

# **Ground Truthing Published Stratigraphic and Geochemical Information for Petroleum Exploration Programs: An Example from the Early Carboniferous of the Southeastern Bonaparte Basin, Australia**

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Comprehensive resampling of a series of Early Carboniferous cores from mineral exploration hole NBF-1002 in the southeastern Bonaparte Basin of northern Australia has led to the re-evaluation of previously published source rock identifications and the stratigraphy of that corehole, and a rethinking of the oil-source rock models. In addition, palaeontological information obtained from resampling exploration wells Spirit Hill-1, Weaber-1 and Keep River-1 indicates that major changes in formation thicknesses occur over short distances and that strata is missing in several areas by unconformity, non deposition or faulting or a combination of these.

Source rock samples from NBF-1002, previously thought to be from the Milligans Formation, were shown to belong to an older sequence separated from the Tanmurra Formation by a major erosional unconformity and cannot be used to infer that the Milligans Formation contains the source rocks of the Turtle, Barnett and Waggon Creek oils. The source rock story is more complex than previously thought and further work will be required to map the organic richness trends in the Langfield Group and Tanmurra Formation in the region. Organic-rich rocks are documented for the first time within the Tanmurra Formation in NBF-1002. The lack of source rock character attributed to this formation in the past may be more a function of a dearth of closely spaced sampling rather than an absence of organic matter.

This study shows that acceptance of previously published information can obscure the exploration picture, leading to erroneous exploration strategies and wasting of resources.