

Remediation of the Gunnar Uranium Site – It's History and Progress to Date

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The Gunnar Uranium Mining and Milling site is located on the north shore of Lake Athabasca, in northern Saskatchewan, Canada. Uranium production started in 1953 and ceased in 1964. The Site was abandoned leaving behind 2,200,000 to 2,700,000 million m³

(~20 ha) of waste rock and over 4 million m³ (~81 ha) of unconfined tailings, an open pit (~100 m deep and 300 m wide), 600 m deep underground mineworking, the uranium mill, two acid plants, and a townsite for year-round support of ~900 workers. In 1964, the open pit was flooded by blasting a channel to Lake Athabasca. For over 60 years, dissolved uranium has been seeping to Lake Athabasca from the pit, waste rock, and tailings. Unconfined dry tailings were exposed to wind erosion/transport. Gamma radiation, residual chemicals, deteriorating buildings and structures, and unstable waste rock piles posed serious risks to public and environmental health.

In 2006, the Saskatchewan Research Council (SRC) was requested by the Government of Saskatchewan to remediate the Gunnar Site as part of Project CLEANs (Cleanup of Abandoned Northern Sites). The project objectives are to eliminate or mitigate unreasonable public and environmental risks and provide safe traditional use of resources on and around the Site. Once the remediation objectives have been met, the Site is to be transferred from the Canadian Nuclear Safety Commission (CNSC) authority to the provincial Institutional Controls Program (ICP).

The building/structure demolition was completed in 2011 to address immediate public hazards. The Environmental Impact Statement was developed by 2013, followed by the comprehensive expert, regulatory, and public/indigenous reviews, and the CNSC licensing process. A two-stage remediation approach has been developed to separately address the tailings areas and other site aspects. It included construction of engineered, vegetated covers over the tailings and waste rock deposits; demolition of remaining buildings and structures; construction of landfills for legacy and demolition debris (hazardous and non-hazardous); surface water diversion from contaminated waste rock to reduce contaminant loading to Lake Athabasca; and long term technical and environmental monitoring programs.

By 2022, some 70 ha of the tailing's deposits have been covered and revegetated, all of the structures and buildings

have been demolished, and most of the debris and legacy waste has been placed in the appropriate landfills. It is anticipated that the waste

rock cover construction, water diversion, and final revegetation will be completed by 2024, followed by at least 10 years of post- construction monitoring to ensure achievement of all the project objectives.

Maximizing the social and economic benefits to the local communities of the Athabasca Basin is one of the most important goals of the Project. SRC has been engaging with the local communities since the beginning of the project, involving them in all stages by providing them with current information, receiving feedback and advice, and incorporating that into the next stage of the project. SRC strives to use local contractors and equipment for the remediation activities whenever possible and hosts multiple programs with the intent of benefiting the communities.

Skye Muirhead

Skye Muirhead is a project manager with the Saskatchewan Research Council in the Environmental Remediation Business Unit. She has a background in environmental and soil science, Environmental Impact Assessments, and in management systems. Skye's current work is focused on the remediation of the Gunnar Tailings project, a legacy uranium mine in northern Saskatchewan.

Alexey Klyashtorin

Alexey Klyashtorin is a senior scientist and a project manager in the Saskatchewan Research Council, where he works with an interdisciplinary team to deliver Saskatchewan's legacy uranium mine sites program (Project CLEANs). He has over 30 years of experience in academic and applied studies of contaminant transport in various environments. Since 2014, he has been providing expert services to the International Atomic Energy Agency (IAEA) Mission to Fukushima. Before that, he studied environmental consequences of the Chernobyl accident and ensured environmental monitoring and compliance for oil and gas projects in eastern Siberia. Alexey has a bachelor's degree in soil science and a PhD degree in environmental geochemistry of technogenic radionuclides.