



Abnormal gas wells' pressure before and after the Wenchuan earthquake of Zhongba gas field in Sichuan province

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The gas well pressure data of Zhongba gas field in the vicinity of Longmenshan fault zone were analyzed in this paper and significant changes were found in most of oil wells before Wenchuan earthquake on May 12, 2008. The well pressures of 7 deep wells at Lei-3 gas storage layer with mining depth of 3100m simultaneously rose with rates greater than 35-130% from April 8 to May 5 and recovered from May 6 to the occurrence of earthquake. At the same time, the pressures of most of 24 gas wells at Xu-2 gas storage layer with mining depth of 2400m decreased slowly with the maximum rate of 45%; the pressures of a few wells rose before the earthquake, especially No.52 and 63 wells appeared 24% and 15% increases of well pressures around May 5. Several days before the earthquake, the well pressures at the two gas storage layers basically returned to normal values. After the earthquake, the changes of well pressures are varied, but most of them recovered after increasing for 7-8 days. The physical mechanism of abnormal changes of wellhead pressures at the two gas storage layers with different mining depths before the earthquake is also discussed. Based on the dilatancy theory of earthquake precursors and gas dynamics process of hydrocarbon migration during the development of earthquake, this paper gave a possible explanation of the physical mechanism of abnormal well pressure changes.