Types of Directional Well Profiles

There are three basic well profiles considered while planning a directional well.

A Type ONE Well is made up of a kick off point, one buildup section and a tangent section to target.

A Type ONE Well is also called a “J” Well or A Build and Hold Trajectory.

The Type ONE well is drilled vertically from the surface to kickoff point at a relatively shallow depth.

From the kick off point, the well is steadily and smoothly deflected until a maximum angle and the desired direction are achieved.

Usually this method is employed when drilling shallow wells with single producing zones.
A Type TWO Well is made up of a vertical section, kick-off point, build-up section, tangent section, drop-off section and a hold section to target.

A Type TWO Well is also called an “S” well because of it’s profile.

Like Type ONE Wells, the Type TWO well is drilled vertically from the surface to a kickoff point at a relatively shallow depth.

From the kickoff point, the well is steadily and smoothly deflected until a maximum angle and the desired direction are achieved.

The angle and direction are maintained until a specified depth and horizontal departure has been reached.

Then, the angle is steadily and smoothly dropped until the well is near vertical.

Finally the angle and direction is maintained till we reach the target depth.

A disadvantage of the Type TWO is that it will generate more torque and drag for the same horizontal departure.

Usually this method is employed to hit multiple targets or to avoid faulted region or to minimize the inclination in the zone which will be fractured during completion or for sidetracking.
A Type THREE Well is made up of anyone of the above profiles plus a horizontal section within the reservoir.

A Type THREE Well is also called a Horizontal or Horizontal Directional well.

From the kick off point, the well is steadily and smoothly deflected, usually at a 10 Degree per Hundred feet build rate until a maximum angle of 90 degrees is obtained and the desired direction are achieved.

The wellbore True Vertical Depth usually remains the same as the TVD of the well at the start of the horizontal section. However, if the horizontal section is not drilled at 90 degrees or there are variations of dip within the reservoir, the TVD can increase with a down dip and decrease with an up dip.

Horizontal drilling is used to produce thin oil zones with water or gas coning problems, used to increase productivity from low permeability reservoirs by increasing the amount of formation exposed to the wellbore, and used to maximize production from reservoirs which are not being efficiently drained by vertical wells. Currently Horizontal drilling is used in “Unconventional” Shale plays that are “Fracked” in order to produce hydrocarbons, either oil or gas.