

## Jury Member Report – Doctor of Philosophy thesis.

**Name of Candidate:** Aliya Mukhametdinova

**PhD Program:** Petroleum Engineering

**Title of Thesis:** Investigation of reservoir properties of unconventional reservoirs using low-field nuclear magnetic resonance

**Supervisor:** Associate Professor Alexey Cheremisin

**Name of the Reviewer:** Associate Professor Dmitry Koroteev

I confirm the absence of any conflict of interest



**Date:** 16-02-2021

*The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.*

*If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.*

### **Reviewer's Report**

Aliya's thesis cover the NMR study of unconventional rocks. The thesis is structured properly, and the topic is relevant to the content. The scientific methods are up-to-date and include low field NMR, Computed tomography, Scanning Electron Microscopy, and Pyrolysis. The study covers Domanik and Bazhenov geological formations.

The research is definitely significant on the international level as it touches the fundamental subject of unconventional's characterization for field development purposes. The field development arm proves the practical applicability of the results.

There are several issues I would like Alina to address before or during the thesis defense.

1. I can hardly see a link between the permafrost chapter and other chapters. Even though it is clear that tackling permafrost issues at field development need to be tackled accurately (for example at drilling), I cannot see a logical link here to oil and gas-bearing formations described in the other parts of the text.

Could you please be more precise at the logical connections between the Bazhenov, Domanik, Heavy Oil reservoirs from one hand and the Permafrost soils from the other?

2. Could you please expand on why you compare NMR measurements on cores with GR logging data, not NMR logging?

3. Talking about the practical implementation of NMR workflows for wettability characterization in massive core testing campaigns, do you believe the NMR will be more beneficial over the rapidly developing microCT techniques for saturated samples? Can you expand on this?

4. Please check once again for the typos. I still can see several of them all over the text.

**Provisional Recommendation**

*I recommend that the candidate should defend the thesis by means of a formal thesis defense*

*I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

*The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*