Assessing the Carbon Sequestration Potential within the San Joaquin Basin, California

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ABSTRACT

The United States Geological Survey (USGS) was directed by the 2007 Energy Independence and Security Act (Public Law 110-140) to assess the potential geologic storage resources for carbon dioxide (CO2) under the United States. Through its petroleum-hydrology methodology for surface CO2 sequestration assessment, the USGS has assessed the storage potential of California and California Tectonic Basins. The basin assessment methodology includes an areal extent of the potential geologic storage formations, the minimum required depth for CO2 to be in a supercritical phase, and the required overlying seal formation. The basin assessment methodology also considers the areal extent of the storage formation and overlying seal required to be continuous and regional in extent. The USGS carbon sequestration national assessment shows that several units in the San Joaquin Basin meet the criteria of the CO2 storage assessment methodology and may be suitable as potential CO2 sequestration sites.

STORAGE ASSESSMENTS

Storage Unit and Seals

The USGS national assessment shows several areas in the San Joaquin Basin over 13,000 ft deep where CO2 storage assessment methodology may be suitable as potential CO2 sequestration sites. These areas are the overlying seal and reservoir quality properties of the storage formation. The USGS CO2 storage assessment methodology emphasizes the technically accessible CO2 storage resource at a variety of scales. The USGS national assessment results are presented in a format that shows the extent and characteristics of the storage formations, the overlying seal, and the minimum seal thickness. The USGS national assessment results are also presented in a format that shows the extent and characteristics of the storage formations, the overlying seal, and the minimum seal thickness. The USGS national assessment results are also presented in a format that shows the extent and characteristics of the storage formations, the overlying seal, and the minimum seal thickness.

REFERENCES


http://pubs.usgs.gov/pp/pp1713/05/pp1713_ch05.pdf

PLAW-110publ140/html/PLAW-110publ140.htm


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Storage Assessment Methodology Requirements:

- Storage Unit must be at least 13,000 ft below the surface.
- Storage Unit must have reservoir quality properties (good porosity and permeability).
- Storage-Assessment Unit (SAU) must exist at regional scale (100’s of miles).
- Overlapping unit requirements:
  - Regionally extensive
  - Sealing rock properties (low permeability)
  - Maintains intergranular (vs. solution)
- Saline ground-water (<10,000 TDS) per EPA requirements
- Maintain minimum thickness (e.g. 75’, good porosity and permeability)
- Storage Unit must have reservoir quality properties

CO2 Storage Assessment Results Include:

- Storage Assessment Unit (SAU) depth (min, max, likely, nice)
- Area of the SAU
- SAU thickness (min, max, likely, nice)
- SAU water quality check and available area function
- SAU target reservoir thickness (min, max, likely, nice)
- SAU target reservoir porosity (min, max, likely, nice)
- Buoyant trapping pore volume (min, max, likely, nice)
- SAU target reservoir interporosity permeability (min, max, likely, nice)
- SAU net porous interval permeability (min, most likely, max)
- Buoyant trapping pore volume (min, most likely, max)
- SAU net porous mean porosity (min, most likely, max)
- SAU thickness (min, most likely, max)
- Saline ground-water (+10,000 TDS) per EPA requirements
- Maintain minimum thickness (e.g. 75’)
- Storage Unit must have reservoir quality properties

To more fully understand the CO2 sequestration potential further studies, including seismic tests, need to be enhanced.

SUMMARY:

The San Joaquin Basin contains several faults formed by a variety of plate boundary stresses. The USGS national assessment shows several areas in the San Joaquin Basin where CO2 storage assessment methodology may be suitable as potential CO2 sequestration sites. The USGS CO2 storage assessment methodology assesses the technically accessible CO2 storage resource at a variety of scales. Level of uncertainty across a formations. The monte-carlo geologic factors that have been completed. Final products are expected in 2013.

In summary, the USGS CO2 sequestration methodology is designed to identify the technically accessible CO2 storage resource at a variety of scales. Level of uncertainty across a formations. The monte-carlo geologic factors that have been completed. Final products are expected in 2013.