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COPL
CANADIAN OVERSEAS PETROLEUM LIMITED

SHORELINE CANOVERSEAS PETROLEUM DEVELOPMENT CORPORATION

May 2017

OPL 226

ShoreCan's 80% Shareholding of Essar Nigeria E&P Limited

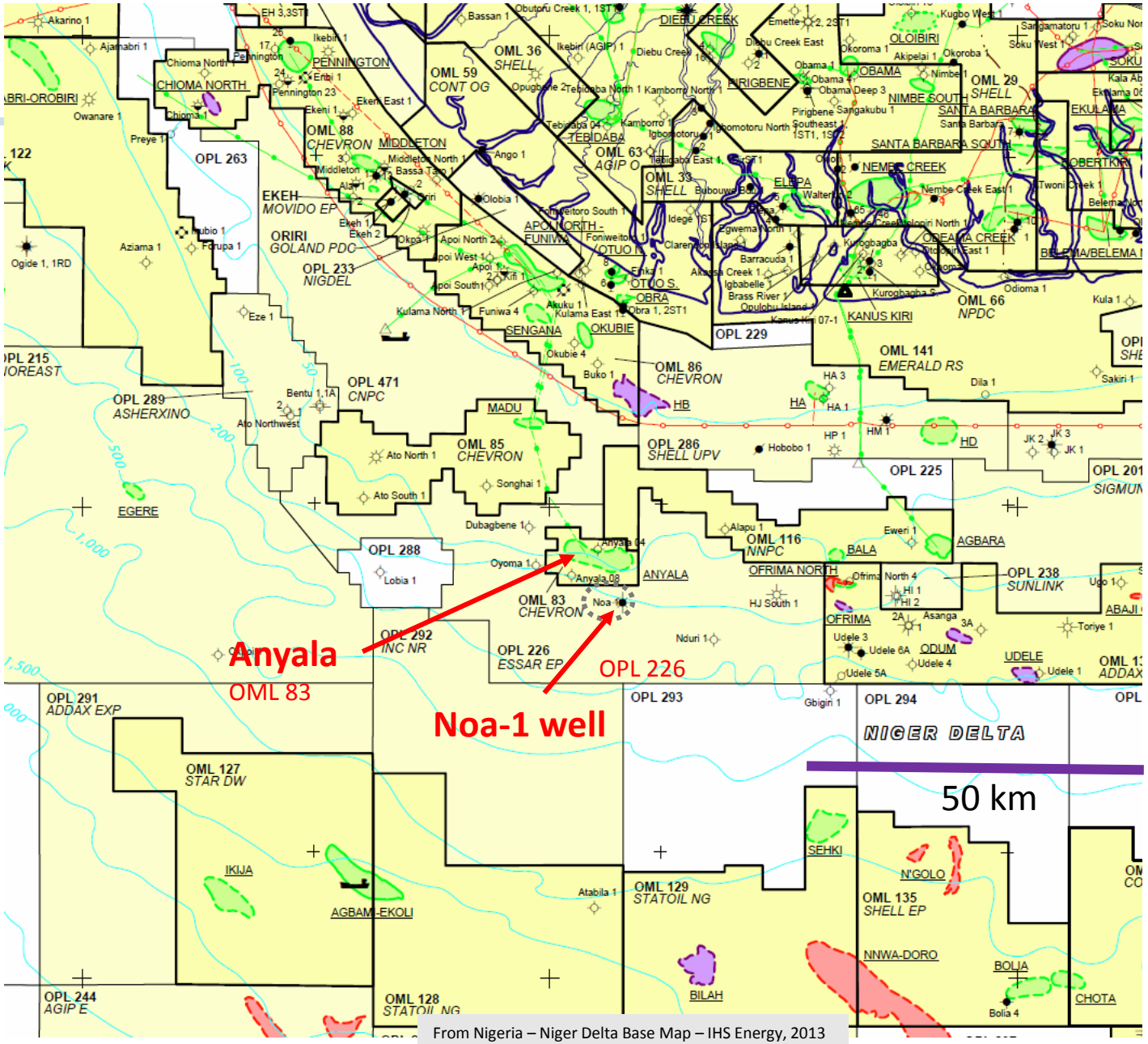
Geology/Geophysics, Appraisal and Development Scenarios

Summary

- Shoreline Canadian Overseas Petroleum Development Corporation has an attractive oil appraisal, development project in OPL 226, with significant exploration upside located 50 km offshore the central Niger Delta, through its ownership of 80% of the share capital of Essar Nigeria
- There are two primary “appraisal” play targets: OPL 226 is situated along both the northwest and southeast portions of the doubly plunging Anyala anticline. The Anyala Field, located within OML 83, is at the crestal area of the anticline and is predominately gas as presently defined by drilling. ShoreCan interprets the gas bearing sands in lower stratigraphic intervals to be gas caps to oil bearing sands present on the northwest plunging limbs and the southeast plunging limbs
    - On the southeast plunging limb, the unappraised Noa-1 oil discovery (2001) has 16 mmbbl 2C recoverable resources with a further 237 mmbbl of best case recoverable resources as estimated by NSAI in a NI 51-101 Report dated March 1, 2016 on the balance of the Noa Structure
    - On the northwest plunging limb, two wells were drilled in 1972 after Texaco’s 1972 Anyala discovery: Oyoma-1 (1972) – 36.2 m net oil and gas pay; Dubagbene-1 (1972) – 8.2 m net oil pay, confirming oil bearing sands down dip from gas bearing sands at Anyala
- Two 3D seismic surveys have been acquired on OPL 226. The “Solgas” survey acquired in 1999 is a short offset (2000 m) survey covering the Anyala anticline. The “Essar” survey acquired in 2012 is a long offset survey (6000 m) covering the southeast limb of the Anyala anticline and the controlling growth fault areas north and southeast of the southeast limb of Anyala
- Significant exploration upside was identified by 2015-2016 inversion processing on Essar 3D seismic. These techniques are not applicable to the Solgas survey due to its acquisition parameters, and was not available to NSAI for the Resource Report dated March 1, 2016
- ShoreCan has submitted a well plan to NAPIMS (National Petroleum Investment Management Services) for an appraisal well, Noa-2, to be drilled in Q4 2017 which will be completed as a producing well under an approved early production scheme utilizing a jackup rig as a temporary production facility
    - This allows for early cash flow and the collection of real time reservoir data to aid in the design of an efficient exploitation scheme in the ultimate Field Development Plan

OPL 226 – Noa Complex

- OPL 226 is adjacent to (and surrounds) the Anyala Field in OML 83
- Noa-1 discovery drilled in 2001 on OPL 226 with several gas zone pays and a lower oil zone with nearly 20 metres of blocky oil sand pay, on the southeast limb of the Anyala Anticline
- Oyoma-1 (1972) – 36.2 m net oil and gas pay; Dubagbene-1 (1972) – 8.2 m net oil pay, located on the northwest plunging limb of the Anyala Anticline



From Nigeria – Niger Delta Base Map – IHS Energy, 2013

ShoreCan Acquisition of 80% of Essar Nigeria E&P Ltd Equity

- Canadian Overseas Petroleum Limited (“COPL”) announced on September 14, 2016 that it’s 50% owned affiliate, Shoreline Canadian Overseas Petroleum Limited (“ShoreCan”) has completed the acquisition of 80% of the share capital of Essar Exploration & Production Limited Nigeria (“Essar Nigeria”)
- Essar Nigeria’s sole asset is a 100% interest and operatorship of OPL 226 that is located 50 km offshore in the central area of the Niger Delta, Nigeria.
- The PSC governing OPL 226 is a “sole risk” contract. NNPC has no right of back in.
- To date in excess of $65 million US has been invested by Essar in OPL 226 in signature bonus and 3D seismic
- Shorecan has control of the Board of Directors and Management of Essar Nigeria. Under the terms of the Production Sharing Contact (“PSC”) governing OPL 226, Essar Nigeria is required is required to seek Ministerial consent for the “change of control” transaction. Application has been made and the parties to the transaction are awaiting its approval.
- An extension to the first phase of the PSC to December 1, 2017 was recently granted to Essar Nigeria. The remaining commitment on the first phase of the PSC is the drilling of one well. COPL’s technical team has identified a commitment well drilling location

OPL 226 – Background, Geology/Geophysics and Reservoir

- OPL 226 is located in the Niger Delta province, offshore Nigeria, and has an area of 1530 km^2 and is located in water depths ranging from 40 to 180 metres. This block is situated along the southwestern edge of a large growth fault-controlled structural complex (Anyala/Noa Complex) that can be mapped with available 3D seismic data
- OPL 226 is situated adjacent to (and surrounds) OML 83 in which the undeveloped Anyala oil and gas field is located
- Historically, only 5 wells have been drilled on OPL 226 by previous operators including: Noa-1 drilled by Solgas in 2001 that is an oil and gas discovery; Oyoma-1 (1972) – 36.2 m net oil and gas pay; Dubagbene-1 (1972) – 8.2 m net oil pay; Nduri-1 (1973) – 9 m net gas pay; HJ South-1 (1973) – 8.5 m net gas pay
- The Dubagbene-1 well was drilled by Deminex in 1972, only a few months after Texaco drilled the Anyala-1 discovery well that encountered several pay zones, including 16.6 m of gas pay in the 6100' sand. The Dubagbene-1 well encountered 8.2 m of pay in that same 6100' sand zone that was initially concluded to be gas pay. However, recent log analysis illustrates that this pay is oil pay from the oil leg that surrounds the gas cap on the crest of the Anyala dome
- The Noa-1 discovery well, drilled in 2001, encountered oil-bearing fine to medium-grained sandstones of the Agbada Formation (6100' sand zone) with porosity averaging 30% and permeabilities over 1000 millidarcies against an antithetic fault on the southeast limb of the Anyala Anticline. Three additional gas-bearing sands (3600', 4900', 5500' sands) were also encountered (uphole) in the Noa-1 well. Due to hole conditions, a test could not be performed
- ShoreCan's technical team has utilized **STATE OF THE ART** amplitude extraction and simultaneous inversion techniques to help map faults, sand trends and hydrocarbon trends on the 3D seismic data. There are several locations to test both low risk appraisal well locations and undrilled exploration prospects with significant upside potential. A development plan has been considered

Appraisal Wells/Prospects

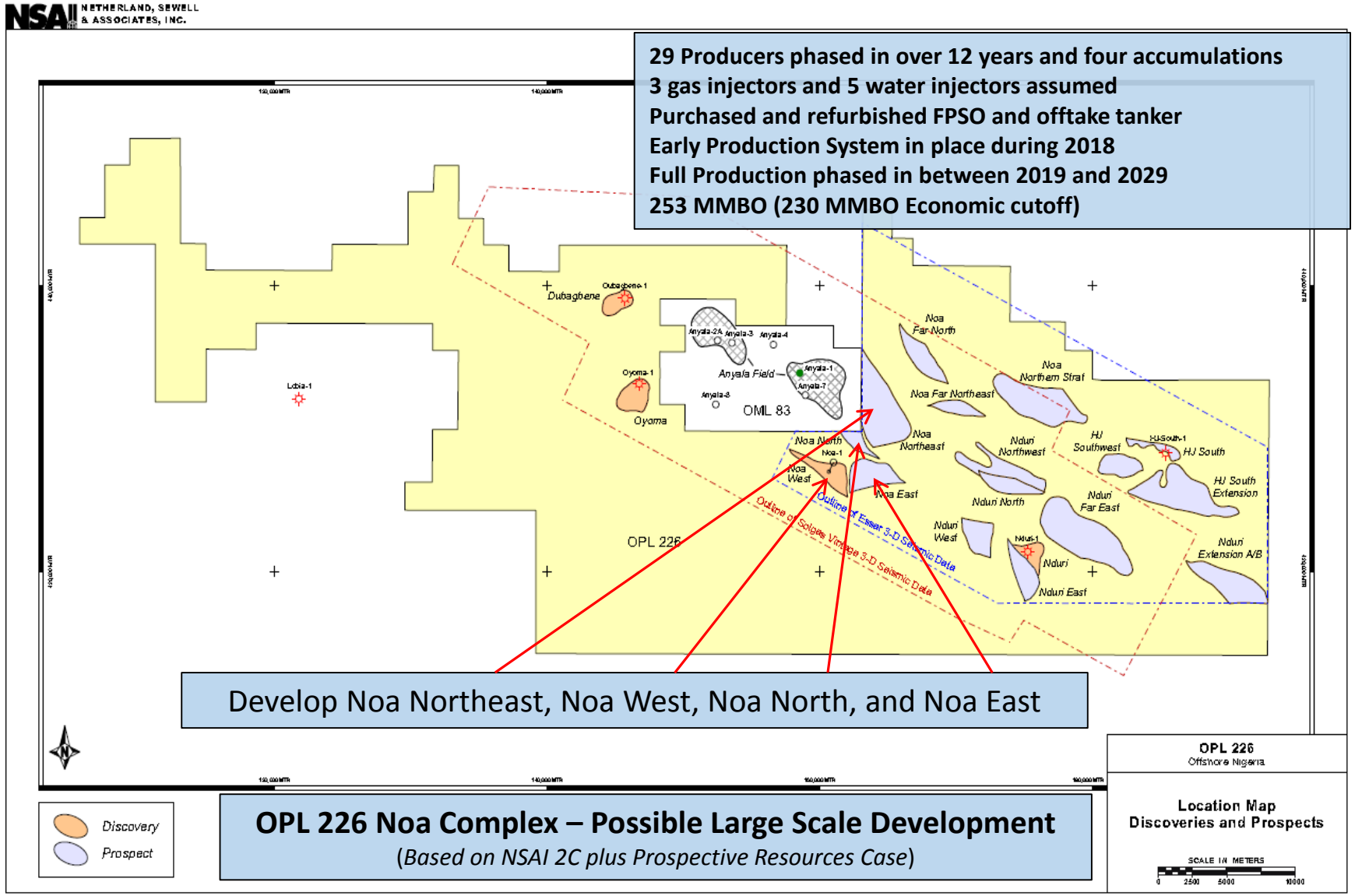
- Noa Northeast Prospect – Growth Fault-related rollover hanging wall, southeast plunge of the Anyala Anticline
- Noa North Prospect – Growth Fault-related rollover hanging wall, southeast plunge of the Anyala Anticline
- Noa West/East Prospects – Footwall trap with clay smear along antithetic faults along the southeast plunging limb of the Anyala Anticline

At the request of COPL, Netherland Sewell Associates Inc. (NSAI) (December 31, 2017) has prepared an independent report in accordance with Canadian National Instrument 51-101 evaluating the Contingent and Prospective Resources attributed to OPL 226, as at 1 March, 2016. In this report, the Gross Unrisked Contingent Oil Resources (recoverable) for the Noa West discovery are estimated to be: Low Estimate (1C) = 11.5 million BO; Best Estimate (2C) = 16.1 million BO; High Estimate = 20.7 million BO

Additionally, the Gross Unrisked Prospective Oil Resources (recoverable) for these three prospective appraisal areas (note that Nduri NW was not included) are estimated to be:

Prospects	Low Estimate	Best Estimate	High Estimate
Noa Northeast	53.7 million BO	94.9 million BO	161.7 million BO
Noa North	19.9 million BO	34.1 million BO	55.8 million BO
Noa West/East	59.7 million BO	108.1 million BO	194.5 million BO
Totals	**133.3 million BO**	**237.1 million BO**	**412.0 million BO**

OPL 226 Noa Complex – Possible Large Scale Development



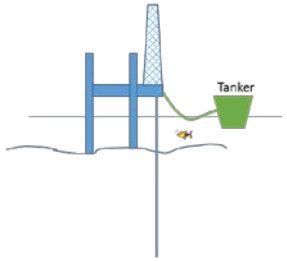
Noa Complex – OPL 226 – Development Scenario

- A possible development scenario was formulated to illustrate the potential economics of the Noa Complex by itself. The scenario was based on the resources identified by Netherland Sewell & Associates (NSAI) in their December 31, 2017 report for block OPL 226. In that report, the Noa complex was divided into 7 separate compartments totaling 476 MMBO of Contingent and Prospective resources in NSAI's "Best Estimate" category. To illustrate some potential economics of a large scale development, the four largest compartments (Noa Northeast, Noa West, Noa North, and Noa East) were chosen for the development scenario due to their size. Total **Unrisked** oil resource used in the economics was 253 MMBO
- Development of the various compartments would be through vertical and horizontal wells, with the main zone being the 6100' zone, and additional reservoir layers being possible from the deeper 7000' and 8000' zones
- Use of a contract jack-up rig is assumed for drilling and production. A total of 29 producers, 3 gas injectors, and 5 water injectors was assumed, phased in over 12 years. In 2017 an early production system (EPS) would produce the first well for 8 months to one year. Permanent production start would be 2018, with the Noa Northeast compartment, followed by the other compartments over the years
- Cost estimates were generated in-house based on knowledge of drilling costs and facility costs in the area. It was assumed that a jack-up rig could be used in most areas. It was also assumed that an available FPSO would be purchased and refurbished for the needs of the project
- The PSC terms for the block are taken from the original PSC document: Fixed 18.5% royalty rate; Petroleum Profits Tax (PPT) is 65.7% for the first 5 years, and then 85% thereafter; Cost recovery limit is 70% of gross income; Investment Tax allowance is 10%; R Factor: R<1.2 contractor share is 70%, 1.2<R<2.5 contractor share is 25%+[(2.5-R)/(1.3)*45%], R>2.5 contractor share is 25%
- Economics were run on the existing known standard PSC terms and the economics for the development plan seem to be attractive, even under the lower price environment

Possible Development Scenario

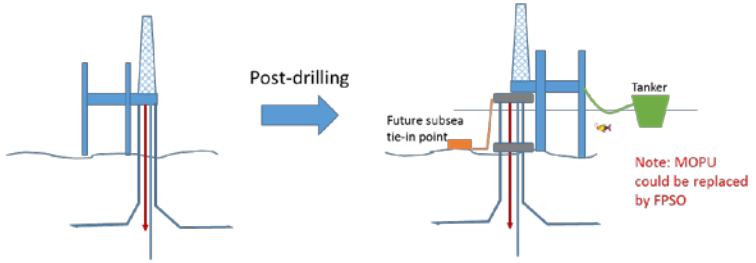
PHASE 1

- Mobilise jack-up rig to first location
- Drill vertical well to 6100’ and 7000’ sands
- Run dual completion
- Leave rig on location and carry out EPS for 8 - 12 months from both sands



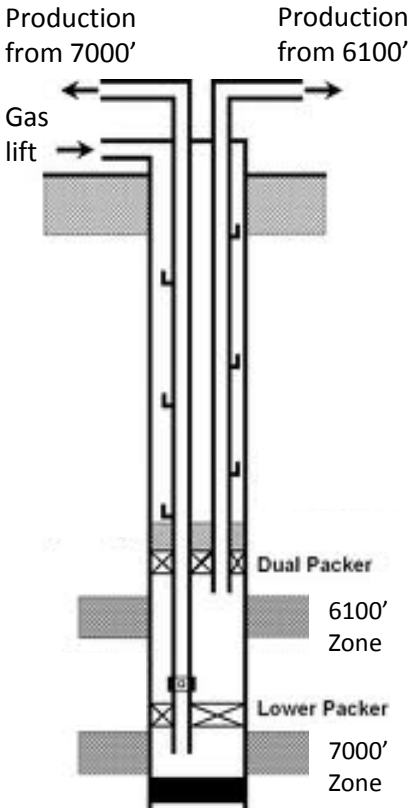
PHASE 2

- Re-instate drilling systems and drill additional 2 horizontals to 6100’ sands
- Drill gas injection well
- Install template and basic compliant tower using rig and well conductors
- Install unmanned, minimal facility with tie-in points for future wells



