



**Blue.** ENERGY

**2022 SAPPHIRE PILOT DRILLING PROGRAMME  
NORTH BOWEN BASIN**

**QUEENSLAND PESA SYMPOSIUM**

9 September 2022

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The estimates of Reserves and Contingent Resources noted throughout this ASX Announcement have been provided by Mr John Hattner of Netherland, Sewell and Associates Inc (NSAI) and were originally reported in the Company’s market announcements of 25 January 2012, 26 February 2013, 19 March 2013, 8 December 2015, 28 February 2019, 22 January 2022 and 14 July 2022. NSAI independently regularly reviews the Company’s Reserves and Contingent Resources. Mr Hattner is a full-time employee of NSAI, has over 30 years of industry experience and 20 years of experience in reserve estimation, is a licensed geologist and a member of the Society of Petroleum Engineers (SPE), and has consented to the use of the information presented herein. The estimates in the reports by Mr Hattner have been prepared in accordance with the definitions and guidelines set forth in the 2018 Petroleum and Resource Management System (PRMS) approved by the SPE, utilising a deterministic methodology. Blue Energy confirms that it is not aware of any new information or data that materially affects the information included in any of the announcements relating to ATP 813, 814 or 854 referred to in this report and that all of the material assumptions and technical parameters underpinning the estimates in the announcements continue to apply and have not materially changed.

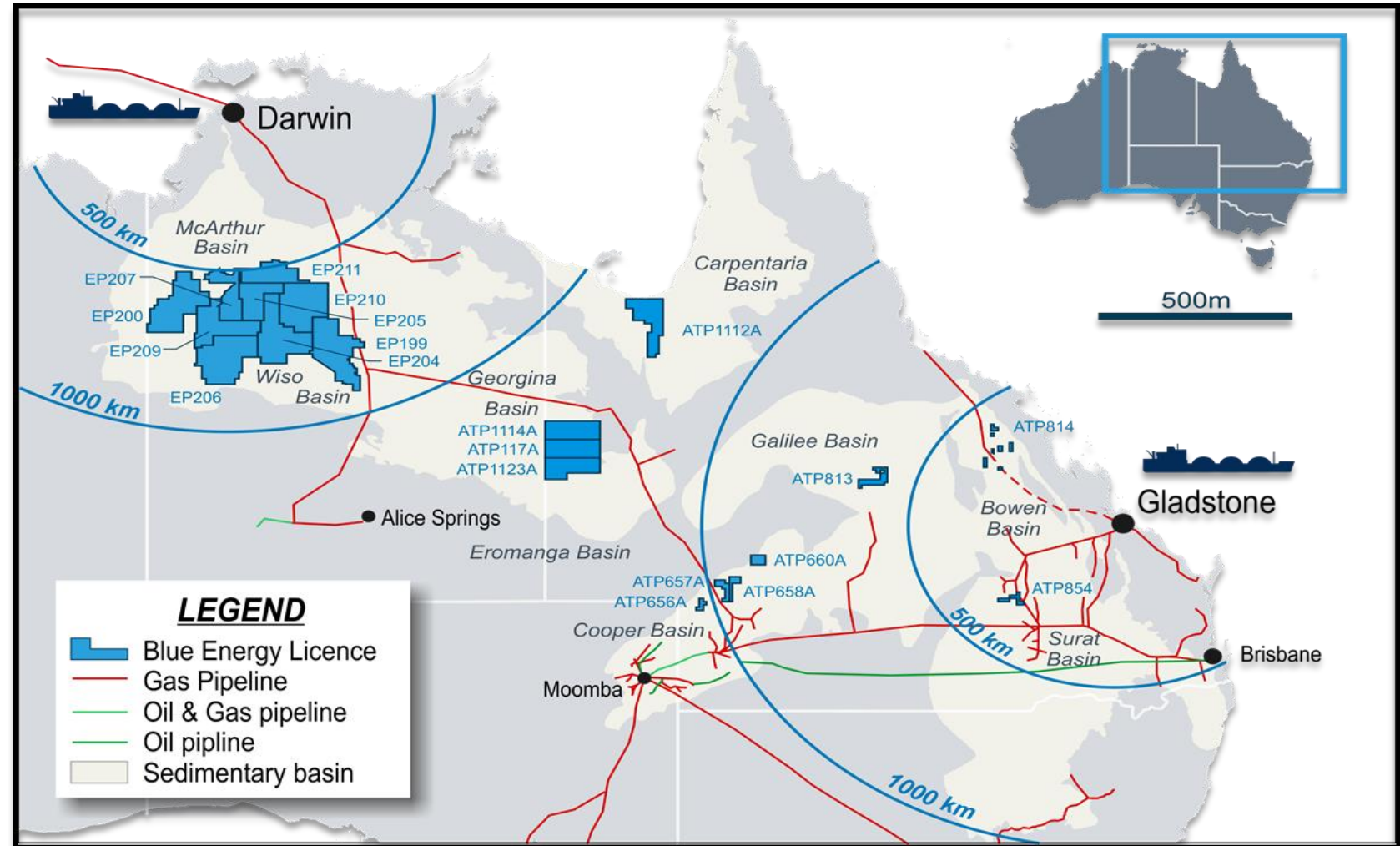
++ Listing Rule 5.28.2: The estimated quantities of petroleum that may potentially be recovered by the application of a future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration appraisal and evaluation is required to determine the existence of a significant quantity of potentially moveable hydrocarbons.

