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Thesis Changes Log

Name of Candidate: Mohammad Ebadi

PhD Program: Petroleum Engineering

Title of Thesis: Fluid transport in tight rocks: multi-scale AI-driven characterization paradigm

Supervisor: Associate Professor Dmitri Koroteev

The thesis document includes the following changes in answer to the external review process.

Dear Chairman,

It is my pleasure to inform you that the made comments have been replied as below:

Prof. Hassanizadeh:

1. *Statements implying that the model accounts for non-Darcy effects should be removed, as only standard Darcy's law with nonlinear permeability coefficient is being used*.

   Many thanks for your comments. The required corrections have been applied.

   Page 3 – Line 9: The non-Darcy effect has been removed.

   Page 20 – Line 2: "Statements implying that the model accounts for non-Darcy effects should be removed, as only standard Darcy's law with nonlinear permeability coefficient is being used." has been removed.

   Page 134 – Line 9: The non-Darcy effect has been removed and the multi-mechanism has been replaced.

2. *Currently underlying assumptions are spread all over the thesis, if explicitly mentioned at all. I suggest providing a comprehensive list of major assumptions and simplifications behind the model at the end of Section 1.2.1. Some assumptions are not even explicitly mentioned; such as the effect of gas desorption on pore effective size and thus on porosity and permeability.*

   Thanks a lot for the comment. All the necessary assumptions have been outlined in Page 23 – Lines 5 to 24.

Prof. Pissarenko:

1. *In the Introduction, while discussing the place and role of unconventional resources, reflect the current ESG trends in the global energy, beyond the stated objective "maximum recovery at minimum cost", which sounds inadequate in 2021.*

   I really appreciate your comment. The required information has been added to the text in Page 17 – Lines 5 to 15, 17 and, 20 – 21.

2. *Elaborate in more detail Conclusions and directions for further work. In the current version of the manuscript, this final Chapter is less than 3 pages. In my view, this section deserves to be more substantial and should contain more detailed conclusions on all the important facts and findings reported in the Thesis.*

   More discussions about the implemented research and related workflow have been added to the manuscript as below.

   Page 134 – Lines 8 to 23
   Page 135 – Lines 1 to 24
   Page 136 – Lines 1 to 2
   Page 137 – Lines 12 to 24
   Page 138 – Lines 1 to 8

Prof. Dylov:

1. *A smoother introduction to the modeled equations and the notation section are still missing. This does not preclude me from recommending awarding the PhD degree, just to make the text better.*

   Thanks a million for your comment.
   The notation part has been added to the text in Page 24 and 25
   The smoother introduction to the equations and more details have been added to the text with Equations 1, 5, 7, 8, 9, 10.