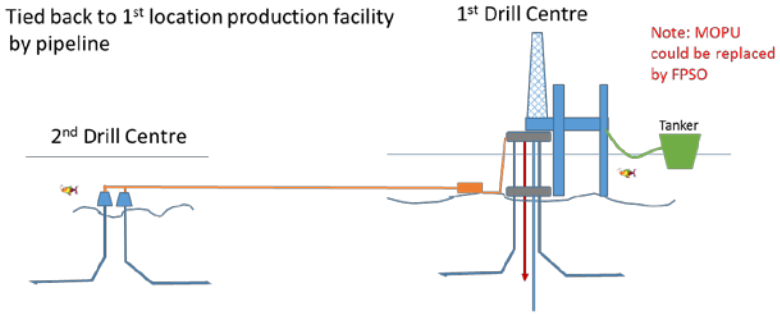
Drilling jack-up on location

Producing through MOPU (converted Jack-up)



PHASE 3

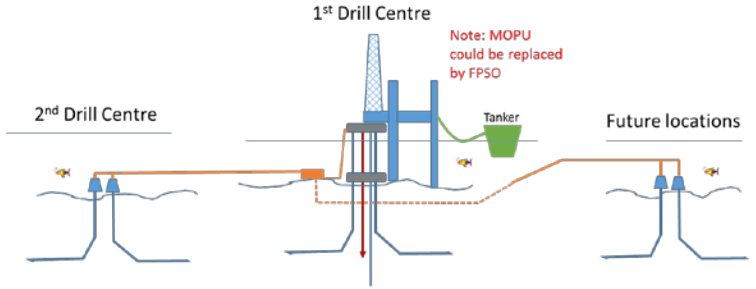
- Drill 2 Horizontal subsea wells in new compartment to 6100’ sands (subsea means only single sand completions)
- Tied back to 1st location production facility by pipeline



Producing through MOPU (converted Jack-up)

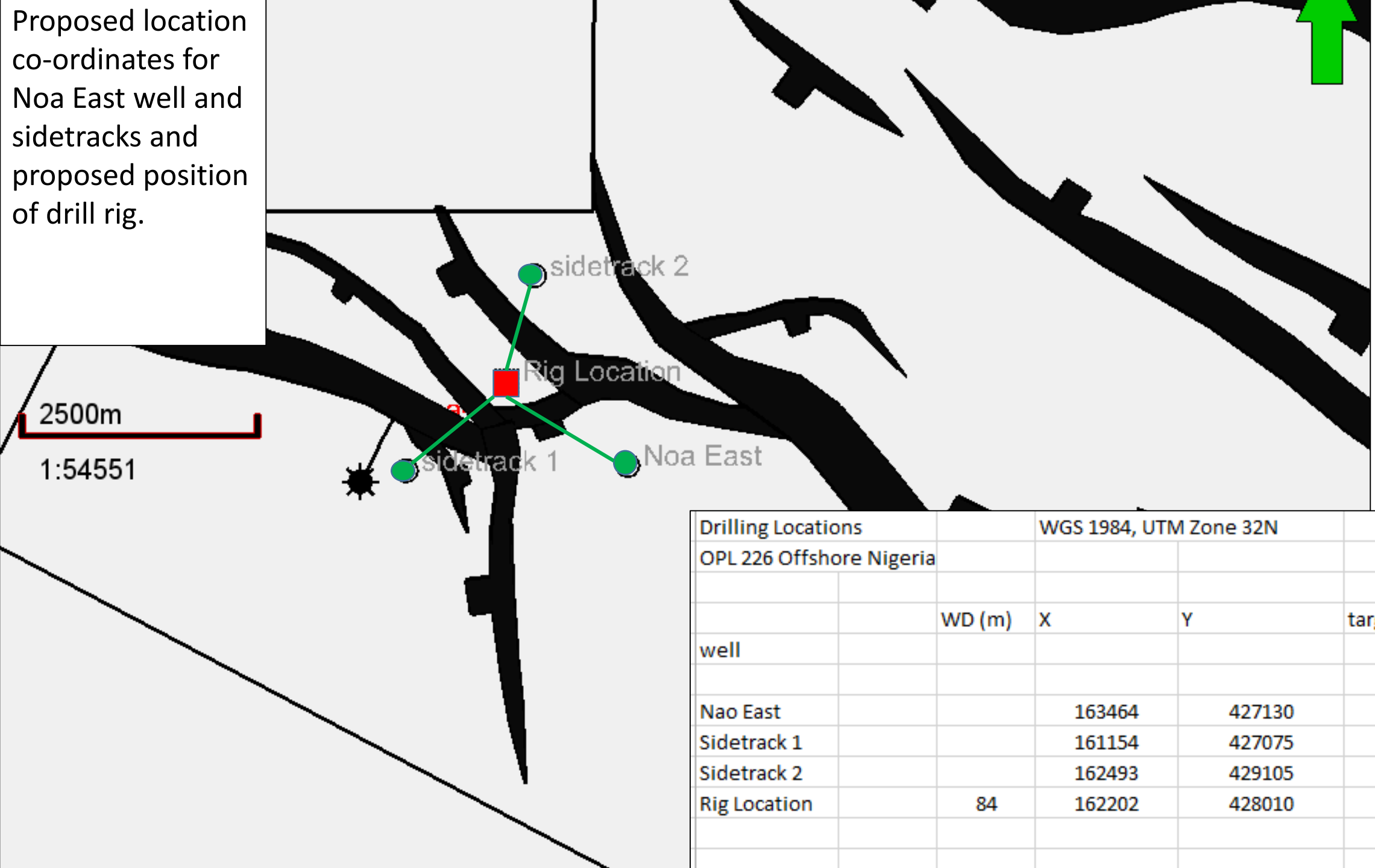
PHASE 4

- Repeat Phase 3 for 3rd and subsequent areas



Producing through MOPU (converted Jack-up)

Proposed location co-ordinates for Noa East well and sidetracks and proposed position of drill rig.

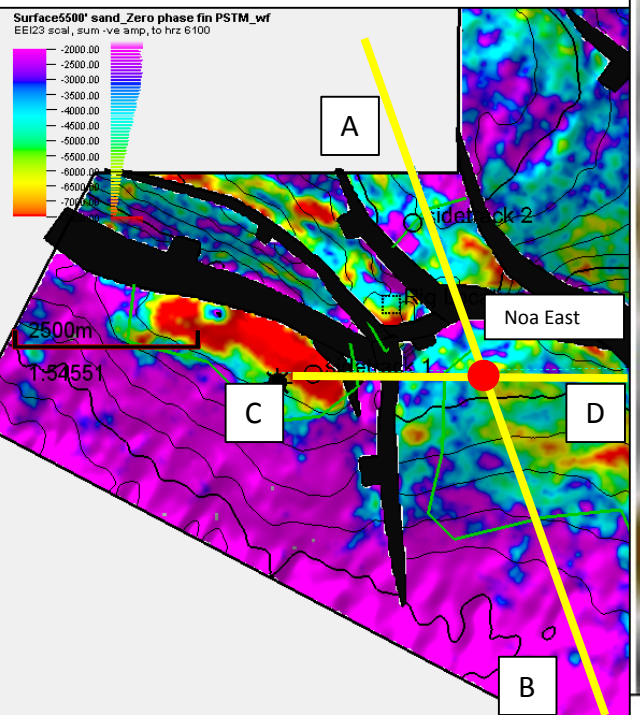


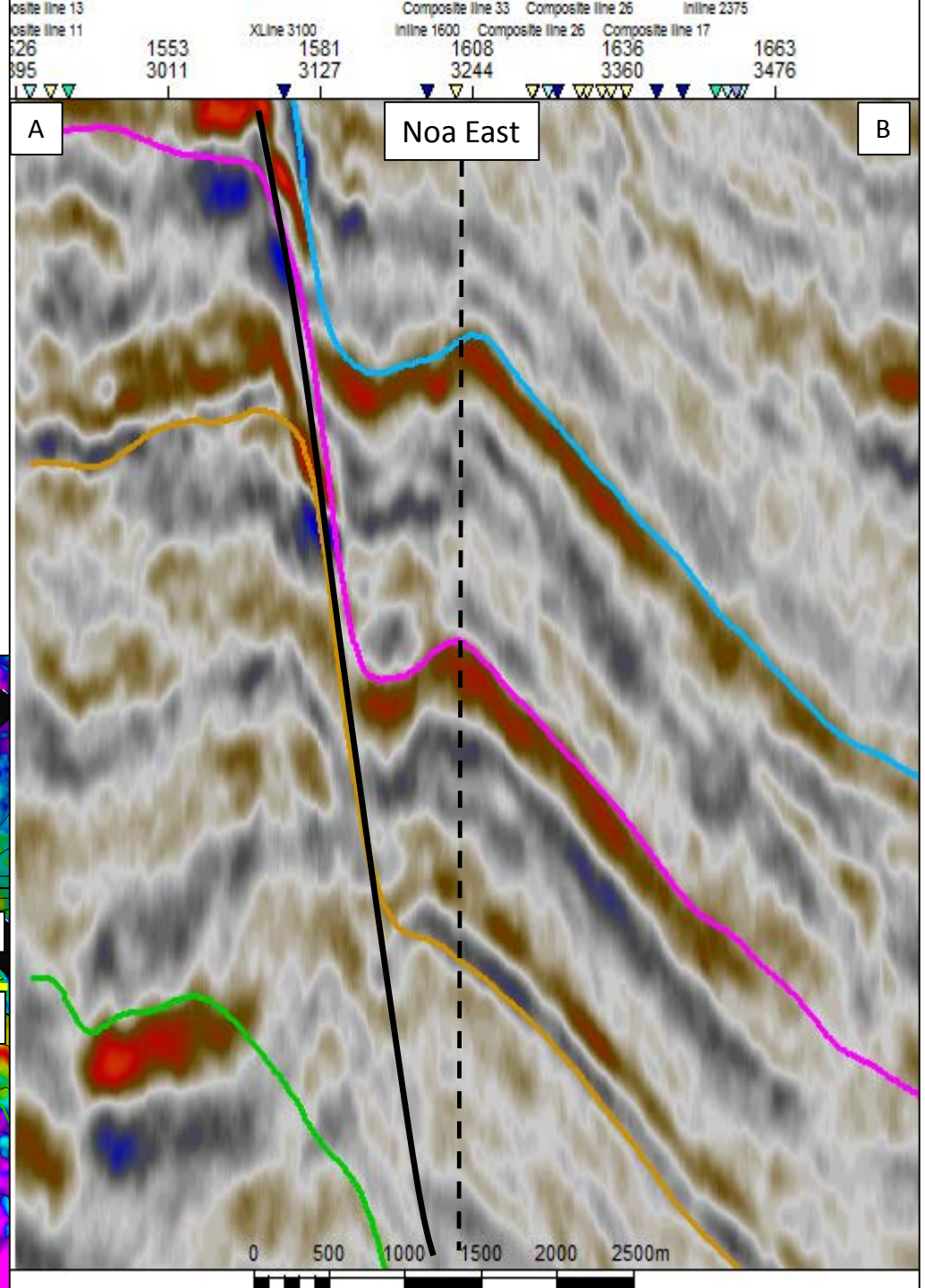
Drilling Locations		WGS 1984, UTM Zone 32N		
OPL 226 Offshore Nigeria				
	WD (m)	X	Y	target depth (m)
well				
Nao East		163464	427130	2282
Sidetrack 1		161154	427075	2267
Sidetrack 2		162493	429105	2148
Rig Location	84	162202	428010	

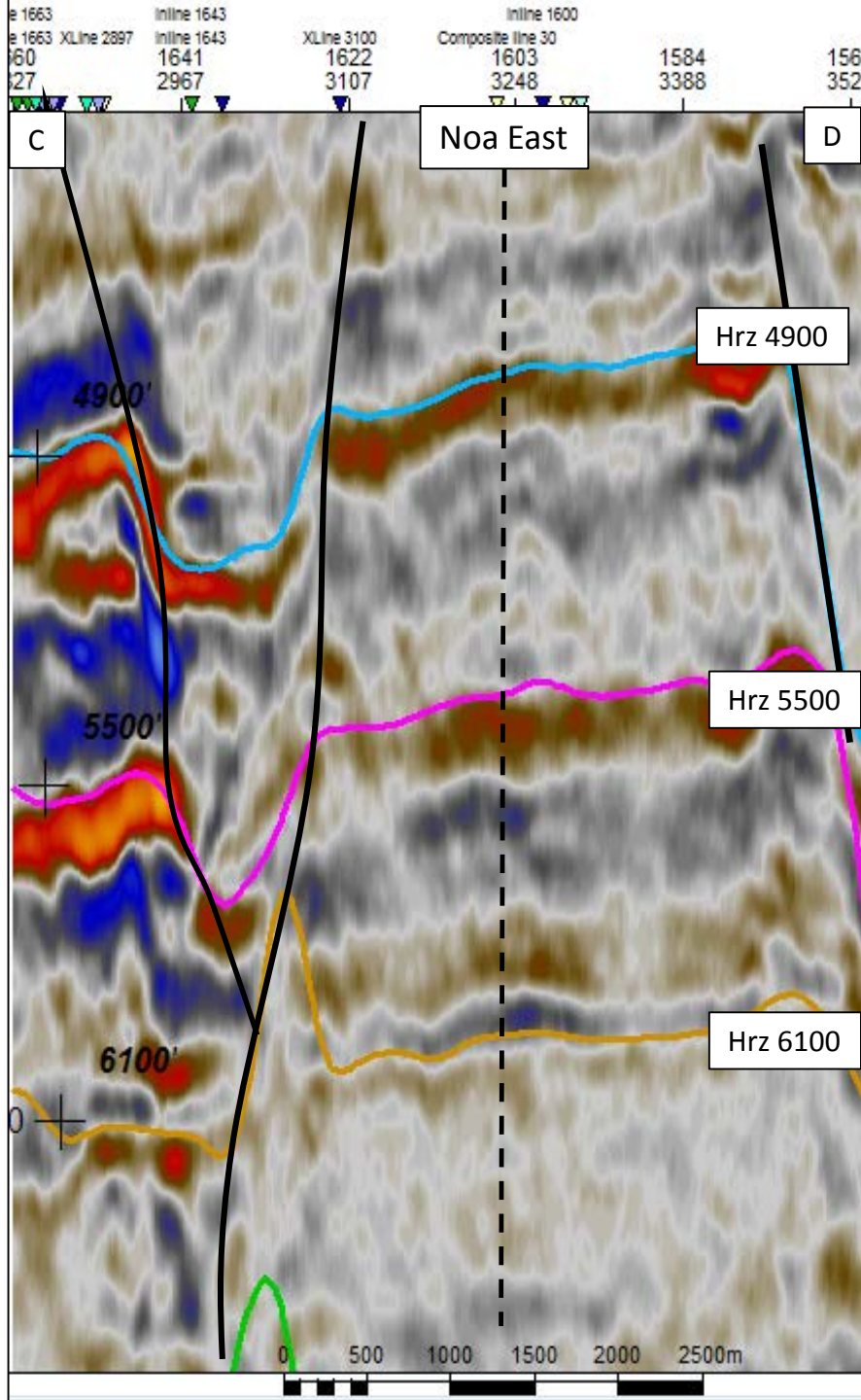
Proposed location of Noa East well

EEI23 data
Warm colour amplitudes indicative of hydrocarbons both on map and section.

Location of lines as indicated on map.





