An Assessment of Undiscovered Uranium Resources in the Texas Gulf Coast: Part 1—Geologic Context

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EXTENDED ABSTRACT

The United States is the world's largest consumer of uranium used in nuclear power plants, but has only 4% of world's known recoverable resources (as of 2013; World Nuclear Association, 2014). The sustainability of nuclear energy in the U.S., which provides approximately 19% of the nation's electricity, relies upon a secure supply of uranium that can be produced in an environmentally acceptable manner. More than 90% of the uranium used domestically for nuclear power generation is imported (U.S. Department of Energy, 2015). Assessment of undiscovered domestic uranium resources is therefore a critical component of a sustainable nuclear industry in the U.S. The last comprehensive domestic uranium assessment, the Department of Energy's (DOE) National Uranium Resource Evaluation (NURE) program, was concluded in 1980 (see Hall [2013]). The U.S. Geological Survey (USGS) recently completed a geology-based assessment of the Texas Coastal Plain region that estimated a mean of 220 million pounds of uranium oxide (U3O8) of potential uranium resources remaining in undiscovered sandstone-hosted uranium roll-front deposits (Mihalasky et al., 2015).

The Tertiary sedimentary sequences of the Texas Gulf Coast host numerous uranium deposits (Eargle et al., 1971). These deposits are typically found in sandstones and are some of the most prolific uranium deposits in the U.S. Deposits in the Texas Coastal Plain region are estimated to contain the third largest domestic sandstone-hosted uranium resource after the Colorado Plateau and Wyoming Basin regions.

Estimates of undiscovered uranium resources associated with sandstone-hosted roll-front deposits in the Texas Coastal Plain were made for geologic units with known uranium occurrences: the Eocene Claiborne and Jackson groups, the Oligocene Catahoula Formation, the Miocene Oakville Sandstone, the Pliocene Goliad Sand and Willis Formation, and the Pleistocene Lissie Formation (Fig. 1). Sandstone facies that host miner-

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alization were deposited in mixed marine-coastal-fluvial facies (Claiborne and Jackson groups) and by dominantly fluvial systems (Catahoula Formation, Oakville Sandstone, Goliad Sand, and Willis and Lissie formations) (Fisher et al., 1970).

There are at least 169 known mines in the region that have produced in total approximately 81 million pounds of U3O8 with reported in-place (unmined) uranium resources of about 59 million pounds of U3O8 (Fig. 2). Ore bodies are typically narrow and long, with strike lengths ranging from 10 of meters to kilometers. Geologic sedimentary units known to host uranium deposits were used to delineate three geographic regions (tracts) permissive for undiscovered uranium deposits: (1) the Claiborne-Jackson tract, (2) the Catahoula-Oakville tract, and (3) the Goliad-Willis-Lissie tract.

The tracts represent groups of stratigraphic sequences that were deposited in broadly similar depositional environments. The tracts are geographically subdivided into the Rio Grande Embayment sub-tract (the southwestern region with more known occurrences and higher mineral potential) and the Houston Embayment sub-tract (the northeastern region with fewer known occurrences and lower mineral potential), forming a total of six sub-tracts.

Part 2 of this work, Mihalasky et al. (2016, <http://www.gcags.org/exploreanddiscover/2016/00079_mihalasky_et_al.pdf>), provides further details regarding assessment approach and results.

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