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Uranium potential in Greenland

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The uranium potential in Greenland is considered high with several known uranium occurrences. South Greenland is the largest uranium province in Greenland, containing the Kvanefjeld deposit, the Motzfeldt Centre and the Grønnedal-Ika complex, which are all large Mesoproterozoic alkaline Gardar intrusions. In the Puissattaq and Vatnaverfi areas, several U-rich veins follow the direction of the major fault zone. The Nordre Sermilik area is also rich in uranium occurrences related to faults and fractures. In the very southern part of Greenland, uranium mineralised veins occur at Illorsuit.

In West Greenland, several large carbonate intrusions (e.g. Sarfartoq, Qaqaarsuk and Tikiusaaq) contain elevated uranium concentrations. The Nuuk region also has a relatively-high level of background radiation due to numerous mineralised pegmatites.

In East Greenland, mineralised zones are located in volcanic and granitic rocks of Devonian age at Randbøldal, Foldaelv and Moskusokseland. Uranium mineralisation associated with phosphorite occurs in the Devonian redbeds of southern Wegener Halvø. At Arkosedal, uranium mineralisation in hydrothermally altered breccia and veins, occur in fault zones between Caledonian complexes and Permian clastics. Uranium anomalies have also been detected at Hinks Land, Frænkel Land.

Given the very limited uranium exploration carried out in Greenland to date, a greater potential is presumed to exist based on spot observations and the knowledge of favourable geological environments.

The 150 km² Ilímaussaq alkaline complex of South Greenland hosts the REE-U-Zn-F deposit referred to as Kvanefjeld. It is intruded into the Palaeoproterozoic Julianehåb Granite and the unconformably overlying Mesoproterozoic Eriksfjord formation comprising sandstone and basalt. Kvanefjeld represents the top of the Ilímaussaq intrusion and is composed of hyper-aggaitic lujavrites and naujaite. The last intrusive phase, the lujavrite, has an average U concentration of 273 ppm and approximately 3 times the amount of thorium. Most of the radioactive minerals are complex silicates and phosphates with rare earth elements, niobium, tantalum, zirconium and iron. Steenstrupine, a sodium-cerium-silico-phosphate is an important carrier of uranium (0.2–1.5% U) and thorium (0.2–7.4% Th). The thorium-silicate thorite (3.1% U, 40.5% Th) occurs only in the late stage differentiate lujavrite. In other rock types, eudialyte, a sodium-calcium- and iron-silicate with zirconium, is the dominant uranium- and thorium-bearing mineral.

The Kvanefjeld uranium deposit is unique in Greenland and has been described in great detail. Geological mapping and radiometric acquisition have been carried out from 1956 to 1985, and 12,455 metres of core have been drilled and a 1 km long adit was constructed.

Since 2007, Greenland Minerals and Energy Ltd. (GME) has conducted REE-exploration activities in the Kvanefjeld area, including the drilling of an additional 57,710 meters of core. GME reports that the overall resource inventory for Kvanefjeld (150 U₃O₈ ppm cut-off) is 619 Mt of ore containing 350 Mlbs U₃O₈ and 6.55 Mt TREO including 0.24 Mt heavy REO. Additional resources exist in Zone Sørensen and Zone 3.

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