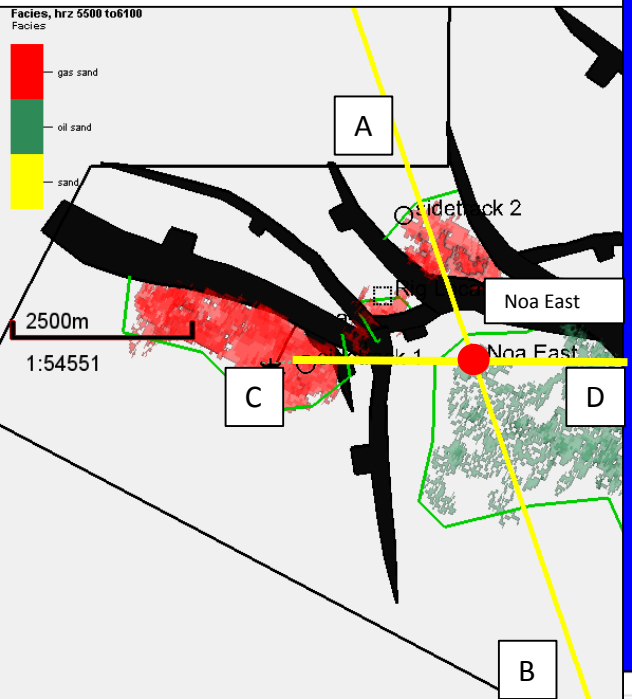


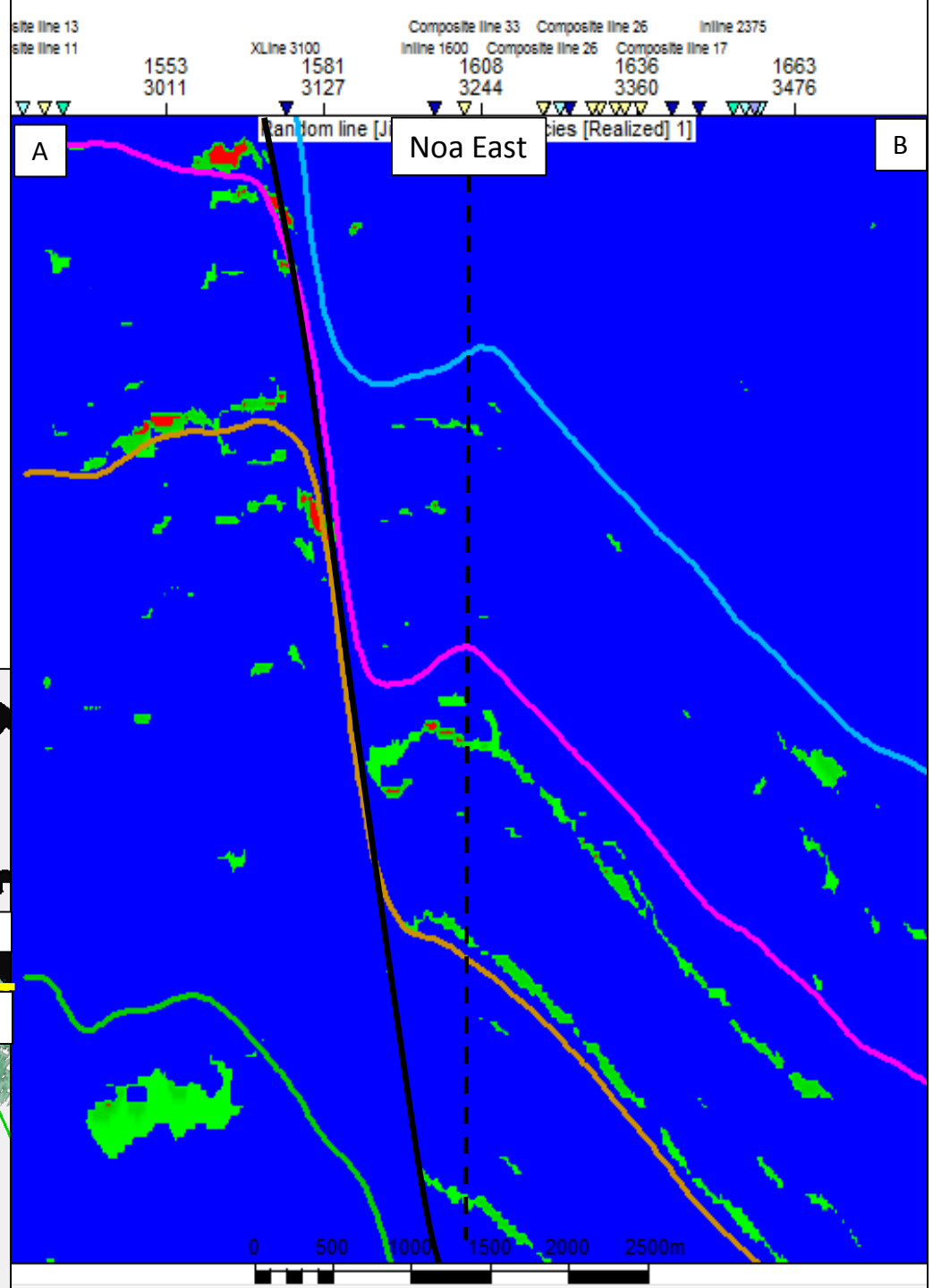
Proposed location of Noa East well

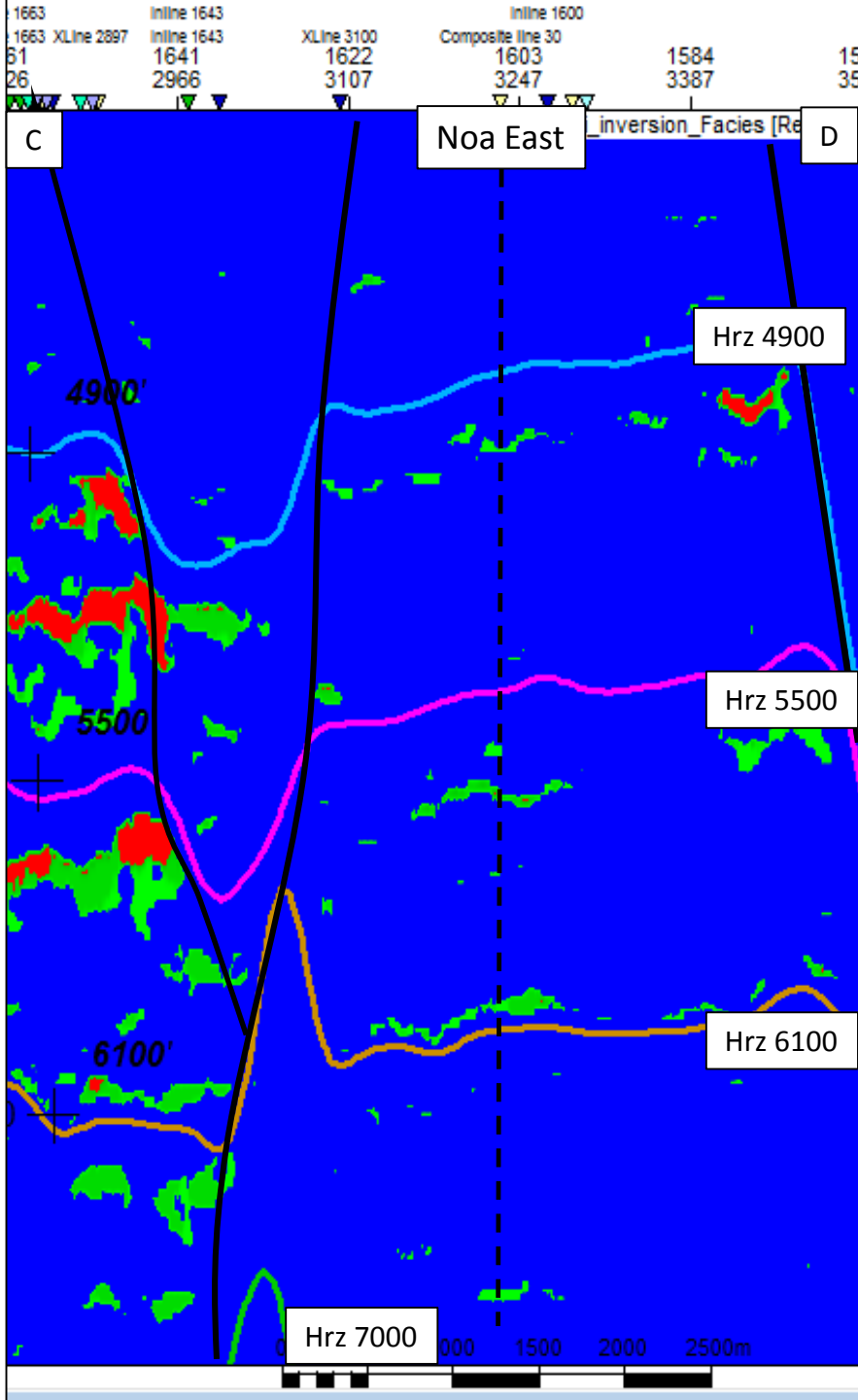
Ji-Fi data

Red gas
Green oil
both on map and section.

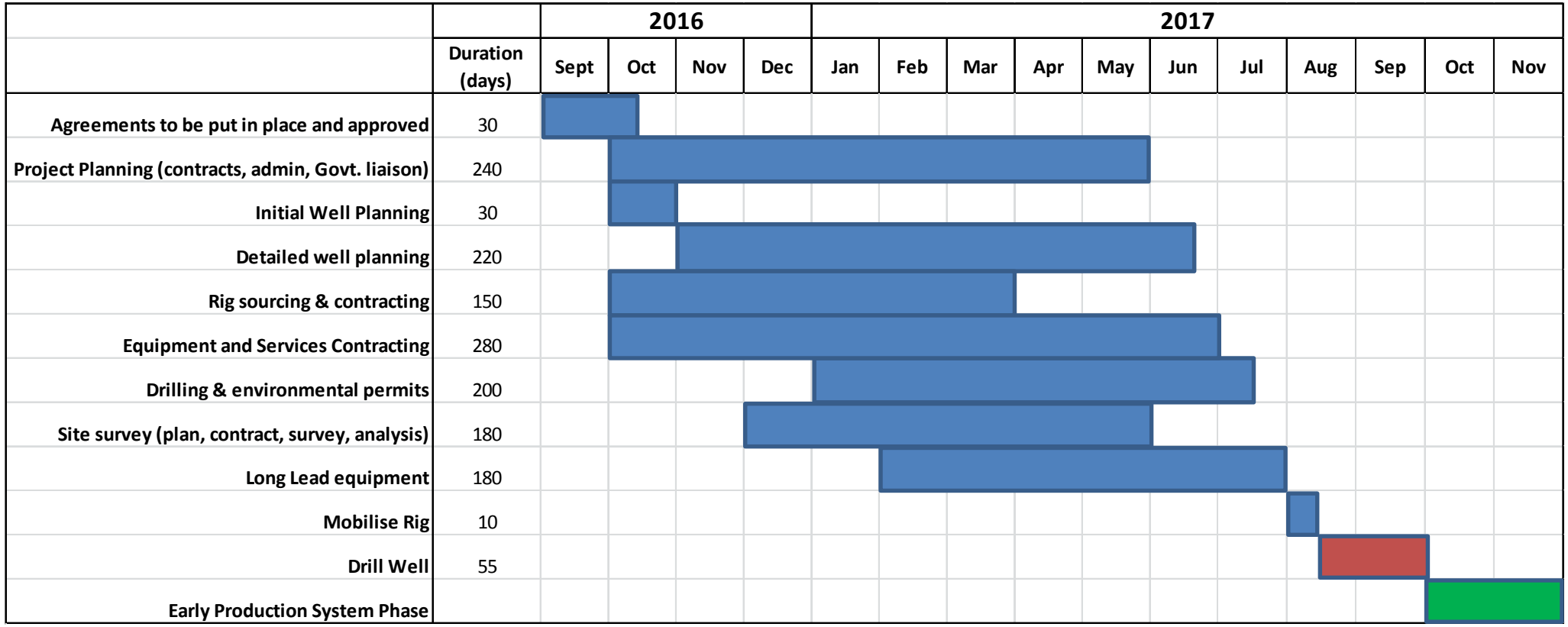
Location of lines as indicated on map.







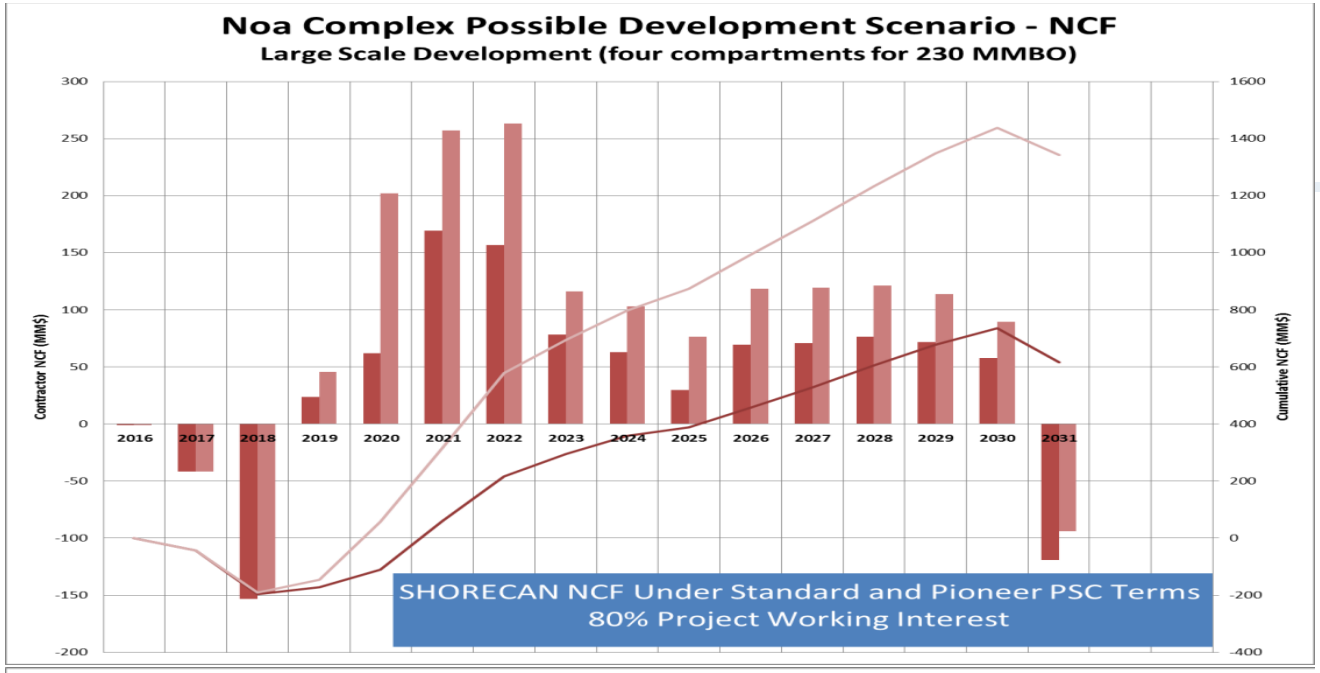
Phase 1 Timescale – Time to drill initial well

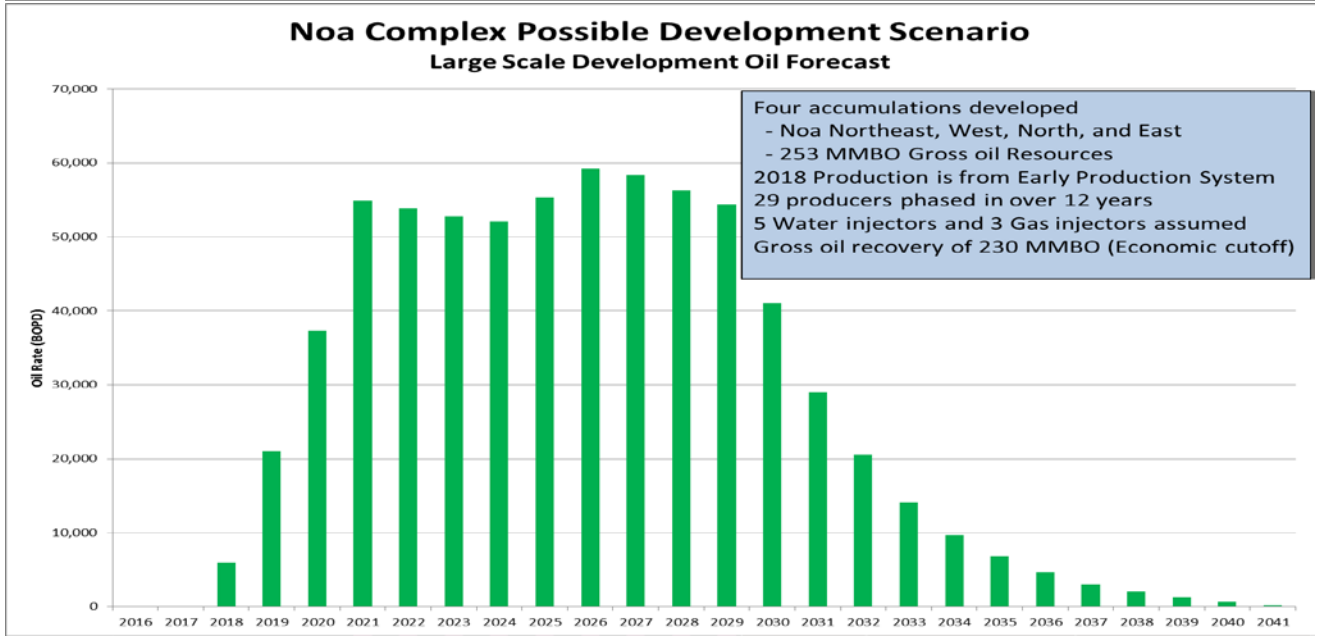


- Aggressive timescale for new Partnership agreement in Licence
- Target is to spud well in Q4 2017
- Availability in rig market and of drilling equipment is good in current market
- Critical timeline expected to be contracting process and engagement of main contractors. NNPC support vital to process.

Early Production System Assumptions and Effect on Cash Flow

- Following successful drilling and completion of first Noa Northeast well, the drilling unit would remain on location to act as production platform. The well would be put on production as an EPS well during 2018
- Jack-up rig would be on reduced day rate as operating cost came down
- Assumed $65,000 per day for jack-up and $5,000 per day for production facilities on board (essentially well test spread)
- Storage tanker require to be permanently moored along side jack up. Option to buy, but more likely leased at $20,000 per day
- Shuttle tanker required for offtake and transport to terminal. Assumed to be full time charter at $25,000 per day
- *Overall daily OPEX cost of EPS would be $115,000 per day - $42 million per year assuming a 365 day operation*
- Option would remain to convert well to subsea producer at later stage if required
- *Early Production System during 2018 would contribute about 580 M$/month of positive cash flow under economic model assumptions*





Noa Development Capital Required			
Capex (MM$)	Year	Gross	Net SHORECAN
	2016	0.25	0.25
	2017	30	30
	2018	200	160
	2019	193.5	154.8
	2020	197	157.6
	2021	183	146.4
	2022	72	57.6
	2023	85	68
	2024	76	60.8
	2025	147	117.6
	Remaining	484	387.2
	Totals	**1,667.75**	**1,340.25**

Noa Development Economics (SHORECAN)			
		Standard PSC Terms	Pioneer Status Terms
NPV (MM$)	0%	617	1344
NET SHORECAN	5%	388	881
	10%	***244***	***592***
	15%	151	406
	20%	90	282
IRR		36%	64%

The development plan presented is just one possible scenario for the Noa complex. Drilling will decide how the resources are developed and phased over time. The scenario is presented simply to illustrate the economic potential of the prospect field. *Internal COPL oil price forecast assumed.*

Geological & Resource Overview - OPL 226

Unrisked Recoverable Contingent Oil Resources on OPL 226 (Mmbbls)

	Gross[1]	Net to COPL
Low	11.5	4.68
Best	16.1	6.44
High	20.7	8.28

Geology

- A large growth fault-controlled structural complex
- Potential of hydrocarbons in multiple zones
- Petroleum trap features along the rollover anticlines and extensive "foot wall traps" proven by the Noa-1 discovery
- Several appraisal/development wells to the proven Anyala anticline already identified

Detailed Technical Work

- Used Extended Elastic Impedance (EEI)technology and Joint Impedance – Facies Inversion (Ji-Fi)
  - More advanced than traditional AVO technology
  - Allows different aspects of the rock, whether this be rock type (lithology), porosity, fluid content, saturation to be seen
- Work has demonstrated that the block holds a number of structural and stratigraphic features that tie in with EEI and Ji-Fi anomalies associated with "sand" lithology, and with "oil" fluid content

Unrisked Recoverable Prospective Oil Resources on OPL 226 (Mmbbls)

