

## Role of robust velocity model for reservoir characterization

*Ritesh Kumar Sharma<sup>+</sup>, Satinder Chopra<sup>+</sup> and Larry Lines<sup>\*</sup>*

*<sup>+</sup>TGS, Calgary, <sup>\*</sup>University of Calgary*

While seismic data are acquired and processed in the time domain, well data are obtained in the depth domain. Similarly, AVO analysis or seismic impedance inversion (pre-stack, joint) are performed in the angle-domain, even though input seismic data used in the analysis are available in the offset domain. Velocity plays an important role in the transformation of depth to time as well as offset information into angle information.

Two types of velocities, namely seismic and well-velocity, are available for analysis. During processing of seismic data, the velocity analysis yields the RMS velocity field. This velocity field can then be converted into an interval velocity field using Dix's relationship, which besides knowledge of RMS velocity requires the two-way travel time at zero offset. As well velocity is considered as the ground truth measurement, it is tempting to use it for domain conversion. However, it needs to be decided whether the horizon-constrained velocity model derived from a single well would be good enough to represent the whole 3D seismic volume, or more well data need be considered in the analysis.

In the current study, problems associated with seismic velocity along with well-velocity are considered. Then, a workflow that makes use of seismic velocity and well-log data to build a robust velocity model building is discussed. Thereafter, we carry out a comparative study in terms of fracture intensity and orientation attributes derived by way of VVAz/AVAz analysis, using seismic velocity and well-velocity. Finally, we make an attempt to correlate them with some other attributes derived independently, such as brittleness index using simultaneous inversion and production data.