

**nwmo**

NUCLEAR WASTE  
MANAGEMENT  
ORGANIZATION

SOCIÉTÉ DE GESTION  
DES DÉCHETS  
NUCLÉAIRES



# What is Used Nuclear Fuel?

Erik Kremer

Senior Engineer, Used Fuel Safety Assessment

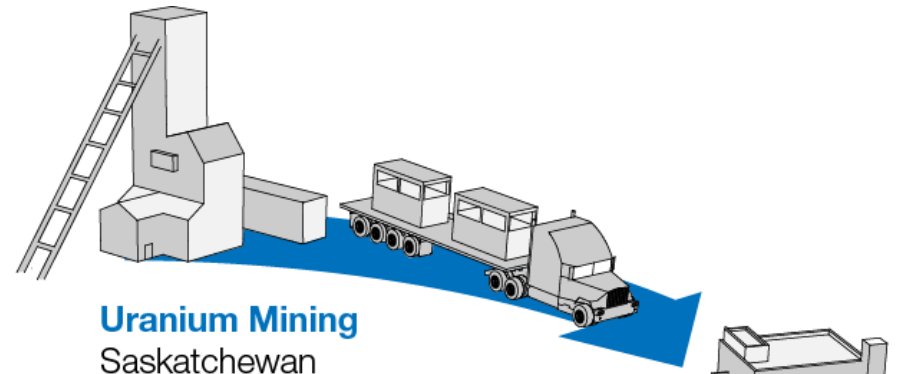
# What is Used Nuclear Fuel?

## Discussion Topics

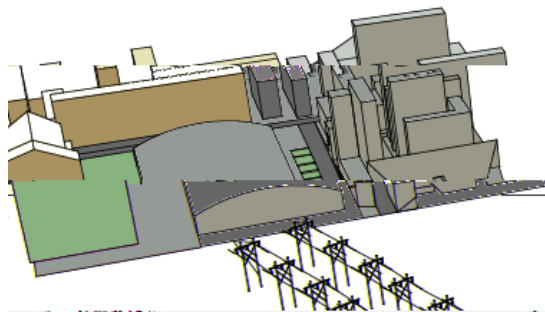
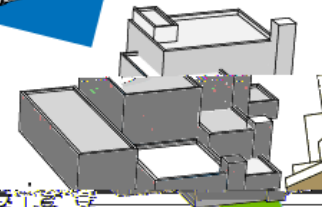
- How is it made?
- What does it look like?
- What is it used for?
- Why is it hazardous?
- Where is it now?



