ico margin west of De Soto Canyon record Mississippi and other river input and its extensive lateral dispersal by regionally important mass flow.

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Preliminary Study of Distribution and Transport of Radium, Radon, and Their Alpha Emitting Daughters Using Nuclear Emulsions and Polonium-210

Drill cores obtained during the drilling of the Bendix/Department of Energy radon emanometry grid, Red Desert, Sweetwater County, Wyoming, have been analyzed for Polonium-210 and studied using alpha sensitive, nuclear emulsions. These nuclear track plates provide descriptive information on the physical distribution of U-238 and its alpha emitting daughter products. Microscopic examination of exposed and developed plates on which non-ore zone core samples were dispersed suggests that U-238 and its long-lived daughters U-234, Th-230, and Ra-226 deposit on grain surfaces in very low concentrations (U-238 in sub-picogram amounts). Many of these atoms are bound to the surfaces so lightly that they, as well as Rn-222, are free to enter the underlying emulsion where their decays are recorded. Concentrations of alpha activity usually associated with discrete uranium minerals were not observed. Ra-226 appears to be more mobile than Rn-222. Measurements of Po-210 in the sequential decay, Rn-222 (3.8 days) $\rightarrow$ Pb-210 (22 years) $\rightarrow$ Po-210 (138 days), provide an indirect means of estimating the number of Rn-222 atoms that have decayed in a sample over the last 80 to 100 years. Many Po-210 highs have been observed in the Red Desert cores, some directly associated with uranium mineralization. To date, evidence for the predicted Po-210 concentration gradient produced by the decay of mobile, unsupported Rn-222 either in transit to the surface or over short distances, has not been found. These Po-210 analyses and microscopic studies suggest that observed Rn-222 and Po-210 surface anomalies may be associated with widely dispersed very low concentration halos of Ra-226 or its longer lived parents which surround the ore.

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Depositional Provinces of Paleozoic and Uppermost Precambrian Rocks in Great Basin, Western United States

From late Precambrian to Late Devonian time, shallow-water carbonate strata were deposited on a broad continental shelf along the west margin of North America in a region that is now the Great Basin. This deposition created a wedge of sedimentary rocks, the Cordilleran miogeocline, that thickens from about 1,000 m in cratonic areas in central Utah to nearly 10,000 m in central Nevada. Abrupt facies changes along the west margin of the miogeocline reflect depositional provinces from outer continental shelf to continental slope. Farther west in the Great Basin, coeval rocks consist mainly of shale, radiolarian chert, quartzite, and mafic pillow lava, considered to be mainly deep-water oceanic deposits.

Depositional provinces of the Great Basin were markedly changed by the Antler orogeny during Late Devonian and Early Mississippian time. This orogeny created the Antler highland, an upland belt trending north-northeast through central Nevada, along the former edge of the continental shelf. During Mississippian, Pennsylvanian, and Permian time, the Antler highland was either emergent or the depositional site of thin shallow-marine or continental coarse detrital sediments and shallow-marine carbonate. A foreland basin east of the Antler highland received thick deposits of coarse, chert-rich detritus during Mississippian and, to a lesser extent, Pennsylvanian and Permian time. A shallow-water carbonate shelf lay east of the foreland basin. Mississippian, Pennsylvanian, and Permian rocks west of the Antler highland consist of shale, sandstone, conglomerate, radiolarian chert, silty limestone, and mafic lava, all deposited in a deep-water oceanic environment.

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Geology and Hydrocarbon Potential of Antarctica

Antarctica covers approximately 14 million sq km, an area greater than the United States and Mexico combined. About 98% of this expanse is buried beneath a continental ice sheet having an average thickness of 3,000 m.

Seven nations have territorial claims to parts of Antarctica; however, parts remain unclaimed. The 1959 Antarctic Treaty, extending to 1991, freezes territorial claims for its duration. The treaty does not cover mineral or hydrocarbon exploration or exploitation.

Available data indicate the presence of 13 major sedimentary areas or basins on or fringing the Antarctic craton. Published descriptions of sedimentary outcrops in Antarctica plus litho-paleogeographic plate reconstructions and consideration of the stratigraphy of the adjacent landmasses allow prediction of sediment age and lithology in the 13 basins. The sediments are predominantly clastic. The onshore basins contain some Paleozoic sediments but the offshore basins are anticipated to contain only Mesozoic and Cenozoic sediment. Five of the 13 basins are onshore and subglacial whereas eight are considered as offshore basins. Five of the offshore basins are accessible with today's exploration technology and of these, three are considered highly prospective for hydrocarbons. Preliminary exploration efforts are beginning in this truly virgin area and future development will be exciting to watch and, hopefully, participate in.

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Kaolinite Formation in Clastic Reservoirs: Carbon Dixoide Factor

Thermodynamic modeling of diagenesis in clastic reservoirs was used to quantify geochemical and geohydrologic constraints on the formation of kaolinite. The formation of significant amounts of kaolinite depends upon four conditions: (1) a source for aluminum; (2) the presence of acidic pore fluids; (3) the pH buffering capacity of the fluids; and (4) the quantities of such fluids moving through the reservoir. The first condition is usually satisfied by the unstable mineral assemblage. The second and third conditions can depend upon CO_2 released during hydrocarbon maturation, and the final condition requires an open system.

The presence of dissolved CO_2 buffers the pH so that the pore solution is undersaturated with respect to illites, chlorites, and smectites while kaolinite is being precipitated. Minimum limits of fCO_2 in equilibrium with fluids forming appreciable amounts of kaolinite were computed as a function of unstable