



Contribution ID: 273

Type: Poster

Gas flow through corroded wellbore casing

Thursday, 17 May 2018 13:30 (15 minutes)

Leakage along wellbores is of concern for a variety of applications, including sub-surface fluid storage facilities, geothermal wells, and CO₂ storage wells. We have investigated whether corroded casing is permeable to gas and can serve as a leakage pathway along the wellbore. Steel plates were corroded in corrosion reactor and sandwiched in a cylindrical assembly (140 mm long, 76 mm diameter), prepared from low permeability cement paste (permeability 10^{-18} m²). The test sequence comprised of single-phase gas flow measurements at different values of effective stress (range from 1 to 12.75 MPa). Gas flow was interpreted as effective permeability and hydraulic aperture using the cubic law. Scanning electron microscope (SEM) images were used to estimate pore characteristics of the corrosion product. Tests under a range of gas pressures were used to account for non-linear flow. We found that the corrosion product was permeable to gas: permeabilities ranged from 10^{-14} to 10^{-16} m² with corresponding hydraulic apertures of 5 to 20 μ m. The permeability increased with the average thickness of the corrosion product. These results suggest corroded casing can serve as a significant leakage path along the axis of a wellbore.

References

Acceptance of Terms and Conditions

[Click here to agree](#)

Primary authors: ANWAR, Ishtiaque (University of New Mexico); HATAMBEIGI, Mahya (The University of New Mexico); Prof. TAHA, Mahmoud Reda (The University of New Mexico); Prof. STORMONT, John (University of New Mexico)

Presenter: ANWAR, Ishtiaque (University of New Mexico)

Session Classification: Poster 4

Track Classification: GS 4: Porous media applications (renamed)