NEB SUN
(SUB – UNCONFORMITY)
INTEGRATED STUDY

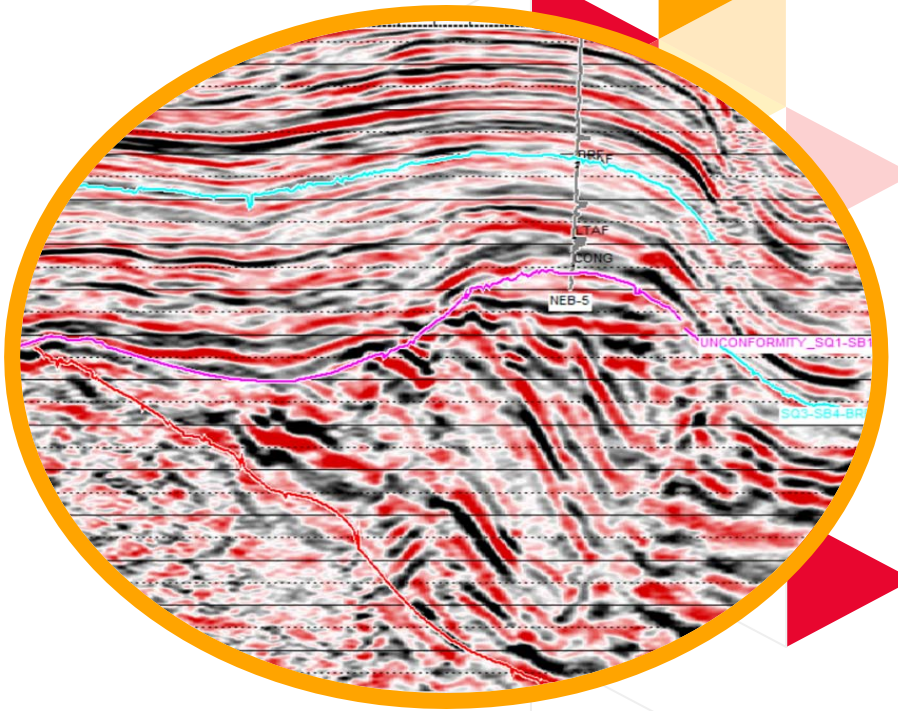
PRESENTATION OUTLINE

- INTRODUCTION OF SUB-UNCONFORMITY PLAY
- POST STACK SEISMIC ANALYSIS
- PRE STACK SEISMIC ANALYSIS

SUN PLAY

- A Sub-unconformity (SUN) section has been classified as a new play type that first was identified clearly in northeastern part of the NEB area below Talangakar (PRE-TAF) section. A model that difference to other Tertiary section.

- The analyses then extended to the whole Jabung and surrounding area, that in Western Jabung, Middle and Eastern Jabung Area had exhibited a massive layer below the unconformity of Pre - Talang Akar section from either 2D seismic and especially clearly identified using the 3D seismic sections. And based on geochemical analysis, some oil samples has signature from Lacustrine origin that associated with Pre-TAF petroleum system.

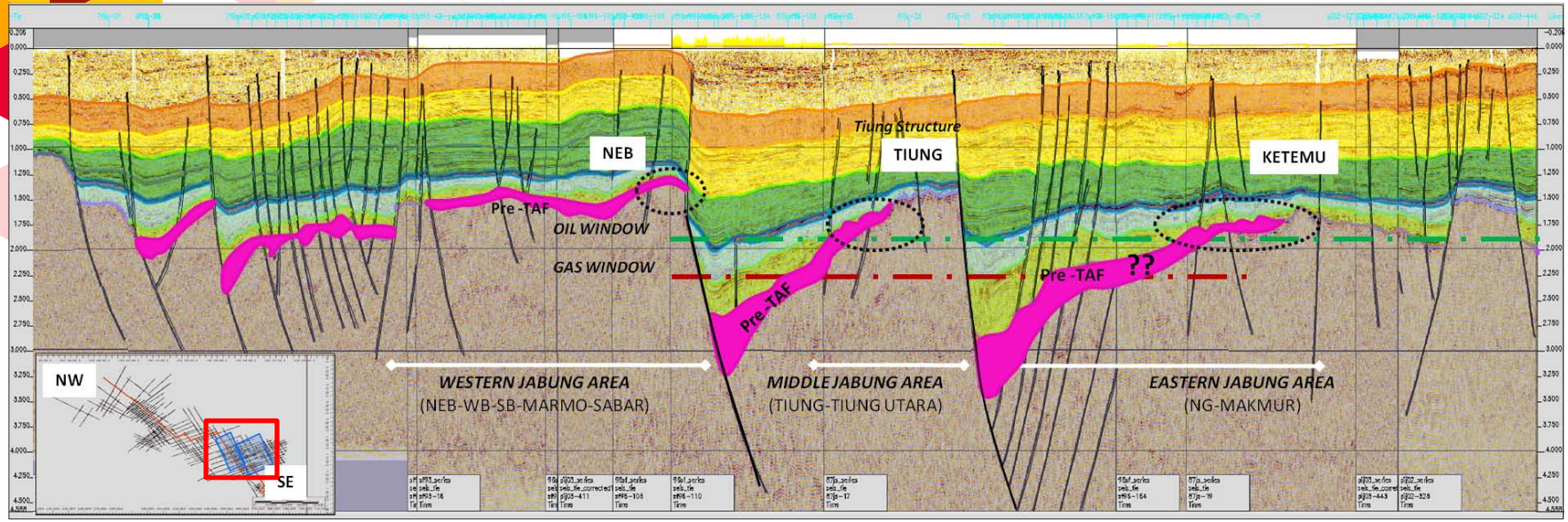


1
INTRODUCTION OF SUN PLAY

SCHEMATIC SECTION

SUB UNCONFORMITY (SUN) OF PRE-TAF POSSIBLE DISTRIBUTION CROSSING JABUNG AREA

NW SE

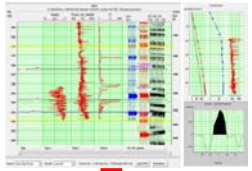


Note:

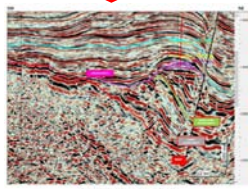
- ✓ The Sub-unconformity (SUN) Play may have its own confined petroleum system connected directly to the lower deeper of the basin, from Lahat lacustrine Kerogen type-I, oil prone
- ✓ The play show its extension regionally in more area of Jabung, so that this is an opener for a new play of Jabung and surrounding area

