

B. PORE PRESSURE QUANTIFICATION

Pore pressure quantification can be made from either empirical data such as well kick information, or from pressure parameter data such as seismic data, drilling data (including drilling exponents and shale density), and wireline log data. The quantification of pore pressure from pressure parameter data requires the knowledge of the normal pore pressure for the area, the establishment of a normal shale compaction trend line on a plot of the pressure parameter deviation from normal and abnormal pore pressure which causes such deviation.

The normal pore pressure for all areas can either be assumed to be 8.3-9.0 ppg EMW (Equivalent Mud Weight) on a rank wildcat well, estimated from formation tests data gathered in the area of interest, or calculated from wireline log formation salinity data.

Pressure parameters described above usually increase exponentially with depth in normally pressured clean shales. Thus a "normal compaction trend" can be identified by a best fit line drawn through clean shale points which form a linear trend on the plot when the pressure parameter scale is log and the depth scale is linear. This trend line represents the normal pore pressure and quantification of geopressure can be made by noting the divergence from this trend line. It should be noted that the above mentioned pressure parameters reflect changes in porosity, and hence compaction only, and do not reflect changes in pore pressure from other causes.

The magnitude of pore pressure can be estimated by the use of overlays, calibration curves, rock matrix stress analysis, or variable overburden method. However, the overlays and calibration curves should ideally only be used in the areas where the empirical well data, used to derive the pore pressure versus pressure parameter departure relationships, was obtained. Differences in lithologies, sediment age, pore water density, and overburden, compaction and cementation rates between areas can produce significantly variant departure relationships. Ignoring this can result in invalid and misleading estimations. In a rank wildcat area where no established empirical guides are available, a