Navigating the Changing World of Reserves and Resources in the Context of the PRMS

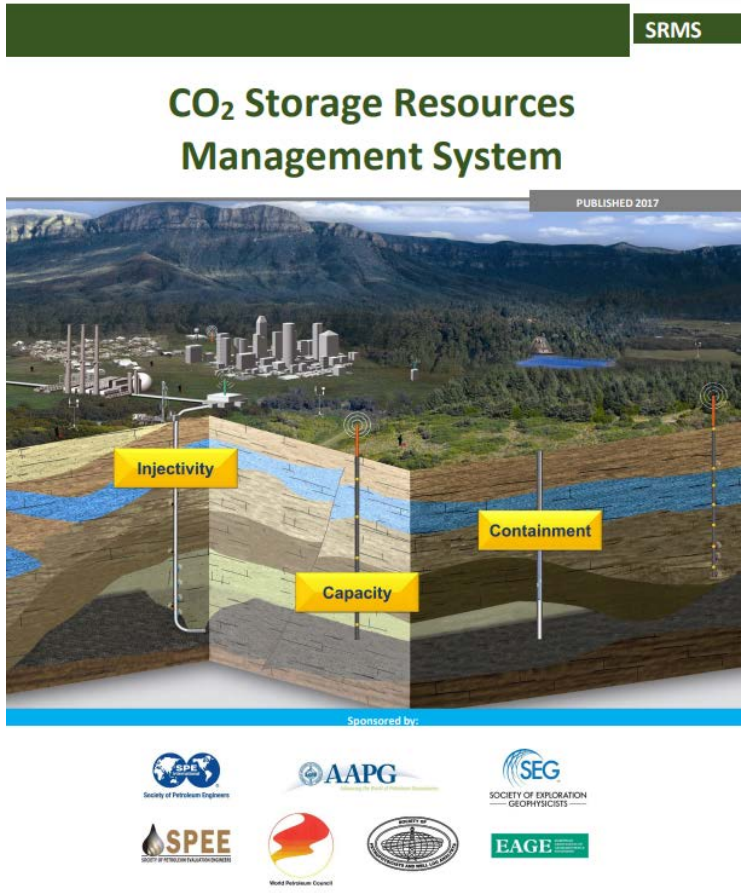
20 - 21 AUGUST 2024 | BRISBANE, AUSTRALIA

