

February 25, 2024



School of Computing

Newcastle University
Newcastle upon Tyne
NE4 5TG, UK

Head of School
Professor Graham Morgan

to whom it may concern

Re: Review of the PhD dissertation by N.M. Shayakhmetov

The dissertation entitled **Optimization of exploitation regimes during the development of deposits using in-situ leaching method** is a timely research work, which addresses the important problems of determining the optimal patterns of technological wells and the reversal of wells to increase mineral extraction.

The scientific outcomes of the study, including the algorithm for well placement and the methodology for automatic calculation of the optimal distances between the wells, are sound and novel. The idea of well reversal is really interesting, it is studied well in the presented work and the useful practical results are presented. The work is logically structured and well written.

The outcomes of the work have potentials for delivering a substantial impact on the industrial exploitation regimes in the development of deposits using the in-situ leaching method.

The dissertation constitutes a substantial novel work conducted independently by the PhD candidate.

I believe the dissertation by Mr Shayakhmetov meets the requirements of the PhD degree, subject to the successful viva examination.

Kind Regards,

A handwritten signature in blue ink, appearing to be "A. Romanovsky".

Prof Alexander Romanovsky
Newcastle University
School of Computing

Tel: +44 (0) 191 222 7972
Fax: +44 (0) 191 222 8232
Computing.Science@ncl.ac.uk
www.cs.ncl.ac.uk

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