

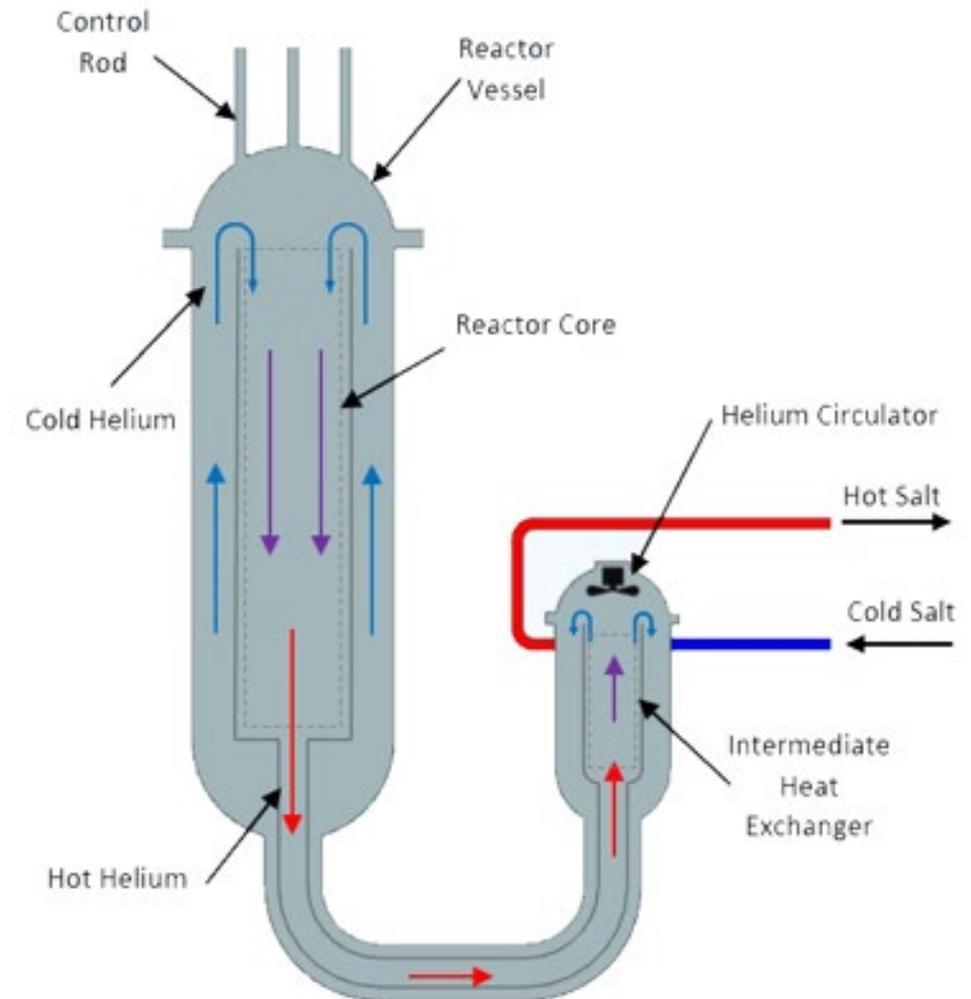
# How it Works

## - Overview of USNC's Micro Modular Reactor® (MMR®) Technology



At a high level, here is how the MMR works:

- Heat is created through controlled fission process
- Fully Ceramic Micro-encapsulated® (FCM®) fuel ensures containment of fission products
- Helium gas passes through the reactor core via a closed loop and removes the heat produced by the fission process
- Hot helium passes through a heat exchanger; heat is transferred to a molten salt system
- Cooled helium is recirculated back through the reactor core
- Hot molten salt transported from nuclear plant to the adjacent plant
- Adjacent plant uses heat from molten salt to generate electricity or for other purposes
- Cooled molten salt is returned to the nuclear plant, FCM fuel ensures helium remains free of fission products



# Safety is Our Priority



Advanced safety systems are inherently built into the design of the MMR.

## **No active safety systems – only “passive”**

- Reactor safely shuts down in absence of electrical power, operator action or engineered control actions

## **No external power or water required to operate and cool the reactor**

- Heat generated by the core is removed through the natural convection of helium
- There are no sudden temperature rises – the reactor controls and switches itself off in the unlikely event of an accident

## **Environmental protection**

- Fission products are locked in the fuel particles permanently due to ceramic fuel coating; no additional containment is necessary

## **Helium gas is the primary coolant; the most benign cooling medium available**

- Inert helium gas means there can be no flashing or boiling possible
- Cannot react chemically with fuel or reactor core components

## **Non-proliferation**

- FCM fuel cannot be re-processed, can only be used to generate heat
- MMR reactor core is sealed in the graphite blocks – the fuel cannot be accessed
- No on-site fueling means no handling or processing of fuel required