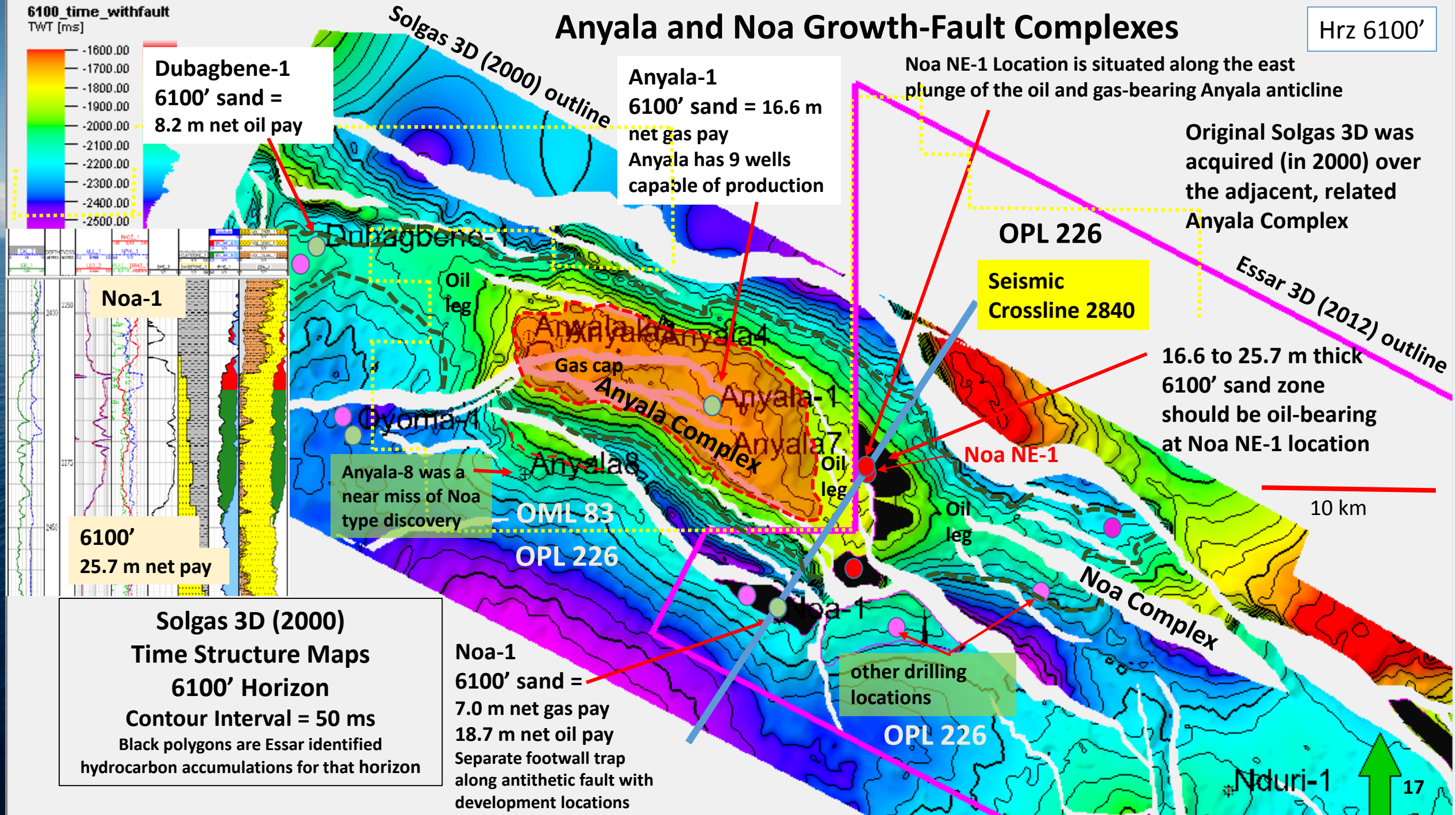
	Gross[1]	Net to COPL
Low	284	113.6
Best	533	213.2
High	1,014	405.6

[1]Netherland Sewell & Associates, Inc , March 31, 2017

Notes:
1. *Low, Best, and High estimates follow the NI 51-101 guidelines for prospective resources.*
2. *Application of any geological and economic chance factor does not equate prospective resources to contingent resources or reserves.*
3. *Recovery efficiency is applied to prospective resources in this table.*
4. *Summations may vary from those shown here due to rounding.*
5. *There is no certainty that any portion of the prospective resources estimated herein will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the prospective resources evaluated.*

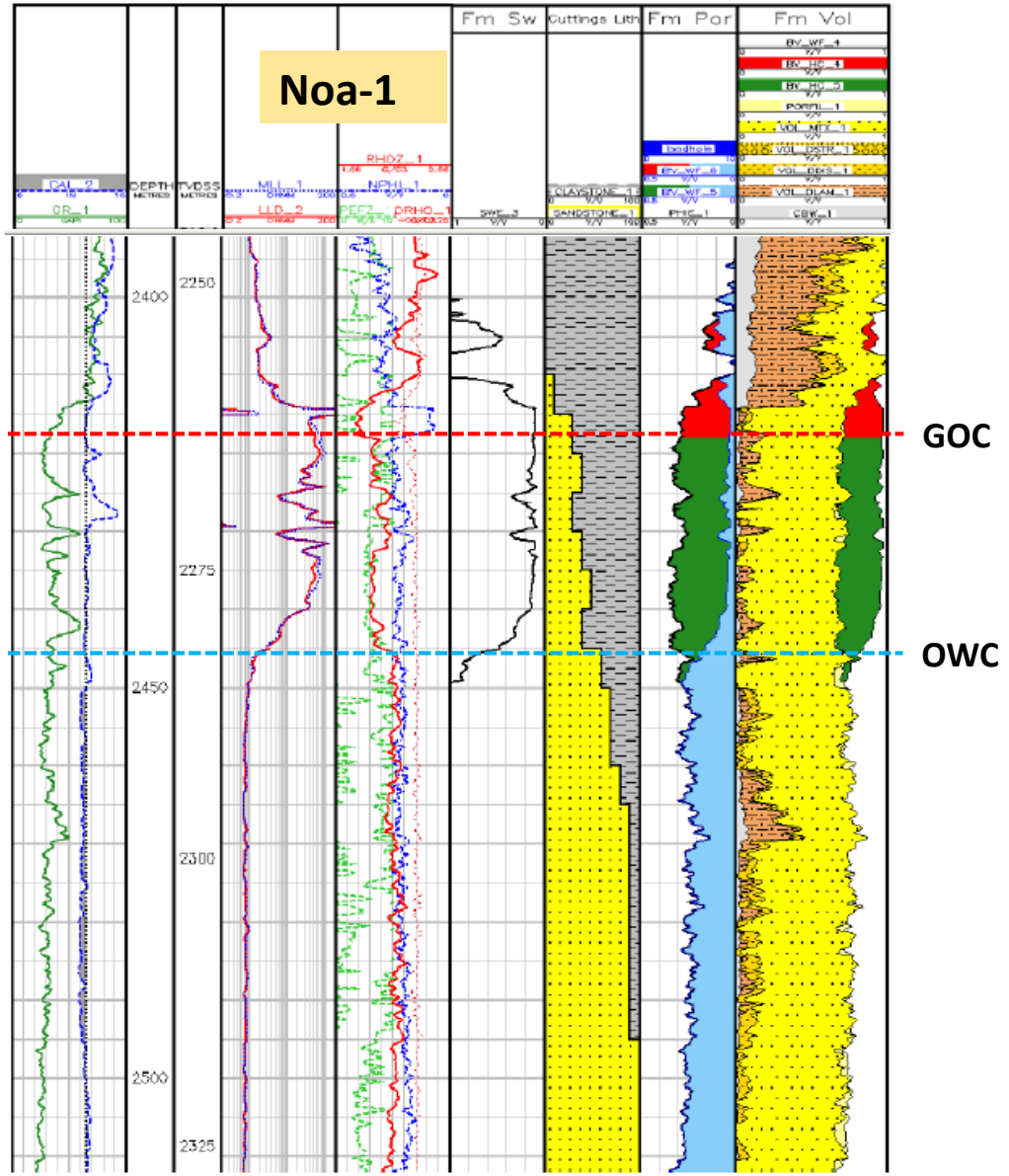
Anyala and Noa Growth-Fault Complexes

Hrz 6100’



OPL 226 – SW Plunge of Anyala Anticline
Noa Complex Discovery

- Log analysis*: 6100’ sand (interval 2400 – 2557 m MD)
- Shows gas-bearing interval (2400 – 2418 m MD) Note cross over effect on CNL-FDC
- Shows oil-bearing interval (2418 – 2445.96 m MD) Note high resistivity
- **Gas net pay**: 7.0 m with avg porosity = 21.3% and avg water saturation = 27.2%
- **Oil net pay**: 18.7 m with avg porosity = 30.8% and avg water saturation = 18.5%
- GOC = 2418 m MD
- OWC = 2445.96 m MD



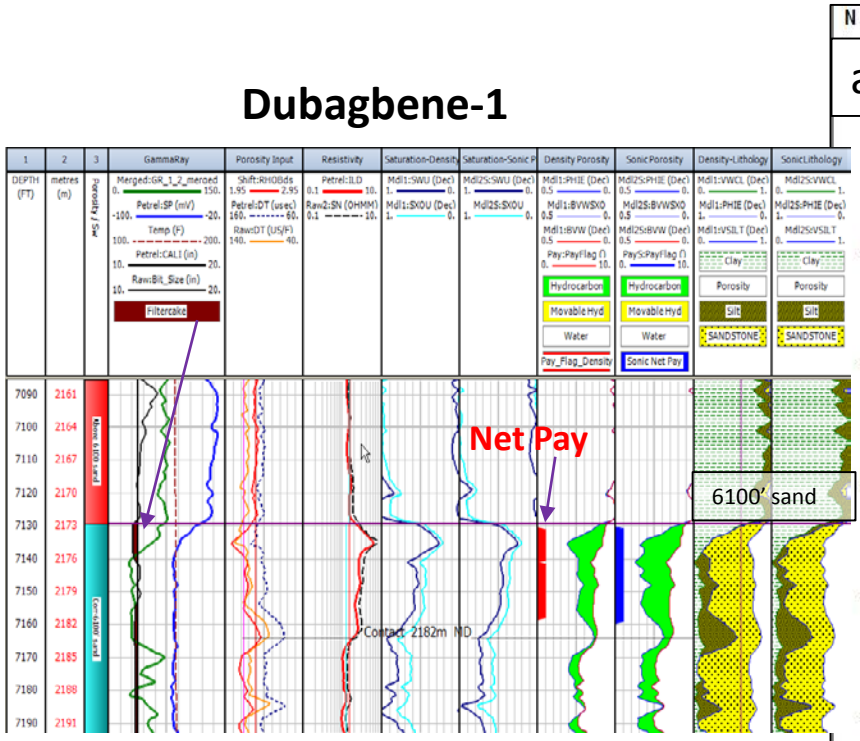
OPL 226 – Noa Complex Discovery
Noa-1 Discovery -- End of Well Summary

"Why didn't Nexen test the 6100' oil-bearing sand in the Noa-1 discovery well?"

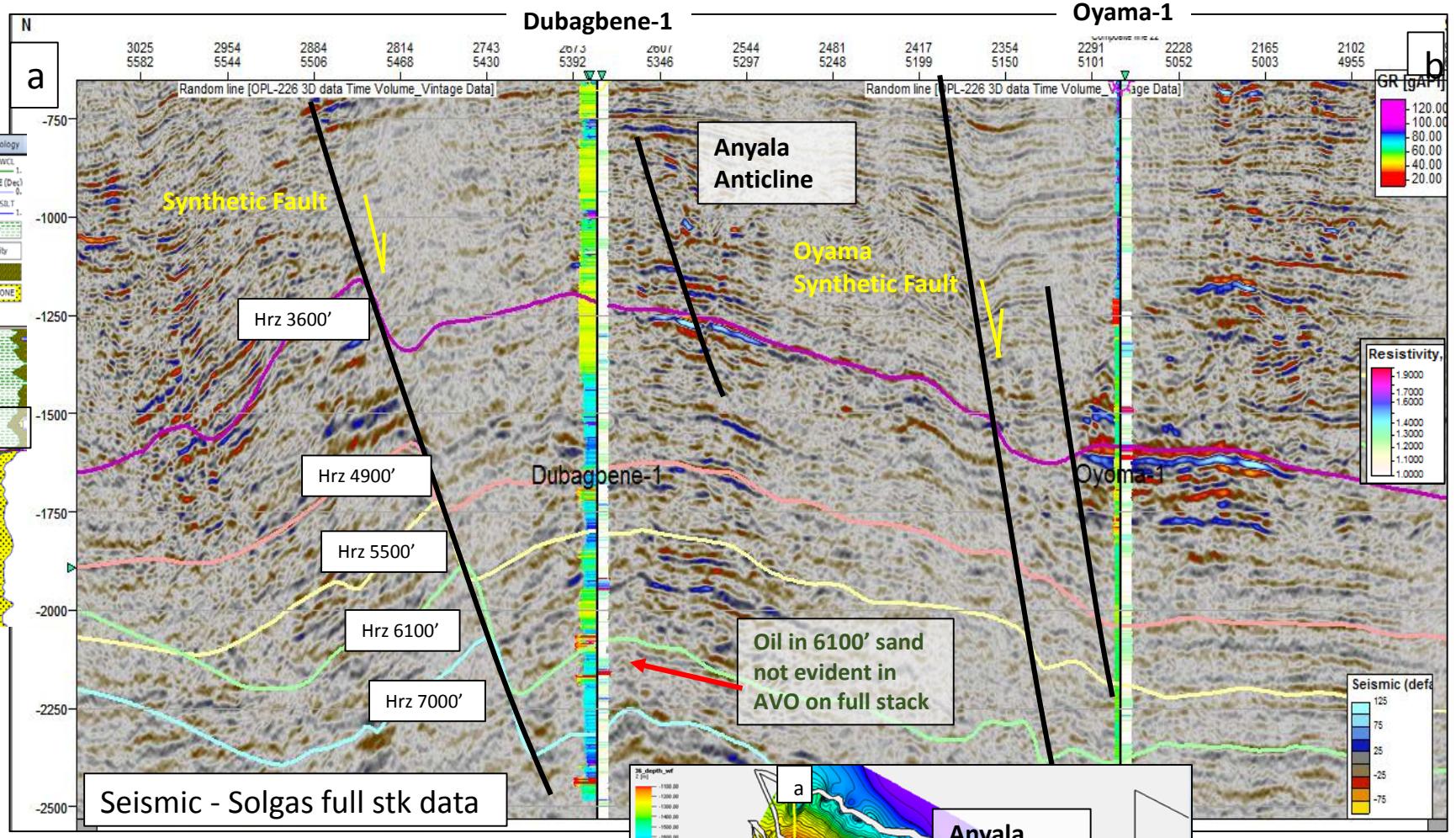
-- Due to unstable hole conditions, no attempt was made to get RFT oil samples nor attempt to flow test the 6100' sand zone

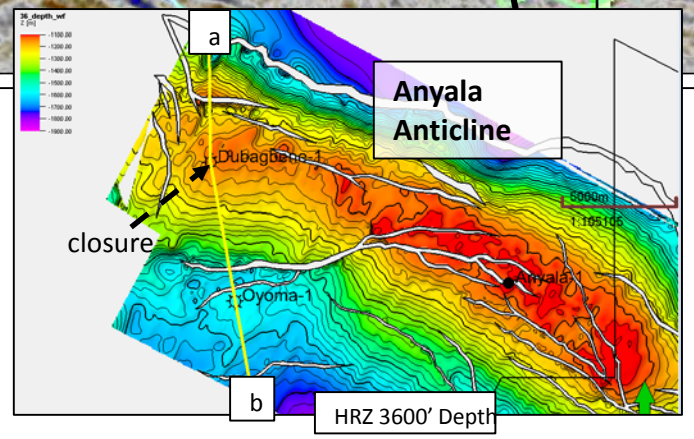
- Total Depth called 155m short of plan due to stuck pipe incident in the 7000' sand interval
  - Probable Causes:
    1. Incorrect drilling fluid system
    2. Insufficient mud weight compounded by insufficient solids control equipment; one shale shaker locked out for repair led to over-reliance on centrifuges (stripping out weighting agents)
    3. Insufficient hydraulics for hole cleaning
    4. Long open-hole section prior to penetrating 7000' horizon (+/-1200m open hole drilled after previous casing shoe)
    5. Driller error
- COPL's planned mitigations:
  1. Contracting strategy
     - Ensure drilling rig and associated equipment correctly sized for well design
     - Thorough technical review of proposed services programs prior to execution (i.e., ensure drilling fluids appropriate etc.)
  2. Optimized casing seat selection during well design process

OPL 226 – NW Plunge of Anyala Anticline Potential

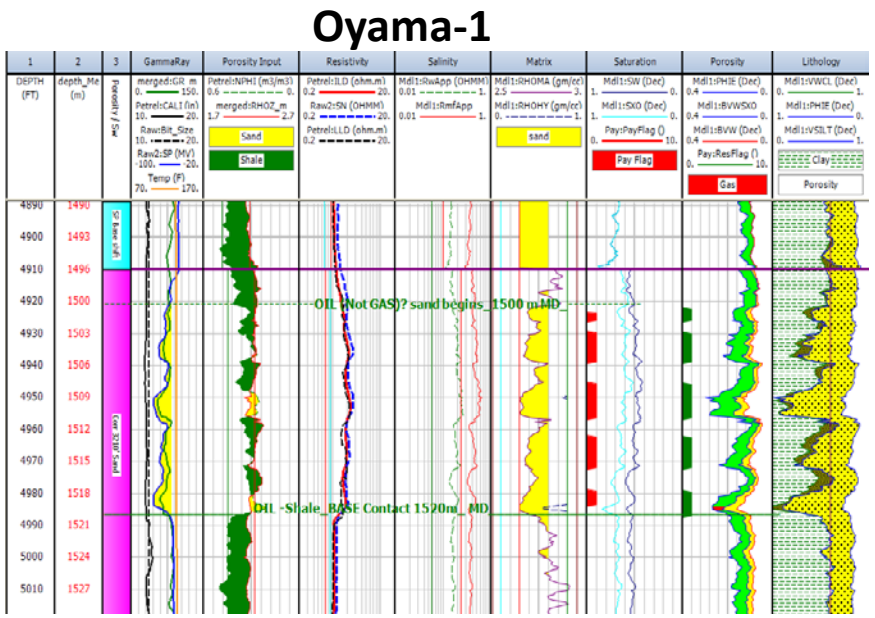


- **Oil Pay of 8.2 m (27 ft) with average porosity of 24% and average Sw of less than 50% in 6100' Sand**
- **Accurate Porosity derived from Density log rather than Sonic log data**
- **Note Filtercake intervals suggesting best permeability**
- **SP curves more reliable to map sands then GR curves**
- **Dubagbene-1 well located within closure of northwest plunge of Anyala anticline**
- **Additional well locations are suggested within this closed area**

