



KINGDOM OF CAMBODIA

The Cambodian National Petroleum Authority (CNPA)

Presentation on Natural Gas Field Development in Offshore Cambodia

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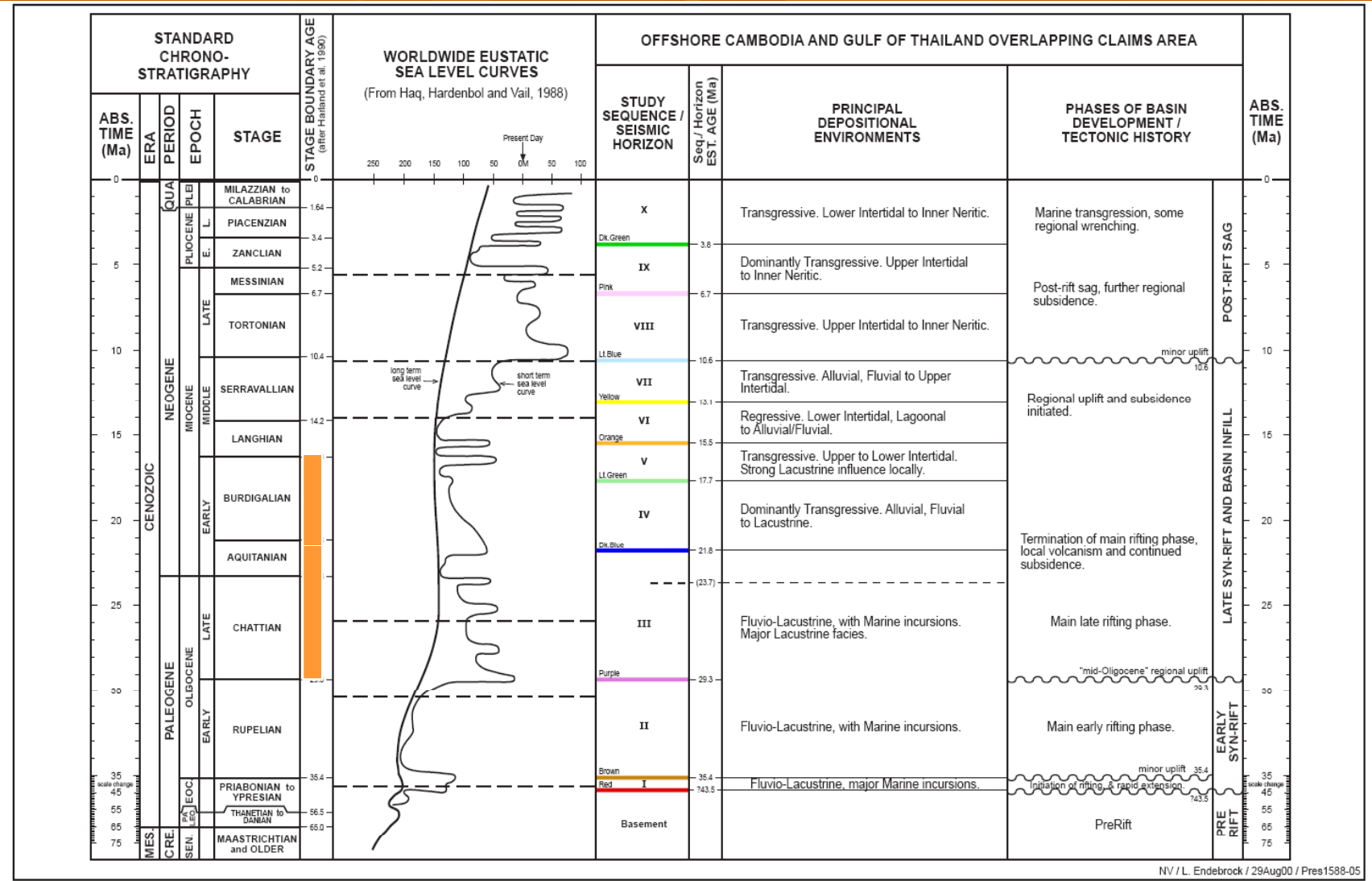
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I-1. Overview of geology



