

# EXPLORATION INVESTMENT OPPORTUNITIES IN MALAYSIA



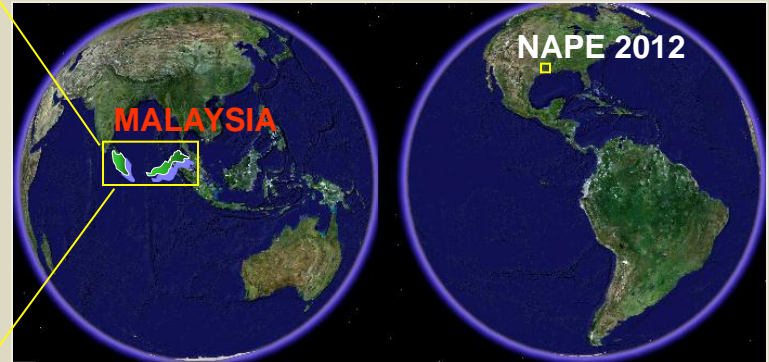
## Talk Profile:

- Malaysia and PETRONAS
- Recent discoveries & new play opportunities
- Data review and petroleum arrangements

NAPE

21<sup>st</sup> Feb 2012

# MALAYSIA in perspective



- ◆ Located in the heart of South East Asia.
- ◆ It is multicultural population of about 28 million the country is politically stable with well developed infrastructures.
- ◆ Comprises Peninsular Malaysia and two states of Sabah & Sarawak in Borneo with total land area of 330,000 sq. km. (slightly less than ½ the size of Texas)

# PETRONAS Corporate Profile



**Logistics & Maritime Business**



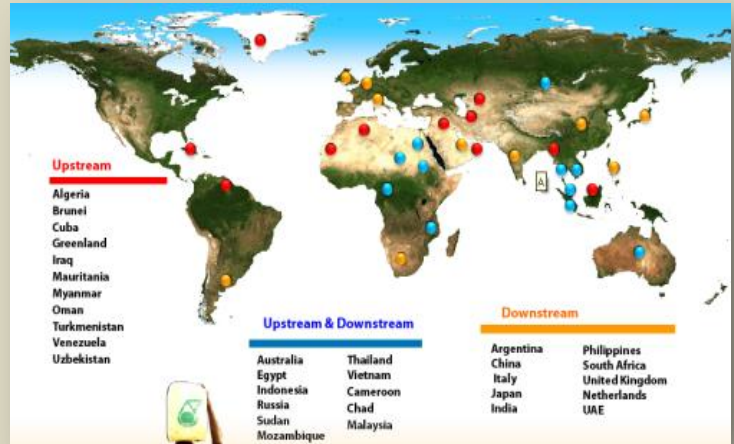
**Oil and gas exploration and production**



**Refining**



**Petrochemical Business**



**Marketing**



**Gas Business**

- Incorporation of PETRONAS on 17th August 1974 under the Malaysian Companies Act of 1965
- The Malaysian Petroleum Development Act 1974 vested upon PETRONAS the exclusive rights to explore, develop and produce petroleum resources within Malaysia
- First PSCs signed in 1976

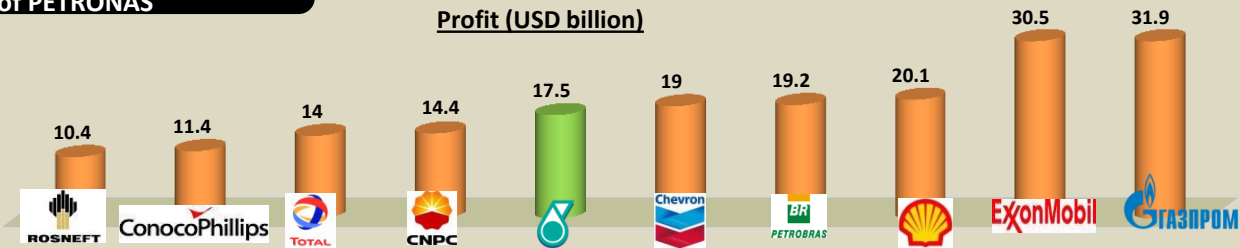
**1970s Creation of PETRONAS**

- Involvement in gas exploration & development activities
- Beginning of downstream gas projects
- Expansion of other domestic downstream projects such as Refining, Petrochemicals & Logistics & Maritime
- International Ventures

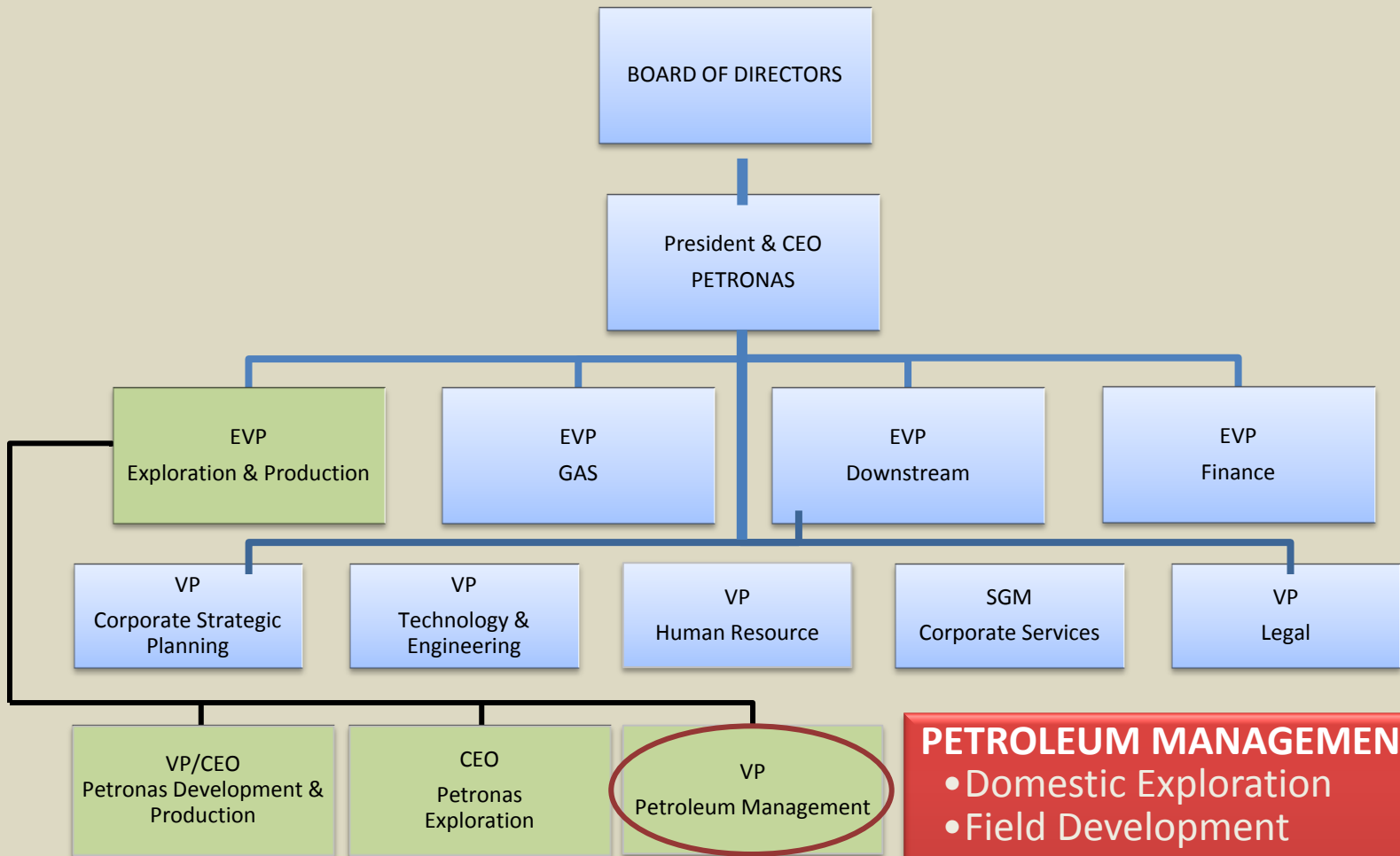
**1980s-2000s Capability & Capacity Building**

- PETRONAS has evolved into a fully integrated multinational oil and gas company
- Worldwide expansion in more than 30 countries
- Revenues from overseas operations
- Production of oil and gas from international ventures

**After 36 Years – Today A Global Player**



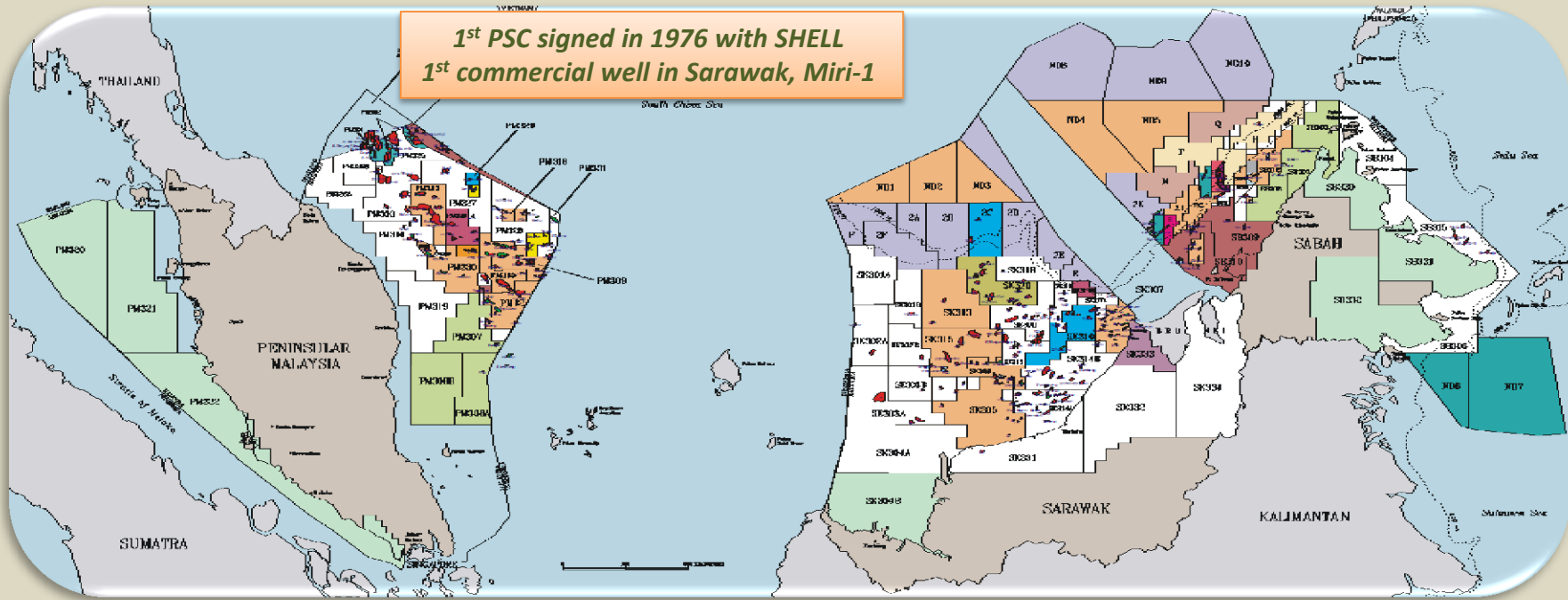
# PETRONAS CORPORATE PROFILE



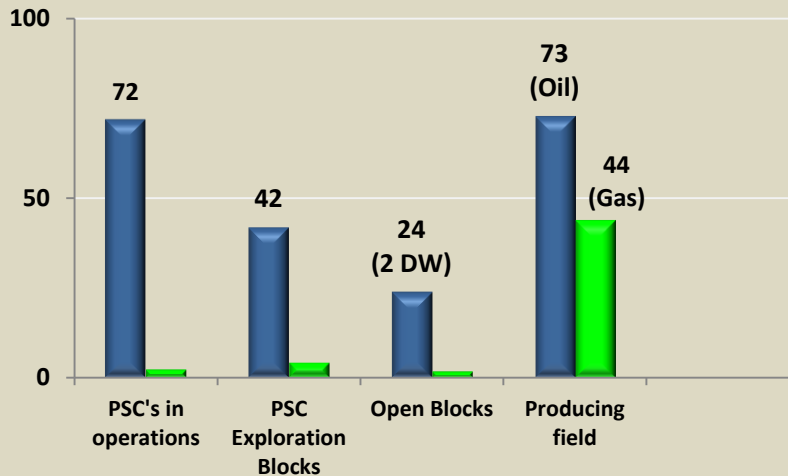
**PETROLEUM MANAGEMENT UNIT:**

- Domestic Exploration
- Field Development
- PSC Management
- Enhance Oil Recovery (EOR)
- Small Field Development
- Data Management and Capability Development

# DOMESTIC E&P – Investments & Activities



List of PSC Operators:



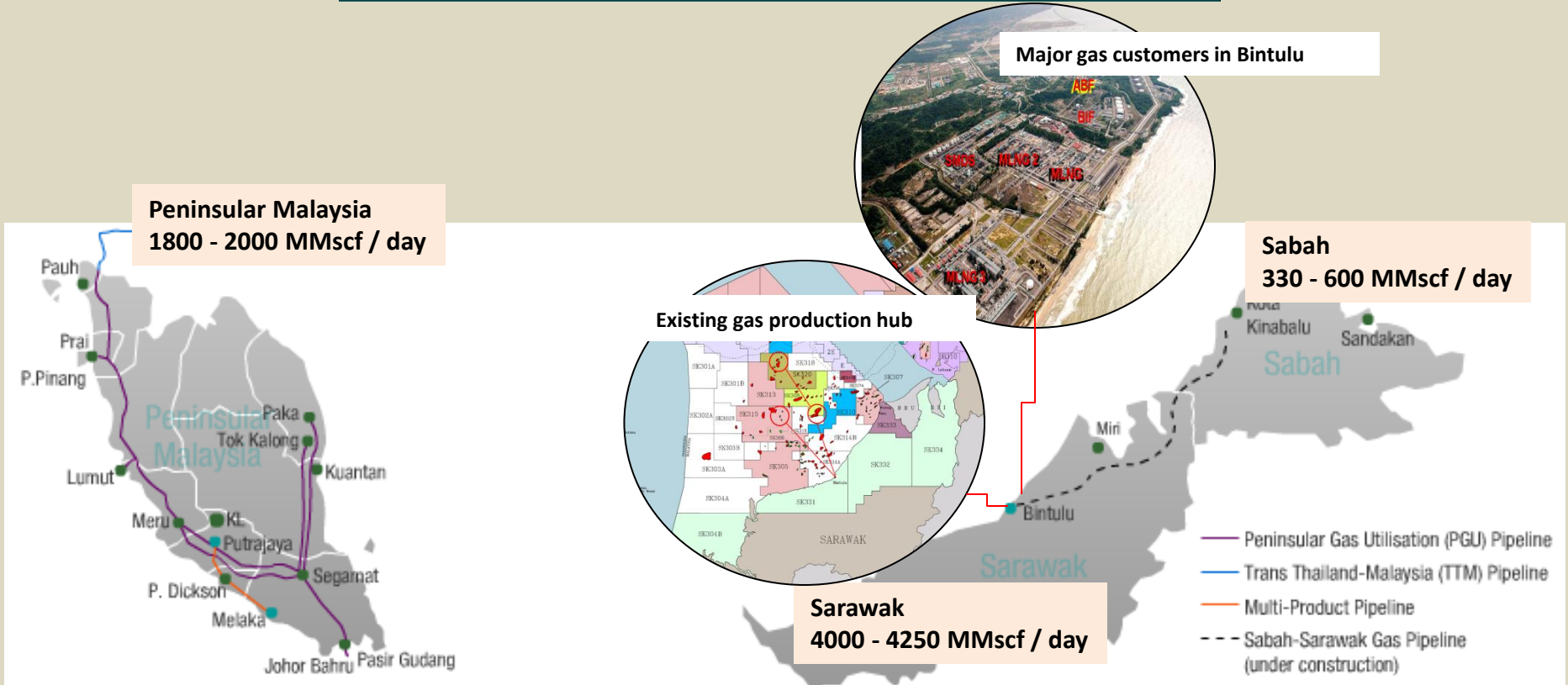
## RECENT PETRONAS E&P Highlights

Signing of **2 DEEPWATER PSC** in offshore SABAH with **JX-Nippon** & **INPEX**

Signing of **2 EOR PSC** with a total investment of **USD12 billion** with **SHELL**

