Notes on Meeting and Key Issues

Research Partnership to Secure Energy for America (RPSEA)

Long-Term Environmental Vision for Deepwater E&P Research

November 20, 2008

Houston Advanced Research Center
4800 Research Forest Drive
The Woodlands, TX 77381

The following notes summarize the meeting on November 20th These notes are a synopsis of the comments, questions, and the intense interest expressed by both the energy community and the environmental community.

The Forum served as a platform for networking, idea generation, and goal making for all. It was an enlightening experience for me and we appreciated the opportunity to be of service.

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Ultra Deepwater Development
Overriding Environmental Issues
November 20, 2008
Notes on Meeting

Goal of Meeting

- To identify important environmental issues encountered in deep water developments.
- To bring together the people and programs involved in the development of ultra-deep O&G resources

Presentations: Studies of the Ocean Floor

1. Craig Borland (MMS)

Previous and On-going Studies

Chemo 1 a MMS study

Chemo 2 study led by Bob Avant 1995 and 2002

MMS is funding deepwater coral work CSA's Al Hart first multidisciplinary report MMS report last year

Chemo III Goal is to understand communities beyond 1,000 meter limit

Findings

Deepwater corals largest site Viosca Peak 1991 Oryx Energy 1000 ft to 3000 meters deepest in GOM in 1500 ft Green Canyon site is 1500meters

Ophelia corals found on WW II shipwrecks reefs off England and Ireland (living corals.)

Ophelia II reef rigs and wrecks (collaboration with NOAA) runs to 2012 now USGS involved as equal partner –looking for support in 2010 May relate to de-commissioning of structures to artificial reefs in ultra-deep water

The group had Jason 2 to characterize commissioning before. And surveys see difference between deep and shallow areas, no species in common.

There are now 8,000 sites in GoM identified.

Bottom impacts Topics– top topic list from MMS (non-acoustic)

Muds and cuttings discharges (CSA)
Anchoring and cable impacts
Produced water
Blowouts
Spills

- Planning requirement for responses to low probability high consequences events (e.gl. blow outs).
- What data can reasonably be collected with respect to time and cost that would guide regulation.
- Are regulatory agencies prepared to cooperate to facilitate deepwater research and development. (lead agency? Energy policy?)
- The "three horse race" issue: industry is developing the technology and increasing exploration at a fast pace. However, the science and biological studies are at a slower pace because of resources as well as the necessities of the scientific process. Finally, the regulations (and having the right regulations) depends on having the best science. As a result, we may end up with under/over regulation.
- Seabed discharge (PW) – specific examples of this challenges.
- How do ecosystems develop on/around subsea development?
- Should we be encouraging or trying to prevent the development of ecosystems on/around subsea developments?
- At the end of a susbsea development lifetime – should the equipment be left in place? What is the damage to the ecosystem by recovering the equipment? What are the tradeoffs?
- What is the toxicity of produced water in a deepwater ecosystem?
- No discussion of impacts of pump and dump – (1^{st} casing string) on seafloor ecosystems – no thought ever given in the past to t his region containing Biodeniz materials in deep water.
- Muds and cuttings discharges.
- Anchoring/cables.
- Produced water?
- Blowout/spills (low probability)
- Anchor handling methodologies that minimize bottom contact.
- Variations of mud and cuttings discharge accumulations in ultra-deepwater.
- Hydrate outcrops – identifications (coordinate with Chevron work.)
- Understanding deepwater coral and affects of discharge.

Questions

Buffer distances? Maybe going to 2,000 ft (CSA study) case by case basis

Methane from hydrates? If yes industry avoids

Sensitivity of deep water corals to stuff? (burial only for short times) but they are used to sediment loading

How do partnerships come together and get funded?

MMS environmental funds – interagency collaboration with NOAA - - they provide facilities (Jason etc)

No industry participation yet but maybe because industry funds their own studies to respond to MMS needs.

