



North Sea  
Transition  
Authority

# 33<sup>rd</sup> Petroleum Round Datapack

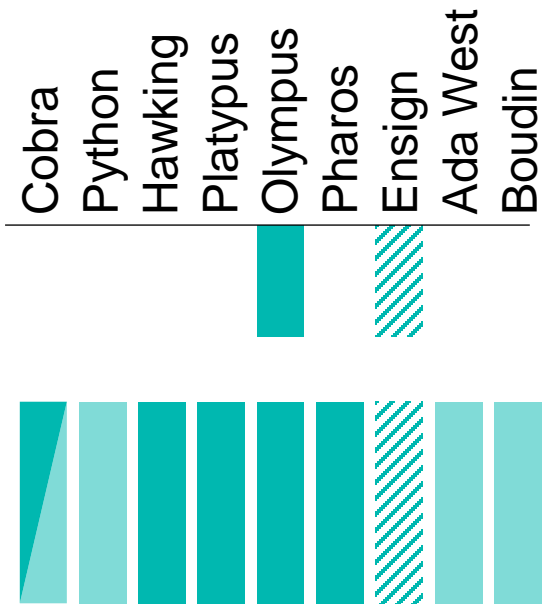
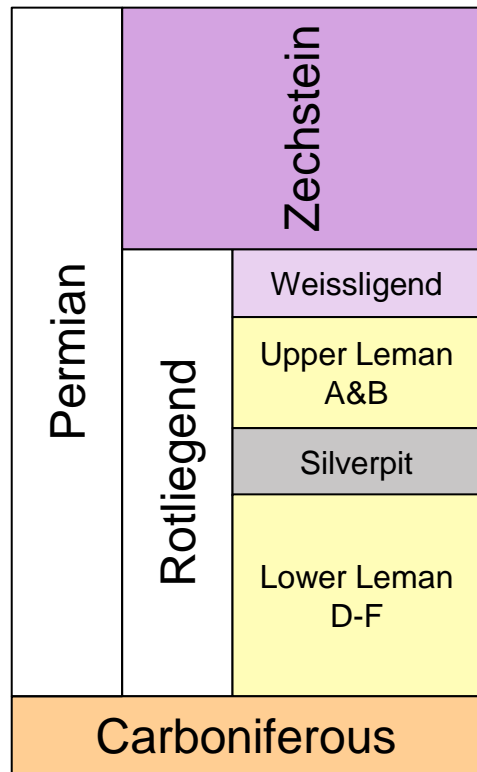
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Southern North Sea: Greater West Sole Area, Quad 48

Cobra, Hawking, Python, Platypus, Olympus, Pharos, Ada, Boudin, Ensign

# West Sole Catchment Area Summary

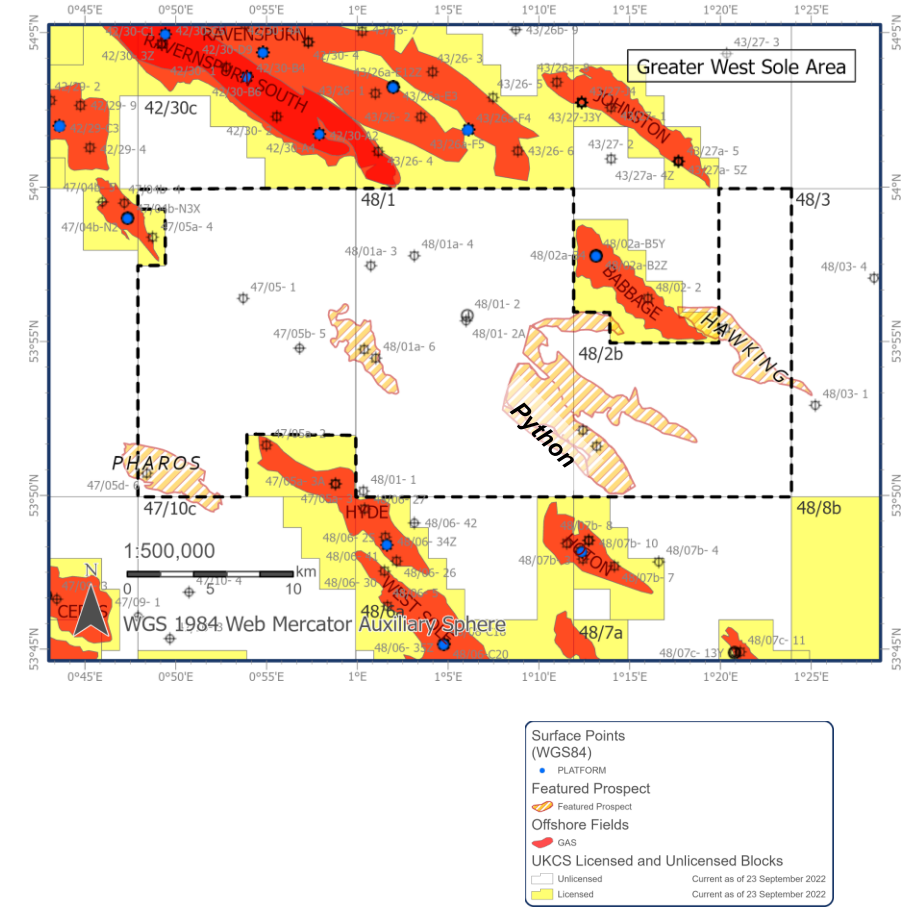


Discovery/Prospect /Redevelopment	Well	Discovered	P50 Recoverable Resources bcf
Cobra (D)	48/2-1, 48/2c-5	1984	20
Cobra (P)	n/a	n/a	125
Python (P)	n/a	n/a	24
Hawking (D)	48/2b-3	1997	50
Platypus (D)	48/1a-5, 48/1a-6	2010	103
Olympus (D)	48/12e-11	2010	23
Pharos (D)	47/5d-6	2013	102
Ada West (P)	n/a	n/a	22
Boudin (P)	n/a	n/a	
Ensign (R)	48/14-2	1986 (2010 sanction)	119

# Cobra & Hawking discoveries, Python prospect

# Cobra-Python-Hawking Cluster 48/1b, 48/2b

- Cobra discovered in 1984 with 48/2-1, tested around 1mmscfd
- Appraised in 2008 with 48/2c-5, tested at 1mmscfd
- Additional undrilled segments present
- Lower Leman Sandstone reservoir
- Python prospect adjacent to Cobra
- Hawking discovery NE of Cobra-Python & adjacent to Babbage

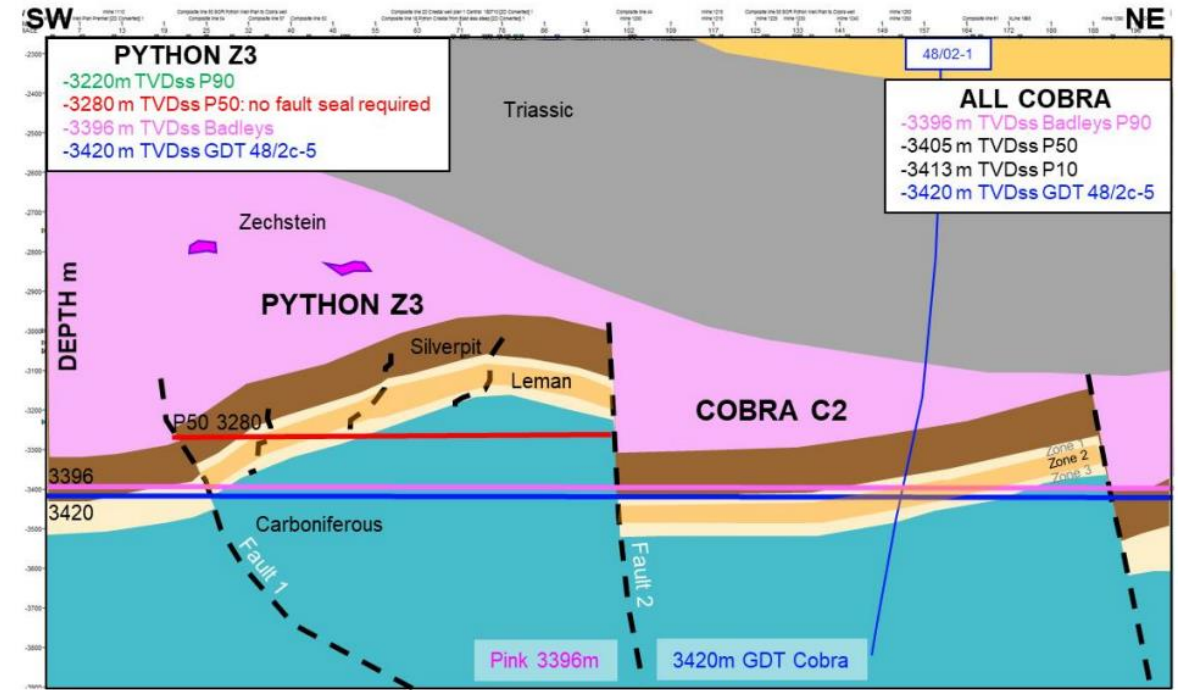
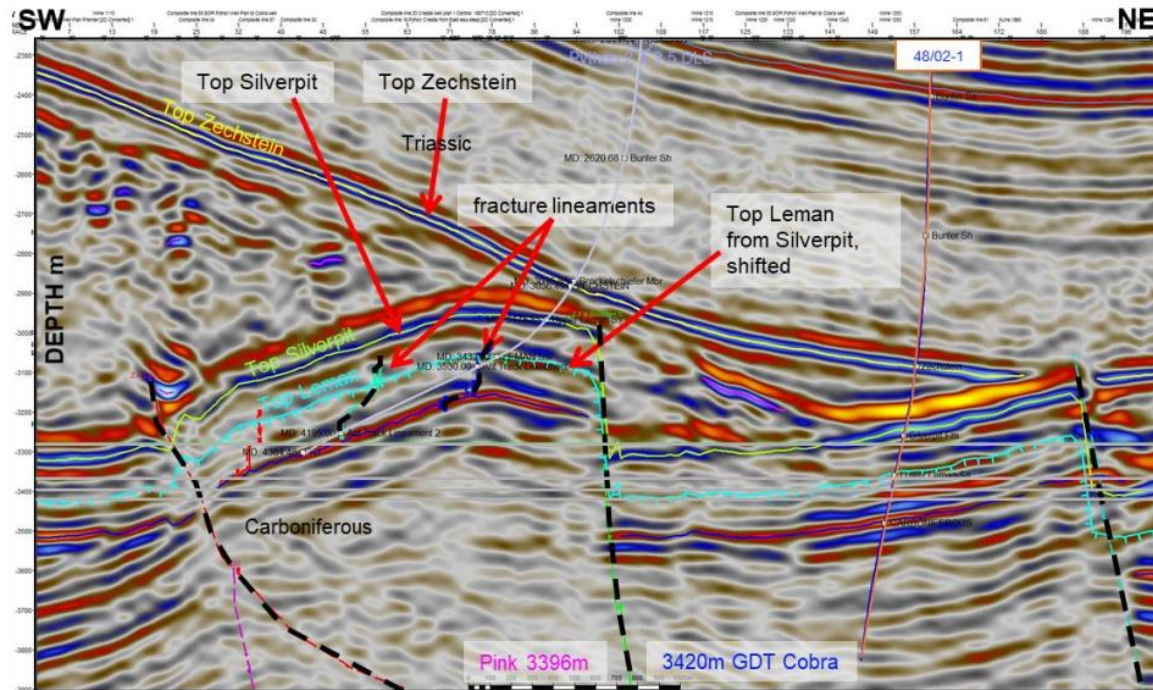


	Unrisked GIIP (bcf)			Unrisked Recoverable resources (bcf)			COS
	P90	P50	P10	P90	P50	P10	
Cobra (discovered fault blocks)	38	60	90	13	20	30	n/a
Cobra (undrilled fault blocks)	213	331	491	50	125	191	73%
Python (undrilled prospect)	37	72	141	15	24	61	73%
Hawking (discovered)	61	97	146	15	50	80	n/a

For more information:  
 Please refer to the [P2212 relinquishment report](#) and the End of Well Reports, available on the [NDR](#)

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# Cobra & Python: Geological Summary



## Play

Source:

