Petroleum Resource Management: Standard Reserves Classification

Presented by

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Petroleum Areas and Blocks in Cambodia
- Cambodia’s Claim 1972
- Thailand’s Claim 1973
- Cambodia’s PSC Contractors
- Conditional Petroleum Agreement
- Joint Development of Petroleum Resources for Area II, III and IV
- Delimitation of Area I
- Indivisible package
- Without prejudice to the maritime claims of either party

- How to agree on the Principles of international law; their applications & practices;
Memorandum of Understanding between
the Royal Government of Cambodia
and
the Royal Thai Government
regarding
the Area of their Overlapping Maritime Claims
to the Continental Shelf

The Royal Government of Cambodia and the Royal Thai Government (hereinafter referred to as the Parties):

DESIRING to strengthen further the existing bonds of traditional friendship between the two countries;

RECOGNISING that as a result of claims made by the two countries to territorial sea, continental shelf and exclusive economic zone in the Gulf of Thailand, there exists an area of overlapping claims (the Overlapping Claims Area);

CONSIDERING that it is in the best interests of the two countries to agree upon an early mutually acceptable basis for exploitation of the hydrocarbon resources of the Overlapping Claims Area as soon as possible; and

TAKING NOTE of the understanding reached between their respective senior officials as reflected in the Agreed Minutes of the Informal Consultations done at Cha Am on 5 October 2000 and at Siem Reap on 21 April 2001:

HAVE AGREED AS FOLLOWS:

1. The Parties consider that it is desirable to enter into provisional arrangements of a practical nature in respect of the Overlapping Claims Area.
2. It is the intent of the Parties, through accelerated negotiation, to simultaneously:
   (a) conclude an agreement for the joint development of the hydrocarbon resources located within the area shown in the Attachment as the Joint Development Area (the Joint Development Treaty); and
   (b) agree upon a mutually acceptable delimitation of the territorial sea, continental shelf and exclusive economic zone in the area shown in the Attachment as the Area to be Delimited.

- Political Good Will
- Rational position
- Mutual interest
- Openness
- Trust & Understanding
- Location of the Meeting
- ....etc.,

- Recommendation from the
  Highly professional qualified team in support
  Of the resolution...

- The need of permanent body that works continuously & Efficiently

- Shared schemes arrangements on rational basis
- Joint Development of Petroleum Resources for Area II, III and IV
- Delimitation of Area I
- Indivisible package
- Without prejudice to the maritime claims of either party
- How to agree on the Principles of international law; their applications & practices;
The onshore Central Cambodian low lands are mostly covered by Quaternary alluvium and little is known about the location or morphology of possible sedimentary basins in these areas.

Past publications have indicated a sedimentary basin below the Tone Sap lake. A recent study funded by JNOC and carried out by Moeco indicates that the Tonle Sap Tertiary basin is actually to the SW of the lake.
Cambodia New Ventures Opportunities

Moeco Study Gravity Interpretation
Onshore Tonle Sap Basin

Moeco Study Interpretation
- Block A: Chevron 55%, Moeco 30% and GS Caltex 15%
- Block B: PTTEP 30%, SPC 30%, Resourceful Petroleum 30% & Cooper Energy 10%
- Block C: Polytec 100%
- Block D: China Petrotech 100%
- Block E: Medco 60%, Kuwait Energy 30% and JHL 10%
- Block F: under negotiation with CNOOC Limited
Cambodia Block A: Structure

Top Sequence 3
Time Structure
Red high, blue low

Apsara Trend

Pimean Akas 2 & 2 ST
Pimean Akas 1
Apsara 1

2x vertical scale increase
Red existing wells
Green proposed wells
Objectives of Reserves Accounting

• Inform public: reserves are principal assets of nations and publicly traded corporations
• Business decisions: reserves are projected as future cash flow, which is essential to government and corporate investment decisions
Reserves Accounting Standards

• Current standards are based on:
  • Principles of economics and physics
  • Historically developed principles of petroleum engineering
  • Estimations in the presence of uncertainty
Economic Principles