Awarded **2 MARGINAL FIELDS DEVELOPMENT RSC** with **Petrofac** and **ROC Oil** with a total investment of **USD 1 billion**

# Malaysia's Daily Gas Demand



## Progress Made In Malaysian Gas Industry

### Peninsular Gas Utilisation (PGU)

- PGU project started in 1984 & completed in 3 stages in 1997
- 6 gas processing plants 2,000 MMscf/day
- > 2,500km of main & lateral pipelines to transmit gas
- PGU pipeline is linked to the Trans Thailand Malaysia (TTM) Gas Pipeline system

### PETRONAS LNG Complex (PLC) Bintulu, Sarawak

- PLC started in 1983
- 3 integrated plants total capacity of 23 MTPA expect to increase to 24.2 via debottlenecking activities) World largest LNG production facilities on a single location

### Gas market in Sabah

- New Sabah Oil & Gas Terminal in Kimanis & Sabah-Sarawak Gas Pipeline (SSGP)
- 2 demand centre (Labuan island & Kota Kinabalu)

# Malaysian Basins & Remaining Play-types

Basement  
Compressional Anticline  
Half graben  
Updip Miocene clastics  
Inverted flower structures

**Malay Basin**

Oligo Miocene  
Compressional Anticline  
Deeper plays  
Clastic Plays  
Updip strat plays

**Sabah Basin**

**Sandakan Basin**

**Strait of Melaka Basin**

**Penyu Basin**

**Sarawak Basin**

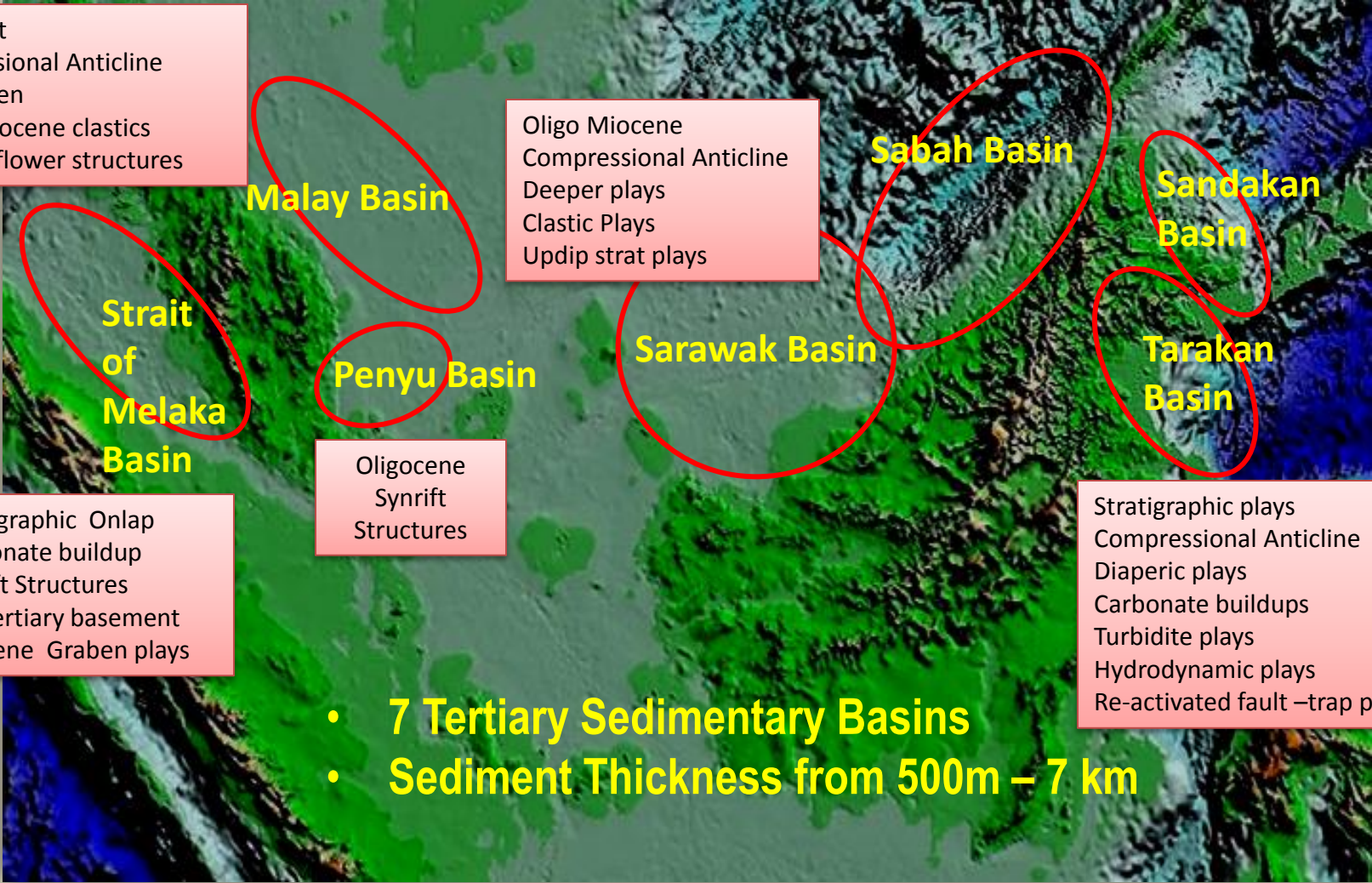
**Tarakan Basin**

Stratigraphic Onlap  
Carbonate buildup  
Synrift Structures  
Pre-tertiary basement  
Miocene Graben plays

Oligocene  
Synrift  
Structures

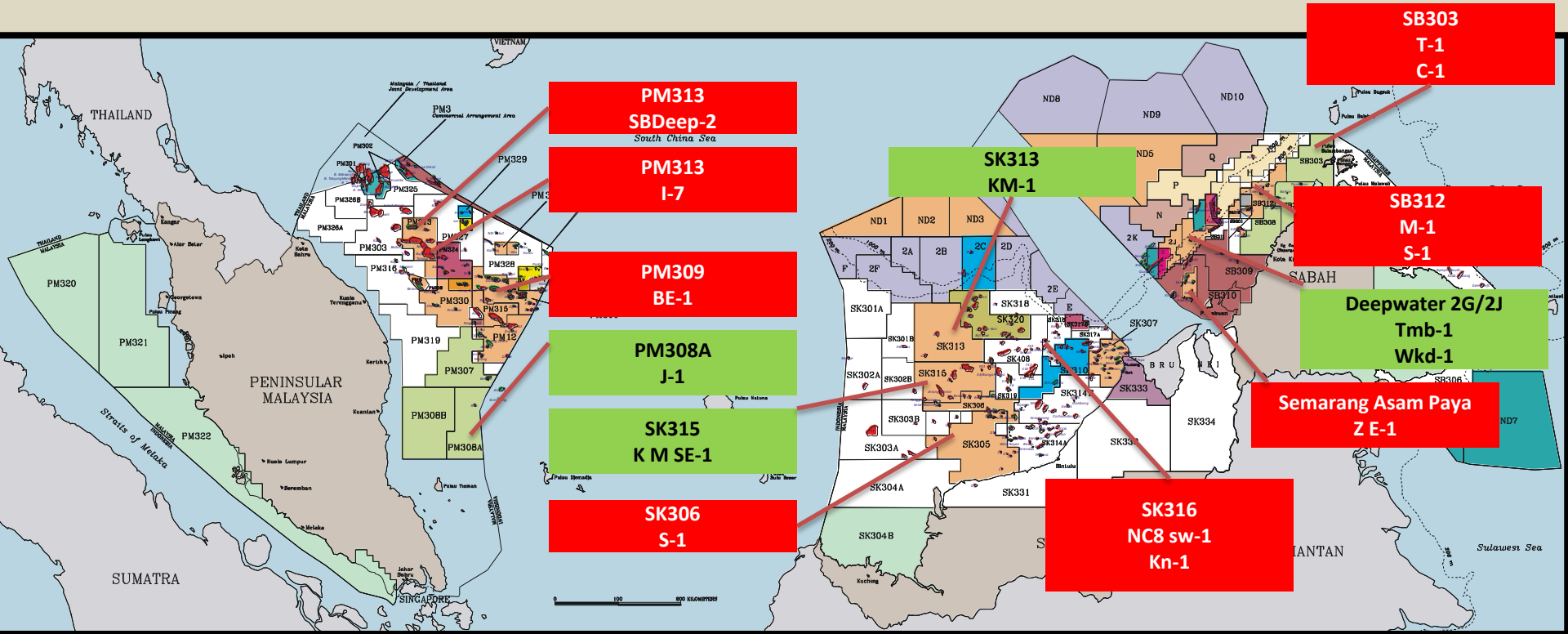
Stratigraphic plays  
Compressional Anticline  
Diaperic plays  
Carbonate buildups  
Turbidite plays  
Hydrodynamic plays  
Re-activated fault –trap plays

- **7 Tertiary Sedimentary Basins**
- **Sediment Thickness from 500m – 7 km**





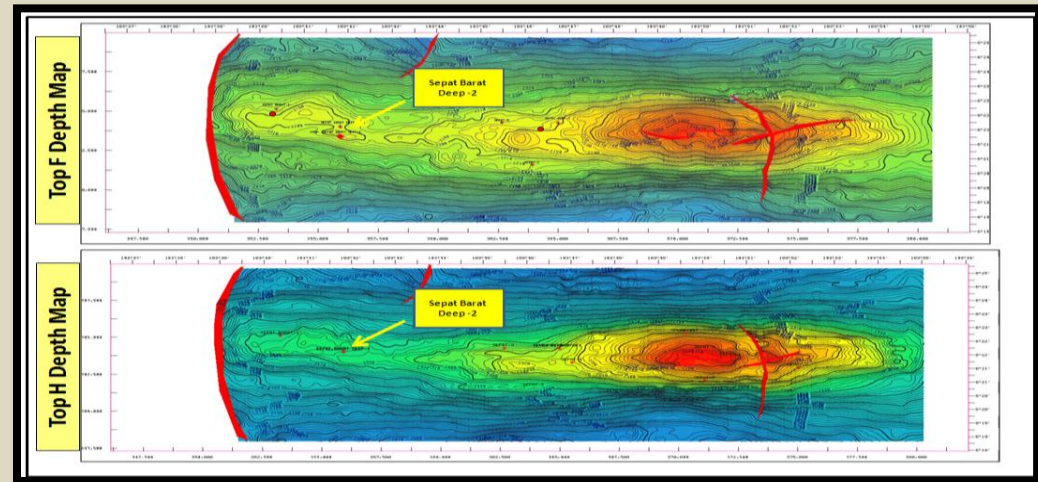
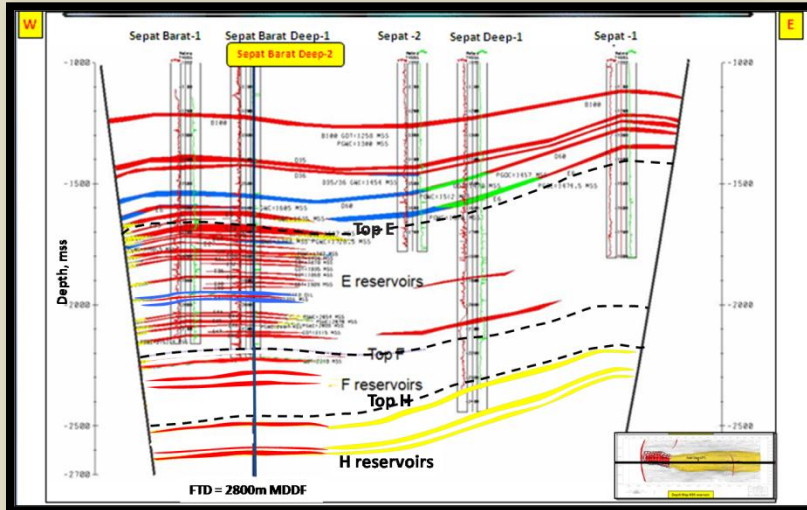
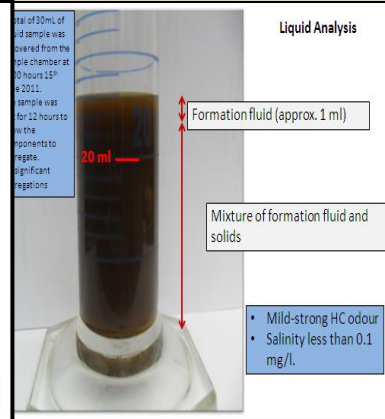
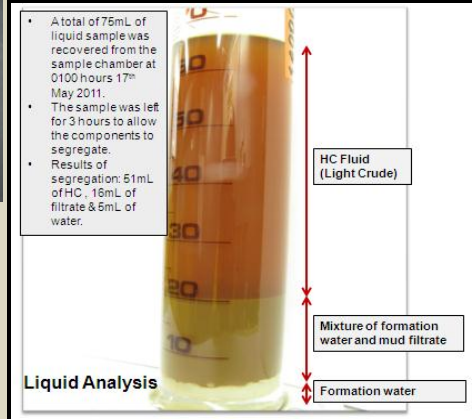
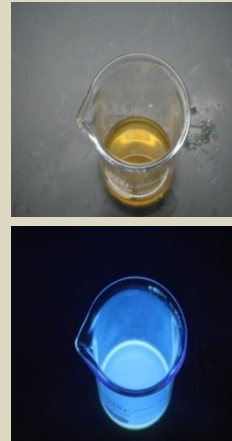
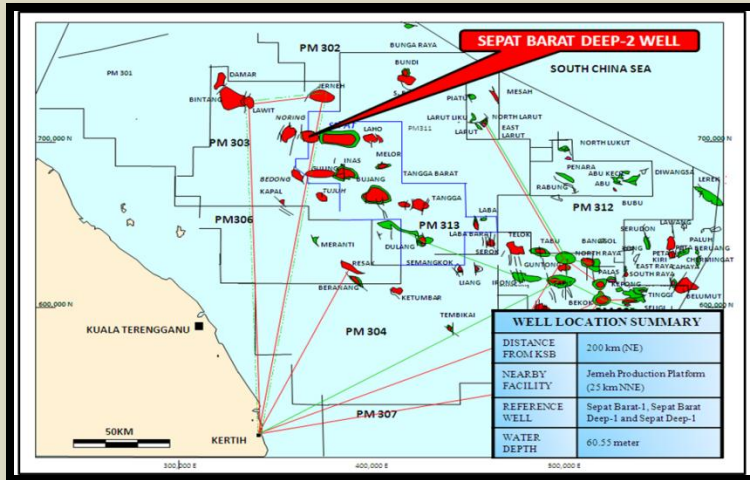
# RECENT EXPLORATION DISCOVERIES 2010/2011



New Play types drilled by wells such as J-1, KM and NC8 stratigraphic trap opened up prospectivity in the basins.

