

Advanced Reactor Designs

Several nuclear reactor designs have been proposed by the Advanced Nuclear Concepts Group, 6221. These designs range from very compact, transportable reactors to large power reactors. These designs are applied to systems for space exploration, to medical isotope production, to self-contained underground power systems to large baseload nuclear reactors.



Lander Space Reactor

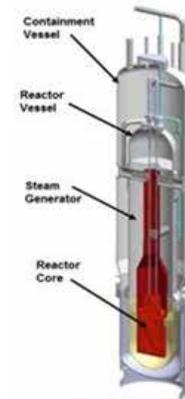
Vision

To enhance the nation's security and prosperity through sustainable, transformative approaches to our most challenging energy, climate, and infrastructure problems.

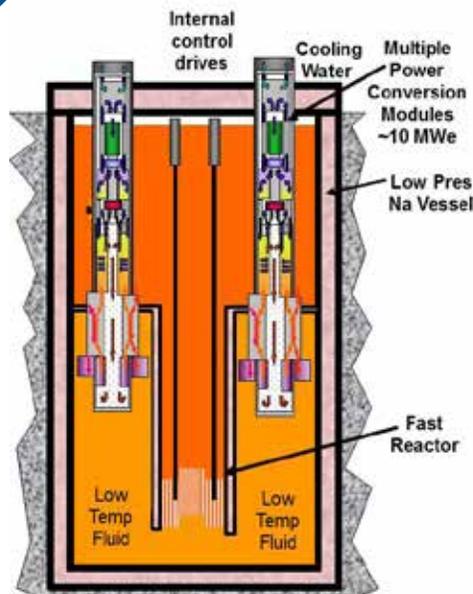
All of our reactor designs employ a concurrent engineering approach that addresses the integration of safety, operations, security, and safeguards from the conceptual design level. Capabilities include core design, thermal hydraulics, waste characterization, simulator development, and severe service and accident testing. Design assessments include: safety, security, vulnerability, siting, emergency planning, and fuel cycle impact. Organization 6221 serves as a window to sister organizations supporting licensing, modeling, radiation effects, large scale tests, and cyber security.

Notable designs include: Right Sized Reactor, Supercritical CO₂ Gas Fast Reactor, Compact Sodium Fast Reactor, and Prometheus Space Reactor. All of these reactor designs exist only on paper and have been produced as concepts for special purpose applications.

Current activities are supporting the development of Small Modular Reactors (SMRs). The first generation of these reactors are light water reactors with passive safety systems and integral steam generator systems. A current interest is the NuScale 45 MWe reactor with natural circulation reactor coolant and fully contained in a deep pool of water. This innovative system represents the first "walk away" safe design and is of particular interest in term of security and vulnerability to attack by terrorists.



NuScale Reactor 45 MWe



Right Sized Reactor



Reactor Vulnerability and Security Analysis

For more information, contact

Gary Rochau, Manager
Sandia National Laboratories
gerocha@sandia.gov
Office: (505) 284-4276
Mobile: (505) 205-0664

Website: <http://ne.sandia.gov>