

► Mining Waste Management

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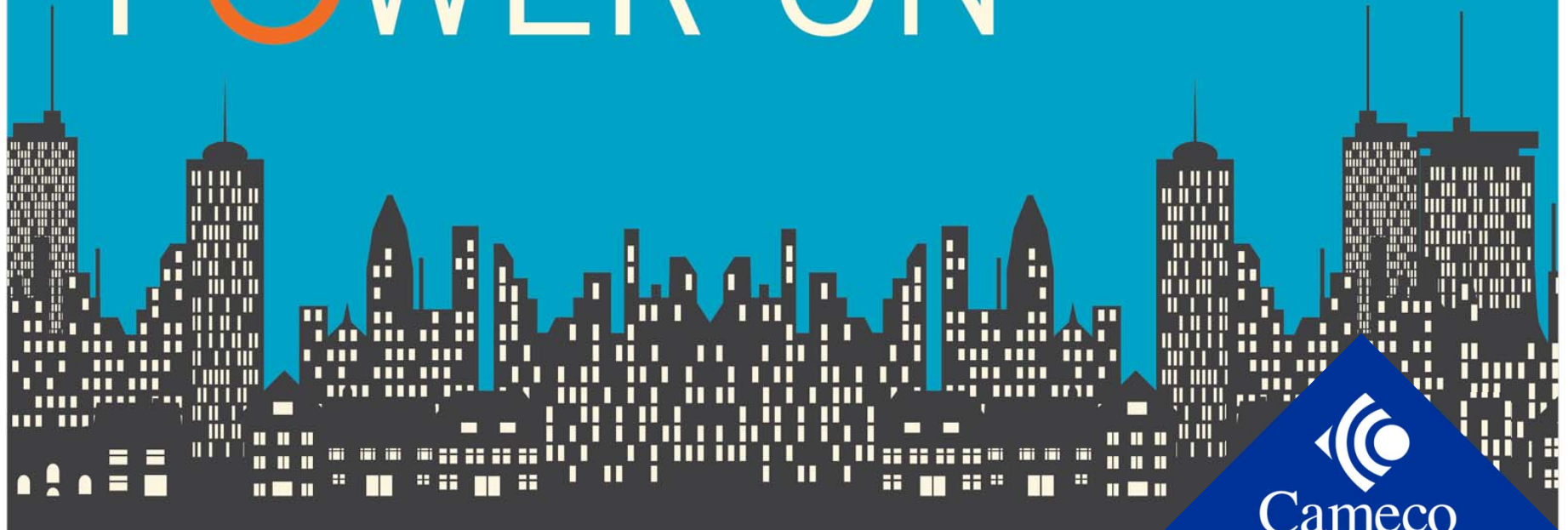
Vice President