SB Deep shows that there is a lot more potential in HPHT area with low CO2 content.

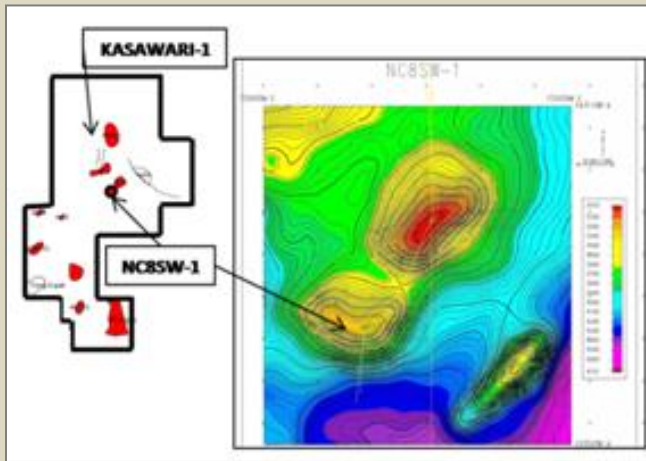
# PM313 - Testing HPHT Low Relief Reservoir of Group F & Group H



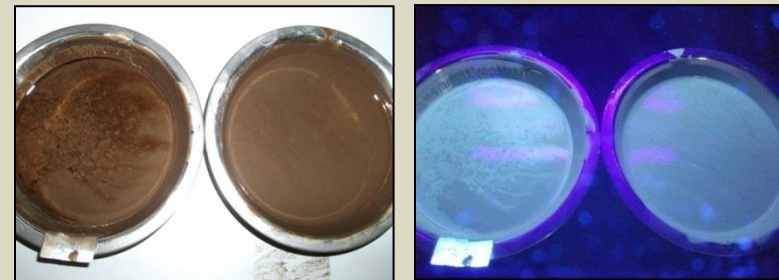
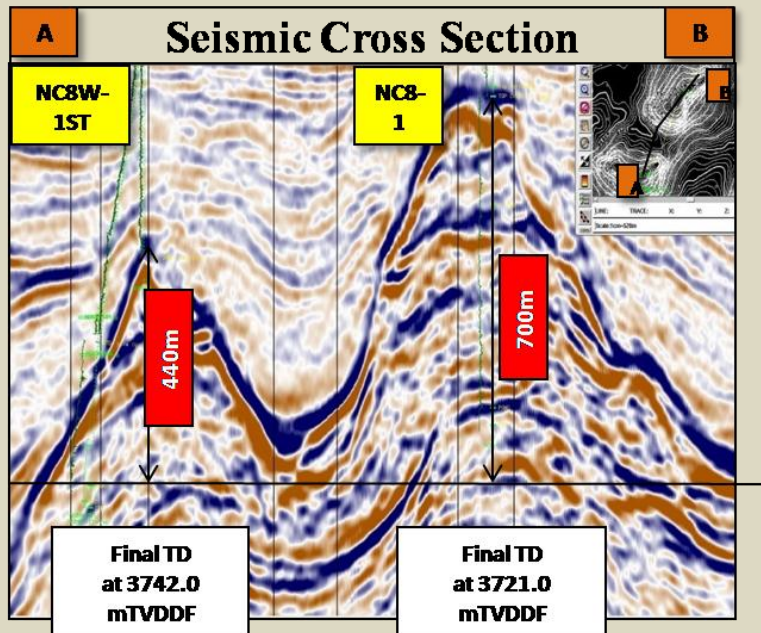
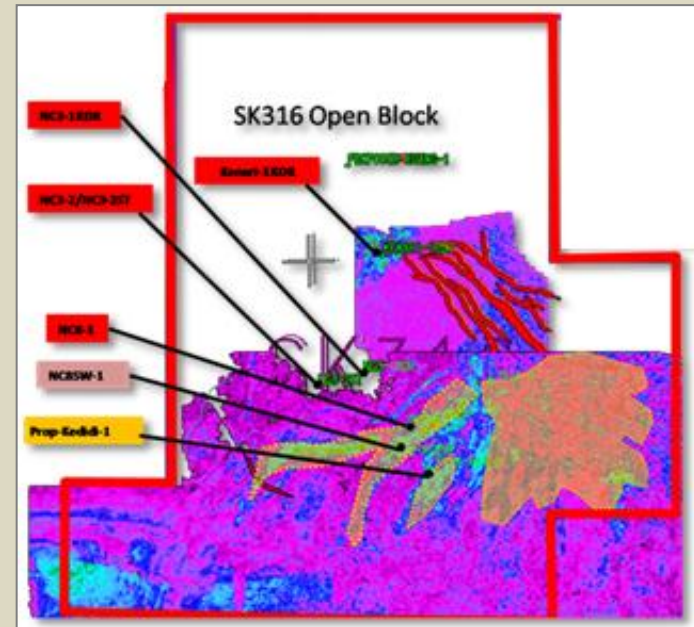
Low relief structure at the deeper reservoir of Sepat Barat

Sepat Barat Deep well was the only well which successfully evaluates the deeper reservoir of Group F and H in North Malay Basin. A total of 8 new hydrocarbon bearing sands were encountered with gross thickness of 69 meters. F sands which are over-pressured reservoirs had preservation of its porosity up to 24%. Minimum CO<sub>2</sub> content (11%) from DST was recorded in H sands concluded that there is no CO<sub>2</sub> trend with depth in the area. Advanced tools and technologies were applied such as Manage Pressure Drilling (MPD), high temperature wireline tools, StethScope and Insitu Fluid Analyser (IFA). Discovery of Sepat Barat Deep well open up the deeper reservoir potential of Sepat Complex and similar plays (Middle Miocene to Lower Miocene HPHT play of Groups F, H and I) within surrounding area i.e Bujang, Inas, Noring and Guling.

# SK316 - Cycle IV Carbonate and Intra Cycle V Channelized Sand

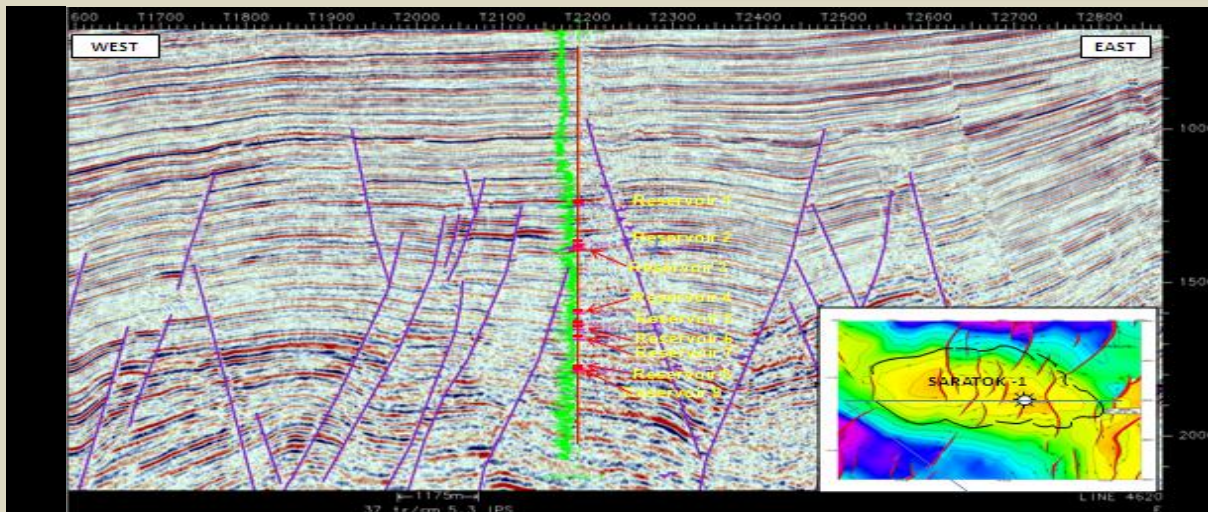
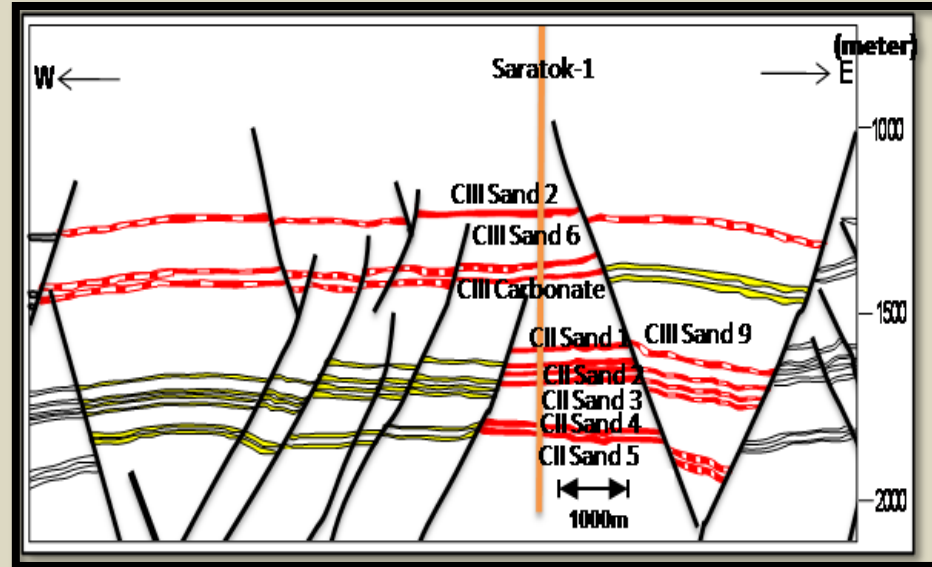
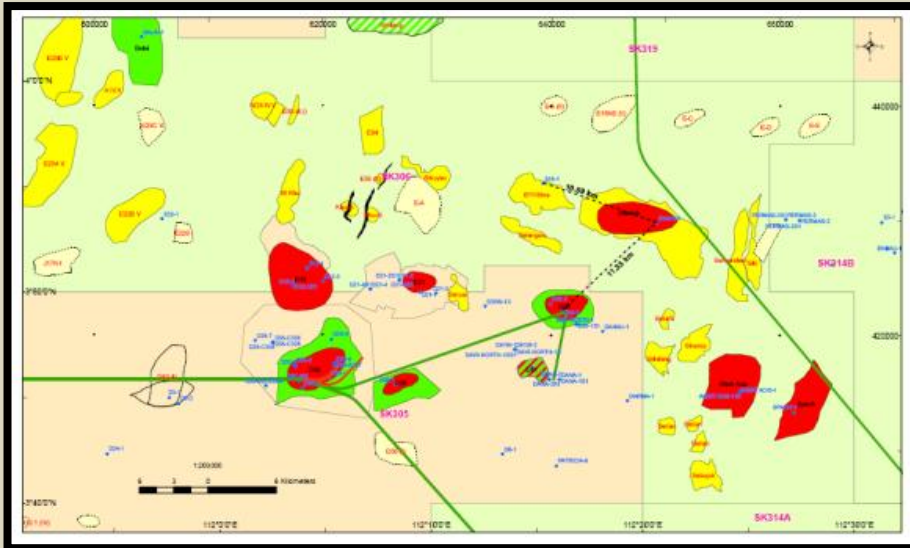


## New Play Type in Central Luconia: Intra Cycle V sand



NC8SW-1 found gas column, testing the Cycle IV carbonate play. The discovery of a potential HC-bearing Intra Cycle V sand opens up a new play type in SK316 and Central Luconia Province.