# BLUE HAS ASSETS IN THE 3 KEY NEW GAS SUPPLY BASINS

**Bowen Basin  
North and South**

**Beetaloo Basin**

**Galilee Basin**

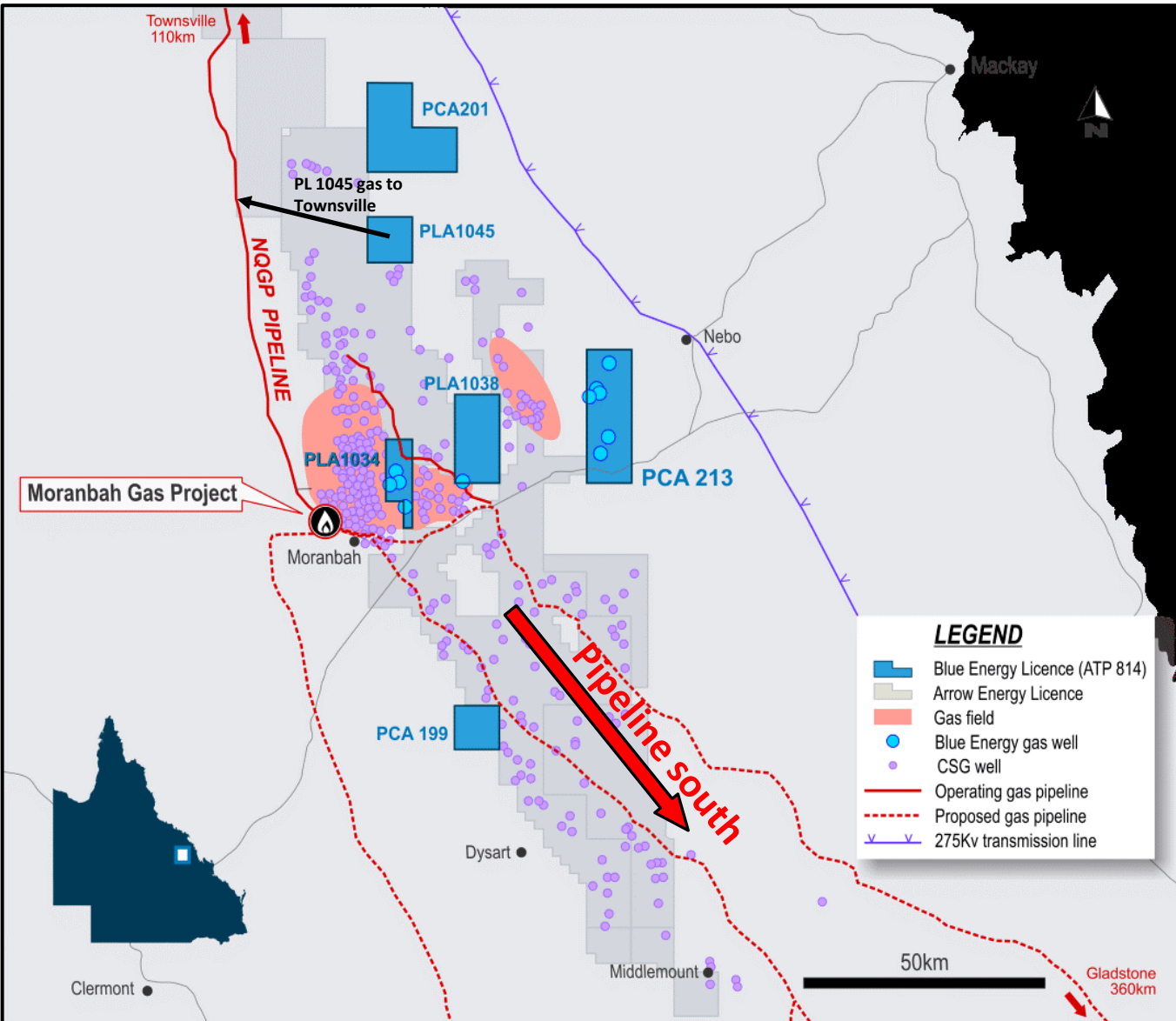


# COPRPORATE RESERVES AND RESOURCES

Permit	Block	Date	Method	Certifier	1P (PJ)	1C (PJ)	2P (PJ)	2C (PJ)	3P (PJ)	3C (PJ)
ATP854P	Whole Permit	22/01/2022	SPE/PRMS	NSAI	0	90	0	194	0	398
ATP813P	Whole Permit	29/10/2014	SPE/PRMS	NSAI	0	0	0	61	0	830
ATP814P	Sapphire	14/07/2022	SPE/PRMS	NSAI	0	154.3	66.5	213.9	253.2	214.1
ATP814P	Central	5/12/2015	SPE/PRMS	NSAI	0	50	12	99	75	306
ATP814P	Monslatt	5/12/2015	SPE/PRMS	NSAI	0	0	0	619	0	2,054
ATP814P	Lancewood	5/12/2015	SPE/PRMS	NSAI	0	5	0	23	1	435
ATP814P	Hillalong	27/02/2019	SPE/PRMS	NSAI	0	0	0	182	0	237
ATP814P	South	30/06/2013	SPE/PRMS	NSAI	0	15	0	27	6	30
<b>Total (PJ)</b>					<b>0</b>	<b>314.3</b>	<b>78</b>	<b>1,418</b>	<b>335</b>	<b>4,504</b>

