

# WR-1 Reactor

## *In situ Decommissioning*



### Alternative means for decommissioning

A number of options that have been considered for this project.

- In situ decommissioning where grout will completely encapsulate the source term (i.e., reactor systems and components) inside the below grade structure to allow for continued radioactive decay and prevent the migration of contaminants. The above grade structures will be demolished.
- Partial removal of the source term for interim storage at an alternate CNL site until final disposal options are available. The remaining structures and components will be grouted in place.
- Full dismantling and removal of all systems, structures and components for interim storage at an alternate CNL site until final disposal options are available.
- Continue with a deferred decommissioning approach, which includes maintaining WR-1 in the Storage with Surveillance phase to allow for further radioactive decay.

### Why in situ decommissioning?

In situ decommissioning has been selected as the decommissioning technique as it provides the following advantages:

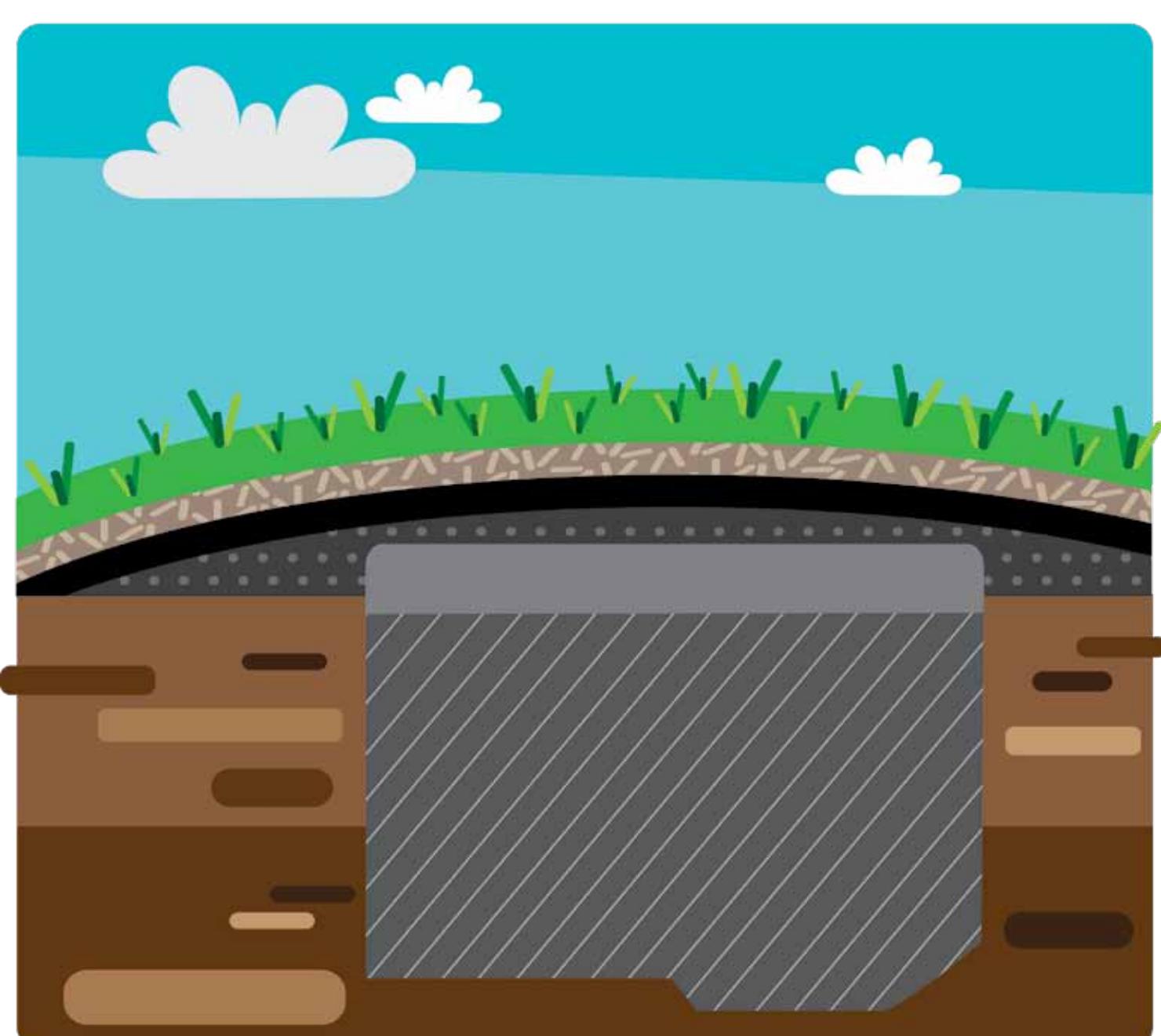
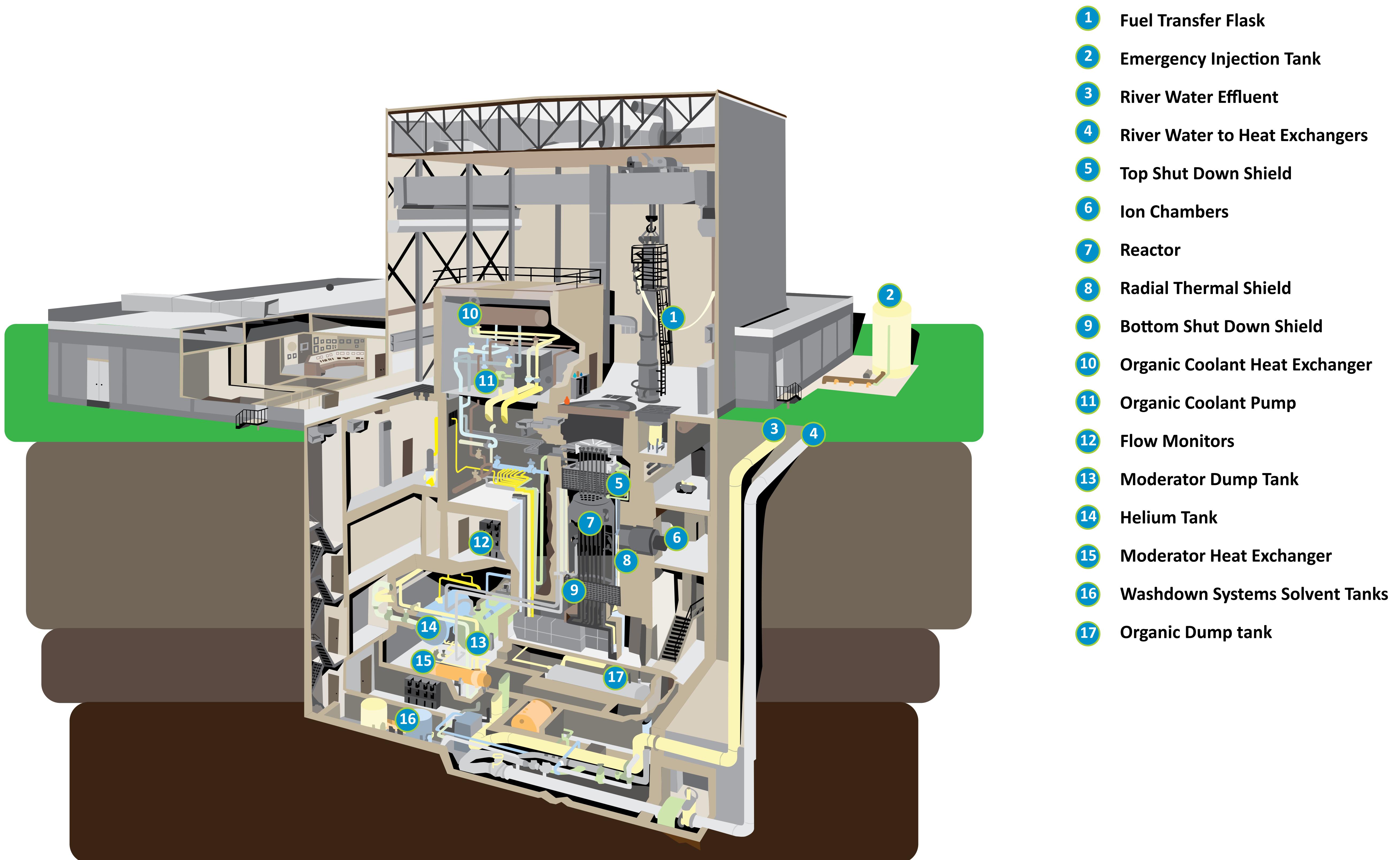
- Reduced risk for radiological and industrial hazards exposure to workers
- Reduced transport/waste handling risks to the public and environment
- Effective reduction of the nuclear liability and eliminating interim waste storage
- Eliminates the risk associated with multiple handling of waste packages to and from interim storage and final disposal
- Lowest cost option for the Canadian taxpayer

The disadvantage is that there is additional long-term monitoring of the impacted area.



