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Western Greece unconventional hydrocarbon potential from oil shale and shale gas reservoirs

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It is clear that we are gradually running out of new sedimentary basins to explore for conventional oil and gas and that the reserves of conventional oil, which can be produced cheaply, are limited. This is the reason why several major oil companies invest in what are often called unconventional hydrocarbons: mainly oil shales, heavy oil, tar sand and shale gas. In western Greece exist important oil and gas shale reservoirs which must be added to its hydrocarbon potential1,2.

Regarding oil shales, Western Greece presents significant underground immature, or close to the early maturation stage, source rocks with black shale composition. These source rock oils may be produced by applying an in-situ conversion process (ICP). A modern technology, yet unproven at a commercial scale, is the thermally conductive in-situ conversion technology, developed by Shell3. Since most of western Greece source rocks are black shales with high organic content, those, which are immature or close to the maturity limit have sufficient thickness and are located below 1500 meters depth, may be converted artificially by in situ pyrolysis. In western Greece, there are several extensive areas with these characteristics, which may be subject of exploitation in the future2.

Shale gas reservoirs in Western Greece are quite possibly present in all areas where shales occur below the ground-water level, with significant extent and organic matter content greater than 1%, and during their geological history, were found under conditions corresponding to the gas window (generally at depths over 5,000 to 6,000m). Western Greece contains argillaceous source rocks, found within the gas window, from which shale gas may be produced and consequently these rocks represent exploitable shale gas reservoirs.

Considering the inevitable increase in crude oil prices, it is expected that at some point soon Western Greece shales will most probably be targeted. Exploration for conventional petroleum reservoirs, through the interpretation of seismic profiles and the surface geological data, will simultaneously provide the subsurface geometry of the unconventional reservoirs. Their exploitation should follow that of conventional hydrocarbons, in order to benefit from the anticipated technological advances, eliminating environmental repercussions. As a realistic approach, the environmental consequences of the oil shale and shale gas exploitation to the natural environment of western Greece, which holds other very significant natural resources, should be delved into as early as possible.

References

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