



Geological storage of carbon dioxide — Measurement, monitoring, and verification plans



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Contents

Task Force on Measurement, Monitoring, and Verification Plans	3
Preface	4
SDG Foreword	5
0 Introduction	6
1 Scope	6
1.1 General	6
1.2 Inclusions	6
1.3 Exclusions	6
1.4 Terminology	7
1.5 Units of measurement	7
2 Reference publications	7
3 Definitions and abbreviations	9
3.1 Definitions	9
3.2 Abbreviations	10
4 Key principles of MMV plans	11
5 MMV plan objectives	12
6 MMV plan components	12
6.1 General	12
6.2 Project description	12
6.2.1 General	12
6.2.2 Project stage	13
6.2.3 Geographic location	13
6.2.4 Geological description of the storage complex	13
6.2.5 CO ₂ source	13
6.2.6 CO ₂ stream receipt point	13
6.2.7 CO ₂ injection wells	13
6.2.8 CO ₂ distribution field facilities and pipelines	14
6.2.9 Key containment risks	14
6.2.10 Key monitoring infrastructure	14
6.3 Geological and hydrological characterization	14
6.3.1 General	14
6.3.2 Deeper geosphere	15
6.3.3 Storage complex description	15
6.3.4 Shallower geologic horizons	15
6.3.5 Protected groundwater zones	15
6.3.6 Shallow biosphere	15
6.4 Application of modelling in MMV planning and verification	16
6.4.1 General	16

6.4.2	Static model	16
6.4.3	Dynamic reservoir modelling	16
6.4.4	Geochemical assessment	16
6.4.5	Geomechanical assessment	17
6.4.6	Wellbore dynamics	17
6.4.7	Geophysical assessment	17
6.5	Legacy well assessment	17
6.6	Site-specific risk assessment	17
6.7	Initial baseline data	18
6.8	Monitoring horizons	19
6.8.1	General	19
6.8.2	Deeper geosphere	20
6.8.3	Storage complex	20
6.8.4	Shallower geologic horizons	20
6.8.5	Protected groundwater zones	21
6.8.6	Biosphere	21
6.8.7	Seawater in offshore environments	21
6.8.8	Atmosphere	22
6.9	Selection and description of monitoring technologies	22
6.10	Verification	23

7 Project life cycle MMV plans 25

7.1	General	25
7.2	Baseline MMV plan	25
7.3	Pre-injection MMV plan	26
7.4	Injection period MMV plans	26
7.5	Closure MMV plan	27

Annex A (informative) — Shell Quest CCS Project 28

Annex B (informative) — Enhance Clive Leduc CO₂-EOR and storage project 34

Annex C (informative) — Bibliography 35

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Preface

This is the first edition of CSA TS-226, *Geological storage of carbon dioxide — Measurement, monitoring, and verification plans*. This Technical Specification (herein referred to as “this Document”) is not a consensus project; that is, it is not a Standard and it has not been formally approved by a Technical Committee.

CSA Group acknowledges that the development of this Document was made possible, in part, by the financial support of NRCan.

CSA Group acknowledges the permission from Enhance Energy Inc. for the use of Figure [B.1](#).

This Document was developed and reviewed by the Task Force on Measurement, Monitoring, and Verification Plans.




Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *Although the intended primary application of this Document is stated in its Scope, it is important to note that it remains the responsibility of the users of the Document to judge its suitability for their particular purpose.*
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 - a) *document designation (number);*
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SDG Foreword

CSA Group develops and maintains Standards across a broad range of topics, most of which support the United Nations Sustainable Development Goals (UN SDGs) towards shaping a sustainable and resilient future.

Through a robust mapping process, connections between CSA TS-226:24 and the following SDGs have been identified:

SDG			
Targets	7a	9.4, 9.5	13.1, 13.2, 13.3

CSA TS-226:24 has notable linkages with the following SDGs:

- SDG 7: *Affordable and Clean Energy*
- SDG 9: *Industry, Innovation, and Infrastructure*
- SDG 13: *Climate Action*

For further information on CSA Group’s SDG Mapping initiative, please visit:

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Disclaimer: It is important to note that although some Standards explicitly support SDG targets, not all Standards link to the SDGs. Standards users should always take care and be specific when claiming their support of SDGs through the use of Standards. The SDG mapping outcomes made available by CSA Group are intended to assist users in their evaluation of how the application of a Standard can support their work towards SDG achievement.

CSA TS-226:24

Geological storage of carbon dioxide — Measurement, monitoring, and verification plans

0 Introduction

It is broadly recognized that the geological storage of carbon dioxide (CO₂) is a key means of reducing anthropogenic emissions of CO₂ to the atmosphere, thereby reducing the increase of atmospheric CO₂ concentrations. To advance the use of the geological storage of CO₂ in accordance with CSA Z741, monitoring and verification programs are a required element in the development of a storage project. To provide confidence to, and acceptance by, regulators, stakeholders, CO₂ capture project and transport operators, and carbon offset crediting agencies, preparation of measurement, monitoring, and verification (MMV) plans are necessary to detail the efforts the storage project proponents will use to

- a) assist in managing health, safety, and environmental risks by demonstrating containment of injected CO₂ providing confidence that CO₂ emission reductions are real and permanent; and
- b) assess storage performance.

The goal of this Document is to provide guidance to geological CO₂ storage project operators on the preparation and maintenance of MMV plans throughout the life of the project, from initial project site selection to its ultimate closure. Regulators and stakeholders, including agencies administering offset credits, may also benefit from this Document to ensure the project meets the goals stated above.

1 Scope

1.1 General

This Document provides recommendations and guidance on preparing and maintaining measurement, monitoring, and verification plans for the geological storage of CO₂ streams in accordance with CSA Z741, regardless of whether the project is located onshore or offshore. While not intended for storage associated with enhanced oil recovery using CO₂ injection, the Technical Specification could be useful for those projects.

1.2 Inclusions

In addition to CSA Z741, this Document may be applicable for use with ISO 27914. This Document is applicable to projects that are located in onshore or offshore environments.

1.3 Exclusions

This Document is not meant to apply to the storage of CO₂ associated with CO₂-EOR. However, as shown by Annex B, the use of MMV plans might be required by regulators and therefore this Document may be used by project proponents, regulators, and interested parties in those situations.