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Carbon dioxide capture, transportation and geological storage — Geological storage

Capture, transport et stockage géologique du dioxyde de carbone — Stockage géologique

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 265, *Carbon dioxide capture, transportation, and geological storage*.

Introduction

Geological storage of carbon dioxide (CO_2) is recognized as a key technology for abatement of CO_2 emissions to the atmosphere or ocean and is an essential component in the process of carbon dioxide capture and storage (CCS)[1]. The objective of this document is to provide recommendations for the safe and effective storage of CO_2 in subsurface geologic formations through all phases of a storage project life cycle (see Figure 1). While CCS is a nascent industry, this document is supported by a wide range of operational experiences in pilot to commercial scale carbon dioxide storage projects that have used methods and technologies mostly developed and widely deployed by the oil and gas industry including CO_2-enhanced oil recovery (EOR). This document applies to injection of CO_2 into geologic units for the sole purpose of storage and does not apply to CO_2 injection for hydrocarbon recovery, or storage of CO_2 that occurs in association with carbon dioxide enhanced hydrocarbon recovery. [ISO 29716 is in development to address carbon dioxide storage using enhanced oil recovery (CO_2-EOR)]. This document is supplemented by recommended practice manuals for CO_2 storage and numerous standards and technical recommendations developed for the oil and gas industry. [See Bibliography for selected references (References [1] to [12])].

Carbon dioxide capture, transportation and geological storage — Geological storage

1 Scope

This document

a) establishes requirements and recommendations for the geological storage of CO_2 streams, the purpose of which is to promote commercial, safe, long-term containment of carbon dioxide in a way that minimizes risk to the environment, natural resources, and human health,

b) is applicable for both onshore and offshore geological storage within permeable and porous geological strata including hydrocarbon reservoirs where a CO_2 stream is not being injected for the purpose of hydrocarbon production or for storage in association with CO_2-EOR,

c) includes activities associated with site screening and selection, characterization, design and development, operation of storage sites, and preparation for site closure,

d) recognizes that site selection and management are unique for each project and that intrinsic technical risk and uncertainty will be dealt with on a site-specific basis,

e) acknowledges that permitting and approval by regulatory authorities will be required throughout the project life cycle, including the closure period, although the permitting process is not included in this document,

f) provides requirements and recommendations for the development of management systems, community and other stakeholder engagement, risk assessment, risk management and risk communication,

g) does not apply to, modify, interpret, or supersede any national or international regulations, treaties, protocols or instruments otherwise applicable to the activities addressed in this document, and

h) does not apply to or modify any property rights or interests in the surface or the subsurface (including mineral rights), or any pre-existing commercial contract or arrangement relating to such property.

The life cycle of a CO_2 geological storage project covers all aspects, periods, and stages of the project, from those that lead to the start of the project (including site screening, selection, characterization, assessment, engineering, permitting, and construction), through the start of injection and proceeding through subsequent operations until cessation of injection and culminating in the post-injection period, which includes a closure period. Figure 1 illustrates the limits of this document.

NOTE 1 This document does not address any post-closure period or specify post-closure period requirements.

This document does not apply to

— the post-closure period,

— injection of CO_2 for enhancing production of hydrocarbons or for storage associated with CO_2-EOR,

— disposal of other acid gases except as considered part of the CO_2 stream,

— disposal of waste and other matter added for purpose of disposal,

— CO_2 injection and storage in coal, basalt, shale and salt caverns, or

— underground storage using any form of buried container.

NOTE 2 This document may not be suitable for research projects, for example, those with a primary objective to test technologies or methods of monitoring.

NOTE 3 The closure period in this document does overlap with the post-closure phase of the EU regulatory definition. This document, however, is not concerned with transfer of liability.

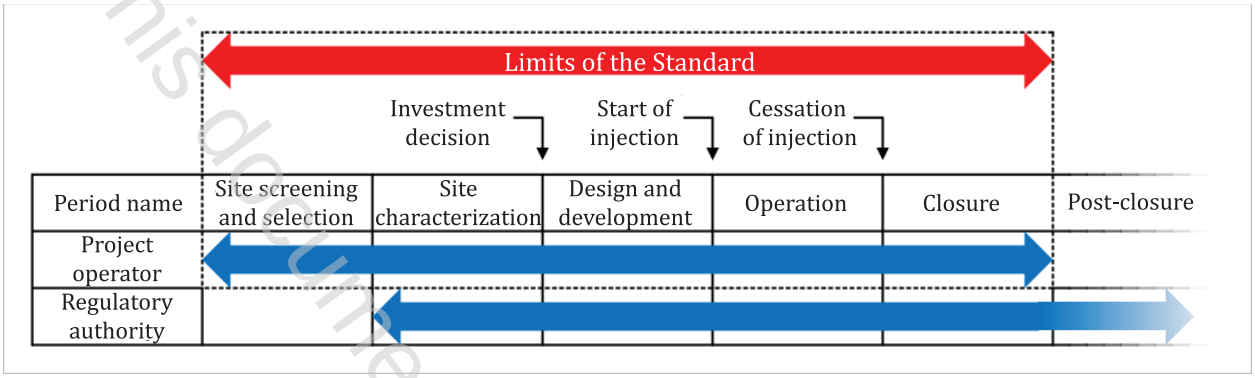

Figure 1 — Entities involved in the storage project life cycle

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
abandonment
process and procedures used to permanently end the operation of a well

Note 1 to entry: Well abandonment is designed to eliminate the physical hazard of the well (the hole in the ground), eliminate a pathway for migration of contamination, and prevent changes in the hydrogeologic system, such as the changes in hydraulic head and the mixing of formation fluids between hydraulically distinct strata.

3.2
acceptable risk
risk (3.39) borne by the *project operator* (3.33) and others, having regard to legal obligations and management policies

3.3
area of review
geographical area(s) of a *storage project* (3.56), or part of it, designated for assessment of the extent to which a storage project, or part of it, could affect life and human health, the environment, competitive development of other resources, or infrastructure

Note 1 to entry: The delineation of an area of review defines the outer perimeters on the land surface or seabed and water surface within which assessments will be conducted as may be required by regulatory authorities.

3.4
baseline
reference basis for comparison against which project performance is monitored or measured