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
End State

### Key Steps

In situ decommissioning activities are:

- Characterization and targeted remediation
- Assembly and operation of the grout batch mixing plant
- Grouting of below grade structures
- Demolition of above grade structures
- Installation of engineered cap over the grouted area
- Final site restoration
- Preparation for long-term care and maintenance activities
- Installation of post-closure monitoring network

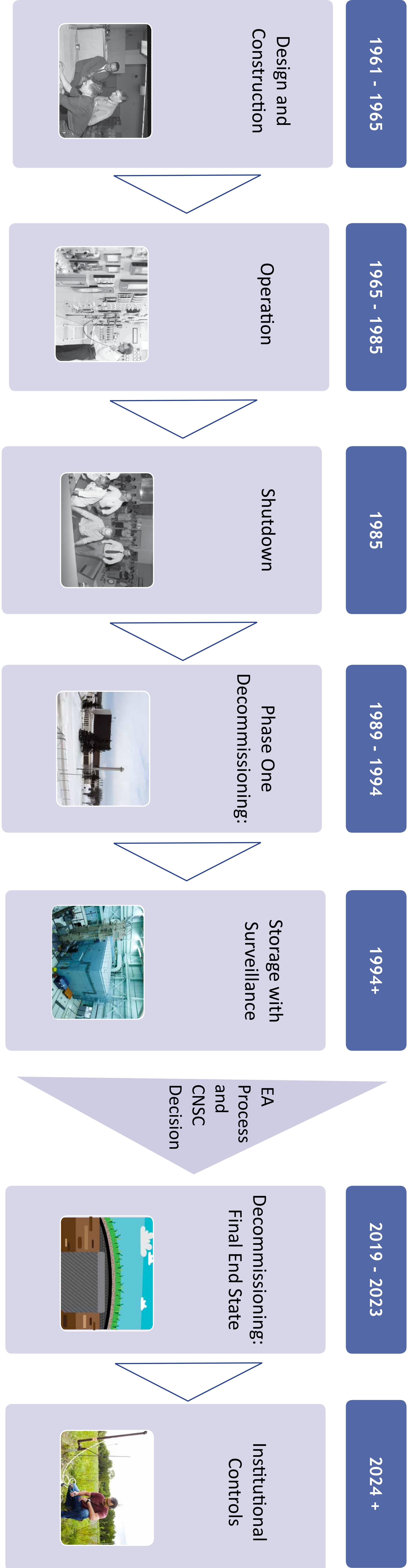
# WR-1 Reactor Site and Surrounding Area





# WR-1 Reactor

## Timeline / Milestones



The WR-1 Reactor, located at the Whiteshell Laboratories near Pinawa, Manitoba was a 60 MW organically-cooled reactor used to test the feasibility of using organic liquid as the primary heat transport cooling media which allowed the reactor to operate at lower pressures and higher temperatures than light water designs of the era.

The reactor was designed and built by Canadian General Electric. The reactor construction commenced in 1964 and was completed 18 months later with the reactor going critical on 1965 November 01.

WR-1 accumulated 120,000 operating hours over its 20 year operational lifetime and was permanently shut down in 1985. Phase 1 of decommissioning took place from 1989 through 1994 and WR-1 was placed in a secure shutdown state under a secure monitoring and surveillance program. The reactor was defueled and drained of coolant and heavy water.

Final decommissioning is scheduled to commence in 2020.

# Valued Components

## WR-1 Reactor

### In situ Decommissioning

Valued Ecological Components (VECs) and Valued Social Components (VSCs) are a way of focussing on potential environmental effects. These components are protected by law or regulation; recognized by the scientific communities as important within the ecosystem; and/or recognized by the public as being important due to their social importance, commercial economic value or role in maintaining quality of life within the community.

VEC for the Whiteshell Laboratories (WL) site were selected by various means during the initial Environmental Assessment for the WL project:

- interviews with knowledgeable lay persons (e.g., trappers, bird watchers, hikers, local residents)
- consultation with appropriate government staff (e.g., Manitoba Natural Resources)
- consultations with First Nations
- input from public consultation program
- lists of endangered, threatened and vulnerable species (e.g., Committee on the Status of Endangered Wildlife in Canada)

Valued Components will be identified in the Environmental Assessment process for the WR-1 In situ Decommissioning project.