2.
POST STACK SEISMIC ANALYSIS

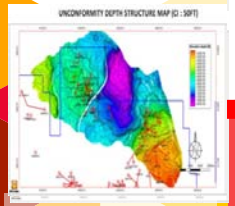
GENERAL WORK FLOW : POST – STACK



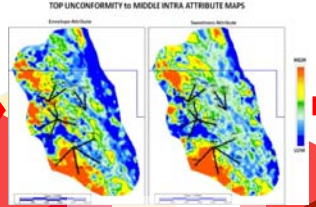
Well to Seismic tie



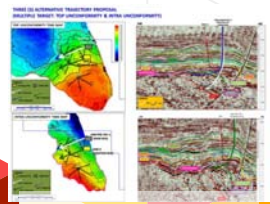
Structural Interpretation



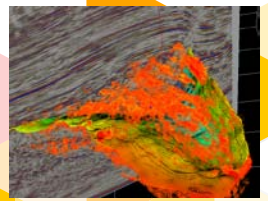
Structural Maps



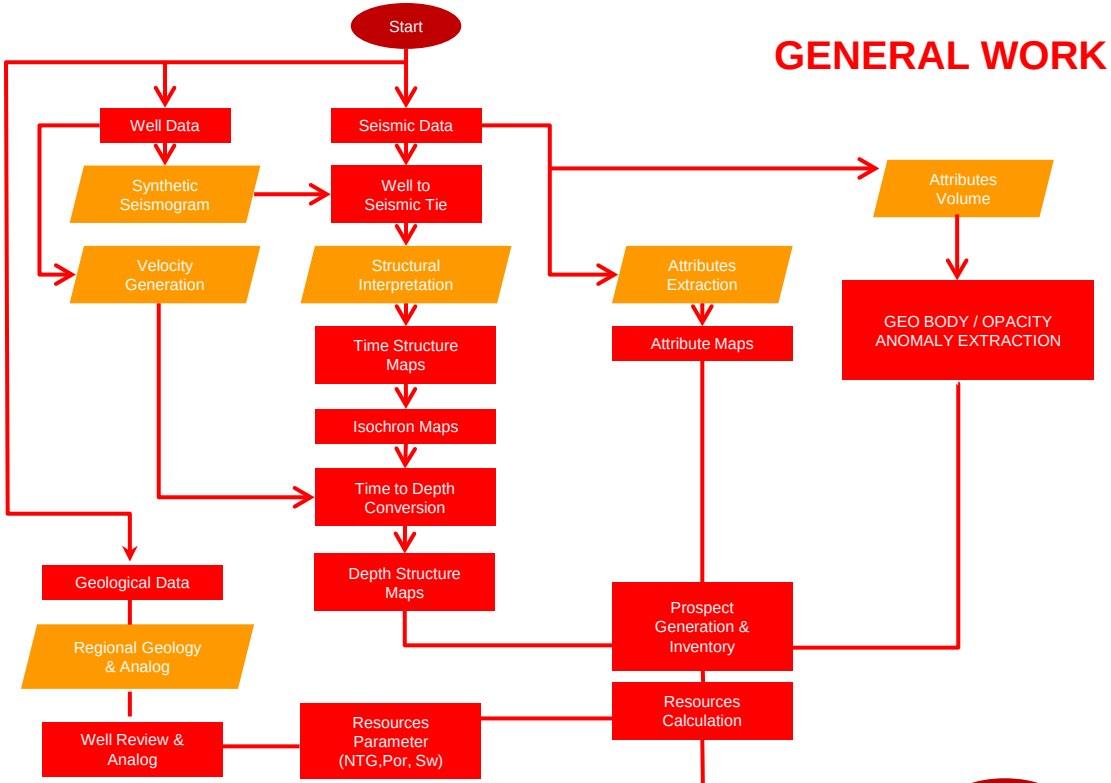
Attribute Maps



New Well Propose



Geobody Extraction



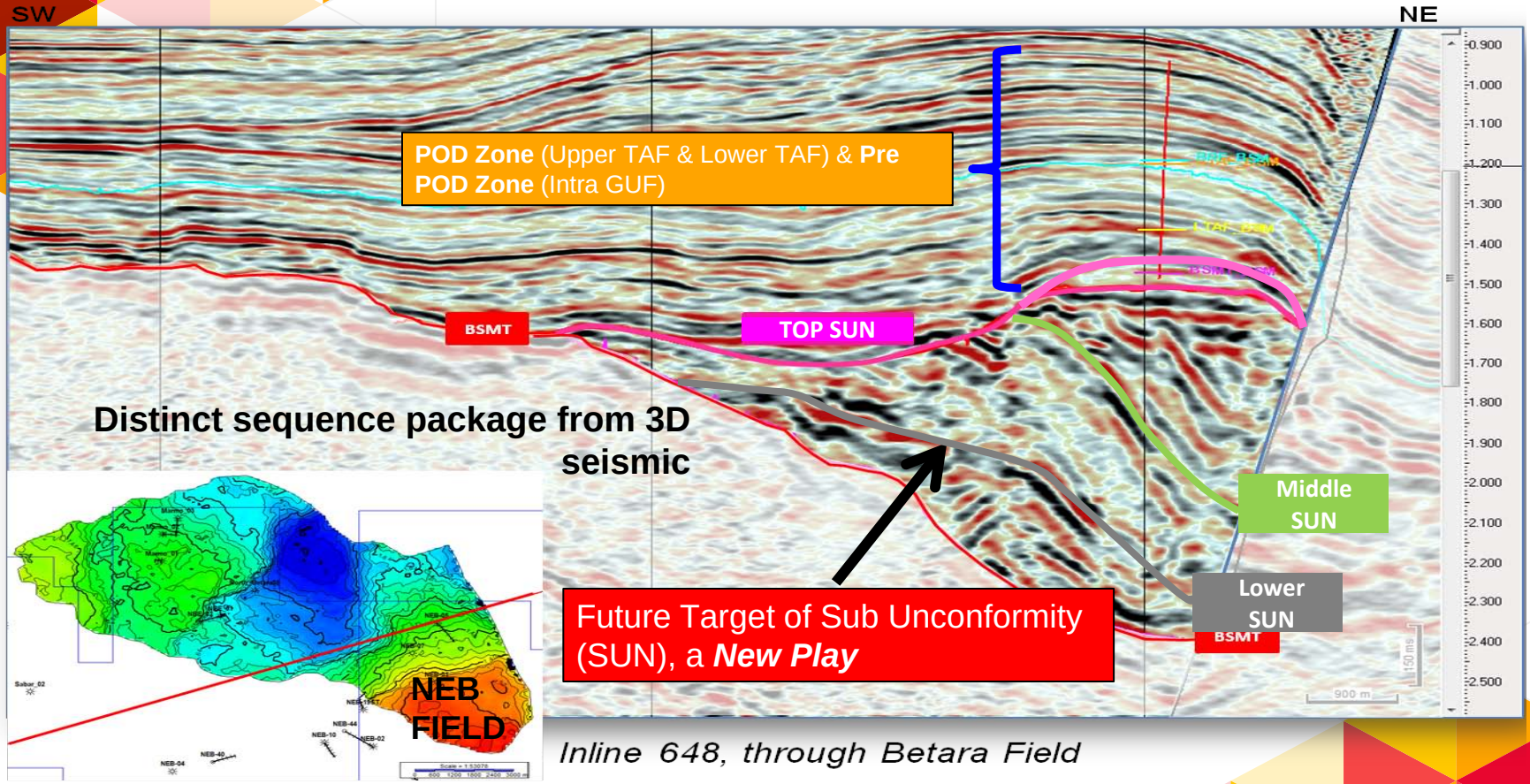
DATA:

3D SEISMIC VOLUME :

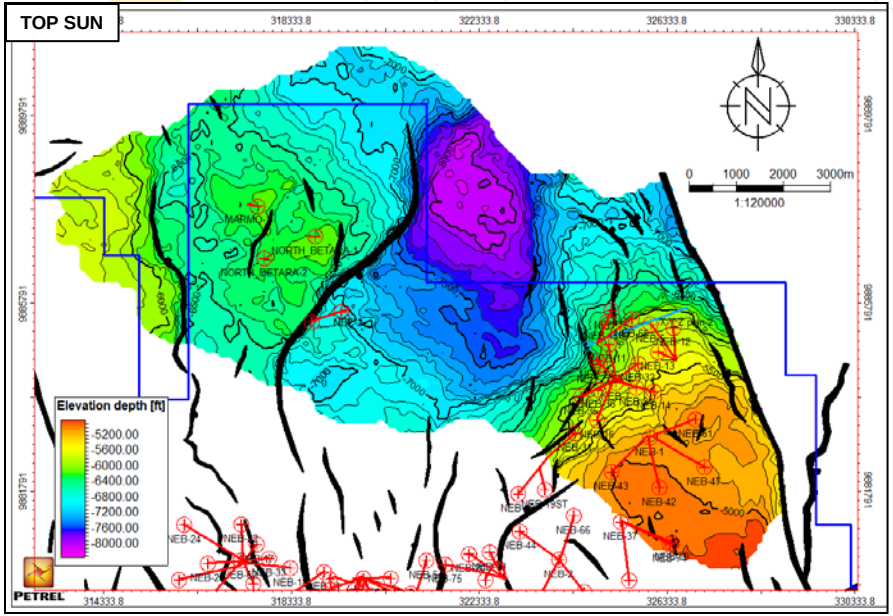
- Amplitude
- Sweetness
- Near Stack
- Mid Stack
- Far Stack