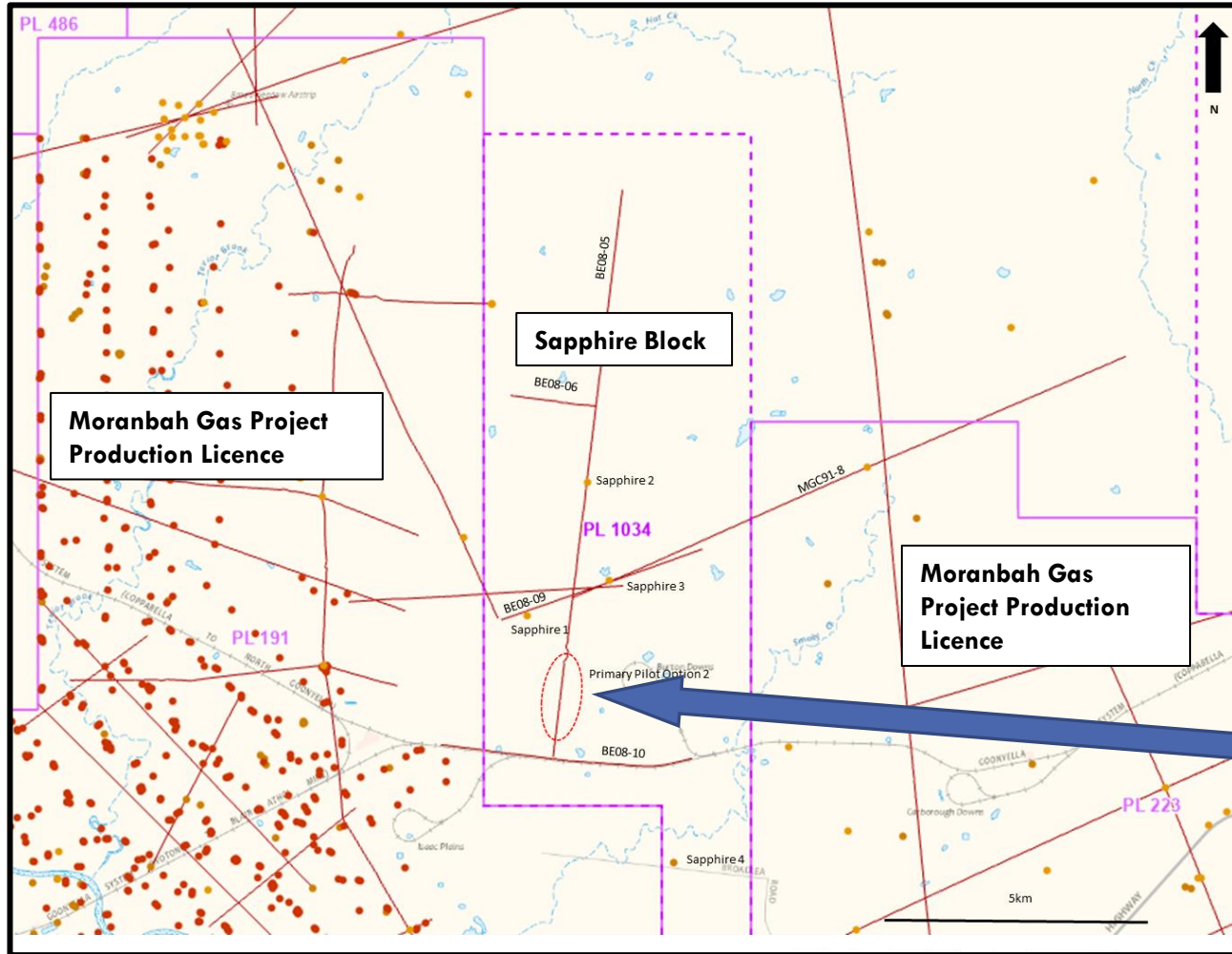
\*All numbers are net to Blue Energy

# BLUE'S BOWEN GAS – LONG TERM, RELIABLE SUPPLY



- North Bowen has ~15,000 PJ gas resource – NSAI
- 30 years of east coast domestic gas demand
- Blue has ~3,000 PJ of the gas resource – NSAI
  - 8 years of east coast domestic gas demand
- Federal and State Govt doing feasibility and commercial studies for pipeline connection to east coast market
- North Bowen Basin
  - Has scale - 30,000 PJ recoverable gas resource
  - Has been de-risked – gas production since 2006
  - Has low environmental impact – cattle country with large scale open pit coal mines
  - Has no Great Artesian Basin aquifers present

# BLUE'S SAPPHIRE PILOT DRILLING



Sapphire 5 and 6 pilots will target the Permian Coal measures:

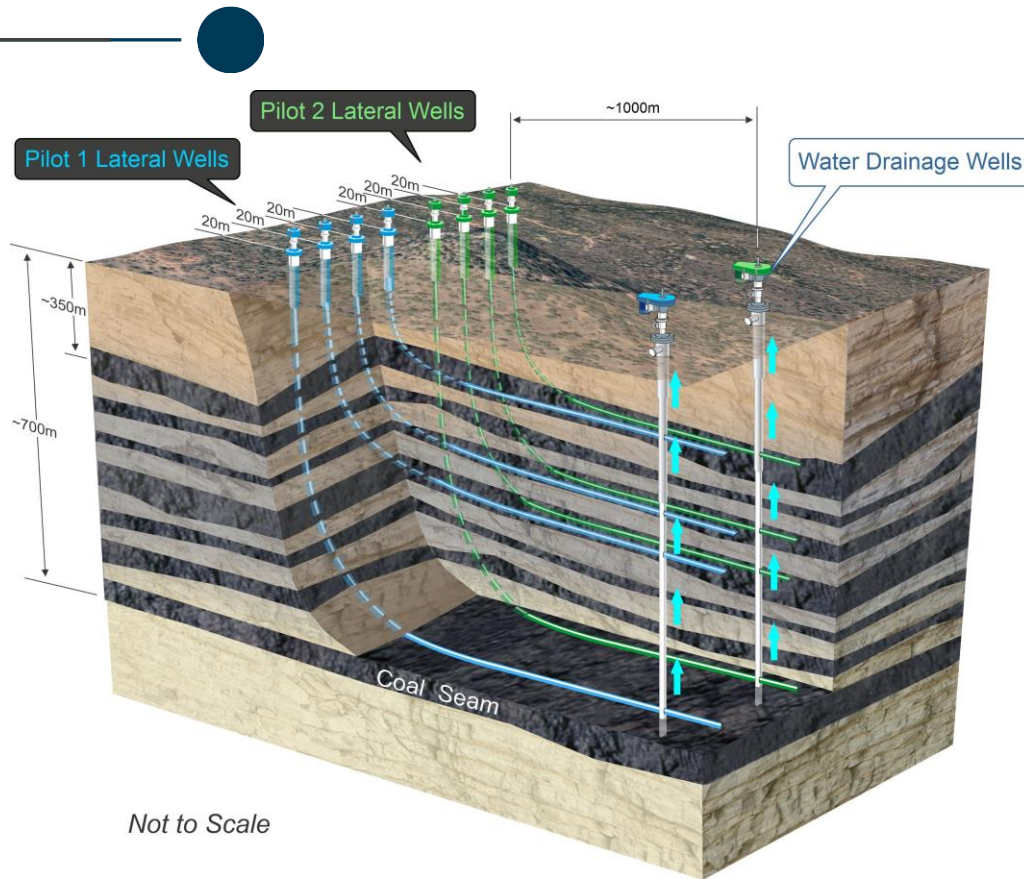
- Rangal Coal Measures
- Fort Cooper Coal Measures
- Moranbah Coal Measures