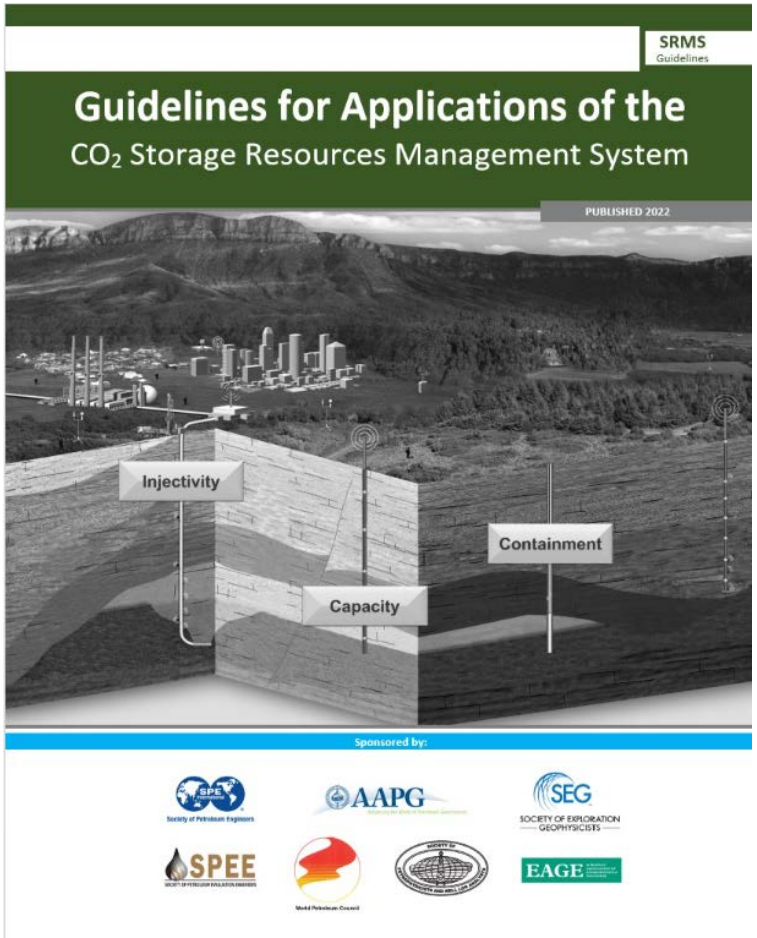
SRMS Update

Paul Lyford

The presentation material is the view of the presenter and not necessarily the view of their employer or SPE.

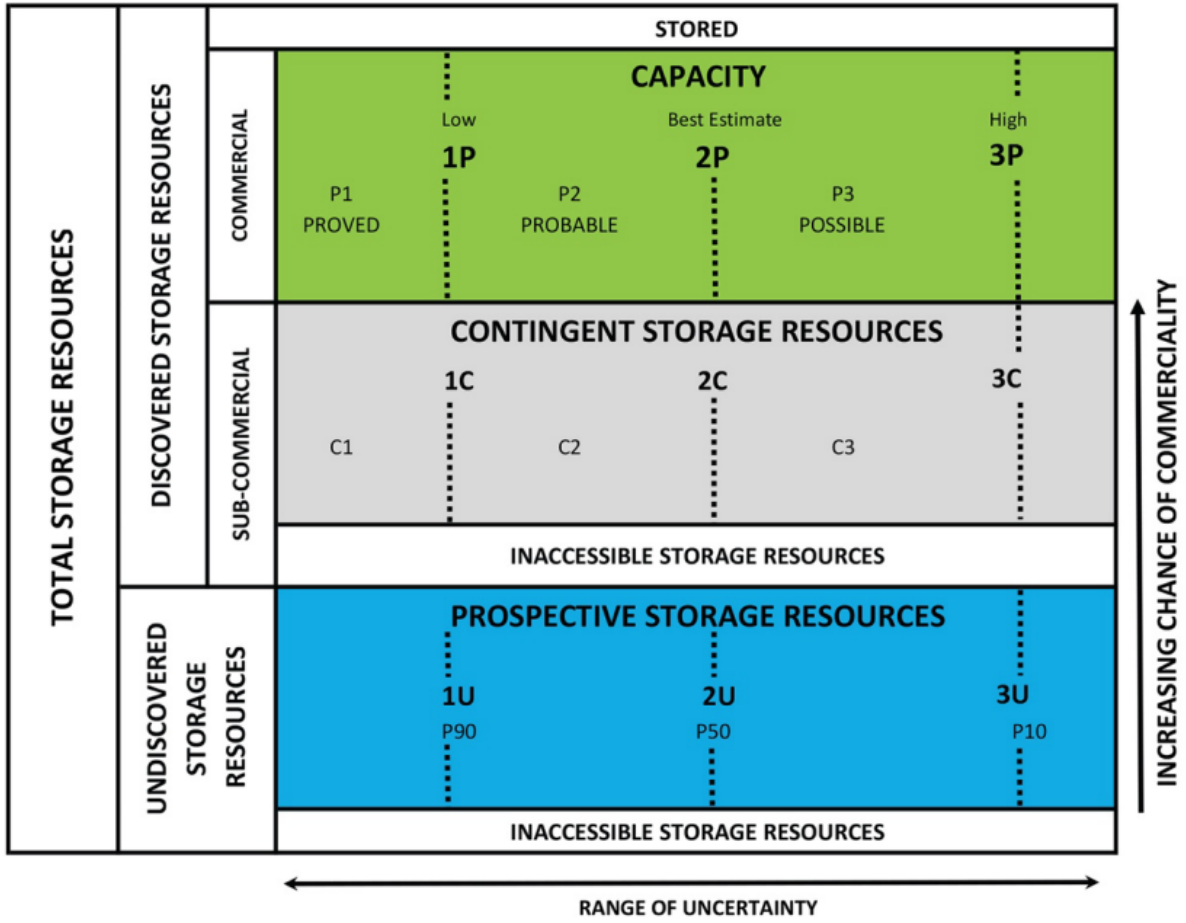
CO2 Storage Resources Management System





- SRMS first published 2017 – seeded from PRMS 2007
- SRMS Applications Guidelines 2022
- Built upon the same reserves terminology developed over many decades
- Common and familiar language

