Abstract

Seismic data processing in time domain or Pre-Stack Time Migration (PSTM) has disadvantage in case of high lateral velocity variations in the seismic data. It caused PSTM velocity did not generate as real velocity model. Root Mean Square (RMS) velocity which assume seismic velocity increase along with depth was used in PSTM processing. This assumption was not valid if the lateral velocity variations happened. In this final assignment there were lateral velocity variations with the presence of carbonate. The carbonate rock has a high velocity. According to that condition, the advances seismic processing was needed. It had been done using Pre-Stack Depth Migration (PSDM) method.

PSDM method consider the lateral variations of velocity. Interval velocity model in depth domain was used as input in migration. Ray tracing assumption was used in the model. in this research, the model was aimed using Dix transformation and coherency inversion. Used Dix transformation in first and second layer because this transformation could only be used in flat and low lateral velocity variation’s layer. Coherency inversion was used for third layer and next layer. Layer by layer analysis has been done by ray tracing. The interval velocity model aimed from dix and coherency inversion had repaired using horizon base tomography until near offset gather became flat. The
conventional PSDM method showed a better reflector continuity rather than PSTM.

After conventional PSDM had done, several far offset gather were not flat yet. There were hockey stick effect. This effect in far offset were reduced by PSDM VTI method. Fourth Order Normal Move Out (NMO) equation was used in PSDM VTI method with epsilon parameter as input. Epsilon parameter was aimed by semblance epsilon analysis from full fold depth gather. Interval epsilon and interval velocity model were used as input in migration process. It resulted VTI depth gather. The reduction of hockey stick effect were shown in VTI depth gather. The far offset gather were relatively flat. Stack result showed that PSDM VTI was able to show the continuity of reflector and show fault feature more optimal.

Keywords: PSTM, Conventional PSDM, PSDM VTI, Fourth Order NMO, Hockey Stick Effect.