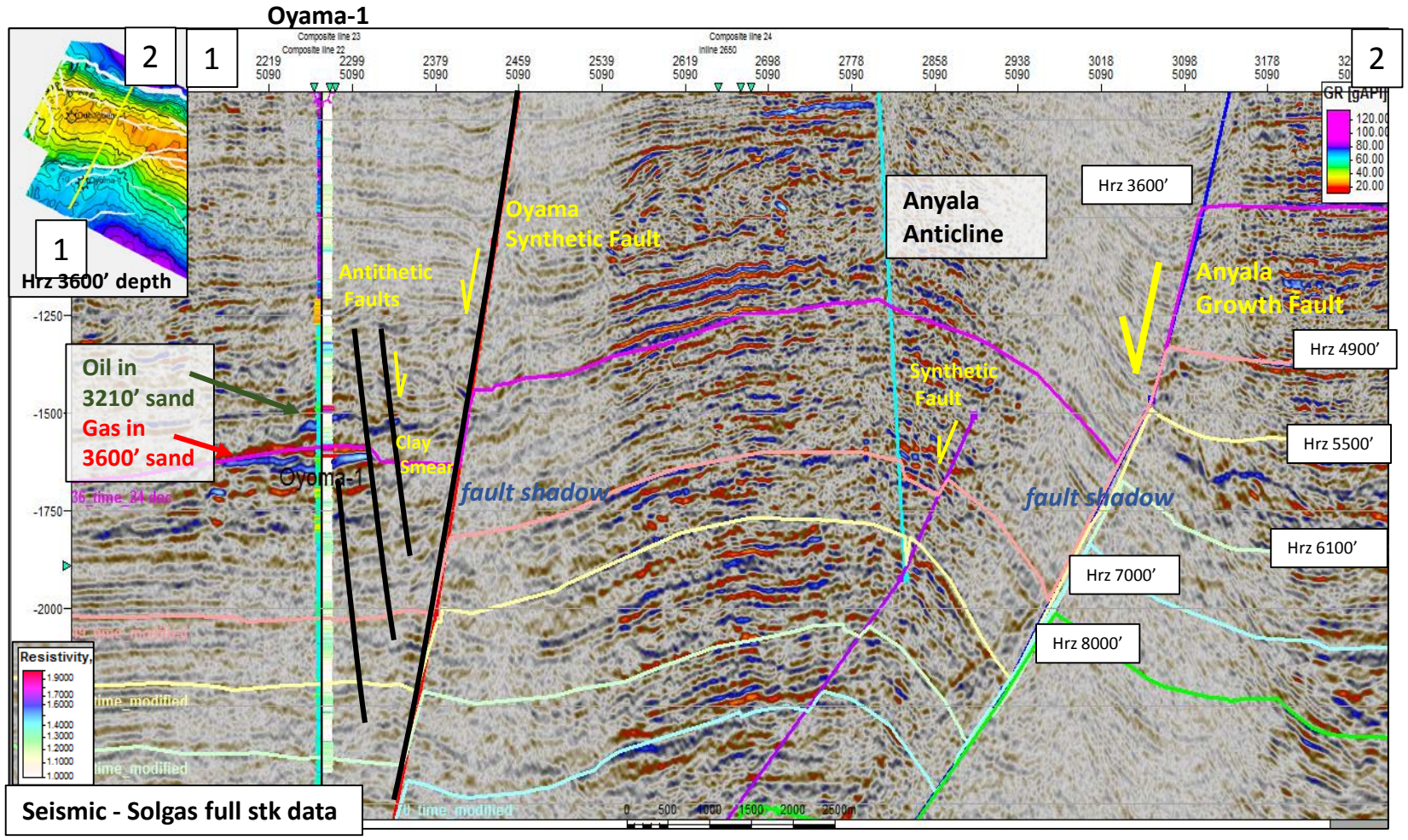




OPL 226 – NW Plunge of Anyala Anticline Potential



- Oil Pay of 11.4 m (37.5 ft) with average porosity of 20% and average Sw of 48% in the 3210’ Sand
- New log analysis illustrates that initial density-neutron “cross-over” gas effect is based on erroneous density curve (oil zone not gas zone)
- Additionally, Gas Pay of 24.8 m (81.5 ft) with average porosity of 27% and average Sw of 35% in the 3600’ Sand
- Oyama-1 well located within trap along faulted south limb of the Anyala anticline – amplitude anomalies at 3600’ marker (and above) are apparent on the Solgas full stack 3D data acquired in 2000
- Additional well locations are suggested within this trap area

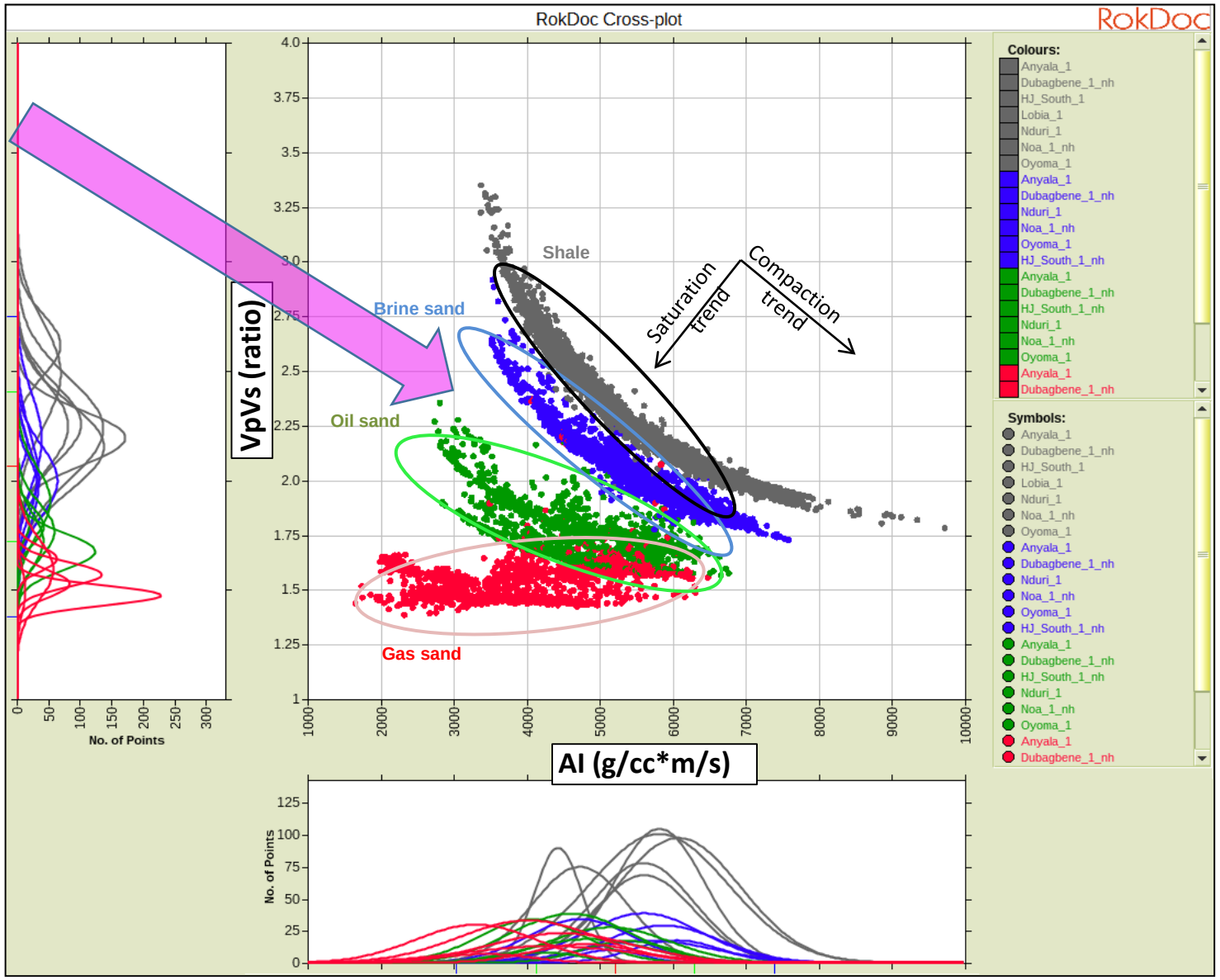


- The northwest portion of the Anyala anticline is evident in this crossline with amplitude anomalies that are apparent for many hydrocarbon-bearing sands along the crestal portion of the anticline
- Oyama-1 well located within trap along the faulted south limb of the Anyala anticline – amplitude anomalies at 3600’ marker (and above) are apparent on the Solgas full stack 3D data acquired in 2000
- Oyama-1 is another discovery in the Noa trend along the south limb of the Anyala anticline

OPL 226 – Generalized Rock Physics – Hydrocarbons Detectable

The hydrocarbon sands show a good separation from the brine sand / shale trend, particularly at high sand porosities.

This rock physics relationship allows seismic data to highlight the presence of hydrocarbon sands in OPL 226.



KEY:
Blue – Brine data points in clean sand
Red – Gas data points in clean sand
Oil – Oil data points in clean sand
Grey – Shale data points

All available sand data is included for the modelled fluid end-member cases (100% brine in blue, 80% oil in green and 90% gas in red). Shale is shown in grey.

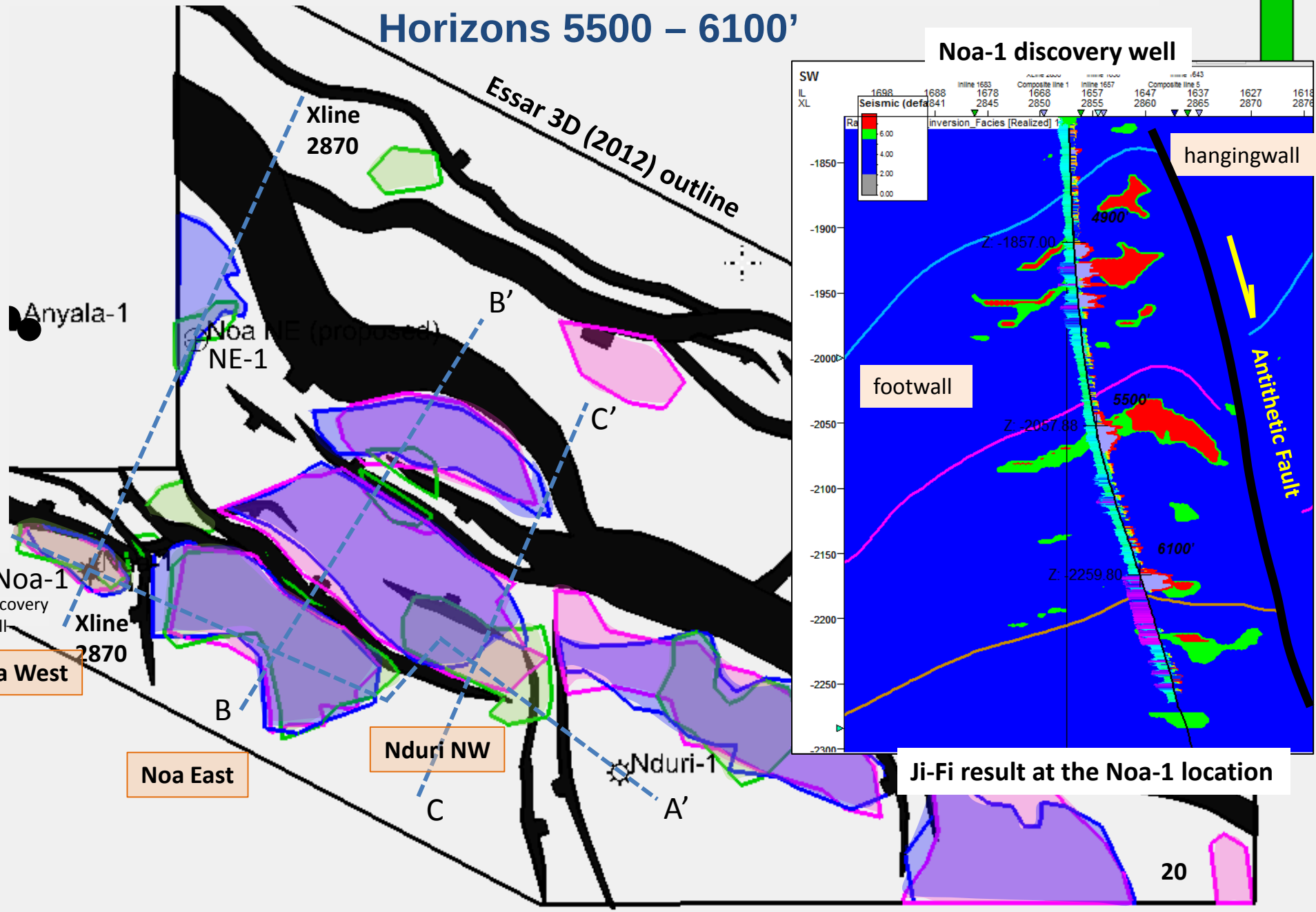
From the synthetic gathers, brine sands and shales have a similar acoustic/elastic response as the shales.

The range of Acoustic Impedance (AI) and VpVs for shales and brine sands is similar, with the separation being a function of sand porosity and shale burial depth.

There is a significant drop in VpVs ratio when hydrocarbons saturate the sands, with the largest drop being for gas saturations.

OPL 226 – Noa West Lobe, Noa East Lobe, Nduri NW
Horizons 5500 – 6100’

- Lambda rho – an indicator of compressibility where a sand with oil or gas is more compressible than one with a brine sand. This technique is used on simple inversions of reflectivity datasets
- Extended Elastic Impedance (EEI) at a chi angle of 23 degrees – at the optimal rotation a potential hydrocarbon accumulation lights up relative to brine sand. These data have been inverted
- Ji-Fi (Joint Impedance and Facies Inversion) – a proprietary Ikonscience inversion scheme which uses a number of geological constraints that allows a more reliable and accurate AVO computation which outputs a facies interpretation



Distribution of HC indicators over OPL 226

Key

Blue	Extended Elastic Impedance
Green	Ji - Fi (oil)
Pink	Lambda rho

OPL 226 – AVO Geobodies

Showing Fault Trends and Oil Geobodies

Horizons 6100 – 7000'

- Lambda rho – an indicator of compressibility where a sand with oil or gas is more compressible than one with a brine sand. This technique is used on simple inversions of reflectivity datasets
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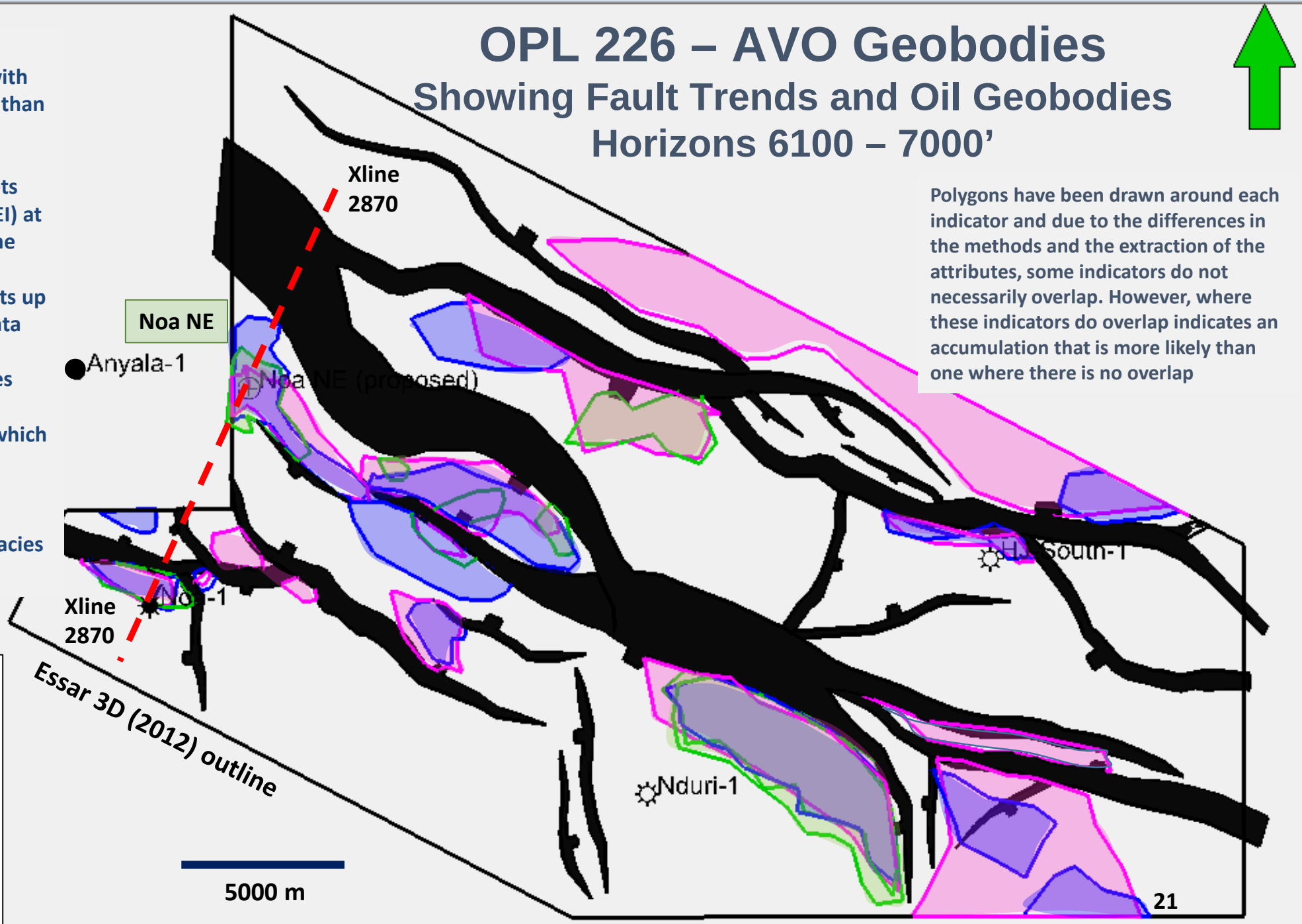


Polygons have been drawn around each indicator and due to the differences in the methods and the extraction of the attributes, some indicators do not necessarily overlap. However, where these indicators do overlap indicates an accumulation that is more likely than one where there is no overlap

Distribution of hc indicators over OPL 226

Key

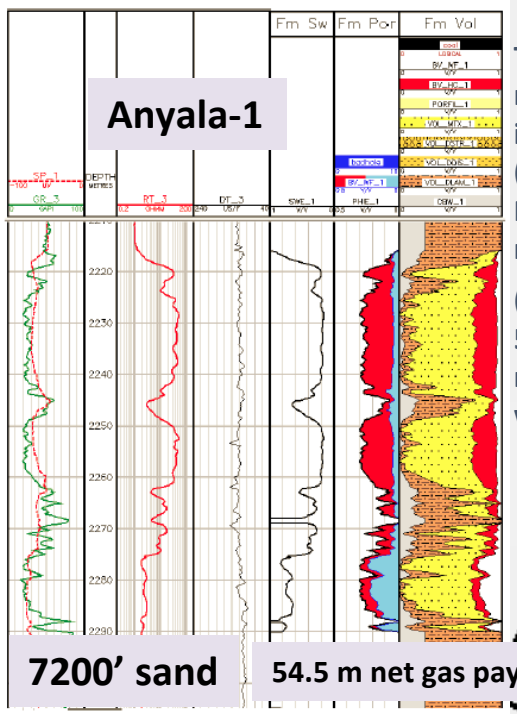
Blue	Extended Elastic Impedance
Green	Ji - Fi (oil)
Pink	Lambda rho

OPL 226 – AVO Geobodies

Showing Fault Trends and Oil Geobodies

Horizons 7000 – 8000’

(Big Kahuna Complex)



The 7200’ sand is the most prospective sand in the Far Northern (“Big Kahuna”) Prospect from AVO maps

(Note that there was 54.5 m (180 feet) of net pay in the Anyala-1 well in the 7200’ sand)

Clay smear of porous sands along fault

Clay smear of porous sands along growth fault

Noa NE (proposed)

