APPLICATION OF RELATIVE ACOUSTIC IMPEDANCE INVERSION TO CONSTRAIN EXTENT OF E SAND RESERVOIR ON KADANWARI FIELD

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Both AVO modelling and acoustic impedance inversion studies have been undertaken recently on seismic data over the Kadanwari Gas Field in an attempt to constrain the extent of the E sand reservoir, particularly in the K-1 0/K-11 block. The AVO and acoustic impedance inversion studies were performed in-house using Hampson-Russell software. The AVO modelling work concluded that there is no significant differentialmoveout between a gas sand and a brine saturatedsand, so inversion is the preferred method to delimit the extent of E sand reservoir. Model based acoustic impedance inversion and relative acoustic impedance inversion methods were tested on seismic line TJ89-503. Model based inversion was shown to be strongly influenced by the background model and this leads to artefacts in the inversion which are not representative of the geology. Relative acoustic impedance (RAI) inversion, which does not rely on an initial model, is therefore the preferred method.

The steps required to produce a RAI seismic section are firstly to convert to zero phase. This was achieved by extracting a wavelet using the K-4 well and applying zero phase (wavelet) deconvo lution. After wavelet deconvolution, the RAI section was obtained by trace integration of the decon volved seismic section.

Forward modelling of the reservoir response concluded that gas saturation has some influence on seismic reflection amp I itude of the E sand interval. However, the E sand in the northen part of Kadanwari Field is generally below tuning thickness and here it is thickness changes which primarily control amplitude changes for the E sand reservoir. The southerly well K-4 has E sand at approximately tuning thickness and thus has strong reflectivity. This reflectivity is found to diminish with thinning E sand reservoir towards the north of the field.

RAI invers ion sections of the seismic data together with the forward modell ing work have provided additional confidence in de lineating E sand reservoir extent over the l(adanwari Field. The RAI sections have improved the understanding of the presence and distribution of the E sand reservoir, and were used to assist tn selecting the location for the K-12 well. In the K-1 0/K-11 block, an interpretation of bright RAI downdip from the existing and proposed wells suggests that there may be some thickening of E sand reservoir to the east, perhaps up to tuning thickness. This observation has implications for reservoir management.