Westphalian Coal Measures

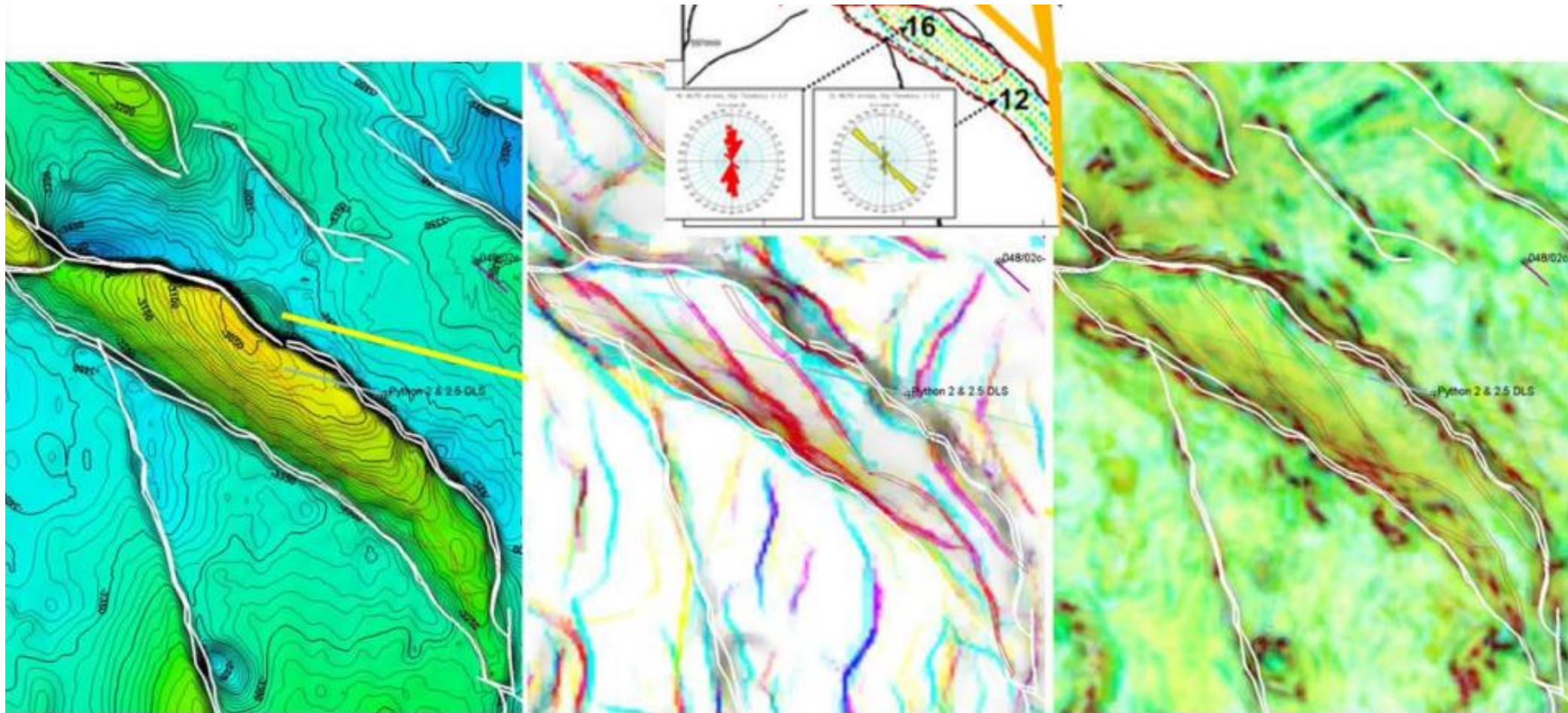
Reservoir:

Lower Leman Sandstone

Seal:

Silverpit shales, Zechstein Group

# Python: fracture orientation prediction potential using seismic attributes



Top Leman depth

CMY Blend of three ant-tracked volumes from Tensor/SOS/Dip

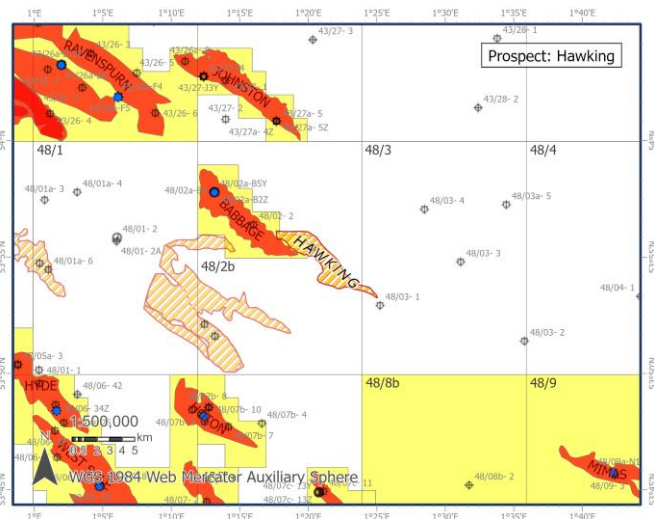
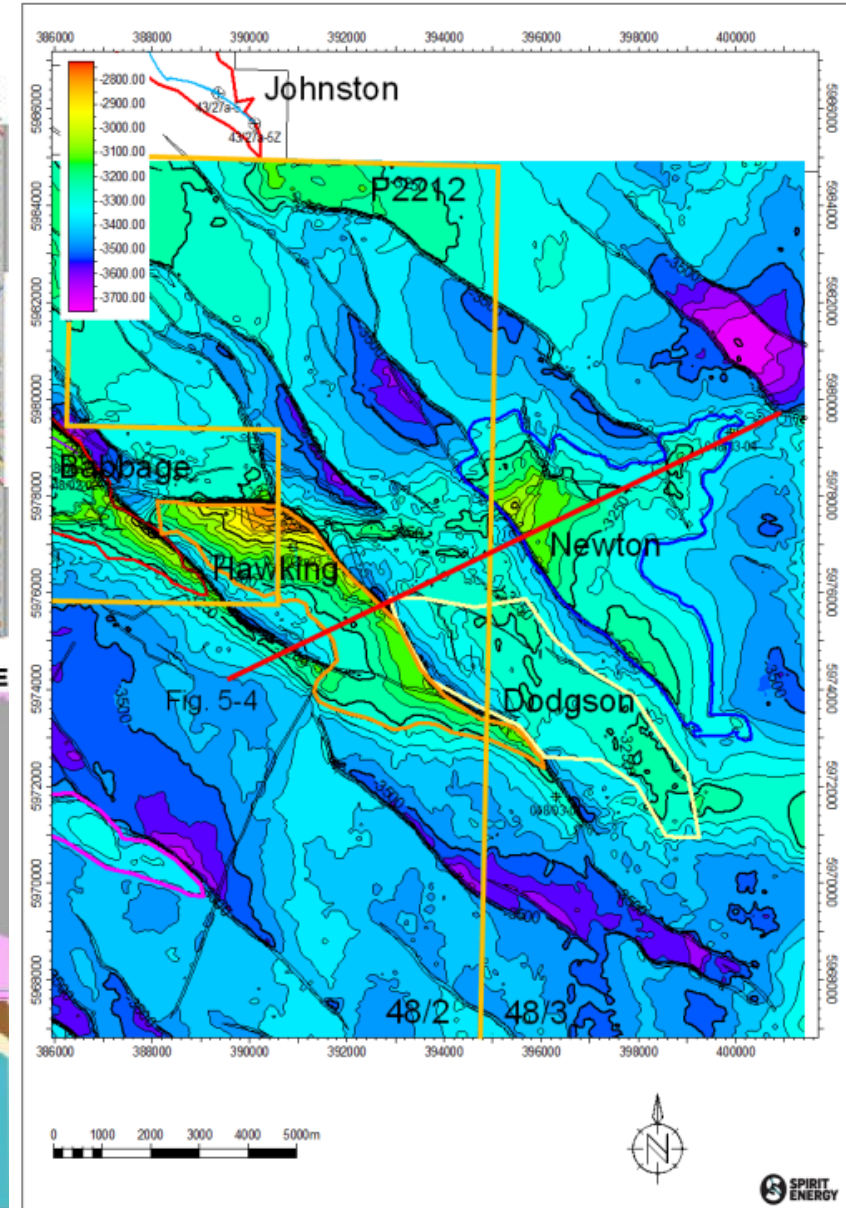
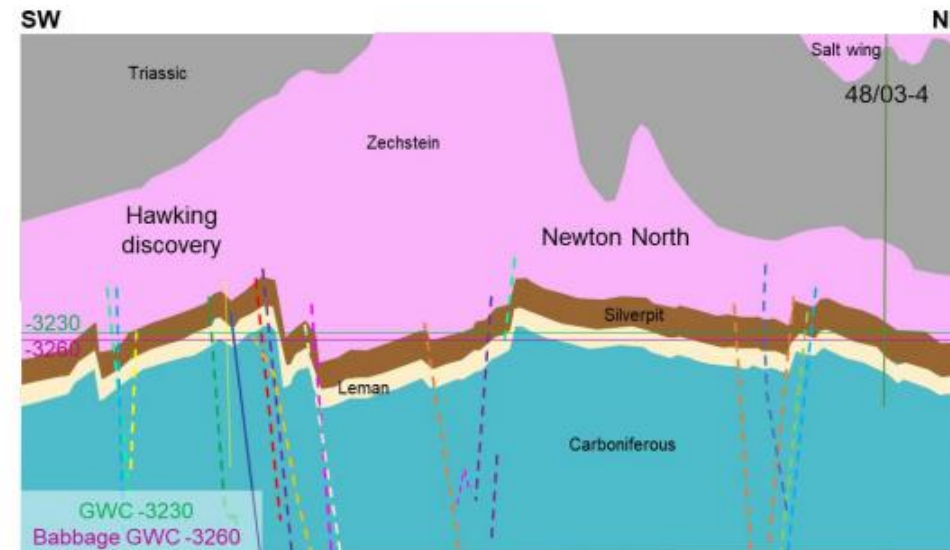
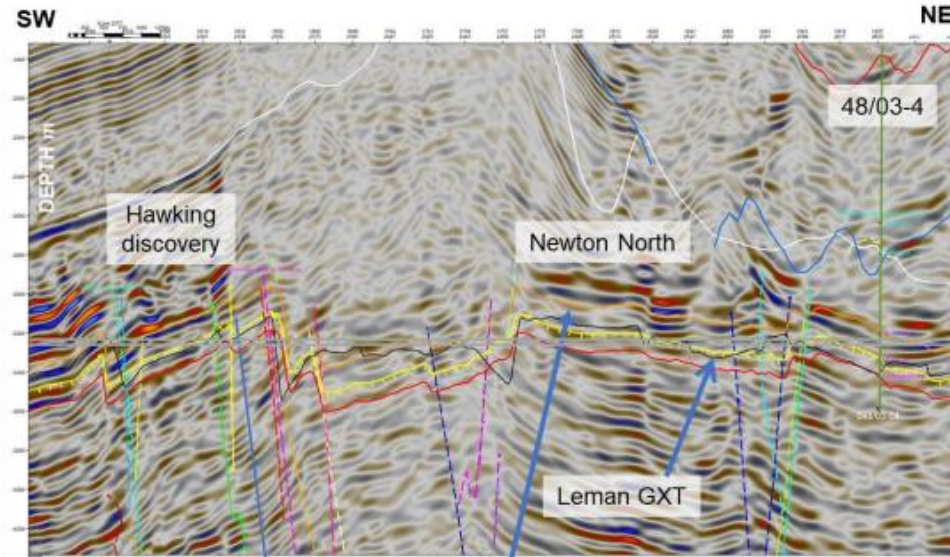
CMY Blend of structural attributes Tensor/SOS/Dip

