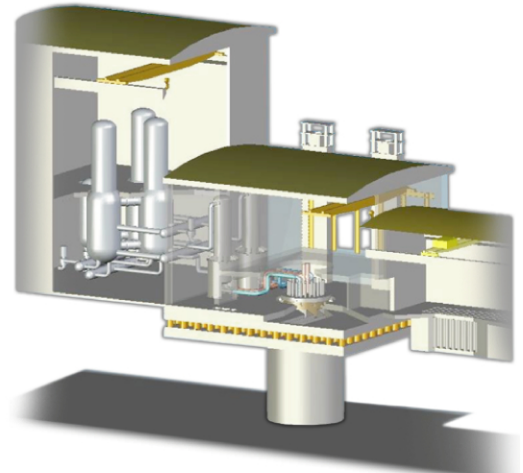


# Nuclear Technology Programs

**T**he Nuclear Technology Program Office (NTPO) develops, coordinates, integrates and manages the nuclear science and technology research and development programs of the Oak Ridge National Laboratory. A wide range of activities are carried out under the auspices of the NTPO in support of the nuclear energy and technology missions of importance to our nation.



*Advanced high-temperature  
reactor concept*

## Program Elements

### *Advanced reactor and fuel cycle technology*

ORNL is leading the materials development for DOE's Gen IV Advanced Reactors Program and Advanced Fuel Cycle Initiative and is a major partner in the development of coated particle fuels for high-temperature reactors. ORNL is developing and demonstrating advanced separations technology and the development of advanced reactors using molten salt coolants for electricity and hydrogen production.

### *Space power systems*

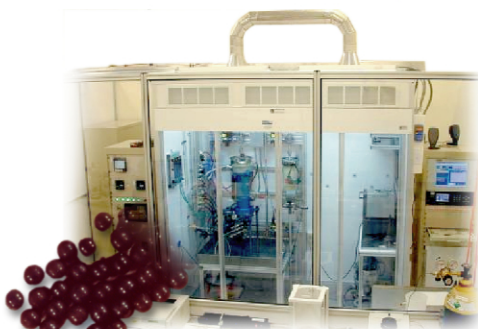
ORNL is a leader in the development of system concepts and technologies for space power systems. From radioisotope thermoelectric generators to lunar and Martian surface power reactors and multi-megawatt reactors, ORNL's system concepts and fuel, material, shielding and instrumentation technologies will power space exploration in the 21st century.

### *NRC technical support*

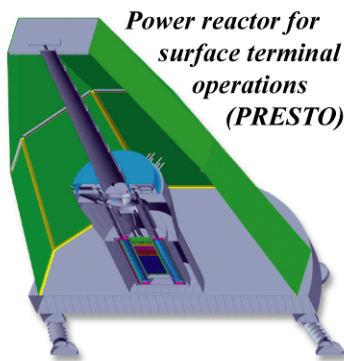
The broad base of technical support provided to NRC is focused on reactor pressure vessel integrity, containment degradation, burnup credit and high-burnup fuel issues for storage and transport of spent fuel, advanced reactor physics, criticality safety, radiation shielding, source terms, and instrumentation and controls.

### *Isotopes and heavy element production and distribution*

For 50 years ORNL has been at the center of the U.S. program to produce and distribute stable and radioactive isotopes for research, medical, and other commercial applications. ORNL is the world's leader in the production and recovery of trans-curium isotopes and is the largest producer of Cf-252 neutron sources.



*Uranium particle  
coating lab*



*Power reactor for  
surface terminal  
operations  
(PRESTO)*

### ***Enrichment technology development***

ORNL is assisting in the development of an economic gas centrifuge machine by providing support in materials, power electronics, modeling, motor development, and instrumentation and controls.

### ***Transport and storage of spent nuclear fuel***

ORNL is a leader in the design, analysis, and testing of spent fuel shipping casks and storage facilities and in the development and application of computational methods and nuclear data for the analysis of spent fuel source terms, criticality safety, and burnup credit.

### ***Radioactive waste management***

ORNL contributes to the technical basis for a geologic repository for spent nuclear fuel with studies of material corrosion phenomena, robotics, cement-like materials, metallic glass development, and transportation logistics.



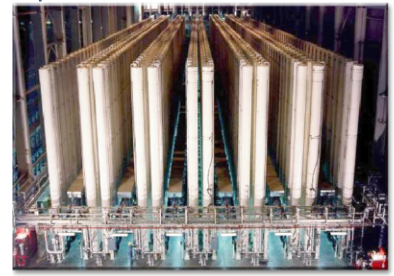
*High flux isotope reactor*

## **Facilities**

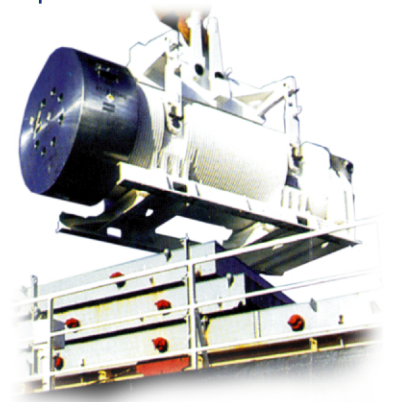
- Thermal Hydraulic Test Laboratory
- High Flux Isotope Reactor (HFIR)
- Radiochemical Engineering Development Center (REDC)
- Coated-particle Fuel Fabrication Laboratory
- Irradiated Fuels Examination Laboratory
- Oak Ridge Electron Linear Accelerator
- Radioisotope Development Laboratory
- Isotope Enrichment Facility

## **Technologies**

- Fuel fabrication
- Irradiated material and fuel examinations
- Core physics
- Thermal hydraulics
- Sensors
- Radiochemical separations and processing
- High-temperature material production, fabrication, and testing
- Shield design
- Autonomous control system design
- Nuclear computational methods
- Reactor pressure vessel testing



*Gas centrifuges*



*Spent nuclear fuel shipping cask*



Nuclear Technology  
Programs Office

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Energy and  
Engineering Sciences