## SK306 - Balingian Structural Trap of Cycle II and Cycle III Play



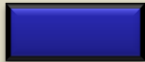
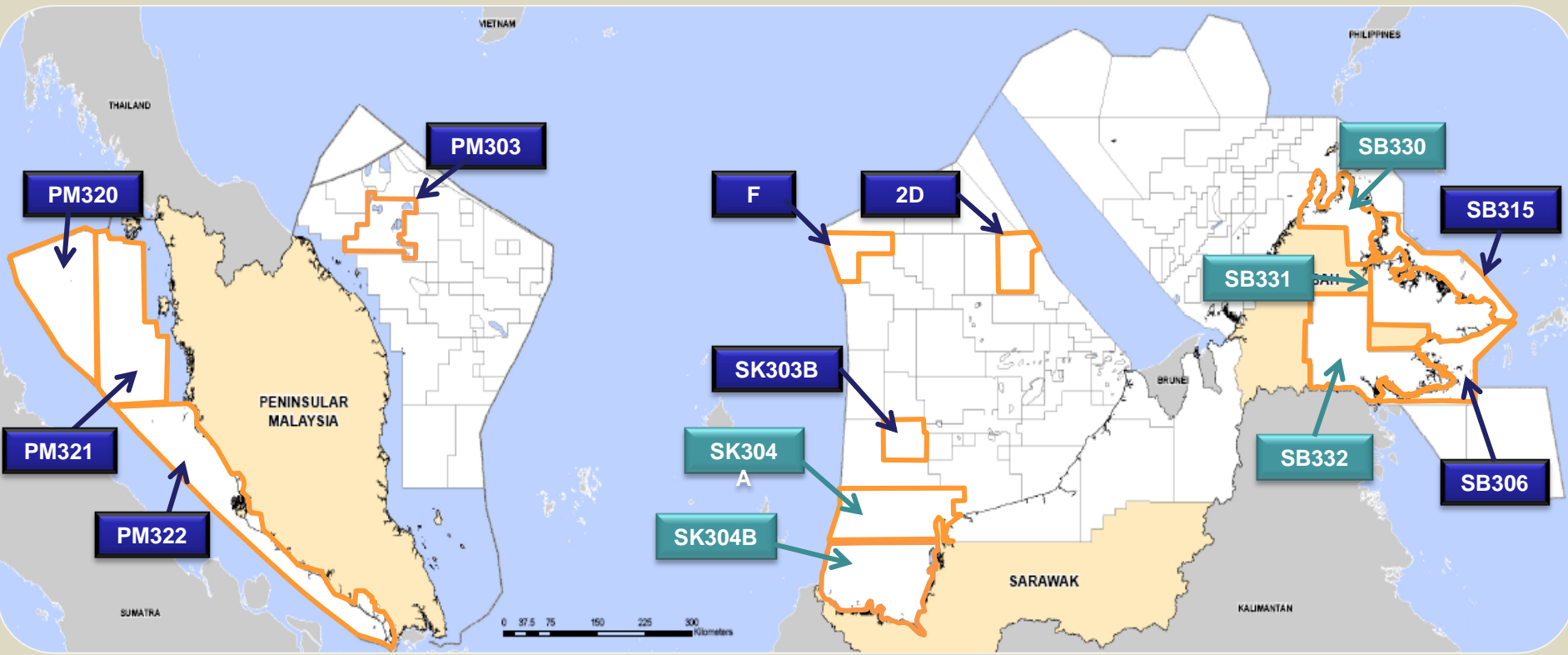
Saratok-1 encountered about 70m of net hydrocarbon sand in Cycle II and Cycle III intervals resulted in most likely case of 170 Bscf gas in place. The discovery proved the amplitude supported prospect can lead to the hydrocarbon accumulation in Balingian area given a good quality seismic imaging.

## BLOCKS OFFERED

### A total of 14 open blocks opportunities :

- R/C** - 3 blocks in Straits of Malacca, PM320,321, 322  
2 blocks in Eastern Sabah, SB315, SB306,  
1 block in Sarawak, SK303B
- R/C or HPHT** - 1 block PM 303
- DW** - 2 blocks F and 2D
- TEA** - 5 blocks SB330,331,332 and SK304A, 304B

# EXPLORATION OPPORTUNITIES 2012



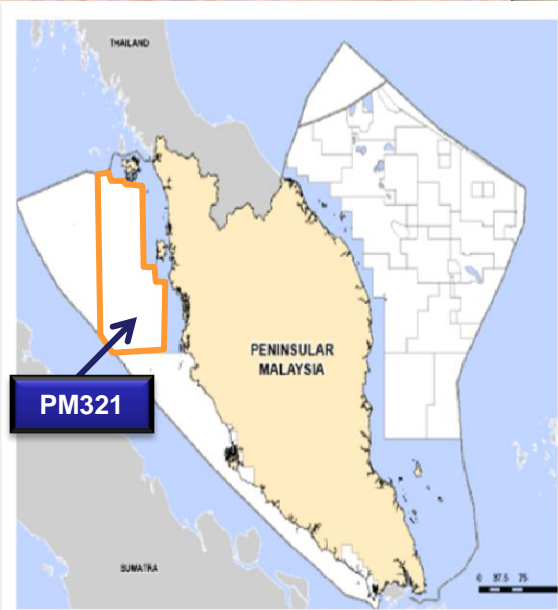
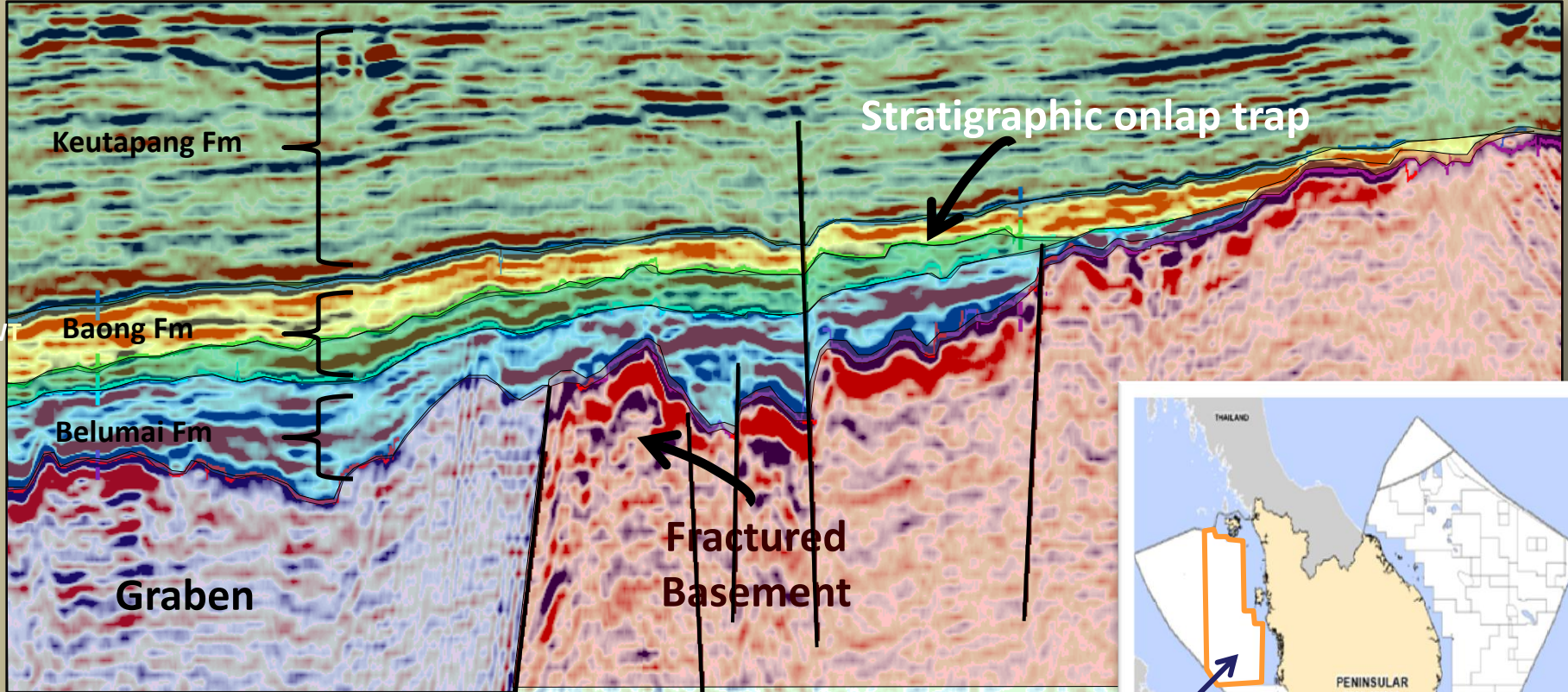
PSC Blocks



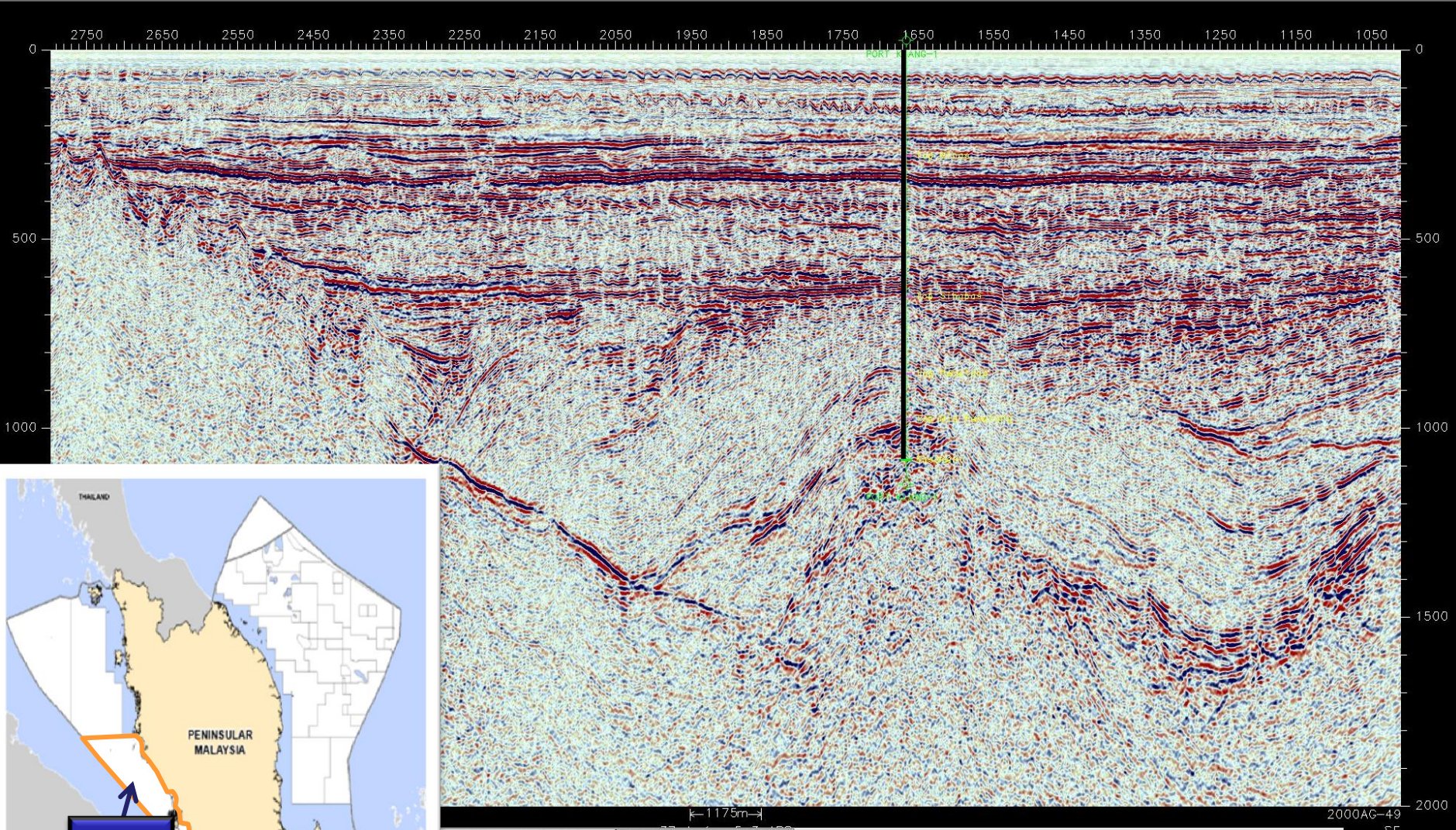
Technical Evaluation Agreement

# Melaka Straits Plays

Stratigraphic Play will it work?

