GSLDP
The Great Sacandaga Lake Deepening Project
gsldeepening.com • info@gsldeepening.com

Rare Earth & Lithium Oxides

Because rare-earth elements, used in consumer electronics and military systems, are usually found in rocks that contain radioactive thorium and uranium, companies looking to produce them have to deal with nuclear regulations. In late 1999, we ran a complete radiological assessment of GSL mineral sands (overburden) at the UCLA Radiation Laboratory and published the results in our Masters Thesis at SUNY Albany (Sediment Characteristics, Great Sacandaga Lake (NY): Economic Potential of Dredging and Land Reclamation).

Rare earths are found associated with potassic granites (K–Feldspar) and pegmatites, which surround the Sacandaga Basin and are also in the sediments of a small portion of the basin called the Great Sacandaga Lake (GSL). Rare earth oxides are found in the minerals monazite, xenotime and apatite, which have been found in each and every mineral count we have had analyzed from the sediments/overburden beneath the GSL. Monazite, the principal ore of rare earths can be recovered safely in wet sand harvesting operations, with no radiational hazard to workers, as opposed to hardrock mining because of rock blasting, pulverization and associated airborne dust.

Rare earths (principal mineral sand ores are monazite and xenotime) are found in GSL overburden enriched in Thorium, Cerium, Yttrium, Lanthanum, Lithium minerals (Lepidolite, the principal ore in the GSL overburden), Titanium minerals Rutile, Luecoxene and Ilmenite (the principal ore in the GSL overburden), Beryllium, Iron (Magnetite is the principal ore in the GSL) and Zirconium (Zircons). An *attachment* of the geochemistry from ALS Chemex showing the suite of elemental analyses from GSL overburden includes one sample from the high-grade metamorphic rocks (Proterozoic, ~900 Million years old) in the Sacandaga Basin, which surround the GSL and twenty-six samples are from GSL lakebed (overburden) Geoprobe cores.

GSL overburden would typically be compared to sandstone crustal abundances for Thorium and are reported from a variety of sources to be from 1.5-4.0 ppm, with our 27 samples represented averaging slightly lower to much higher at ~4ppm to ~13ppm. Cerium crustal abundances in sandstone report from 6-7ppm with our Hardrock sample ~168ppm and overburden samples averaging 55ppm to highs of 122ppm. Lanthanum crustal abundances in sandstone report from 19-21ppm with our Hardrock sample 81ppm and overburden samples

Arthur M. Ambrosino, E.M. • President & Lead Engineer
3511 William Penn Drive • San Antonio, Texas 78230
Phone: 210-451-8165 • Cell: 562-537-1902

averaging ~24ppm to highs of ~58ppm. Yttrium crustal abundances in sandstone report from 14-16ppm in sandstones with our Hardrock samples averaging 31ppm and overburden samples averaging 32ppm to highs of 76ppm. Lithium crustal abundances report from 14-16ppm with our Hardrock sample averaging 24ppm and overburden samples averaging 16ppm to highs of 38ppm.

The data reported is a small snapshot of sampling done in the basin and reflects the sampling protocols we set-up early on in our investigations. A great deal more sampling needs to be undertaken in the Sacandaga Basin and in the GSL sediments/overburden to substantiate the total ore reserve there. One might expect the rare earths to be generally light (Lanthanum), based on the high concentrations of Cerium, but the heavy rare earth (Yttrium) is also higher than expected in the overburden. More recent mineral counts of heavies indicate an important Yttrium phosphate mineral called xenotime was present in unexpectedly large quantities in the GSL overburden.

Arthur M. Ambrosino, E.M. • President & Lead Engineer
3511 William Penn Drive • San Antonio, Texas 78230
Phone: 210-451-8165 • Cell: 562-537-1902