ONE-DIMENSIONAL BURIAL HISTORY MODEL SHEDS NEW INSIGHTS INTO THE PETROLEUM SYSTEMS IN THE VALLECITOS AREA AND OIL FIELD, SAN JOAQUIN BASIN, CALIFORNIA

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The Vallecitos syncline is a westerly structural extension of the western San Joaquin basin. By the end of 1959 the Vallecitos field, comprised of eight separate producing areas (Griswold Canyon, Franco, Cedar Flat, Ashurst, Silver Creek, Pimental Canyon, Central, and Los Pinos Canyon), had produced approximately 2.2 MMBO and 1.5 BCF of gas from Cretaceous and Paleogene reservoirs. Cumulative oil and gas production through 2007 in the Vallecitos area reached 5.4 MMBO and 3.9 BCF, respectively (California Division of Oil, Gas, and Geothermal Resources, 2008). However, dispersed oil accumulations in the Vallecitos area make the oil and gas exploration challenging. In order to better understand the petroleum systems in the areas and demonstrate oil generation locally, 1D burial histories have been generated for the Vallecitos areas. Prominent features of the Vallecitos syncline documented in published works include complexities of subsurface geology and rock records of tectonic events. These are important for understanding the origin of the oils captured in the present day traps in this syncline.The 1D model is based on a pseudo-well placed at the axis of Vallecitos syncline where the overburden rock above the uppermost Cretaceous Moreno Formation is thickest. The pseudo-well is compiled from two nearby wells, Ne-Tex 1and Ortis 48-24. Using a cross-section through the pseudo-well and these two wells, there appears to be no basis for adding additional eroded stratigraphic section to the model, even though significant erosion did remove significant overburden rocks on the flank of the syncline. The thickness of the stratigraphic section and migration of the Mendocino triple junction were considered in terms of the heat flow for the model. Results suggest that the bottom and the top of the Cretaceous Moreno Formation reached thermal maturity at 19 Ma and 9Ma, and the synclinal Eocene Kreyenhagen Formation became thermally mature 4 Ma. It is highly likely that the Kreyenhagen Formation with Maximum transformation ratio (TR) (~18%) in relatively recent time is a minor source contributor to the oils. Those results differ from those obtained from the early studies in terms of source origins of the oils in the syncline.The Eocene Kreyenhagen Formation was believed to be a significant source rock and the deep sources were dismissed.