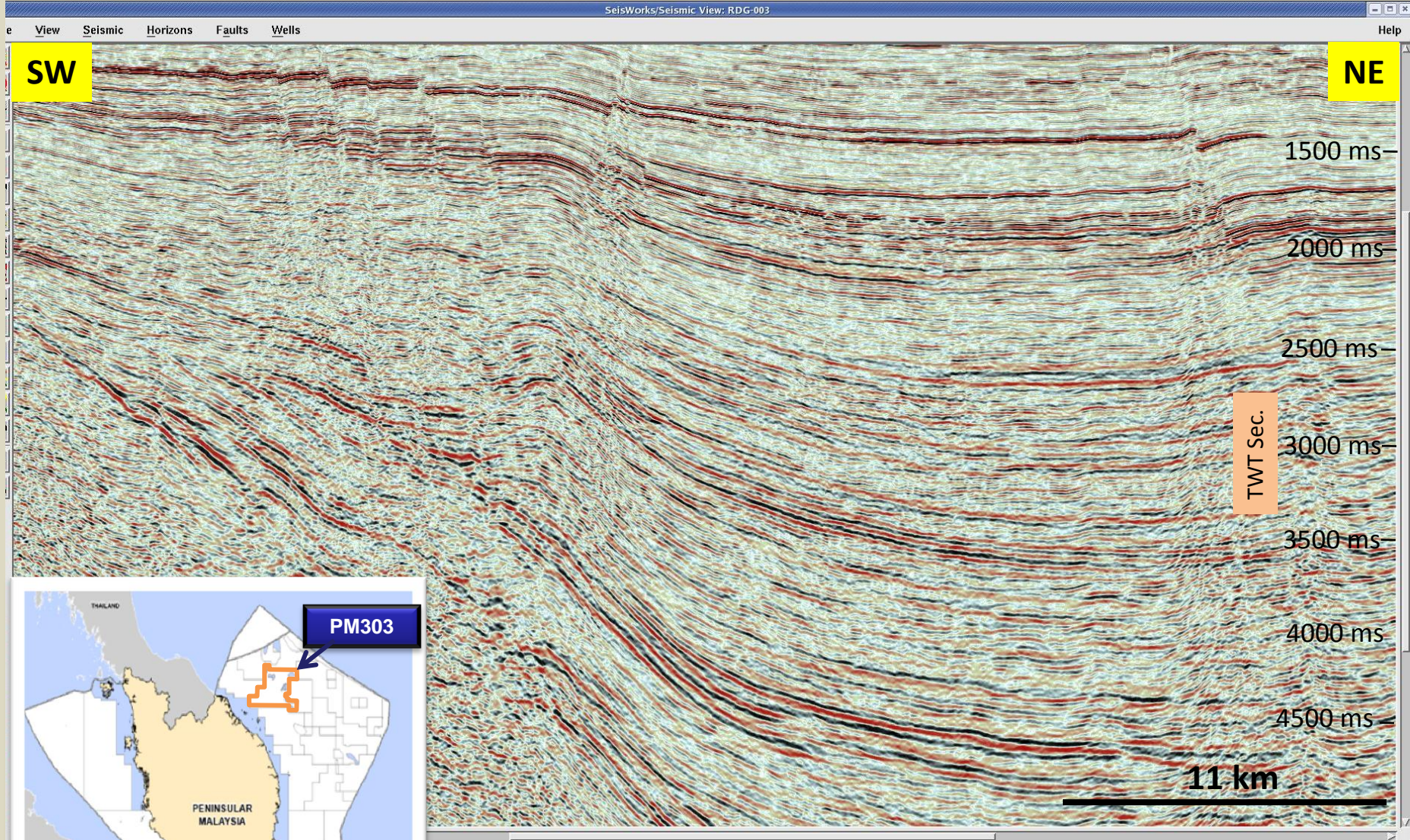


# Straits of Malacca Block PM322



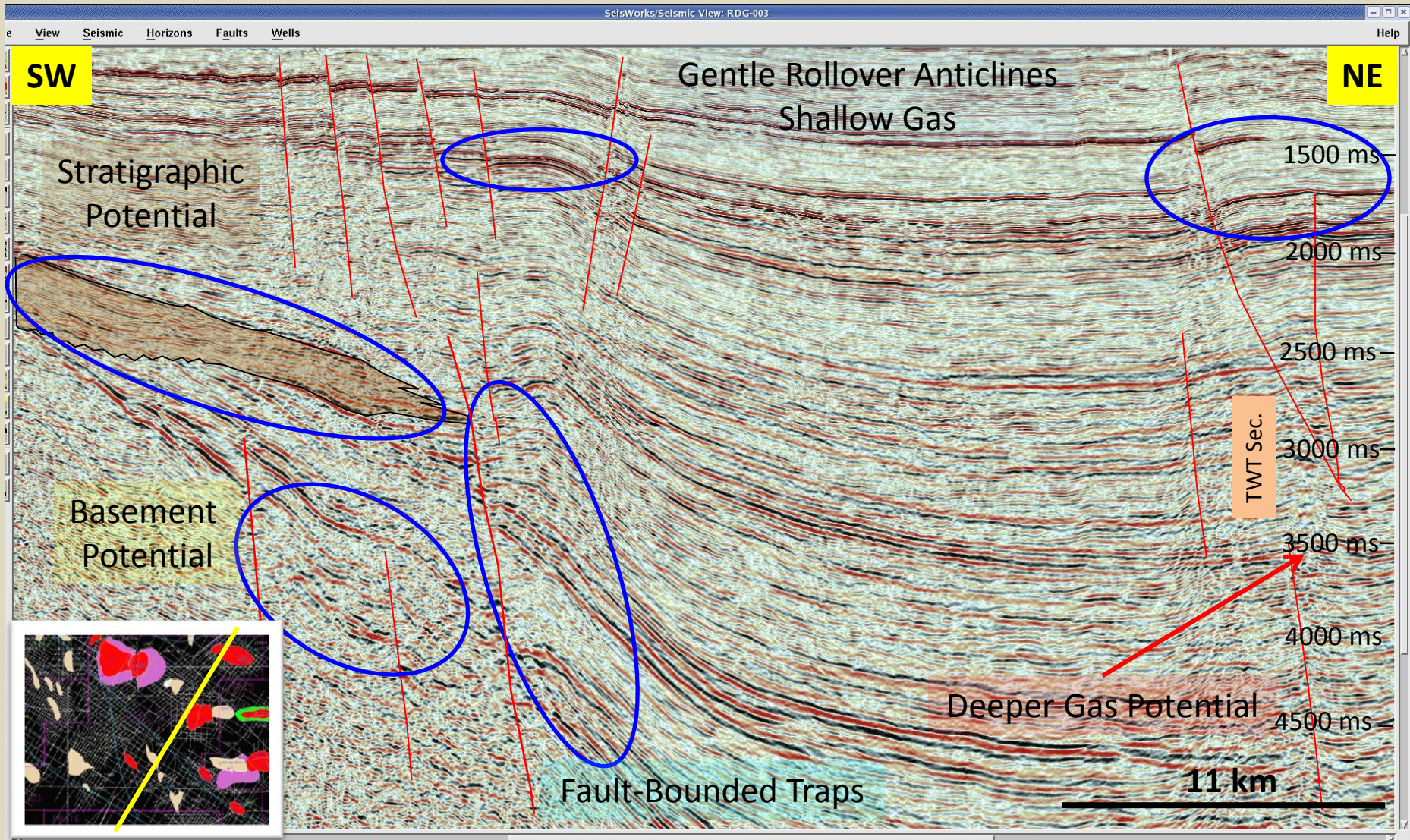
Structural traps, drilled by Port Klang-1 well – found 10m of oil sands



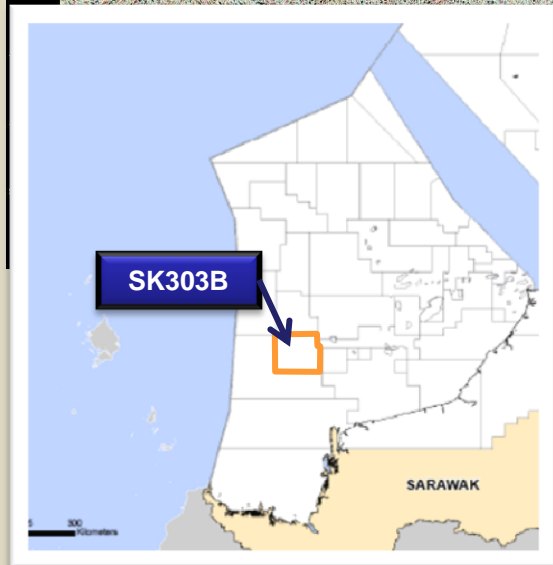
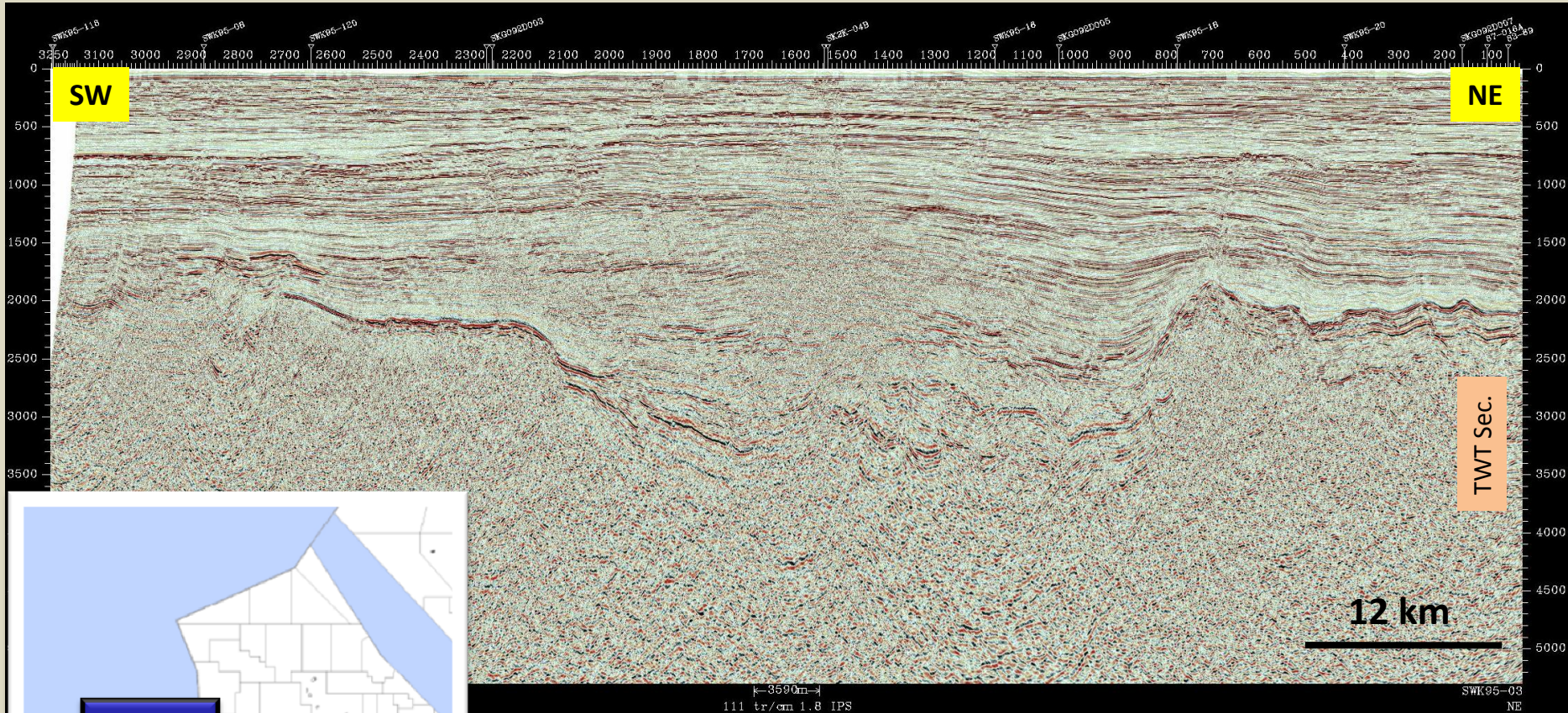


- Compressional anticlines with 4-way dipclosure
- Low-relief gentle anticlines
- Fault-bounded closures at different stratigraphic levels

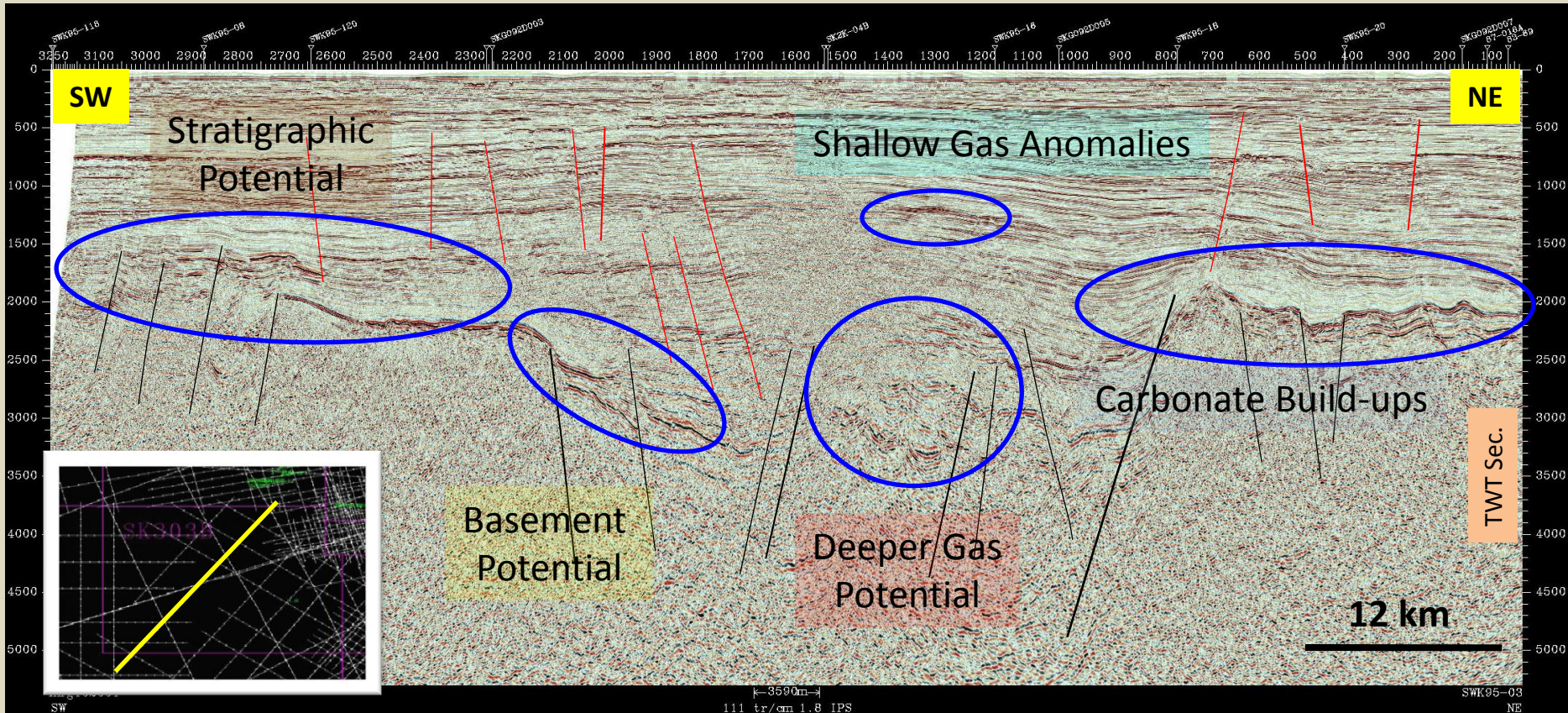
- Up-dip stratigraphic trap potential
- Shallow gas anomalies
- Basement potential



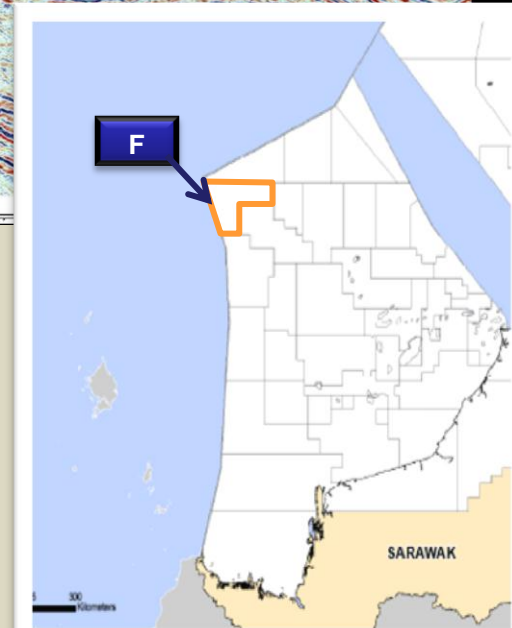
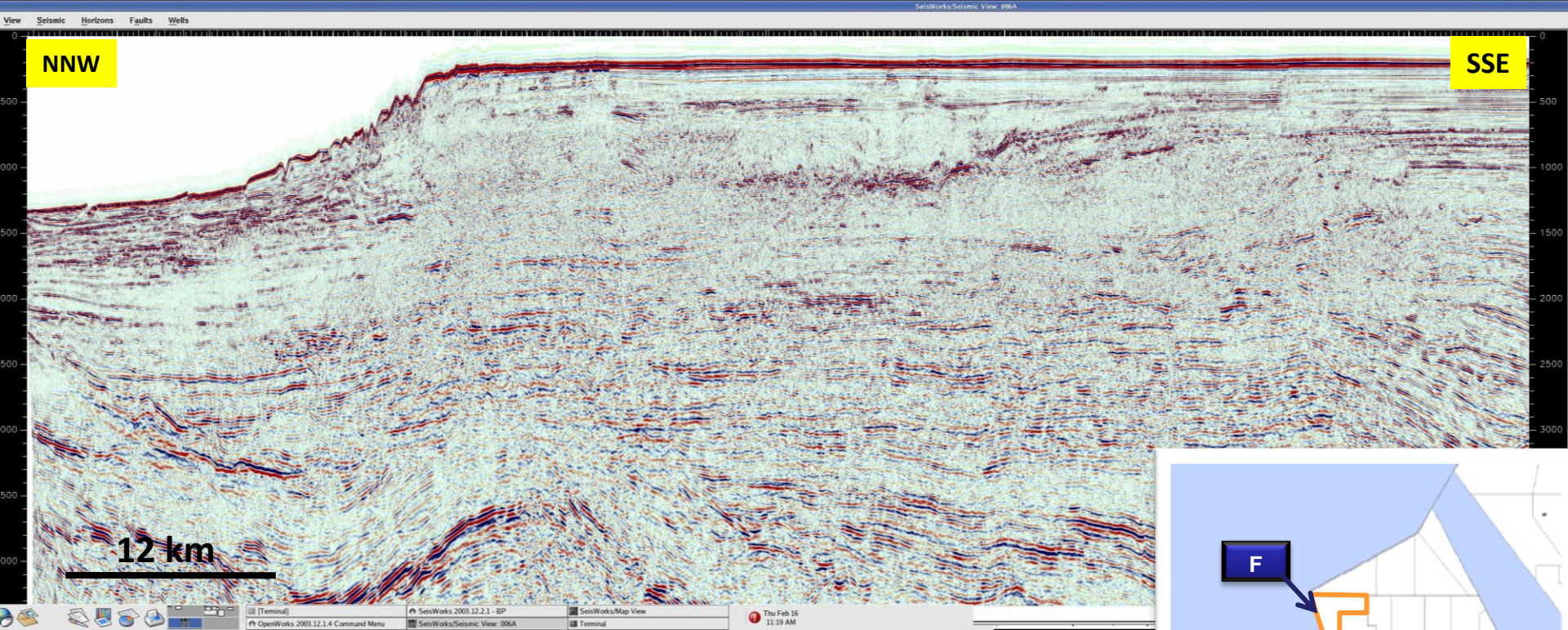
# Offshore Sarawak Block SK303B Line SWK 95-03