## **Physical security**

- Underground design provides external hazard protection

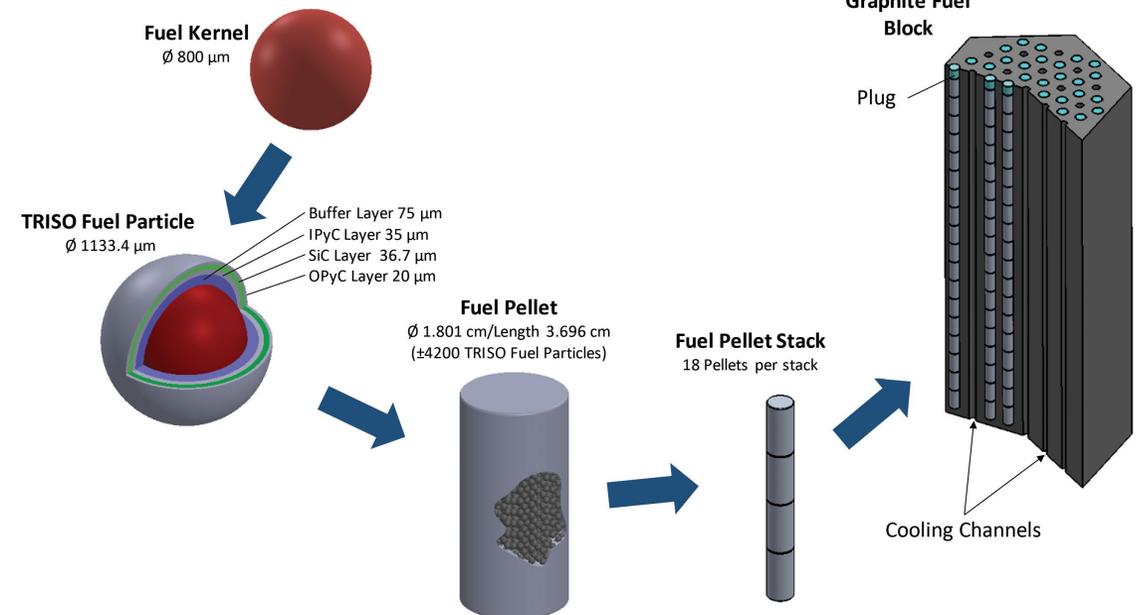
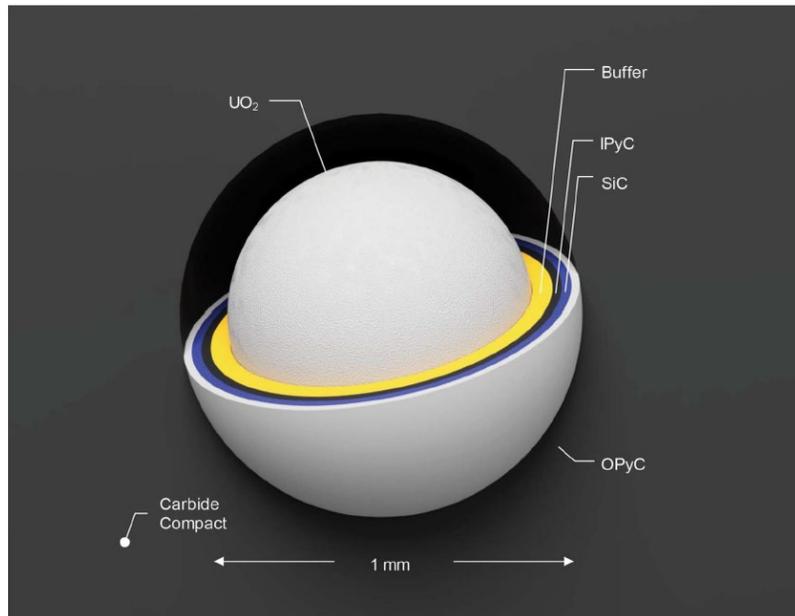
# A Key Component for Safety



## USNC's Fully Ceramic Micro-encapsulated® (FCM®) Fuel

- Low-enriched uranium FCM fuel pellets
- Manufactured with Triple Coated Isotropic (TRISO) fuel particles, whose primary purpose is to retain fission products and radioactive materials during operations
- One particle is the size of the tip of a ballpoint pen
- Fuel particles are compacted in specially designed silicon carbide pellets

- Particles are highly proliferation resistant and provide environmental protection during and after operations
- Based on a reliable and historically proven technology resulting in two extra and very strong barriers against potential radioactivity release



# Safely Managing Wastes at Chalk River



- Low and intermediate level radioactive wastes will be managed on-site before storage at a long-term licensed facility
- The reactor will operate for its lifetime on a single load of fuel. Following station operations, used fuel will be managed on-site before going to an off-site facility managed by the Nuclear Waste Management Organization (NWMO) which is responsible for the management of used fuel in Canada
- Conventional solid waste, construction waste and hazardous materials will be managed at licensed off-site facilities
- Sewage will be managed through the existing Chalk River site infrastructure