SRMS Framework



- Covers all classes of CO_2 storage resources
- Classification by increasing chance of commerciality
  - Prospective Storage Resource
  - Contingent Storage Resource
  - Capacity
- Categorisation by uncertainty
  - 1P – 2P – 3P
  - 1C – 2C – 3C
  - 1U – 2U – 3U

SRMS Update open for public comment

SRMS Update Alert

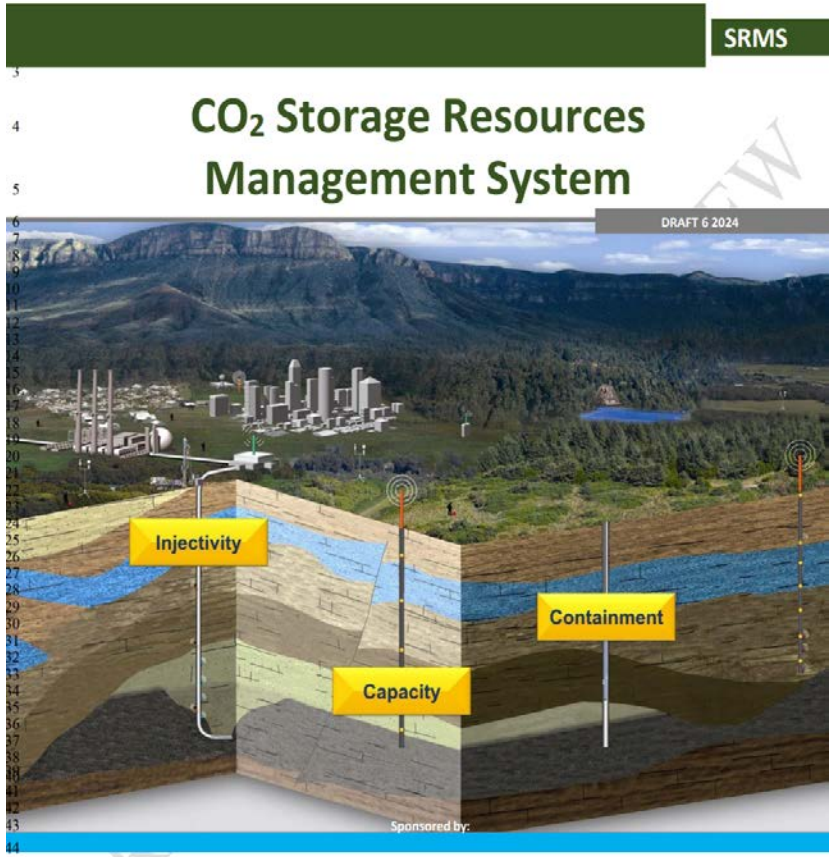
SRMS Update is Open for Public Comment

The CO_2 Storage Resources Committee (CSRC) is committed to ensure a relevant resource framework as the CO_2 storage industry evolves, and, as such, has commenced an update to the SRMS. The draft update has incorporated comments from stakeholders and sponsoring societies such as the inclusion of CO_2 EOR and is now open for public comment.

Please provide feedback to the draft SRMS Update using the instructions provided below by **1 October 2024**.

