VICTOR, BILL, Union Oil Co.

The Anderson Mine Formation: Stratigraphy and Depositional Environment of a Miocene Uranium-Bearing Sequence, Basin and Range Province, Arizona

The Anderson Mine uranium deposit in west-central Arizona is potentially the most significant uranium discovery in the Basin and Range province. The uranium mineralization occurs in fine-grained, tuffaceous sediments of the middle Miocene Anderson Mine Formation.

The stratigraphy of the Anderson Mine Formation is complex and is characterized by rapid vertical and lateral changes in lithology. The lower part of the formation consists of tuffaceous sandstones, siltstones and conglomerates with subordinate amounts of tuffaceous claystones and carbonaceous siltstones. The upper part of the formation includes tuffaceous siltstones, claystones, fine sandstones and impure limestones which are locally interbedded with carbonaceous siltstones, fetid limestones and impure lignites. Rocks which were deposited at the center of the depositional basin are fine grained, micaceous, carbonaceous, and contain widespread laminations. Units deposited near the basin's edge are coarser grained and contain sedimentary structures indicative of deposition in a higher energy environment. Carbonaceous material is either completely lacking from rocks deposited at the edge of the basin or the organic material shows the effects of deposition in an oxidizing environment.

Deposition of the Anderson Mine Formation occurred in a small, restricted, shallow-water basin that supported abundant vegetation. Anoxic water conditions at the center of the basin, where current action was non-existent, permitted thick accumulations of carbonaceous material. Better

circulation at the basin's edge resulted in a relatively oxidizing environment which prevented preservation of organic material. Sediment was supplied to the basin by alluvial fans which originated in the surrounding Precambrian and volcanic highlands. The rapid decrease in water velocity, where the fans entered the quiet-water paludal environment resulted in immediate deposition of the coarse-grained material at the basin's edge. Progressively finer grained material was deposited, from suspension, towards the center of the basin.

The distribution of the uranium mineralization is facies controlled. The highest grade mineralization occurs in the carbonaceous sediments which were deposited at the center of the basin. The non-carbonaceous units at the basin's edge are only weakly mineralized.