Technical

ISO/TR 27926

Carbon dioxide capture, transportation and geological storage — Carbon dioxide enhanced oil recovery (CO_2-EOR) — Transitioning from EOR to storage

Captage du dioxyde de carbone, transport et stockage géologique — Récupération assistée du pétrole par le dioxyde de carbone (RAP-CO2) — Transition de la RAP au stockage

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Across the globe, interest in and development of projects for the geological storage of captured anthropogenic CO_2 continues to increase. One subset of these projects consists of those that would find some way to increase CO_2 storage through the use of existing hydrocarbon fields and infrastructure. There is a continuum of projects from hydrocarbon fields near the end of their lives that start CO_2 injection before the end of production, thereby accelerating transition to storage and potentially reducing costs, to full-fledged carbon dioxide enhanced oil recovery (CO_2-EOR) projects that can be optimized to maximize CO_2 storage while still producing oil. Alternatively, operators of a producing field can decide to begin storage operations in that field before ceasing production. Such operations would instead be designed to achieve storage simultaneously with production.

Due to the availability of existing infrastructure for CO_2 transport, handling, injection and storage, modifying CO_2-EOR projects nearing maturity to increase CO_2 storage can be a particularly cost-effective way to reduce atmospheric emissions of CO_2. Some such modified projects can also defer project decommissioning, again helping to expand commercial carbon capture and sequestration (CCS) as an emissions-reduction option. CO_2 transport and injection infrastructure, as well as the generally well-characterized geologic formations where CO_2-EOR operation are already undertaken or where operations at CO_2-bearing geological formations occur, can be modified too for CO_2 storage.

Similarly, for producing oil and gas fields, starting CO_2 injection before cessation of production (i.e. having overlapping storage and production licenses) can have significant economic benefits. The CCS project can have certainty in timing and can potentially avoid having to compensate the hydrocarbon operator for "lost production". There is also no gap between production and storage leading to no challenging questions over who pays for mothballed infrastructure.

There is considerable overlap in technology and infrastructure between standard CO_2-EOR, other hydrocarbon recovery processes and dedicated geological storage of CO_2. Each of the processes – and many of the operational variations discussed in this document – can present different advantages or disadvantages. For example, a number of the operational techniques for maximizing CO_2 storage would tend to increase reservoir pressures affecting the containment risk assessment, CO_2 movement through the storage complex or certain subsurface-engineered facilities. The technical and operational portion of this document examines these issues.

Similarly, the legal, regulatory and even consensus standards framework developed for typical CO_2-EOR operations can no longer be applicable to a modified operation. A given framework can be appropriate for some operational changes, but not for others. Clause 10 provides an overview of these issues.

This document does not address the quantification of greenhouse gases (GHGs) other than CO_2 for carbon dioxide storage projects. CCS projects can address quantifying, monitoring, reporting, and validating or verifying other GHG emissions reductions or removals through the application of ISO 14064-2 or other documents in the ISO 14064 series.