# Hawking discovery

Tilted fault block to SE of Babbage field

Leman reservoir, Silverpit seal

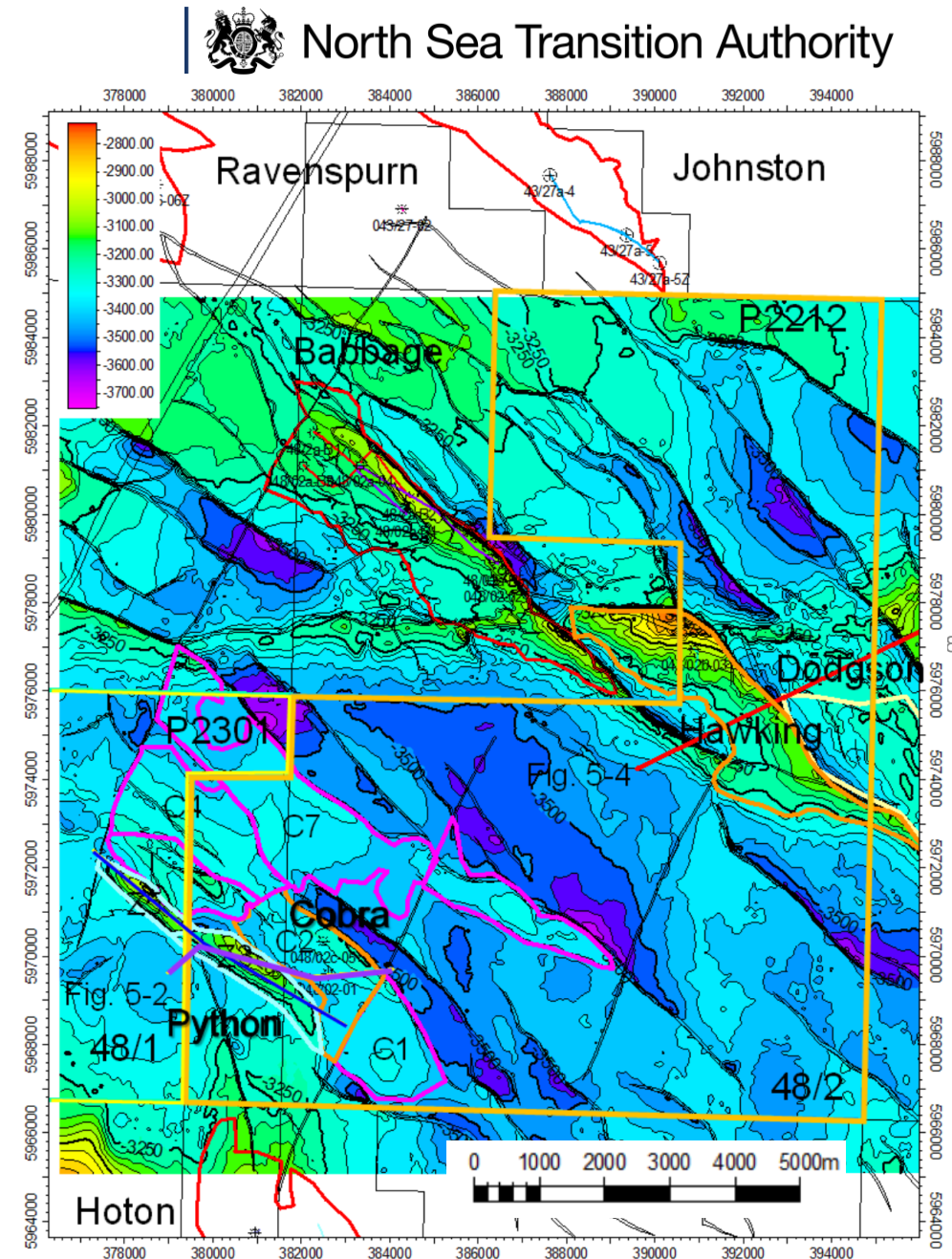
Drilled in 1997 with 48/2b-3, tested at 0.4mmscfd



Data source: P2212 relinquishment report (available [online](#))

# Cobra-Python-Hawking: Main uncertainties & challenges

- Permeability – development of illite
- Fracture network presence & prediction
  - Critical for delivery of gas to the wellbore
- Well deliverability
  - Well location, design and stimulation programme
- How to maximise flow rates from test benchmarks

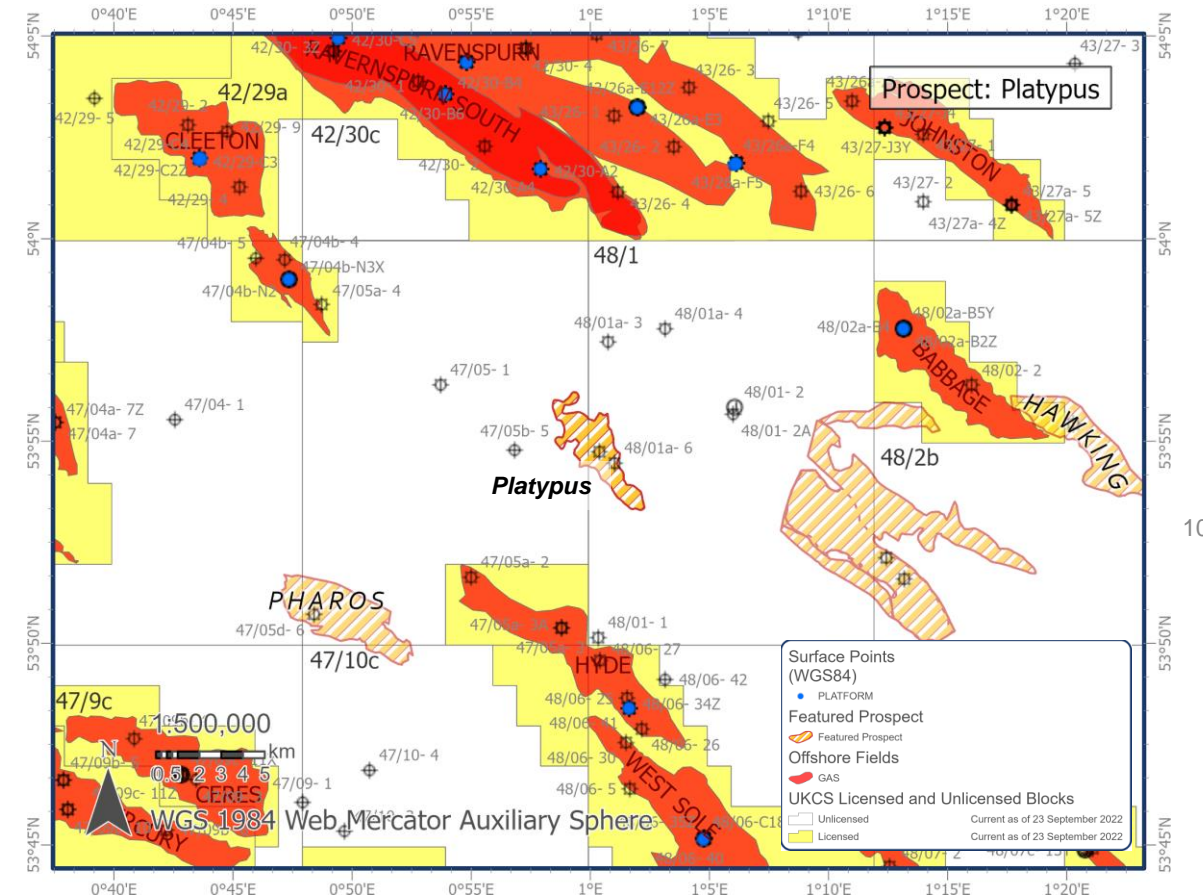


# Platypus discovery

# Platypus Discovery, 47/5b, 48/1a

- Platypus discovered in 2010 with 48/1a-5
- Appraised in 2012 with 48/1a-6
- Largely fault-bounded to north, east and west with dip-closure to south
- Lower Lemn Sandstone reservoir
- Good porosity
- Wells tested at rates of 7mmscfd and 27mmscfd respectively

Unrisked	Low	Mid	High
GIIP bcf)	165.1	183.2	204.8
Recoverable gas (bcf)	91.4	103.0	132.7
Recoverable condensate (mmstb)	0.28	0.32	0.41

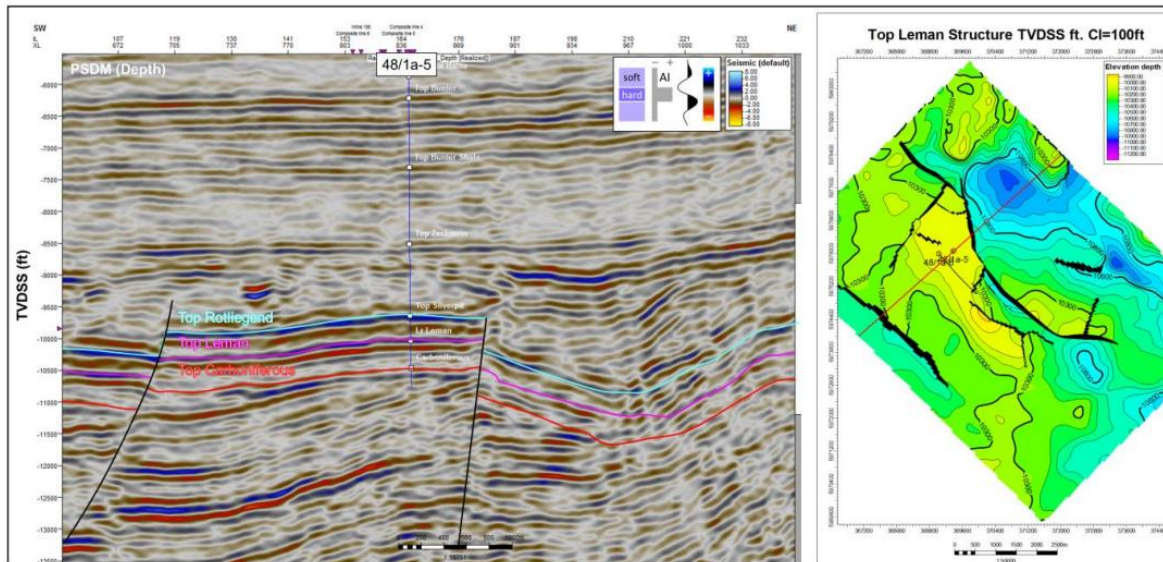
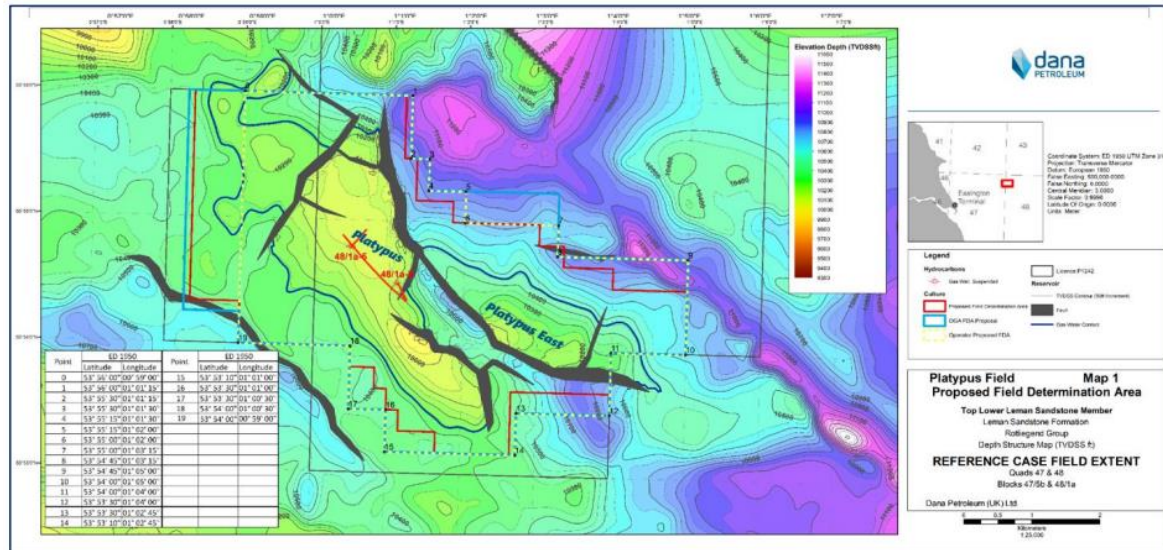


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For more information:  
Please refer to the P1242 Relinquishment Report (available [online](#))

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# Platypus Discovery: Geological Summary



Data source: P1242 relinquishment report (available [online](#))

