SP44

Carbon Dioxide Storage in Reservoir Structures on Example of Jastrzabka Stara Oil Deposit

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SUMMARY

Carbon dioxide is one of the greenhouse gases, which occur in the atmosphere as a result of Earth's processes and human activity. In case of the descending concentration of CO₂ in the atmosphere, global society decided to invite and implement new technologies, which allow to combust fossil fuels with any carbon dioxide emission. One of these technology is carbon dioxide capture and injection to geological structures (Carbon Capture and Storage - CSS). CO₂ is supposed to be stored in sedimentary basins and possibility of long - term storage is related to their stable structure.

Depleted oil and gas fields tend to be a perfect structures to carbon dioxide injection. They are natural traps holding reservoir liquids and in case of hydrocarbon exploration and production are well recognized. In addition, enhanced oil recovery associated with CO₂ injection increase the reservoir production. Advantages and disadvantages of CO₂ storage and parameters of geological structures capable for sequestration are discussed. Possibility of use the enhanced oil recovery methods are presented in relation to Jastrzabka Stara oil deposit (SE Poland, Carpathian Fordeep).

Industry and development of civilization are the main reason of greenhouse gases emission. Carbon dioxide is one of those gases. It occurs in the atmosphere as a product of natural Earth's processes (breathing, volcanic eruption) and as a result of human activity. Anthropogenic carbon dioxide emission is associated with fossil fuels combustion (coal, oil, natural gas). In case of inability of fossil fuels abandonment, global society decided to invite and implement new technologies, which allow to combust fossil fuel with any carbon dioxide emission to atmosphere. One of these technology is carbon dioxide capture and injection to geological structures (Carbon Capture and Storage - CSS).

Carbon dioxide is supposed to be stored in sedimentary basins. Considering the appropriate basin for carbon dioxide sequestration is associated with its tectonics activity, regimes and resources (coal, salt, hydrocarbons). Other issues are the range of industry development, infrastructure and social aspects as economic developments level, environmental protection and public education. Sedimentary basins location on continental crust is also considered. The mostly requested location are mid-continental basins or lying at the edge of continental plates. Possibility of long - term carbon dioxide storage is related to their stable structure. Basically 3 major types of structures are distinguished to anthropogenic carbon dioxide: depleted oil and gas fields, deep saline formations, coal beds.

Depleted oil and gas fields tend to be a perfect structures to carbon dioxide injection. They are natural traps holding reservoir liquids and in case of hydrocarbon exploration and production are well recognized. In addition, they are featured with necessary infrastructure to perform the injection. Other point the enhanced oil recovery associated with CO₂ injection increase the reservoir production.

Advantages and disadvantages of CO₂ storage and parameters of geological structures capable for sequestration are discussed. Possibility of use the enhanced oil recovery methods are presented in relation to Jastrzabka Stara oil deposit (SE Poland, Carpathian Fordeep).