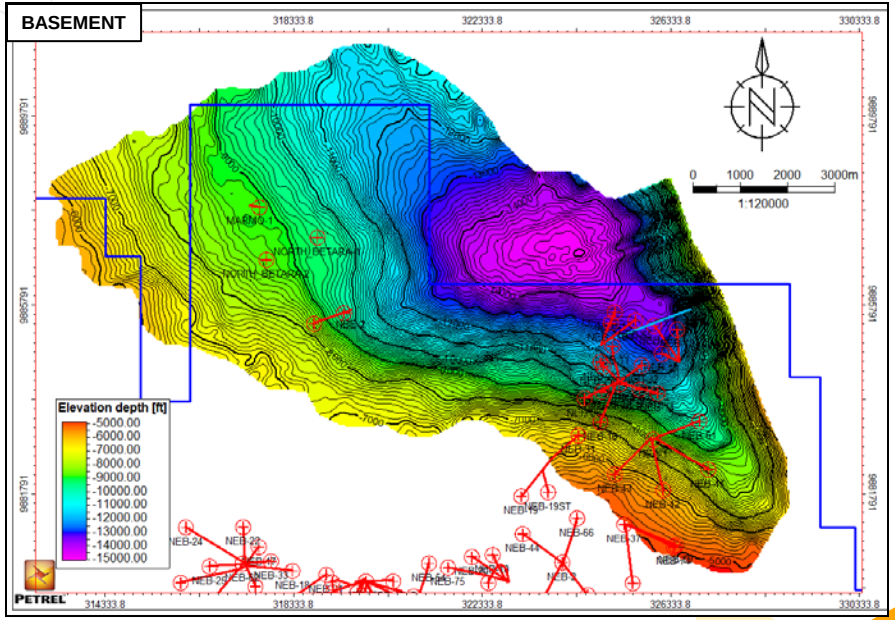
NEB Wells

Jabung New Play - Sub-unconformity Potential (PRE-TAF)



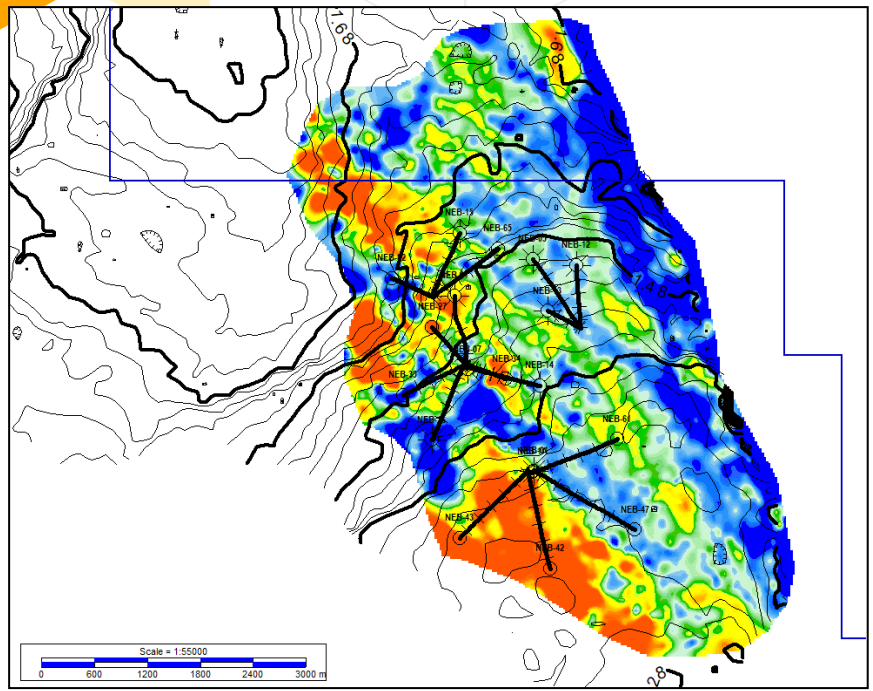
SUN DEPTH STRUCTURE MAP



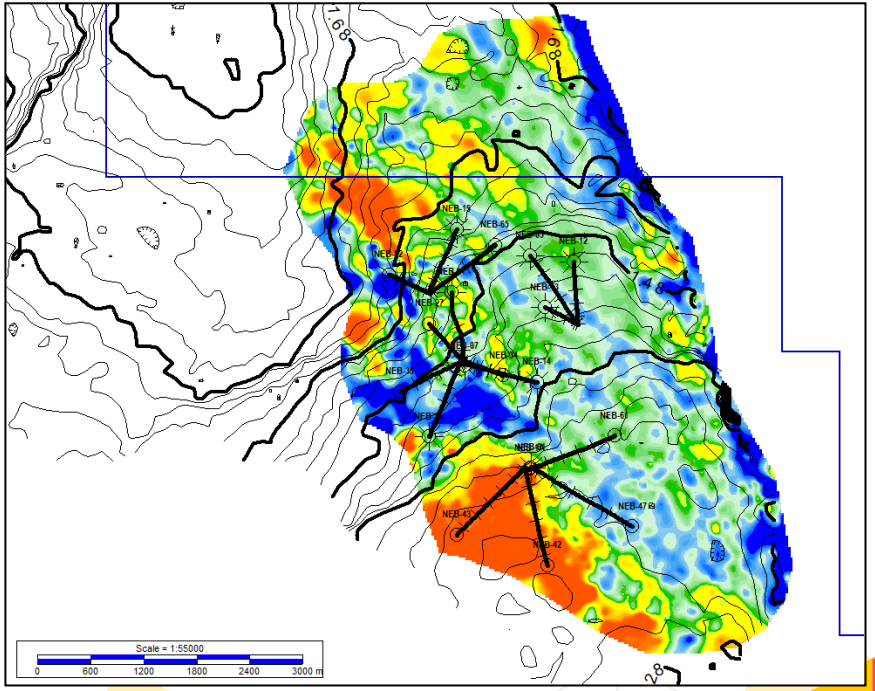


TOP SUN to MIDDLE SUN ATTRIBUTE MAPS

Envelope Attribute



Sweetness Attribute



HIGH

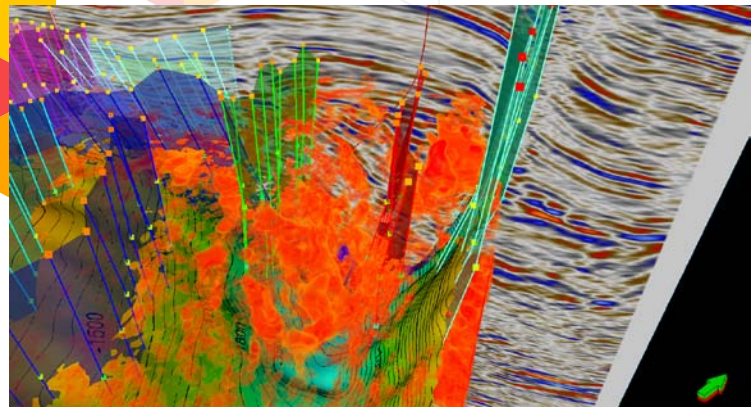
LOW

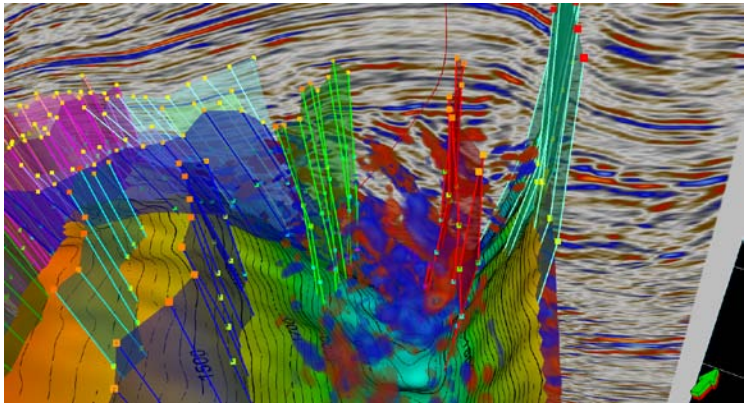
Envelope and Sweetness attributes strongly correlated to reflection amplitudes. They show such brightspot, tuning thickness, HC accumulation, unconformity, lithology change, etc. The red color show the highest attributes values.

