

(19) **SU** (11) **571584** (13) **A1**

(51) 5 E21B33/14



STATE COMMITTEE  
FOR INVENTIONS AND  
DISCOVERIES

(12) DESCRIPTION OF INVENTION

(21) Application number: **2065277**

(22) Application filing date: **1974.10.08**

(45) Date: **1977.09.05**

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**(54) A method for reverse cementing of casing pipes**

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## **Sample of Russian to English translation**

The invention relates to a method for the casing of oil and gas wells.

A method is known for reverse cementing of casing pipes by pumping of a cement slurry directly into the annular space between a casing pipe and the hole wall and the determination of the point in time to begin the cement slurry flow into a casing pipe by a specific increase in pressure at the casing pipe wellhead [1].

The disadvantage of this method is the impossibility of taking into account the factors such as the partial lost circulation of a cement slurry due to bed formations or the filling of caved-in portions of a well bore, which give rise to a spurious signal for beginning the flow.

A method is known for the reverse cementing of casing pipes, wherein the time for the beginning of flow is determined by the volume of the fluid pumped into the annular space [2].

The disadvantage of this method is the impossibility of taking into consideration the partial absorption of the cement slurry and its mixing with flushing liquid, and in addition the method requires exact information on the geometric shape of the uncased portion of the well bore.

The method for the reverse cementing of casing pipes comprising the pumping of a cement slurry into the annular space and the determination of the point in time for beginning the cement slurry flow [3] is the closest art to the offered method.

In order to improve the quality of the cementing by obtaining information about the pressure differential between the formed channels at the wellhead and the system without intermediate stoppages, an additional pipe string is lowered into the well, the pressure differential between the additional pipe

string and the casing pipe is measured, and the beginning of the cement slurry flow from the annular space into the cemented casing pipe is judged based on this increase.

The figure presents the schematic view of the well attachments used in the embodiment of the method.

The technical design includes casing pipe 1 for maintaining the borehole, additional pipe string 2 with a small diameter, differential manometer 3, flowmeter 4, surface casing 5, uncased well hole 6, annular space 7 in the casing pipe, space 8 between the cemented casing pipe and the additional pipe string, and internal space 9 of additional pipe string 2.

The additional pipe string 2 is lowered into the cased well. The circulation of working fluids in the system is realized from the annular space 7 through the shoe of the casing pipe over space 8 with overflow into the ditch system. Internal space 9 is blanked off during the pumping of the cement into the well. From the point in time when the cement slurry begins to flow from space 7 into space 8, when the level of the mixture appears higher than the low end of the additional pipe string, the hydrostatic component of the pressures on the side of the space 8 increases, which leads to an increase in the pressure differential between the spaces 8 and 9 of the system. The recorded change in the pressure differential at the wellhead is the signal to begin the cement slurry flow through the shoe into the cemented casing pipe. The beginning of the flow and the end of the process are judged by the specific changes in the curve of the pressure differential record over time.

### **Claim**

A method for reverse cementing of casing pipes comprising the pumping of a cement slurry into an annular space and the determination of the point in time for beginning the cement slurry flow, wherein in order to improve the quality of the cementing process, an additional pipe string is lowered, the pressure differential between the additional pipe string and the casing pipe is measured, and based on its increase the beginning of the flow is determined.

### **References** (taken into account during the examination process)

1. Bulatov A.I., Domanov G.P. Technological advancement in cementing of wells. Krasnodar, 1968, p. 142.
2. Bulatov A.I. Method for cementing of oil and gas wells. M.: "Nedra", 1973, p. 259 – 264.
3. Volzhin A.K. Cementing of casing pipes using reverse circulation with radioactive control. "Neftyanik", №7, 1961, p. 10.

### **Figure**

Liquid mud

Water

Cement slurry