

SOUTH WEST HUB CO₂ SEQUESTRATION

Investigating CO₂ storage in Western Australia

As the Lead Agency for Greenhouse Gas (GHG) storage in Western Australia, the Department of Mines and Petroleum (DMP) has three main roles:

- To regulate the development of GHG storage (Carbon dioxide)
- To provide pre-competitive data
- To provide assurance to the public that the operations are safe and that the GHG is removed from the atmosphere and safely stored underground for 1000 years.

Large power plants are located in the South West at Kwinana and in the Collie area with combined annual CO₂ emissions in the order of 27 million tonnes per year (Mtpa). Government and industry are collaborating to investigate the potential of the geosequestration of CO₂ in the deep saline formation of the Lesueur Sandstone in the southern Perth Basin. The objective of the South West Hub project is to store up to 6.5 Mtpa of CO₂ over an injection period of forty years. Two desk top studies analysed all the available data to locate an area in the Harvey and Waroona Shires that offers the greatest storage potential.

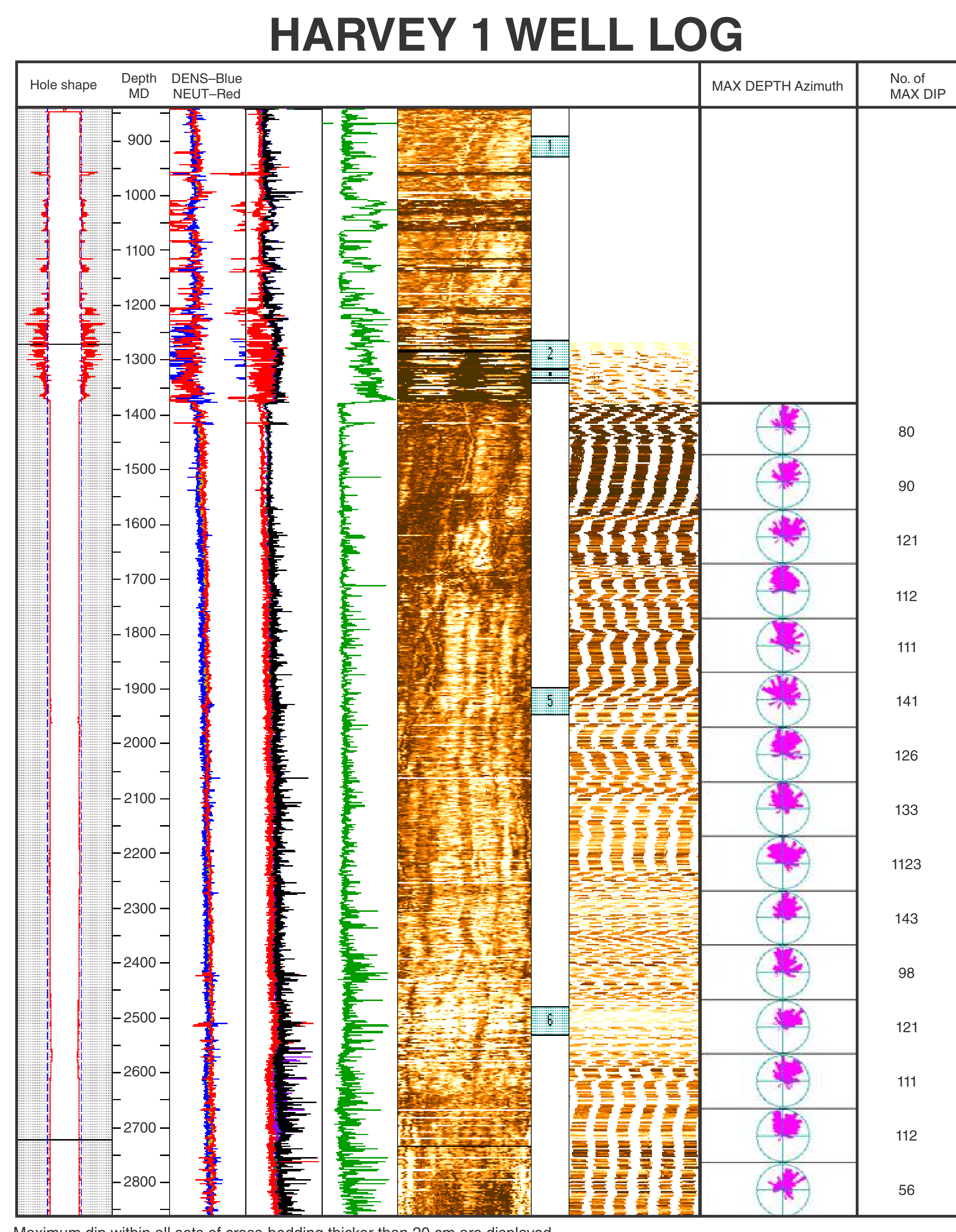
A 2D seismic study was conducted in March 2011 and the 2945-m deep Harvey 1 stratigraphic well was drilled in February and March 2012. This stratigraphic well obtained technical data and samples that reduce the uncertainty of storage capacity.