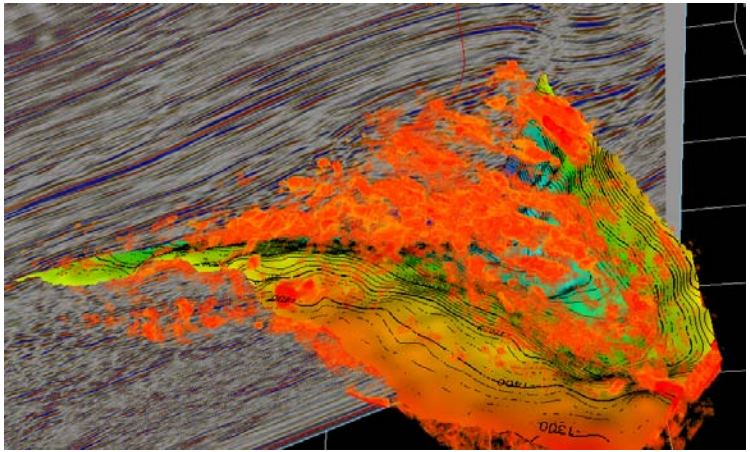
GEOBODY INTERPRETATION USING POST STACK SEISMIC

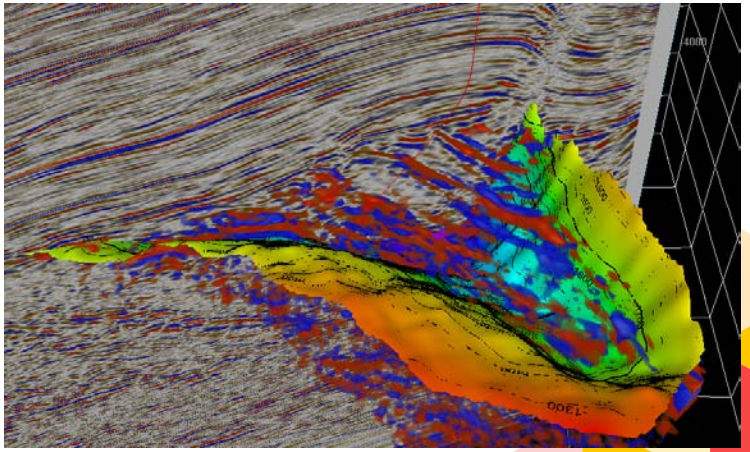
Geobody extraction is used to predict the distribution of reservoir.
Sweetness attribute could help to differentiate reservoir from non reservoir

SWEETNESS









ORIGINAL AMPLITUDE

2.
PRE STACK SEISMIC ANALYSIS

GENERAL WORK FLOW : PRE – STACK

Data Input
Pre-Stack Gathers
& Velocity

Data Conditioning
Denoise and Filter

Processing / Velocity
Analyhsis
NMO Correction
Offset to Angle
Conversion
Velocity Profile Analysis

AVA/O Analysis
Gradient
Analysis

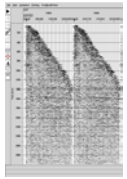
Volume Attribute
Angle Limited Stack
Intercept*Gradient
Poisson Ratio, Fluid Factor
& Cross plot, Velocity
Volumnes etc