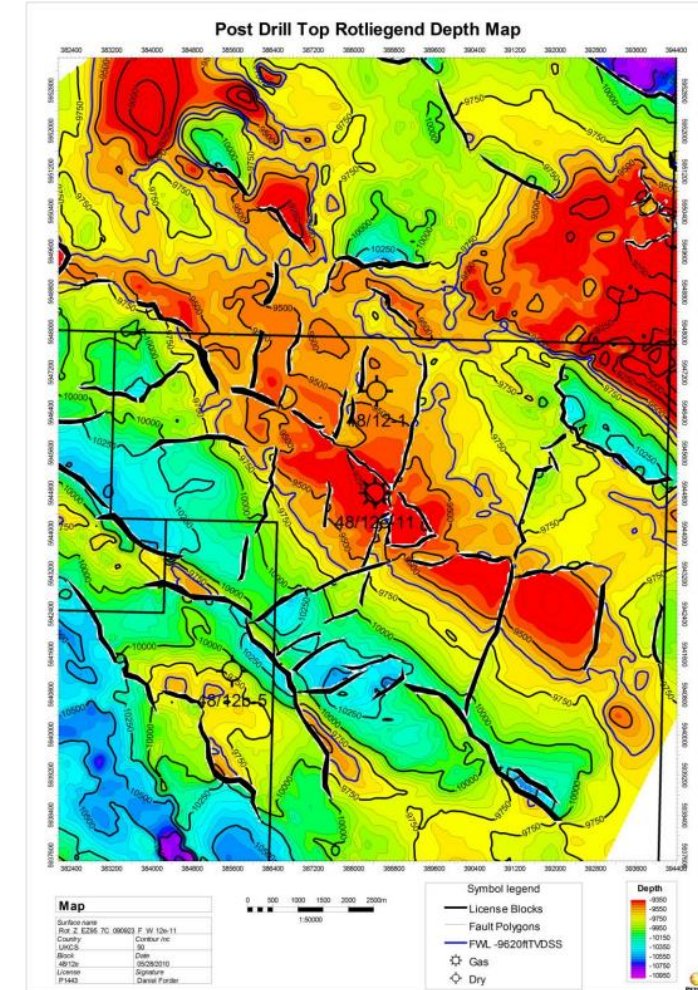
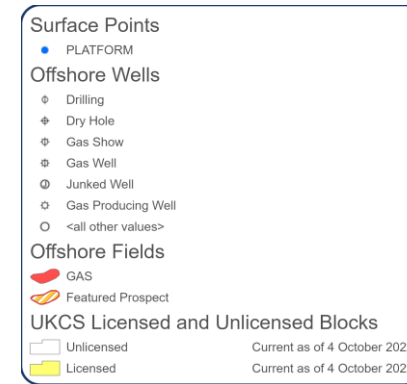
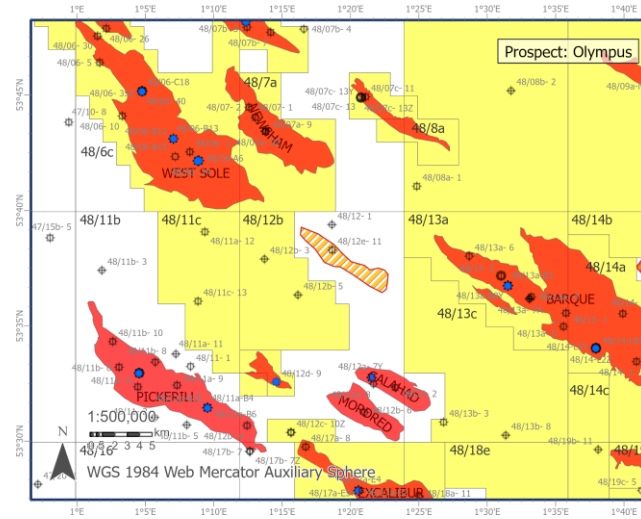
# Olympus discovery

# Olympus discovery Block 48/12e

## Description

- Olympus discovered in 2010 with 48/12e-11
- Upper and Lower Lemman Sandstone reservoir
- Tested at 11mmscfd

	Unrisked GIIP (bcf)			Recoverable resources (bcf)		
	P90	P50	P10	P90	P50	P10
Lower Lemman	29	45	85	15	23	43
Upper Lemman	7	15	72	Not Assessed		

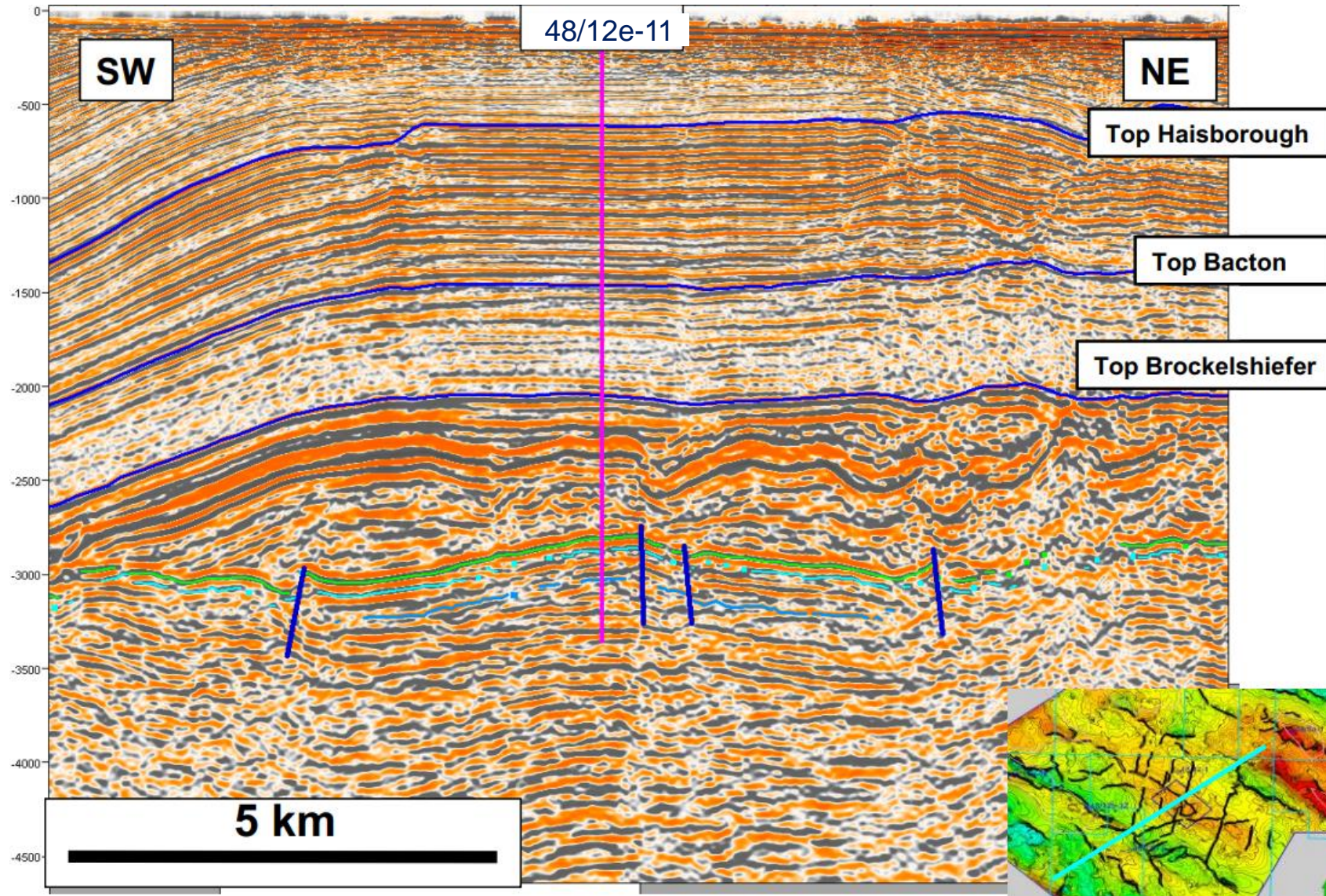


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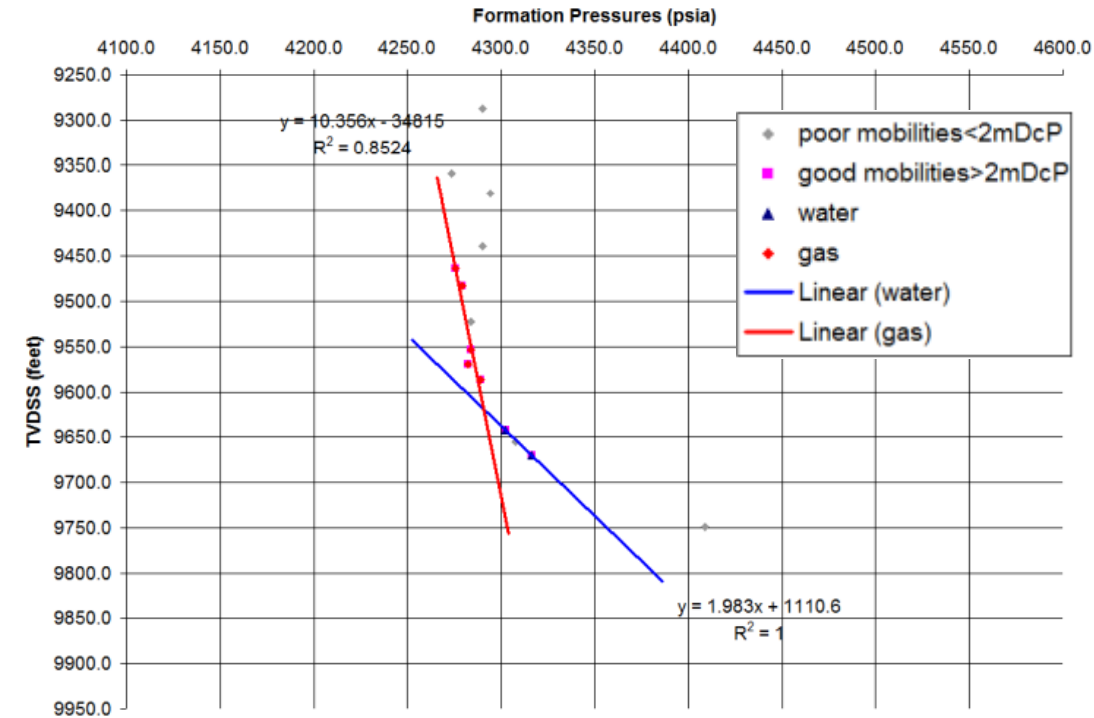
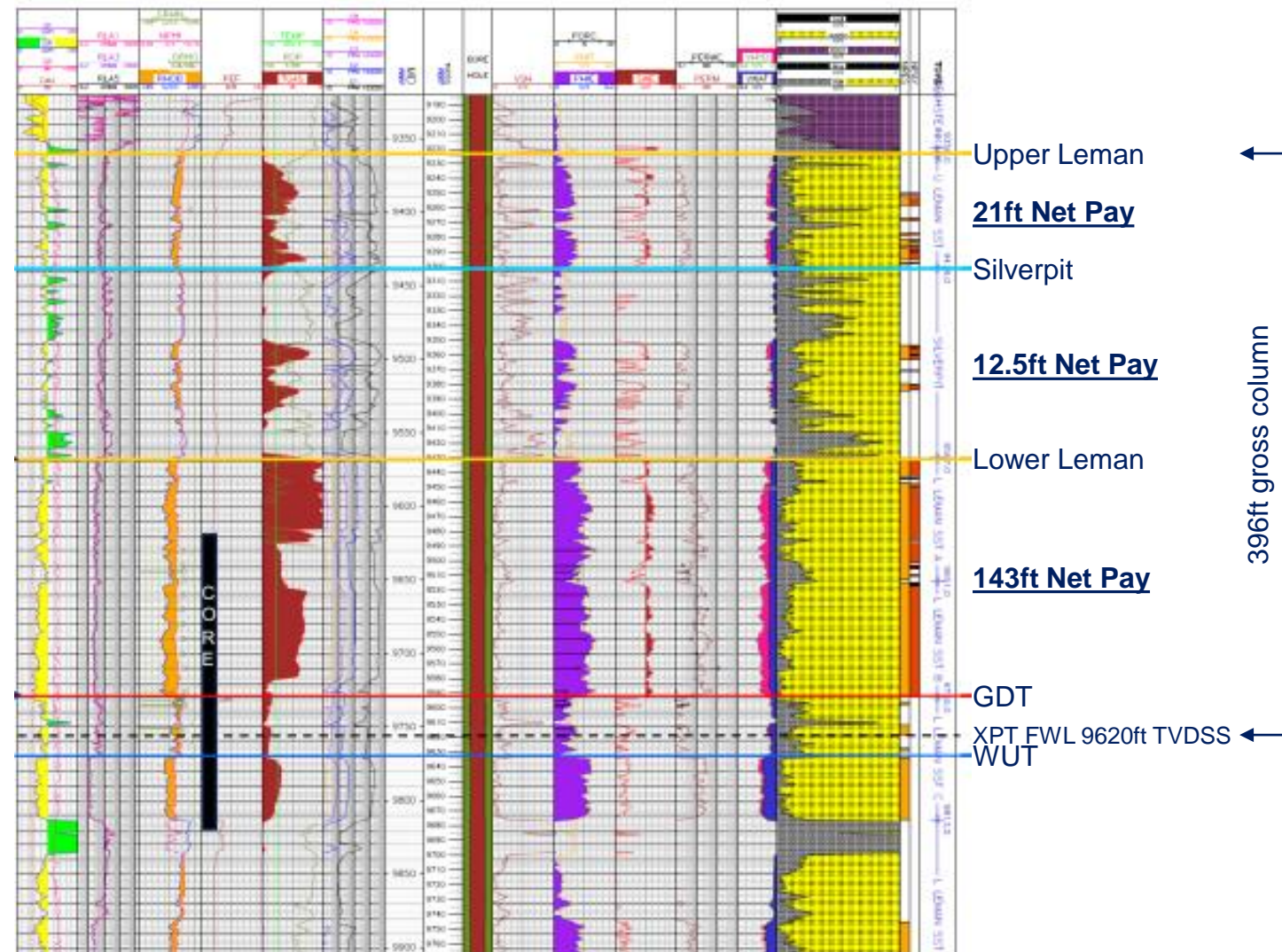
For more information:  
Please refer to the 48/12e-11 well reports (available online at the [NDR](#))