One of the more significant observations interpreted from Harvey 1 logs and core data is that an interval in the Wonnerup Member of the Lesueur Sandstone showed poor to good ranges in permeability, which reduces CO₂ injection constraints for the planned storage. A preliminary dynamic model, prepared by DMP and Schlumberger Greenhouse Gas Solutions, shows that the CO₂ plume does not reach the main faults in any of the scenarios in 1000 years.

Future work will acquire more pre-competitive data and may include:

- Drilling a slimhole well to 1000 m depth to further determine the thickness of the shale in the Eneabba Formation and the salinity of the Eneabba Formation and Yalgorup Member
- Acquisition of 3D seismic data which will give more information on the subsurface including fault distribution in the area
- Drilling data wells and conducting a trial injection

Indeed, a major GHG storage project such as the South West Hub moves from uncertainty to certainty in a series of staged evaluations that provides improved knowledge of the subsurface. These activities will assist DMP to assume its role as regulator once the project is operational.



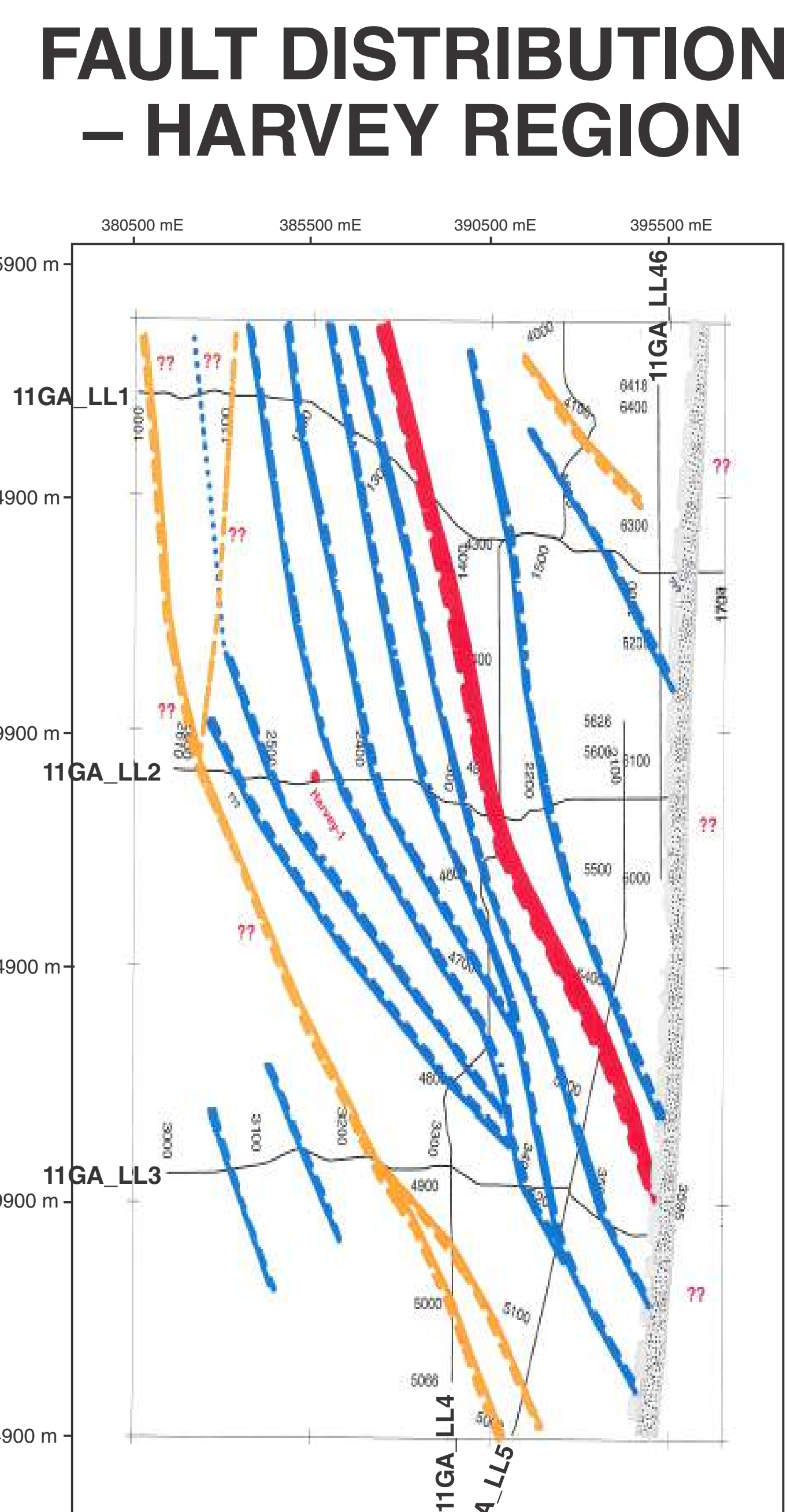
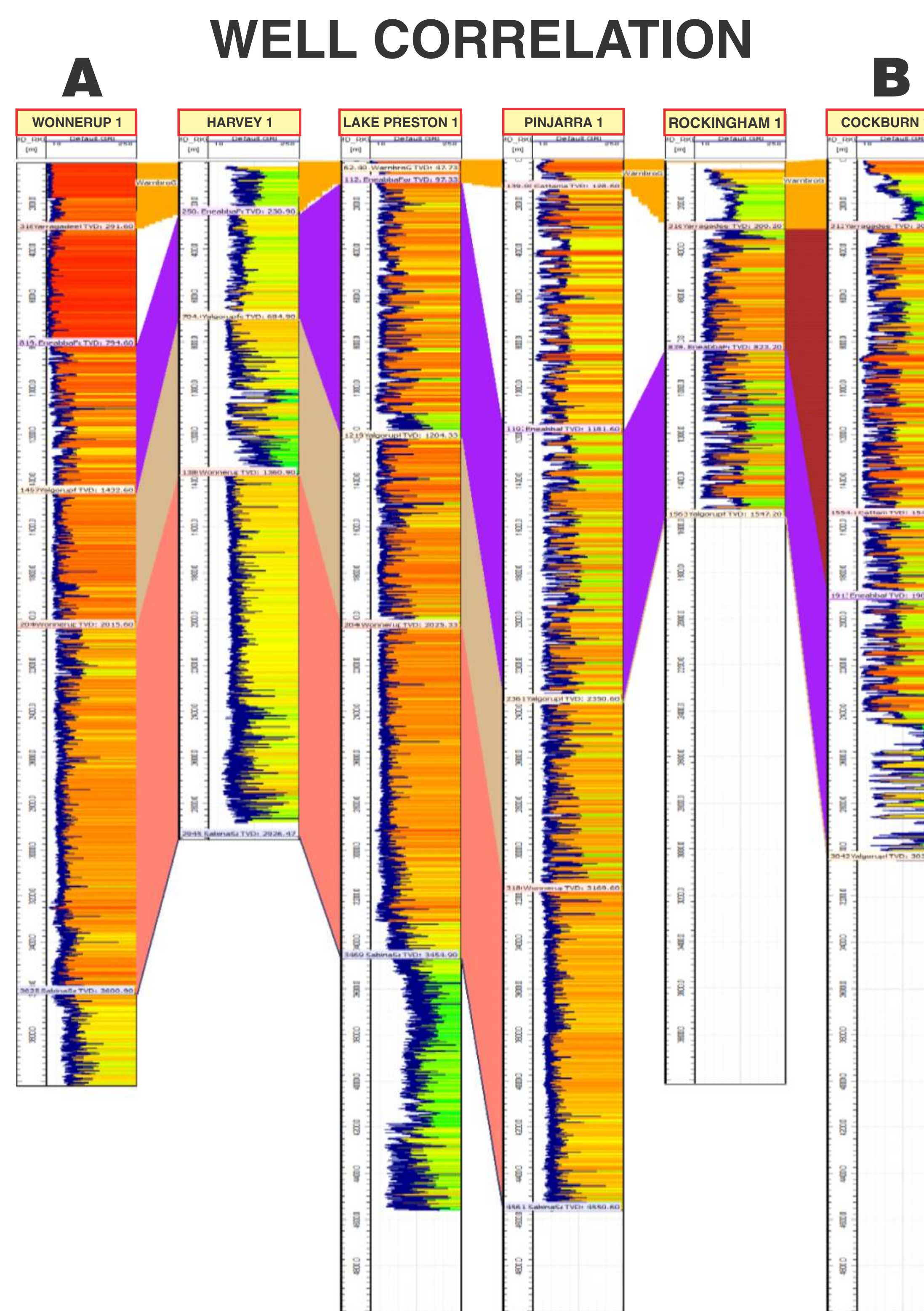
Overview of logged section, 841-2878 m, including core intervals.

