



DNIPRO UNIVERSITY
of TECHNOLOGY
1899

MATERIALS OF THE
INTERNATIONAL
SCIENTIFIC & PRACTICAL
CONFERENCE

**PHYSICAL & CHEMICAL
GEOTECHNOLOGIES – 2019**

PROGRAM OF REPORTS

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
DNIPRO UNIVERSITY OF TECHNOLOGY**



**PHYSICAL & CHEMICAL GEOTECHNOLOGIES – 2019
MATERIALS OF THE INTERNATIONAL SCIENTIFIC &
PRACTICAL CONFERENCE
(PROGRAM OF REPORTS)
October 3 – 4, 2019, Dnipro**

**ФІЗИКО-ХІМІЧНІ ГЕОТЕХНОЛОГІЇ – 2019
МАТЕРІАЛИ МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
КОНФЕРЕНЦІЇ
(ПРОГРАМА ВИСТУПІВ)
3 – 4 жовтня 2019 р., м. Дніпро**

**Dnipro
Dnipro University of Technology
2019**

FEATURES OF GEOREACTOR SYSTEMS FORMATION IN THE UNDERGROUND COAL MINE

SAIK Pavlo¹, LOZYNSKYI Vasyl¹,
BABII Yurii² & TEODOROVYCH Vadym²

¹*Dnipro University of Technology, Dnipro, Ukraine*

²*Chervonograd Mining and Economic College, Chervonograd, Ukraine*

Purpose. Analysis of technical and technological solutions for the georeactor system formation based on the underground coal gasification technology.

Methodology. This paper applies a systematic approach to research, the analysis and synthesis of new technical solutions in the context of the current problem. Complex research algorithm on the formation of georeactor systems on the basis of the mining enterprises is traced according to the developed of the structural and logical scheme of planned research. This makes it possible to divide the systems into subsystems and to solve various technical tasks in stages using their inherent methods.

Findings. Today, in the conditions of rapid scientific and technological progress development, mining regions of Ukraine have acquired the status of “depressed”. This situation is explained by the impossibility of the normal functioning of socio-economic and environmental processes in these regions. The development of underground space in the modern development of scientific and technological progress is increasingly faced with the problems of technological and operational safety, protection of man and the environment. In today’s context, the approach taken to the development of underground space in coal mines has several man-made hazards, environmental and man-made risks. The modern approach to the development of the coal mine is based on the principle of risk tolerance. It has the following requirements: no harm for human health, the inevitability of losses in natural ecological systems with a minimum of these losses, a real possibility of recovery, a balance between economic effect and environmental risk.

Coal gasification may be an alternative to conventional coal mining technology and provide a more complete energy recovery by converting solid fuels into gaseous and liquid hydrocarbons. Therefore, scientific and practical recommendations for the formation of georeactor systems in the underground space of coal mines, depending on the potential of enterprises and territorial location, will allow substantiating the rational energy-efficient parameters of conventional and alternative coal technologies in a sustainable and interconnected systems.

References

1. Bondarenko, V., Tabachenko, M., & Wachowicz, J. (2010). Possibility of production complex of sufficient gasses in Ukraine. *New Techniques and Technologies in Mining*, 113-119. <https://doi.org/10.1201/b11329-19>
2. Falshtynskyi, V., Saik, P., Lozynskyi, V., Dychkovskyi, R., & Petlovanyi, M. (2018). Innovative Aspects of Underground Coal Gasification Technology in Mine

Conditions. *Mining of Mineral Deposits*, 12(2), 68-75.
<https://doi.org/10.15407/mining12.02.068>

3. Kalybekov, T., Rysbekov, K.B., Toktarov, A.A., Otarbaev, O.M. (2019). Underground mine planning with regard to preparedness of mineral reserves. *Mining Informational and Analytical Bulletin*, (5), 34-43.

4. Pivnyak, G., Dychkovskiy, R., Bobyliov, O., Cabana, E. C., & Smoliński, A. (2018). Mathematical and Geomechanical Model in Physical and Chemical Processes of Underground Coal Gasification. *Solid State Phenomena*, 277, 1-16.
<https://doi.org/10.4028/www.scientific.net/ssp.277.1>

5. Piwniak, G.G., Bondarenko, V.I., Salli, V.I., Pavlenko, I.I., & Dychkovskiy, R.O. (2007). Limits to economic viability of extraction of thin coal seams in Ukraine. *Technical, Technological and Economic Aspects of Thin-Seams Coal Mining International Mining Forum 2007*, 129-132.
<https://doi.org/10.1201/noe0415436700.ch16>