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# Pre-drill seismic dip line



# Olympus CPI and pressure data



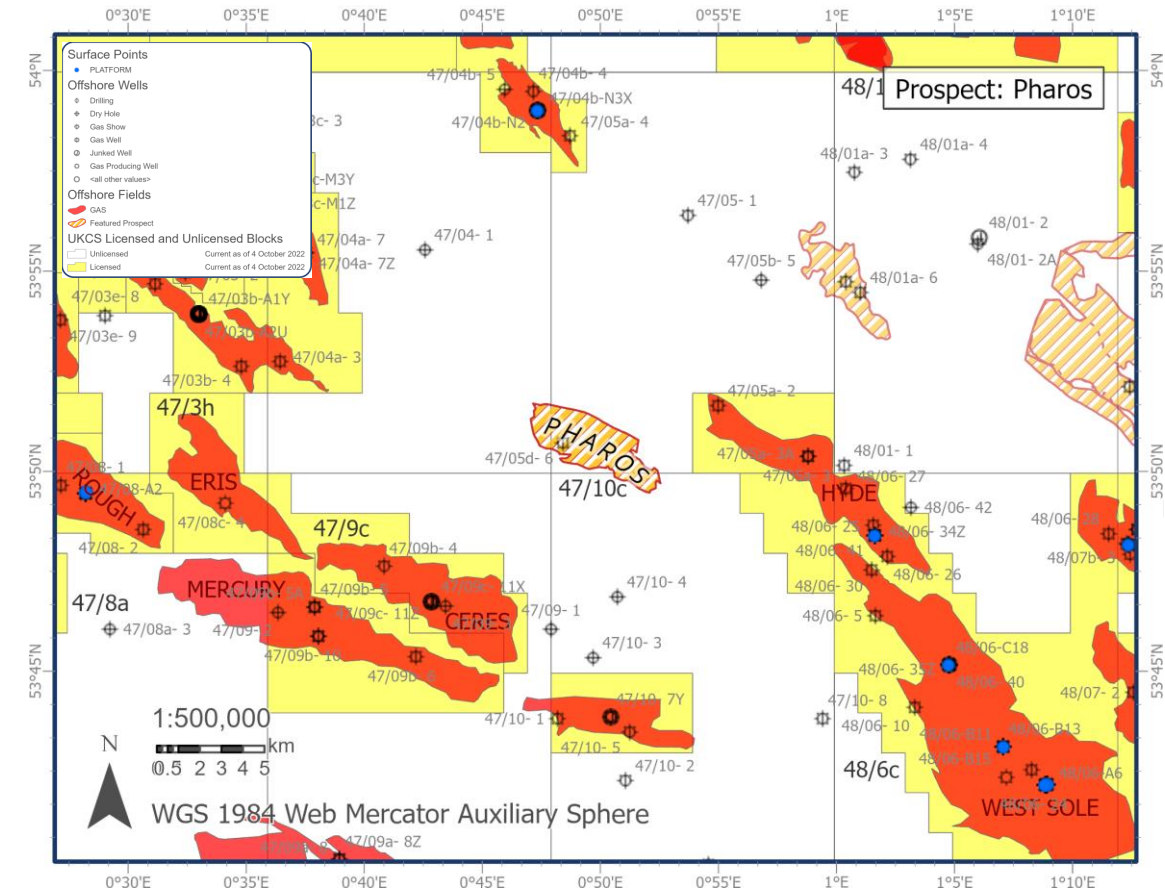
Data source: 48/12e-11 End of Well Report & Post-well Summary (available at the [NDR](#))

# Pharos discovery

# Pharos Discovery, 47/4d, 47/5d

- Pharos discovered in 2013 with 47/5d-6
- Leman Sandstone reservoir
- Good porosity recorded in core, low permeability
- Horizontal development wells likely required

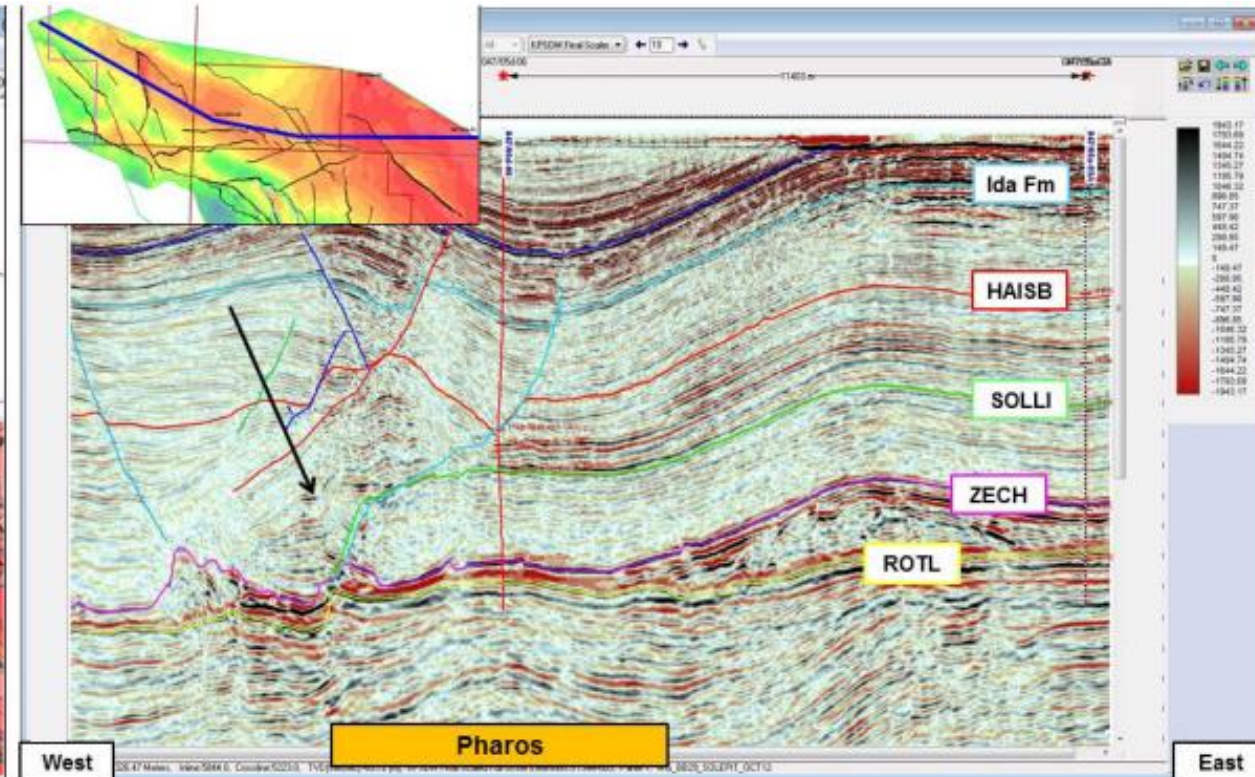
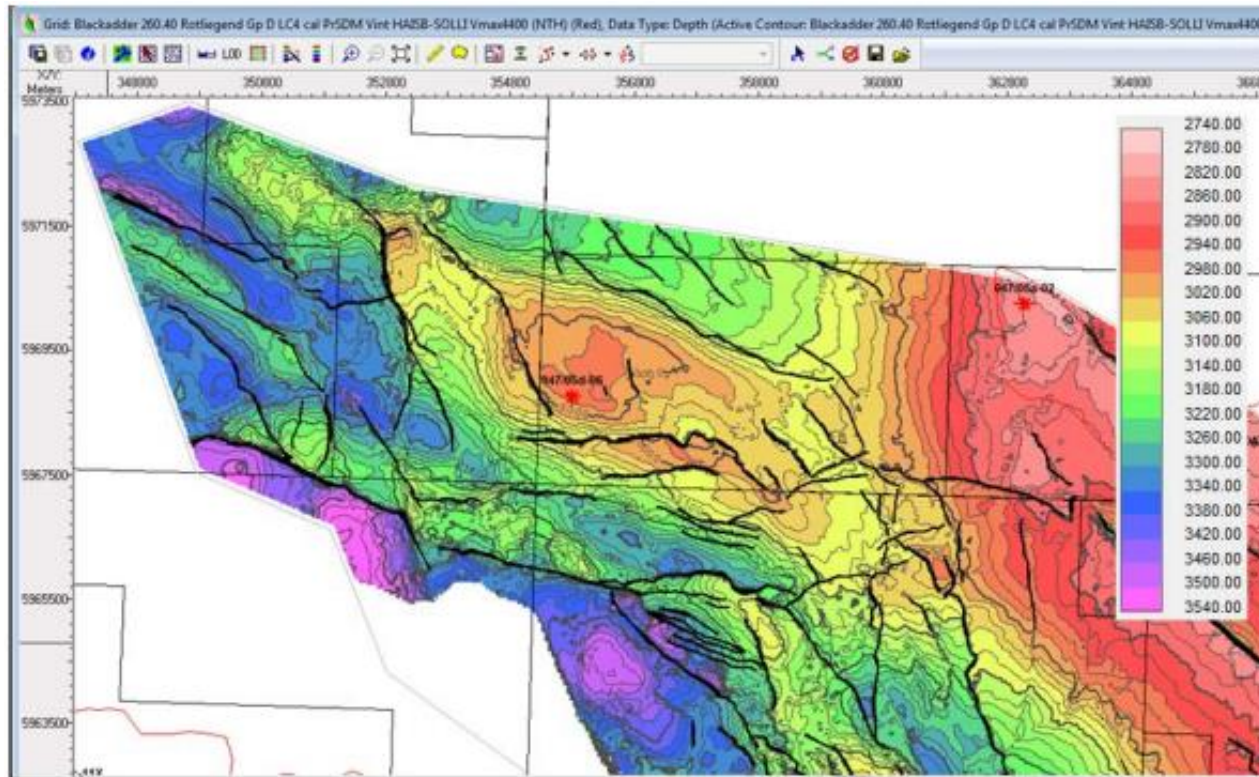
	Low	Mid	High
Recoverable reserves (unrisked) (bcf)	67	102	146