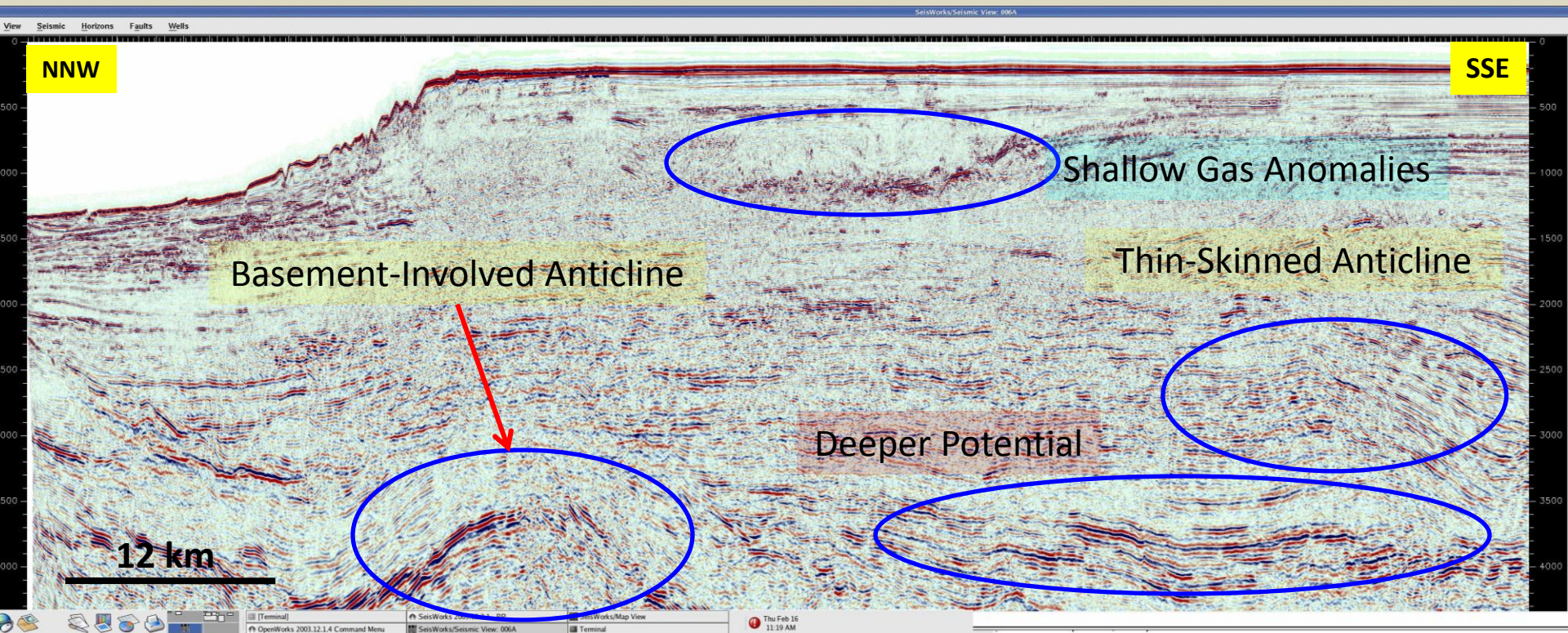
- Well-defined grabens bounded by basement highs
- Carbonate build-ups on structural highs.
- Deeper gas potential in HPHT plays
- Shallow gas anomalies
- Wrench-induced anticlinal features.



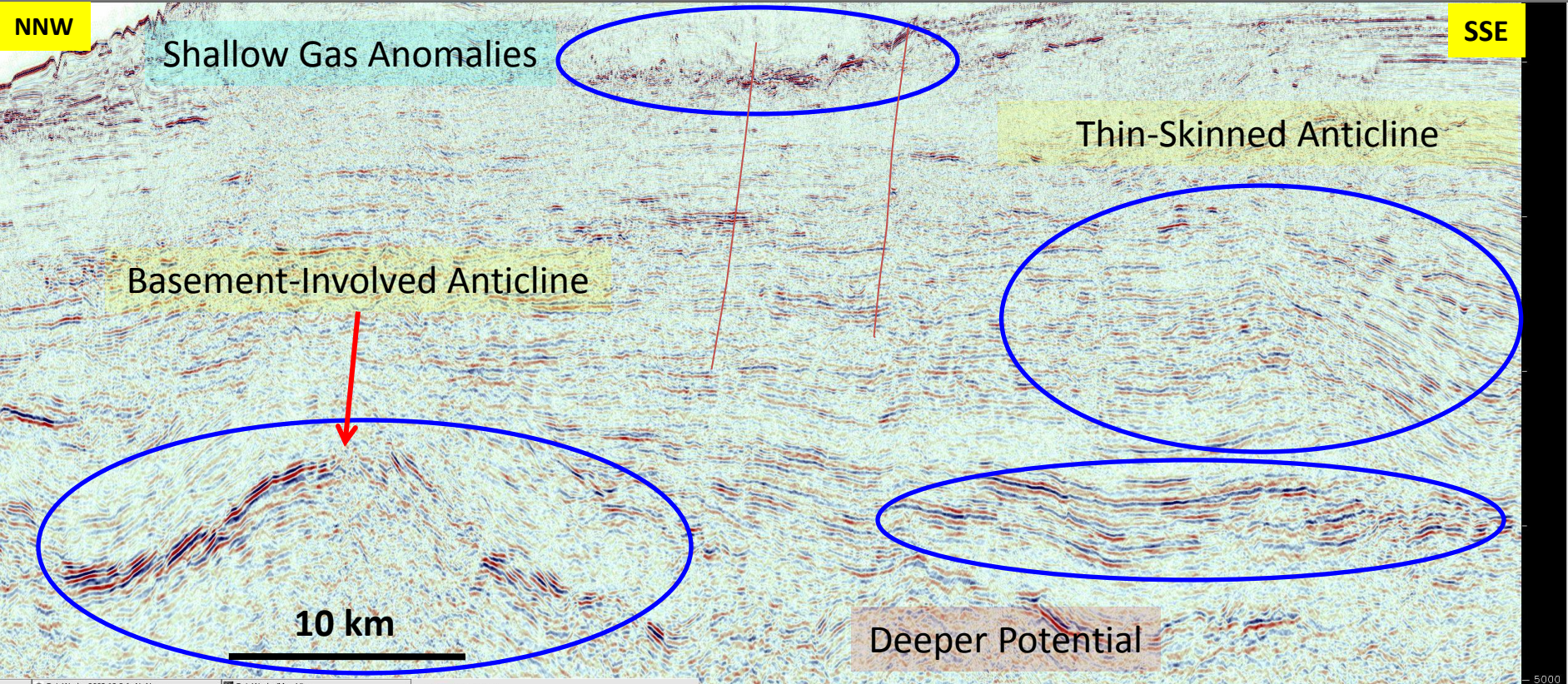
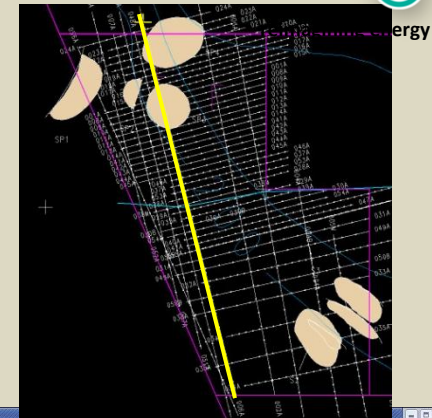
# Deepwater Block F Line 006A



- Block contains six large anticlines
- All structures are located in shallow water
- Structurally undisturbed, 4-way dip closures
- Size 12 to 35 sq km. Size
- Likely fed by lacustrine and deltaic source rocks of Cycles I-III & V-VIII respectively

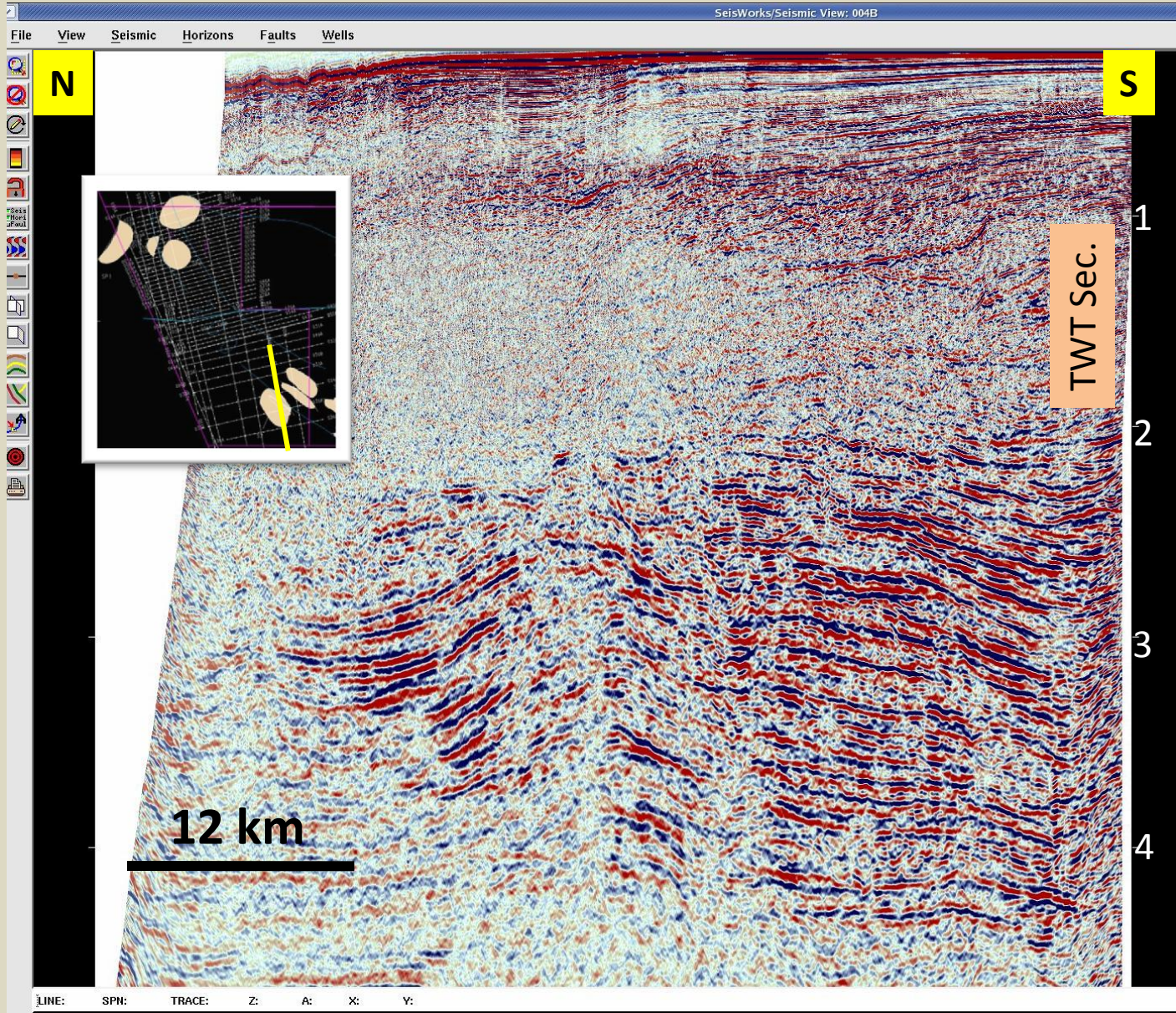


- Both basement-involved and thin-skinned structures
- Cycle I to III clastics reservoirs and carbonate build-ups on highs
- Deeper gas potential in HPHT plays
- Shallow gas anomalies
- Wrench-induced anticlinal features.



