

Search OnePetro ...

Search

Peer reviewed only Published between: Published from year:

An Improved Model for Estimating Productivity of Horizontal Drain Hole

Authors Fadaïro Adesina (Department of Petroleum Engineering, Covenant University) | Anawe Paul (Department of Petroleum Engineering, Covenant University) | Orodu Oyinkepreye (Department of Petroleum Engineering, Covenant University) | Oladepo Adebawale (Department of Petroleum Engineering, Covenant University) DOI <https://doi.org/10.2118/184264-MS> Document ID SPE-184264-MS Publisher Society of Petroleum Engineers Source SPE Nigeria Annual International Conference and Exhibition, 2-4 August, Lagos, Nigeria Publication Date 2016

Show more detail View rights & permissions

SPE Member Price: USD 8.50

SPE Non-Member Price: USD 25.00

Abstract

Horizontal wells have become a popular alternative for the development of hydrocarbon fields around the world because of their high flow efficiency caused by a larger contact area made with the reservoir. Most of the analytical model existing in the literature on horizontal productivity either assumed that the well is infinitely conductive or the flow is uniform along the entire well length. Guo et al (2007) formulation is one of the most recent and accurate models reported in the literatures for predicting production rate in horizontal well considering the frictional pressure drop along long horizontal drain hole. In this paper, an improved predictive model that takes into account the effect of other possible wellbore pressure losses on production rate variation of long horizontal well was developed. Results show that the discrepancies in the predictions of the previous models and field results were not only due to effect of friction pressure losses as opined by previous authors but may also be due to loss due to fluid accumulation experienced by the flowing fluid in a conduit. The effect is most pronounced at the early production time where initial transience at the onset of flow is experienced. The improved model was applied to the same field case study used by Guo et al and results is much more accurate and show that the error of the new model is less than 4% compared to 20% reported by Guo et al. This work provides reservoir engineers an accurate and handy tool for prediction and evaluation of horizontal wells.

File Size 1 MB Number of Pages 11

Adamache, I., McIntyre, F.J., M., Lewis, D., Davis, R., Butler, S., Kuhme, A., Bloy, G., Van Regan, N., Sheppard, G. and Grenon, J.P., "Horizontal Well Application in a Vertical Miscible Flood," The Journal of Canadian Petroleum Technology, Vol. 33, No. 3, pp.19-25, 1994.

Asheim, H., Kolnes, J, and Oudeman, P., "A flow Resistance Correlation for Completed wellbore," Journal of Petroleum Science and Engineering. Vol, 8, No. 2, pp, 97-104, 1992.

Asheim, H. and Oudeman, P.: "Determination of Perforation Schemes to Control production and Injection Profiles along Horizontal wells," SPE DC (March 1997), 13

Babu, D.K and Odeh, A.S.: "Productivity of a horizontal well," SPERE (Nov. 1989), 417-421.

Broman, W.H., Stagg, T.O. and Rosenzweig, J.J., "Horizontal-Well Performance at Prodhoe Bay," JPT, October 1992, p. 1074-1080.

Butler, R.M., Horizontal Wells for the Recovery of Oil, Gas and Bitumen, Petroleum Society Monograph Number 2, The petroleum society of the Canadian Petroleum Technology, Vol. 33, No 10, pp. 27-33, December 1994.

Butler, R.M. and Kanakia, V., "Recovery of Heavy and Conventional Oils From Pressure-depleted Reservoirs Using Horizontal Wells," The Journal of Canadian Institute of Mining, Metallurgy and Petroleum, 1994.

Chauvel, Y., Anderson, J., Aldred, R. and deplege, L.: "Horizontal Well Production Logging in Australia," paper SPE 28737 presented at the SPE Asia Pacific Oil & Gas Conference held November 7-10, 1994 in Melbourne Australia.

Collins, D.A., Ngheim, L.X., Shama, R, Agarwal, R.K and Jha, K.N., "Field-Scale Stimulation of Horizontal Wells with Hybrid Grids," SPE 21218, presented at the 11th SPE symposium on Reservoir Simulation, Anaheim, California, USA, February 17-20, 1991.

Chen, N.H.: "An Explicit Equation for friction factor in pipe," Ind. Eng. Chem. Fund.,18: 296, 1979.

Dikken, B.J.: "Pressure Drop in Horizontal Well and Its Effects on production Performance," JPT (Nov. 1990), 1426

Economides, M.J., Deimbacher, F.X., Brand, C.W. and Heinemann, Z.E., "Comprehensive Simulation of Horizontal Well Performance," SPE Formation Evaluation, December 1991. Pp, 418-426.

Edmunds, N.R. and Gittins, S.D., "Effective Application of Steam Assisted Gravity Drainage of Bitumen to Long Horizontal Well Pairs," The Journal of Canadian Petroleum Technology, Vol. 32, No. 6, pp. 49-55, June 1993.