SEQUENCE CHRONOSTRATIGRAPHY - DEPOSITIONAL ENVIRONMENTS - PHASES OF BASIN DEVELOPMENT

I-1. Overview of geology (cont)

Petroleum Geology Khmer Basin

- Source rocks : Late Oligocene and Early Miocene.
- Reservoir rocks : are potential developed in stacked sandstone sequence which are anticipated to be developed fluvial channel sandstone in stacked channel complexes fluvial-delta and fluvial lacustrine sediment.
 - Reservoir quality effective hydrocarbon reservoir within the Khmer basin are sandstone of Late Oligocene to Early Miocene age .

I-1. Overview of geology (cont) Geochemistry

Angkor-1, (Oil and Gas)

- Sequence IV
- Depth = 2552-2594m MDRT
- Gross thickness = 42m
- Net thickness = 7m
- TOC = 38.1%, HI = 258.2134
- Kerogen Type: hydrogen rich Type I/II lacustrine units

I-1. Overview of geology (cont) Petrophysical Result

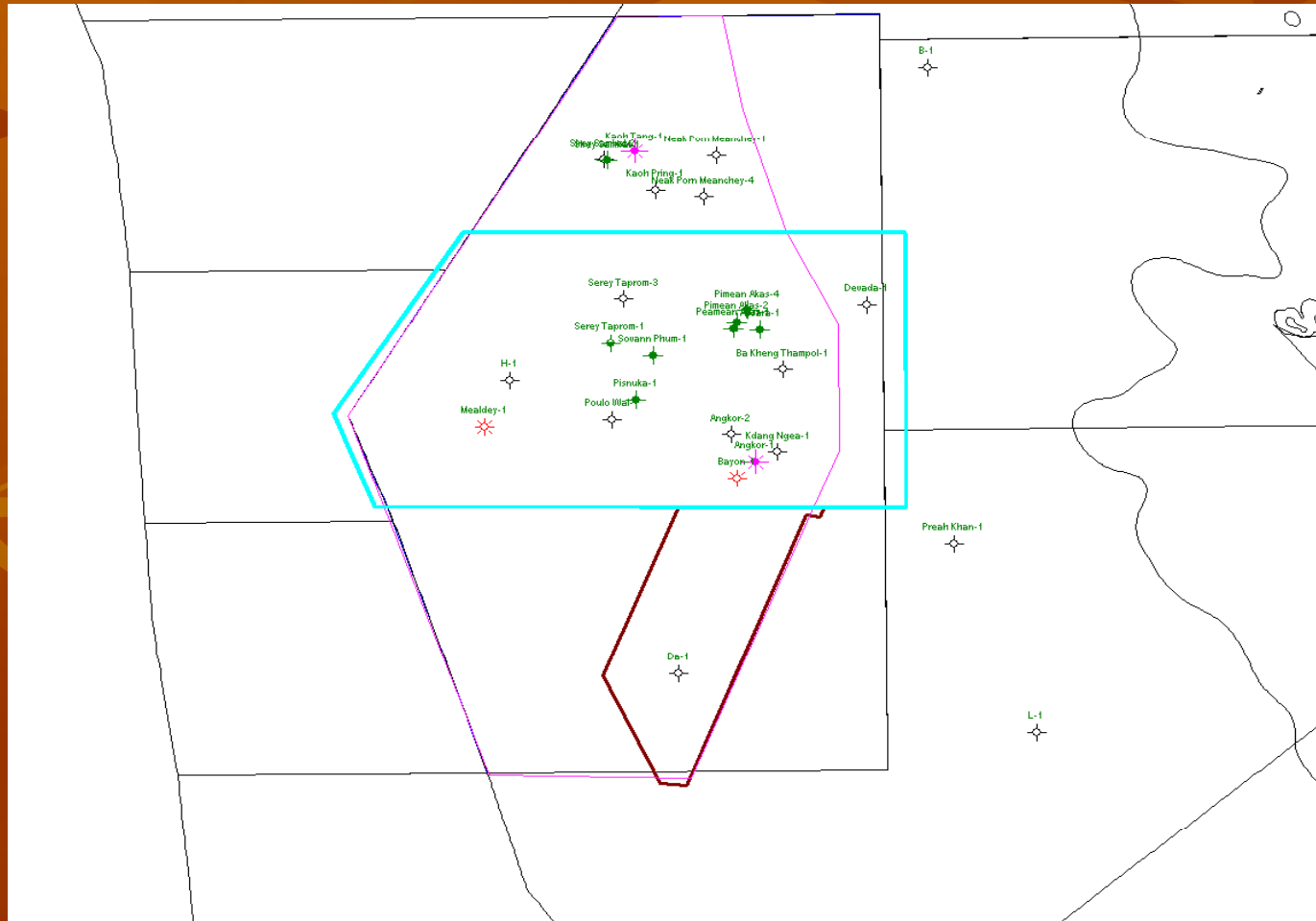
- Angkor-1 (Oil & Gas) :

