

THE CHARACTERISATION OF OVERLAPPING FLAT SPRAYS FOR DESCALING OIL AND GAS WELLS

M. A. El kamkhi ¹, G. G. Nasr, M. Burby and E. Onyukwu
Spray Research Group (SRG)
Institute of Materials Research (IMR)
School of Computing, Science and Engineering (CSE)
University of Salford
Salford, Manchester M5 4WT, England

ABSTRACT

Scale deposition and blockages is one of the most common production problems in oil and gas fields. The scale formed in the well bore is predominately due to the accumulation of calcium carbonate. This growth of scale in the pipe can significantly decrease well productivity, and can also affect the safety and integrity of the asset. Thus, managing scale deposition is highly essential to the productivity of the well.

The three most common types of scale to form in oil wells are calcite, the calcium sulfates and barite. Calcite crystals are consists mostly of calcium carbonate (CaCO_3), but often contain up to 20% of iron or magnesium carbonate. The problems caused by each scale can be dramatic and immediate, for example, petroleum companies may spend in excess of £2,000,000 annually to remediate scale related problems in the North Sea alone according to BP and attributes about 20% of its well losses to scale removal and scale inhibition treatment.

It has been proposed to use high-pressure water atomizers to remove wellhead scale as a cost effective and environmentally friendly method. This paper investigates the characteristics of a novel, overlapping, flat fan spray nozzle arrangement and examines its effect on scale removal for use in oil and gas fields. The use of high pressure water sprays, through a carefully selected atomizer, has significant advantages over chemical and mechanical techniques. In the application of high pressure spray for removing down-hole scale, a Coiled tubing unit is all that is required for the operation with the spray-head connected to the tubing. Various samples from oil and gas wells, with scale deposition have also been used in the study to analyse operational effectiveness of the spray.

Key words: Volume scale removal, Overlapping Flat Spray, Oil well, CaCO_3

¹ Corresponding author: m_kamkhi@hotmail.com