Monitoring of Geological CO2 Sequestration Using Isotopes and Perfluorocarbon Tracers

Agreement Number: FWP-FEAA045

Performer: Oak Ridge National Laboratory

Key Technologies:

Subsurface Monitoring (all tasks)

- **Task 1 – Transfer of perfluorocarbon tracer (PFT) and isotopic geochemistry technology to partners for collaboration and deployment of MVA techniques.**
  The project is continuing to pursue key partners for transfer of the tracer technologies. Organizations to be targeted include university, non-profit and private enterprises engaged in CO_2 storage in saline reservoirs or through EOR, EGR, and ECBM.

- **Task 2 – Evaluate effects of hydrocarbon-rich matrices on PFT capture and quantification in gas samples.**
  When sorbent tubes are used to trap PFTs, it is not clear if the sorption of different perfluorocarbon compounds is affected by the presence of volatile organic compounds found in petroleum liquids and natural gas typical of EOR and EGR reservoirs. Determining the effect of hydrocarbon-rich matrices on the trapping and quantification of PFTs in sorbent tubes is the main focus of this task.

- **Task 3 – Improve quantitative models of CO_2 plume activity in reservoirs using perfluorocarbon and geochemical tracer data in new simulator modules.**
  Maximizing the value of tracer data requires modeling with a reservoir simulator to quantify the degree of CO_2 dispersion, dissolution, fingering, and other transport properties of the CO_2 plume. Estimating these parameters using unprecedented PFT and isotope measurements is addressing the main metrics of CO_2 plume area and pressure differentials that control leakage and induced seismicity risk. Predicting

these properties through a new tracer-simulation MVA package that leverages capabilities of an advanced reservoir simulator is the goal of this task.

Technology Areas:

- Monitoring, Verification, Accounting, and Assessment