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Sour gas occurrence in the South Pars gas field in Iran and the mitigation challenge

Научный руководитель – Краснова Андереевна Елизавета

Голизаде Хамидреза

Postgraduate

Московский государственный университет имени М.В.Ломоносова, Геологический факультет, Кафедра геологии и геохимии горючих ископаемых, Москва, Россия

E-mail: h.gholizadeh@mail.ru

The enormous number of world's hydrocarbon resources are significantly contaminated by hydrogen sulfide (H2S), which generally is an unpleasant component of natural gas due to its role in triggering toxicity and depreciation of gas sales value [1,2,5]. The South Pars field is located in the Persian Gulf waters and it is the northern extension of Qatar's North Field [‎3]. Main gas-bearing formations in the field are the Upper Permian to Lower Triassic carbonate series of Dalan-Kangan Formation [4,‎6]. In the South Pars gas field, reservoir temperature ranges from 85 to 105 °C from top to the bottom part of the reservoir (2600-3500 m burial depth), and the average reported H2S concentration is 10,000 ppm (1%) [1,3]. Despite existing uncertainty about interpreting the origin of hydrogen sulfide in this field, it deems that thermochemical sulfide reduction might be the coral mechanism for the occurrence of this phenomenon [‎3,‎5]. Accurate forecasting for H2S distribution within the reservoir can lead to a successful mitigation strategy. H2S distribution within reservoir can be traced by several innovative technologies such as S^{34}/S^{32} Isotope ratio analysis, Bacterial DNA sequencing and QEMSCAN mineralogy[1], among which, DNA analysis, due to its low cost and responsibility of Sulfate Reduction Bacteria as the chief factor in reservoir souring process during production, might be considered as an optimum option.

The objective of this study is to establish the controls on the occurrence of the H2S as an undesired component in Late Permian to Early Triassic Dalan-Kangan Formation of the South Pars gas field in the Persian Gulf area, Southern Iran.

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