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开发工程

呼图壁地下储气库气井冲蚀产量模型及其应用

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摘要:

气井临界冲蚀产量是地下储气库气井配产的重要参考因素之一。为此, 根据经典计算模型, 结合气藏工程原理, 详细研究并推导了适合于准噶尔盆地呼图壁地下储气库气井冲蚀产量的模型公式; 并据此公式分析了影响冲蚀产量大小的主要因素(管柱内径、流动压力和气体温度等)与影响规律(冲蚀产量与管柱内径、流动压力呈正比关系, 与气体温度呈反比关系, 且受管柱内径变化的影响较大); 在调研大量文献的基础上, 参考国内其他地下储气库的资料, 结合呼图壁地下储气库的实际情况, 确定了该储气库气井的经验常数 C 值大小; 从气井冲蚀产量大小的角度入手, 计算并优选出 $\phi 114.3$ mm管柱为该储气库的直井管柱; 还研究了安全阀部位的冲蚀规律, 认为在实际采气阶段 $\phi 88.9$ mm安全阀存在阶段性的冲蚀, 应定期检查并及时更换安全阀, 确保其正常使用。

关键词: [准噶尔盆地](#) [呼图壁](#) [地下储气库](#) [冲蚀](#) [流速](#) [产量](#) [管柱](#) [安全阀](#)

Research and application of the model of gas well erosion output of the Hutubi underground gas storage

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Abstract:

The critical erosion output of a gas well is one of the main factors mostly considered in realizing the allocation of gas wells in the underground gas storage(UGS). For this purpose, according to the canonical calculation model and in combination with the principle of gas reservoir engineering, the equation applicable in the calculation of critical erosion output of gas wells in the Hutubi UGS is derived after a detailed study. On this basis, the major factors influencing the erosion output are well studied such as string inner diameter, flow pressure, gas temperature, etc. In addition, the corresponding influencing rules are analyzed, including that erosion output is in direct proportion to string inner diameter as well as flow pressure, but in inverse proportion to gas temperature, and it is influenced significantly by the change of string inner diameter. Moreover, on the basis of the substantial literature and data of the other UGS projects, the practical case of the Hutubi UGS is studied and the empirical constant of C value for the gas wells of this storage is determined. Then, from the perspective of erosion output, a $\phi 114.3$ mm string is optimally selected as the vertical well string of gas wells in the Hutubi UGS. Finally, the erosion rules of relief valves is also studied and it is believed that in the practical actual gas production phase, the phased erosion will appear in the $\phi 88.9$ mm relief valves, which must be checked regularly and replaced to ensure the regular service.

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