

THE USE OF PHOTON LOGS TO EVALUATE GRAVEL PACKING

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ABSTRACT

Application of gravel packing in the soft and unconsolidated sands of California has enjoyed increasing use in recent years. The practice has allowed sand-free production from zones that have been impossible to produce by other means.

A photon log is available to the oil industry to evaluate gravel packs prior to placing the well on production, enabling operators to determine the success of gravel packing operations and take immediate action when needed. Failures due to incomplete packs are minimized, as are workover programs, damaged equipment, and lost production.

A complete pack is especially important in steam operations because of the long time span between completion and actual recovery of hydrocarbons.

Photon logs supply valuable information pertaining to the quality of the gravel pack to the operator in time to isolate and eliminate potential problems and improve the probability of a productive and trouble free completion.

This paper will discuss the photon log, its presentation, interpretation, applications, and discuss field examples.

References and illustrations at end of paper.

INTRODUCTION

Sand control is a chronic problem for the petroleum industry. The cost of sand production is enormous in terms of damaged equipment, expensive workover programs, and lost production. The problem exists to some degree in almost every producing area throughout the world, and considerable effort is devoted to preventing sand production so that oil and gas can be profitably produced.^{1,4}

Sand control methods fall in two broad categories: limiting production rates to reduce the tendency of the sand to move⁵ and various means of either artificially consolidating the sand or of mechanically propping the formation.^{1,4,6}

Open hole gravel packing is one of the most common examples of the latter category.

Open hole gravel packs are extensively used in the soft and unconsolidated sands of California. A wire-wrapped liner or a slotted liner is set across the productive zone, and sand or gravel is pumped into the annular space between the liner and the formation. The section is usually underreamed prior to setting the liner, so that a thicker pack is provided between the formation and the liner.¹

The purpose of the packed annular space is to provide a permeable filter that will allow production and prevent the formation sand from moving toward the well bore. Operators use all available data to