

عنوان مقاله:

Verification of FNETF Code for Hydrocarbon Migration Analysis through Discrete Rock Mass around Unlined Rock Caverns

محل انتشار:

دومین کنفرانس منطقه ای و یازدهمین کنفرانس تونل ایران (سال: 1394)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

The typical safety concern in the design of unlined rock caverns (URC) is to prevent hydrocarbon leakage from the storage to the surrounding rock mass. Most of the unlined storage caverns are constructed in good quality, hard, and massive rock masses, where fractures are the main flow paths and control the hydrocarbon leakage phenomenon. In such situation, discontinuous representations of fractured rock and discrete fluid flow analysis appear much more adapted to the physical processes and hydrocarbon leakage phenomenon. This issue was recently implemented in the FNETF computational code that established for discrete fracture flow analysis. This paper discusses the verification of calculations and algorithms of hydrocarbon migration that have been recently developed and implemented in the FNETF computational code. The accuracy of the developed algorithm and numerical method was explored by predicting the hydrocarbon migration in a regular fracture network around an unlined cavern and comparing with the results of finite element continuum fluid flow analysis. The results of verification analysis indicate that there is an appropriate corresponding between the output of FNETF computational code and finite element fluid flow analysis. The proposed method may prove useful for better design analysis of hydraulic confinement around unlined rock caverns, or inclusions in simulators for computational demands.

کلمات کلیدی:

FNETF, Discrete Fracture Flow, Hydrocarbon Migration, URC, Water Curtain, Tracing Algorithm

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