SUMMARIES

Gasiński J., Macuda J., Kaczmarek T.: **Percussion-rotary method of drilling large-diameter dewatering wells in 'Bełchatów' liginte mine** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

Lignite opencast extraction can be performed after prior dewatering of the rock mass. Most frequently it is realized with large-diameter dewatering wells which have been mostly drilled with the invert mud rotary method and airlift. This method allows for quick drilling in lithologically diversified aquifers, minimizing the negative impact of mud on the near-well zone. When drilling in dewatered carbonate rocks with the stone runs or well developed karst the efficiency of this method considerably decreases. The technical and technological aspects of use of downhole hammers for drilling large-diameter dewatering wells in difficult geological conditions are discussed in the paper. Thanks to the use of this method for drilling wells in 'Bełchatów' Lignite Mine the drilling rate could be increased and the number of complications and drilling failures lowered.

Keywords: *well, dewatering of rock mass, lignite, drilling wells, downhole hammers*

Śliwa T., Grygieńcza A., Bieda A., Sapińska-Śliwa A., Gonet A., Jaszczur M., Kowalski T.: **The analysis of heating output evaluation methods for borehole heat exchangers** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

Projects involving borehole heat exchangers more often need to undergo a series of tests before implementation. Inserted pipes and cement in the borehole may have different thermal properties. Until recently, such values were determined in approximate, based on values taken from the literature. Special methods are used more often to perform this type of work in order to correctly determine the properties of a borehole heat exchanger. The aim of the study was to present an analysis of thermal properties of borehole heat exchangers with the main emphasis on parameters such as thermal conductivity and thermal resistance.
The analyzed data was obtained through the use of three methods:
– analysis of the lithological profile with rock conductivity based on the literature,
– analysis of natural temperature profile in aborehole heat exchanger (logger NIMO-T),
– thermal response test.

Keywords: *borehole heat exchanger, geoenergetics, heat pumps, thermal response test*

Kremieniewski M., Rzepka M., Stryczek S., Wiśniowski R.: **Comparison of gas migration test and building structural strength of slurry in the aspect of limiting gas invasion** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

The problem of eliminating natural gas microflows through the cement slurry while bonding has been investigated by scientists in a number of scientific and research centers. Works have been undertaken to define the causes of gas migration and predict possibilities of interchannel communication in the hardened cement slurry. In the course of bonding cement slurry changes its state from liquid through gel to solid. Accordingly, the gas migration effects should be taken into account in the formation of these phases.
The results of tests of gas migration in the course of binding and building structural strength have been presented in this paper. Both research methods have been compared and a high dependence of parameters defined by each of them has been found. The research works were conducted with the use of innovative apparatuses thanks to which the phenomena taking place in the course of binding can be observed. This gives the possibility of working out recipes of sealing slurries applicable to deposits where the risk of occurrence of gas migration is high.

Keywords: *Gas migration, structural strength, cement slurry, hardened cement slurry, transition period, transition time*

Formela M., Stryczek S., Wiśniowski R., Pikłowska A.: **Selecting recipes of cement slurry for sealing casing columns in wellbores used for CCS** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

Cement sheath serves primarily as a zonal isolation for the life of the well while protecting and supporting the casing. Nowadays, more and more solutions in the term of different cement slurries compositions appear on the market. One of them is application of fluid ashes as an alternative substitution of cement itself. The purpose of it is to overcome a challenging environment where a high concentration of corrosive gases or fluids exist. An example of that aggressive substance is carbon dioxide. Moreover, this is how it might reduce the cost of the cementing process. Laboratory research was conducted at the Drilling, Oil and Gas Faculty and Materials Science and Ceramics Faculty at AGH University of Science and Technology in Krakow.

Keywords: *cement sheath, cement slurry, cement corrosion, Carbon Capture and Storage, carbon dioxide, fly ashes*

Włodek T., Kuczyński Sz., Smulski R., Polański K.: **An application of a Raman scattering analyzer for the determination of natural gas composition at a processing plant** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

The development of conventional and unconventional natural gas reservoir management includes continuous monitoring of hydrocarbon exploitation processes and its impact on the reservoir and environment. Raman spectroscopy, which allows for the identification of reservoir fluids (including natural gas) components can be a very promising method for the application of providing a quick, non-invasive, nondestructive analysis.
The proposed in this paper measurement methods are focused on the use of:
– a laboratory cell (autoclave) with sapphire window mounted on a specially prepared bypass pipeline;
– a dedicated Raman probe mounted to the available installed stub pipe;
– the construction of a special measurement cell.
The article presents the basic technical assumptions for measurements of the composition of natural gas with the use Raman spectroscopy.

Keywords: *Raman spectroscopy, natural gas measurements, qualitative and quantitative measurements, measurement technical assumptions, composition analysis*

Wysocki S., Wiśniowski R., Gaczoł M., Nowak W.: **Influence of ionic hydration inhibitors on dual inhibitor system mud properties – technological parameters** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

Various organic and inorganic compounds can be used as hydration inhibitors. The main purpose of this paper is the examination of five different ionic hydration inhibitors: KCl, K_2CO_3, HCOOK, NH_4Cl, $CaCl_2$. The paper contains the survey findings of the influence of the above mentioned inhibitors different concentrations on technological parameters of drilling muds with a dual inhibitor system and swelling of clays.

Keywords: *drilling fluids, ionic hydration inhibitors, clays and shales*

Macuda J., Styrkowiec E.: **The technical and technological aspects of commissioning a new intake wells** • AGH Drilling, Oil, Gas 2016 • Vol. 33 • No. 3

Correctly performed intake wells are a warranty of long and efficient exploitation of the object. A number of important factors are involved, starting from the correct technology of drilling to proper supervision of the investor and control of realization of particular stages of work. These factors are typical of each stage of the investment process, from the stage of determining project requirements, quality of drilling to commissioning of the well. For this reason it is extremely important for the investor to establish the requirements and technical criteria which will be presented to the authors of the geological project and potential performer of the well. Geological works can be successfully

verified with available diagnostic techniques, thanks to which the quality of performance can be recognized, make the contractor remove construction failures and improve the efficiency of hydraulic well before final commissioning. The necessity of performing such an analyses should be included in the budget of the planned well.
Properly defined technical condition of the drilled well and evaluation of its hydraulic efficiency, being a basis for commissioning, allows the designers to select rational parameters of production and elongate a well's life.

Keywords: *drilled well, technical condition of well, hydraulic efficiency, diagnostics of well, quality of drilling*