Noa Far Northern

HJ South-1

HJ South

Nduri-1

Essar 3D (2012) outline

5000 m

Hrz 7000 to 8000

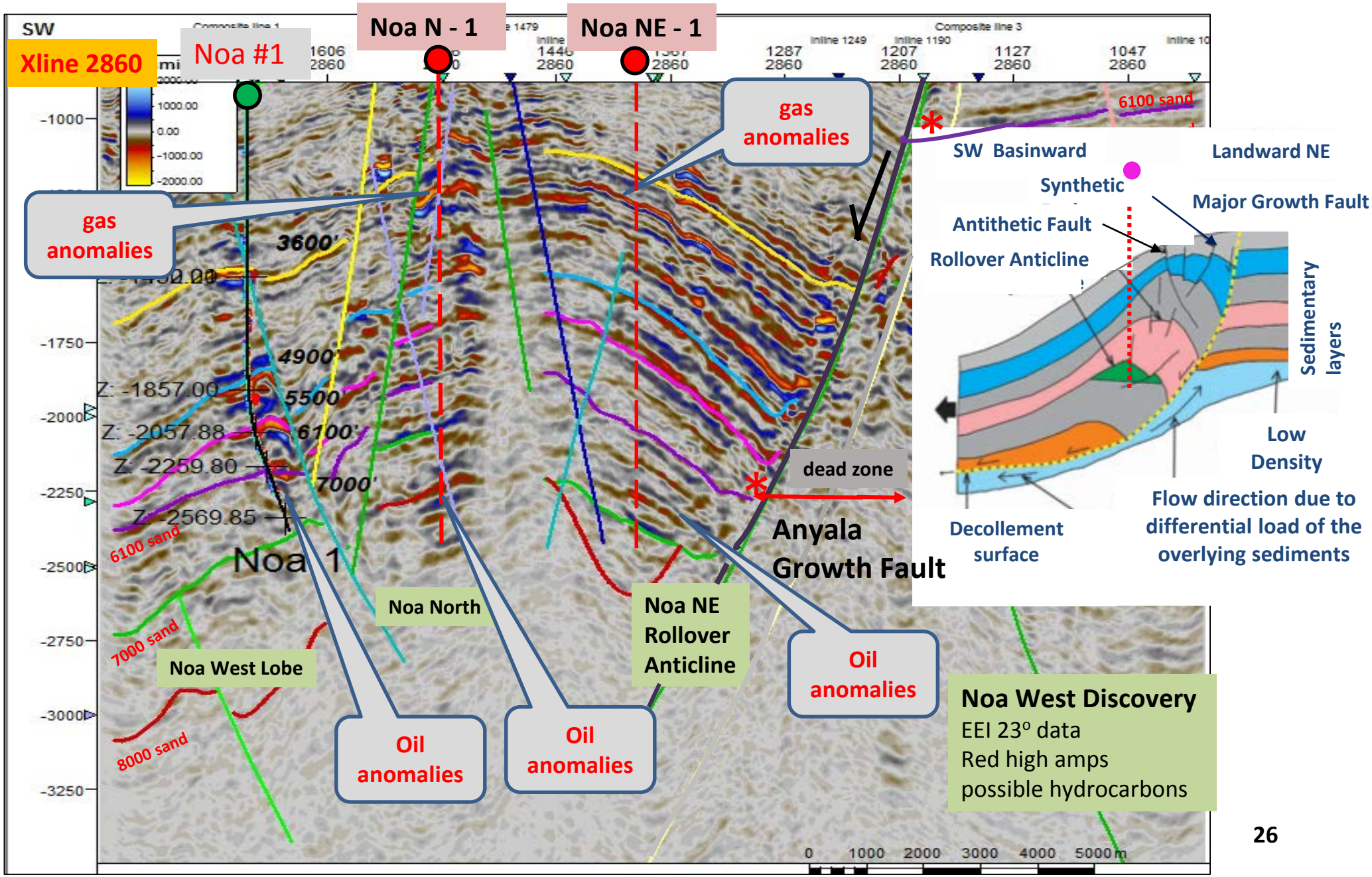
Distribution of hc indicators over OPL 226

Key

Blue	Extended Elastic Impedance
Green	Ji-Fi (oil)
Pink	Lambda rho

OPL 226 – Noa-1 Discovery – Noa NE Rollover Anticline

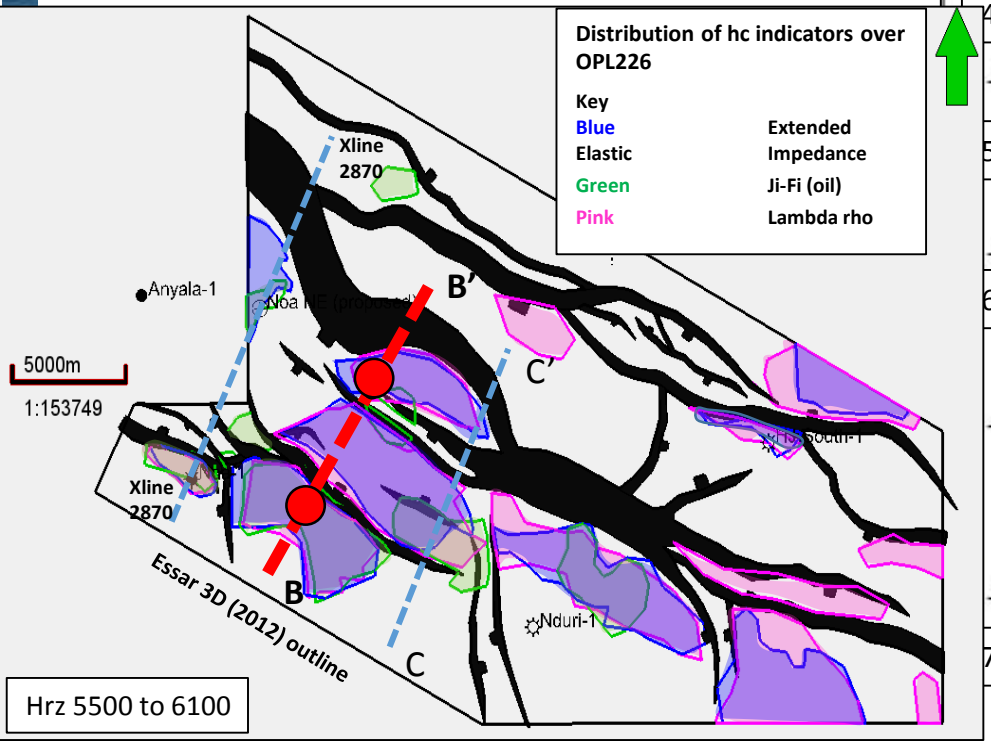
- Extended Elastic Impedance (EEI 23°) inversion data
- High red negative amplitudes indicative of hydrocarbons
- Such high amplitude terminations suggest capable trapping of hydrocarbons due to clay smear along the fault gouge
- There is very little rotation of beds in the footwall with an antithetic normal fault. A footwall trap can be mapped along this arcuate trend

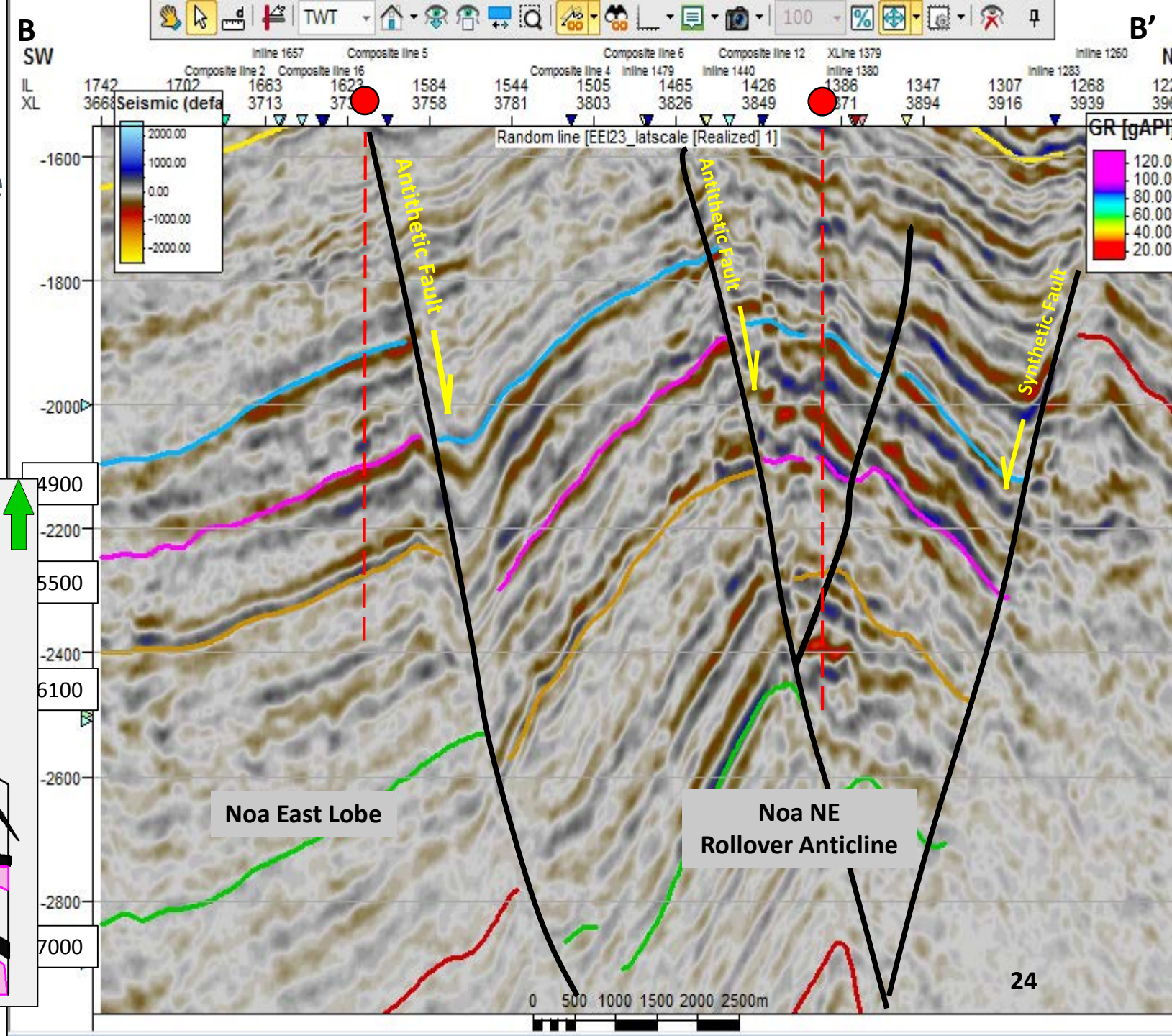


OPL 226 – Noa Complex
Noa East Lobe
Noa NE Rollover Anticline

EEI 23° - Profile B to B'

High red amplitudes indicative of hydrocarbons





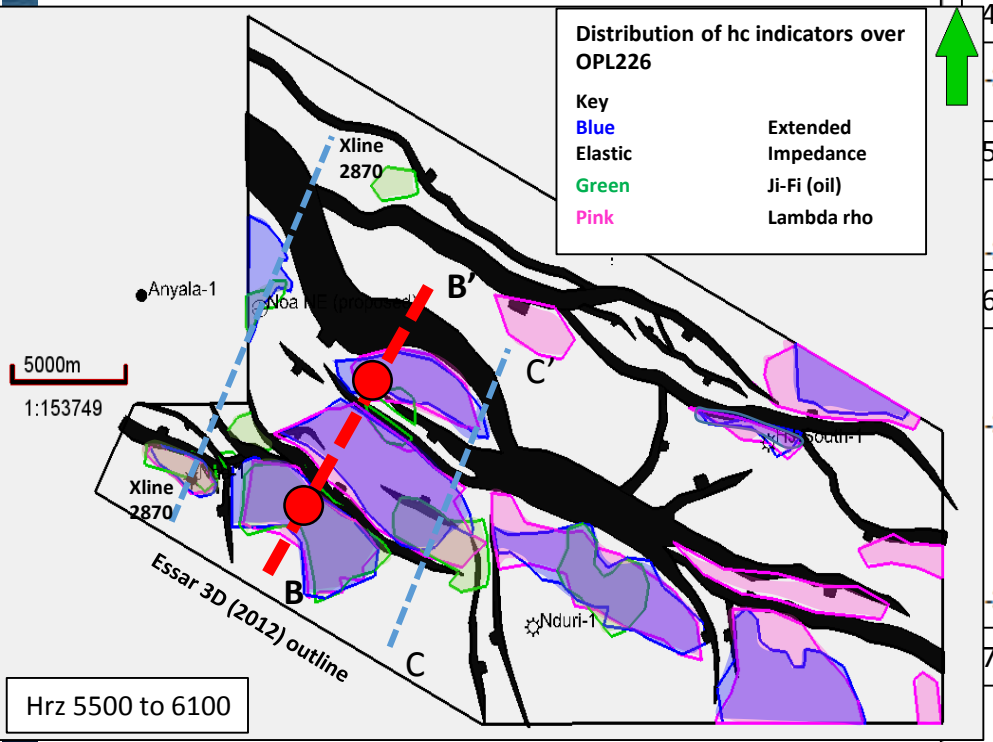
OPL 226 – Noa Complex
Noa East Lobe
Noa NE Rollover Anticline

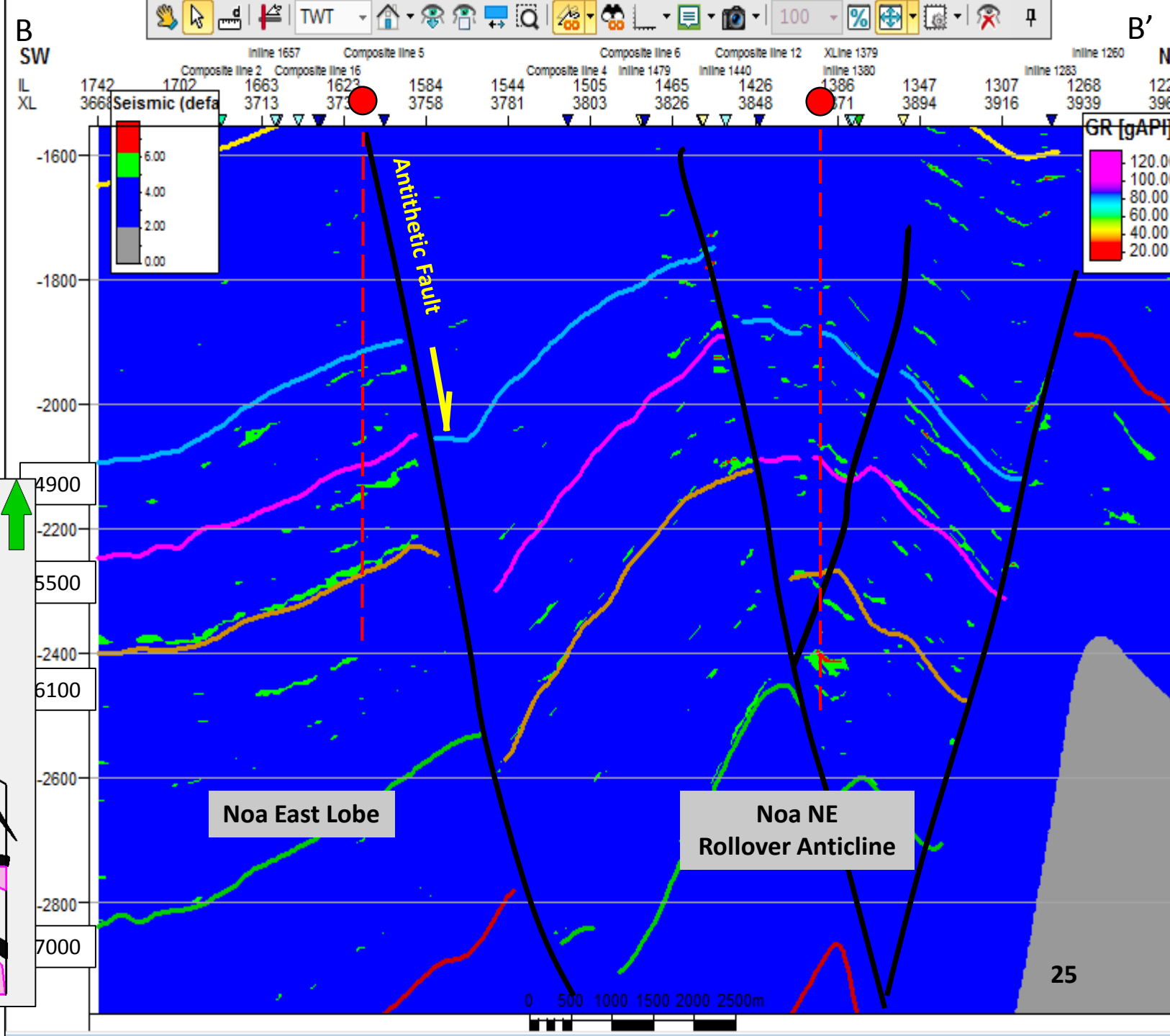
Ji-Fi Facies - Profile B to B’

