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Open letter to the Namibian public and to decision makers in government

Science is precisely why SAUMA opposes ISL mining

Various recent media reports studiously avoid, ignore or even negate the dangers of in situ leach mining, which SAUMA has repeatedly raised. Articles also misleadingly claim the absence of scientific proof, but then make misleading, or even false, statements themselves. Claims that ISL mining is environmentally friendly and safe are far from the truth.

Information has been sourced from groundwater studies and publications by the International Atomic Energy Agency, Canadian Nuclear Safety Commission, CSIRO Australia, Nuclear Energy Agency, USA Environmental Protection Agency, USA Nuclear Regulatory Commission, Radiation Safety, World Health Organisation, World Nuclear Association, and others.

The Stampriet Artesian Basin (SAB) is a legislated Water Protection Area specifically for the protection of the artesian water. It has been a communal and commercial farming area for decades and depends entirely on the underground aquifers for its water supply. Every borehole requires a permit from the Ministry of Agriculture, Water and Land Reform. The Water Management Act, 11 of 2013, specifically states that a person, organisation, institution, entity or authority may not cause a water resource to be polluted ... **as to render it less fit for any beneficial use.**

Strong boreholes provide drinking water for the towns and villages, and the same water for irrigation. The SAB is a food production area for Namibia and for export. The main aquifer underlies almost the whole SAB and extends into Botswana and South Africa, where drinking water is also extracted from the aquifer. The basin is 42% larger in Botswana than previously thought.

The proposed mining would take place in the main drinking-water aquifer.

The following must be noted:

- In situ leach mining (ISL) uses a leach solution consisting of water with a little sulphuric acid and oxidising chemicals added;
- This is pumped through injection boreholes into the orebody, takes 1-2 months to dissolve the uranium and is then pumped to surface to recover the uranium;
- The flow rate of the leach solution through the ore is about 0.5 - 1 m per day;
- Other radioactive elements and heavy metals in the orebody are simultaneously dissolved. This mine solution is highly toxic;
- Such mine solutions can contain amounts of dissolved uranium up to 3 000 times above the World Health Organisation (WHO) safe guideline for drinking water;
- Involves the drilling of thousands of injection and recovery boreholes spaced, on average, between 20 and 30 m apart;
- Such mining can last for several decades;
- Highly toxic mine solution does periodically escape into aquifers beyond the mine area (called excursions) or are spilt on surface (official USA and Australian records);
- To detect excursions, all ISL mines are surrounded by monitoring boreholes;
- Remediation of excursions is not always successful and excursions can contaminate aquifers for many kilometres beyond mining areas.

Problems encountered during ISL mining include:

- Broken casing or improper cementing of casing (about 60% of problems);
- Replacement of broken pumps or other down-hole hardware;
- Loss of pressure due to leaks or blockages;
- Having to stop pumping to clear blockages - approximately every 2-3 weeks (called workovers);
- Leaking surface pipelines;
- Radioactive dust blown out of evaporation ponds;
- Most of the problems are underground where they are not obvious.

The following aspects of the underground geology of the SAB present major problems for ISL mining:

- The uranium orebody is in the main drinking-water aquifer that is under artesian pressure;
- Direct contacts between aquifer sandstones allow water/mine solution to flow naturally from one aquifer to another;
- Numerous fractures with highly porous broken rock cut through all layers;
- The artesian water pressure would force toxic mine solution up the fractures into shallower aquifers;
- There is a high percentage of old leaking boreholes with broken casing;
- All these will facilitate cross contamination of the aquifers by migration of the toxic mine solutions.

It has been stated that the groundwater in the SAB is contaminated with uranium and radioactivity.

Groundwater quality; uranium and radioactivity in groundwater:

- Groundwater inside uranium orebodies contains elevated amounts of dissolved uranium and radioactivity;
- In most cases, groundwater outside uranium orebodies contains only minute amounts of uranium and radioactivity well below the WHO safe guideline for drinking water of 30 micrograms per litre (international databases);
- Groundwater samples from the Leonardville area analysed by Headspring Investments show exactly this, high values in the discovered orebody and values below the WHO safe guideline outside the orebody;
- Thus, outside of the orebody, the water in the same SAB aquifer is safe to drink;
- Groundwater outside of uranium orebodies can be of drinking-water quality (as in the SAB), or saline, or highly saline;

Groundwater usage in the SAB:

- Approximately 88% of total water abstraction is for irrigation (about 6.1 million m³ per year);
- Irrigation projects pump continuously at hourly rates of up to 100 m³/hour all year round (1 m³ = 1 000 litres);
- Irrigation induces underground flow rates of 22 m per day and higher, much higher than the flow rates for ISL mining;
- Such underground high flow rates are only possible along the fractures;
- High pumping rates hard draw water along fractures from as far away as 40 km from a borehole;
- Such flow rates will draw toxic mine solution out of the mine area and contaminate the aquifer for kilometres.

Namibia is a highly water-stressed country. Water and food production go hand-in-hand. Once water contamination occurs, food production is adversely affected or entirely ceases.

ISL mining of uranium is not permitted in drinking-water aquifers in Australia. Namibia would be well advised to heed the science and the potential problems, and not allow mining in the Stampriet Artesian Basin.

In a UNESCO-sponsored meeting held on 17 June this year, Minister Schlettwein concluded his speech with the comment **“At the end of the day we cannot survive without water and food, but we can live without coal or uranium.”**

Team SAUMA