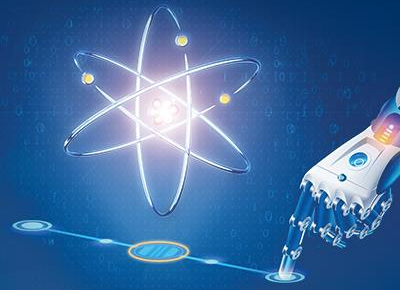
SCIENTIFIC FORUM
NUCLEAR ENERGY FOR CLIMATE



INNOVATIONS IN THE FRONT END

Examples from the Namibian uranium sector

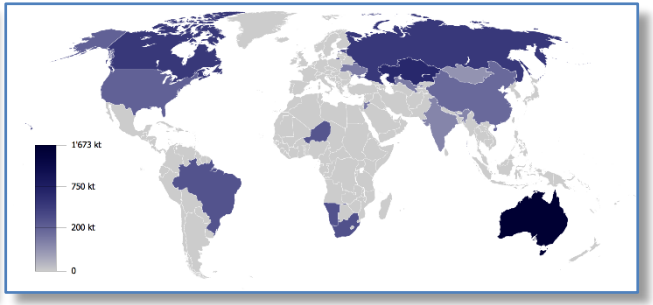
Gabi Schneider
Namiban Uranium Association/Namibian Uranium Institute

Namibian Uranium Association

2023

Background

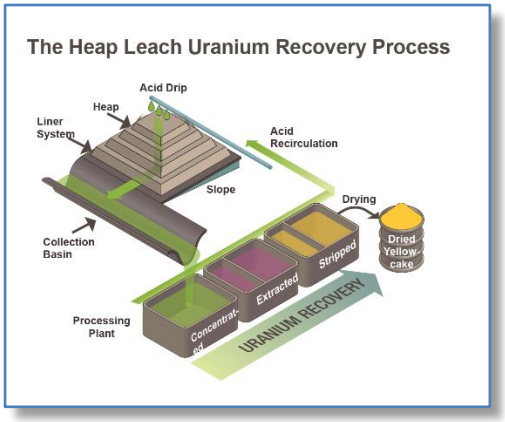
- Namibia produced 13.5% of World uranium output in 2022
- 3rd largest producer in the world, largest in Africa
- 5th largest uranium reserves in the World (8% - 470 000 tU of 6.1 mtU)
- Namibia's first commercial uranium mine began operating in 1976
- Rössing and Husab Mines in operation, re-start plan for Langer Heinrich Mine
- Current uranium price trends support the development of many projects
- BUT: Low grade (0.02-0.05%), Canada up to 20%, Niger 0.1-0.2%, Kazakhstan 0.07%, Australia 0.06%



Rössing Mine

- Life-of-Mine extended from 2026 to 2036
- Deeper mining of current orebody through extension of current pit
- Additional water storage to avoid downtime
- Plant refurbishment to increase recovery and decrease reagent usage
- Extension of tailings storage facility
- Solar PV
- Studies for future heap leaching of low-grade ore

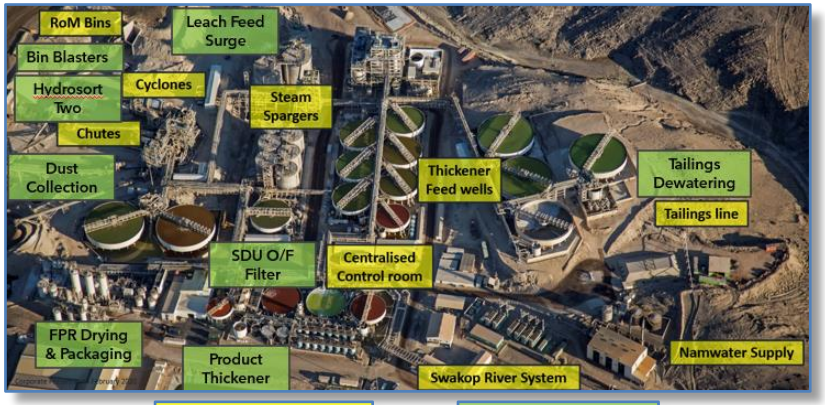
Husab Mine



- Low-grade ore not suitable for existing tank leach facility
- Study for heap leach facility
- Heap leach pad with 6 cells for optimal recovery
- Crushing, agglomeration, reagent and solution handling
- Reclamation and waste storage

Langer Heinrich Mine

- Re-opening after Care & Maintenance (2018), Q1 2024
- Growth Project: increase throughput capacity and operational availability
- Hydrosort classifier (size, density),sodium-diuranate overflow filter, agitators, thickeners, cyclones, and prefabricated tanks
- New Final Product Recovery Facility: automated and dustless drumming plant