Red gas

Green oil

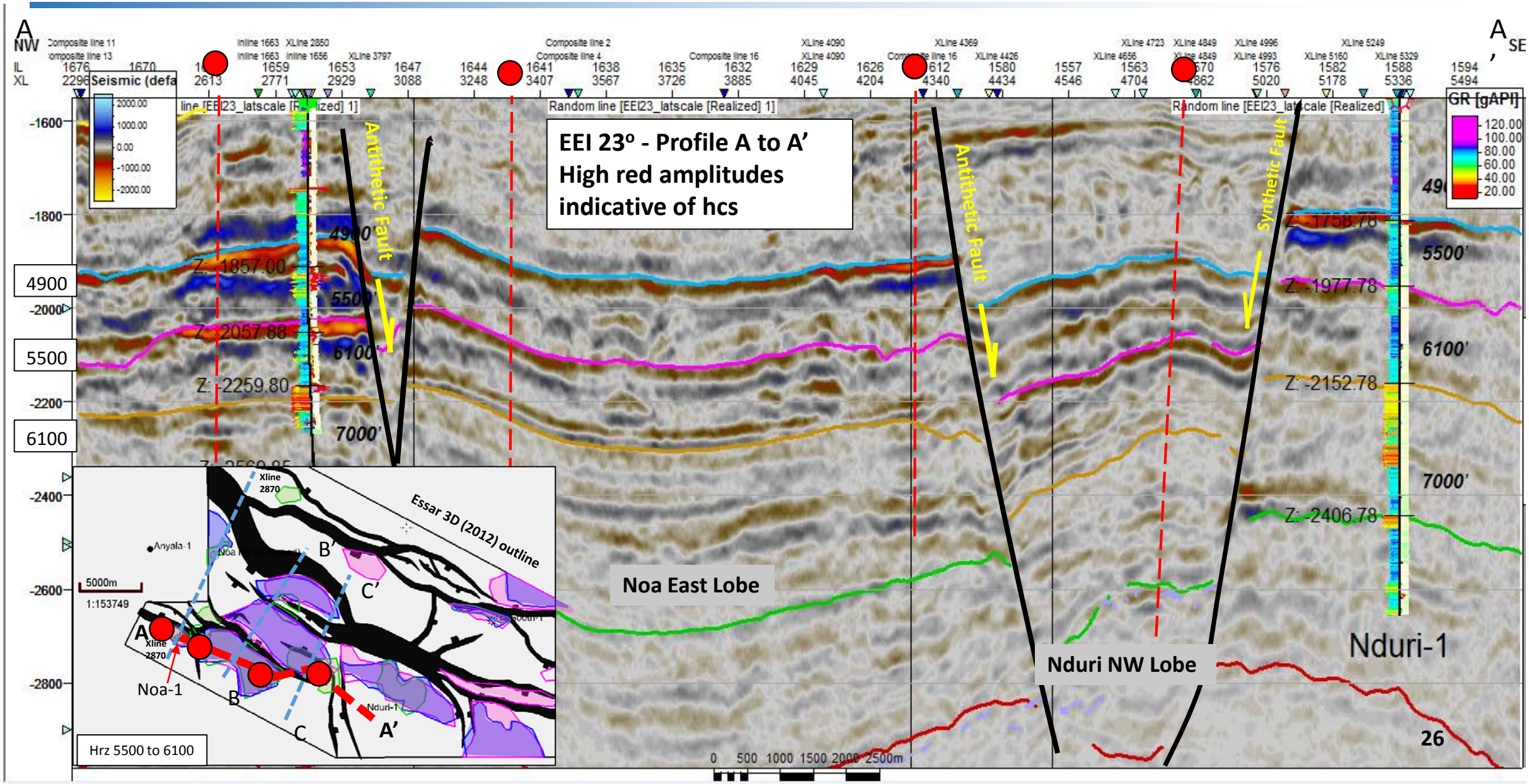
Blue shale/brine sand





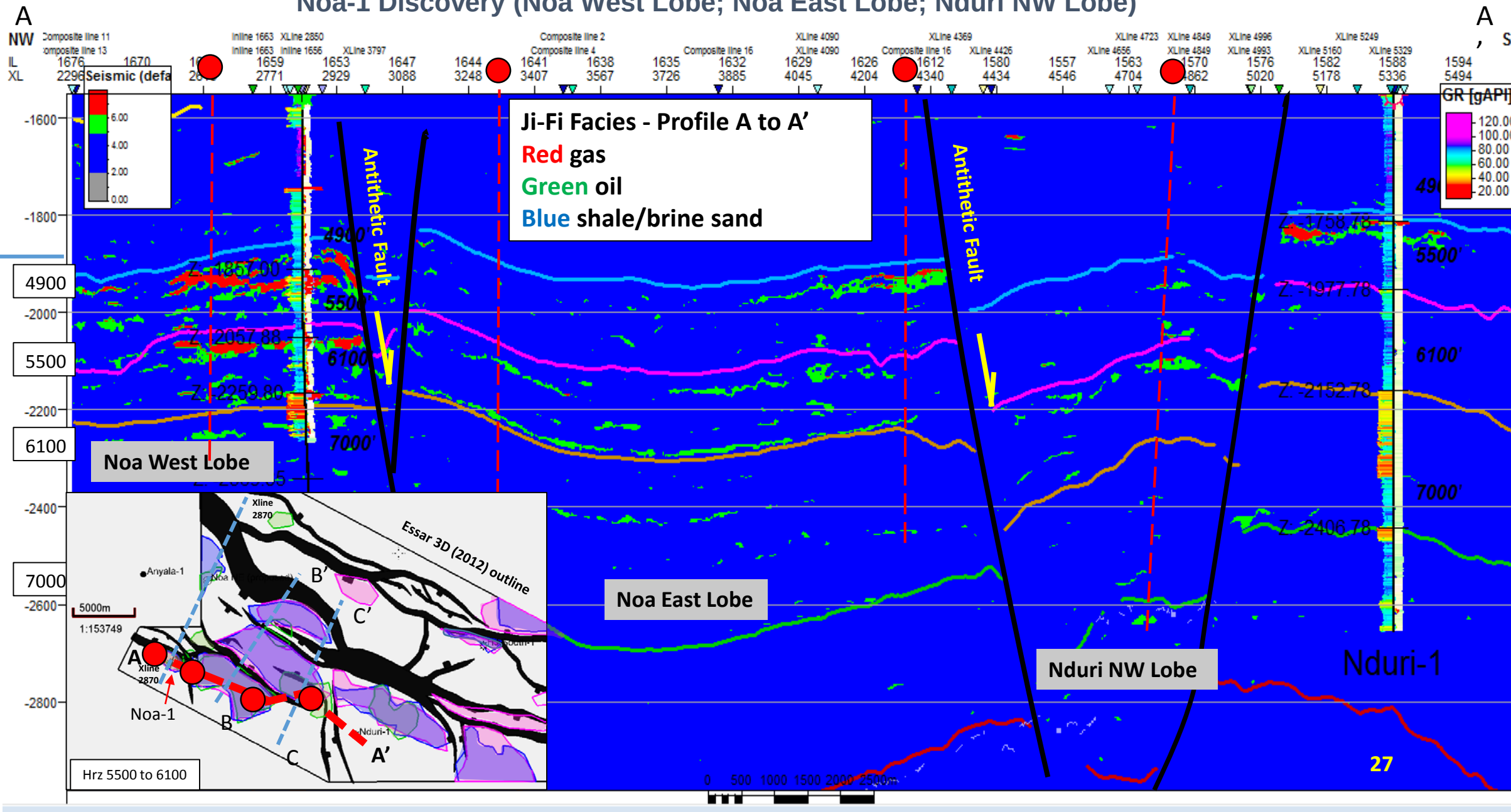
OPL 226 – Noa Complex

Noa-1 Discovery (Noa West Lobe; Noa East Lobe; Nduri NW Lobe)



OPL 226 – Noa Complex

Noa-1 Discovery (Noa West Lobe; Noa East Lobe; Nduri NW Lobe)



Exploration Upside

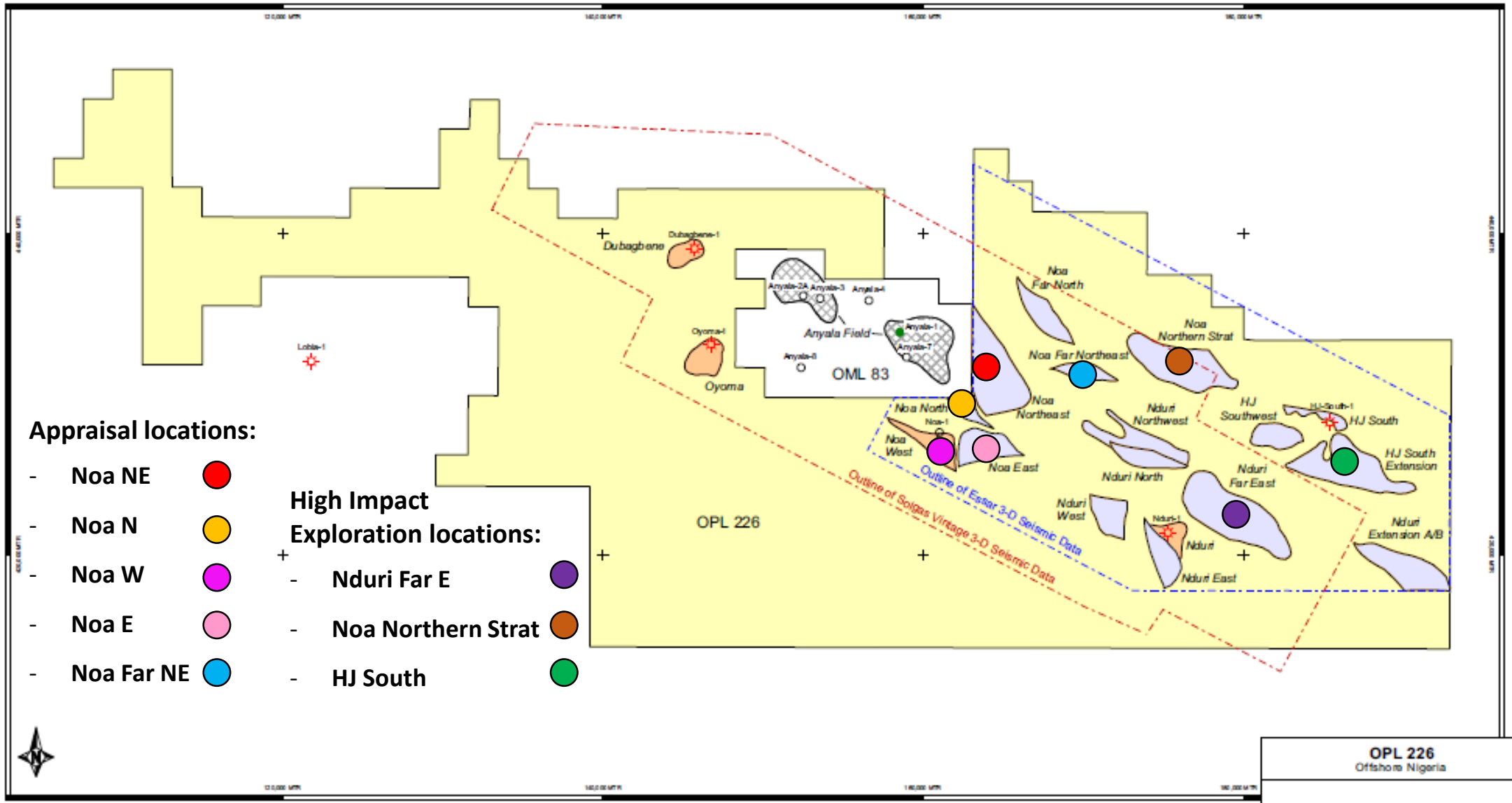
- Nduri Far East Prospect – Growth Fault-related rollover anticline
- Noa Northern “Big Kahuna” Prospect – including HJ South and Noa Northern

At the request of COPL, Netherland Sewell Associates Inc. (NSAI) has prepared an independent report in accordance with Canadian National Instrument 51-101 evaluating the Contingent and Prospective Resources attributed to OPL 226, as at 1 March, 2016. NSAI did not use ShoreCan seismic inversion products in their analysis and estimates of independent reserves/resources evaluation. In this report, the Gross Unrisked Prospective Oil Resources (recoverable) for these three prospective exploration areas are estimated to be:

Prospects	Low Estimate	Best Estimate	High Estimate
Nduri Far East	10.9 million BO	19.9 million BO	34.9 million BO
Noa Northern	24.6 million BO	43.9 million BO	76.6 million BO
HJ South	36.8 million BO	61.3 million BO	98.9 million BO
Totals	**72.3 million BO**	**125.1 million BO**	**210.4 million BO**

NETHERLAND, SEWELL & ASSOCIATES, INC.

Netherland Sewell Associates Inc. Discoveries and Prospects



Appraisal locations:

- Noa NE
- Noa N
- Noa W
- Noa E
- Noa Far NE

High Impact Exploration locations:

- Nduri Far E
- Noa Northern Strat
- HJ South

Discovery

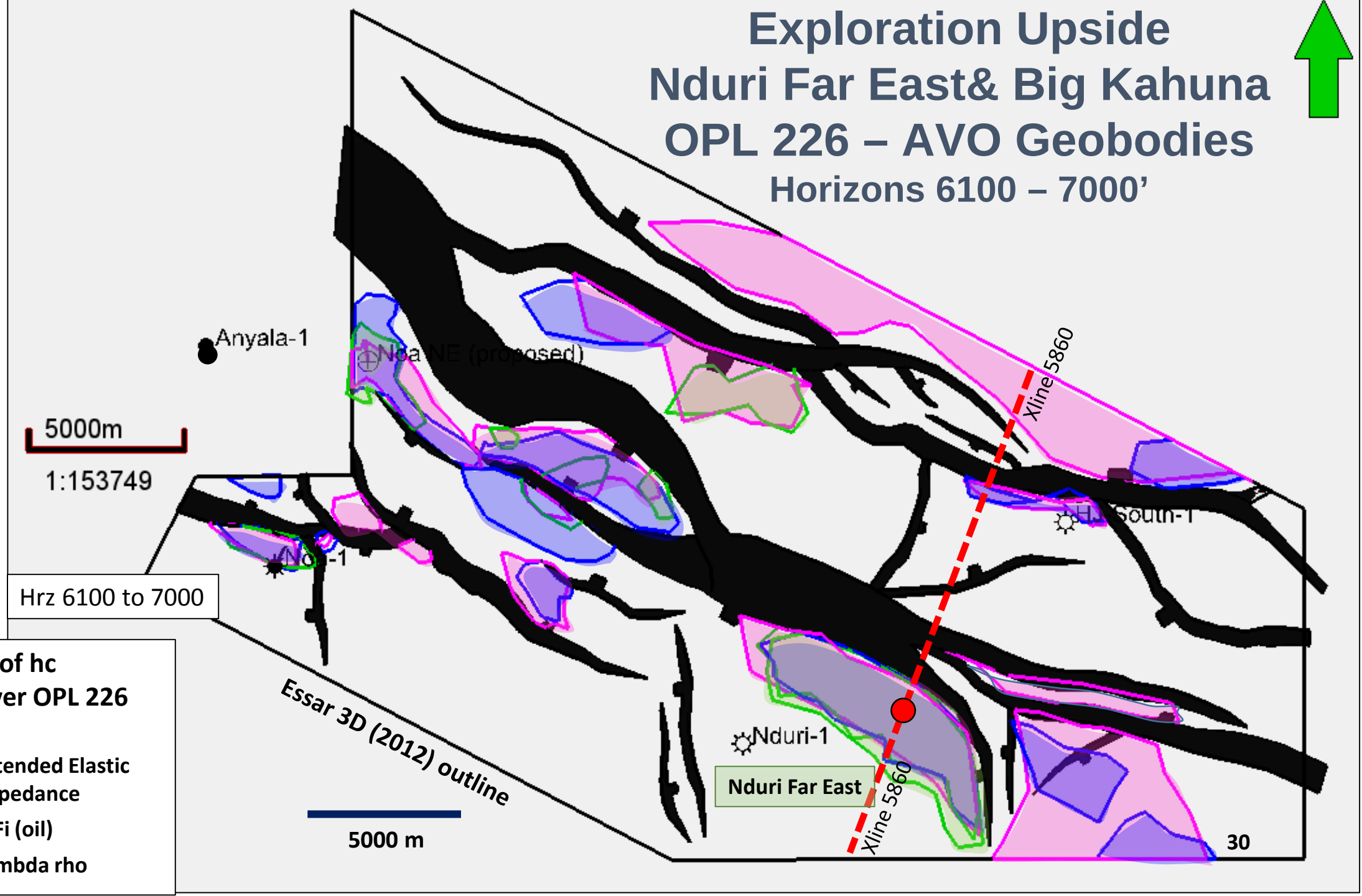
Prospect

OPL 226
Offshore Nigeria

Location Map
Discoveries and Prospects

SCALE IN METERS
0 2500 5000 10000

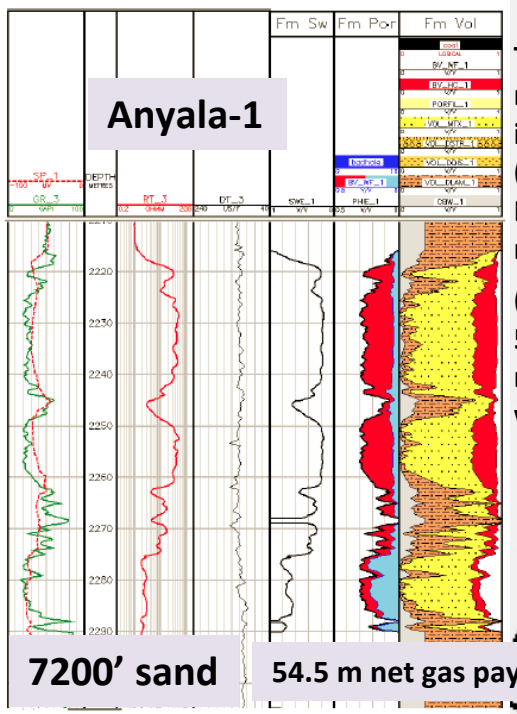
Exploration Upside
Nduri Far East& Big Kahuna
OPL 226 – AVO Geobodies
Horizons 6100 – 7000’



Distribution of hc indicators over OPL 226

Key	
Blue	**Extended Elastic Impedance**
Green	**Ji-Fi (oil)**
Pink	**Lambda rho**

OPL 226 – AVO Geobodies
Showing Fault Trends and Oil Geobodies
Horizons 7000 – 8000'
(Big Kahuna Complex)



The 7200' sand is the most prospective sand in the Far Northern ("Big Kahuna") Prospect from AVO maps

(Note that there was 54.5 m (180 feet) of net pay in the Anyala-1 well in the 7200' sand)

Clay smear of porous sands along fault

Clay smear of porous sands along growth fault

Noa NE (proposed)

Noa Far Northern

HJ South-1

HJ South

Nduri-1

Essar 3D (2012) outline

5000 m

Hrz 7000 to 8000

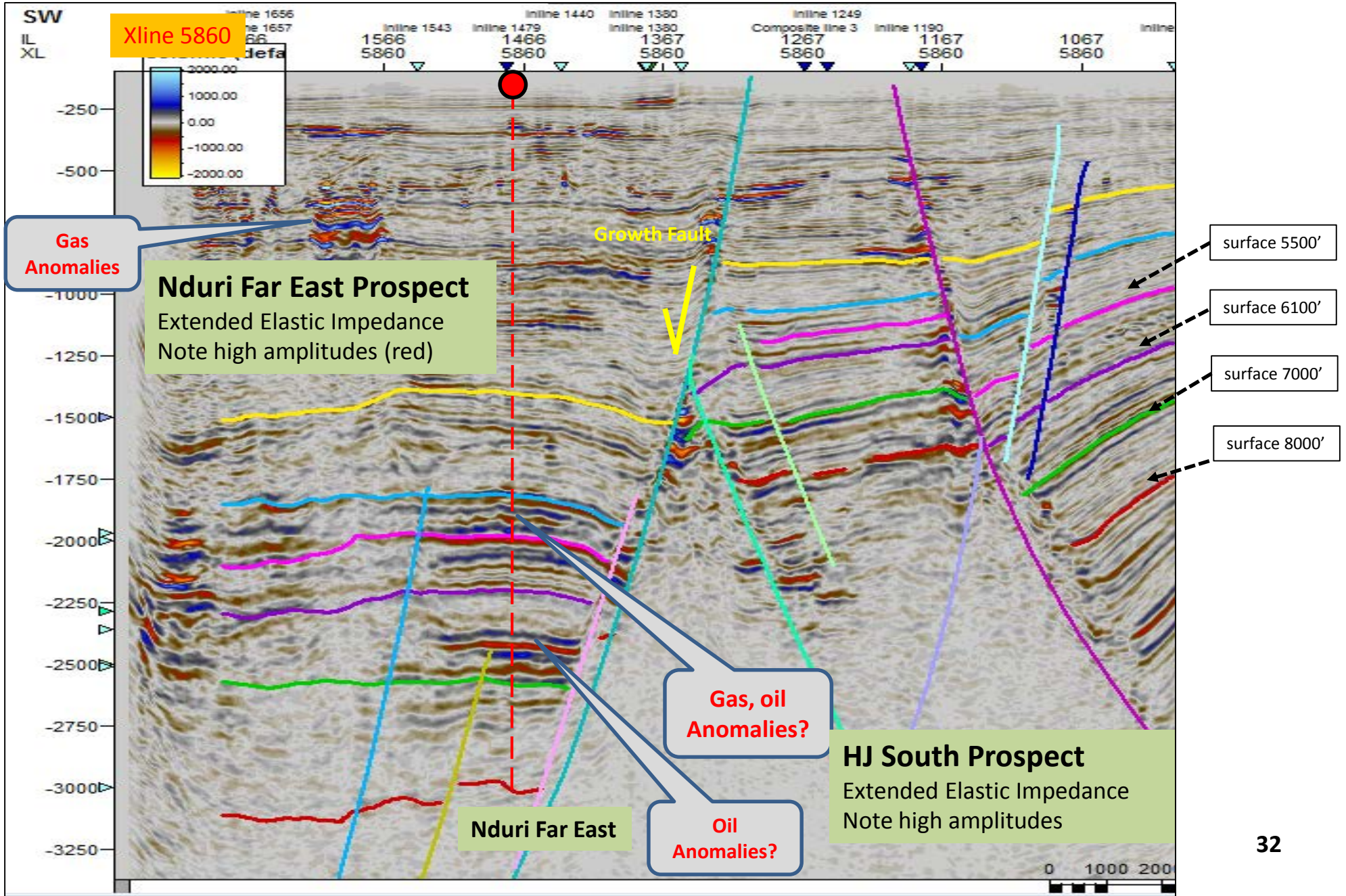
Distribution of hc indicators over OPL 226

