

METHOD AND APPARATUS FOR CREATING AN ANNULAR BARRIER IN A SUBTERRANEAN WELLBORE

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~~CROSS-REFERENCE TO RELATED APPLICATIONS~~

~~None~~

FIELD OF INVENTION

[0001] The invention relates to apparatus and methods for creating annular barriers in the annular space between a tubing assembly and the wellbore, and more particularly, to creating an annular barrier downhole by flowing a settable material into the annular space and setting the settable material such that it creates an annular barrier capable of holding a pressure differential.

BACKGROUND OF INVENTION

[0002] It is well known that oil and gas wells pass through a number of zones other than the particular oil and/or gas zones of interest. Some of these zones may be

SUMMARY

~~[0010] Presented is a method of completing a subterranean well having an open wellbore extending through a subterranean formation having a target zone. In a preferred embodiment, a tubing assembly is placed in the wellbore, extending through the target zone. An annular space is defined between the outer surface of the tubing assembly and the wellbore wall. A gravel pack is placed in the annular space along at least a length of the target zone. Then an annular barrier forming material is flowed into the annular space along at least a length of the target zone. Then the annular barrier forming material is "set" to create an annular barrier in the annular space.~~

[0010] In accordance with an aspect of the present invention, there is provided a method of completing a subterranean well having an open wellbore extending through a subterranean formation having a target zone, the method comprising the steps of: placing a tubing assembly in the open wellbore, the tubing assembly extending through the target zone, the tubing assembly having an outer surface and defining an interior passageway extending through the target zone, an annular space defined between the outer surface of the tubing assembly and the wellbore wall; positioning at least one annular flow restrictor in the annular space adjacent the target zone; placing a gravel pack in the annular space along at least a length of the target zone and adjacent at least one annular flow restrictor; then flowing an annular barrier forming material from the interior passageway into the annular space occupied at least in part by the gravel pack and adjacent at least one annular flow restrictor, the annular flow restrictor at least partially restricting flow of the annular barrier forming material along the annular space; and then setting the annular barrier forming material in the annular space and adjacent at least one annular flow restrictor, and creating an annular barrier in the annular space and leaving the interior passageway open; and then flowing a fluid through the interior passageway.

[0011] In one embodiment, the annular barrier forming material is stored in a compartment in the tubing assembly and carried downhole. Alternately, the annular barrier forming material is pumped downhole from the surface to the annular space and then into the annular space adjacent the target zone.

[0012] In a preferred embodiment, at least one flow restrictor is positioned in the target zone, such as a packer. The flow restrictor can be used to seal against flow in the annular space and can be employed to restrict flow of the annular barrier forming material. The restriction allows the material to “set” in the selected location in the wellbore. The annular barrier forming material can be flowed into the annular space uphole or downhole from the flow restrictor. The flow restrictor