

TITLE: Relationship between Radiogenic Heat Generation and High Subsurface Temperatures in Sedimentary Basins in Western Australia

ABSTRACT TOPIC

Higher than normal subsurface temperatures are found in the Perth and Carnarvon basins in Western Australia. Both basins are known to be underlain by granitoid rocks which may possess higher than normal levels of the elements uranium and thorium, which in turn contribute to heat generation in those rocks. Airborne and ground radiometric data confirm the presence of radiogenic-granitoid rocks surrounding the Perth Basin, which are believed to be the cause of the observed elevated subsurface temperatures in that basin. Heat generation in these granitoid rocks typically ranges between 2 and 20  $\mu\text{Wm}^{-3}$ . New radiometric data for crystalline rocks, inferred to underlie the high subsurface-temperature regions of the Carnarvon basin, also indicate regions of anomalously high uranium and thorium. Brief reference to other high-radiogenic rocks in Western Australia and possible implications for heat flow is also made. One and two dimensional static heat-flow models, incorporating new upper-crustal radiogenic information, for the Perth and Carnarvon basins have been developed. The models are used to review the thermal history of these basins.