- Geological age Net Sand (m) Porosity (%)

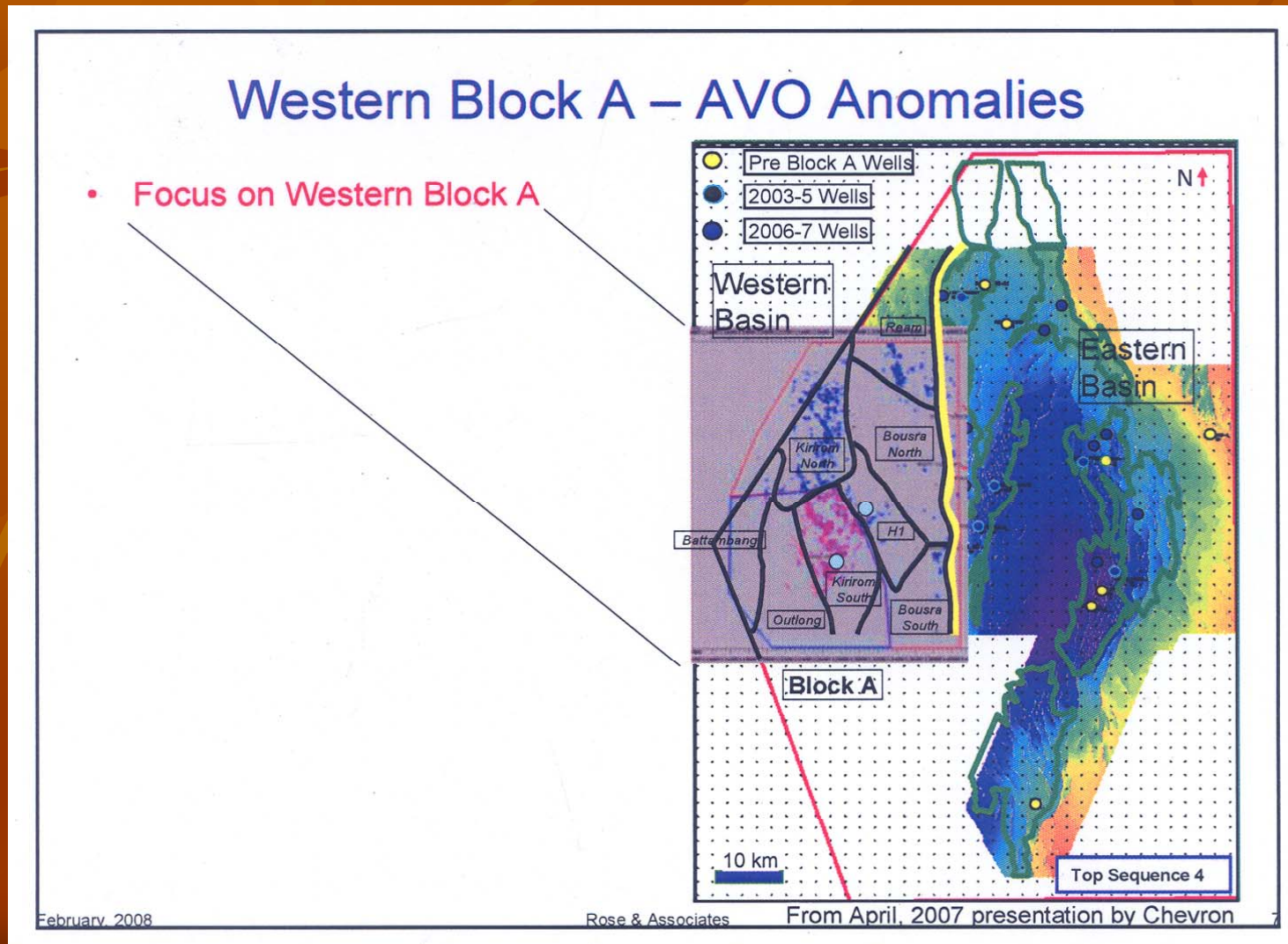
Late Miocene	99.5	30
Mid Miocene	119.9	23.8
Low Miocene	275.2	10.9
Early Miocene	137	10.1

