

SEALING OF CASING ANNULUS AT CAVERN ENTRANCE

Sarah Gibson

BJ Services Company UK Ltd, Aberdeen, Scotland

Abstract

The success of a gas storage project depends on achieving a sound seal between the structural casings and the surrounding rock. Most caverns are constructed with one or two strings of pipe to isolate upper formations and a final string ending in the top of the salt zone. When the cavern is created below this casing the sealing agent around this pipe forms a critical element in the security of the well. Portland cement is the sealing material of choice, due to its ease of availability and economical advantages. However, cured cement tends to be brittle making it likely to fail under repeated stress cycles, as experienced during charging and depletion of the gas store. Leak paths around the casing and/or cement would render the cavern unsuitable for use.

This paper describes the design of a casing cementation already successfully applied to a gas storage project. The cement slurry composition is discussed in relation to mix water salinity, compressive strength development and other properties. Placement procedures will be reviewed, highlighting the impact of pumping operations and the application of best practices. In addition, the audience will be introduced to more recently developed modelling techniques and how these may improve the quality of the applied cement seal.

Key words: Caverns for gas storage, computer modelling, rock mechanics, Zechstein,