Abstracts

Carbonate Dolomitization in Geochemistry

SALEH M. BILLO
King Saud University, Riyadh, Saudi Arabia

Although many researchers believe that most, if not all, dolomites are mainly formed by secondary replacement of limestones anywhere from soon after deposition, diagenesis, to now, a controversy over dolomite origin still remains. This is fueled by the fact that (a) thinly laminated wholly unfossiliferous dolomites closely associated with bedded anhydrite recur frequently in the stratigraphic record and (b) the discovery of Recent primary or evaporitic penecontemporanceous dolomites in the intertidal and supratidal regions of the Arabian Gulf, Florida, and the Bahamas, and other areas. Yet, no one has been able to synthesize dolomite in a laboratory simulating normal marine conditions; albeit experimental work at low temperatures has recently produced dolomite from solutions at pH's greater than 9.5 while maintaining high concentrations of SO_4 and NO_3. Now there is new evidence from carbonate geochemistry showing the precipitation of primary dolomites is related to kinetics or reaction rates.

Use of Probiological Remediation Technology to Remediate Crude Oil Tank Bottom Materials

TED I. BREWSTER, and JOHN J. KRAMBERGER
Texas Energy & Environmental, Inc., Houston, TX

Historically, the disposal of crude oil tank bottom materials has consisted of off-site transport to an incineration facility, a state approved landfill, or an off-site treatment facility. With increased treatment costs, regulatory limitations on landfill use, and increased environmental liability, producers have had to develop new strategies in order to dispose of their crude oil tank bottom wastes. One form of remediation which is proving highly effective in remediating production wastes is "Probiological Remediation Technology' (PRT). PRT enables producers to treat their basic sediment wastes on-site using a highly specialized form of biological remediation.

With treatment being accomplished on-site, high costs associated with storage, transportation, off-site treatment, and environmental liability are drastically reduced. Since 1987, PRT has been utilized in numerous remediation applications. In one instance, PRT methods were applied to remediate 3,200 cubic yards of tank bottom wastes which had accumulated on a south Texas oil and gas lease. Initially, total petroleum hydrocarbon (TPH) levels were in excess of 75,000 parts per million (PPM) or 7.5%. However, within six weeks, TPH levels were reduced to below acceptable state commission regulatory standards of 10,000 ppm (< 1.0%) without diluting the saturated sediments with clean soil. Remediation was accomplished under harsh conditions which included high salt, chloride, and heavy metal concentrations.

PRT is highly effective in reducing contaminants commonly associated with oil and gas field operations. The science of PRT is complex, but application is simple and can be accomplished on-site, thereby reducing costs identified with off-site treatment, transportation, and/or disposal..

The Use of Probiological Remediation Technology to Remediate Petroleum Hydrocarbon Contaminated Soil: A Collection of Laboratory and Field Results

TED I. BREWSTER, and JOHN J. KRAMBERGER
Texas Energy & Environmental, Inc., Houston, TX

Laboratory studies and full scale field projects have shown the effectiveness of a newly emerging bioremediation technology, "Probiological Remediation Technology" (PRT). Laboratory feasibility studies and full scale remediation projects throughout the United States have proven the effectiveness of PRT. Many aspects of the probiological process are still unknown to scientists, but recent studies are helping to explain the complex nature of this emerging bioremediation technology. PRT utilizes complex organic materials to "detoxify" an impacted environment. When specific liquified organic acids and natural chelates are added to an impacted environment, limiting biological conditions and contaminants are altered in a fashion that will allow the biodegradation of a deleterious contaminant. The exact mechanism for the degradation of the contaminant is not fully known, but recent research has suggested that several pathways may be involved.

Several laboratory studies and full scale field projects have shown remarkable results. Many of the processes involved in probiological remediation technology are fairly common within the bioremediation scientific arena, but the use of specific organic materials is not. A collection of laboratory feasibility studies and full scale field projects will help explain this promising new technology. PRT is proving to be quite useful within the oil and gas industry for restoring sites that are contaminated with production wastes which often seem immune to biological degradation. Lethal microbial environmental conditions are altered, and microorganisms, whether they be indigenous or not, are able to perform their natural function as petroleum "degraders" when PRT is used as a remediation tool.