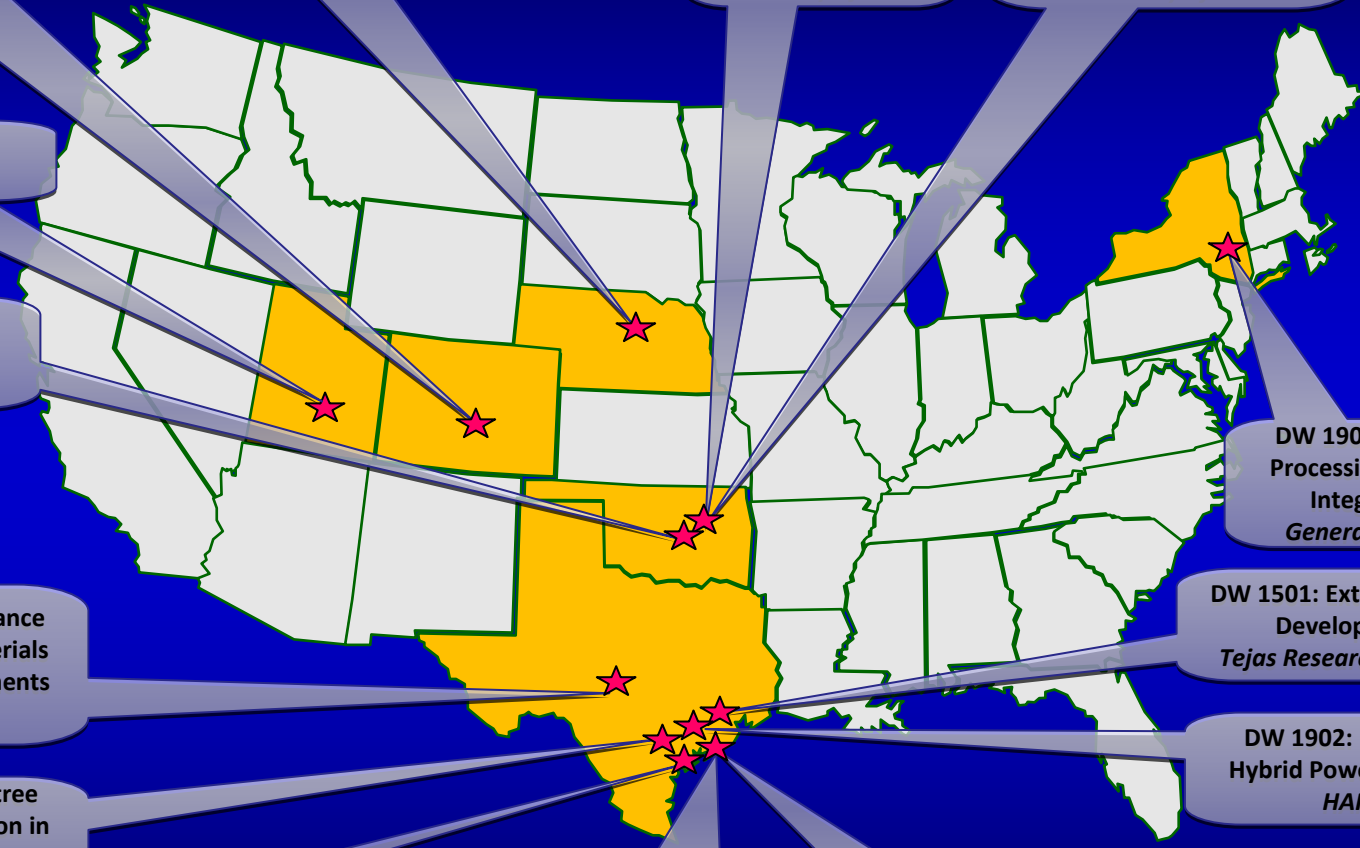
DW 1603: Design Investigation - Extreme High Pressure, High Temperature, Subsurface Safety Valves
Rice University

