REVIEW

From overseas research supervisor Wisup Bae
To the PhD thesis of Yskak Ardak on the topic «Development of water shut-off technology in bottomhole of oil wells with the use of plugging materials on the basis of sodium silicate and micro-cement» submitted for the requirement of a PhD degree in the speciality of 6D070800-Petroleum Engineering

Most of the fields in Kazakhstan are currently in the second and third stages of development, which are characterized by high water cut in well production due to significant production of reserves.

It is known that the main reasons for watering wells are technological ones associated with the introduction of bottom water in the reservoir and the technical ones associated with the timbering distortion of well and leakage of the production casing. Extraction of excess water and related phenomena can significantly reduce the economic productivity of the well, therefore, the thesis work performed touches the actual problem of the majority of the Kazakhstan field.

Scientific progress and a variety of geological and technical conditions of the developed fields contributed to the creation of a large number of materials and plug-back mixtures, which significantly expanded the range of technologies used in the conduct of isolation works. However, not all known water shut-off technologies are effective.

The PhD thesis of Yskak Ardak was dedicated to the problem of water production management and productivity increase of oil wells through the application of sodium silicate. The author was faced with the task of studying and determining the regularities of interaction of sodium silicate with formation water, and also determining the rational parameters of the process of creating a waterproofing screen from new oil-well plugging materials based on liquid glass and micro- cement at the level of water-oil contact in reservoir conditions.

The work is aimed at solving the problem of restricting water inflow into production wells by establishing the necessity for simultaneous injection of degassed oil into the oil layer and into the aquifer active fluids as a flush fluid - fresh water, sodium silicate, fresh water, a new type of cross-linker (gellant) and micro-cement, as a result of which a reliable waterproofing screen is formed below the bottom of the wells.

Developed new, environmentally friendly water shut-off technology allows effectively limiting the inflow of water by the formation of insoluble precipitates of finely dispersed magnesium silicate or calcium that perfectly clog in the rock

cracks and pores. Injection of micro-cement solution promotes additional strength of the water isolation screen.

Research in this area was published in scientific and technical journals "Bulletin of KazNITU", "Pollution Research", "Industry of Kazakhstan", "Bulletin of KBTU", etc. This research work was carried out according to the agreement with the Chinese-Kazakh oil and gas company JSC PetroKazakhstan.

The effectiveness of the developed water shut-off composition is confirmed by the results of core flooding studies on samples at the working equipment in the research laboratory of the Department of Petroleum Engineering of KazNTRU named after K.I. Satpayev.

Conducted by Yskak. A. the study shows that the author has sufficient knowledge of the methods of scientific analysis, has a sufficiently high level of preparedness for carrying out deep scientific research, has a broad erudition in the petroleum engineering.

The level of scientific training, which is evidenced by submitted thesis to the defense, allows us to assume that Yskak A.S. deserves to be Doctor of Philosophy (PhD) in the speciality of 6D070800 - Petroleum Engineering.

Sincerely,

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