

Technical Reports - Public Summary – Key Lake Operation

Environmental Protection Program

Introduction

The Cameco Corporation (Cameco) Key Lake Operation (Key Lake) is located approximately 570 kilometers north of Saskatoon, Saskatchewan. Key Lake holds a Uranium Mill Licence (Licence) from the Canadian Nuclear Safety Commission (CNSC) to prepare a site for, construct, operate, modify and decommission a nuclear facility for milling uranium ore, as well as an Approval to Operate Pollutant Control Facilities (Approval to Operate) from the Saskatchewan Ministry of Environment (SMOE).

The CNSC maintains Safety Control Areas (SCAs) through which they assess, evaluate, review and verify the compliance of their licensees. The Environmental Protection SCA requires operators of licensed nuclear facilities to prepare an Environmental Protection Program (EPP) to ensure that matters pertaining to the environment are identified, monitored, interpreted and acted upon in a way that demonstrates protection of the environment.

The Key Lake EPP provides a summary of the environmental protection and reporting activities for Key Lake. The Key Lake EPP was developed in consideration of applicable regulatory requirements, industry standards, Cameco requirements and Cameco's Safety, Health, Environment and Quality (SHEQ) Policy. Cameco's SHEQ Policy recognizes the safety and health of its workers and the public, protection of the environment and quality of its processes as the highest corporate priorities during all stages of its activities.

The Key Lake EPP outlines the environmental management activities at Key Lake, including:

- Environmental site characterization;
- Environmental risk identification and assessment;
- Environmental contingency plans;
- General environmental protection measures;
- Environmental monitoring;
- Decommissioning and reclamation;
- Training;
- Stakeholder communication;
- Audits; and
- Quality assurance.

The program applies to all personnel working at Key Lake. The Key Lake EPP requires acceptance by the CNSC prior to being revised and finalized.

Environmental Protection

The Key Lake EPP discusses environmental protection measures employed at Key Lake. At a high level, the environmental protection measures are as follows:

- Tailings Management:

- Key Lake maintains an Above Ground Tailings Management Facility (AGTMF). Tailings placement no longer occurs at the AGTMF. The AGTMF is currently actively used as a disposal area for contaminated waste and potentially contaminated waste;
- Mill tailings are deposited and managed in the Deilmann Tailings Management Facility (DTMF). In order to maintain hydraulic containment, water management also occurs at the DTMF.
- Containment Systems:
 - Key Lake uses engineered and routinely inspected containment facilities for the storage and conveyance of materials that could potentially have an adverse affect on the environment.
- Water Treatment:
 - Contaminated and potentially contaminated process water generated at Key Lake is treated in either the bulk neutralization (BN) circuit or the reverse osmosis (RO) plant at site;
 - The treated water is then sampled and analyzed. The results of the analysis are compared to and must meet regulatory criteria prior to release to the environment.
- Environmental Action Levels:
 - Environmental action levels define a specific dose or parameter that, if reached, may indicate a potential loss of control of the EPP. Action levels for releases of treated water to the environment at Key Lake are detailed in an environmental code of practice (ECOP) within the Key Lake EPP;
 - The Key Lake ECOP describes the specific actions to be taken in response to measured results outside of the historical operating range;
 - The ECOP is required to meet certain regulatory requirements and is then approved by CNSC.
- Groundwater Protection:
 - Cameco protects groundwater at Key Lake by employing engineered and operational controls, such as routine inspection and maintenance of containment structures as well as regular groundwater monitoring;
- Air Protection:
 - Cameco utilizes air dispersion modelling and regular air quality monitoring accompanied by engineered and operational controls, including abatement equipment.
- Decommissioning and Reclamation:
 - Key Lake facilities that are no longer required for future milling activities are decommissioned and reclaimed, as necessary;
 - Cameco's decommissioning and reclamation efforts at Key Lake have focused on re-vegetation to eventually reclaim the site to a condition that is as similar as reasonably achievable to pre-mining conditions and will support wildlife and traditional land use.
- Environmental Risk Assessments (ERAs):
 - An ERA is a systematic process to identify and assess any potential risk posed to human health and the environment by the Key Lake facility;
 - ERAs are completed in accordance with the Canadian Standards Association (CSA) N288.6 standard for conducting ERAs at Class I nuclear facilities and uranium mines and mills;
 - Cameco had the latest approved Key Lake ERA completed in 2020.
 - The ERA is required to meet certain regulatory requirements and is then approved by the regulatory agencies.

Environmental Monitoring and Measurement

The Key Lake EPP describes the environmental monitoring and measurement methods Cameco has implemented at Key Lake. Cameco completes environmental monitoring and measurement to confirm that environmental protection activities are meeting regulatory and program requirements. Monitoring programs are conducted in accordance with CSA standards N288.4 and N288.5, specific to effluent and environmental monitoring programs, respectively. This includes monitoring, measuring and evaluating key environmental characteristics at specific frequencies. These key environmental characteristics include climate and air quality, terrestrial ecology, aquatic ecology, treated water quantity and quality, surface water quality, surface hydrology, groundwater quality, facility monitoring and water balance. Additionally, Cameco regularly monitors and measures the general condition of the surrounding environment and overall facility performance at Key Lake.

Monitoring results may be assessed against historical trends, benchmarks (e.g.: guidelines or regulatory limits), reference data, background conditions or predictions (e.g.: ERA or environmental assessments (EA)).

Cameco prepares and submits reports, including environmental monitoring and measurement results for review by regulatory agencies on a quarterly, annual and every five years basis. Quarterly and annual reports summarize environmental monitoring activities that Cameco conducted during the applicable quarter or year. Cameco conducts a management review annually to assess the overall performance of the Key Lake EPP. The Key Lake Environmental Performance Report (EPR) is completed every five years. The EPR provides a five-year review of the results of environmental monitoring programs and compares monitoring results to ERA or EA predictions. Requirements of the quarterly reports, annual reports and EPRs are detailed in the Key Lake Approval to Operate.

As well, the CNSC completes a Regulatory Oversight Report (ROR) for Key Lake every year. The ROR provides an annual review of safety programs and regulatory compliance at Key Lake. This review is also the subject of a formal CNSC proceeding where intervenor funding is provided.

Conclusion

The EPP that is currently implemented at Key Lake, which has been approved by the CNSC, ensures that human health and the environment in the vicinity of Key Lake remain protected.