alteration index (CAI) ranges from 1 at the type section to 1.5 to 2 in transitional and basinal areas. Because CAI values of 1 to 2 correspond to the thermal interval of oil generation, a vast area of Lower Triassic rocks has productive potential.

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Newly Discovered Inlier of Ordovician Phi Kappa Formation, South-Central Idaho

An inlier of Ordovician Phi Kappa Formation at Meridian Creek, Custer County, Idaho, provides new information on the distribution and character of this formation. The exposure, which trends 2.3 km along the drainage and ranges up to 0.5 km in width, is isolated from other Phi Kappa outcrops by Tertiary Challis Volcanics. Although the rocks here are similar in age and general lithology to the Phi Kappa exposed 7.1 km northwest in the East Pass Creek window and 5.2 km south on the North Fork of the Lost River, there are significant differences.

The Ordovician at Meridian Creek has a minimum thickness of 210 m. About 150 m is graptolite-bearing, Middle Ordovician (Caradocian) shale and calcareous siltstone, whereas the remainder consists of thick (30 m) units of dolomitic limestone and radiolarian-bearing chert. The carbonate unit, which consists of medium to thick beds of fine to medium-grained, dolomitic limestone with clasts of mudstone up to 1 cm long, is coarser grained and thicker than carbonates in Ordovician rocks in nearby areas. The limestones seem to be turbidites, but this interpretation is difficult to reconcile with potential carbonate sources.

The uppermost Phi Kappa at Meridian Creek is intensely deformed. Similar relations are present in adjacent areas where the Mississippian Copper Basin Formation is thrust over the Ordovician. Although Mississippian rocks are absent along Meridian Creek, it seems a Copper Basin thrust plate once extended across this area. Regional considerations also suggest that the Ordovician rocks at Meridian Creek are allochthonous.

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Exploration Guides for Uranium in Volcanic Environments

Exploration for volcanogenic uranium deposits in the United States is a relatively new endeavor, but it is not new in other countries in the world. The Soviet Union, Italy, Yugoslavia, Canada, Brazil, and Mexico have substantial reserves in volcanic host environments. Few volcanogenic uranium deposits have been discovered in the United States, but they may be indicators of larger, more favorable environments.

Volcanogenic systems that evolve from mantle-derived, hydrous, alkaline, magmas than can be enriched in Li, Be, Mo, and Hg, are most likely to develop favorable host environments. Rocks that develop in these host environments exhibit regional enrichment of uranium and thorium. The tectonic settings of these systems are extensional and are related to rift systems and transverse zones in the Basin and Range province of the western United States.

Uranium mineralization processes active in the volcanogenic system produce deposits in both high-temperature and low-temperature regimes. High-temperature deposits form from pneumatolytic, magmatic-hydrothermal, and meteoric-hydrothermal processes; the deposits may be fumaroles, breccia pipes, brecciated margins of intrusives, fractured and porous country rock, and porous zones along ash-flow contacts. Diagenetic and reduction-oxidation processes work in conjunction to form low-temperature deposits, commonly in sedimentary environments where oxidizing ground-water flow can introduce labile uranium into reducing environments.

Sierra Pena Blanca, Chihuahua, Mexico, is a preserved part of an alkaline volcanic complex that formed in a rift system active in late Eocene through early Oligocene time. Although detailed mapping is still underway, the number of uranium and thorium enriched alkaline and peralkaline ash-flows suggests several eruptive centers nearby. Enrichment of other metals in these ash-flow sheets suggests regional enrichment of lithophilic elements. Sierra Pena Blanca has pneumatolytic uranium deposits in fumarolic ash flows, magmatic and meteoric hydrothermal deposits in interbedded ash flows and invaded country rock, and low-temperature deposits forming in closed basins adjacent to the volcanic complex.

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Stratigraphy and Petroleum Trapping Mechanisms of Upper Jurassic Entrada Sandstone, Northwestern New Mexico

Extensive outcrops and 14 measured sections of the Upper Jurassic Entrada Sandstone and overlying Todilto Formation in the southern Chama basin Echo Amphitheater–Ghost Ranch area show long, parallel, eolian transverse dune buildups in the upper Entrada perpendicular to the dominant wind direction as shown by cross-bed foresets. Some bevelling of the buildups occurred prior to the evaporitic deposition of limestone and gypsum of the Todilto Formation and this deposition preserved the buildups, filling in the low interdune areas.

The subsurface Entrada-Todilto of the southeastern San Juan basin was mapped over an area including 20 townships. An isopach of the Todilto Formation shows that essentially the same trend of Entrada dune buildups is present here as in the outcrop area.

Support for the mechanism of trapping in Entrada oil fields as proposed earlier by Bryant is present both in the surface and subsurface where relief created by eolian buildup of sand is preserved by the infilling of the Todilto. However, structural dip counter to regional dip along the axis of dune buildups is needed to trap oil. This dip can be provided by syndepositional faults cutting across the buildup axis as in the outcrop area where there is sudden thickening of the Todilto and of the Entrada downthrown to the fault.

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Distribution and Stratigraphic Correlation of Burro Canyon(?) Formation, Chama and Northern San Juan Basins, New Mexico

The Lower Cretaceous conglomerate sandstone, sandstone, and mudstone interval stratigraphically between the Upper Cretaceous Dakota Sandstone and the Upper Jurassic Brushy Basin Member of the Morrison Formation in the Chama and northern San Juan basins, New Mexico and Colorado, is tentatively called the Burro Canyon(?) Formation. In this area the Burro Canyon(?) consists of a basal fluvial sequence deposited in braided-stream environments and an upper fluvial sequence deposited in braided to meandering-stream environments.

The Burro Canyon(?) is unconformably overlain by the Dakota Sandstone and may disconformably overlie the Brushy Basin Member of the Morrison Formation. The Burro Canyon(?) thins southward from the Chama and northern San Juan basins because of truncation of the formation under the