# Deepwater Block F Line 006A

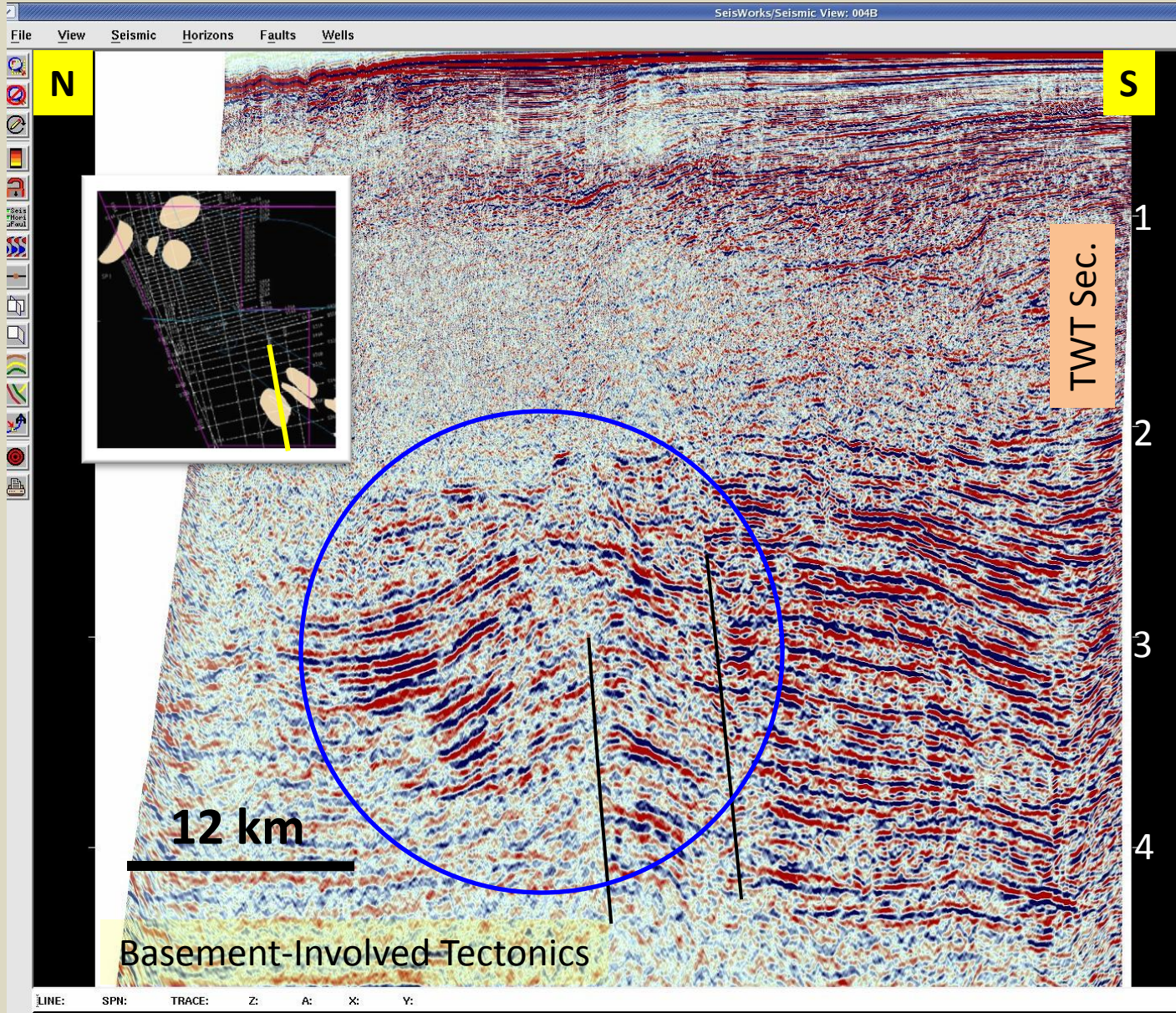
- Both basement-involved anticlines with 4-way dip closure
- Deeper gas potential in HPHT plays



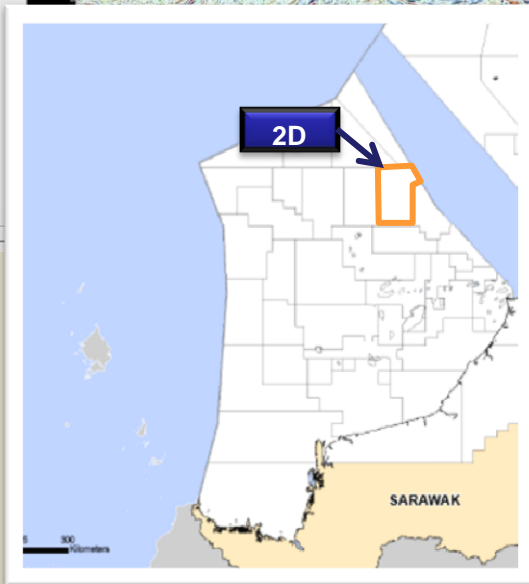
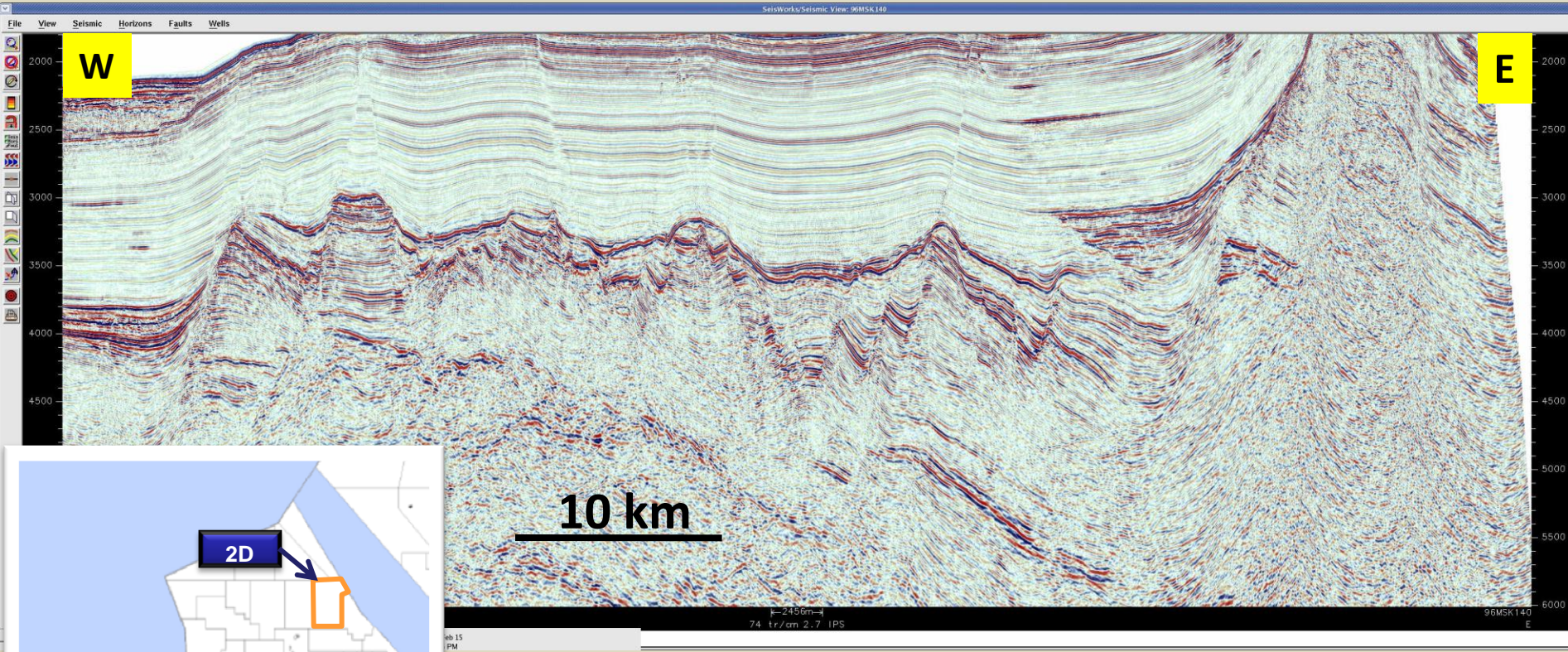


# Deepwater Block F Line 006A

- Both basement-involved anticlines with 4-way dip closure
- Deeper gas potential in HPHT plays



# Deepwater 2D Line 96MSK140

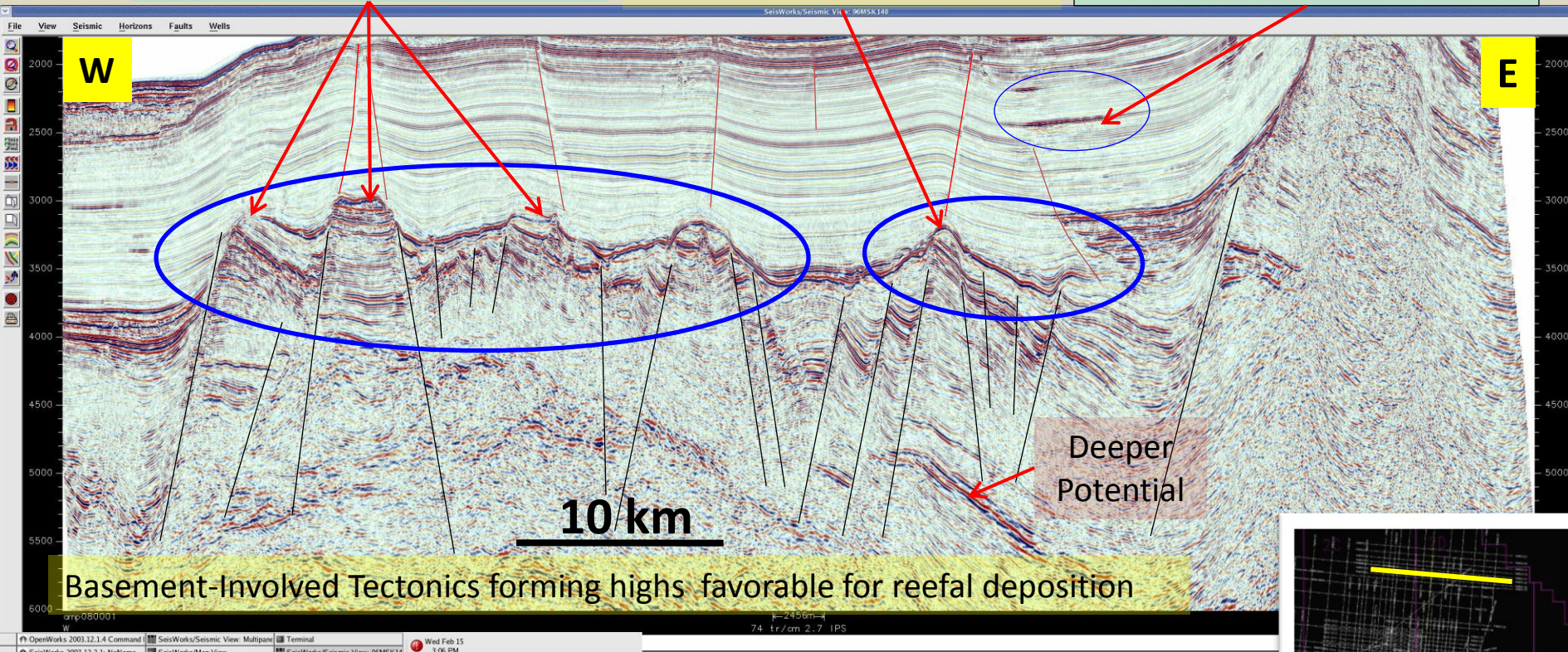


- Basement-involved tectonics forming structural highs and favoring carbonate build-ups
- High amplitude on tops of carbonates suggesting HCs presence
- No evidence of gas chimney-effect in shallow Miocene section suggesting breach of trap
- Tilted half-grabens forming highs with amplitude anomalies indicating HCs effect
- Deeper gas potential indicated by high amplitudes
- Shallow gas effect

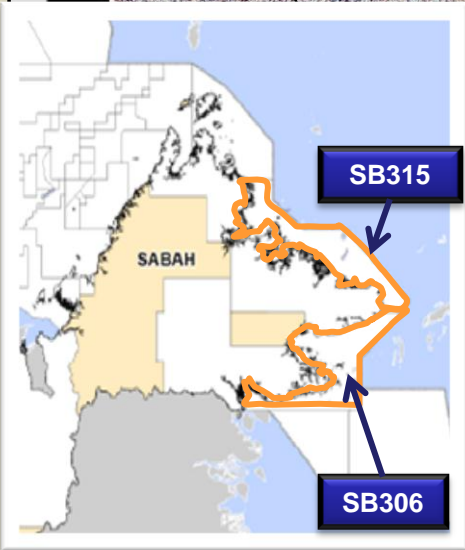
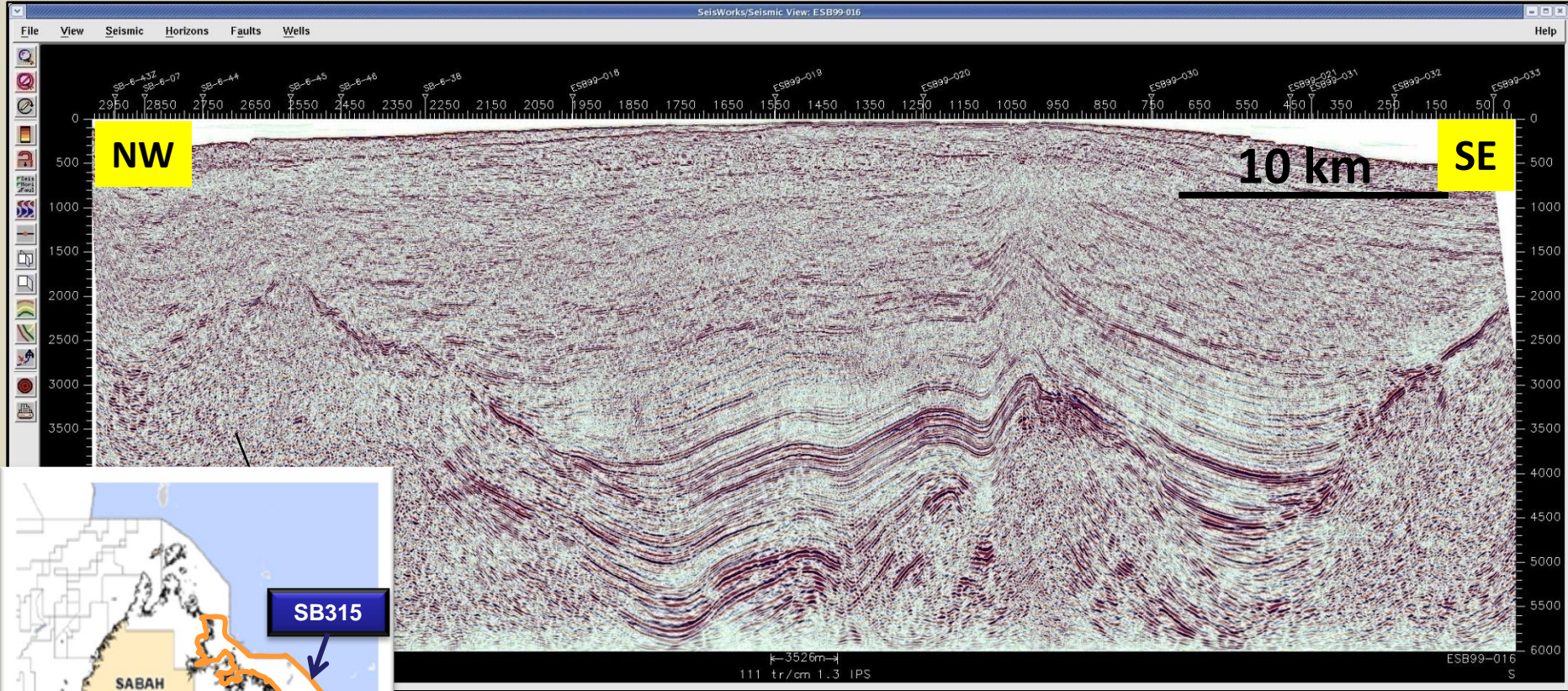
Carbonate Reefal Build-ups