6. Saik, P., Falshtynskiy, V., Dychkovskiy, R., & Lozynskiy, V. (2015). Revisiting the preservation of uniformity advance of combustible face. *Mining of Mineral Deposits*, 9(4), 487-492. <https://doi.org/10.15407/mining09.04.487>

7. Saik, P., Petlevanyi, M., Lozynskiy, V., Sai, K., & Merzlikin, A. (2018). Innovative approach to the integrated use of energy resources of underground coal gasification. *Solid State Phenomena*, (277), 221-231.
<https://doi.org/10.4028/www.scientific.net/SSP.277.221>

8. Tabachenko, M., Saik, P., Lozynskiy, V., Falshtynskiy, V., & Dychkovskiy, R. (2016). Features of setting up a complex, combined and zero-waste gasifier plant. *Mining of Mineral Deposits*, 10(3), 37-45.
<https://doi.org/10.15407/mining10.03.037>

9. Дичковський, Р.О., Табаченко, М.М., Фальштинський, В.С., Лозинський, В.Г., & Саїк, П.Б. (2017). Адаптація технології свердловинної підземної газифікації вугілля. Д.: Національний гірничий університет, 185 с.

10. Колоколов, О. В. (2000). Теория и практика термохимической технологии добычи и переработки угля. Днепропетровск: НГА Украины.

11. Лозинський, В.Г., Саїк, П.Б., Паваленко, О.В., & Кошка, Д.О. (2010). Аналіз сучасного стану і перспективи промислового застосування свердловинної підземної газифікації вугілля в Україні. В *Матеріали IV міжнародної науково-практичної конференції "Школа підземної розробки"*, 351-363. Дніпропетровськ: Національний Гірничий Університет.

12. Півняк, Г.Г., Бешта, О.С., Табаченко, М.М., Самуся, В., Шкрабець, Ф.П., Дичковський, Р.О., Тимошенко, Є.В., Лозинський, В.Г., & Саїк, П.Б. (2013). Традиційні та нетрадиційні системи енергозабезпечення урбанізованих і промислових територій України. Д.: Національний гірничий університет, 333 с.

13. Півняк, Г.Г., Табаченко, М.М., Дичковський, Р.О., Фальштинський, В.С. (2015). Керування ризиками в гірничодобувній діяльності: монографія. Д.:НГУ, 288 с.

14. Плотницька, С.І. (2012). Проблеми ідентифікації депресивних територій України. Вісник Запорізького національного університету, 4(16), 195-199.

15. Саїк, П., & Лозинський, В. (2016). Розвиток та впровадження технології підземної газифікації вугілля. В *Матеріали X міжнародної науково-практичної конференції "Школа підземної розробки"*, 17-18. Бердянськ: Національний Гірничий Університет.

16. Фальштинський, В. С. (2009). Удосконалення технології свердловинної підземної газифікації вугілля. Дніпропетровськ: Національний гірничий університет.

INVESTIGATION OF TECHNOLOGY FOR CLEANING OF THE FLOWLINES OF WELLS

VOLOVETSKYI Volodymyr¹, UHRYNOVSKYI Andrii² & SHCHYRBA Oksana¹
¹*Ukrainian Scientific Research Institute of Natural Gases (UkrNDIGaz), Kharkiv, Ukraine*

²*Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUOG), Ivano-Frankivsk, Ukraine*

Purpose. To investigate the technology of cleaning flowlines of gas-condensate wells with foam, to perform feasibility study on the prospect of its application in practice.

Methodology. The technology of cleaning flowlines of gas-condensate wells with foam has been investigated to objectively evaluate its application and to determine the effectiveness of this measure.

Findings. During the operation of gas condensate wells, gas moves from reservoir to borehole bottom, and then with the help of a column of elevator pipes and a flowline to a gas treatment unit (GTU). Along with gas there is a movement of liquid. Under certain conditions, the fluid gradually accumulates in the flowlines, which results in decrease in their throughput and, consequently, in the flow rate and production of hydrocarbons. To solve this problem, one should periodically clean the inner cavity of the flowline using various methods.

Using the example of the wells of the Yuliivske oil and gas condensate field, the operating parameters were measured and the pressure losses along the length of the flowlines were calculated. According to the results of calculations at two wells (No.85 and No.60) a significant excess of the actual value of the flow friction characteristic over the theoretical was established. To reduce excessive pressure losses due to the presence of fluid and to improve the hydraulic characteristics of the wells, their inner cavities were cleaned using foam of expansion ratio from 40 to 100.

According to the results of production research, due to the cleaning flowlines of wells (No.85 and No.60) from the accumulation of fluid, the coefficients of their hydraulic efficiency increased by 12 % and 7 %, respectively. Measures taken to