Pilot wells located on seismic line BE08-05 close to the intersection with BE08-09 & BE08-10

Adjacent to Arrow's Moranbah Gas Project, one of Queensland's earliest CSG fields and numerous coal mines (Stanmore and Fitzroy Operated)

Sapphire Pilots located 2 km from existing MGP producing wells

# PILOT DESIGN AND WELL LOCATIONS



The Pilot configuration is a modified chevron intercept design

- Approx 75m separation between the two vertical wells.
- Two sets 4 lateral wells intercepting one of the vertical wells.
- Gas will be produced out of the laterals, with water out of the vertical.
- Locations are optimised to straddle the seismic line and allow 1000m of lateral per seam.
- Phased drilling sequence – verticals first for geological controlled; then build section of first pilot series; then horizontal (1000m) section and intercept with vertical last.



# WELL LOCATION TOPOGRAPHY

(LOOKING SOUTH TOWARD ISAAC PLAINS MINE)





# SAPPHIRE PILOT PRE-DRILL TARGET SEAMS

## Pre-drill Targets:

### L4 - Lower Rangal (Vermont Seams)

- Depth - 320m
- 21m thick
- Gas Con (~2.1-9.2m<sup>3</sup>/t DAF)

### L3 - Fort Cooper (Middle Main Seam)

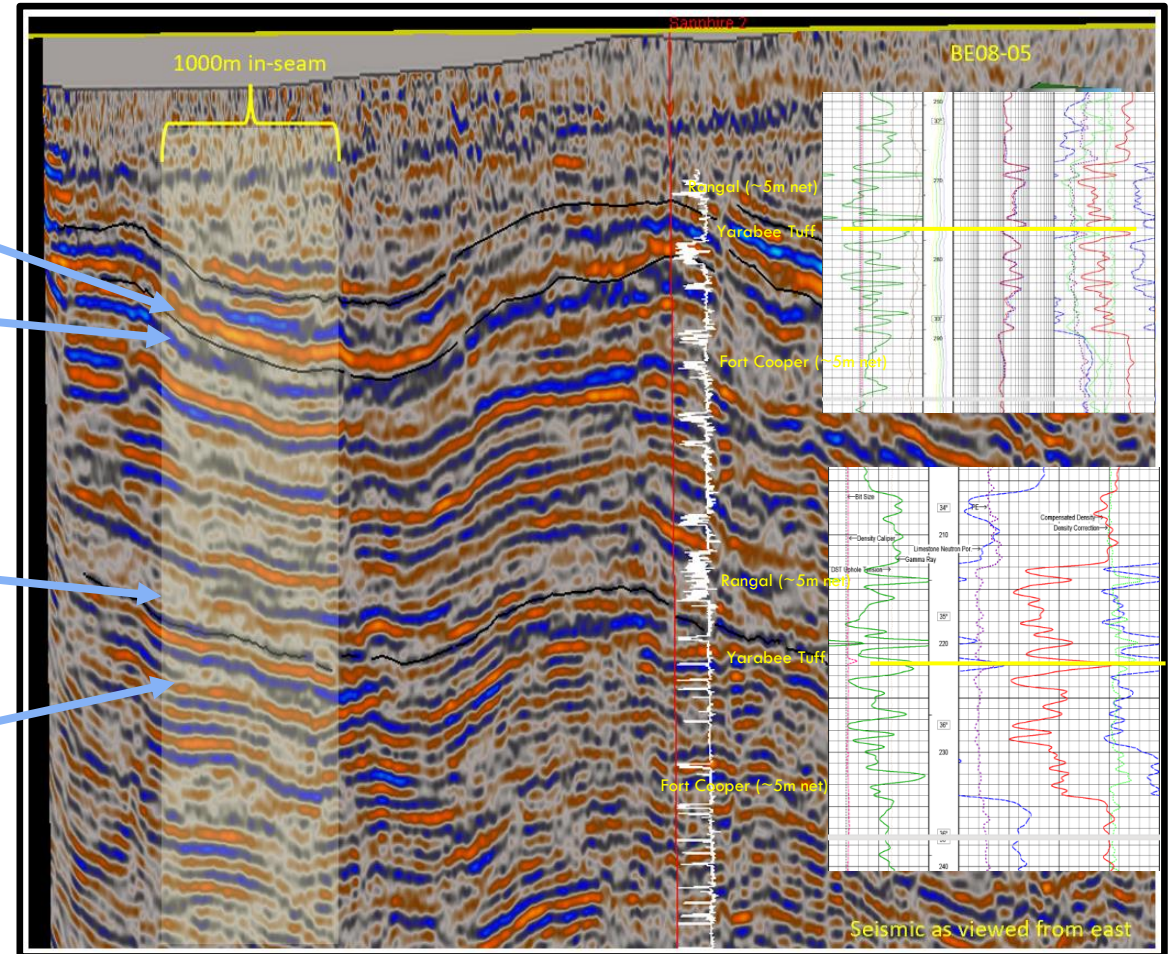
- Depth - 540m
- 11m thick
- Gas Con (~4.2-14.1m<sup>3</sup>/t DAF)

