Unocal Exploration Activities in Mature Kutei Basin

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Outline

• Introduction
• Saturation Exploration
• Exploration Data
• Shelf Exploration Activities
• Deep Water Exploration Activities
• Conclusion
Exploration Activity Summary

- Unocal Indonesia Co. operated in Indonesia for 35 years since 1968
- Unocal is operator in 6 PSCs and partners in 5 other PSCs
- Production PSC:
  - East Kalimantan (including Attaka), in 1968
  - Makassar Straits, in 1997
- Exploration PSC:
  - Period 1997 and 1998: Rapak, Ganal, Sesulu, Sangkarang
  - Period 1999 and 2002: Ambalat, Bukat, Popodi, Papalang, Muara Bakau
- Production in 12 Fields
- West Seno Field begins production in July/Aug 2003 as the first deep water field development in 3,200ft WD.
- Since 1997, 14 commercial discoveries identified and appraised; 11 DW and 3 Shelf; 3 developed
- Unocal continue with active exploration program in Indonesia.

Shelf and Deep Water

Slope to Basin Variation in Channel and Sandbody Architecture, Brushy Canyon Formation, Delaware Basin
REGIONAL 2D SEISMIC LINE RAP98-60

Tectonic Elements and Geological Provinces
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Saturated Exploration Strategy

More wells - More knowledge - More discoveries

- MAXIMIZE THE NUMBER OF WELLS
  - Increase Statistical Opportunity
  - Higher Prospect Risk Tolerance
- MINIMIZE WELL TIME & COST
  - Optimize Well Design
  - EXPENDABLE WELLS
  - MINIMUM STRINGS
  - ACCEPT "FAILURE" (TO REACH PROGNOSIZED TD)
  - Optimize Data Collection
    - WANTS vs. NEEDS
    - FOOTAGE, LOGS, CORES, DST’s

- EXECUTE WITH URGENCY
- THE EXPLORATION STRATEGY DEFINES
  THE DRILLING SYSTEM
- BOTTOM-LINE:
  - Lowers cycle time (exploration to production)
  - Lowers the economic threshold
  - Uses latest technologies when appropriate

Experience - Total Time and Water Depth

Deepwater wells in Sequence

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Experience - Total Well Cost and Water Depth

![Graph showing field cost total and water depth over time.]

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Unocal holds interest in about 27,000 sqkm (6.6 million acres) of offshore acreage (end of 2001)

Total Wells Drilled (31/12/2002):
1042 Wells

Exploration Wells Offshore: 354
Exploration Wells Onshore: 32

Deep Water Wells: > 100
Development Wells: 656

Unocal Shelf and DW 3D Seismic

Total 3D Seismic Data is approx. 15,000 SqKm (Jan 2002):
• Shelf ~ Proprietary
• Deep Water ~ Predominantly Non-Exclusive Regional Seismic Data

Legend
- Proprietary
- Non-Exclusive

On-going Seismic Program
Ongoing Seismic Program:
NIB3D Land/TZ/Shallow Marine/Marine
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Shelf Exploration Activities

- Exploration in Mature Field - **Attaka Case**
- Exploration in the vicinity of Fields - **Mahoni Field**
- Exploration in Complex Structure - **Northern Outboard Area**
  - Exploration in Poor Data Area
    - Poor seismic data quality, imaging, shallow attenuation, multiple problems
    - Poor seismic data coverage
  - Exploration in Intervals Overlain by Laterally Varying Seismic Velocity Section
- Coastal/Transition Zone
- Exploration for Subtle Trap
- Exploration for Combination Struct/Strat Traps
- Exploration in Economically Marginal Projects
- Turbidite Plays in the Shelf
- Deep and High Pressured Targets
**Exploration in Mature Field - Attaka Case**

- HiRes 2D Survey for Shallow Prospect/Leads
- Seismic Acquisition: Mar/April 2003
- Processing: Jun/July 2003
- Results: 2D HiRes + Pseudo 3D