I-1. Overview of geology

Well Locations of Offshore Cambodia



I-2. Map Showing Gas Fields



I-3. Marketing options

- The marketing options for gas in the Cambodian domestic market and possible export. The export of gas were ruled out on the grounds that potential markets which could be reached by pipeline . Additional markets such as gas being bottled and distributed as LPG.
- The investment in infrastructure for natural gas supply requires analysis of long-term demand for energy.
- In relation to the utilization of gas , the connection to the National Power Plan and cooperation with the Electricity Authority of Cambodia (EAC) is important .

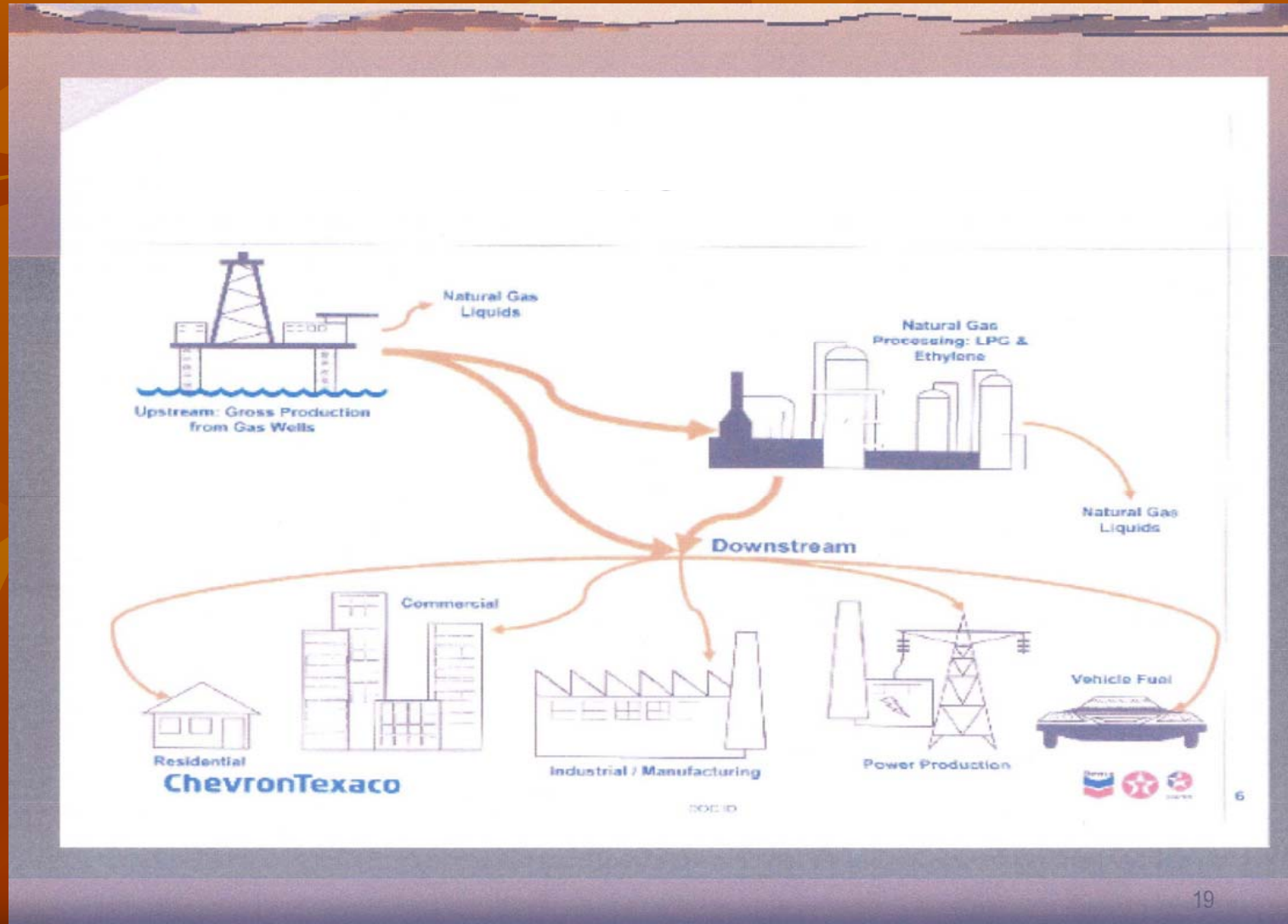
II. Gas Resources and Potential

- Western Block-A :
 - In- place raw gas volume is 619 BCF
 - Average recovery efficiency is 60%
 - Average 23% recovered gas is CO₂

III. Current Supply and Demand

- At present , only 5% and 10% of Cambodia's population has access to networked power.
- Less than 9% of rural households have access to a grid-quality electricity services.
- Per capita consumption is only about 48 kWh/year.
- The viability of a gas development depends on increasing demand for electrical power , and the building of power stations and associated infrastructure to service that demand.

III. Current Supply and Demand (Cont) The Natural Gas Supply Distribution Chain



IV. Natural Gas Development Policy and Roadmap

- The Cambodia government is eager to discover and develop gas resources for planning to increase in domestic power requirement . It are also keen to sell gas to neighboring countries ,such as Thailand and Vietnam.
- Natural gas for Economic Growth, Environmental Protection & conservation .
- To develop a natural gas in domestic market , regional and international.
