CO_2 Sequestration in Central New York State: Update

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The UB-Cornell-NYSERDA-Geomatrix-AES-Anschutz-Norse Energy-Talisman-NYS Museum consortium was formed in 2008 to investigate the feasibility of subsurface CO_2 sequestration from coal-fired power plants in central New York State. The targeted units included Cambrian units (e.g., Potsdam, Rose Run, Galway), Ordovician Queenston, and Silurian Oneida and Oswego. The Phase I tasks included 1) determining characteristics of the targeted horizons (Jordan, Frappa, NYS Museum, and Jacobi); 2) determining the spatial variability of these units from seismic reflection data (Jordan); 3) modeling dynamic CO2 capacity and fracture flow in potential CO2 reservoirs (Becker); 4) evaluating CO2 fluid-reservoir rock interactions (Derry); 5) modeling CO2 capacity incorporating task #4 (Phipps Morgan); 6) collecting published and new fault and fracture data (Jacobi); 7) identification of lineaments and testing the lineaments against task #6 (Csatho and Jacobi).

The Potsdam has porosities (P) up to 10% and permeabilities (k) ranging from 0.002 to generally 1 mD. The Rose Run locally has P over 10% and k up to 4 mD. P for the Queenston is up to 14% and k ranges from 0.1 to 20 mD. The Oneida and Oswego sands are too thin to be viable targets. The static capacity of the Queenston is sufficient to store in a 25 mi^2 area 3-12 years of CO_2 emitted from the largest of the local power plants. However, if permeability and capillarity are considered, the dynamic CO_2 storage capacity of these units is inhibited by permeability. Hydraulic fracturing could significantly enhance the rate of injection (e.g., by at least a factor of 4 in the Queenston). The largest simulated dynamic storage volume after 10 years (without hydraulic fracturing) was achieved in Cambrian units: 4 megatons of CO_2 storage in the Rose Run, and 6 megatons CO_2 storage in the Avoca/Little Falls formations. Queenston has roughly comparable numbers to the Rose Run. These volumes approach the *1 megaton per year* economic threshold. In the Queenston Formation no P occlusion would result by precipitation

of new minerals over decades. Lineaments and proposed fault systems are relatively close to each of the coal-fired power plants. In order to predict the actual fractures in the target units at the target site, and to verify an absence of faults, 3D seismic and horizontal test wells are a necessary step in Phase II.