Key	
Blue	Extended Elastic Impedance
Green	Ji-Fi (oil)
Pink	Lambda rho

OPL 226 –Nduri Far East Prospect (& HJ South)

EEI 23° data

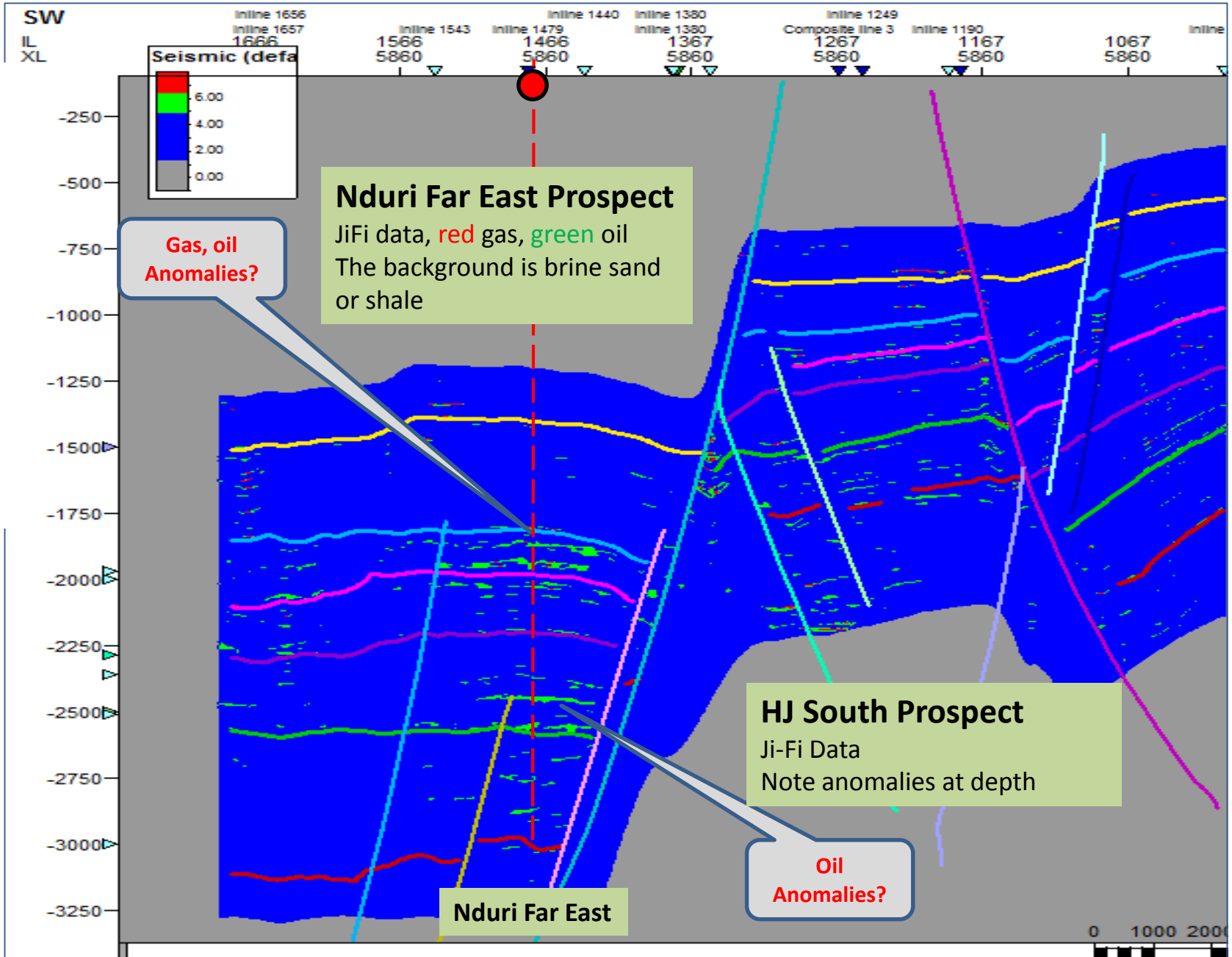
High red negative amplitudes are indicative of hydrocarbons



OPL 226 –Nduri Far East Prospect (& HJ South)

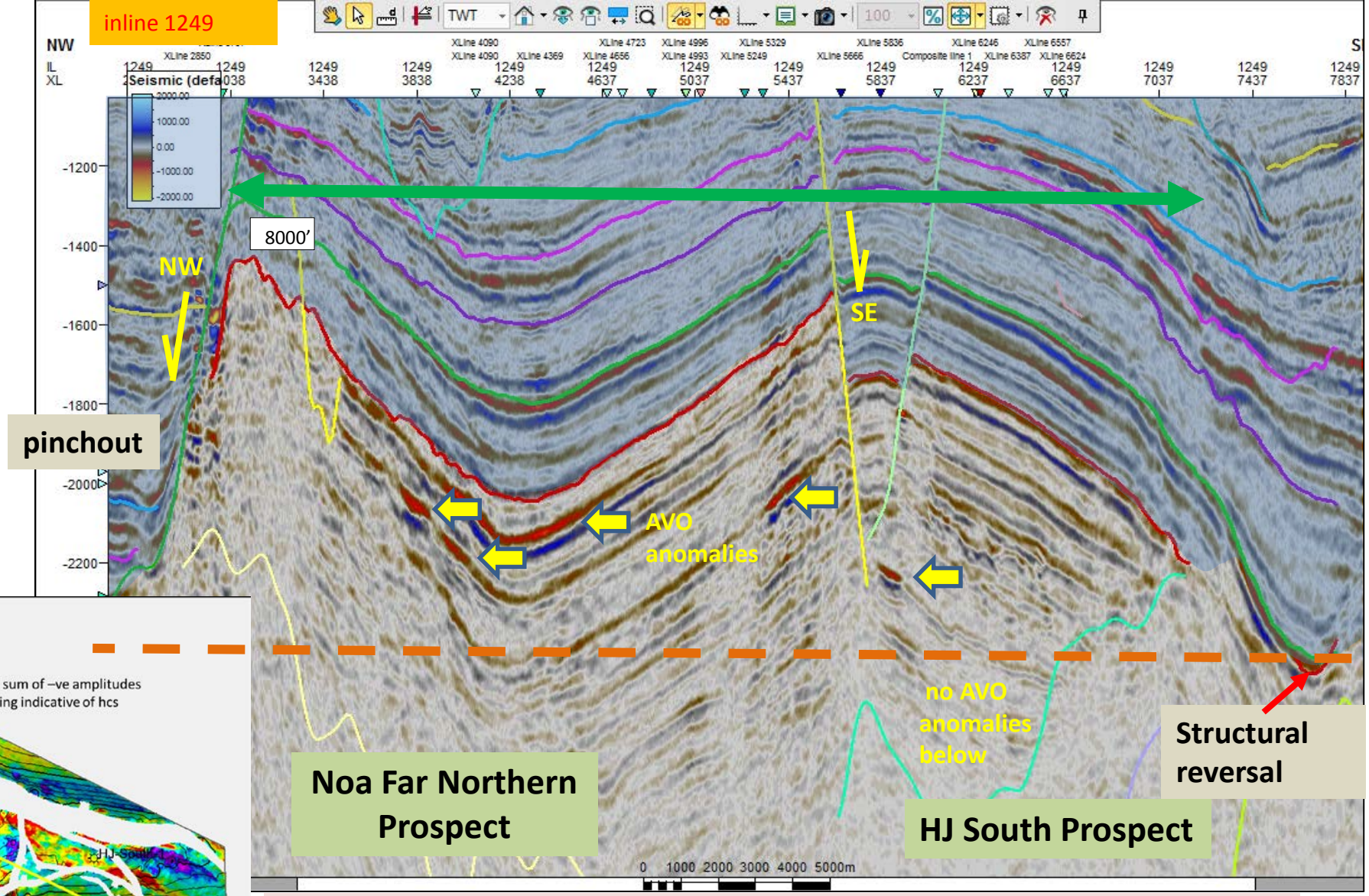
Joint Impedance and Facies inversion (Ji-Fi)

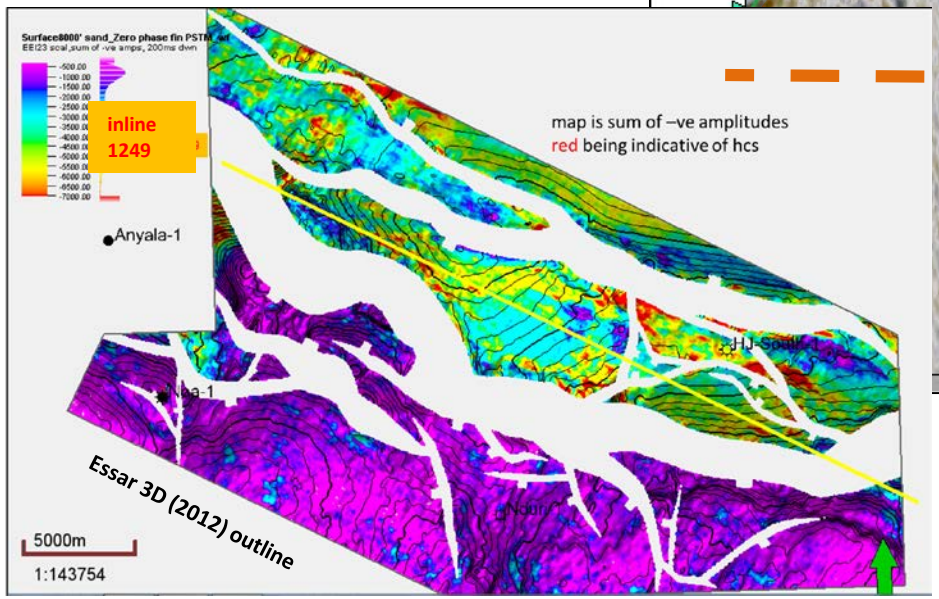
An inversion scheme has been carried out to highlight hydrocarbon accumulations and to distinguish between gas and oil



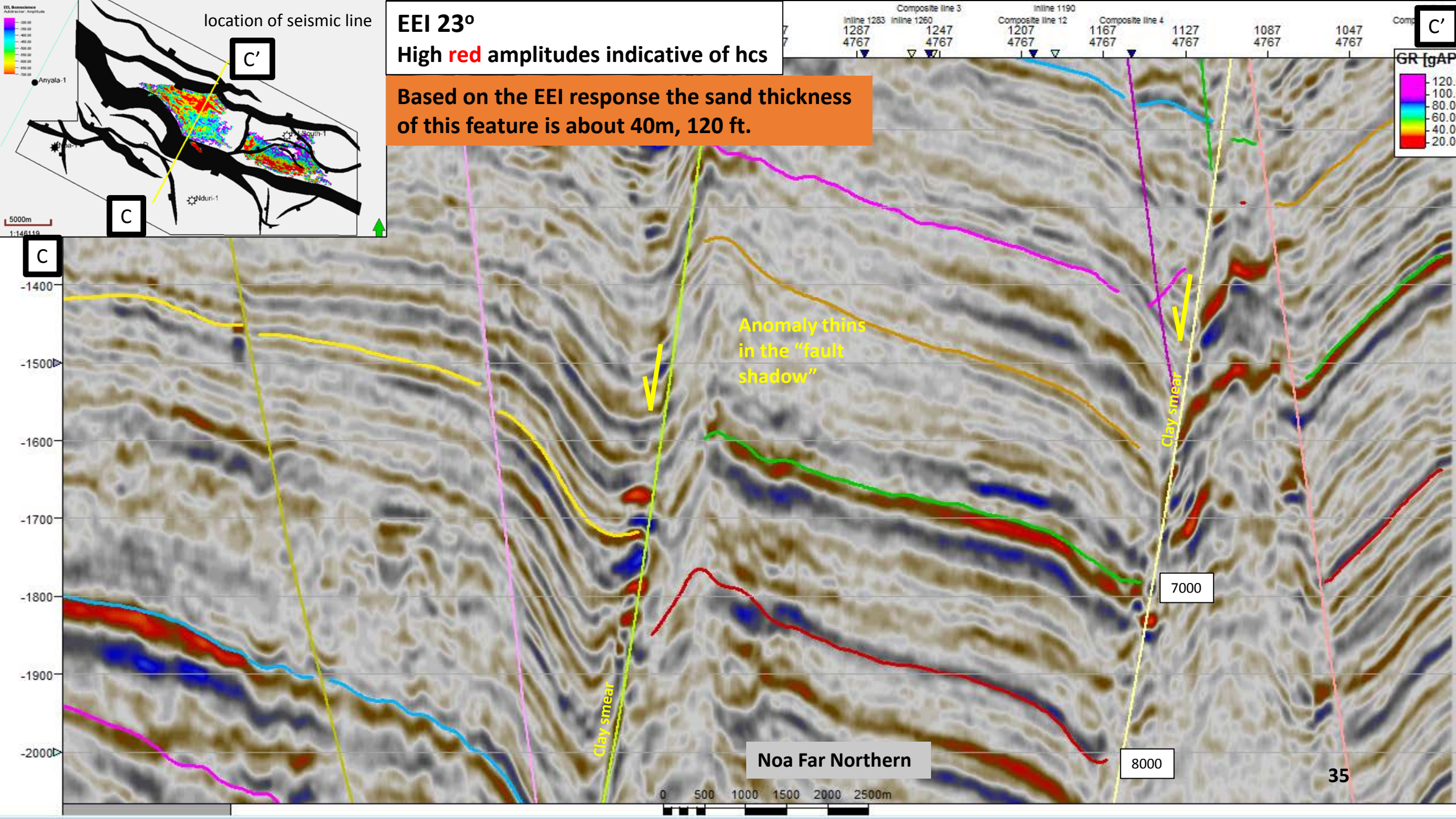
OPL 226 – Noa Far Northern & HJ South Prospects of "Big Kahuna Complex"

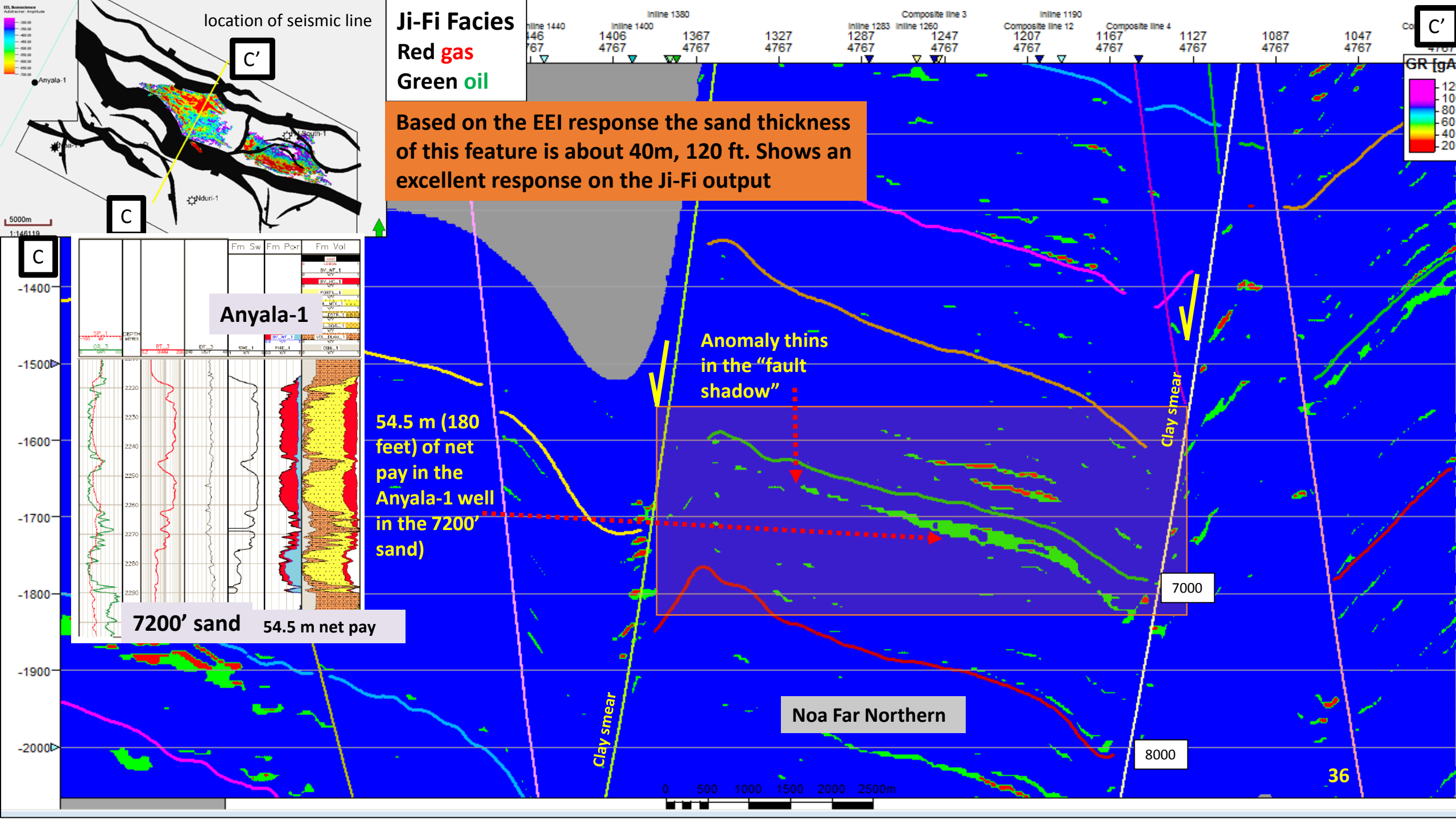
High red negative amplitudes are indicative of hydrocarbons





- Need strike-oriented trap to contain oil between these duplex, listric growth faults
- In the strike direction, faulted (NW) pinchout at NW probably creates trap, however, there is also a significant fault (SE) to the SE that may provide trap assistance along with structural reversal to the SE
- Prospective Agbada Formation sands are 7000', 7200', 8000' sand members


location of seismic line
C'
C
Anyala-1
Nduri-1
5000m
1:146119
EEI 23º
High red amplitudes indicative of hcs
Based on the EEI response the sand thickness of this feature is about 40m, 120 ft.
Composite line 3
Inline 1283
Inline 1260
Inline 1190
Composite line 12
Composite line 4
1287
1247
1207
1167
1127
1087
1047
4767
GR [gAP
120.
100.
80.0
60.0
40.0
20.0
-1400
-1500
-1600
-1700
-1800
-1900
-2000
Anomaly thins in the "fault shadow"
clay smear
clay smear
7000
8000
Noa Far Northern
0
500
1000
1500
2000
2500m
35


location of seismic line
C'
C
Anyala-1
Nduri-1
5000m
Ji-Fi Facies
Red gas
Green oil
Based on the EEI response the sand thickness of this feature is about 40m, 120 ft. Shows an excellent response on the Ji-Fi output
Anyala-1
7200' sand
54.5 m net pay
54.5 m (180 feet) of net pay in the Anyala-1 well in the 7200' sand)
Anomaly thins in the "fault shadow"
Clay smear
Clay smear
Noa Far Northern
7000
8000
36
GR [gA
0 500 1000 1500 2000 2500m