### L2 - Fort Cooper (Fair Hill Seam)

- Depth - 590m
- 49m thick
- Gas Con (~9.1-16m<sup>3</sup>/t DAF)

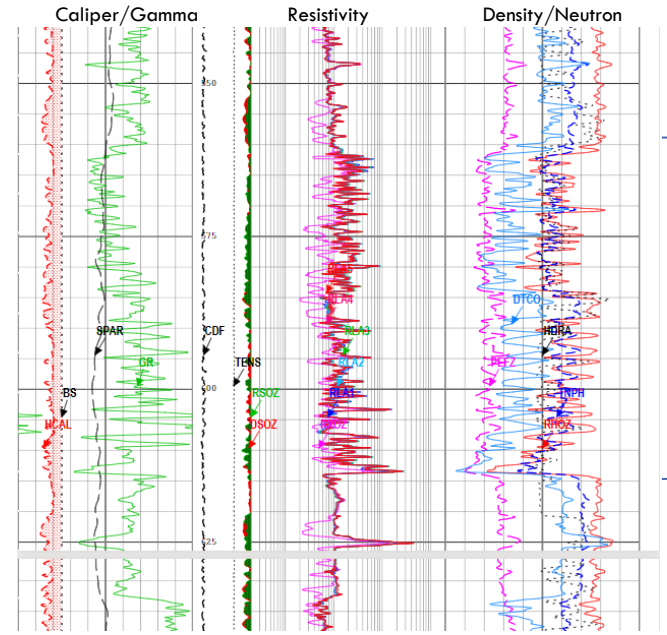
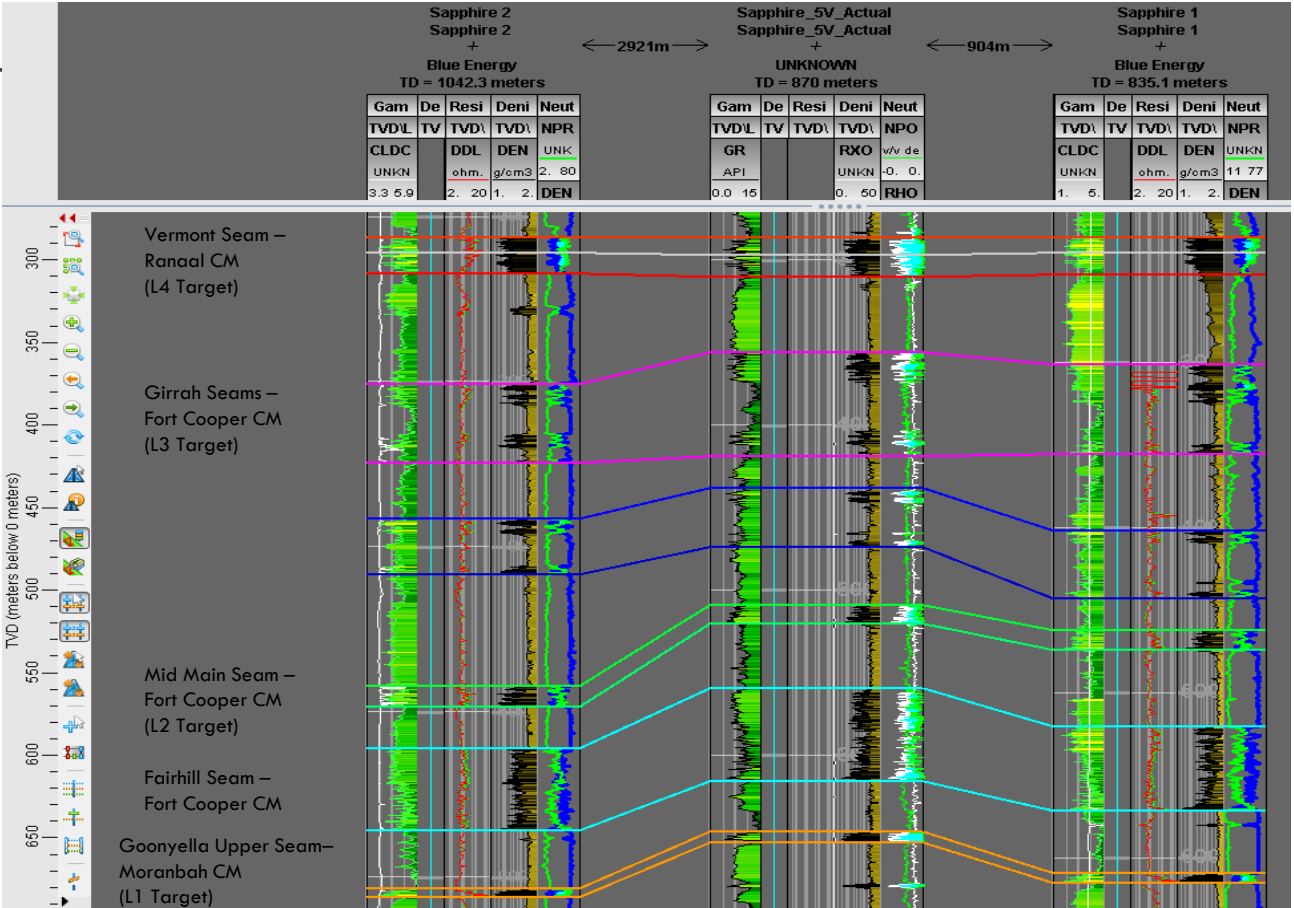
### L1 - Upper Moranbah (Goonyella Upper Seam)