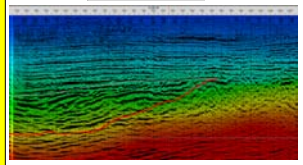
Reservoir Distribution
Analysis

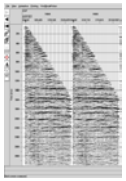
INPUT

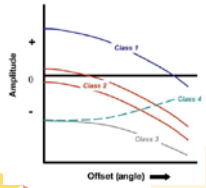
PROCESS

OUTPUT



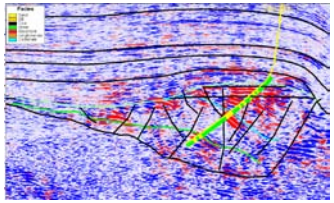




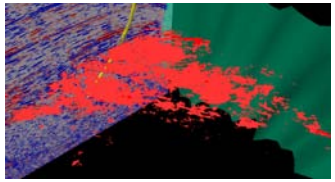


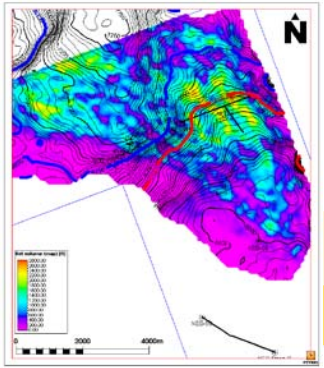
OUTPUT

P*G Product

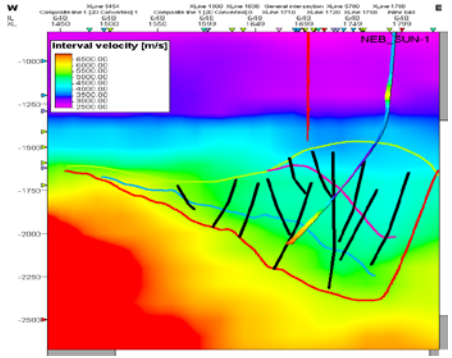


Geobody of P*G Product

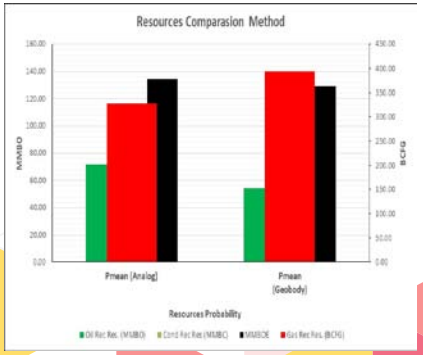




RESERVOIR DISTRIBUTION

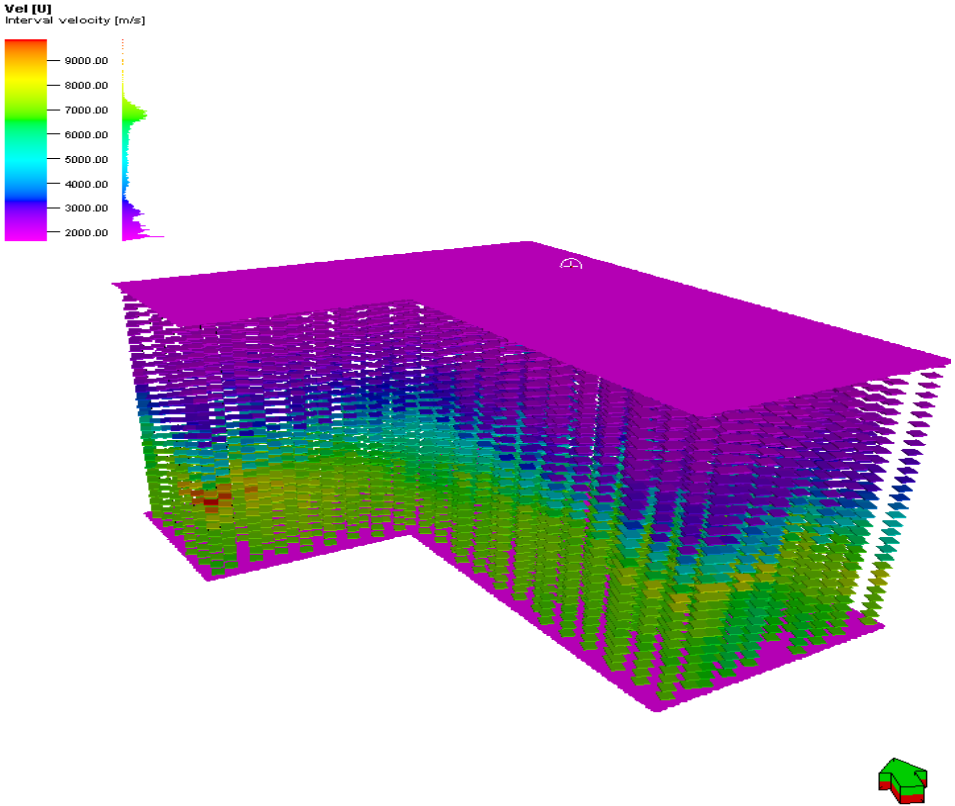


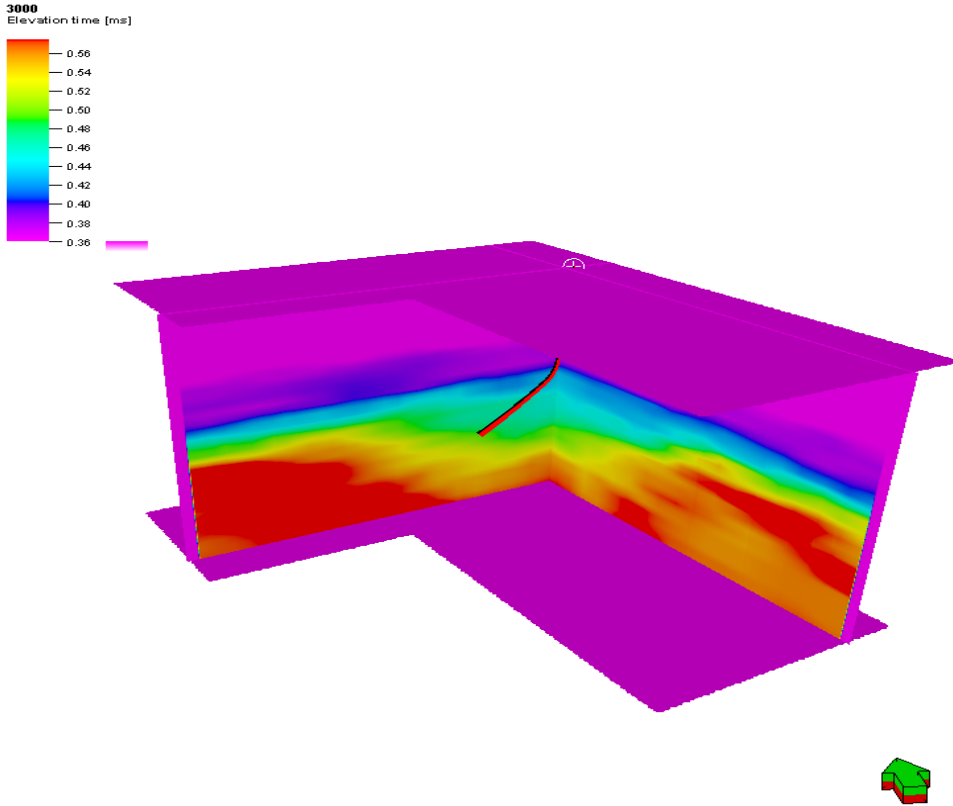
PORE PRESSURE PREDICTION



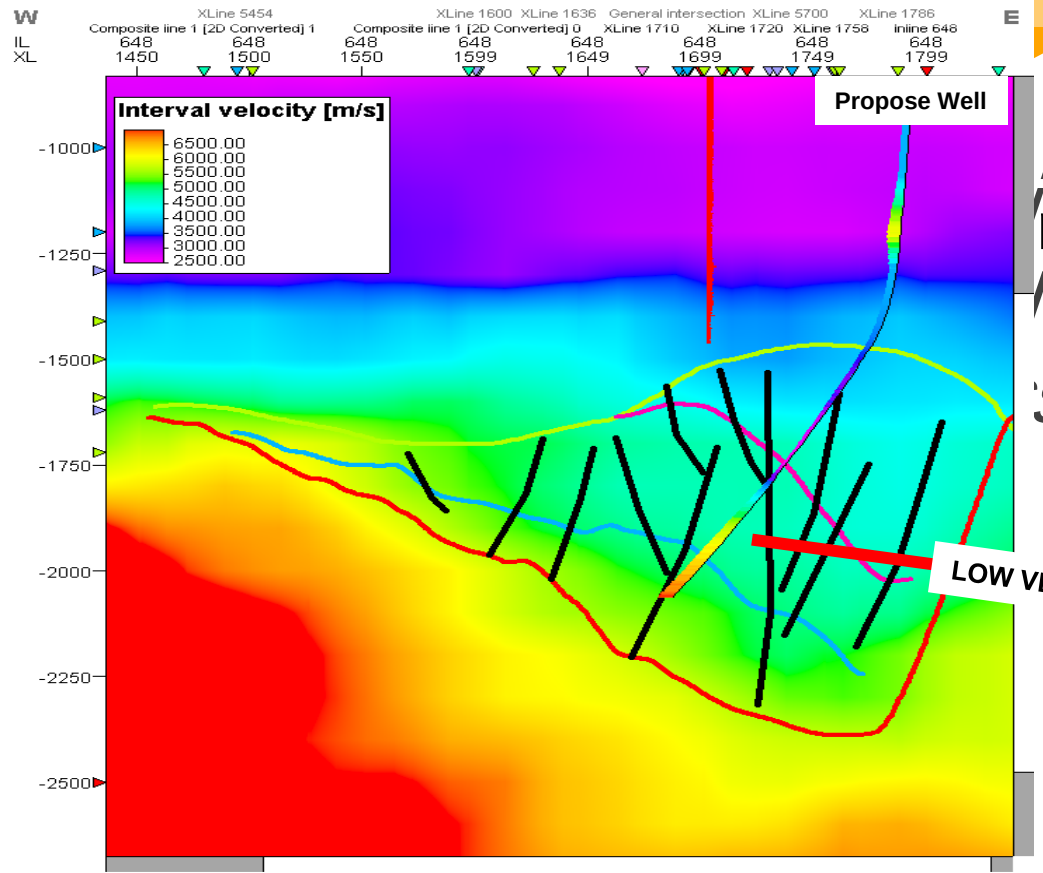
RESOURCES CALCULLATION

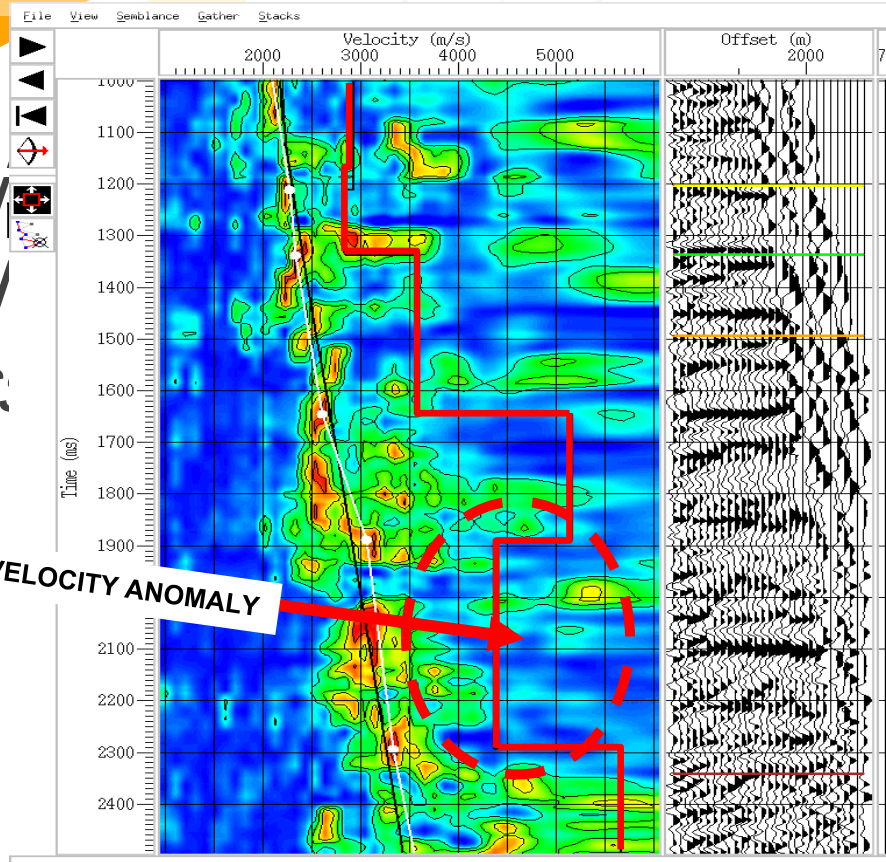
PROCESSING EXAMPLES
FINAL 3D SEISMIC VELOCITY MODEL AS AN INPUT TO PORE PRESSURE STUDY





