Using the Fused Fault Block Technique to Model Low Angle and Thrust Faults

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Reservoir grids often have problems in correctly modeling low angle and thrust faults. Pillar gridding methods of fault modeling have limitations when fault dips are less than 45 degrees; it is usually difficult if not impossible to stair-step, or regularize, the cell edges in Z along these faults. Fault/fault intersections of low angle faults also present their own sets of difficulties; modeling systems often do not allow staircasing of two intersecting low angle faults. As vertical cell edges are frequently desired for a simulation grid, faults are shifted or modified to meet the requirements of the modeling system. The limitations thus prevent the reservoir engineer from using a correct geologic model, and different parts of the asset team no longer use a truly shared earth model. The fused fault block approach to fault modeling eliminates these restrictions.

This technique does not use pillars or nodes to define a fault network, but rather uses a modified binary tree where implicit fault relationships do not require an explicit definition in the tree. Using this technique, not only can a correct geologic model be built, but the reservoir grid calculated from this model can be generated with aligned or stair-cased cells as the engineer desires. With thrust faults, the staircased grid maintains the layer connections across the faults, allowing this grid to be used for facies modeling, attribute modeling, or reservoir simulation. All parts of the asset team can now use the same model, even in areas with extremely complex fault patterns.