Hole shape:
Blue curve = Bit
Red curve = Average Caliper

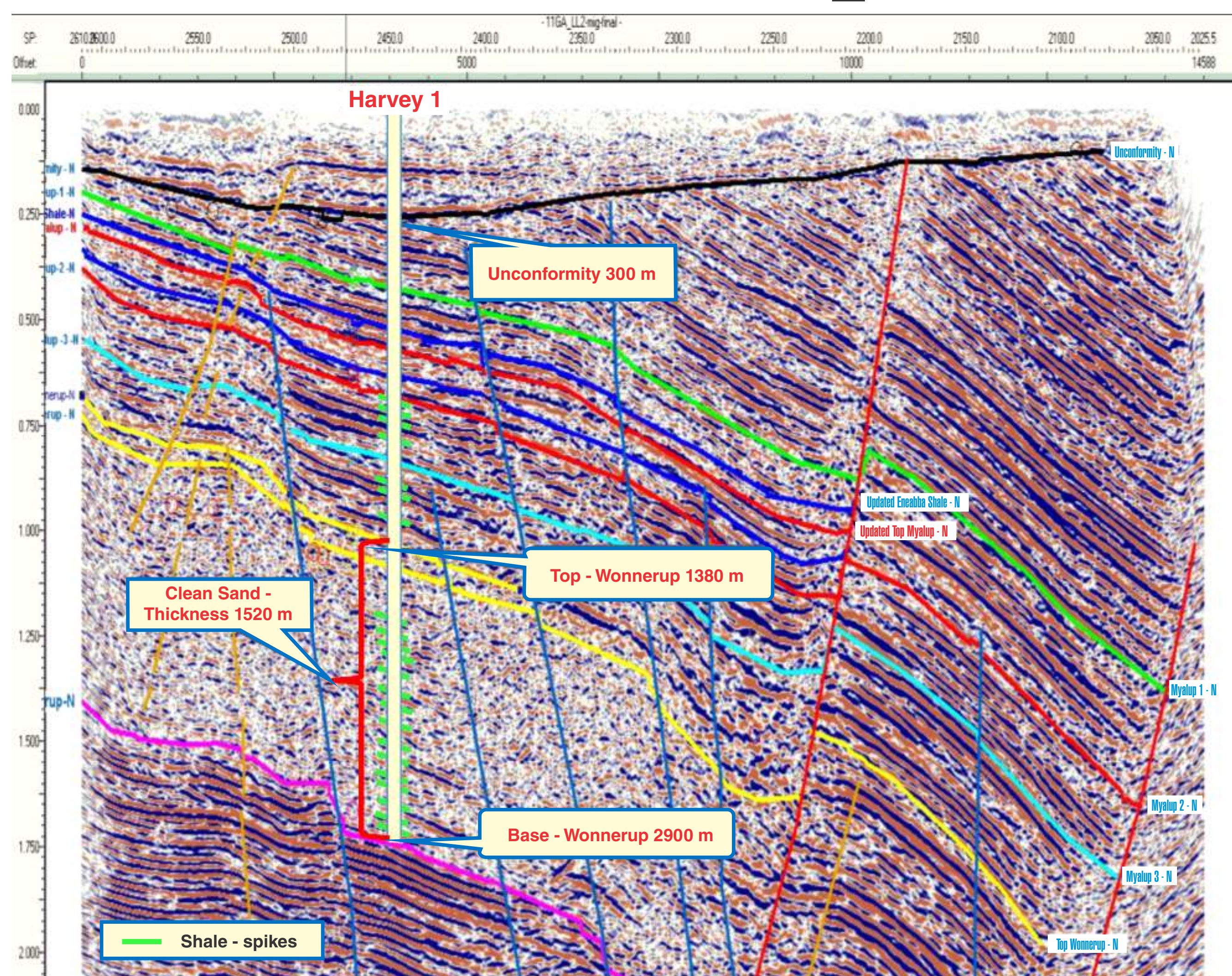
Borehole size 8.5 inch.
Enlarged borehole in top section (841-1370 m).