PROCESSING EXAMPLES
SEISMIC VELOCITY ESTIMATION TO PREDICT HIGH PRESSURE ZONE



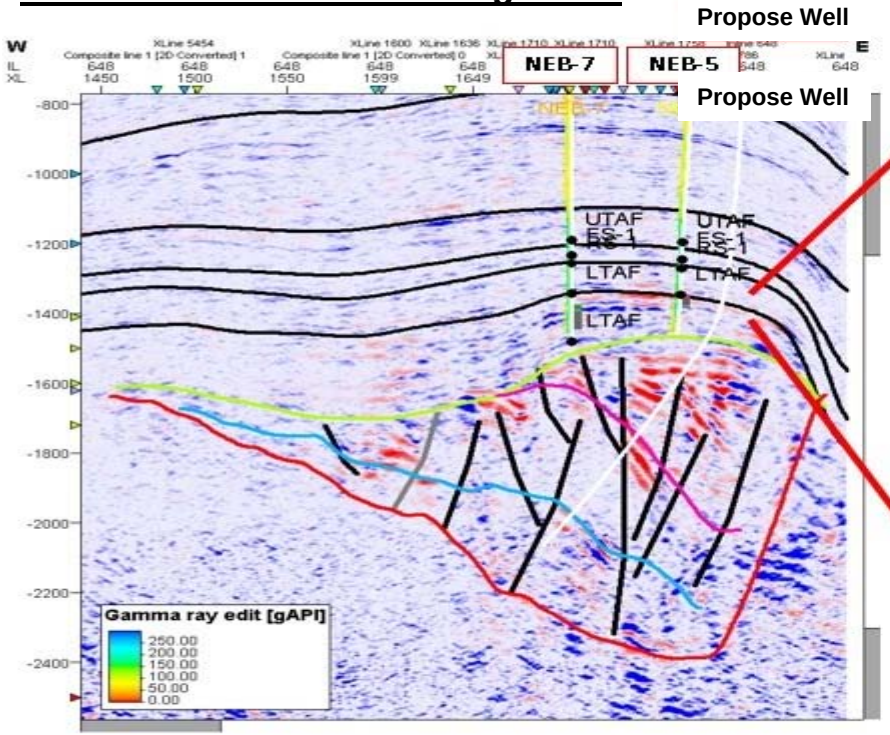


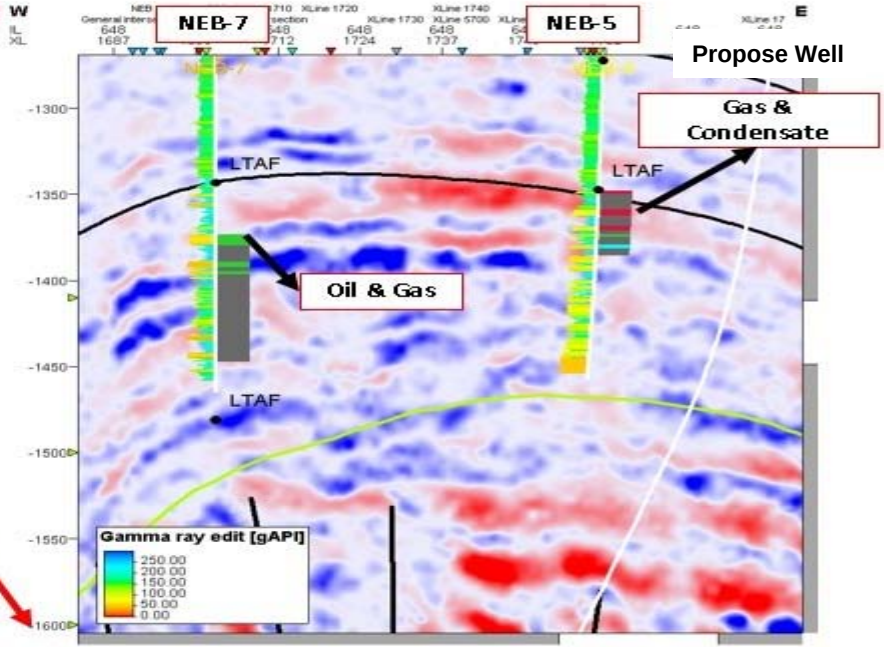
VALIDITY CHECK

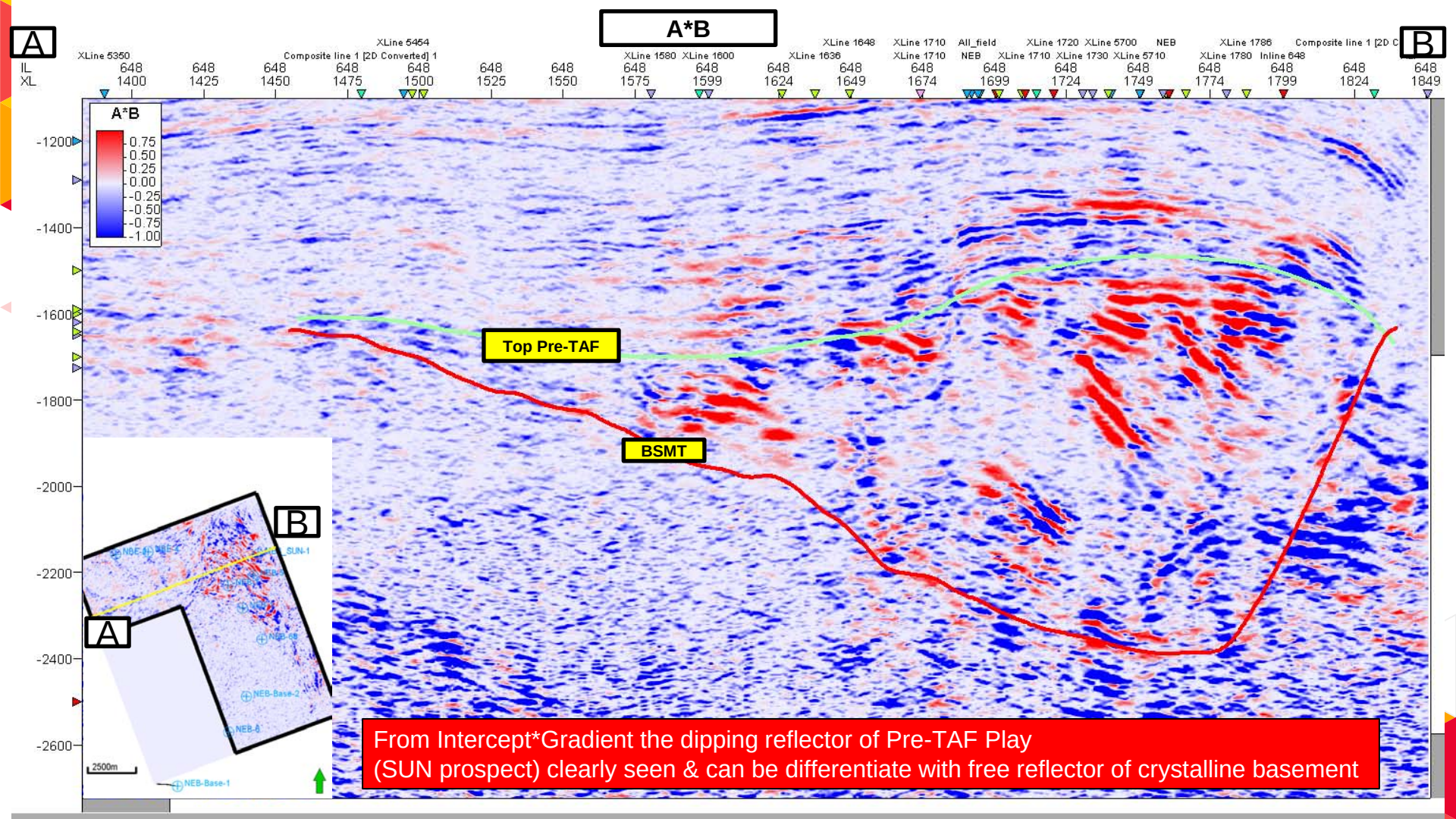
AVO ATTRIBUTE EXAMPLES: P*G (Intercept*Gradient)