2. The Serpent Program: Mark Benfield

LSU guys led by Ian Hudson started the program. ROVs are made available as a time available basis

Value of Study

Enforces "E" side of HSE showcase corporate commitment to enviro

ROV pilots need stick time dog fighting with jelly fish

Less than 12 ROVs with fewer owned by academic community

Scientific discovery

Squids with lures

Little fish \deepwater shark

Educational interns value to academia

Funded by industry and MMS BP right 180 k from MMS and equivalent time from industry

Vision is to be a long term deep water vision take GOM slide put logs from industry

Video on web site *http://www.serpentproject.com/default.php*

Questions:

Other academic institutions involved? Answer: hey look for experts in whatever topic is being studied.

3. Ian MacDonald (TAMUCC)

MacDonald CV http://www.oso.tamucc.edu/~ianmacd/ianmacd/long_CV.pdf

Biodiversity of marine organisms --ChEss Best area is from GoM across to W Africa

Hot spot forming processes

Rocky substrata in deep sea (turbulence, anchoring)

Fluid seepage (escarpment base Florida)

Mud volcanoes

Solid phase hydrocarbons

Loop current eddies

Salt domes at surface

Authogenic carbonates then colonized by organisms

Florida escarpment

Stuff forms from seepage

More Information at:

http://www.nurp.noaa.gov/Spotlight/deepsea.htm
http://www.otcnet.org/2007/technical/schedule/documents/otc184791.pdf

Alaminos Canyon GoM

http://www.shell.com/home/content/media/news_and_library/press_releases/2006/deepwater_gulf_mexico_26102006.html

Hypersaline salt water flows sulfide forms at interface
Part of Chemo. III
Brine pooling habitats 100 120 ppt that are rich in methane
Hydrate mounds
Salt worms
Gas bubbling and oil seeps thru gas hydrate formations – can use satellite images to track surface concentrations**.**

Campeche Knolls – in Southern GoM

German ship Zona visited and gave him a look
In 3000 meters of water they found solidified asphalts seeping from sea floor and colonized with organisms. Since then, industry is seeing this behavior is prevalent
What drives this? The lighter HCs
2002 visit saw large areas of asphalt (Sea Grant Texas (Bob Stickney) putting data together

Arctic Area Surveys (74N funded by NOAA

http://oceanexplorer.noaa.gov/explorations/05arctic/background/explorers/explorers.html
Findings included "potholes" in seafloor -- unknown origin.

Recommendations:

We need a way to bring industry and faculty together -

Q&A

Microbial community in high concentration brines? Yes NSF study a brine observatory brine pools up to 50 Celsius

4: John Vicic (Shell)

Regulatory and HSE standards not clear in ultra deep water

Oil and TOC monitoring there are technological developments needed

How about degassing on sea floor at high pressures?

Dissolved solids management release? Regulatory standards

EOR down the road? And discharge of EOR chemicals

Environmentally sounds produced water solids disposal (Shell "do no harm" practices)

Subsea processing (scene setting)

Brownfield operations to enhance oil and gas recovery
As equipment matures implementation will grow

Sea bed discharge *Roadblocks are*

Procedures and standards for discharge globally?
Impact on sea critters
No dialog with marine scientists
Incomplete understanding of risks and gaps in mitigation strategies
Equipment qualified? Still are some
Reliability assessment of integrated package 25 yrs.
Case for action

Technical enabler
Business case more economic
Better recovery (wellhead pressure)
Corrosion damage
Less environ risks
Tortoise first seabed separation and disposal well (failed)
Replace pipelines and risers and debottleneck the system
lower Capex
FMC Tortoise system water brings back topside
A way to meet zero discharge

Q: footprint? A: For FMC unit it is 15 by 30 meters
Q control?
Q toxicity of discharged brine is close to onshore regs . Is this ok?