DW 1603: Robotic Magnetic Flux Leakage (MFL) Sensor for Monitoring and Inspection of Deepwater Risers
Rice University

DW 1901: Subsea Processing System Integration
General Electric

DW 1501: Extreme Reach Development
Tejas Research Institute

DW 1902: Deep Sea Hybrid Power Systems
HARC



2007 Selected Proposals

Categories	UDW	Unconventional	Small Producers	Total
Universities	5	13	6	24
National Laboratories	-	2	1	3
Nonprofit Corporation	4	1	-	5
For Profit Corporation	8	1	-	9
Geological Science	-	2	-	2
	17	19	7	43

UDW 2007 RFPs

- 4 RFPs released November 5, 2007
 - 9 proposals received December 27, 2007
- 5 RFPs released November 28, 2007
 - 13 proposals received January 28, 2008
- 5 RFPs to be released February 11, 2008
 - 10 proposals received April 14, 2008



2008 UDW projects

TAC Number	Impact	2008 RPSEA Max Share
DW 2101	New Safety Barrier Testing Methods	\$ 128,000
DW 1202	EOS improvement for xHPHT	\$1,600,000
DW 2201	Viscous Oil PVT	\$460,000
DW 2301	Deepwater Riserless Light Well Intervention	\$3,411,500
DW 1502	Coil Tubing Drilling & Intervention	\$820,000
DW 2501	Early Reservoir Appraisal, Utilizing a Low Cost Well Testing System - Phase 1	\$880,000
DW 2502	Modeling and Simulation; MPD	\$384,000
DW 2701	Resources to Reserves Development and Acceleration through Appraisal	\$400,000
DW 2801	Gulf 3-D Operational Current Model Pilot	\$1,248,000
DW 2901	power distribution & components (Component Qualification)	\$4,811,000
10 Projects	Totals	\$14,142,500



2008 RFP Release

- Modification of scope of work to reflect significant learnings from 2007 process – September 2008.
- Final review by Project Champions – October 2008.
- Final NETL review in late October.
- Approval by NETL to use multi-step contract and/or other contract form (?).
- Release of 2 to 3 RFP tranches.




2009 UDW Annual Plan

- **Strategies:**

- Show integrated nature of 2007 & 2008 and future programs.
- Provide overview of each 2007 & 2008 project.
- High level view of 2009 program direction.
- Fewer, more general and integrated RFPs.
- Include Environmental Issues

Annual Plan Strategy Development



Portfolio of Opportunities
(Canopy, Coyote Gumout, Diablo)

Field Development Scenarios
(Dry Trees; Tiebacks, Produce to Beach)

