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## Unfounded claims on In-Situ Recovery mining of uranium misleads readers

On 18 April 2025, The Villager newspaper, published an opinion piece by self-declared community activist, Anton Geinub, in an article entitled "What Uranium One (Headspring Investments Rosatom) means for Leonardville". He asked for support of the Leonardville Uranium One in-situ leaching mining project that's in an exploratory phase to help bring it to scale. His article focuses on what the company has done for schools thus far, and makes a brief plug for In-Situ Recovery (ISR) as "safe and environmentally friendly".

The article makes several claims that are scientifically unfounded, and may mislead readers to feel a false sense of security regarding the environmental and health risks associated with this project. We have several concerns when reading the article. The article does not discuss the known vulnerabilities of groundwater to negative impacts from this method-- this is perhaps the biggest community (and a transnational) health concern given that the site sits amid the extremely important Stampriet Transboundary Aquifer System (STAS).

In-situ recovery (ISR) mining of uranium—also known as in-situ leaching (ISL)—involves injecting a solution (usually acid or alkaline) into underground uranium-bearing formations to dissolve the uranium and pump it to the surface. While this method avoids the surface disruption of conventional mining, it carries significant risks to water supplies, especially groundwater. The leaching solution (e.g., sulfuric acid or bicarbonate with oxidants like hydrogen peroxide or oxygen) can mobilize not only uranium, but also arsenic, selenium, vanadium, heavy metals, and radionuclides. If the solution migrates beyond the mining zone, it can contaminate nearby aquifers, including those used for drinking water or agriculture. Restoration of groundwater to pre-mining quality is technically difficult and often incomplete. ISR relies on numerous injection and recovery wells. Faulty well construction or corrosion can lead to leaks, allowing leachate to escape into unintended water zones. Aquifers are complex. Fractures, faults, and variable permeability can lead to unexpected flow paths, increasing the risk of leachate escape. Although ISR uses less water than traditional mining, it still requires significant quantities for injection, processing, and flushing—potentially stressing local water resources.

Long-term monitoring has shown persistent elevated concentrations of contaminants even years after ISR operations cease. And as the International Groundwater Resources Assessment

Centre (IGRAC) clearly articulates, “the importance of this aquifer cannot be understated. In the entire area of this ‘STAS area’, the two main rivers, the Auob and Nossob, flow only about once every ten years during exceptionally good rains, and then only briefly. There is no permanent surface water. It is the drinking water in the underground sandstone aquifers that is the lifeblood of the whole region, for the people, their animals, the economy and the ecology. Between 92 and 95% of this underground water is used for town supply and irrigation. Farm boreholes and some guest lodges account for the balance. Irrigation produces fruit and vegetables for the Namibian people and fodder for animals. Total annual abstraction from all aquifers was 20 million m3 in 2015 and has been increasing steadily since then.“ https://un-igrac.org/latest/stories/plans-for-uranium-in-situ-leach-mining-in-namibias-largest-transboundary-aquifer/

The article's claim of "self-restoration of aquifers" is not accurate–it is typically an intensive process often involving expensive reverse osmosis techniques and results that can remain incomplete or unsuccessful, which leaves human and animal health at risk. Drinking water guidelines for uranium are primarily based on its chemical toxicity—specifically, its nephrotoxicity (toxicity to the kidneys)—rather than its radiological effects. The WHO Guideline value for uranium is 30 µg/L (0.03 ppm).

Any such project should require an EIA and public engagement process, which is not available for the project in question, and the company should make their monitoring and safety protocols entirely public to be fairly evaluated by neutral experts with no vested interest. The Environmental Compliance report (2021) of Headspring Investments (Pty) Ltd is available online, with a woefully inadequate set of groundwater requirements that have no hope of identifying a problem because no monitoring is planned for the exploratory phase.

For example, pg. 18 of the report says "[i]f there are any further (larger scale) exploration/drilling activities and/or mining activities to follow from the initial planned drill holes, groundwater monitoring must be implemented to include water level monitoring and also water sampling on a bi-annual basis. In order to have greater transparency on the water monitoring activities, the affected landowners / farmers must be given full access to the results of the water monitoring analyses."

With respect to an individual proposed ISR uranium-ore mining project, the specific details about site-specific levels of toxic metals that might be accumulate with uranium, and details about the nature and use of the aquifer underlying the ore deposit are critical to understanding the potential scope and scale of impacts. These are details that can only be answered through a vigorous Environmental Impact Assessment (EIA) process with full stakeholder participation.

While it can feel nice that a company invests in local education, this is a common and well-studied practice used by mining companies to mitigate social, financial, and reputational risk without any data demonstrating long-term benefits to the local communities. There is an extensive body of literature examining the rise in corporate social responsibility (CSR) investment from mining companies, and the lack of evidence that the increase in investment has resulted in any measurable increase in community well-being. Critics argue companies are unwilling to change their behaviours or invest the resources needed to improve their impacts and development outcomes (e.g. improved health and wellbeing for local populations). Misleading claims with no scientific backing underscores the need for a vigorous EIA process concerning in-situ uranium mining and highlights that not all that glitters are gold.

*This article was drafted by Legal Assistance Centre's LEAD department in conjunction with the science team at ELAW, a global alliance of attorneys, scientists, and other advocates that helps communities speak out for clean air, clean water, and a healthy planet*.