This would be a good thing to include in the program

Questions and Comments

Regulations how to make them
MacDonald we need to experiment
Al Hart commented on some dat he knew about
Shell is champion on the proposal to RPSEA now in place
How to get samples accept in leu of toxicity test? EPA Region 6
Shll wants multiple operators multiple inputs
How much produced water100 mm bbls 15 to 20 k per day
Deepwater is 40 ppm aim is to get to 29 ppm
Rich notes that critters like this stuff.
Purification techniques? Not defined**.**

5: Alan Hart (Continental Shelf Association)

"*SBM Cuttings discharge tale of two studies*"

SMM Research Group was MMS funded

9.4% synthetics left on cuttings

ROV studies of sea floor

Objective to collect scientific data etc

Site selection sites on shelf and on OCS slope

http://www.MMS.gov/mmab/Archives/policy-committee-archives/Meetings/Fall01/Hinds110101.pdf

Effects of O&G Exploration (the MMS study)

Focused on discharge of internal olefins SBMs (synthetic base materials)

Studies

http://www.gomr.MMS.gov/PI/PDFImages/ESPIS/3/3602.pdf

http://www.gomr.MMS.gov/PI/PDFImages/ESPIS/3/4066.pdf

http://www.gomr.MMS.gov/PI/PDFImages/ESPIS/3/3601.pdf

Garden Banks one site Mississippi Canyon 202 site

Viosca Knoll sites

Findings:

Barium conc several orders of mag higher in near field

depressed oxygen values

meiorauna very little differences (organisms living in sand silt

macroinfauna – generally higher conc found nearer well

Recommendations:

Make it easier for scientists to contact rig operations so as to interact with putting instruments on rig or on seafloor.

Create a stronger collaboration between academia and industry operations.

Q&A

Because of depth lower conc and more dispersed effect of discharge

Current technology doesn't quite allow you to say at reasonable depth dispersion will make problem go away – what does this mean in terms of changes in environment

Also risk management identifies low probability – high consequences events as important drivers of palliative action

Recovery times? No definite answer need re-sampling

"H2S issues from stuff brought up"

MacDonald bioreactor on sea floor

6: Bob Stickney (Texas) Sea Grant

http://texas-sea-grant.tamu.edu/

Ongoing Programs

Discussed the sea floor chart displayed in lobby. Data is available to take this all the way to the surf line – data charts stretch 8 ft at present. Will be used to map effect of hurricanes.

The GCOOS observing system in the Gulf http://gcoos.tamu.edu/

The Gulf Coast Universities collaboration where four schools have contributed $75k each to study coastal reliance.

Recommendations:

Use deep water platforms as a "City in the Sea" providing a chance for scientisits to reside offshore to perform scientific studies – a surface enlargement of Serpent.

7. Quenton Dokken, *(*Gulf of Mexico Foundation)

http://www.gulfmex.org/

He predicts by year 2100 there will be one single metropolitan area rom Key West Fla. To Cancun Mexico.

Endorses evaluating deep water programs on total life cycle cost benefit. Would like to see more conservation of resources. Wants to develop ultra-deepwater resources with minimal environmental footprint.

Recommendations:

Industry take lead role in protection of the environment.
Studies should include rig removal/re-use on shelf developments too.

Q&A

How to interact with rig ops? Contact OTC environmental committee folks.
Go to offshore operator committee (DEEPSTAR)
Comment: Remember that all of the ops on the rig must address the need for the study (does the study make sense?)
Remember funding cycle for industry March is time for ideas to be placed the following year.

8. Deep Water Technology Development (Chris Haver, DEEPSTAR)

Background

DEEPSTAR Started in 1991 started by Texaco and works as an early concepts gap identifier for RPSEA

9 oil companies 58 contributing member

Fees $650,000 for two years for major so they have between 5 to 8 mm every 2 years

Function of DEEPSTAR within RPSEA

RPSEA does research develop and commercialism demos

A business case for technology development – slides shows deepwater resources but not bringing them to market

Since 2003 haven't brought on stream many deep water GoM projects probably because it is getting too expensive to use same technology to go after deeper water

DEEPSTAR leverages expertise and financial resources of member companies to get problems solved.