Fadairo, A.S., Ako, C., Falode, O., "Modeling Productivity Index For Long Horizontal Well" Vol. 3 JERT 005103, August 2011.

Fleming, C.H., "Comparing performance of Horizontal versus Vertical Wells," World Oil, March 1993, pp, 57-61.

Furui, K., Zhu, D., and Hill, A.D.: "A Rigorous Formation Damage Skin Factor and Reservoir Inflow Model for Horizontal Well," SPERE (Aug. 2003), 151.

Giger, F.M.: "Horizontal Wells Production techniques in Heterogenous Reservoir," paper SPE 13710 presented at the SPE middle East Oil technical Conference and Exhibition held March 11-14, 1985 in Bahrain

Giger, F.M., "Analytical Two-Dimensional Model of Water Cresting before Break-through for Horizontal Wells," SPE Reservoir Engineering, November 1989, pp. 409-416.

Goode, P.A and Thambynayagam, R.K.M., "Pressure Drawdown and Buildup Analysis of Horizontal Wells in Anisotropic Media," SPE Formation Evaluation, December 1987. Pp, 683-697.

Guntis, Mortis, "Complex Well Geometries Boost Orinoco Heavy Oil Production Rates," Oil and Gas Journal, February 28, 2000.

Guo, B., Ling, K., and Ghalambor, A.: "A Rigorous Composite-IPR Model for Multilateral Wells," paper SPE 100923 presented at SPE ATCE held September 24-27, 2007 in San Antonio, Texas

Joshi, S.D.: "Augmentation of Well productivity with Slant and Horizontal Wells," JPT (June (1988), 729.

Kara, D.T., Hearn, D.D., Grant, L.L. and Blount, C.G.: "Dynamically Overbalanced Coiled-tubing Drilling on the North Slope of Alaska," SPE Drilling & Completion Journal, p. 91, June 2001.

Landman, M.J.: "Analytical Modeling of Selectively Perforated Horizontal Wells," J. of petroleum science and engineering, Vol 10 (1994), 179.

Novy, R.A.: "Pressure Drop in Horizontal Wells: When can they be ignored?" SPERE (Feb, 1995), 29.

Ouyang, L.B., and Huang, B.: "An Evaluation of Well Completion Impact on the Performance of Horizontal and Multilateral Wells," paper SPE 96530 presented at the SPE annual Technical and Exhibition held in Delta, Texas, 9-12 October 2005.

Kara, D.T., Hearn, D.D., Grant, L.L. and Blount, C.G.: "Dynamically Overbalanced Coiled-tubing Drilling on the North Slope of Alaska," SPE Drilling & Completion Journal, p. 91, June 2001.

Novy, R.A.: "Pressure Drop in Horizontal Wells: When can they be ignored?" SPERE (Feb, 1995), 29.

Ouyang, L.B., and Huang, B.: "An Evaluation of Well Completion Impact on the Performance of Horizontal and Multilateral Wells," paper SPE 96530 presented at the SPE annual Technical and Exhibition held in Delta, Texas, 9-12 October 2005.

Ozkan. E., Sarica, C., Hacıislamoglu, M., and Raghavan, R.: "The Influence of Pressure Drop along the wellbore on Horizontal productivity," paper SPE 25502 presented at the SPE production Operations Symposium held March 21-23, 1993 in Oklahoma City, Oklahoma.

Penmatcha, R.V., Arbabi, S., and Aziz, K.: "Effects of pressure Drop in Horizontal Wells and Optimum well Length," paper SPE 37494 presented at the SSPE production Operation Symposium held in March 9-11, 1997 in Oklahoma city, Oklahoma.

Yuan, H., Sarica, C., and Brill, J.P.: "Effect of Completion Geometry and Phasing on Single Phase Liquid Flow Behavior in Horizontal Wells," paper SPE 48937 presented at the SPE ATCE held September 27-30, 1998 in New Orleans, Louisiana.

Some of the OnePetro partner societies have developed subject- specific wikis that may help.

PetroWiki was initially created from the seven volume Petroleum Engineering Handbook (PEH) published by the Society of Petroleum Engineers (SPE).

The SEG Wiki is a useful collection of information for working geophysicists, educators, and students in the field of geophysics. The initial content has been derived from : Robert E. Sheriff's Encyclopedic Dictionary of Applied Geophysics, fourth edition.

[Home](#)

[Journals](#)

[Conferences](#)

[Copyright © SPE All rights reserved](#)

[About us](#)

[Contact us](#)

[Help](#)

[Terms of use](#)

[Publishers](#)

[Content Coverage](#)

[Privacy](#)

[Administration log in](#)