A LABORATORY TEST CHEMICAL CONSOLIDATION TO FIELD INJECTION

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ABSTRACT

Formation consolidation is a form of sand control that had been used extensively in the past until it was replaced by mechanical systems. This change arose because the level of uncertainty regarding effective chemical placement and reliability. Alternative ways to prevent sand production in effective and efficient ways have been developed to reduce production cost. Resin treatments have been known as one way to stop sand production when the amounts of both resin and catalyst are suitable.

Plastic consolidation involves the injection of plastic resins, which are sand grains attractive. The resin hardens and forms a consolidated mass, binding the sand grains together at their contact points. If successful, the increase in formation compressive strength will be sufficient to withstands the drag forces of matrix formation while keeping the production at the desired rates.

Three types of resins are commercially available: epoxies, furans (including furan/phenolic blends), and pure phenolic. Resin is in liquid form when injected to the formation and catalyst or curing agent is required to harden it. Some systems use “internal” catalyst that is mixed into the resin solution at the surface and require time and suitable temperature to harden the resin. Other systems use “external” catalyst, injected after the resin is already in the formation. The advantage of internal catalyst is its positive placement because all resin will be in contact with the catalyst required for efficient curing. The disadvantage of using internal catalysts is the possibility of premature hardening in the workstring. Thus, the composition both resin and catalyst must be carefully chosen and controlled for the specific well conditions.

This study has used data from “I” reservoir. A success method understanding concentration has developed to inject polymer in formation.

INTRODUCTION

The objective of Sand Control and Management research is to boost oil and gas production without producing sand. Sand control has been a problem for many years. Gravel packs, special liners and plastic consolidation have been used with varying degrees of success. The advantages of gravel packs and liners are relatively low cost and easy to apply while the disadvantages are its high susceptibility to plugging by formation fines and their tendency to complicate multiple completion operations when they are installed in the wellbore.

Plastic sand consolidation has advantages over gravel packs and special liners. The consolidated formation prevents its fines from flowing. Furthermore, the outer perimeter of a typically consolidated formation is larger than that of a gravel pack or of a prepacked liner so that plugging of the outer perimeter is reduced. The weakness of plastic sand consolidation is its relatively high cost, difficulty to inject resin uniformly throughout production period and complexity of handling chemicals at the well site.

A number of sand consolidation processes have been described in the literature, but few of these processes meet all desired sand consolidation characteristics. This paper describes a new laboratory method that meets the desired characteristics. Laboratory process, discussion of laboratory experiments and the experience obtained from field applications.

Process, Resin and Consolidated Formation Characteristics

A number of techniques are known to deal with sand production from wells. Plastic consolidation involves the injection of plastic resins, which are sand grains attractive. The resin hardens and forms a consolidated mass, binding the sand grains together at their contact points. If successful, the