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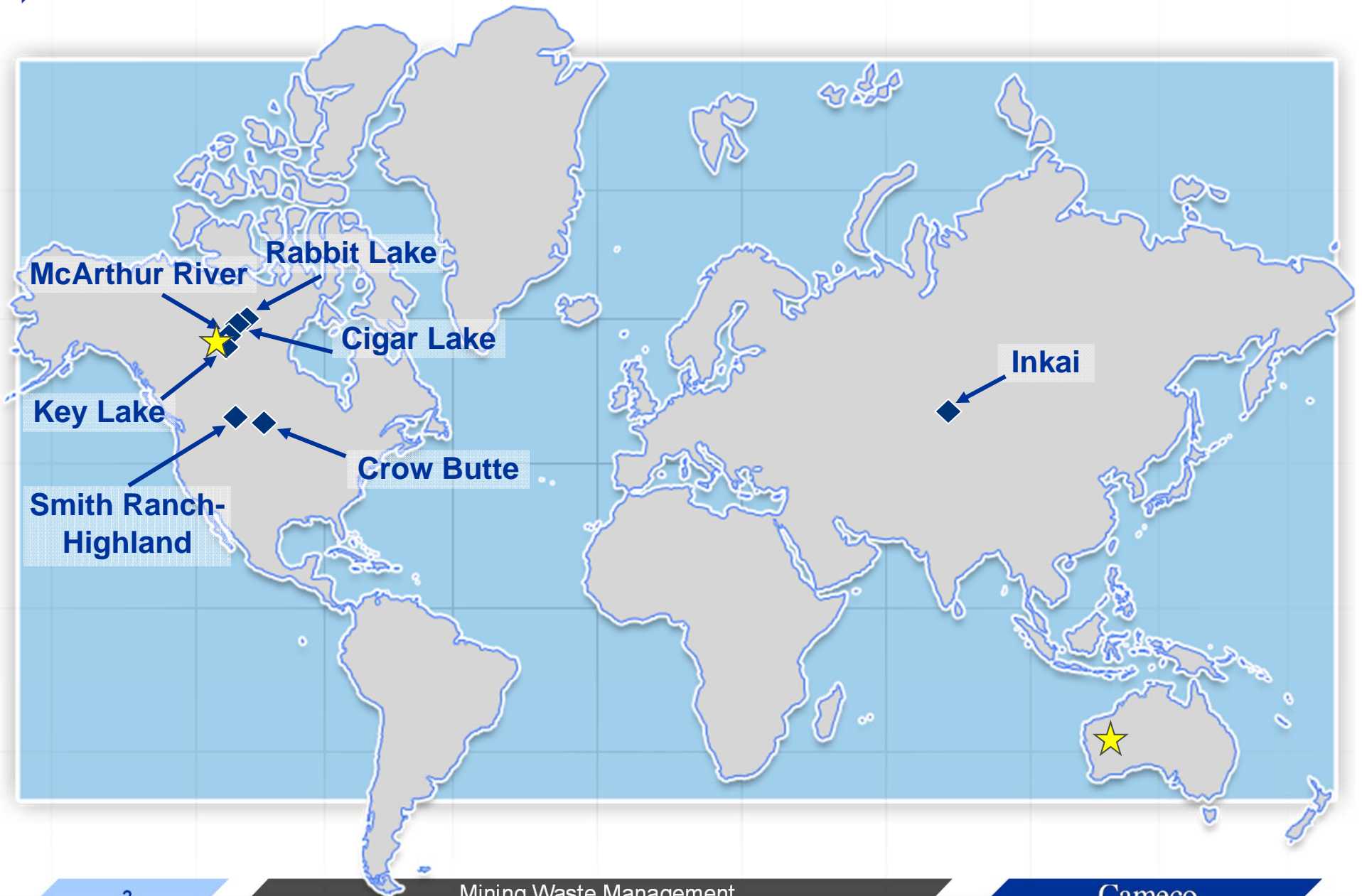
Cameco Corporation

