

the largest resources occur offshore in the Beaufort shelf and the Navarin basin shelf. Basins appearing to have a relatively low potential should not be ignored. Future geologic information could cause significant revisions. Cost and technical considerations detract significantly from the apparent exploration merit of some resource-bearing basins, particularly in the arctic marine areas.

Industry investment commitments since the study correspond with the study results.

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Oil Exploration in Nonmarine Rift Basins of Interior Sudan

In early 1975 Chevron Overseas Petroleum Inc. commenced a major petroleum exploration effort in previously unexplored interior Sudan. With the complete cooperation of the Sudanese Government, Chevron has acquired a vast amount of geologic and geophysical data during the past 9 years. These data include extensive aeromagnetic and gravity surveys, 25,000 mi (40,200 km) of seismic data, and the results of 66 wells. This information has defined several large rift basins which are now recognized as a major part of the Central African rift system.

The sedimentary basins of interior Sudan are characterized by thick Cretaceous and Tertiary nonmarine clastic sequences. Over 35,000 ft (10,600 m) of sediment have been deposited in the deepest trough, and extensive basinal areas are underlain by more than 20,000 ft (6,100 m) of sediment. The depositional sequence includes thick lacustrine shales and claystones, flood plain claystones, and lacustrine, fluvial, and alluvial sandstones and conglomerates. Those lacustrine claystones which were deposited in an anoxic environment provide oil-prone source rocks. Reservoir sandstones have been found in a wide variety of nonmarine sandstone facies.

The extensional tectonism which formed these basins began in the Early Cretaceous. Movement along major fault trends continued intermittently into the Miocene. This deformation resulted in a complex structural history which led to the formation of several deep fault-bounded troughs, major interbasin high trends, and complex basin flanks. This tectonism has created a wide variety of structures, many of which have become effective hydrocarbon traps.

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Effect of Radiation on Particulate Organic Matter Associated with Roll-Front Deposits

When multiple maturation populations are observed in organic materials derived from core and/or outcrop samples, the common assumption is that the more mature organic constituents have been reworked from older sediments. Uranium roll-front deposits are exceptions to this rule. In core samples that pass through roll-front deposits, the extractable organic matter frequently exhibits various aspects of radiation damage (selective oxidation and/or thermal alteration). Core samples taken above the roll-front contain spores, pollen, and associated plant debris which have a uniform level of alteration (thermal maturity). However, once the roll-front deposit is penetrated, a dual mode of thermal maturity is observed. Lower levels of maturation gradually give way to much higher alteration values as one approaches the zone where the uranium ore is most concentrated. This process reverses itself once the core hole passes through the roll-front into nonmineralized rocks.

Because the alteration of the spores, pollen, plant tissue, and associated vitrinite particles is irreversible, the organic petrographer can use this data to assist the explorationist in regional mapping of uranium roll-front deposits, even when radioactivity in a given location has decreased below measurable levels.

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Paleodrainage-Unconformity Model as Guide to Uranium Deposits

This paper considers a uranium occurrence model that shows how early Eocene and Oligocene depositional patterns and paleogeography can be used to identify favorable host rocks and to suggest where uraniferous

ground water passed through these rocks. The uranium in the ground water was derived mostly from volcanic ash of the Oligocene White River Group. This model accounts for most known uranium deposits and occurrences in eastern Wyoming, western South Dakota, and western Nebraska.

All major deposits in Eocene sandstones are in rocks of the fan-channel facies that were identified by sand grain size and shape studies, and most deposits are basinward of present-day major mountain valleys. Deposits occur only where rocks of this facies are less than 300 m (980 ft) below the reconstructed basal Oligocene surface—a distance calculated from roll-front migration and erosion rates.

Uranium deposits in other than Eocene rocks also are related to the configuration of the pre-Oligocene surface. White River channel sandstones have deposits and occurrences along a 200-km (125-mi) section of a major Oligocene river in eastern Wyoming and Nebraska. Oligocene trans-mountain drainages localized uranium occurrences in Precambrian granitic rocks in the Laramie Mountains. Deposits in Cretaceous rocks in northern Colorado and along the flanks of the Black Hills lie beneath the axes of Oligocene channels. The channels were the major conduits that localized the movement of the uranium-bearing solutions. Rocks underlying the divides between the channels are unfavorable for uranium deposits where the channels are parallel to the regional dip, because the divides have a thick impervious lateritic soil cover.

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Strike-Slip Tectonics, Related Basin Formation, and Sedimentology in Zones of Continental Escape: Turkey as a Case Study

Strike-slip movement on various scales and in diverse orientations is one of the most prominent modes of deformation in zones of continental convergence. Extreme heterogeneity and low shear strength of continental rocks are responsible for creating "escape routes" of bewildering complexity into free faces from nodes of constriction along irregular collision fronts. Since the Tortonian (11 Ma), the tectonics of Turkey has been dominated by its escape westward from the east Anatolian collision zone onto the oceanic lithosphere of the eastern Mediterranean, mainly along the north and east Anatolian transform faults (NAT & EAT), and at least two other southeast-concave strike-slip faults that branch off the NAT near Erzincan and Resadiye. The Aegean graben system is a broad shear zone between the latter of these and the Grecian shear zone. At "triple junctions" involving the NAT/EAT and EAT/Dead Sea transform fault, space problems arise, giving rise to the Karliova and Adana/Cilicia basins, respectively. In Thrace, where the NAT takes a southwesterly bend, part of the resulting constraint is released by rifting in a northwest orientation that formed the Ergene basin. In addition, various pull-apart structures and "leaky" strike-slip faults contribute to the richness of strike-slip-related negative structures in Turkey. Some of these are of lithospheric dimensions and contain thousands of meters of sediment, whereas others formed within thinner crustal flakes above decollement horizons. Because escape tectonics necessarily involves subduction, arc-related strike-slip deformation may interfere with that indigenous to collision tectonics, as in south Turkey. Continental convergence eventually eliminates all subductable areas along the collision front and the structures generated by escape regimes may fall prey to compressional obliteration. In zones of complex and multiple continental collision such as Turkey, several episodes of escape tectonics may alternate with intracontinental compressional deformation, whereby the products of the older escape regimes would be very difficult to recognize. The present tectonics of Turkey constitutes an excellent guide to earlier episodes of escape tectonics in and around Turkey.

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Role of Diagenesis in Formation of Stratigraphic Traps in Aux Vases of Illinois Basin

The Aux Vases Sandstone, a prime exploration target in the Illinois basin, is a prolific but enigmatic reservoir that has produced nearly a billion bbl of oil. Detailed outcrop and subsurface study shows that much of this production is from diagenetically influenced stratigraphic traps in a complex tidal-sandbar system. The complexity of this system makes iden-