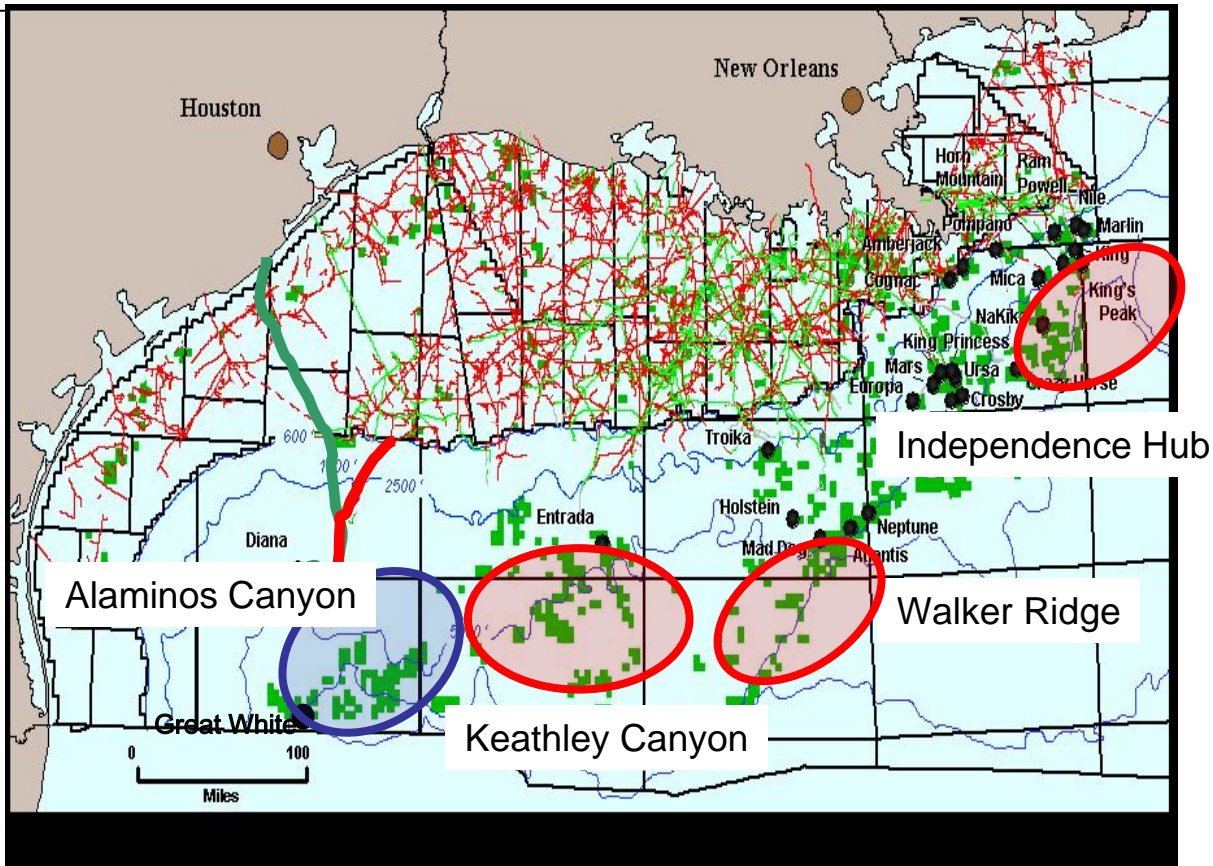
Technology Needs

Initiatives
(Programs)


Projects

GOM Ultra-deepwater Activity

- **Walker Ridge /Keathley Canyon**
 - Sub-salt
 - Deeper wells
 - Tight formations
 - **Alaminos Canyon**
 - Viscous crude
 - Lacking infrastructure
 - **Eastern Gulf – Gas Independence Hub**
 - Higher pressure
 - Higher Temperature
 - CO₂ / H₂S
- Higher Drilling Costs
Challenging Economics



Ultra Deepwater Needs

- Drilling, completion and intervention breakthroughs
 - Appraisal & development geoscience and reservoir engineering
 - Significantly extend subsea tieback distances & surface host elimination
 - Dry trees/direct well intervention and risers in 10,000' wd
 - Continuous improvement / optimize field development
 - Per wellbore recovery
 - Cost reduction
 - Reliability improvements
 - Efficiency improvements
 - Associated safety and environmental trade-offs
- 



Ongoing Needs and Initiatives

- Need 1: Drilling, Completion and Intervention Breakthroughs
 - Initiative 1: Drilling and Completions
 - Initiative 2: Intervention (Downhole Services)
- Need 2: Appraisal and Development Geoscience and Reservoir Engineering
 - Initiative 1: Exploration and Appraisal
 - Initiative 2: Field Development
- Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination
 - Initiative 1: Stabilized Flow
 - Initiative 2: Subsea Power
 - Initiative 3: Subsea Processing



Ongoing Needs and Initiatives

- Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000 foot Water Depths
 - Initiative 1: Dry Trees/Direct Well Intervention and Risers
- Need 5: Continuous Improvement/Optimize Field Development
 - Initiative 1: Improve Operating and Inspection Processes
 - Initiative 2: Graduate Student and Long Term Research and Development
- Need 6: Associated Safety and Environmental Concerns



