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SEISMIC RESERVOIR MONITORING OF EOR PROCESS IN HEAVY OIL RESERVOIRS

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Abstract

Seismic reservoir monitoring can be done by comparing the results of repeated or time lapse seismic data over the same area. This technique is also known as 4D seismic, where the fourth dimension is time. Seismic reservoir monitoring is done to monitor changes in the reservoir because of production or an ongoing recovery process. The monitoring of changes in the reservoir can help in locating un-swept zones in the producing reservoir and monitor the recovery process. Producing crude from heavy oil reservoir is a challenging task as the heavy oil is less mobile due to high viscosity. Due to this fact, primary recovery factor from heavy oil reservoir is generally low, hence enhanced oil recovery (EOR) processes like steam injection and fire flooding/in-situ combustion are applied to mobilize the immobile oil in the reservoir by reducing its viscosity. Whenever an EOR process is implemented, reservoir properties change. This leads to a change in seismic response of the reservoir, which can be monitored using the time lapse seismic data. Thus, in this paper we discuss the effectiveness of seismic reservoir monitoring in enhancing the production of heavy oil by citing examples from various heavy oil fields.

Keywords: 4D Seismic, Enhanced Oil Recovery (EOR), Heavy oil, In-situ combustion and Steam injection.