# Nuclear Fuel Cycle in Canada



Refining



Electricity  
Generation

Ontario

Quebec  
New Brunswick

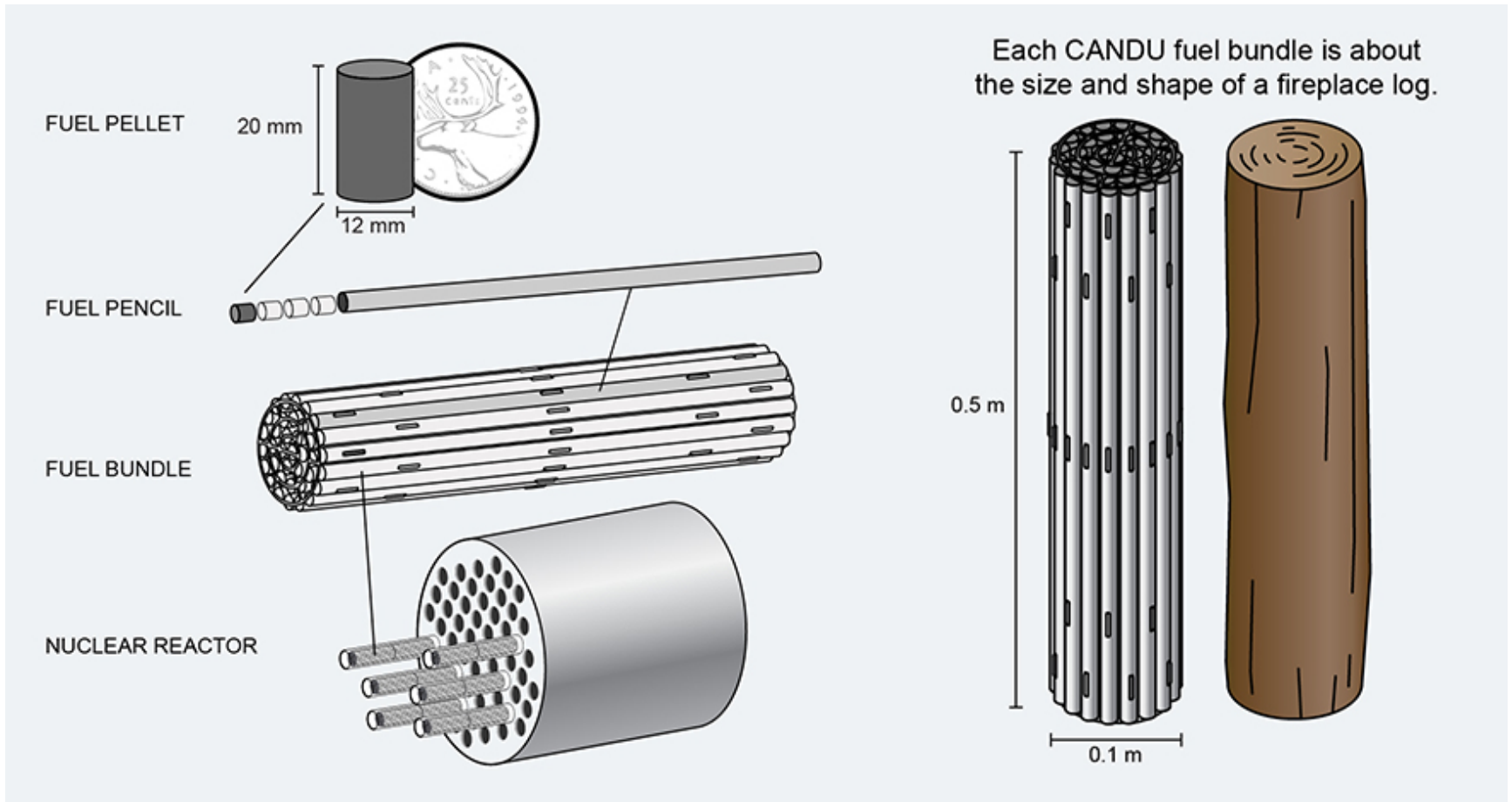
This diagram shows a stylized illustration of a nuclear power plant with a forklift and several drums, representing the use of uranium fuel in nuclear reactors to generate electricity.

Fuel Fabrication

Port Hope, Ontario  
Peterborough, Ontario  
Toronto, Ontario

This diagram shows a stylized illustration of fuel fabrication with a forklift and several drums, representing the fabrication of uranium fuel rods.

# CANDU Fuel

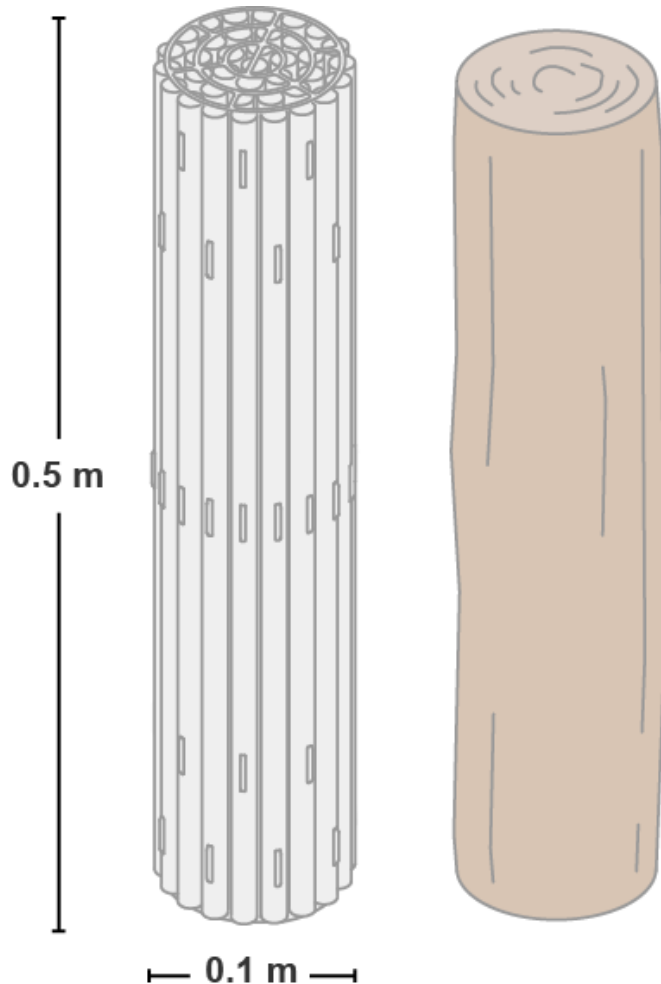


# CANDU Reactor

- About 5,000 fuel bundles per reactor
- Each bundle stays in reactor for about 15 to 18 months



# CANDU Fuel



One fuel bundle . . .