2009 UDW Plan Strategy

- 4 to 7 Initiative-based RFPs (5 to 10 project awards)
- Unlike 2007 and 2008, however, the UDW TACs have not voted for individual projects. Rather, the TACs prioritized project ideas by initiatives.
- This input was evaluated by the PAC prior to decide the appropriate balance for the 2009 UDW program.
- UDW 2009 RFPs will consist of both specific projects (follow-on) and broader initiative-based requests. Anticipated 2009 RPSEA UDW initiatives and/or projects are listed below in the context of each UDW need.
- The actual 2009 RPSEA UDW may differ from the anticipated portfolio listed below. The actual 2009 UDW portfolio will be driven by further guidance from the UDW PAC and the timing associated with 2009 program funding.



2009 Anticipated Initiatives

Need 1: Drilling, Completion and Intervention Breakthroughs

- Proposals will be requested identifying novel ideas to reduce well construction and completion costs.

Need 2: Appraisal and Development Geoscience and Reservoir Engineering

- Proposals will be requested in the area of production and reservoir surveillance.

Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination

- Proposals may be requested in one or more of the following areas:
 - Ultra-deepwater flow assurance especially for the areas of solids (asphaltenes, hydrates, waxes, and scale) deposition and plug formation management
 - Pressure boosting
 - Autonomous underwater vehicles and intervention
 - Subsea processing/produced water treatment



2009 Anticipated Initiatives, cont'd

Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000' Water Depth

- Proposals in this area to be determined.

Need 5: Continuous Improvement/Optimize Field Development

- Proposals in this need area may include:
 - Advancing industry understanding of phenomena impacting ultra-deepwater operations such as vortex-induced vibration
 - Improvements in integrity management and reliability
 - Additional graduate student project funding
 - High risk, high reward 'long-shot' R&D opportunities

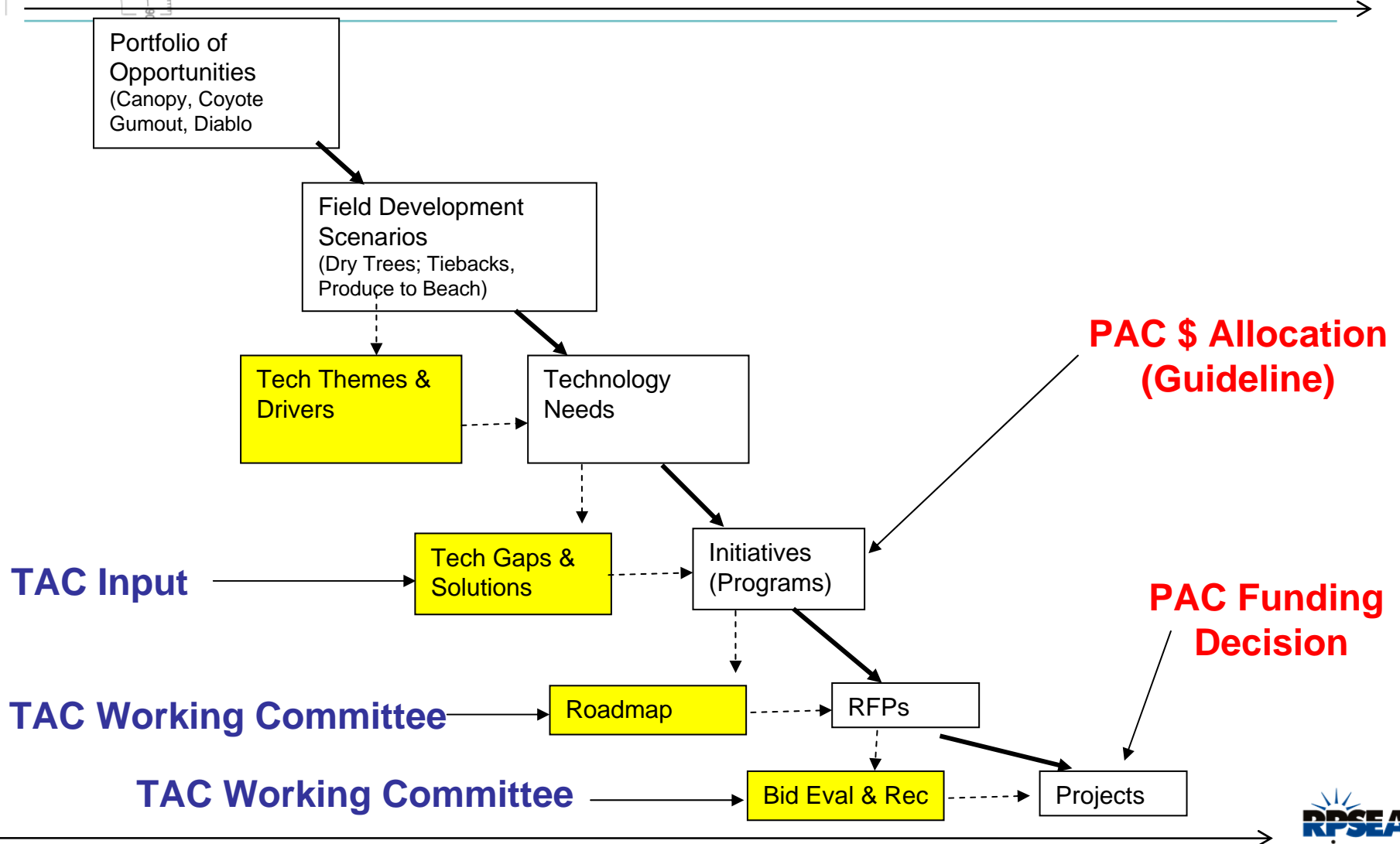
Need 6: Associated Safety and Environmental Concerns

