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**BIOGEOCHEMISTRY OF STRATEGIC PETROLEUM
STOCKS IN SALT CAVERNS**

Harry N. Giles, Office of Strategic Petroleum Reserve,
U.S. Department of Energy, Washington, D.C. 20585, U.S.A.

J. W. Joachim Koenig, Erdölbevorratungsverband
(German Strategic Petroleum Reserve),
D 2000 Hamburg 36, Germany

Abstract—Caverns in salt have been used by several countries for the stocking of petroleum in strategic reserves. These reserves have included crude oil, motor gasoline, home heating oil, and jet fuel. The walls of salt caverns are largely inert with respect to stored petroleum and, so far, no reactions between them are known to take place. Only the water bed in solution-mined caverns interacts to any degree with petroleum, and this interaction can be minimized with certain precautions. Crude oil is least endangered by deleterious changes in quality, as most changes can be accommodated by refinery processing. Crude oil does, however, exhibit a tendency to deposit sludge during prolonged storage. The sludge itself is relatively innocuous; but it is difficult to handle on the surface, coats the walls of pipelines, can contaminate subsequent movements of products, represents loss of a valuable commodity, and could pose an environmental problem. During storage, gasoline and middle distillates can become contaminated with brine, causing them to fail certain specification tests. Autooxidation initiated by dissolved oxygen is probably only a minor problem if the brine is saturated with salt, although in newly-leached caverns this could be a serious problem. Excessive additive treatment may mitigate these problems. Biodeterioration of petroleum is generally inhibited by the high sodium chloride concentration of the brine, but episodic growth and aerobic catabolism of hydrocarbons or anaerobic reduction of sulfates and production of hydrogen sulfide could possibly occur following injections of relatively fresh surface water for operational reasons. Most quality problems encountered to date in the development of strategic petroleum reserves can be avoided by careful planning and exercise of a few precautions. These include using saturated brine for petroleum movements, carefully selecting the crude oils to be stored and not commingling them in storage, not storing refined products in caverns previously used for crude oil, and judicious use of additives both before and following storage. By observing these precautions, petroleum stored in caverns in salt will not need to be rolled over as frequently as if it were stored in aboveground tanks in order to maintain its quality. The determination of the maximum permissible storage period is, however, still in its infancy.