Facies Control of Upper Cretaceous Cleary and Gibson Coal Members near Gallup, New Mexico

The Upper Cretaceous Point Lookout Sandstone separates the Cleary Coal Member of the Menefee Formation from the Gibson Coal Member of the Crevasse Canyon Formation in much of the Chaco slope and southwest San Juan basin. These coal-bearing members merge as the intervening Point Lookout Sandstone pinches out to the southwest in the direction of the Nutria monocline and Gallup coal field. The deposits of the merged coal interval supported widespread mining activity northwest and north of Gallup, New Mexico, near the turn of the century; however, renewed mining of these coals for the past few years has concentrated northwest of the town. Closely spaced outcrop sections provided data from which to infer the depositional settings of the merged coals.

Northwest of Gallup (Enterprise mine area), an alluvial facies of channel sandstones, deposited by northward-flowing streams is complexly interspersed with interfluvial siltstones and with laterally discontinuous coal deposits. North of Gallup (Gibson and Heaton mine areas), better integrated sandstones deposited in north-to-northeast flowing distributary channels, subordinate crevasse-splay sandstones, more widespread coal zones, and common bioturbations in laminated carbonaceous siltstones suggest coal accumulation in a deltaic to lagoonal transition environment. Further northeast of Gallup, where the Nutria monocline changes to an easterly strike toward the Chaco slope, well-developed coals remain associated with the deltaic and lagoonal environments. However, these coal-forming environments grade northeastward into the Point Lookout back-barrier to lagoonal transition environments, where coal deposits are poorly developed.

CHAMBERLIN, RICHARD M., New Mexico Bur. Mines and Mineral Resources, Socorro, NM

Unconformity-Related Uranium Deposits in Upper Cretaceous Sandstones, Datil Mountains Area, West-Central New Mexico

The north flank of the Datil Mountains is underlain by gently south-southwest dipping strata of the Late Cretaceous Crevasse Canyon Formation, which is unconformably overlain by the Eocene Baca Formation. This erosional unconformity is well exposed where the upper 30 to 60 m of the Crevasse Canyon forms a 15-km-long belt of mesas, which probably represents an east-trending, fine-grained, meander-belt complex.

Numerous uranium anomalies and several small orebodies (Red Basin area) generally form a coaxial uranium belt within (and below) a 20 to 30-m-thick, intensely bleached zone at the top of the Crevasse Canyon. In drill cuttings and canyon walls, the light-gray sandstones and light-purplish-gray shales of the bleached zone grade downward into the dark-gray sandstones and carbonaceous shales typical of the Crevasse Canyon Formation. Tabular uranium deposits commonly occur in bleached channel sands where they are in contact with carbonaceous shales. Thin laminae of black hematite are common along the mineralized contacts. Carbonized wood and pyrite concretions, common in the lower Crevasse Canyon, occur as silicified logs and limonite concretions in the bleached zone.

The basal 0 to 10 m of the Baca Formation is usually a light-brownish-gray conglomeratic sandstone containing abundant hematite flakes, broken limonite concretions, and bits of silicified wood, suggesting that bleaching (and mineralization?) may have predated Baca deposition.

COMBS, DOUGLAS W., UNC Teton Exploration Drilling Co., Inc., Albuquerque, NM

Disequilibrium and Possible Origin of Uranium Deposit in Cretaceous Lower Dakota Scour Channel, Church Rock District, McKinley County, New Mexico

Uranium mineralization has been intersected in a Cretaceous Dakota fluvial channel in the Church Rock district of the Grants mineral belt, New Mexico. This channel scours into the Brushy Basin Member of the Jurassic Morrison Formation and contains the only mineralization discovered in the Dakota Sandstone on the property. Two hypotheses may explain the source of the uranium: (1) a reworking of the Westwater Canyon sediments south of the orebody where the Brushy Basin is absent, and (2) the expulsion of uranium-bearing waters from the underlying Brushy Basin mudstone.

A Laramide uplift created a hydrologic gradient which resulted in the encroachment of oxidizing ground waters upon the orebody. The southern half of the orebody exhibits a limonitic(?) staining and paucity of actual uranium compared to radiometrics whereas the northern half lacks obvious iron staining and possesses an abundance of uranium over the associate radiometrics.

DELLA VALLE, RICHARD S., D. G. BROOKINS, and C. I. MORA, Univ. New Mexico, Albuquerque, NM

Tartaric Acid Leaching of Selected Ore Samples, Grants Mineral Belt, New Mexico

Composite samples of high-grade ore samples from the Doris and Johnny M mines were leached under controlled laboratory conditions to determine which elements are more mobile in the presence of organic acids. The samples selected consisted of -2-μ composites of kaolinite + mixed layer smectite/illite + U-mineral + accessory organic matter and sulfides; and chlorite + mixed layer smectite/illite + U-minerals + accessory organic matter and sulfides. These samples were leached with 0.01 molar tartaric acids in tightly sealed Erlenmeyer flasks, with constant agitation, for 100 hours and the leachates and insoluble residues were analyzed by neutron activation analysis. Uranium, Th, and the REE (rare earth element) were strongly leached and presumbably form chelates with the tartaric acid; Na, K, and Ba were also leached but Rb and Cs were either not leached or else fixed on the outer armor of the insoluble residue. Fe and Hf were also leached but Cr, Co, Sb, and Ta concentrated in the insoluble residues. The distribution patterns for the REE for leached and untreated samples are parallel, but the amount of REE leached is proportional to U leached, thus suggesting that organic transport of the REE with U (and Th?) may account for the high REE contents common in many uraniun deposits of the Grants mineral belt. The source for the REE and for at least some of the U may have been the Brushy Basin Member (Morrison Formation) for deposits in the underlying Westwater Canyon Member.

DENNIS, BRANT A., Mobil Oil Corp., Denver, CO, and T. E. KELLY, Geohydrology Associates, Inc., Albuquerque, NM

Effects of Mining and Reclamation on Hydrologic Parameters

Studies in west-central New Mexico show that the hydrologic parameters of a coal sequence do not change appreciably