- Ultra-deepwater efforts in this need area will involve the assessment of environmental and safety impact of RPSEA UDW funded technology development projects. This effort may take the form of individual solicitations or elements of more extensive project based solicitations. Areas of study may include:
 - Improved Metocean understanding
 - Discharge of produced water subsea – technology and regulatory aspects

2009 UDW PAC Recommended Funding

RPSEA YR3 Funding Allocation (2009)		Funding Distribution (\$k)		
	Title / Description	Low	High	Average
Need #1	Drilling Completion and Intervention Breakthroughs			6,250
1	Drilling	2,000	5,000	3,500
2	Completions	1,000	3,000	2,000
3	Intervention (Downhole Services)			-
4	Intervention (In-Water IMR)	500	1,000	750
5	Extended Well Testing			-
Need # 2	Appraisal & development geosciences and reservoir engineering			1,500
6	Reservoir Surveillance	1,000	2,000	1,500
Need #3	Significantly extend subsea tieback distances / surface host elimination			3,625
7	Stabilized Flow	750	1,500	1,125
8	Subsea Power			-
9	Subsea Processing, Pressure Boosting, Instrumentation and Controls	2,000	3,000	2,500
Need #4	Dry trees / Direct well intervention and risers in 10,000' wd.			-
10	Riser Systems			-
11	Dry Tree Structures			-
Need #5	Continuous Improvement / Optimize field development			3,000
12	Long Term Research and Development and Graduate Student Program	1,000	2,000	1,500
13	Sensors, tools and Inspection Processes	1,000	2,000	1,500
	Bridging and Contingency	500	750	625
Need #6	Associated Safety and Environmental Concerns			500
14	Environmental Issues	250	750	500
		10,000	21,000	14,875

2009 Annual Plan Process





Technology Transfer Plans

2.5% Set-aside for Tech Transfer in each subcontract

– 1.5% Project Level

- Preparing publications
- Participating in conferences & workshops

– 1% Program Level

- Support activities that impact multiple projects
- Regional workshops, conferences
- Topical conference
- Directed publications
- Newsletter
- Website/Database creation & maintenance (Knowledge Database)
- Technical support
- Other novel approaches?



What Questions Can I Answer?



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