

A New Integrated Measuring and Adjusting Technology of Separate Layer Water Injection Well

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ABSTRACT

There can be problems in the application of conventional measuring and adjusting integrated technologies. The challenges include the nozzle drift, large cumulative errors in test and regulation, difficulties in locating the injection wells in thin interlayers, etc. The structure of adjustable water distributor and integrated measuring and adjusting instrument have been optimized on the basis of laboratory tests and numerical analysis. As a result, the team developed an anti-rotation adjustable water distributor, double-flow meters integrated measuring and adjusting instrument and accurate electromagnetic depth measuring device, by which a new integrated measuring and adjusting technology was created. Laboratory tests showed that the integrated double-flow measuring and adjusting instrument with a supporting mechanism had a stable measuring performance after improvement when the testing flow rate was over 20.0 m³/d and the well inclination was larger than 30°. That procedure kept the errors within 2.5%. This technology has been applied in six layered injection wells in Shengli oilfield, with the success rate of measurement and adjustment up to 100%. Further, the qualification rate of layers reached 90.1%, and it was possible to reduce the average testing time for a single well by more than 25%. The study results indicated that the new integrated measuring and adjusting technology may not only improve the layered water injection effects in Shengli oilfield, but also help meet the requirement of accurate layered water injection in other water-flooding oilfields.