1 INTRODUCTION

This case study provides an example of when traditional ecological knowledge (TEK) data were appropriately acquired and incorporated into analysis and decision-making processes.

The Saskatchewan Research Council (SRC) manages 37 former uranium mining sites in northern Saskatchewan. On one of the larger sites, the former Lorado Mill site, traditional knowledge was used in support of scientific assessments to successfully create a revegetation plan overlying the engineered tailings cover system.

2 SITE

The former Lorado uranium mill site is located approximately 8 kilometers south of Uranium City, Saskatchewan. The mill operated from 1957 to 1960 (Figure 1). Tailings were deposited adjacent to Nero Lake, with some flowing into the lake. Estimates of the amount of ore processed at the mill range from 305,000 to 545,000 tons. The volume of tailings produced is estimated to be 227,000 cubic meters, of which 50,000 cubic meters lie within Nero Lake. The exposed tailings cover approximately 14 hectares (Figures 2 and 3).

Construction work on an engineered sand and till tailings cover began in 2014 and continued in 2015. The intent of the cover is to reduce radiation exposure risk and prevent run-off from flowing over the tailings surface and into Nero Lake. Several areas around the site contained mill infrastructure and associated industrial waste. This legacy debris was consolidated, compacted, and covered with clean till to reduce risks to public safety and the environment.



Figure 1. Aerial photo showing the former Lorado Mill facility and tailings area circa 1980.
Source: Saskatchewan Energy and Resources Undated.



Figure 2. The Lorado Mill tailings area with wind fencing in 2011.
Source: SRC Undated



Figure 3. Aerial photo showing the Lorado Mill footprint with wind fencing (with structures removed and tailings area) in 2008.
Source: Woodland Aerial Photography Undated

3 ELDER KNOWLEDGE

Early in the Lorado Mill remediation project, the SRC reached out to the local community members and requested that they be active participants and partners in all aspects of the project. Engaging and communicating with indigenous groups and other community stakeholders early in the project is an important methodology for success and trust building.

During remediation planning, an extensive list of local knowledge holders provided information that was pivotal to the success of the project. Elders shared their stories of working at the mill, as well as their insights into past and desired future site conditions. These elders also offered their knowledge of the site and their advice on remediation methods, including, but not limited to:

- ecosystem monitoring

- risk assessment
- conceptual remediation planning
- engineering design
- environmental protection monitoring
- quality assurance

One of the areas where elder knowledge visibly contributed to the success of the mill closure and remediation was in the design of the revegetation layer that forms the topmost erosional protection layer of the engineered tailings cover system.

4 REVEGETATION DESIGN

In parallel with and supportive of the substantial laboratory and scientific field studies that took place to develop a quick-growing and robust long-term vegetation cover to protect the engineered tailings cover system, SRC used the trust it had developed with local knowledge holders to acquire traditional knowledge on what native plant species would best be planted to maintain short- and long-term viability on the cover.

A series of workshops and site visits (Figure 4) were organized with elders from the local communities. During the workshops, vegetation experts presented all the potential native plant species that were being considered for use at the site. Knowledge holders provided information on which species:

- establish most quickly
- provide the most long-term surface coverage
- provide expected long-term plant succession

During the multiday site visit, a community elder provided information on how best to plant the species that were selected during the workshops and which plant species would do best in varied areas on site (e.g., slope, shade, wetted vs. non-wetted areas, etc.). The elder also provided information on which areas on site to actively plant and which areas could be left for island growth from adjacent areas.



Figure 4. SRC plant ecologist and Athabasca Indigenous elder.
Source: SRC Undated

5 RESULTS



Figure 5. Example of vegetation established on the cover of the Lorado Mill tailings.
Source: SRC Undated

SRC used a combination of the scientific and traditional knowledge it acquired to create a site-specific revegetation prescription. Three years after the implementation of the prescription, the vegetative cover that has established on the engineered tailings cover system has been very successful (Figure 5). The results of this successful cover have saved the project thousands of dollars (versus the use of geosynthetics), allowing for the quicker re-establishment of the ecosystem (more diverse plant and animal communities have come back), and provided for a robust, long-term erosion control layer for the tailings cover system that is fire resistant and self-sustaining.

6 REFERENCES AND ACRONYMS

The references cited in this fact sheet, and the other ITRC EDM Best Practices fact sheets, are included in one combined list that is available on the ITRC web site. The combined acronyms list is also available on the ITRC web site.