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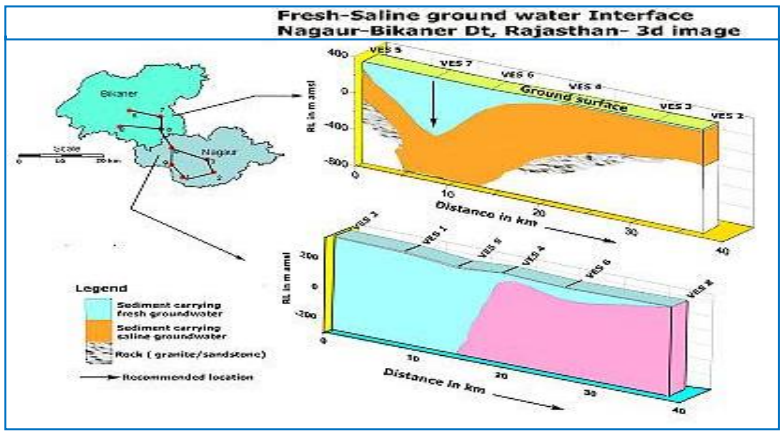
Climate Change- Identification of Deep Saline Aquifer for CO2 Sequestrationin Bikaner-Nagaur Basin, Rajasthan, India

Chadha, D.K.[1]

[1]Adviser, Global Hydrogeological Solutions (Former Chairman- Central Groundwater Board)

The emission of greenhouse gases is increasing world over, also the emission of greenhouse gases in India is computed to have increased from 560 million ton (Mt) in 1990 to about 2,300 Mt in 2015 and is projected to increase further to 2,934 Mt by 2020. The climate change due to increasing concentration of greenhouse gases is expected to cause significant impact on hydrological cycle at regional as well as global scale. To stabilize and ultimately reduce concentration of CO2, it is imperative to capture and sequestrate CO2 in different geological sinks. Among the different geological sinks, deep saline aquifers constitute the best option as it is estimated that about 1000 Gt CO2 can be stored. The emission of CO2, from power plants in Rajasthan is estimated at 19.32 Mt, the same can be captured and stored in the deep saline aquifers in the Bikaner- Nagaur basin (Rajasthan) as the other geological sinks e.g depleted oil and gas fields, abundant coal mines and deep saline aquifers are very far off from Rajasthan. The CO2 sequestration in saline aquifers requires the identification of saline aquifers below 700m bgl. In India, the study of deep saline aquifers have recently been initiated and the study of deep saline aquifers in the Bikaner- Nagaur Basin show that the saline aquifers are present at different depth ranges and extend beyond 700m depth thus meeting the screening criterion.

The Bikaner-Nagaur Basin is underlain with older alluvial sediments of quaternary age overlying the thick sandstone formation belonging to Tertiary and Mesozoicperiods. In the present study, in order to comprehend the configuration of the deep saline aquifers, nine VES soundings were carried out in the Bikaner –Nagaur basin to an average depth of 950 m, the brackish to saline ground water is generally present below the depth varying from 85 m to 340 m bgl. The interpreted data is shown in Figure 1. The sandstone formation is underlain with Vindhyan group of hard rock formation consisting of Granite, Quartzite, mica schist , etc. The sandstone formations are laterally extensive for an area of about 400 km with a saturated thickness of 350 m. Based on this preliminary assessment , it is computed that the storage capacity of carbon dioxide in the sandstone aquifers is 450.8 million ton against the present emission of 19.32 Mt. It is, thus, opined that deep saline aquifers of different sedimentary basins of the country be mapped for identification and configuration of



deep saline aquifers for mitigation measures.

Figure 1: Panel diagram showing variation in Sub surface lithology
Of the nine VES sounding done in Rajasthan Basin