

Characterization and working programme of Hontomín CO₂ injection site (Spain). Geological and Geophysical Characterization

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Hontomín is the site of the Research Facility for the Geological Storage of CO₂, the Technology Demonstration Plant of the Compostilla OXYCFB300 Project (EU funded: European Energy Programme for Recovery), operated by CIUDEN (a state-owned, public R&D institution created by the Spanish Administration). Hontomín presents a dome-like structure, and is located in Burgos (Northern Spain). CO₂ will be injected in a Jurassic limestone-dolomitized level located at, approximately, 1450 m depth. The seal rocks belong to the overlying series of the Lias and Dogger, and are composed by marls and black shales. The petrophysical properties estimated from old well logs and other data allowed us to determine that the reservoir interval features adequate porosity and permeability. Furthermore, the data reveals the presence potentially effective seals.

CIUDEN's research on geological storage of CO₂ is focused on three key issues; 1) the characterization of the Hontomín reservoir for long-term storage of CO₂ in saline aquifers, 2) modeling the long term behavior of CO₂ in a saline aquifer, including the integrity of storage, verification, and security, 3) investigating the technology required for the injection of CO₂ into the reservoir and its long-term monitoring.

A large number of experiments are being developed for site characterization, and for future monitoring of the CO₂ injection. These comprise: geological mapping, sedimentological and petrophysical studies, hydrogeological and hydrogeochemical characterization of aquifers, baseline of gases emission and geophysical site characterization. The latter includes a 3D seismic reflection experiment (35 km²), acquired by CGGVeritas in Summer 2010. The volume imaged characterized the Hontomín dome. The topography and difficult logistics of the study area forced a mixed source acquisition (Vibroseis ~74% + explosives ~26%). Additionally, 3D magnetotellurics experiment and a high resolution gravity survey were also acquired. These completed the subsurface characterization. Innovative and non-standard experiments were also carried out as part of the geophysical baseline study: 1) two 2D three-component seismic reflection profiles, 2) a SeisMovie survey, and 3) a 30 station passive-seismic recording network was installed.

Three boreholes have been designed in Hontomín site one for injection and two for observation and monitoring purposes. Drilling will start by the end of 2011. A large number of experiments are planned both for monitoring the evolution of the reservoir and the CO₂ plume and for testing leading edge and/or development of new injection technology.