ABSTRACTS – SHREVEPORT MEETING, MARCH 26-29, 2003 – Mary Barrett, Chairperson

## EIGHT DECADES OF ANTHROPOGENIC AND NATURAL LANDSCAPE CHANGE IN SMACKOVER FIELD, ARKANSAS

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Discovery and recovery of substantial petroleum in the unregulated Smackover oilfield (Smackover Field) in 1922 resulted in massive surficial environmental impacts, and recovery transformations are continuing today. The technically and environmentally unsophisticated petroleum industry and social infrastructure of the 1920s and following decades was nonetheless spurred toward ever greater production by a nation eager for oil, jobs, and rural development. Except for anomalies such as the Great Depression, people prospered, world wars were fought, and industry surged forward making the United States a secure world power. During these early decades, intentional and accidental releases of produced fluids (petroleum hydrocarbons and saltwater) took a toll on the natural landscape.

Beginning in 1922, the first ten years of production resulted in the release of five to ten million barrels of oil and over one billion barrels of saltwater to the landscape surface. The oil losses were due to technical problems dealing with containment security, recovery economics from oil emulsions, and inadequate earthen storage pit volumes, whereas the saltwater was intentionally released. In addition to relict pit scars, terrestrial vegetation and aquatic life in Smackover Creek and the Ouachita River suffered from decades of excessive salinity and oil spills.

Loss of native pine and hardwood forest vegetation in the uplands exposed topsoil and subsoil to erosion forces. Suspended by stormwater and released saltwater, upland soil particulate migrated across toeslope drainageways although substantial soil particulate remained sufficiently suspended to be carried to the Gulf of Mexico, much of it settled out in low gradient lowlands and floodplain areas where water moved slowly. These sediment accretion areas, called drainageway flats, salt flats, and salt scars also contain layers of dense and entrained petroleum hydrocarbons.

In 1958 producers were given five years to cease discharging oilfield saltwater into surface waters. Natural revegetation assisted by ample rainfall and adequate drainage became increasingly evident in the uplands after this time. Although some progress is evident, natural revegetation of the drainageways and lowland areas has been much slower to develop. Fortunately, there has been sufficient interest by public agencies, oil companies, private landowners, and the community to fund vegetative restoration efforts in these lowland areas using economically useful salt loving plants. Wildlife aficionados are especially excited about the increasing number of deer foraging on the halophyte forages.

## GILBERT D. HARRIS (1864-1952); CORNELL PROFESSOR, LOUISIANA STATE GEOLOGIST, AND LONG DISTANT OIL CONSULTANT

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Gilbert Dennison Harris, a native of Jamestown, New York, was State Geologist for Louisiana from 1899 until 1909, while on the faculty at Cornell University. He spent each winter in Louisiana and fall and summer teaching at Cornell; an arrangement which provided students from Cornell and Louisiana State University the opportunity to gain work experience. The oil industry in this part of the world was just starting when Harris began his work with the Louisiana survey, and what he and his survey teams did, not the least of which was the recognition of dome structures in the state, provided a geological foundation for later discoveries.

Harris found that he was constantly receiving requests for assistance with various drilling projects and considered becoming a private consultant. When the Survey lost its funding in 1909, Harris was free to pursue his role as a private consultant while still maintaining his faculty position at Cornell. During his time in New York, of course, the drilling would continue in Louisiana and Harris would do his consulting by telegram and letter. He would receive letters directly from a well, along with actual well cuttings and their depths, asking what to do next. After examining the cuttings, Harris would telegraph or mail his instructions back to the driller. One wonders how much "down time" there was on the rig while the crew waited for the mail to be delivered. But this method was successful and he remained a consultant for many years.

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## SUBMARINES, BLIMPS, TRAINS, AND SHIPS: TRANSPORTATION PROPOSALS FOR PRUDHOE BAY CRUDE OIL, 1968-77.

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Upon discovery in 1968 of the Prudhoe Bay (Alaska) oil field, North America's largest at 20 billion barrels, the immediate challenge facing the oil industry was how to bring these vast reserves to market. Alaska's North Slope is a notoriously unforgiving environment with long winters of continual darkness punctuated by temperatures of 65 degrees Fahrenheit below zero. The subsurface of the tundra