

International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues (URAM-2018)



Contribution ID: 80

Type: ORAL

Quantitative Mineral Resource Assessments of Roll-Front and Calcrete Uranium in Southern Texas and the Southern High Plains Province of the United States: Results and Simple Economic Filter Analysis

Wednesday, 27 June 2018 09:00 (20 minutes)

INTRODUCTION

The U.S. Geological Survey (USGS) recently completed two uranium mineral resource assessments in the south-central United States (U.S.) as part of a re-evaluation of domestic resources previously considered by the 1980 National Uranium Resource Evaluation program [1]. These new assessments include: (1) in 2015, an assessment of undiscovered roll-front uranium resources in Tertiary coastal plain sediments of southern Texas [2]; and (2) in 2017, an assessment of undiscovered calcrete uranium resources in Pliocene and Pleistocene carbonate-rich sediments of the Southern High Plains region of Texas, New Mexico, and Oklahoma [3]. Roll-front uranium in southern Texas has been recognized since the mid-1950s. Calcrete uranium, however, a deposit style known elsewhere around the world but previously unreported in the U.S., was only brought to the attention of the USGS in 2015 after two small deposits (Buzzard Draw and Sulphur Springs Draw) and several prospects were recognized in northern Texas in the mid-1970s [4].

METHODS AND RESULTS

The roll-front assessment was conducted using a combination 3-Part quantitative [5] and Weights-of-Evidence qualitative mineral potential modelling [6] methods, and identified 54,000 tU, with 85,000 tU estimated mean undiscovered. The calcrete assessment was conducted using the 3-Part quantitative method, and identified 1,000 tU, with 15,000 tU estimated mean undiscovered. Collectively they total about 155,000 tU.

DISCUSSION AND CONCLUSIONS

If these identified and estimated undiscovered uranium resources are economic, and if the identified resources are mined and undiscovered resources found and produced, this represents over 8 years of U.S. civilian nuclear power reactor fuel requirements. The application of a simple economic filter based on the Pareto principle, and using uranium resource data from the IAEA global UDEPO database [7] and a USGS-compiled database for southern Texas [8], was used to investigate whether the undiscovered uranium resources could be economic in relation to known and(or) produced regional and global uranium resources. Given the uranium resource endowment (size) of deposits regionally and globally, and the current market prices for uranium (October, 2017; approximately $20\text{USD per pound } U_3O_8$ or 52 USD per kg U), the results suggest that: (1) the undiscovered calcrete uranium resources are not likely to be economic at the present time; and (2) the undiscovered roll-front resources are economic in context of regional (southern Texas) uranium production considerations and setting, but marginally- to sub-economic when regarded in a larger, global context.

REFERENCES

[1] U.S. DEPARTMENT OF ENERGY, An assessment report on uranium in the United States of America, U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, USA, Report Number GJO-111(80), 160p. (1980).

- [2] Mihalasky, M.J., Hall, S.M., Hammarstrom, J.M., Tureck, K.R., Hannon, M.T., Breit, G.N., Zielinski, R.A., and Elliot, Brent, Assessment of undiscovered sandstone-hosted uranium resources in the Texas Coastal Plain, 2015, U.S. Geological Survey Fact Sheet 2015–3069, 4 p. (2015), <http://dx.doi.org/10.3133/fs20153069>.
- [3] Hall, S.M., Mihalasky, M.J., and Van Gosen, B.S., Assessment of undiscovered resources in calcrete uranium deposits, Southern High Plains region of Texas, New Mexico, and Oklahoma, 2017, U.S. Geological Survey Fact Sheet 2017–3078, 2 p. (2017), <https://doi.org/10.3133/fs20173078>.
- [4] Van Gosen, B.S., and Hall, S.M., The discovery and character of Pleistocene calcrete uranium deposits in the Southern High Plains of west Texas, United States, U.S. Geological Survey Scientific Investigations Report 2017–5134, 27 p. (2017), <https://doi.org/10.3133/sir20175134>.
- [5] Singer, D.A., and Menzie, W.D., *Quantitative mineral resource assessments: An integrated approach*, Oxford University Press, New York, New York, USA, 219 p. (2010).
- [6] Bonham-Carter, G.F., *Geographic information systems for geoscientists: Modelling with GIS*, Pergamon Press / Elsevier Science Publications, Tarrytown, New York, USA, 398 p. (1994).
- [7] INTERNATIONAL ATOMIC ENERGY AGENCY, *World Distribution of Uranium Deposits (UDEPO)*, IAEA-TECDOC-1629 (2009; 2012 online edition), <https://infocis.iaea.org/>.
- [8] Hall, S.M., Mihalasky, M.J., Tureck, K.R., Hammarstrom, J.M., and Hannon, M.T., Genetic and grade and tonnage models for sandstone hosted roll-type uranium deposits, Texas Coastal Plain, USA, *Ore Geology Reviews*, v. 80, p. 716–753 (2016), <https://doi.org/10.1016/j.oregeorev.2016.06.013>.

Country or International Organization

United States of America

Primary author: Dr MIHALASKY, Mark (U.S. Geological Survey)

Presenter: Dr MIHALASKY, Mark (U.S. Geological Survey)

Session Classification: Advances in Exploration

Track Classification: Track 4. Advances in exploration