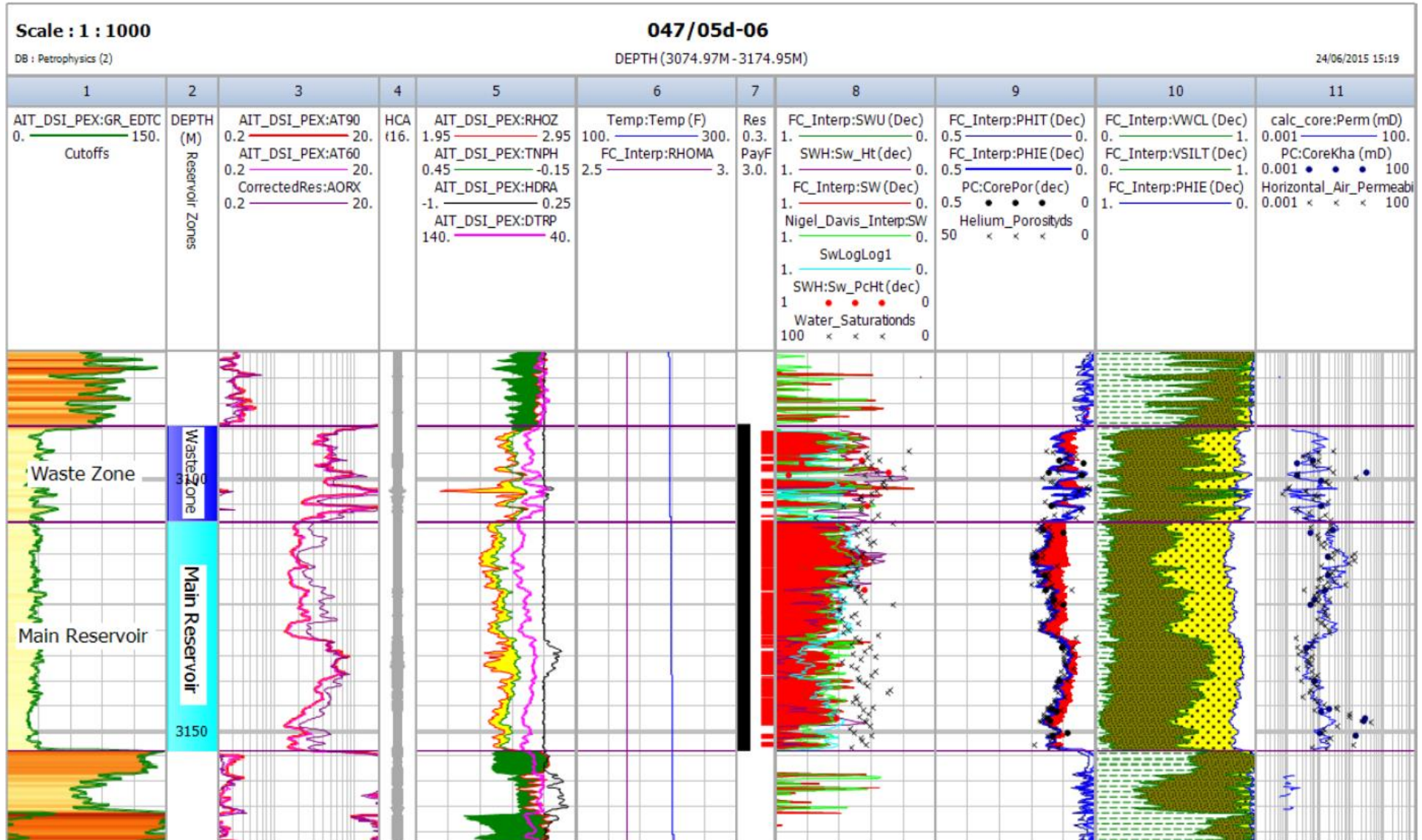
For more information:  
Please refer to the P1566 relinquishment report (available [online](#))

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# Pharos discovery: Geological Summary



Robust closure visible on seismic data



# Ensign Redevelopment

# Ensign field, blocks 48/14 & 48/15

## Discovered:

- 1986 by 48/14-2

## Appraised:

- 1988 by 48/15a-6,
- 2006 by 48/14-5,
- 2007-8 by 48/14-6 [EN02]

## Project sanction 2010

## Developed 2011-12:

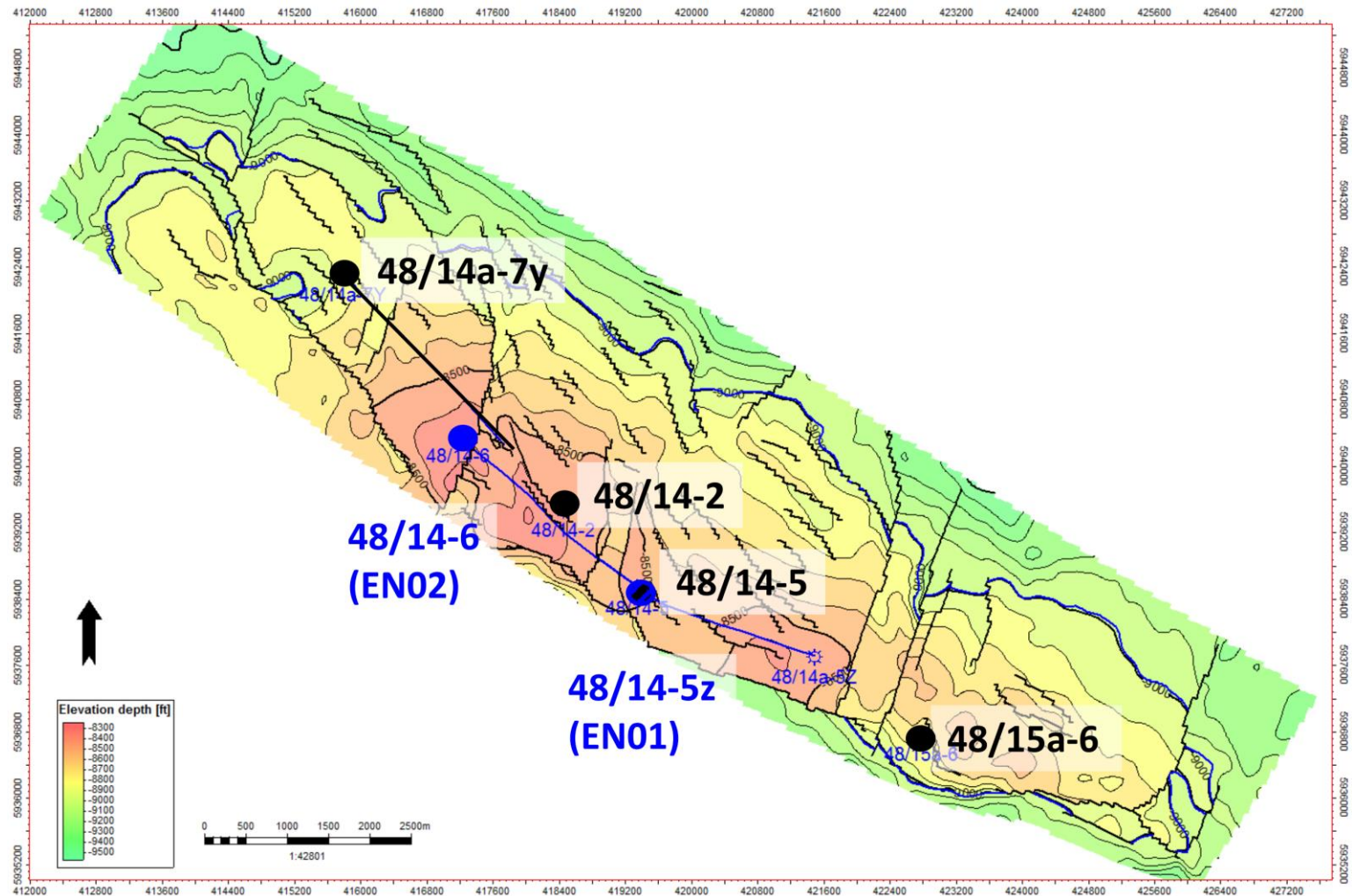
- 48/14-5z [EN01] &
- 48/14a-7y

## First gas April 2012

## COP July 2018

EN01, EN02 wells shut-in

48/14a-7, 7z, 7y Ph1 abandoned



Five main compartments with some further compartmentalisation

Static GIIP estimated around 550bcf; ultimate recovery of only 18.5bcf achieved  
Field well-characterised

Lower recoveries per well than forecast in FDP – only 3.5% recovered rather than the c.25% forecast  
Key reasons:

- Tight reservoir
- Poor production due to reservoir quality, compartmentalisation & suboptimal well completions
- Loss of LOGGS export route in 2018

Opportunity for redevelopment with new wells

- Improved completions
- Wells targeting multiple compartments

New export route required following LOGGS COP in 2018

# Ada West prospect

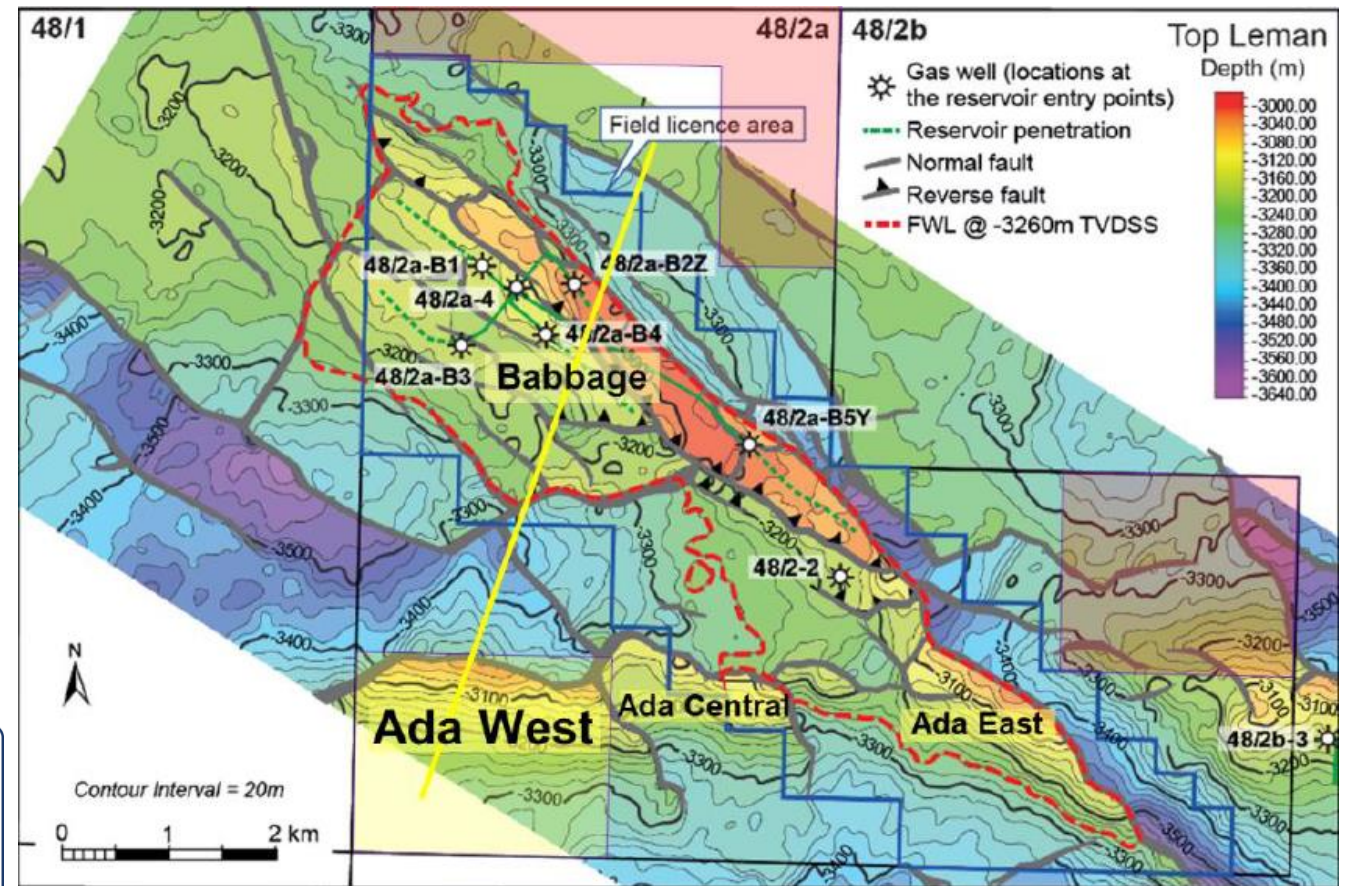
# Ada West prospect

Prospect lies adjacent to producing Babbage field

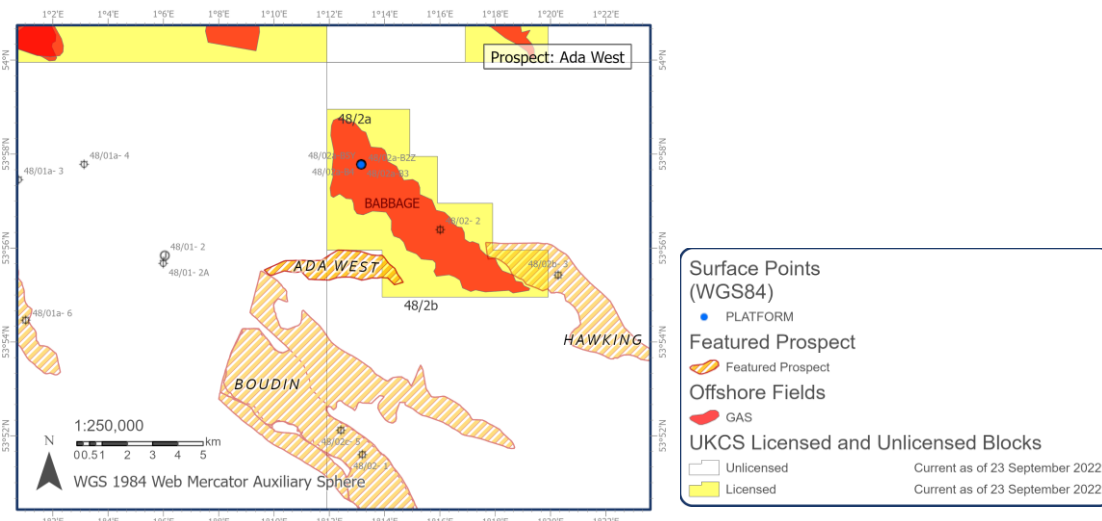
High porosity but inhibited permeability in offset wells due to development of fibrous illite