Bright Red colour of P*G is proven in upper section of NEB-5 & 7 (LTAF) as HC reservoir zone. This amplitude anomaly is even more brighter in the lower seciton (Pre-TAF)

Discoveries on surrounding Wells

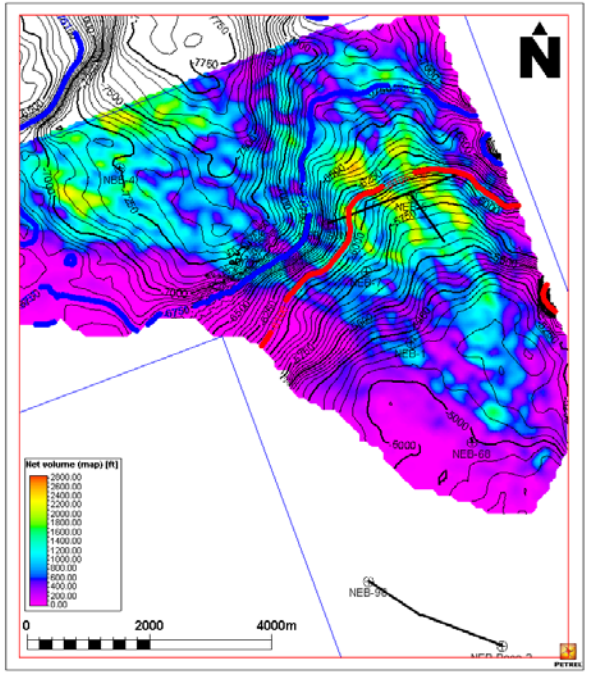




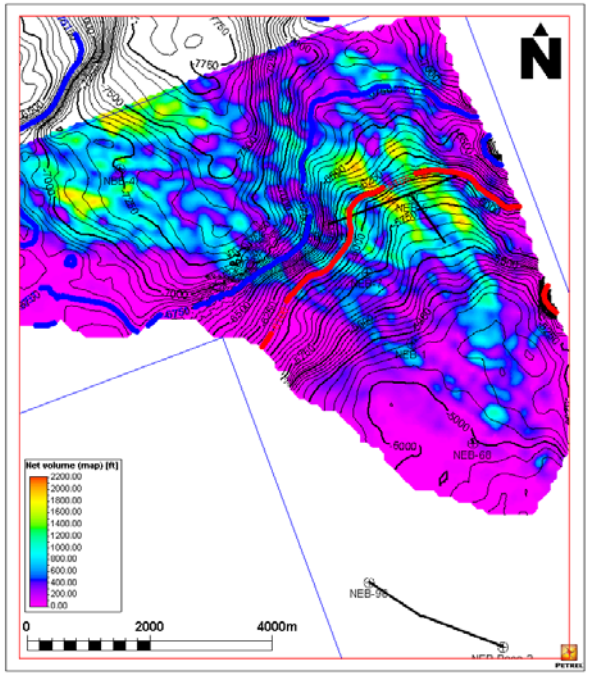

A*B
A
B
XLine 5350
XLine 5454
Composite line 1 [2D Converted] 1
XLine 1580
XLine 1600
XLine 1636
XLine 1648
XLine 1710
All_field
NEB
XLine 1720
XLine 5700
XLine 1786
Composite line 1 [2D C
XLine 1780
Inline 648
IL
XL
A*B
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1200
-1400
-1600
-1800
-2000
-2200
-2400
-2600
Top Pre-TAF
BSMT
NEB-Base-2
NEB-Base-1
2500m
From Intercept*Gradient the dipping reflector of Pre-TAF Play
(SUN prospect) clearly seen & can be differentiate with free reflector of crystalline basement

Sand Thickness & Distribution Prediction from P*G Geobody

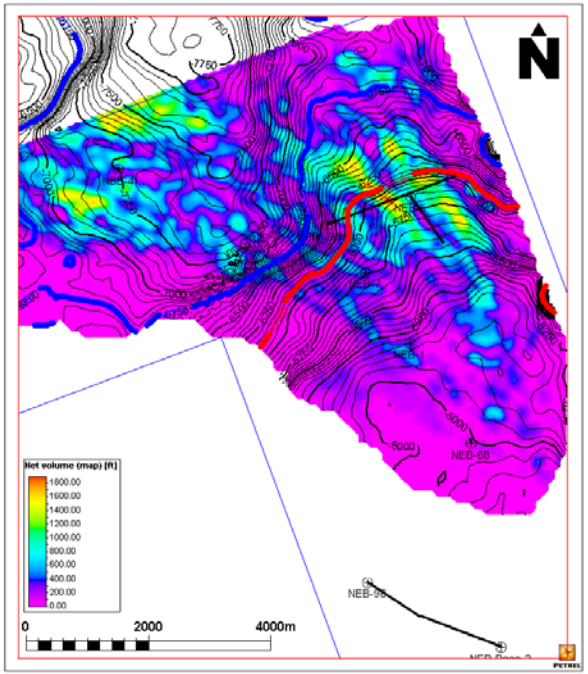
Unconformity - Basement



Cut off (P*G): 0.05



Cut off (P*G): 0.15

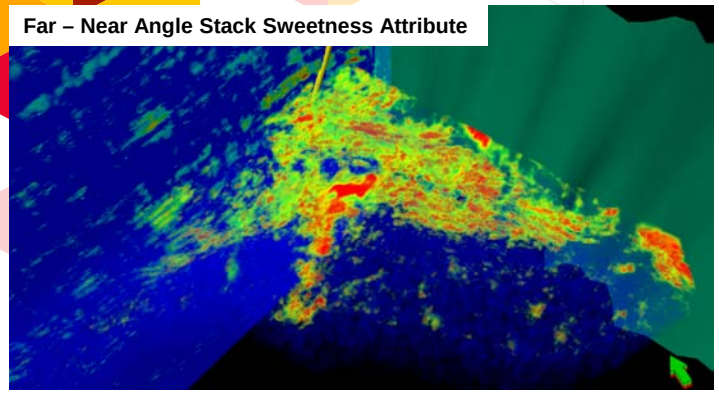


Cut off (P*G): 0.25

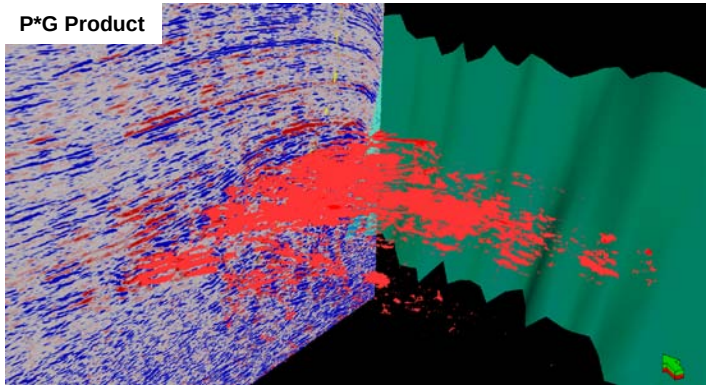
Note : Only the bright amplitude that has positive P*G value were stated as reservoir / sands.

