THE POTENTIAL OF IN SITU LIGNITE GASIFICATION IN TEXAS

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The technical and economic feasibility of utilizing in situ gasification to recover energy from deep basin Texas lignite has been under investigation during the past three years at UT-Austin. The low Btu gas produced can be utilized for production of electric power or as a chemical feedstock. The economic and technical factors which make the in situ process attractive have been identified. Potential problem areas have also been evaluated. A discussion of previous operating experience in the U.S. and Russia will be given. Since Texas lignite is a shrinking coal, a three-step conversion process is envisioned: (1) drying; (2) backward burning; (3) forward burning. Steps (1) and (2) are permeability enhancement (seam preparation) processes, while the final step is the major gas production step. Laboratory work is presently underway to determine which geological, physical, and chemical conditions in Texas are conducive to economic application of in situ gasification, and to develop a design and operating basis for eventual field testing.

GEOTHERMAL ENERGY FROM THE FRIO FORMATION—A NEW RESOURCE FROM AN OLD TREND

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A high percentage of the Texas Gulf Coast oil and gas is produced from the Frio Formation; most of the hydrocarbons are derived from fluvial sands on the updip portion of the Frio sedimentary wedge and are less than 100 feet thick. The downdip Frio sands are considerably thicker (100 - 700 feet) and were deposited either as deltas or as strandplain deposits. These thick sands at depths greater than 10,000 feet commonly produce water fresher than sea water with temperatures between 250-300° F and are saturated with methane gas. The objective of the Bureau of Economic Geology project is to evaluate the potential of producing water from these large geopressured reservoirs in order to obtain thermal energy, methane gas, and potable water.

The first essential step in such an evaluation is to determine regional trends of the sand bodies and their depositional environments. Sand-percent maps of the lower part of the Frio outline thick dip-oriented sand bodies which were deposited as high-constructive deltas along the Lower Texas Gulf Coast. To the north, along the Middle and Upper Texas Gulf Coast, sands along the main sand depocenter are strike-aligned and were deposited as strandplain sands and barrier bars. The sands of the upper part of the Frio, on the other hand, are dominately strike oriented throughout the Texas Gulf Coast.

Sand-percent maps along with isothermal maps identify gross geothermal fairways which contain sand bodies greater than 300 feet thick with fluid temperatures higher than 250°F. More detailed studies of these fairways, then, incorporate both detailed analysis of sand distribution with closely spaced well-logs and porosity and permeability data obtained from core analysis and log interpretation.