• Criteria for Reserves
  – Present value of reserves cash flow exceeds initial investment by the internal corporate margin
  – Future cash flow is generally computed using the current oil price, escalated by nominal inflation
  – Initial investment and expenses are generally estimated using current costs, escalated by nominal inflation
Uncertainties in Reserves Accounting

• Greatest uncertainty: geologic
  – Reservoir properties can be directly measured only at a small number of points (well data), or roughly inferred at thousands of points (seismic data)
  – The most important geologic features, barriers to flow (small faults, sand channel boundaries), generally cannot be seen by well or seismic data
  – The presence of hydrocarbon can be determined only by wells: seismic data detects potential hydrocarbon traps only
Uncertainties in Reserves Accounting

• Greatest uncertainty: geologic
  – A standard well test does not discern the reservoir size: optimal number of wells is not known at the onset of development
  – The presence of hydrocarbon in a trap does not imply hydrocarbon in an adjacent trap
  – Gulf of Thailand geology is among the world’s most complex due to severe faulting and sand channeling: thousands of small accumulations exist

• Future price uncertainty
• Future cost uncertainty
Reserves are like fish

• Proved Developed
  – The fish is in your boat.
  – You have weighed it, you can smell it and you will eat it.

• Proved Undeveloped
  – The fish is on your hook in the water by your boat and you are ready to net it.
  – You can tell how big it looks (they always look bigger in the water).
Reserves are like fish

**Probable**
- There are fish in the lake and you may have caught some yesterday.
- You may even be able to see them, but you have not caught any today (yet).

**Possible**
- There is water in the lake and someone may have told you that there are fish in the lake.
- You have your boat on the trailer but you may go golfing instead.
Contingent resources are also like fish

Has all the same physical certainty categories as Reserves but can't catch, sell, or eat the fish because:

• Market/ Infrastructure
  – The whole country is totally vegetarian.
  – There are no refrigerated trucks to get the fish to market.

• Political
  – You don't have a fishing license.
Pimean Akas – 2 ST1
TST #2
9,439 – 9461 ft MD
October, 2006
Feasibility Study and Project Implementation

- Project Planning
  - Oil Products Import
  - Domestic Crude Oil Production
  - Refinery Site

- Feasibility Study
  - Total Investment Capital
  - Sales Revenue
  - Production Costs
  - Cash Flow Statements
  - Balance Sheet
  - Internal Rate of Return

- Project Financing
  - Debt Financing
    - ODA Loans
    - Foreign Investment
    - Local Banks
  - Equity Financing

- Project Implementation
  - Invitation to Bid
  - Bid Evaluation
  - Contractor Selection
  - Project Execution

- Project Perception
  - Population
  - Number of Vehicles
  - Oil Products Demand / Supply

- Oil Products Import
  - Domestic Crude Oil Production
  - Refinery Site
JSA Structure

JSA Steering Committee
- H.E. Sok An - Chairman
  - Partners
  - Government

Sub Team
- Partners
- Government

Sub Team
- Partners
- Government

Sub Team
- Partners
- Government

Overall Workscope

Petroleum Agreement
- Income Tax (Sec 17)
- Petroleum Costs & Recovery (Sec 15 & 16)
- Allocation of Production (Sec 11)
- Permitting, Reports, Audits, Workplans

Kingdom’s Governing Law & Regulations
- Tax, Tariffs, Duty, Vat, Labor, etc.

CNPA
- Min of Fin
- Min of Com
- Min of Envir.
- Min of I,M,E

Royal Government Of Cambodia

Assures involvement of all necessary parties
FPSO (Floating Production, Storage and Offloading system)
FSO (Floating Storage and Offloading system)

**Production** (Process system)
The fluid from the reservoir is separated into oil, gas and water.

**Mooring**
The turret system moors the FPSO allowing it to weather vane in response to the forces of wave, wind and current.

**Offloading**
Crude oil stored in the tanks is periodically offloaded to shuttle tankers.

**Storage**
Processed crude oil is stored in the tanks.