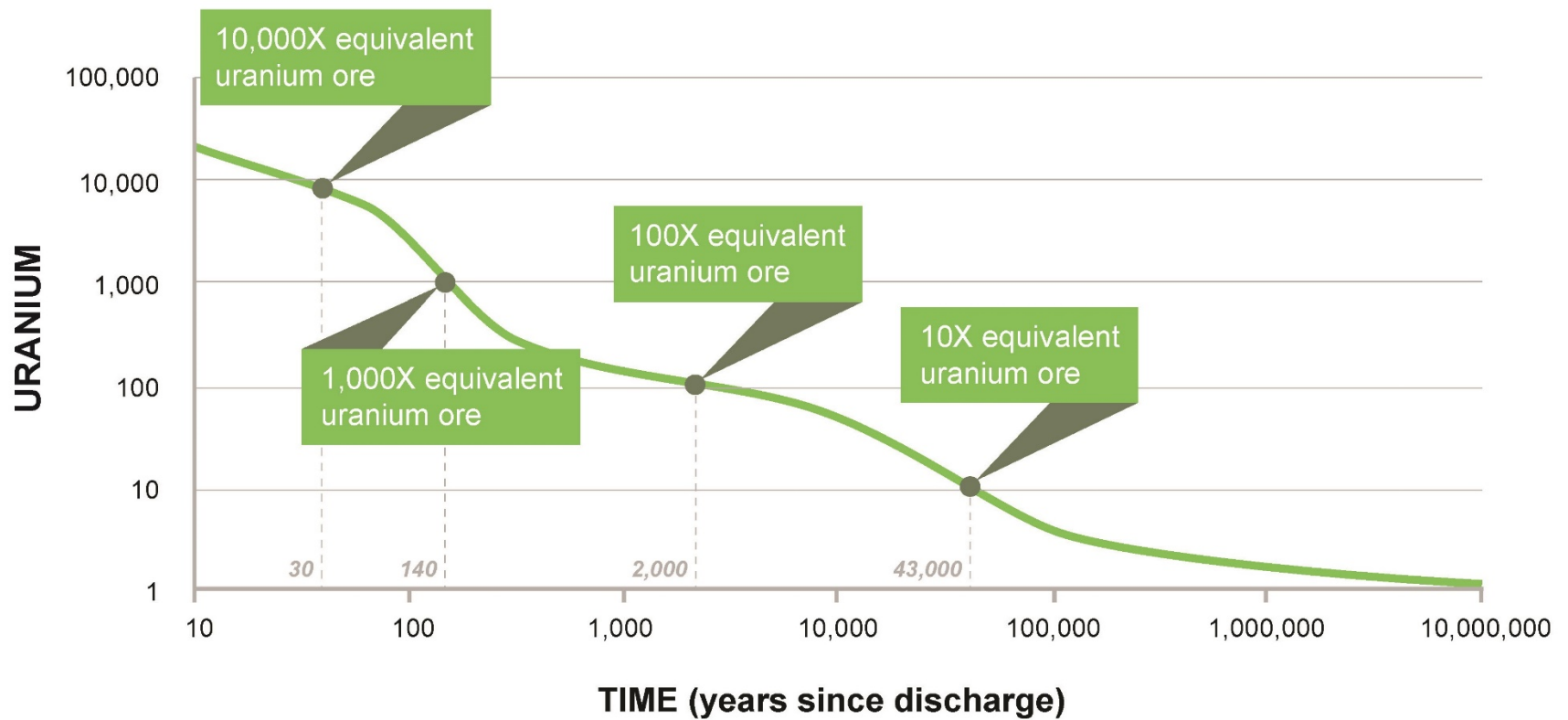
- Is about the size of a fireplace log
- Can power 100 homes for a year
- Contains about 20 kg uranium

