The NCPGG can conduct a full suite of petrographic and petrophysical analysis including:

- Thin section analysis, XRD, Image Analysis, Pore Casting, Isotope Analysis and Quantitative Chemistry, MICP, Porosity, Permeability, and CEC.

Current research includes:

- Investigation of the effects of clays on reservoir quality
- Influence of clays on log response and petrophysical properties
- Effect of clays on water saturation and the calculation of $S_w$
- The siderite-goethite-glaucyn reactions and their control on reservoir compartmentalisation and use in sequence stratigraphy
- The use of image analysis to define reservoir heterogeneity at pore level

Faults along the eastern margin of the Barrow Sub-basin act as conduits for formation waters, both from dewatering of the thick sedimentary pile to the west and from the exposed platforms to the east. Mixing of the waters in a zone of hydrocarbon biodegradation brings about the precipitation of calcite cement.

Reservoir sand under cathodoluminescence (CL) microscopy illustrates porosity enhancement by dissolution of quartz overgrowth (black).

Precipitation of siderite on the sea floor is related to an influx of meteoric water. This may indicate a hiatus and exposure and be used as evidence of high frequency relative sea level fluctuations.

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