- Depth - 650m
- 3.7m thick
- Very High Gas Con (~9.1-15.3 m<sup>3</sup>/t DAF)

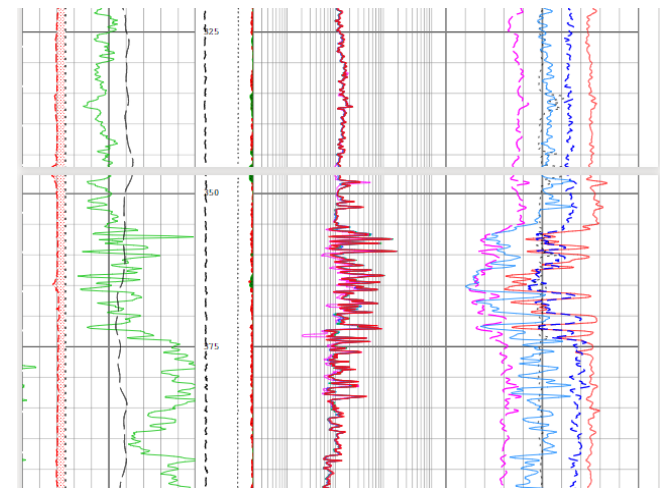


Deepest target seam targeted by L1 Lateral – drilled first for control of shallower targets

# UPDATING TARGET SELECTION ....POST VERTICALS – DIRECTIONAL RE-WORK ON THE FLY



Original Target (Fairhill)



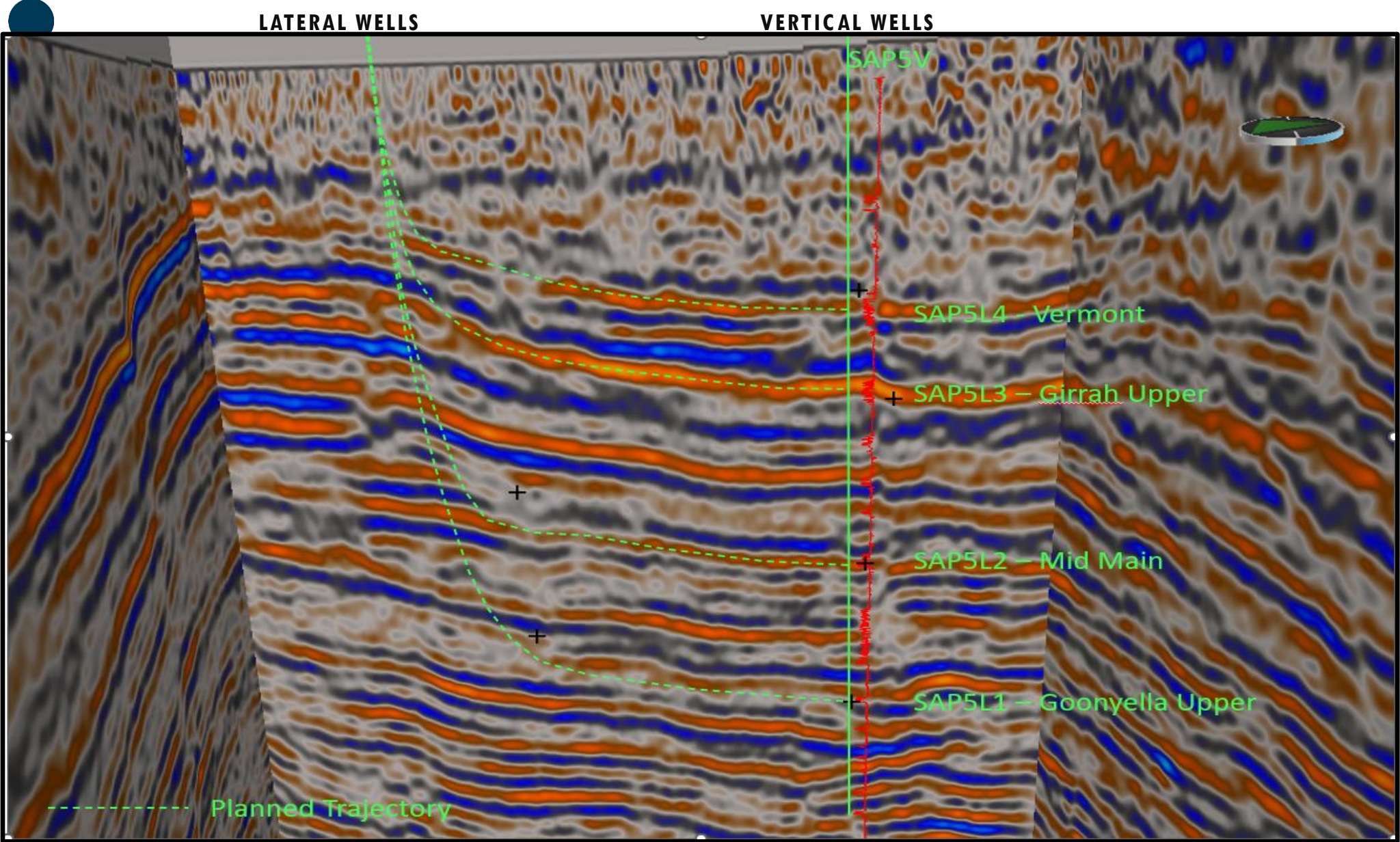
Post-Drill Target (Girrah Upper)

