



The Nuclear We Need:

Advancing Technology for the World's Greatest Power Source

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Our Businesses

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 Propulsion 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



In-space power



Space propulsion

Copernicus image credit: NASA



Terrestrial microreactor concept

> 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?



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