- To Convert the electricity generation.
- To reduce electricity prices.
- To expand energy consumption.

IV. Natural Gas Development Policy and Roadmap (cont) Natural Gas Development Institution

- The Cambodia government has a Gas Development Working Group Established on 8 August 2001 by the Government degree.
- The Working Group is responsible for :
 - Co-ordinate consultation on these matters between the Royal Government and the private sectors .
 - Device and document an appropriate national policy for development and operation of energy sectors.
 - Evaluate the gas capacity to supply gas to electricity power plant.
 - Advise the Government on the appropriate technical , financial, legal and other arrangements.

V. Identify Project and Research Activities

- Petroleum activities in offshore Cambodia , currently are exploration stage . For Natural Gas Fields Development focus on the Western Of Block-A .
- Plan related to natural gas fields development is a Mealdey Gas discovery .
- Plan of Development will be in the form of a Development Work Program (DWP).
- DWP is the basis for the Production Permit Application.
- Western Gas POD is being drafted .

VI. Issue and Challenges

- State-of-the-art Development and operation.
- To promote Human Resources
- To enhance Policy and legal frameworks
- Critical environmental elements focus on :
 - CO₂ emission from flaring
 - Waste discharge (drilling mud , drilling cuttings and produced waters), their impact on the marine environment.

Conclusion

- Natural gas fields development should make a plan to evaluate environmental issue for various aspects of the prospect areas.
- Findings from the monitoring environmental issues are the Effectiveness of the fields development.

Thank you very much for your kind
attention.