Wildlife



Winnipeg River



Forested Area



Habitat Diversity



Sport Fishing



Fish Species



What components are valuable to **you**?



Some of the VECs and VSCs identified in the initial assessment are listed below:

- Winnipeg River and Shoreline
- Fish Species
- Forested Areas
- Whitetail Deer and Moose (wildlife)
- Habitat Diversity
- Sport Fishery

#### Contact Us!

For more information or to share your thoughts on the Valued Ecosystem Components or Valued Social Components related to this project, contact us at [communications@cnl.ca](mailto:communications@cnl.ca), call 1- 800-364-6989 or visit [www.cnl.ca/WL](http://www.cnl.ca/WL).



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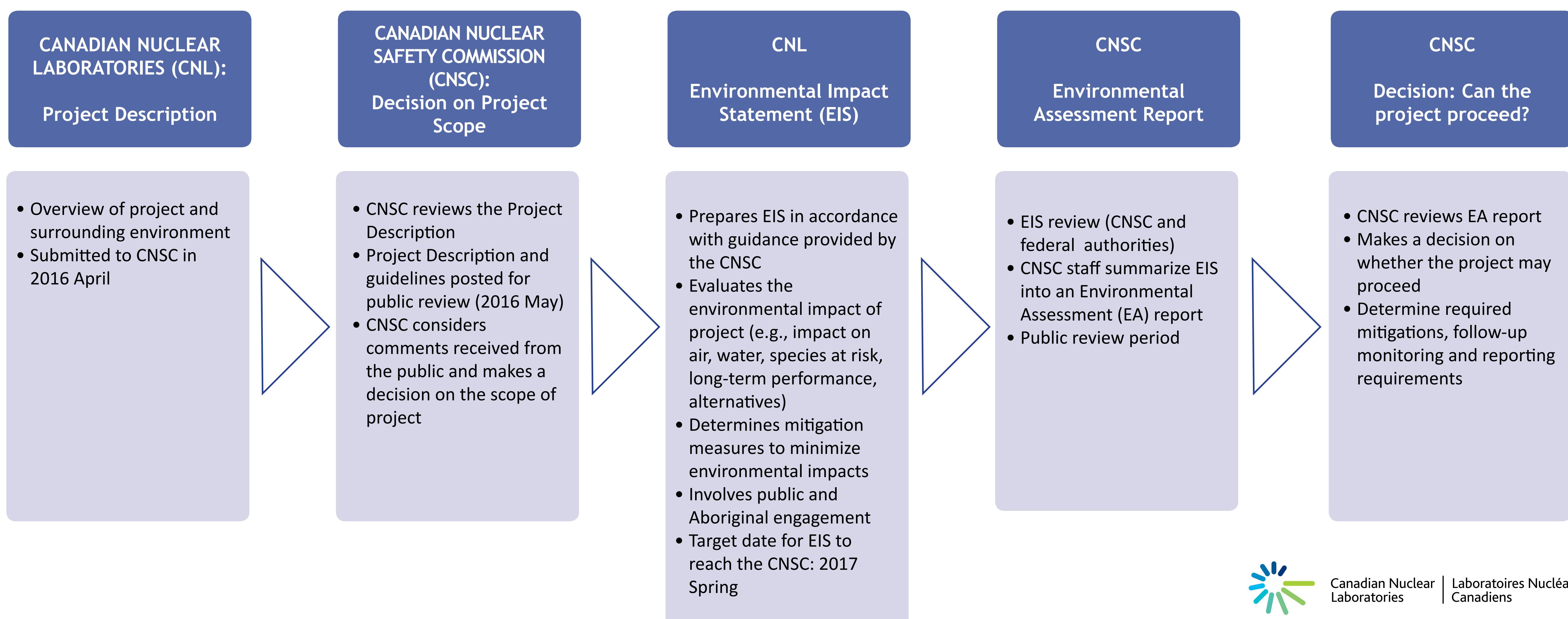
# What is an Environmental Assessment?

Environmental assessment is a process to predict environmental effects of proposed projects before they are carried out.

The in situ decommissioning strategy being proposed for the WR-1 reactor requires an Environmental Assessment (EA) under the Canadian Environmental Assessment Act (CEAA 2012). The Canadian Nuclear Safety Commission (CNSC) is the authority responsible for making the Environmental Assessment Decision on whether the project may proceed.

## Purpose:

- To identify the possible adverse environmental effects of a proposed project
- To determine mitigation measures to minimize adverse environmental effects
- To ensure that opportunities are provided for meaningful public participation



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