Fair Hill Seam (L2) target changed to the Girrah seam (Fort Coopers - Leo seam) after vertical well data obtained

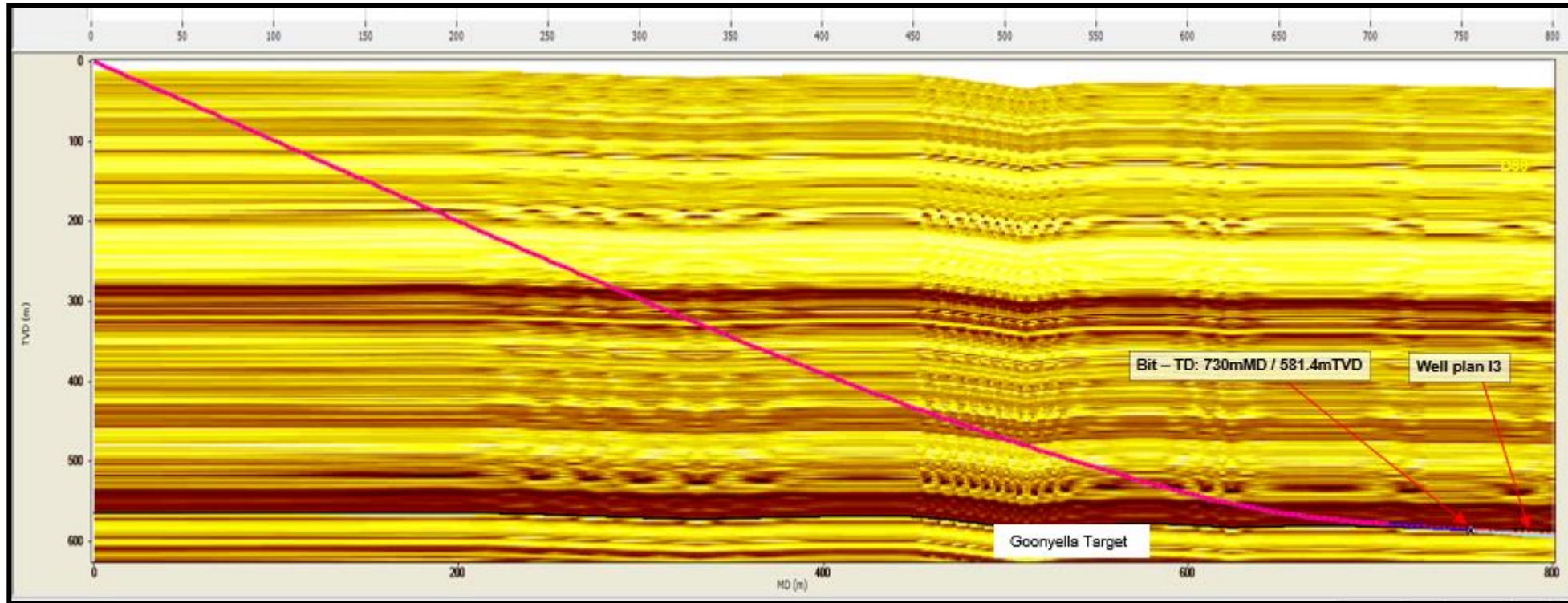
Targets now:

- L1 – Upper Moranbah
- L2 – Middle Main
- L3 – Girrah
- L4 – Vermont

# SEISMIC CORRELATION AND LATERAL TRAJECTORIES



# FIRST LATERAL INTERSECTION



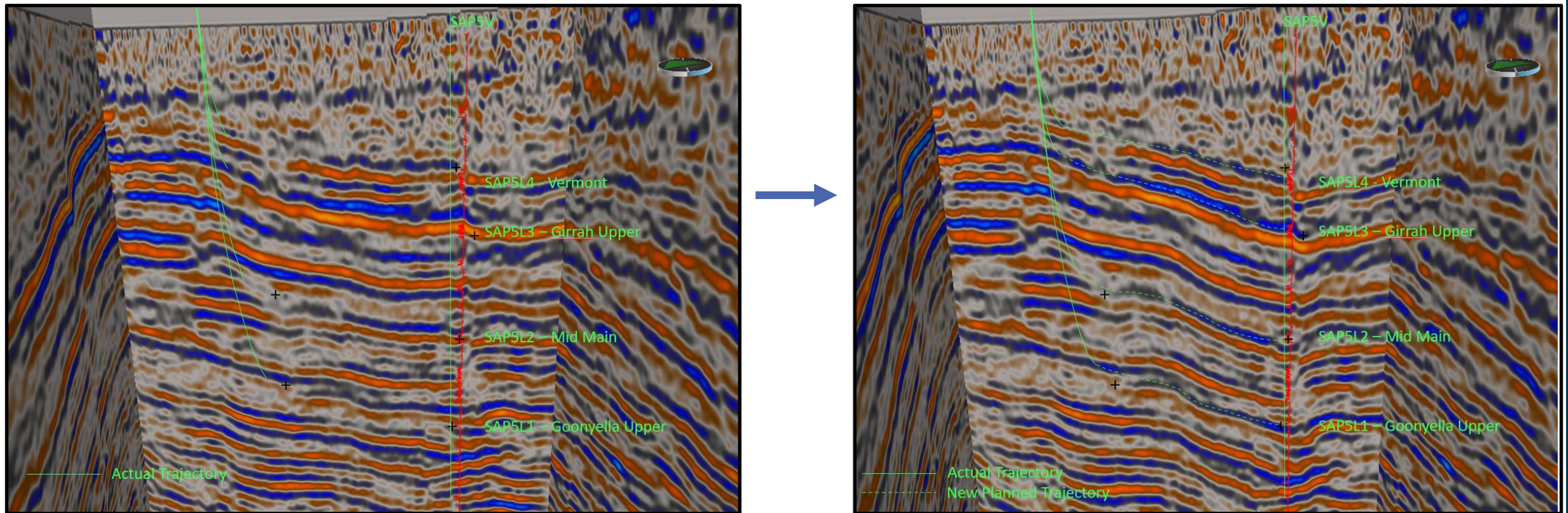
Lateral wells drilled by Sperry using gamma imaging tool.