Tilted-Fault Block Bounded Anticlines

Shallow Gas Anomalies

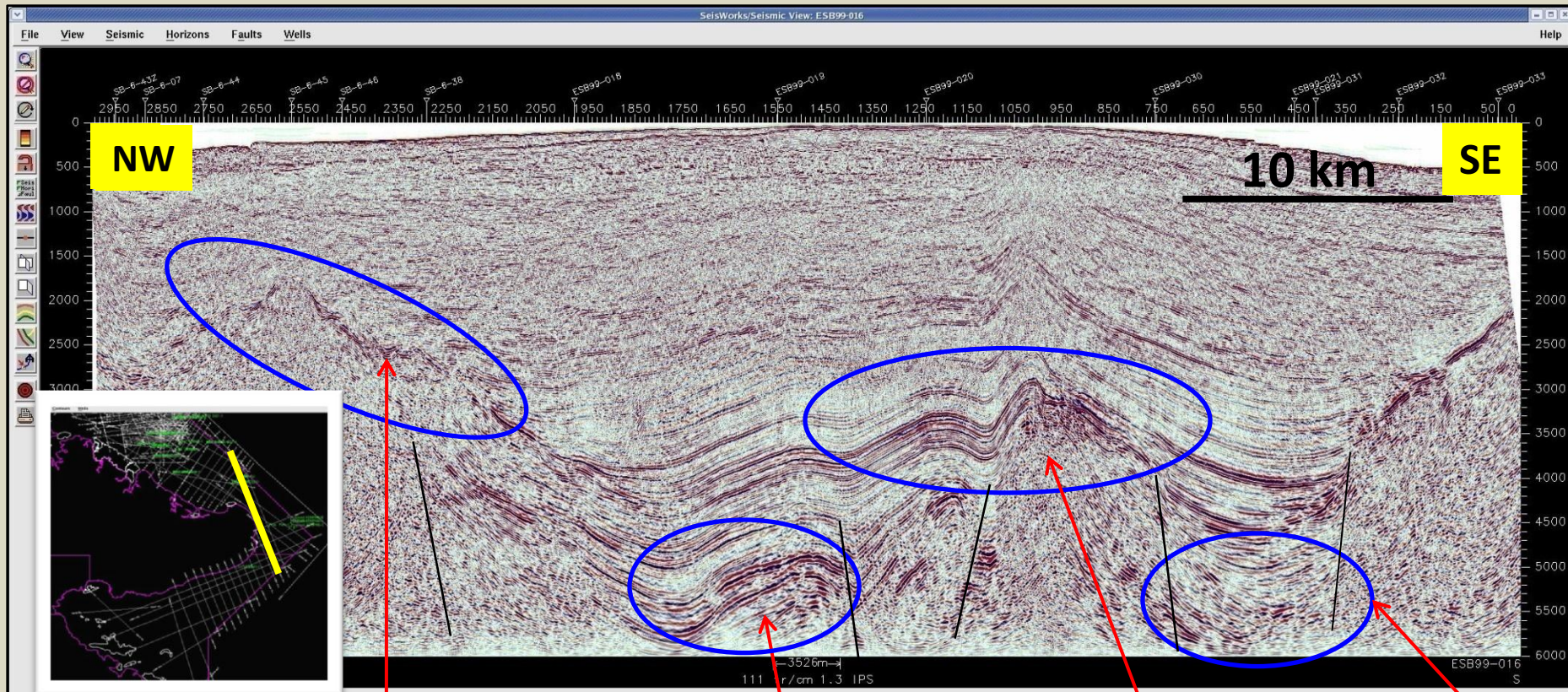


# Blocks in Sabah SB306-SB315 Line ESB99-016



# 2012 opportunities..... Blocks in Sabah SB306-SB315 Line ESB99-016

- Compressional anticlines on basement highs
- Tilted-fault blocks
- Major grabens with active petroleum systems
- Reefal build-up on highs



Structural High with High amplitude

Deeper Potential

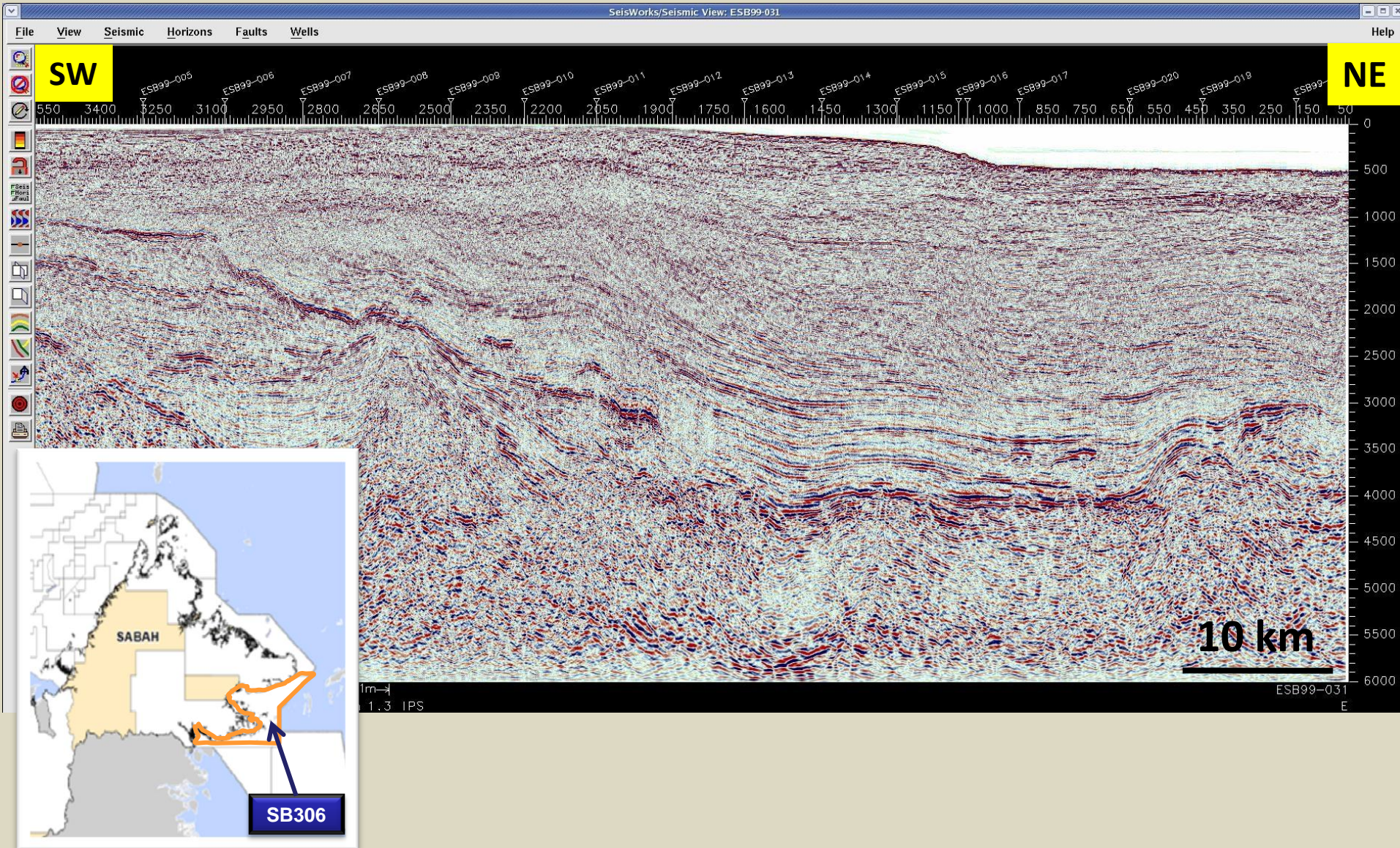
Carbonate Reefal Build-ups on Tilted-Fault Blocks

Kitchens Areas

# 2012 opportunities..... Block in Sabah SB306 Line ESB99-031



reimagining energy



# 2012 opportunities..... Block in Sabah SB306 Line ESB99-031

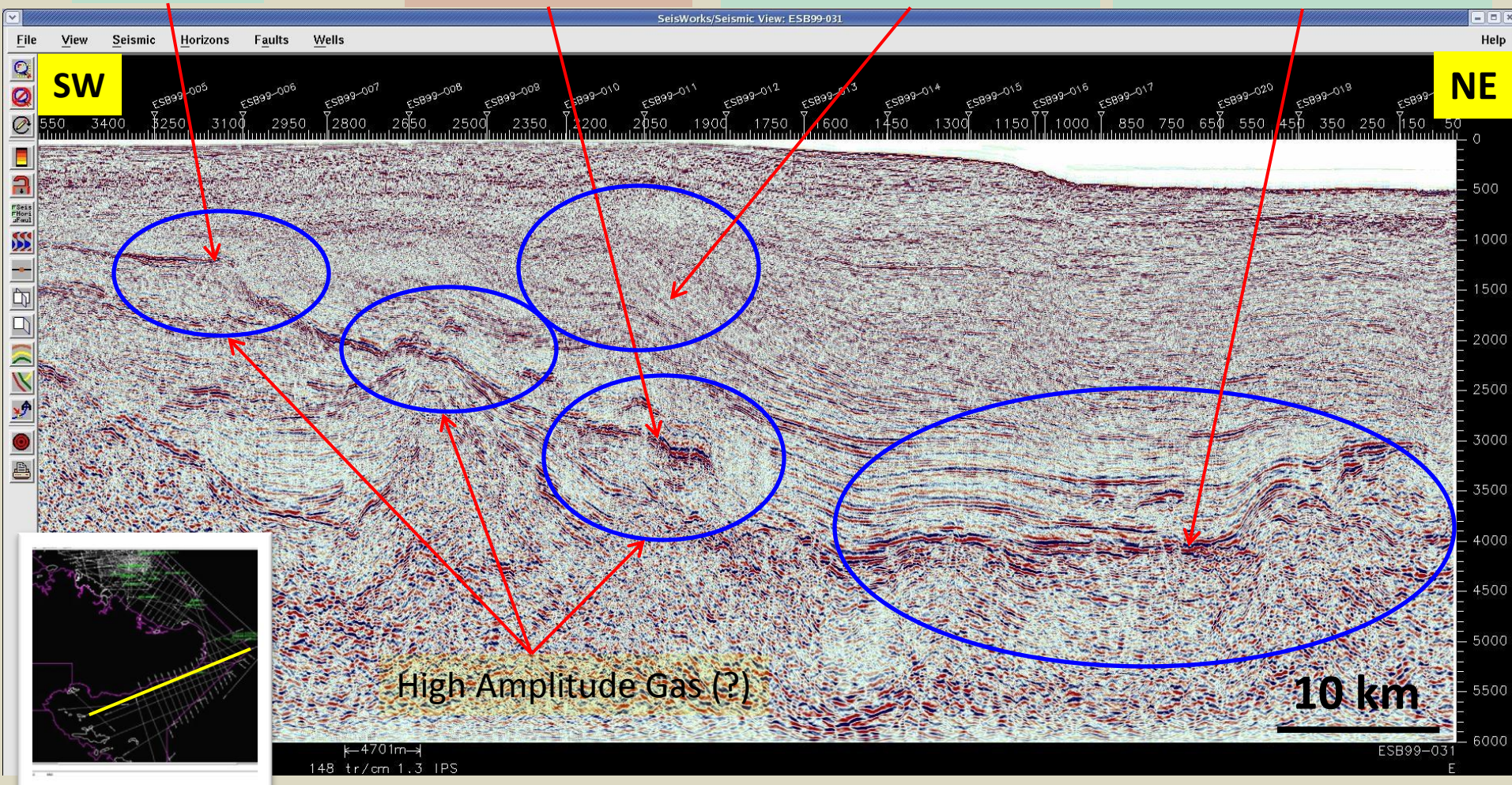
- Well-defined shelf-edge with slope facies
- Deep graben-fill with turbidite sands
- Compressional anticlines on basement highs
- Stratigraphic potential

Shelf Edge

Sandy Turbidites

Deltaic Clinofolds

Graben Filled with Turbidite Sands



## SUMMARY - EXPLORATION OPPORTUNITIES 2012

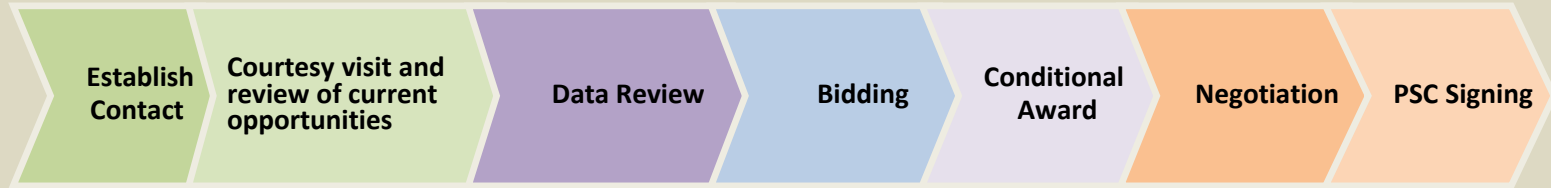
- Flexible fiscal terms, well-developed Infrastructure and well-defined commercial means
- Relaxed and purpose-fit fiscal terms available which suit the exploration strategies and economic threshold of all sizes of companies
- Highly organized and easily accessible database
- Wide variety of plays both in clastics and carbonates in all major tectonic settings
  - ❑ Fractured basement play
  - ❑ HPHT plays,
  - ❑ Stratigraphic plays
- Proven petroleum systems prevailing in all blocks offered fed by world-class lacustrine and deltaic source rocks
- Focus is given to shallow gas and deep-basin gas plays
- Variety of block choices from high-risk and high-reward to low-risk and low-reward
- Can fit to exploration strategies of large, medium and small size companies. Specifically aiming at companies with experience in state-of-the-art techniques and innovative technologies
- Future possibilities are testing shelf-margins plays, unconventional , basement fractured plays, onshore Peninsular Malaysia Triassic potentials - extension of Thailand



## **PRODUCTION SHARING CONTRACT**

- **Companies that are interested to explore and exploit hydrocarbon resources in Malaysia are required to enter into a PSC with PETRONAS**
- **Each PSC obligates the PSC Contractor to provide all the financing and bear all the risk of exploration, development and production activities in exchange for a share of the total production**
- **Types of PSC**
  1. **R/C PSC – below 200m water depth**
  2. **Deepwater PSC – 200m to 1000m water depth**
  3. **Ultra Deepwater PSC – beyond 1000m**
  4. **HPHT**
  5. **RSC – marginal fields development**
  6. **EOR**

## DATA REVIEW TO BLOCK AWARD PROCESS



1

- Companies establish contact with PMU and assessed for interest

2

- Data is available for review upon request and companies are requested to sign confidentiality agreement
- Companies to submit report on technical findings and interest to bid within 2 months

3

- Short listed companies are invited for a closed tender process for selected blocks

4

- PSC negotiation and award to successful company

**WE ARE AT BOOTH 1047**

**Data review  
is available at booth**

## Contact:

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# Thank You