APPLICATION OF STURCTURAL GEOLOGY TO PETROLEUM

Structural Geology for Petroleum Applications. This course is delivered in 3 hour segments over 3 days. The course is delivered by virtual means using Skype for.

At the end of the session, students will have a clear understanding of how and why structures happen. Day 2 Session Two 3 hours - Expression of Structure Ductile Deformation - Folding Brittle Deformation - Faulting Brittle Deformation - Fracturing This session is devoted to understanding the types of structures that can be formed, how they are formed, and how to recognise and describe the structure. After decades of declining production in North America, saw the largest production increase ever2 and, as a surprise to most watchers, the prospect of an energy independent and energy secure future for North America is predicted within most of our lifetimes3. These can be dated to know when the structural features formed. While the traditional applications of qualitative and descriptive structural geology remain central to the story of industry development the quantitative and predictive aspects are growing in importance as the industry more routinely ventures into physically and environmentally challenging realms. An understanding of the variety of geological structures is important, because it helps to determine the nature of subsurface structures from geological maps. The interpretation of geological maps is basically an attempt to visualize and understand the complex shapes of rock units in the subsurface. In nature there is no pure elastic, viscous or plastic deformation; all types of deformation take place altogether but in different proportions. This will be discussed at all scales, from scall-scale to regional. Session One 3 hours - Structural Concepts and Fundamentals Forces - Stress and strain Tectonics - Extensional, Compressional, Strike-Slip Scale - Regional to Microscopic Students will gain an understanding of the forces involved in the creation of structure, and of the relationship between those forces and the subsequent structure type. New York. Structural geology, therefore, is a major cornerstone of the art of geological map interpretation. The three basic categories - folding, faulting, and fracturing - will be covered, with respect to their relevance to the petroleum industry and their ability to create petroleum traps. We can learn how to interpret geological maps and know the structures in them such as folds and faults. It is important for PSG types to have as much experience as possible in these topics: structural analysis in the brittle realm global tectonics and continental margin geodynamics seismic interpretation development of 3D digital models physical rock mechanics and reservoir geomechanics hydrology and fluid flow in porous media crustal heat flow. They vary in size from microscopic crinkles to mountain sized folds. If the nature of these rocks can be determined, petroleum geologists can discover if oil or natural gas are trapped within the rocks. Structural Geology for Petroleum Geologists. Folds are formed when the flat and planar surfaces are bent or curved as a result of plastic deformation. Topics in this area include predicting the pore pressure environment; characterizing and modeling the coupled nature of deformation and fluid flow in stress-sensitive, faulted, fractured and compliant reservoirs; predicting and managing production-related deformation in reservoirs and their overburden to ensure operational integrity; deriving detailed models of subsurface stress and rock strength for horizontal drilling and stimulation of low permeability reservoirs; analyzing laboratory rock mechanics data and many other topics. At the end of the session, students will understand how to recognise and classify structure. Oil was flowing from surface anticlines in the foothills of the western Appalachians and the well control incident at the crest of a salt dome at what would become Spindletop Field in southeastern Texas was still 13 years away1. The main target of structural geology is to use measurements to understand the stress field that resulted in the observed strain and geometries. It is quite impossible for single individuals to be an expert in all of the topics stated above but a broad yet quantitative technical background is important for success as a PSG practitioner. The greatest compressive stress is normal to fold axial planes. This contribution is a discussion of what constitutes the modern dimensions of Petroleum Structural Geology, the skills and experience that are desired in its practitioners, and recommendations for how the links between academia and industry can be made more productive. While the need for customary applications of structural geology in the petroleum industry has not waned, in the last few years the importance of reservoir geomechanics has increased many-fold. An essential importance of structural geology is to know areas that contain folds and faults because they can form traps in which the accumulation and concentration of fluids such as oil and natural gas occur. It spans spatial scales from tectonic reconstructions to

SEM-imaged rock-fabrics. At the end of this session, students should be able to perform functional interpretations from these types of data.