The Genesis of the CO_2 Storage Resource Management System (SRMS)

Over the past decade, there have been many published methodologies to calculate CO2 storage. However, they vary from volumetric assessments of pore volume to rigorous statistical representation of geologic heterogeneity with CO2-brine displacement efficiency. Many methods concentrate on the scientific analysis technique that they use to estimate storage, rather than on the uncertainty in their estimate based on quantity and quality of data and the types of data available. The application of these methods to the same rock unit may yield differences in the estimate by 2-5 orders of magnitude.

While neither is necessarily incorrect, they represent estimates with as equally wide difference in certainty. Moreover, of a site with active CO2 injection, an estimate of storage at that site will have the highest degree of certainty based on historical injection performance compared to a CO2 storage estimate of site without a well or injection. Consequently, project maturity is an important part of the certainty in a specific estimate.

A qualitative method that can classify these estimates based on data available and project maturity could give assurance to stakeholders. From a “full-chain” CCS project development perspective, industry, investors, regulators, and other stakeholders want to know that these estimates are attainable via real wells and real CO2, and not a high-level pore volume assessment. There is no broadly accepted method for classifying storage estimates in terms of the geologic and project uncertainty.

The petroleum industry has faced similar challenges. Over the decades, it has developed a Petroleum Resources Management System (PRMS) for classification of subsurface petroleum accumulation of petroleum classification that has been used by the petroleum industry for decades. This classification system clearly labels the certainty of the quantification of underground accumulation of hydrocarbons that includes the relative certainty that the project is commercially viable and projected to proceed. For example, the PRMS differentiates between an oil accumulation that is assessed with very limited data as "exploratory or undiscovered" compared to more rigorous assessment of a “discovered” oil accumulation that is being actively developed and produced. This system also gives confidence levels within the highest level of classification estimates - proved, probable, and possible.

There are differences between CO2 storage estimates and petroleum accumulation estimates. Petroleum accumulations are localized and have an initial estimate of the hydrocarbon in place. On the other hand, CO_2 storage may be more broadly available based on the presence of porous and permeable rocks throughout a sedimentary basin that may be within a geologic structure or on regional dip.

The Society of Petroleum Engineers CCS Technical Section is forming a multi-society committee to develop a unified classification system for storage estimates – the Storage Resource Management System (SRMS). This committee will be tasked to develop a classification system that may provide the CCS community a standardized storage resource classification that provide all stakeholders a system of comparing and contrasting CO2 storage estimates based on project and geologic certainty.

Currently, the committee plans to align the SRMS classification with that of the PRMS, so that analogs to the three PRMS classification of hydrocarbon reserves, contingent resource and prospective resource are identified. While beyond the scope of this committee, once a unified classification system is developed, a concerted effort to classify existing CO2 storage estimates into the SRMS methodology will

be possible. Consequently, it will be possible to combine local and regional estimates of storage to create a global estimate for a given classification. Ultimately, it will allow investors to take a pragmatic and informed view of the CO2 storage available within the bounds of subsurface variability and uncertainty, and sanction more CCS projects.