Process Upgrades **New Equipment**

Bannerman Resources

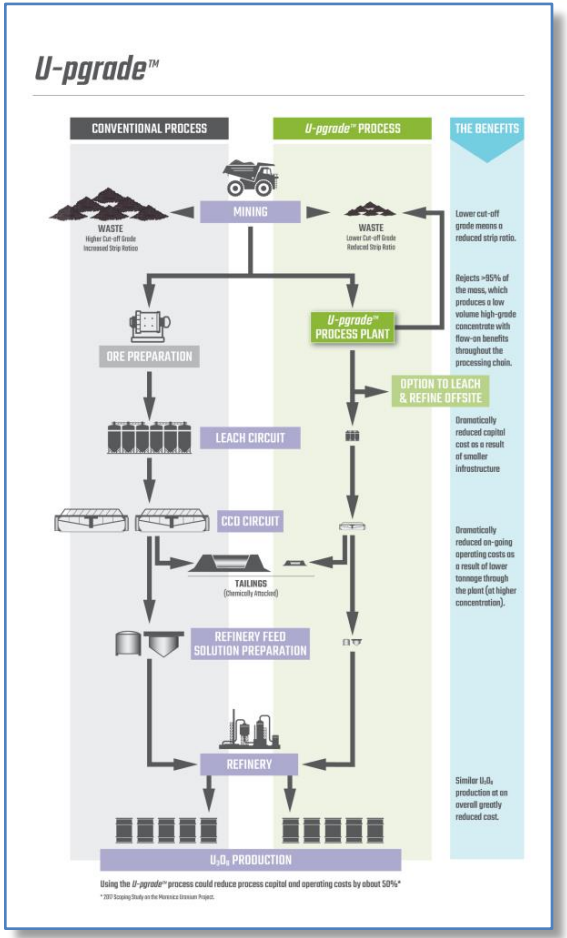
- Etango Project: Large-scale development replaced by innovative smaller and streamlined project with expansion potential
- Heap-Leach Demonstration Plant de-risked proposed heap leach process
- Optimisation of processing parameters, large database of processing info
- Nano-filtration for uranium upgrade and acid recovery

Reptile

- Tumas project: Concentrating on ore reserve increase, recently increased life-of-mine from 22 to 30+ years
- Ore treatment studies
- Other projects in addition to Tumas

Elevate Uranium

- *U-pgrade™* Process: patented process to upgrade low-grade ore, based on Elevate's Marenica deposit
- Beneficiation process rejecting > 95% of the mass of calcrete ore by commonly used and well understood recovery methods, removing the non-uranium bearing minerals
- Removal of carbonate minerals makes ore amenable to acid leaching
- < 5% of the ore going through the leach plant reduces the size of the plant and hence the capital cost, as well as reagent consumption and hence operational costs

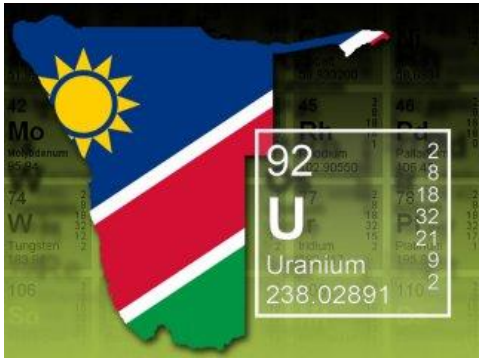


Innovation Worldwide

- Emerging uranium projects have used the time of low uranium prices to invest in innovative technologies all over the World.
- In-situ recovery (ISR) unique to uranium, USA, Kazakhstan, 57% and increasing
- Cameco's Cigar Lake: jet boring system (JBS) – high pressure water carving out cavities in the ore body and recovering ore slurry
- Denison Mines, Canada: Freeze wall technology to contain ISR fluids
- Orano: Surface Access Borehole Resources Extraction (SABRE) – high pressure water at the bottom of a drill hole
- Kayelekera: Pre-sorting - only concentrate to plant
- By-product: vanadium from calcrete ore, copper, zinc, nickel, cobalt from mixed sulphide ore

Conclusion

- Namibia has significant uranium mines
- Namibia has uranium deposits which are fully explored and ready for development supported by the current uranium price trend
- Innovative exploration and beneficiation techniques are utilised by Namibian uranium explorers and miners to allow low-grade ores to be mined profitably
- Uranium companies in Namibia adhere to international best practice, SD standards, and ESG principles
- In an innovative approach they have formed the Namibian Uranium Association in order to address the cumulative impacts of their activities

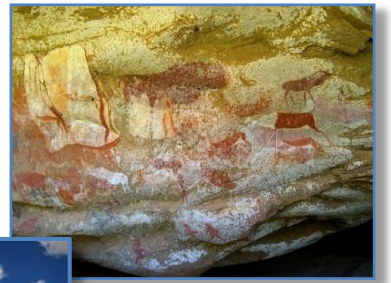
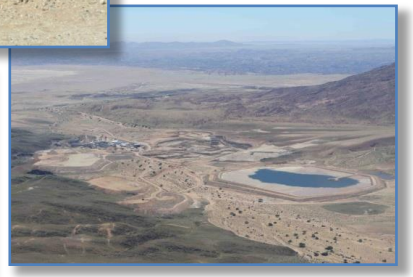


NUA's slogan:

Promoting
The
Namibian Uranium Brand

SCIENTIFIC FORUM
NUCLEAR ENERGY FOR CLIMATE

THANK YOU!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