TRIGGERED EARTHQUAKES AND MITIGATION OF SEISMIC RISK IN THE REGION OF LARGE GAS FIELD

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The severe earthquakes 6.0 M 7.3, which are occurred last years in regions of major oil and gas field extraction in USA, Italy, Turkmenistan, Russia, Uzbekistan testify possible influence of engineering activity of man on isostatic and hydrodynamic conditions of Earth crust, redistribution of acting tectonic forces. This phenomenon can lead to changing or appearance of local seismic activity and constitutes a major portion of the seismic risk to the structure and human lives. The economic, social and environmental importance of a proper understanding of the phenomenon is obvious.We would like to present results of seismic monitoring in the regions of large gas-oil fields of Uzbekistan (Gazli, Shurtan), analysis of structural and tectonic setting conditions of earthquakes, connected with world large gas -oil fields and comparison with exploitation regime. It has been revealed two main regularities of strong earthquake occurrence in the vicinity of large gas-oil fields: a) presence of regional tectonic compression conditions and b) initial gas-oil pressure drop in reservoir - 50%. The method of kinematic and dynamic parameters forecast of probable triggered earthquakes in the conditions of adopted gas field exploitation regime has been proposed. This approach has been implemented for assessment of maximal probable triggered earthquake in vicinity of Shurtan gas field (South Uzbekistan). Seismic monitoring in regions with different geologic, tectonic, hydrogeologic conditions allows work out generalized geomechanical model of triggered seismicity phenomenon, caused by oil- gas extraction and recommendations for optimal exploitation regime, reducing environmental impact of fluids withdrawal.