**Activity Summary**

- One of prospect identified after the Balikpapan Bay Transition Zone 3D seismic survey in 1996
- Discovered and produced in less than 2 years
- Reserve proven to be significantly larger than initially predicted

**Key Dates**

- **Late ’98 and early ’99:** Discovery
  - Up to 29' Oil & 32' Gas in Mid Miocene
- **Feb ’00:** Submitted Balikpapan Bay Integrated POD
- **May & Jun ’00:** Mahoni West discovery
  - Up to 111' oil and 72 gas
- **Aug ’00:** Installation of pipe line and production facility
- **Oct 18 ’00:** First Production from MHN-3HZ - 2768 BOPD, 0% cut, 32°API

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**Exploration in the vicinity of Fields - Mahoni Field**

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Deep Water Exploration Activities

- Identification of reservoir and struct/strat trap
- Application of turbidite deposition model from known analogs
- Application of seismic lithology and fluid identification methods
- Exploration in poor data area resulting from severe near waterbottom multiple train
- Exploration in deeper water depths and deeper target intervals

- The deepest well was drilled to 6722’ Water Depth
- More than 100 Wells drilled in DW since 1997
- To date, there are 11 commercial discoveries in DW PSCs
- Resource potential ~ 1,300 million barrel of oil equivalent (MMBOE)

Current sand system in the Kutei is an analog of the complex reservoir distribution

Water Bottom Coherency
- Analog Paleo-Topography

Merah Besar
Bangka
Gendalo
Current sand system in the Kutei is an analog of the complex reservoir distribution.

**Early Lowstand**
- Delta Front Channels
- Coarse-Grained Slope Channel Fills
- Sand-rich Basin Floor Fan

**Late Lowstand**
- Channel/Levee Complex
- Basin Floor Fan

**DW Kutei Rock Properties**

**AVO Behavior of Gas Sands**

**AVO Cross Plot 97’ Oil Sand**

**3D Seismic Data**
Conclusion

- Unocal continue with Active Exploration Program
- Growth in Deep Water
- Maintain Production in Shelf

End of Presentation
Questions?
### Benefit of None-Exclusive Seismic Data
- Prospecting advantage from having regional 3D data early in the exploration stage
- Overall cost saving in both short and long term
  - Evaluation/Discovery/Appraisal/Production
- Effective use of time
  - No time delay to access 3D data
  - Rapid evaluation and identification of drilling locations
  - Rapid evaluation of PSC Block and accelerate production of the Block in a success case
- Mitigation of risk relating to data acquisition and processing

### Cost Savings Directly Related to $
- Higher costs of conducting proprietary surveys
- Avoiding multiple fixed cost from multiple surveys in a PSC Block
  - Mob/demod, stand-by, infill, personnel/consultants, preparation costs, export/import, fuels, clearance of the survey area, etc
- Avoiding large up-front investment for regional 3D in DW Exploration effort
- Time advantage – turn-around time between decision to data availability
- Avoiding risk of poor survey results
- Immediate impact to the exploration drilling campaign

### Technical Advantages
- Flexibility to define survey area
- Flexibility to add or extend new surveys
- Avoid merging issues from multiple surveys
- Maintain consistencies in the 3D data volume
- Early anticipation for potential seismic reprocessing or advanced processes: PSTM/PSDM, Advanced Multiple Attenuation
- Detailed reservoir characterization and structural analysis
- Rapid analysis of regional geology, especially in the deep water objectives

### Cost Savings Indirectly Related to $
- Improve DW prospect definition early in the exploration program
- Delay in the use of 3D data to evaluate prospects may lead to poor well positioning and causing future re-drill
- In the success case:
  - Reduced exploration cycle time and maximize reserve bookings
  - Accelerate follow-up appraisal drillings
  - Early reserve assessment and preparation of POD
  - Accelerate the time to production