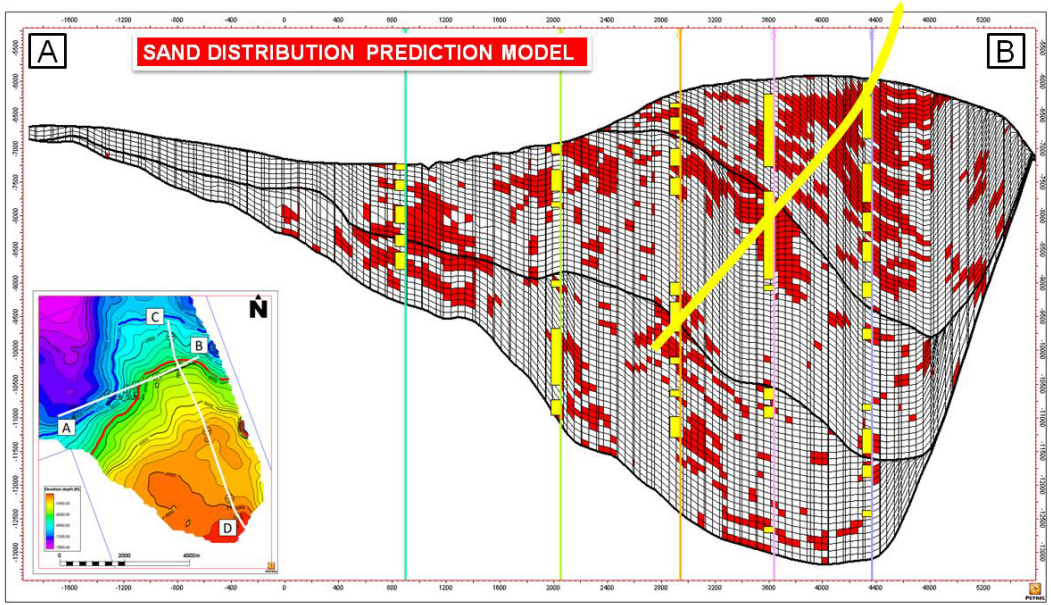
GEOBODY EXTRACTION TO PREDICT RESERVOIR DISTRIBUTION AND NET TO GROSS THICKNESS

Far – Near Angle Stack Sweetness Attribute



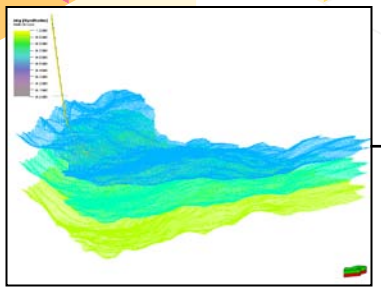
P*G Product



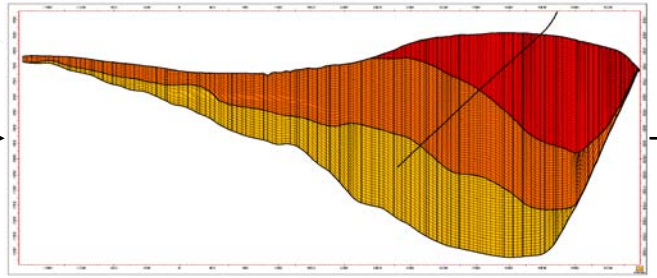


Geobody Extraction of P*G product used to predict and determine the reservoir distribution in SUN Formation. It could be help as input in resources calculation

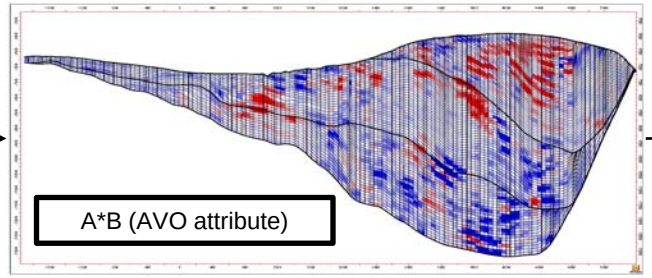
GEO-BODY GENERATION AND METODOLOGY



Simple grid modeling

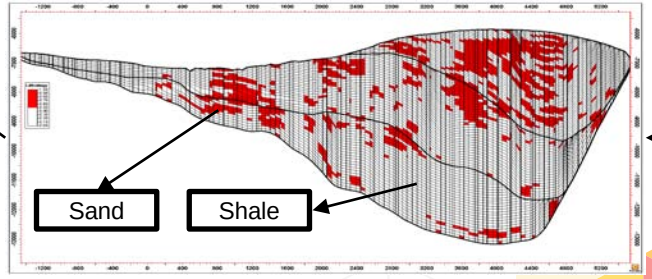


Layering

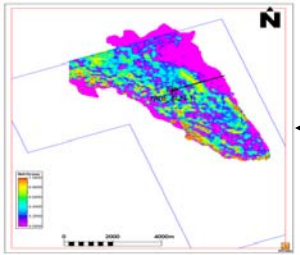


Seismic resampling

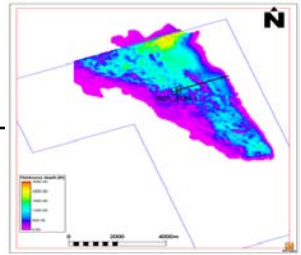
Time to depth conversion



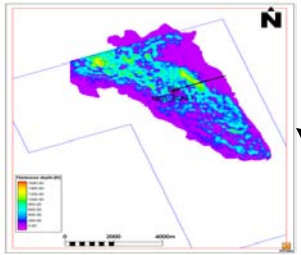
If condition (geobody)



Net to Gross



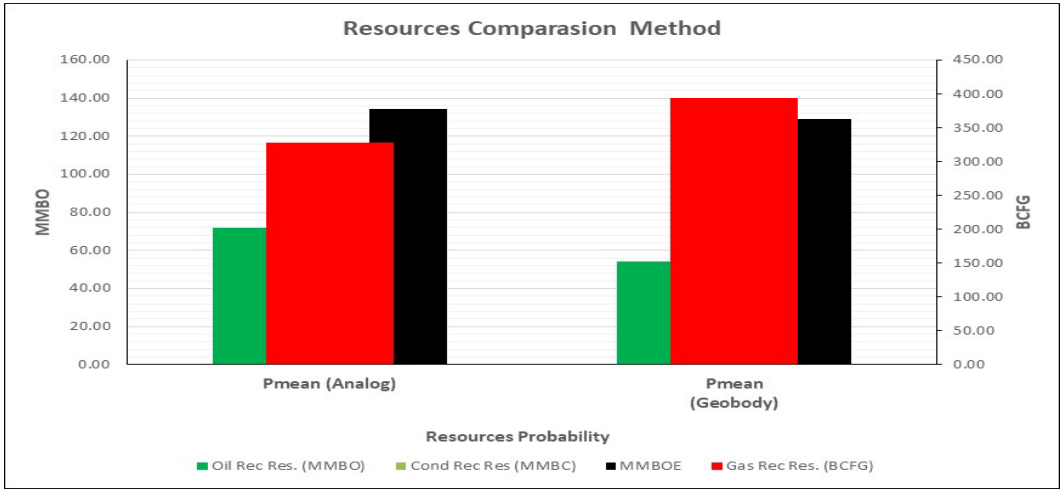
Shale thickness



Sand thickness

NTG = Sand thickness / (Sand + Shale thickness)

RESOURCES CALCULATION COMPARASION



Resources Calculation has been compared between using konvensional equation and using Geobody generation

SUMMARY

- Generally, DHI Post Stack Analysis predicted the distribution of reservoir in SUN Play. This analysis showed and proved that NEB has SUN PLAY which previously identified as basement

- DHI Pre Stack Analysis is more detailed study, following the previous Post Stack study. The results of this study could help to predict reservoir thickness, increasing reservoir distribution confidence, pore pressure anomalies, and upgrading existing prospect with a higher chance of success.

THANK YOU