

“Dry“ Recompletion of a Cavern Storage Well

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Abstract

The innogy Gas Storage NWE GmbH operates two natural gas storage facilities at Epe site (North Rhine Westphalia, Germany).

In the course of the first quarter of 2014, increased annulus activities were observed at a cavern, which finally led to an annulus surface pressure equal to the tubing wellhead pressure. The results of the performed investigation program showed that the installed permanent packer as well as the anchor seal are functional and the 8 5/8" section of the tubing string is integer. However, they indicated that there must be a leakage within the subsurface safety valve section. A video inspection proved that the defect is a ruptured connection in the landing nipple section of the installed flapper valve.

As part of the planning, various repair concepts were designed and compared. A "dry" recompletion concept was evaluated as the most useful variant. In this case flooding of the cavern is not required but pressurized gas filled cavern needed to be safely isolated from the well.

The performed workover involved necessary modifications of the wellhead, the installation of a straddle assembly to bridge the rupture and connect the production tubing again, cutting the connected tubing string just above the packer, removing the old one and installing the new gas production tubing. The workover was executed from November 2014 to February 2015.

The project was successfully completed in June 2015 with removal of the plugs, which served as barriers to the cavern during the entire workover, as well as the installation of a new subsurface safety valve. The selected SSSV was a velocity valve (type Storm Choke).

Key words: storage cavern; gas storage; well design, drilling and completion; Germany