First Lateral well (5L1) corelated back to the vertical well (5V) in real time by Blue Energy and Sperry Geosteering teams

Sapphire 5L1 – 35m high to prognosis in the lateral although on seismic and 1.5km from well control .... Needed to adjust

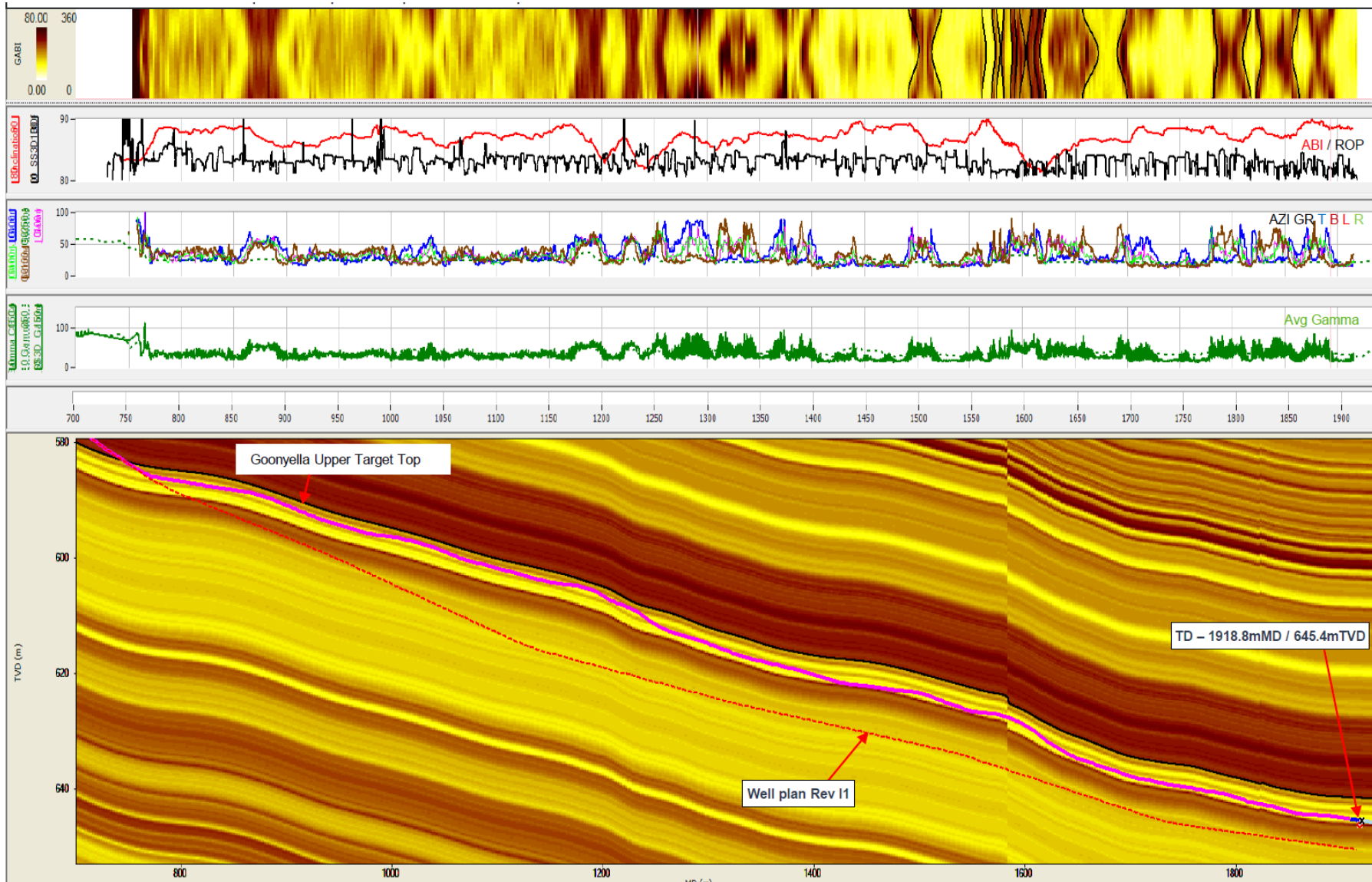
# REAL TIME SEISMIC VELOCITY RE-WORK FOR LATERAL TRAJECTORY UPDATE FROM NEW LATERAL AND VERTICAL WELLS

- Intersection of target seams defined in 5L1 (deepest) lateral well build section showed need for new depth prognosis/mapping in order to intercept target seams at 5V (makes no sense based on pre-drill work)
- Previous average velocity model for depth conversion updated to interval velocity model using vertical well data



- New interval velocity model used for updated lateral well seam depths and redefined target seam well trajectories.
- Blue would like to thank Landmark (Halliburton) for their support in rapidly updating our geological model

# Lateral Update



Successfully geo steering in the coal. Use of near bit gamma has enabled almost 100% in coal for the first lateral

# Conclusion

## Positives

- Use of existing seismic and well data significantly de-risked the well locations
- Batch drilling has been very successful, allow build sections and landing points to be optimised
- In seam steering has been very successful with ~100% in coal

## Learnings

- Check velocities as they can change over a very short distance
- Underestimated the strata variations in short distances (15m can make a difference)
- Even on a seismic line, geosteering can be difficult

## Forward Plans

- Sapphire 5 pilot should be online date in late October
- Sapphire 6 pilot should be on line before Christmas



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