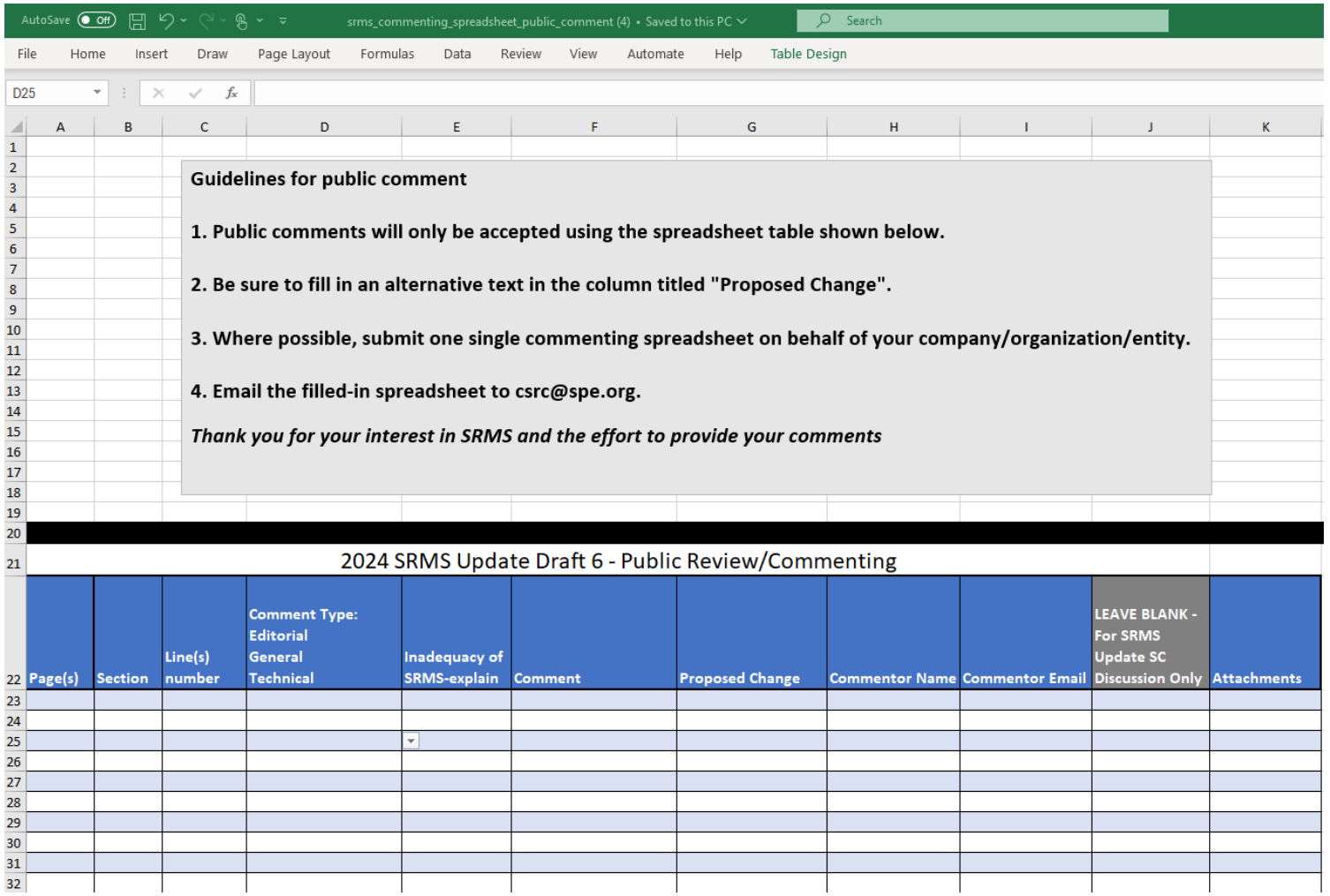
- **Download Draft SRMS Update**
- **Download instructions for providing comment**

SRMS Update open for Public comment



- Align with PRMS 2018 – kept principles of PRMS and the terms analogous to PRMS, revised where necessary
- Introduction revised to reflect purpose and current state of CO2 storage
- Definitions reviewed/updated for most classifications
- Revised to definition of Discovery and inclusion of considerations for containment
- Revised to definition of Commerciality to align with PRMS (expanded to 8 criteria)
- Additional sub-section 2.1.7 Containment Assessment
- Addition sub-section 2.4 Development concepts, primary and secondary storage to distinguish between CO2 injection only or CO2 with brine extraction
- Expanded to include CO2 EOR
- New section 4.2 Containment Assessment
- Review and update to glossary

SRMS Update open for Public comment



AutoSave Off | srms_commenting_spreadsheet_public_comment (4) • Saved to this PC | Search

File Home Insert Draw Page Layout Formulas Data Review View Automate Help Table Design