**Used nuclear fuel is a potential health risk for a very long time.**

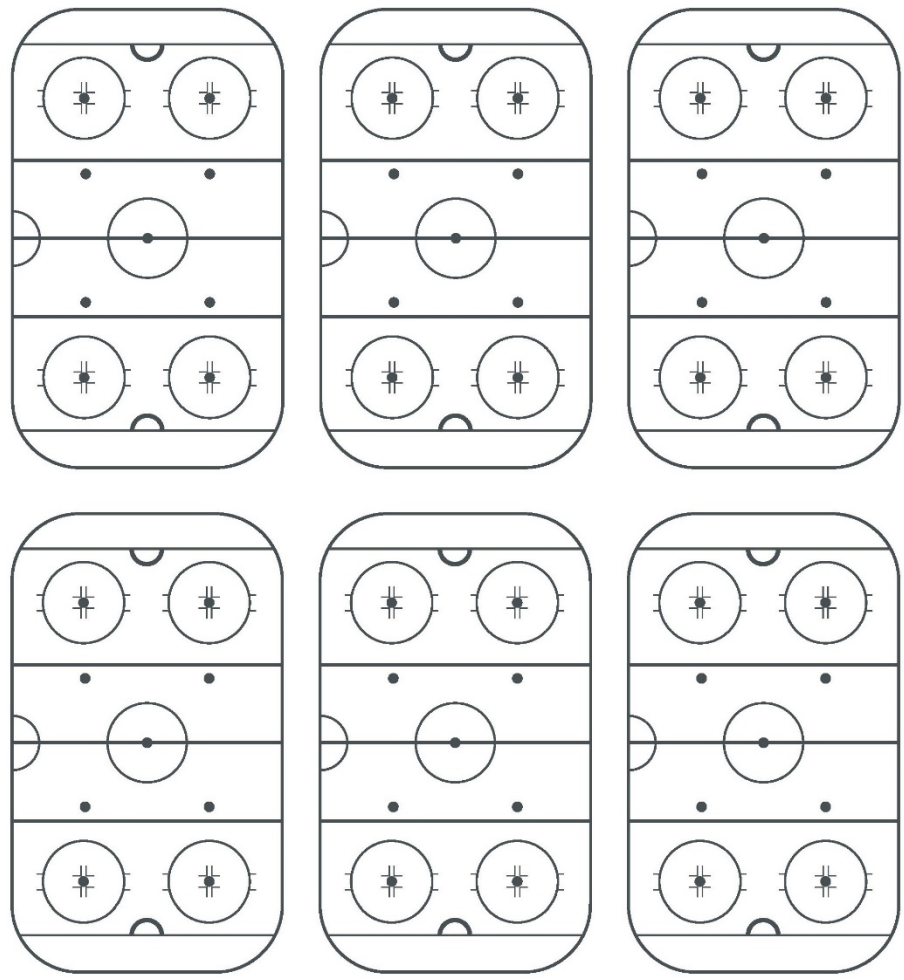
**It must be safely contained and isolated from people and the environment, essentially indefinitely.**

