

Contents

1	Shale Gas Reservoirs—A Comparative Approach	1
1.1	Introduction	1
1.2	Shale Gas Versus Conventional Reservoirs	2
1.3	Shale Gas Development in the World	7
1.4	Potential of the UK Shale Gas	8
	References	10
2	Inherent Defying Features in Shale Gas Modelling	13
2.1	Incorporation of Natural Fractures in Shale Gas Models	13
2.1.1	Dual Porosity/Dual Permeability Model	14
2.1.2	Discrete Fracture Network	17
2.2	Diffusion Models in Shale	18
2.3	Modelling of Fracture Propagation	24
2.4	Adsorption and Desorption Models in Shale	30
2.5	Stress-Dependent Permeability in Shale	35
	References	38
3	Numerical Study of Shale Gas Flow Behaviour in Reservoir and Hydraulic Fractures	43
3.1	Instantaneous Capillary Equilibrium	43
3.2	Non-Darcy Flow Simulation	45
3.3	Proppant Transport	49
3.4	Structured and Unstructured Grid	51
3.4.1	Unstructured (PEBI) Grid	52
3.5	FDM, FEM and FVM	53
3.5.1	Finite Difference Method	53
3.5.2	Finite Element Method	54
3.5.3	Finite Volume Methods	54
3.6	Reservoir Simulators for Shale Simulation	55
	References	58

4	Production Performance Analysis of Shale Gas Reservoirs	61
4.1	Decline Curve Analysis and Prediction of Future Potential	61
4.1.1	Arp's Decline Curve Analysis	62
4.1.2	Power Law Exponential Decline (PLE)	63
4.1.3	Stretched Exponential Decline Model (SEDM)	63
4.1.4	Duong's Model	64
4.2	Pressure Transient Analysis in Complex Fracture Networks	65
4.2.1	Flow Regimes of MTFHW in Shale Gas Reservoirs	66
4.2.2	Straight Line Analysis of Pressure Transient Responses	74
4.3	Rate Transient Analysis in Shale Gas Reservoirs	76
4.4	Type Curves	78
	References	83

Challenges in Modelling and Simulation of Shale Gas
Reservoirs

Gholinezhad, J.; Fianu, J.S.; Galal Hassan, M.

2018, XIII, 84 p. 37 illus., 33 illus. in color., Softcover

ISBN: 978-3-319-70768-6