Horizontal well and multi-stage frac required for successful development of Lemnan at Ada West

Unrisked	P90	P50	P10
GIIP (bcf)	39	69	115
Recoverable gas (bcf)	10	22	58



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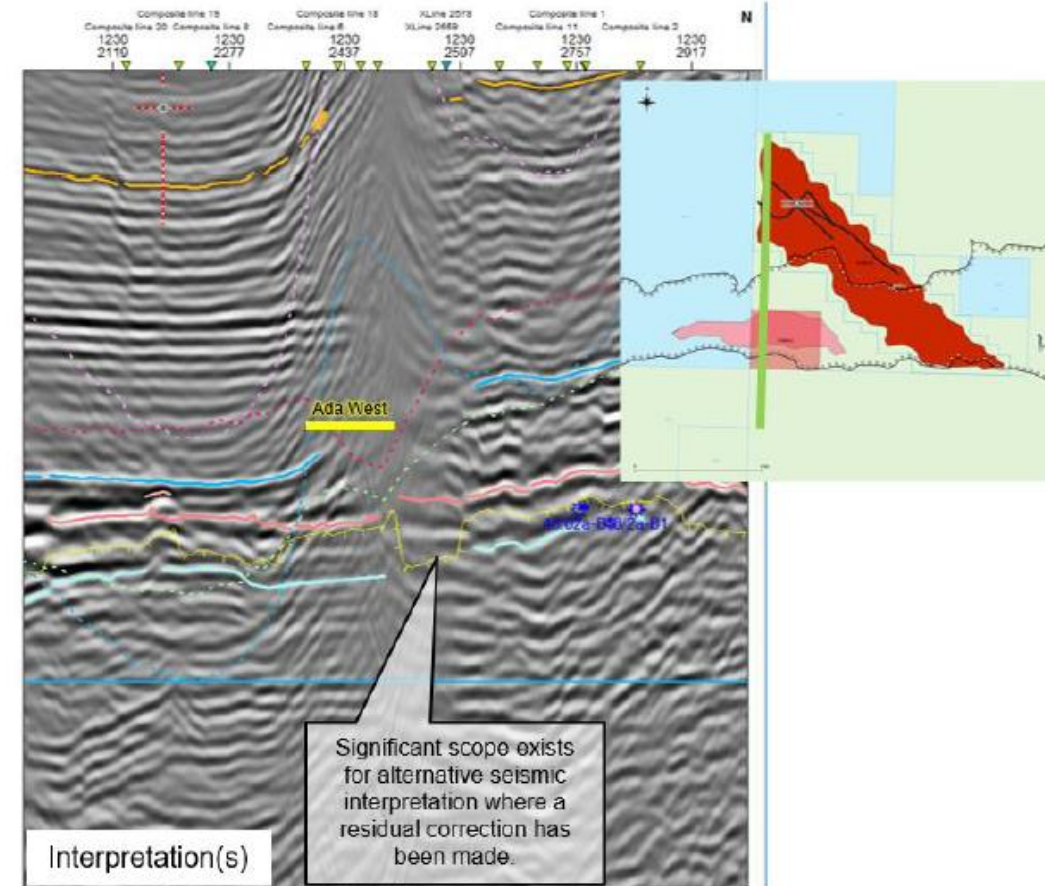
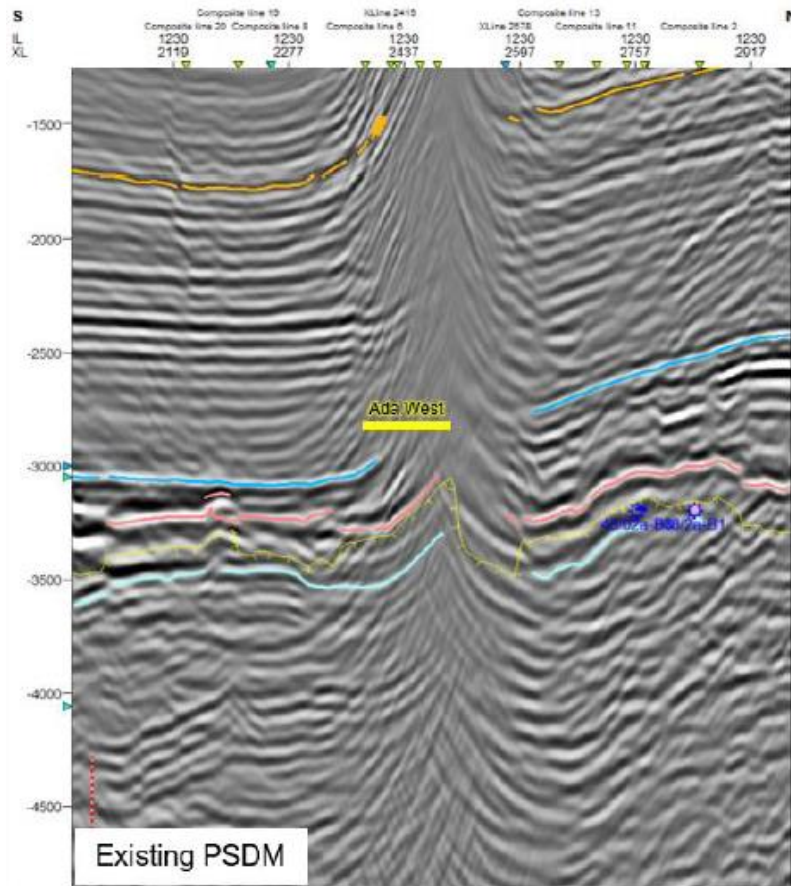


Data from [P456 Relinquishment Report](#)

# Seismic imaging challenges

Complex imaging due to overlying salt wall

Velocity perturbations possible to assess uncertainty – will impact prospect imaging and Trap Presence assessment



Data from [P456 Relinquishment Report](#)

# Boudin prospect

# Boudin prospect, 48/1e

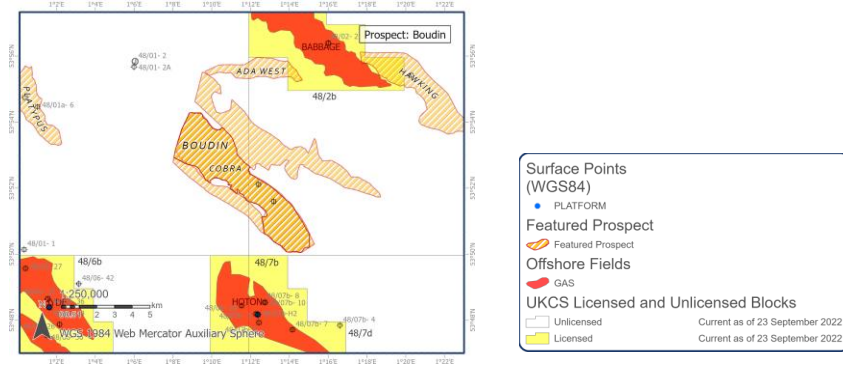
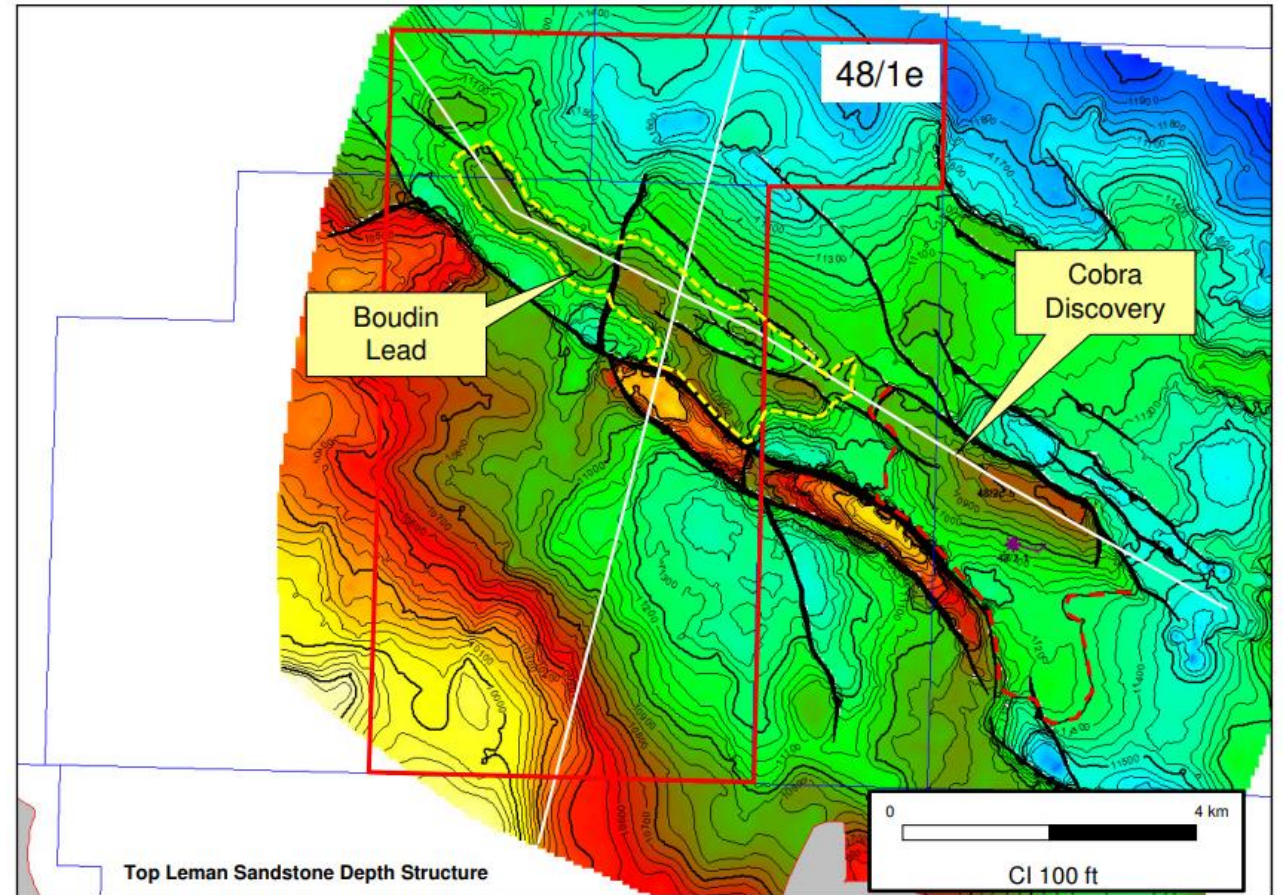
## Description

