

Natural Sealing Large-Scale Evaluation

Publieke samenvatting / Public summary

Aanleiding

Utilizing innovative well sealing and abandonment methods and materials could result in massive cost savings. Materials for long-term sealing of wellbores require a unique combination of properties to provide long-term sealing integrity at the intended depth. Salt- and clay-based (bentonite) materials exhibit unique properties such as low permeability, high capillary entry pressure, coupled to mechanical ductility and chemical resistivity over a wide range of downhole environments. Furthermore, both materials are natural constituents forming effective caprocks in the subsurface, safely sealing oil and gas reservoirs over geological timescales (millions of years). This project will investigate the superior sealing capacities of natural seals and will test bentonites as reliable and cost-efficient alternatives to conventional cement-based materials.

Doelstelling

The objective of this proposal is to continue previous research and testing of bentonites and salts on larger-scales and to address remaining technical challenges defined in previous TKI projects. In addition it will tackle a potential financial hurdle for the application of the natural sealing concept and will investigate promising chemical options to remove the casing to enable a cost-efficient option of letting existing ductile formation creep into the created “window” in the wellbore to restore the original caprock.

Korte omschrijving

This project combines previous sub-systems of the concept of natural formation sealing which have

Projectinformatie / Project information

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Algemene informatie / General information

Penvoerder / Secretariat

TNO

Publicaties en materialen / Publications and attachments

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been developed within the TKI New Gas Program Line Decommissioning and Abandonment. Based on previous findings the proposed work in this proposal will combine three major natural sealing topics in one project to provide a comprehensive and aligned technology development for a fast field application and market uptake of the natural sealing technology. The specific activities in this project comprise: 1. Bentonite placement and sealing performance optimization, together with innovative coating options for an ideal sealing performance at full-scale, including downhole sealing tests in the OIC-WT test well 2. Rock-salt stimulation and self-sealing full-scale as well as field testing at OIC-WT and in Nouryon's Hengelo-01 well 3. Investigate controlled chemical casing and cement dissolution options on large-scale to overcome high casing removal costs and enable an economic application of the natural sealing and placement concept

Resultaat

The project aims at investigating and testing, on large- and full-scale, that natural formation sealing of deep wellbores is feasible and can result in a cost-efficient and simultaneously more reliable and sustainable way of constructing, remediating, re-using or plugging existing and new deep wells for geo-energy purposes. It will prepare for natural sealing field trials in deep oil and gas wells and support the fast implementation of this promising sealing technology. Current estimates of abandonment costs for all existing Dutch O&G wells are >3 billion Euros. The potential cost reduction when expensive rigs for casing pulling/milling and cement placement equipment can be re-placed with natural sealing rig-less operations is substantial and have been estimated to be up to 70%. These cases show the high cost saving potential and could be projected on the total estimated P&A cost which would result in several billions savings for the Dutch geo-energy companies and society.

samenwerking met de Topsector Energie ontsloten.

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