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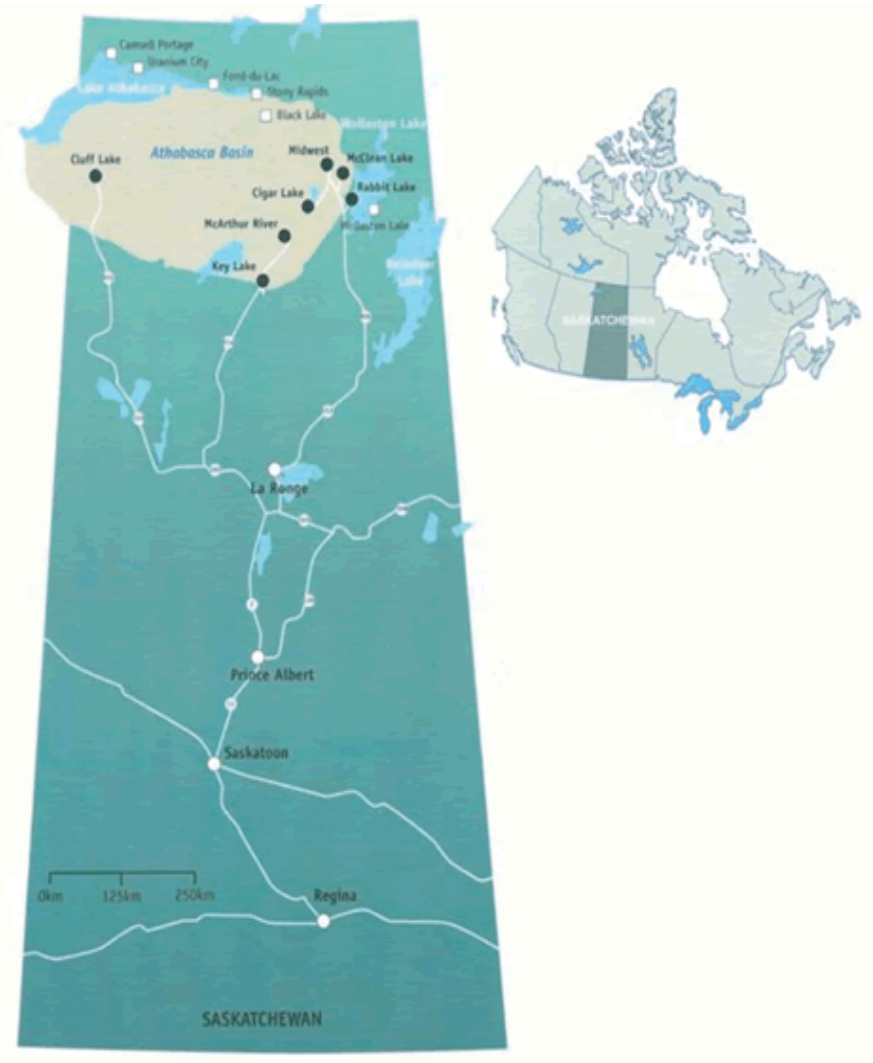
POWER ON