A new technology advancement offers an opportunity to implement DEEPSTAR works with MMS to get technology allowed.

FPSO first enviro impact statement for GoM for MMS petrobras suggestion

Availability and reliability a big issues

DEEPSTAR helped to develop deepwater ops plan(starts the effort to design a new development)

HTHP in Eastern Gulf

intervention a major issue

mid ocean committee

Rossby waves modeling and measurement – need to predict velocity waves Woods hole group puts down current sensors to improve models Developing an asphaltene deposition simulator (GoM crudes have asphaltenes) $1 MM a well for ¼ in tubes (Rice U and NM institute**)**

General Discussion – Polling Attendees (Rich Haut)

Majors should be members, $ available for R&D but no one has time to think about long term research and development where should we be in ten years

Table 1

water disposal

Drill cuttings disposal

Sensitivity od deep sea organisms

Concerned about technical limitations of these components in ultra deepwater environment

Table 2

Allowance for impact to sensitive communities

Defining definition of low density and high density communities

Table 3

Survival as prices collapse how to make a meal out of small game with

subsea discharge of produced water is a huge enabler

What are regulatory targets to allow this?

Table 4

Dry tree structures -- what would happen if you have catastrophe on deck with risers dumped.

Table 5

MacDonald demise of oceanographic fleet in GoM down to 1 ship 100ft Pelican irresponsible of industry to launch into ultra deep w/o such vessels

This is job of govt to do this.NSF panels say industry does this –

Industry has many faces the problem is how to get Consensus our society has to go about this

Can’t assess impacts without baseline measurements and definition

Table 6

Bridging gap between observed env changes and sig impact on critters

Effort put into seeing if numbers selected is really right

Risers is an environmental.panning (low probability high conseq (risk management)

Should regul agencies cooperate ? yes – how does this fit in to fed energy policy

Table 7

Wireless thru water communications systems

What is ultimate goal – do we have a roadmap to use data?

Table 8

Technology science and regulatory travel at diff paces, so this is a challenge need to coordinate – example is subsea discharge of produced water

Table 9

How does an ecosystem develop around a subsea system should we prevent this? Should we discourage

How about pump and dump in first casing stream (biogenetics materials coming to seafloor?

Open Discussion

What about Mexico (Ixtop 1?) environment problems vs Mexico, immigration problem our govt. ought to work with one GoM way of doing things – create an international dialog with Mexico and US

Example of Norwegian and Brazil going ahead how do we ties things together? Art answers we are trying to do this**.**

Have this meeting next year? Yes**.**

Key Issues identified at Forum:

- Work upfront with a project to install sensors.
- Develop wireless sensors – through water communication.
- Operators are willing to participate, but need clear definition of outreach.
- Water disposal, waste
    - Solution: Annular (?) disposal drill mud cuttings
- Economics of facilities maintenance.
- Sensitivities of deep sea organisms.
- Detection/monitoring.
- Buffer zone.
- Impact styles.
- Data sharing/coordination, data collection opportunities.
- Variations of cuttings discharge impacts (biological) below 1,500 m.
- Approach to defining allowable impacts to deepwater megafauna (chemo/coral)
- Cost of environmental management for deepwater operations.
- Demise of oceanographic research fleet in GOM.
- Survival in ultra deepwater as price collapses.
- Bridging the gap between observed change in the environment and a significant impact on ecosystems.
- Supporting regulations or operating practices by scientific data rather than arbitrary decisions i.e. based on science.

- Planning requirement for responses to low probability high consequences events (e.gl. blow outs).
- What data can reasonably be collected with respect to time and cost that would guide regulation.
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