- Mapped in 2012 for 27<sup>th</sup> Round
- 2006 PSDM repro of 1990 seismic

Significant opportunity adjacent to discovered volumes

Scope for reprocessing to update imaging

	Min	ML	Max
GIIP	31	87	225
Reserves	19	61	180

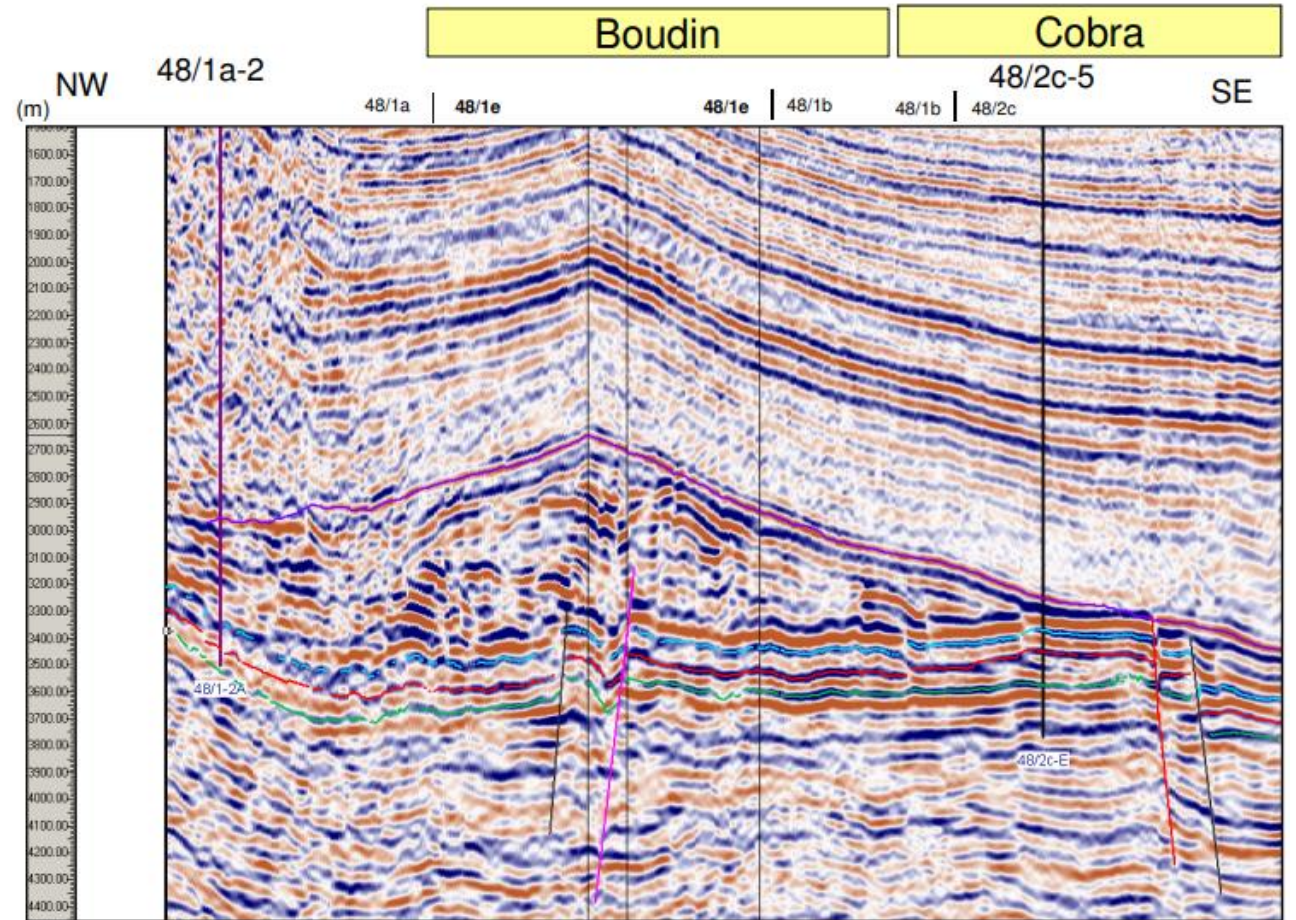
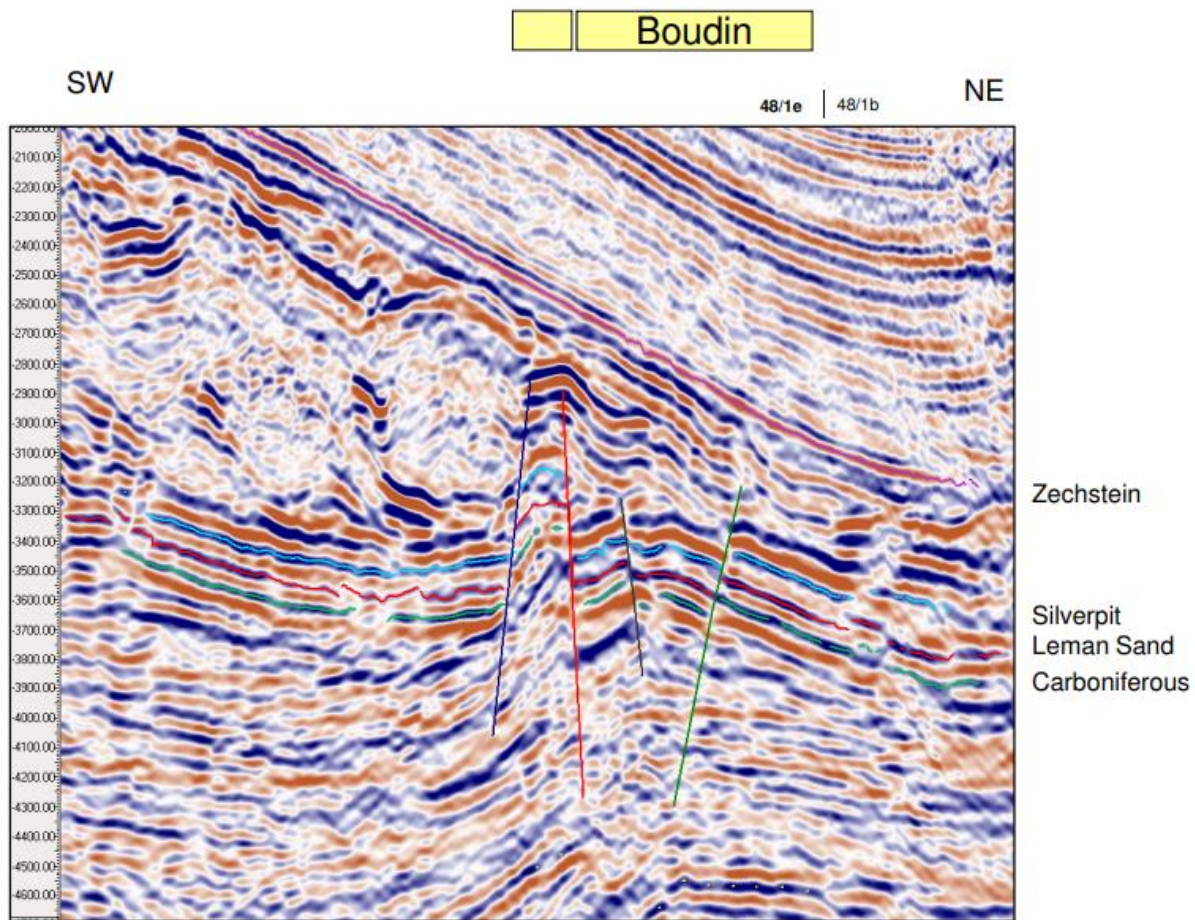


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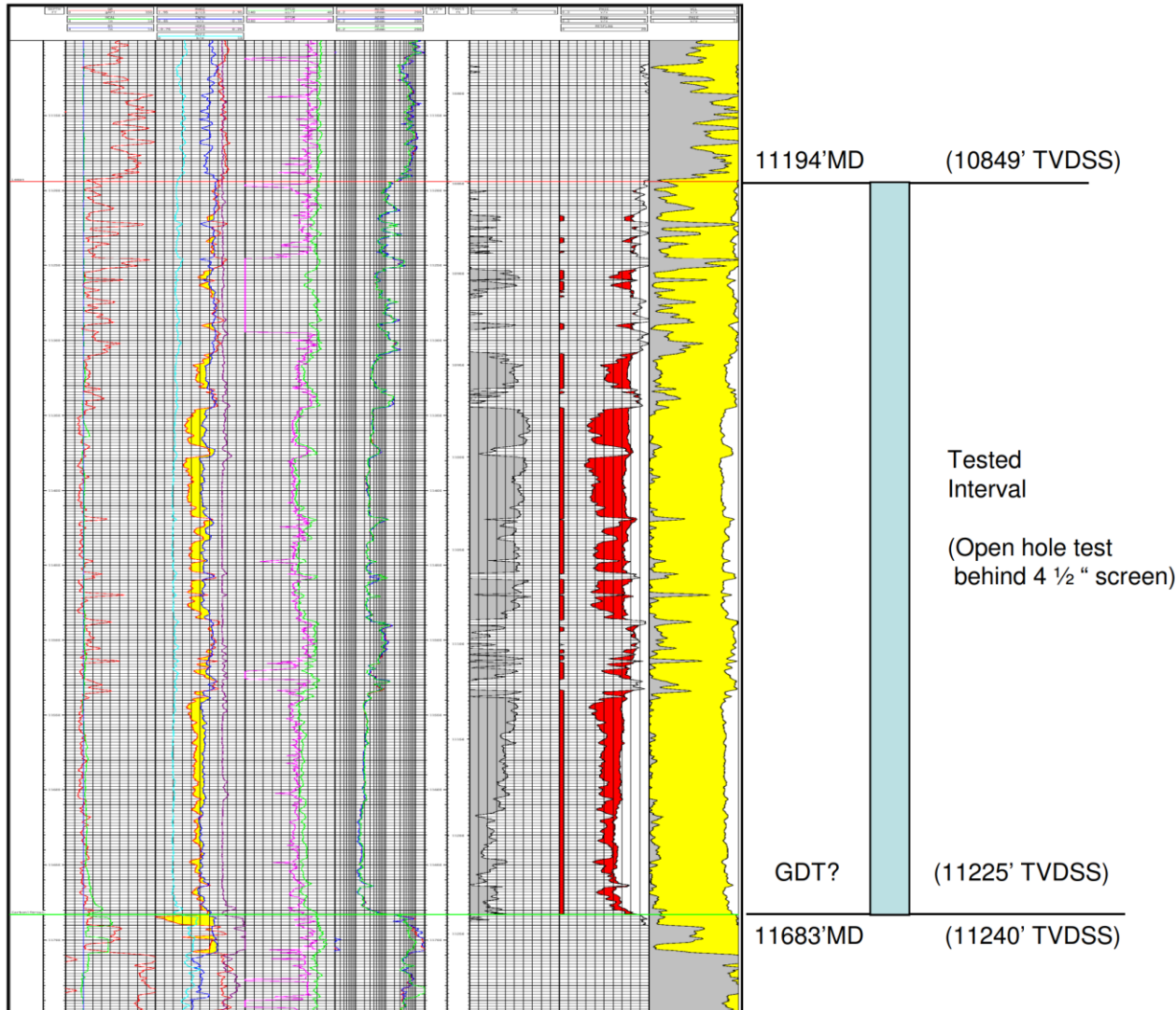
For more information:  
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 Information compiled by the North Sea Transition Authority

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# Seismic sections



Boudin prospect



- Well 48/2c-5 drilled in 2008 by Encore
- Testing Rotliegend updip of Cobra discovery
- Gas discovered in Leman
- Tested and flowed at 1.2mmscf/d

Gross: 489ft  
 TVT: 391ft  
 Net: 284ft  
 N/G: 73%  
 Por: 14.5%  
 Sh: 44%

Tested Interval  
 (Open hole test behind 4 1/2" screen)

# Summary

# Greater West Sole Area Summary

- Suite of opportunities available – discovered volumes and associated prospectivity in the proven SNS Leman play
- Well deliverability is key issue based on reservoir quality
- Redevelopment of Ensign field is an opportunity for near-term production

Discovery/Prospect /Redevelopment	Well	Discovered	P50 Recoverable Resources bcf
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Ada West (P)	n/a	n/a	22
Boudin (P)	n/a	n/a	61
Ensign (R)	48/14-2	1986 (2010 sanction)	119