# Used Nuclear Fuel is Radioactive

USED FUEL RADIOACTIVITY RELATIVE TO EQUIVALENT AMOUNT OF URANIUM

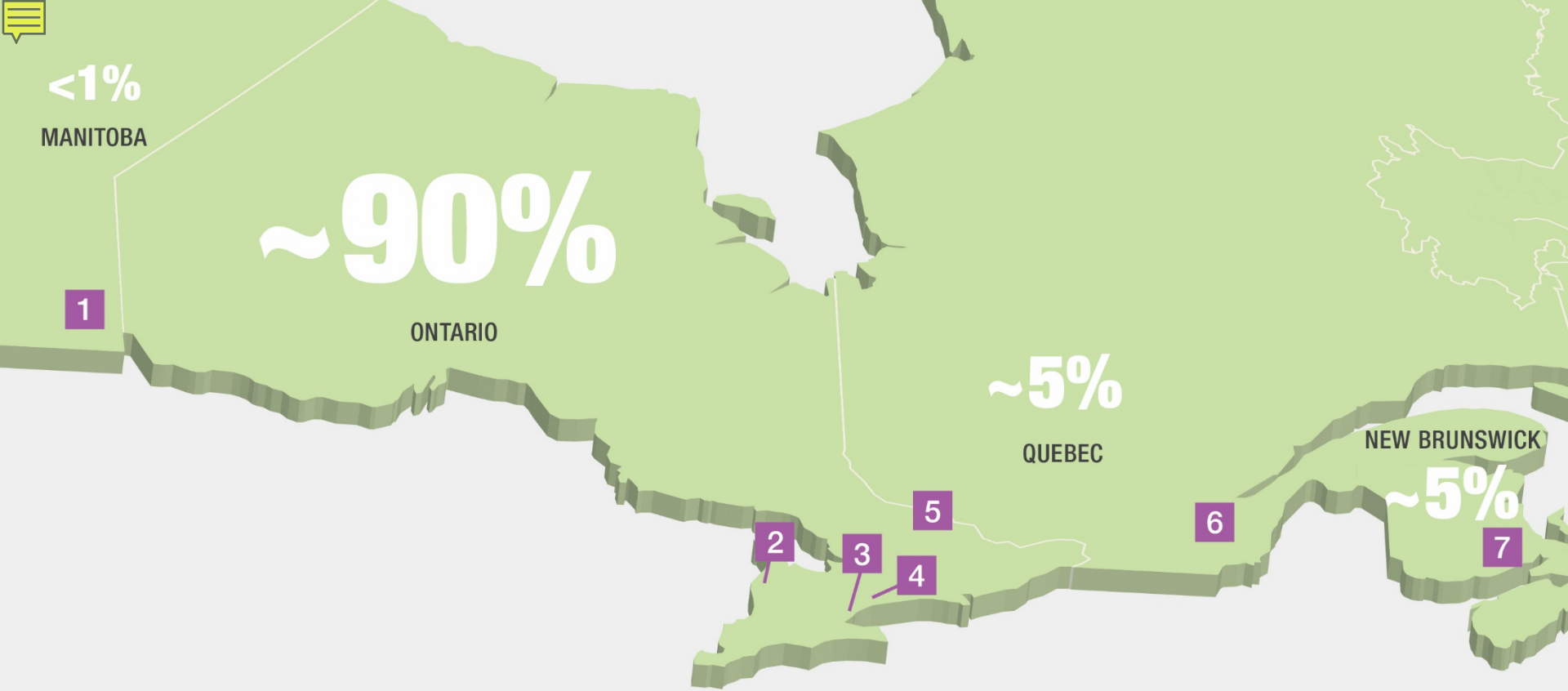


# ~2.8 million



As of June 30, 2017, there are about 2.8 million used nuclear fuel bundles in Canada.





### ■ Interim Storage Facilities

1. Whiteshell Laboratories, Manitoba
2. Bruce Nuclear Generating Station, Ontario
3. Pickering Nuclear Generating Station, Ontario
4. Darlington Nuclear Generating Station, Ontario
5. Chalk River Laboratories, Ontario
6. Gentilly Nuclear Generating Station, Quebec
7. Point Lepreau Nuclear Generating Station, New Brunswick





## Wet Storage

- Used nuclear fuel initially very hot and highly radioactive
- Stored in water pools for cooling and shielding
- Pool water kept separate from other water
- After 7 to 10 years, used fuel cool enough to move to dry storage



326

326

416

416

425

G

423

421

419

419

417

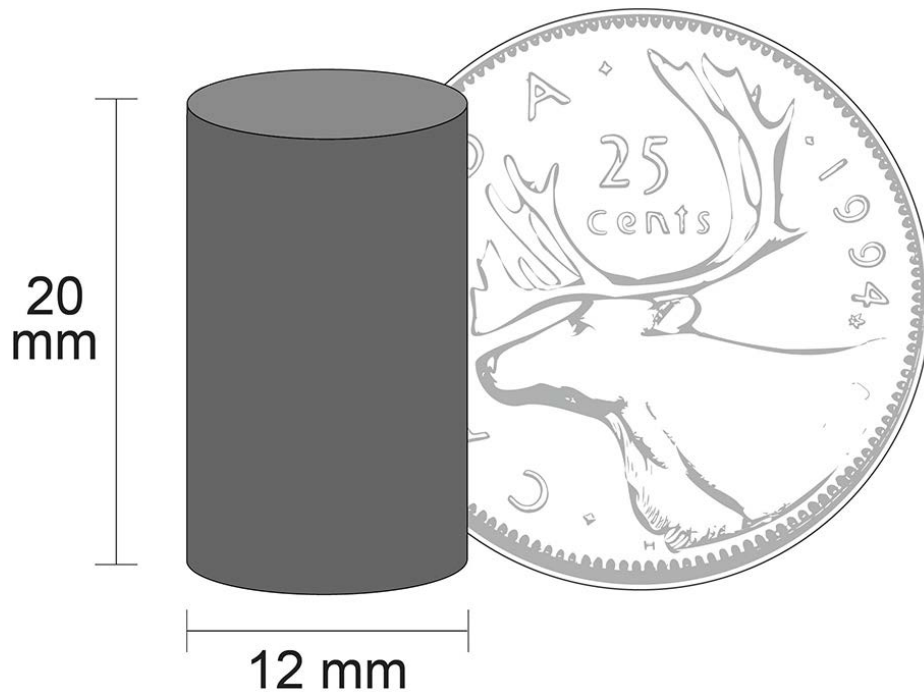
# Dry Storage



# Fuel Bundle

- **Used fuel pellets are held in sealed tubes**
- **Zircaloy metal is extremely strong**
- **Zircaloy metal is corrosion-resistant**

# Fuel Pellet



- High density ceramic
- Extremely durable
- Does not readily dissolve



**Thank you**