



#### **NUCLEAR OPERATIONS**

Manufactures naval nuclear reactors for U.S. submarines and aircraft carriers; supplies research reactor fuel and elements for universities, national laboratories and international customers

#### **NUCLEAR POWER**

Designs, services, engineers and manufactures components and fuel for Canada Deuterium Uranium (CANDU) nuclear power plants; medical isotope and radiopharmaceutical production for hospitals and radiopharmacies

#### **NUCLEAR SERVICES**

Provides technical operations at government sites; advanced technology developments in space power and medical isotopes

# Manufacturing, Engineering, Design



### The Nuclear We Know



- Power plants
- Submarines and aircraft carriers
- Nuclear weapons
- Environmental cleanup

# Reliable, Safe, Powerful



The Nuclear We Need

- Nuclear thermal propulsion
- Microreactors
- Additive manufacturing
- Advanced reactors
- Medical isotopes



# Cutting-edge, Cost-effective, Scalable



## Nuclear Thermal Propulsion

- NASA pursuing various technologies to support Mars voyage
- NTP is a promising propulsion technology
- Nuclear power source heats hydrogen, which creates thrust
- Benefits over chemical propulsion
  - Shorter mission time
  - Less exposure to cosmic radiation
- High bar for surviving harsh conditions and extreme temperatures
- Current work centered around design and fuel form fabrication development



NASA's Nuclear Thermal Prolusion engine system concept, for which BWXT is providing support for reactor design, manufacturing, and fuel fabrication.



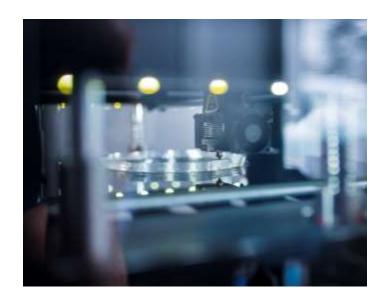
### Microreactors

- Several concepts in development
- Terrestrial and space
- Smaller than Small Modular Reactors (1-20 MWe vs 20-300 MWe)
- Portable and scalable
- Provide electricity, heat, desalination, hydrogen production, etc.
- Private-industry driven, government supporting
- Demonstration in next 3-5 years





# Additive Manufacturing



- 3D Printing
- Components
- Fuel
- Reduces design constraints
- Allows for new geometries
- More efficient



## Advanced Reactors



- Numerous new designs and technologies
- Accident-tolerant fuel forms
- Smaller than current large plants
- Load-following
- Modular construction
- Smaller output, scalable
- Cost-competitive

## Medical Isotopes



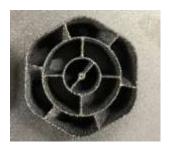
- Diagnostic and therapeutic use cases
- 40 million nuclear medicine procedures each year, demand rising 5% annually
- Domestic (North American) sources are needed for Mo-99
- Competing companies and technologies racing to meet the need and improve the technology
- Medical Isotopes proprietary technology, constructing facilities for North American solution



BWXT Is Contributing to the Nuclear We Need

- Nuclear Thermal Propulsion awarded NASA design contract; fuel, welding technologies
- Microreactors awarded DoD contract for mobile nuclear design project
- Additive Manufacturing design contract, breakthroughs in our own labs
- Advanced Reactors supporting developers, restarted TRISO fuel line







### Conclusion

- Many U.S.-based companies are on the forefront of developing the nuclear we need
- Thank you for your advocacy
  - Proper science
  - Public sentiment
- We all have a role to play



## Questions?



