

Experience of Old Oil and Gas Boreholes Eliminative Cementation

(abstract)

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Complex geological structure as well as long-term intensive operation of oil and gas deposits in Borisla-Pokutska zone of Carpathians leads to changes in thermo dynamical parameters of pools, rock deformation and, as a result, to crippling of the boreholes and creasing and damaging of boring casing. The abovementioned actions not only complicate extraction of oil and gas but increase the technological charge on the environment. The problem of reliable liquidation cementation of old boreholes is a high problem for the deposits of hydrocarbons of Boryslavsky, Dolynsky and Nadvirniansky oil industry districts that are situated near resorts Truskavets, Skhidnytsia, Morshin, Bukovel. As a rule, casing has not been cementating like today, but rather has been tamping by clay, therefore some cases of depressurization of a mouth of borehole. To ensure the necessary level of reliability of the borehole casing, as an engineering structure, it is required to develop plugging material which is able to form durable corrosion-resistant cement stone.

Three types of materials were investigated: PCT-I-100—traditional tamping cement, CREA and CREA-LF tamping mixes produced by dry mixing technology that were designed by authors. Dry mixes are characterized by higher level of SiO₂ because of addition of milled sand. Developed materials are characterized by lower dehydration and water reduction, thanks to clearly chosen composition and modern chemical admixtures usage. Water reduction is lower in more them forty times. Also, they are characterized by higher strength (CREA strength is 7,1 and CREA-LF is 7,6 MPa) and what is the most important they can cause expansion (1,2 and 1,5%).¹ Due to this property tight contact between casing and cement stone is made. What is also has to be mentioned they are characterized by higher specific surface and higher spreadability. This is an explanation about higher early strength and higher thickening time of such mixes.

The method of borehole eliminative cementation is also presented by authors. After decompression of the mouth of the borehole, a level of the formation fluid inside the production string is determined. The specimens are taken away from the surface of liquid and study. Mostly it is petroleum emulsion that threatens the environment. Inside the columns 50–70 kg of thermographenite is filling up, which absorbs oil and forms a highly viscous layer of 30–50 m thick on a fluid surface. On the formed layer, 70–100 kg of finely dispersed zeolite tuff is poured, which further is grown by the plugging suspension of composition mixture of CREA or CREA-LF. After the cement mixture get on a dry zeolite the setting time is getting lower, because zeolite adsorbs needless water. Thus baffles of petrolized thermographenite and zeolite protect the cement stone from destruction.

1. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

The oil and gas deposits of Carpathians are characterized by its unique mining-and-geological properties and plenty of old mining holes which require high-efficiency liquidating cementation. Summarizing of results of researches in the direction of solving this problem, evidences the experience of application of the modern plugging composition materials produced by technology of dry building mixture preparation and high-efficiency sorbents such as zeolite tuff and thermograpphenite.

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