D25

Guidelines for public comment

1. Public comments will only be accepted using the spreadsheet table shown below.

2. Be sure to fill in an alternative text in the column titled "Proposed Change".

3. Where possible, submit one single commenting spreadsheet on behalf of your company/organization/entity.

4. Email the filled-in spreadsheet to csrc@spe.org.

Thank you for your interest in SRMS and the effort to provide your comments

2024 SRMS Update Draft 6 - Public Review/Commenting

Page(s)	Section	Line(s) number	Comment Type: Editorial General Technical	Inadequacy of SRMS-explain	Comment	Proposed Change	Commentor Name	Commentor Email	LEAVE BLANK - For SRMS Update SC Discussion Only	Attachments

- Draft and commenting sheet available at spe.org
- Where possible submit one single commenting spreadsheet on behalf of company/organisation
- Email response to csrc@spe.org
- Deadline for feedback 1 October 2024

Questions to workshop

- Are you familiar with SRMS?
- Does the update address questions you may have?
- Please review and provide comments – these periodic updates are the opportunity to improve

Back-up

Discovery

SRMS 2017

2.1.1 Determination of Discovery Status. A discovery is one geologic formation or several geologic formations collectively, for which one or several wells have been established through testing, sampling, and/or logging the existence of a significant quantity of potential CO2 storage for the proposed project. For a geologic formation to be deemed to have potential for CO2 storage (i.e., storable quantities), it must be assessed as having both accessible pore volume (quantity and sustained injectivity commensurate with the project requirement) and as being suited to containment of the injected CO2 over a time period established by the project. In this context, "significant quantity" implies that there is evidence of a sufficient quantity of Total Storage Resources to justify estimating the storable quantity (volume or mass) demonstrated by the well(s) and for evaluating the potential for economic storage. Estimated storable quantities within such a discovered (known) and characterized geologic formation(s) will initially be classified as Contingent Storage Resources, pending definition of projects with sufficient chance of commercial development to reclassify all, or a portion thereof, as Capacity. Where Contingent Storage Resources are identified but are not considered currently storable, such quantities may be classified as Inaccessible Contingent Storage Resources, if considered appropriate for resource management purposes; a portion of this quantity may become accessible Contingent Storage Resources in the future as commercial circumstances change or technological developments occur

SRMS Update Draft 6 for Public Comment

2.1.1.1 A discovery of storable quantities is one geologic formation or several geologic formations collectively, for which geophysical and well data (including but not limited to well tests, logs, cores and integrity assessment) have established the existence of a significant quantity of potential CO2 storage with long-term containment for the proposed project. For a geologic formation to be deemed to have potential for CO2 storage (i.e., storable quantities), it must be assessed as having accessible pore volume (quantity and sustained injection rates commensurate with the project requirement) **and as having confidence there will be containment of the injected CO2 over a time period established by the project including the post injection monitoring period to site closure.**

2.1.1.2 In this context, "significant quantity" implies that there is evidence of sufficient quantity of discovered resources demonstrated by the well(s), other data, and studies, to justify evaluating the potential for commercial storage. **Additionally, "confidence" implies that the geologic formations being assessed for storage, and any penetrating wellbores, have the characteristics to contain quantities associated with a proposed storage project. This can include expected presence of sufficient seal with integrity to support continued project evaluation, and the screening of all penetrating wellbores to confirm that none have known integrity issues with containment failures that cannot be mechanically resolved**. Estimated storable quantities within such a discovered (known) and characterized geologic formation(s) will initially be classified as Contingent Storage Resources, pending definition of projects with sufficient chance of commercial development to reclassify all, or a portion thereof, as Capacity. Where Contingent Storage Resources are identified but are not considered currently storable, such quantities may be classified as Inaccessible. If considered appropriate for resource management purposes, a portion of this quantity may become accessible Contingent Storage Resources in the future as commercial circumstances change or technological developments occur

Commerciality

SRMS 2017

2.1.2 Determination of Commerciality. Discovered Storage Resources may be considered commercial, and thus may be classified as Capacity, if the entity claiming commerciality has demonstrated firm intention to proceed with development and such intention is based on all of the following criteria:

- Evidence to support a reasonable timetable for development.
- A reasonable assessment of the future economics of such development projects meet defined investment and operating criteria.
- A reasonable expectation that there will be sustained demand (i.e., market) for storage from this development project and the expected stored quantities required to justify development.
- Evidence that the necessary injection facilities are available or can be made available.
- Evidence that legal, regulatory, contractual, environmental, and other social and economic concerns will allow for the actual implementation of the storage project being evaluated.