GR: scale 0-250

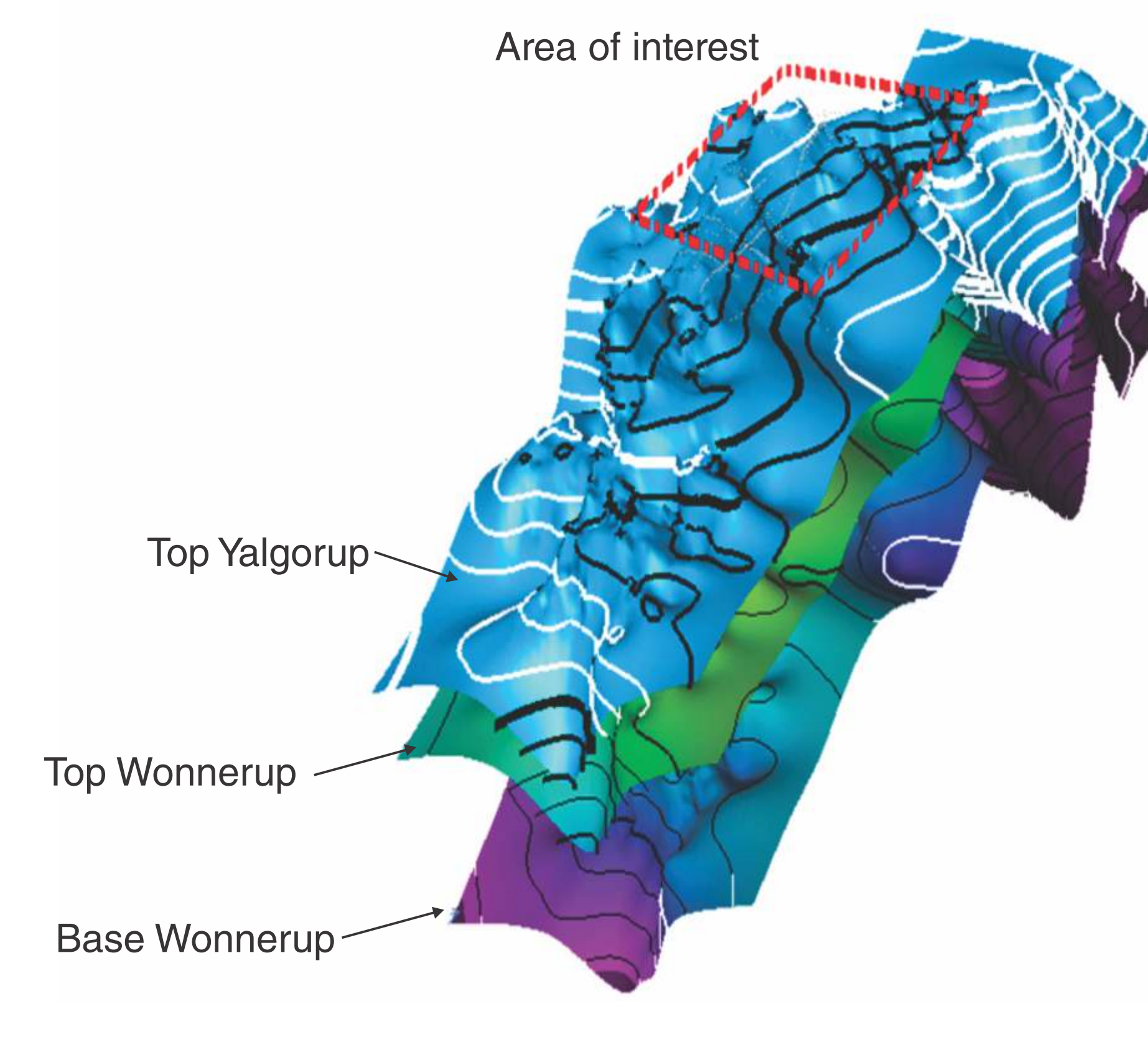
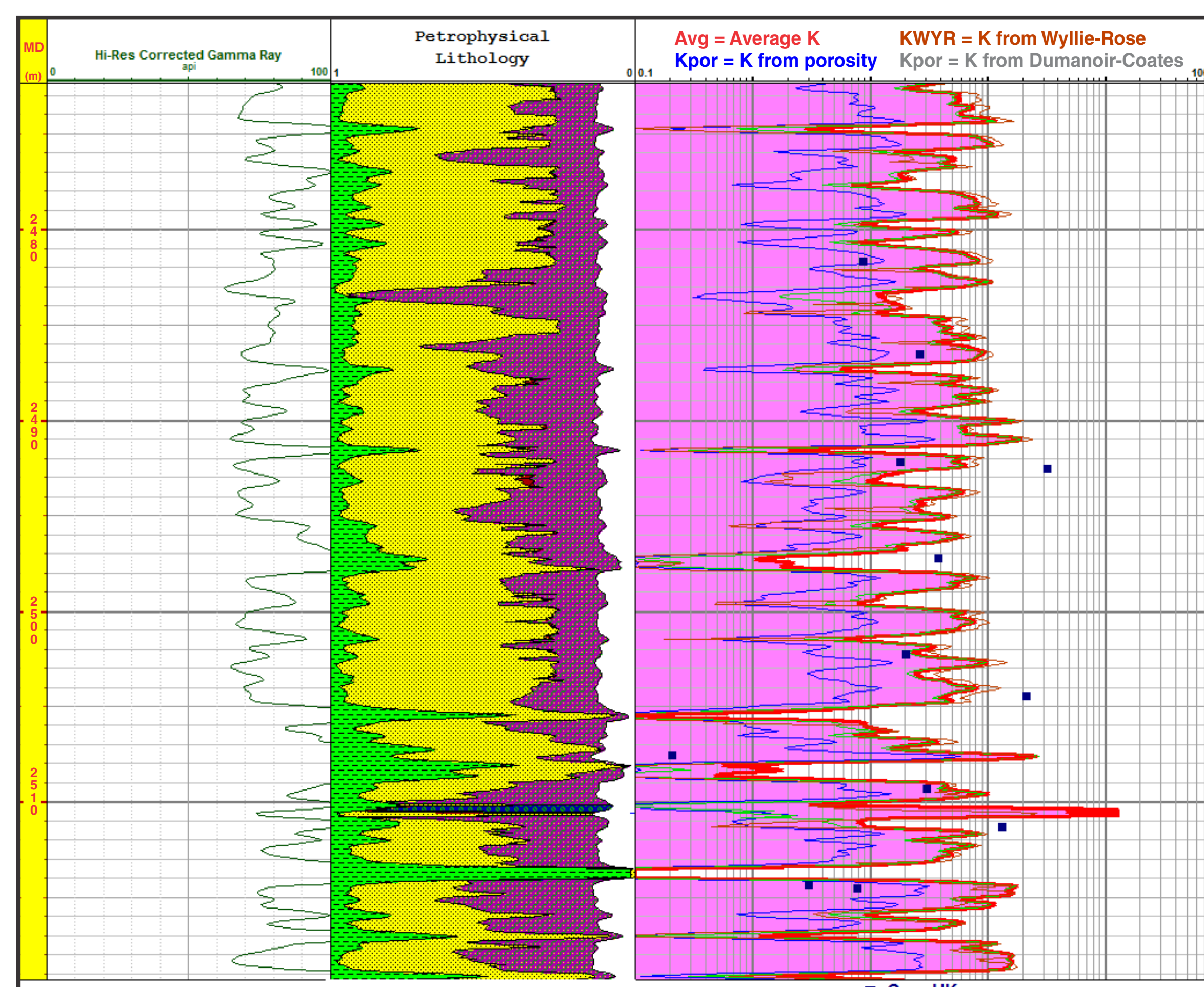
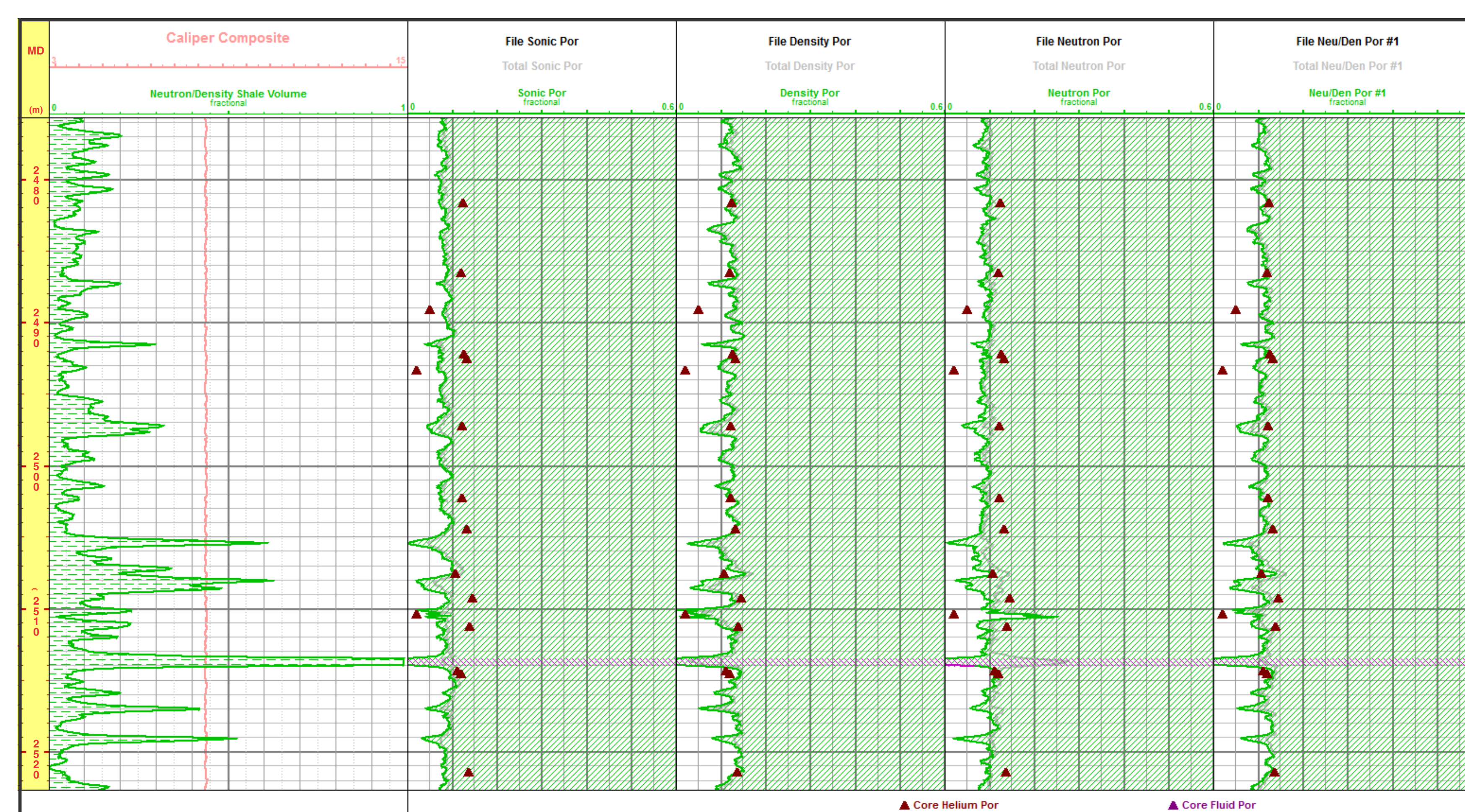
Core intervals, shifted depths:
Core 1 = 892.25 - 928.75 m
Core 2 = 1263.5 - 1314.5 m
Core 3 = 1317.4 - 1332.4 m
Core 4 = 1333.0 - 1341.0 m
Core 5 = 1896.4 - 1948.1 m
Core 6 = 2479.0 - 2531.0 m



2D SEISMIC LINE 11GA_LL2



RESERVOIR CHARACTERIZATION



STYLIZED REPRESENTATION OF THE PROJECT