► Introduction to Cameco Corporation



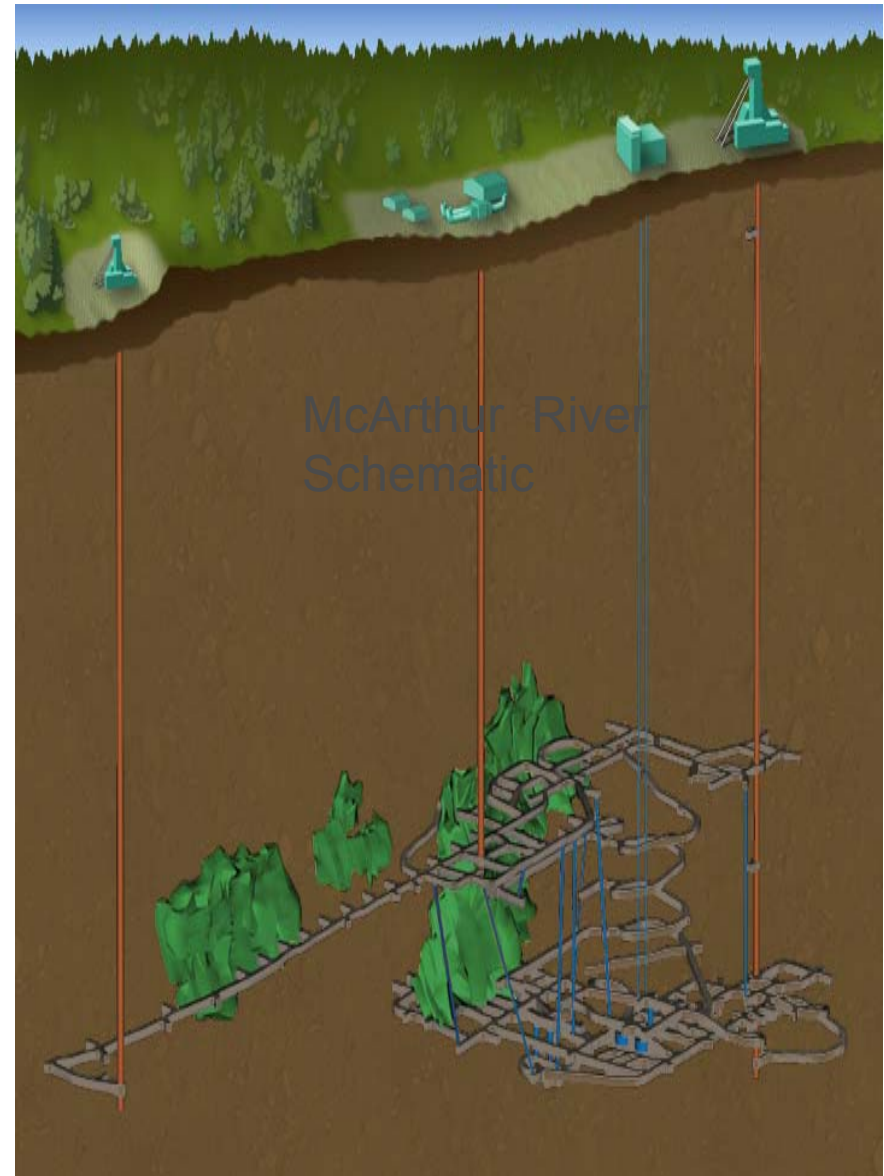
Northern Saskatchewan



**Key Lake Mill and
the Cigar Lake project**

► Uranium Mining Industry Waste Management

- Conventional uranium mining carried out by open pit or underground mines.
- Alternative mining technique called in-situ recovery (ISR)
- Current Canadian mines all conventional and focus of this presentation
- Two dominant waste streams are mill tailings and mine waste rock



► General Advancements

- **Tailings and waste rock account for roughly half of site decommissioning costs for an integrated mine/mill complex like Key Lake or Rabbit Lake.**
- **Much has changed over the years:**
 - Sites noticeably more compact,
 - less land disturbance, and
 - generally better organized from a waste management perspective
- **Better management of waste chemical and physical controls.**

► Waste Rock Management

- **Relatively large volume waste to access ore, moreso in open pit than underground mining**
- **Historically, non-segregated piles created with less priority given to secondary factors**
- **Segregation by future management requirements now a core strategy**
- **Clean waste vs. special waste separated based on radiological, secondary metal and acid-generating potential**



► Waste Rock Management



► Tailings Management



- Rabbit Lake In-Pit Tailings Management Facility

- Prior to and during construction of pit expansion.



► Tailings Management



- Pit during early re-flooding and more current conditions.

- Deilmann Tailings Management Facility at Key Lake



▶ LLRW Classification

- **Wastes generated from uranium mine and mill facilities classified as low level radioactive waste. Key characteristics are:**
 - Relatively large volumes
 - Tailings relatively inert
 - Waste rock relatively low in uranium concentration

► Uranium Mining Regulations

- **Some of the key characteristics of the uranium mining and milling paradigm in Canada:**
 - Strong Federal and Provincial regulation
 - Multiple environmental regulators
 - Private sector ownership

► Current Challenges

- Need for early selection of decommissioning designs
- Selection of end-state design objectives
- Extent of operating phase progressive decommissioning
- Balance between radioactive and conventional contaminant control



► Current Challenges (continued)

- Other challenges include:
 - Maintaining healthy disposal capacity reserve
 - Developing management plans for legacy issues
 - Ongoing constructive community dialogue



▶ Recent Successes

- **Uranium mining facilities making strides to lower their environmental footprint:**
 - Reducing treated effluent selenium and molybdenum loadings
 - Large scale application of reverse osmosis water treatment
 - Recycle of uranium-bearing products from downstream fuel processing
 - Significant progress in progressive reclamation projects, modeling, and environmental effects monitoring



► Decommissioning Priorities

- **Regardless of design, overall objective is safe and environmentally acceptable site conditions.**
 - Must avoid growing liability and minimize long-term care and control requirements
 - Can be achieved through passive or institutional controls
 - Province of Saskatchewan has made great strides in developing an institutional control framework to address licensing and long-term needs requirements

▶ Transfer to Provincial Control

Canada 



Cameco

Beaverlodge
properties



- Return properties that pose minimal risk to people and the environment back to the province
- Institutional Control Program

▶ Linkage to Cameco's Strategy



▶ Questions