SRMS Update Draft 6 for Public Comment

2.1.2.1 Discovered Storage Resources may be considered commercial, and thus may be classified as Capacity, if the entity claiming commerciality has demonstrated firm intention to proceed with development and such intention is based on the following criteria:

A. Evidence of a technically mature and feasible development plan with high confidence of injection and containment as per project definition.

B. Evidence of financial appropriations either being in place or having a high likelihood of being secured to implement the project.

C. Evidence to support a reasonable timeframe for development.

D. A reasonable expectation that the development projects will be economic going forward.

E. A reasonable expectation that the development projects will meet defined investment and operating criteria. This assessment is performed on the estimated entitlement forecast quantities and associated cash flow on which the investment decision is made (see section 3.1.1 Cash-Flow-Based Resources Evaluations).

F. Reasonable expectation that there will be sustained demand (i.e., market) for storage for this development project and that the expected stored quantities are sufficient to justify development (there should also be similar confidence that all produced streams can be appropriately managed).

G. Evidence that necessary injection and processing facilities are available or will be made available.

H. Evidence that legal, contractual, environmental, regulatory and government approvals are in place or will be forthcoming, together with resolving any social and economic concerns.

Containment Assessment & Project Maturity

2.1.7 Containment Assessment and Project Maturity

2.1.7.1 The containment assessment for storable quantities must be consistent with the maturity of the project, the financial commitment associated with the project's development plan status and updated as the project's technical and commerciality elements change. This would be demonstrated by a containment risk assessment. By definition, storable quantities require confidence there will be containment of the injected CO2 over a time period established by the project.

Development Concepts

2.4 Development Concepts

2.4.0.1 A CO2 storage project involves the injection of CO2 into a geologic formation. The development project may or may not require production of formation brine to assist with pressure management in situations in which the storage pressure is a limiting factor. This could also include the pressure impact from offset projects. A CO2 Storage project can be performed through CO2 injection only or together with fluid extraction from the same geologic formation. An expected benefit of fluid extraction is to enable pressure management, and hence to increase storable quantities when pressure is the storage limiting factor. This is also applicable for CO2 EOR. Therefore, the project assessment should include the development concept e.g., whether the fluid is going to be extracted to mitigate pressure increase.

Containment Assessment

4.2 Containment Assessment

4.2.0.1 Containment of CO2 in a geologic formation comprises geologic and wellbore containment. Both the impact and probability of containment must be assessed and incorporated into resource quantification and uncertainty range, and include consideration of CO2 injectants, in-situ fluids, and displaced brine. The containment assessment area is at a minimum the entire area impacted by the injected CO2. The predicted pressure footprint may extend beyond the pore space entitlement of the project area for which Storable Quantities are estimated.

4.2.0.2 Containment risks (e.g., fracture pressure limits and any wellbores) must be considered as potential constraints when estimating the Storable Quantities associated with a development project. The project storable quantities cannot exceed that which can be contained in the defined containment area for the duration required. Where there are uncertainties with respect to containment potential, this may be reflected in the range of uncertainty in project storable quantities as represented in Figure 1.1 – Resources Classification Framework. Containment assessment must be commensurate with maturity of the project.

4.2.0.3 Wellbore containment assessment must include all wellbores, regardless of status (e.g., injecting, planned, producing, monitoring, inactive, plugged, or abandoned) or original purpose of the well. The project's Storable Quantities and uncertainty must reflect the wellbores' containment uncertainty.

4.2.0.4 Geologic containment assessment must include an evaluation of the seals (e.g., caprock and lateral seals, faults, and/or structural features that impact containment) to establish that they provide geologic containment of the Storable Quantities to meet the project's specifications (e.g., operating/injection conditions). As a project matures, the uncertainty associated with geologic containment is likely to be progressively reduced by acquisition and analysis of the project's operational data. This process will support the project's Storable Quantities and classification.

4.2.0.5 Containment should incorporate potential interactions with other known usages of the subsurface (e.g., hydrocarbon production, natural gas storage, geothermal plants, disposal wells, other uses of the water resource) in the same geologic formation