

Roll-front uranium occurrences of the South Texas Mineral Belt: Development of a database for mineral potential modelling and quantitative resource assessment

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The South Texas Mineral Belt in the United States is a broad curvilinear region of marginal-marine roll-front sandstone uranium occurrences. Located ~130 km inland, the belt parallels the Gulf of Mexico coastline and extends from southeast Texas to Mexico. It trends northeast-southwest and is about 400 km long and 10-50 km wide as delineated by alignments and clusters of occurrences, but ~100 km wide if outlying occurrences are included. The occurrences are hosted in coastal plain sediments and rocks of Tertiary age that dip gently towards the Gulf. These include the Lower Eocene Wilcox Group, Middle Eocene Claiborne Group, Upper Eocene Jackson Group, Upper Oligocene–Miocene Catahoula Tuff, Lower Miocene Oakville Sandstone, and Pliocene Goliad Sand. Older sequences are mixed fluvial-beach facies, whereas younger are dominantly fluvial. Occurrence distribution is controlled by host unit strike and dip, and permeable sequences therein, and by a combination of growth faults and locations of reductants.

The U.S. Geological Survey is conducting a quantitative assessment of roll-front uranium resources in the South Texas Mineral Belt using geospatial mineral potential modeling and 3-Part Assessment methodologies. The objectives are to (1) delineate permissive, favorable, and prospective tracts, (2) estimate the number of undiscovered deposits, and (3) estimate the resource endowment of each tract. A roll-front uranium resources database has been compiled for the assessment detailing occurrence location, size, operation type, U₃O₈ production and reserves, and host unit.

The database contains 253 occurrences, including 165 deposits (sites with recorded production or reserves), 75 prospects (sites with some level of exploration), 6 showings (sites of interest that have been investigated), and 5 anomalies (sites with indications of mineralizing processes). Of the deposits, ~52% are open-pit operations, ~29% are ISR, and the remainder unknown. These include 102 past-producers, 41 unmined, 2 operating, and 1 under development, as well as 11 deposits and prospects with exploration status. Through 2013, an estimated total resource of ~134,862,000 lbs U₃O₈ (~81,239,000 lbs production, ~53,623,000 lbs reserves) are contained in 122 occurrences, mainly in past-producing, unmined, and operating deposits. The Goliad Sand hosts ~7% of the occurrences, with resources of ~44,906,700 lbs U₃O₈ in ISR past-producing, operating, and exploration and development phase deposits. The Oakville Sandstone hosts ~18% of the occurrences, with resources of ~48,635,100 lbs U₃O₈ mainly in ISR and open-pit past-producing and some unmined deposits. The Catahoula Tuff hosts ~25% of the occurrences, with resources of ~14,870,100 lbs U₃O₈ mainly in ISR and open-pit past-producing and unmined deposits. The Jackson Group hosts ~46% of the occurrences with resources of ~26,276,600 lbs U₃O₈ mainly in open-pit and past-producing deposits. The Claiborne Group, Wilcox Group, and unidentified units host the remaining occurrences. Grades range 0.04% - 0.3% U₃O₈ (0.11% average) for open-pit operations, and 0.03% - 0.34% (0.09% average) for ISR (higher grades have been reported).

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