The Transient Reactor Test Facility (No. 50) is an air-cooled, thermal-spectrum test facility specifically designed to evaluate the response of reactor fuels and structural materials to accident conditions.

Nuclear Heritage

Idaho's 52 Reactors

In 1949, the U.S. Atomic Energy Commission set aside 400,000 acres of mostly public lands in east-central Idaho's high desert to serve as home to the National Reactor Testing Station. Very quickly, organizations from across the country began to design, construct and operate experimental and test reactors on the Idaho desert. The first three projects — the Experimental Breeder Reactor-I, the Materials Testing Reactor, and the Submarine Thermal Reactor — began operating in 1951, 1952 and 1953, respectively. For many years the site contained the largest concentration of nuclear reactors in the world. The alphabetical listing of Idaho-based reactors below is from "Proving the Principle" by author and historian Susan M. Stacy.

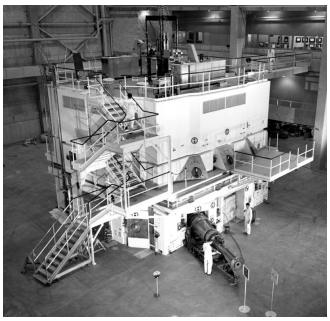
1. Advanced Reactivity Measurement Facility No. 1. *(1960-1974)*
2. Advanced Reactivity Measurement Facility No. 2 *(1962-1968)*
3. Advanced Test Reactor *(1967-present)*
4. Advanced Test Reactor Critical Facility *(1964-present)*
5. Argonne Fast Source Reactor *(1959-late 1970s)*
6. Boiling Water Reactor Experiment No. 1 *(1953-1954)*
7. Boiling Water Reactor Experiment No. 2 *(1954-1955)*
8. Boiling Water Reactor Experiment No. 3 *(1955-1956)*
9. Boiling Water Reactor Experiment No. 4 *(1956-1958)*
10. Boiling Water Reactor Experiment No. 5 *(1962-1964)*

Cavity Reactor Critical Experiment *(1967-early 1970s)*

11. Coupled Fast Reactivity Measurement Facility *(1968-1991)*

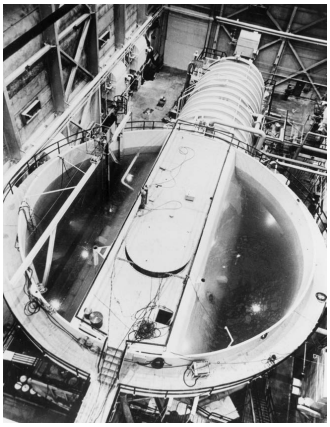
Advanced Test Reactor (No. 3) is used to study the effects of radiation on materials and is also capable of producing rare and valuable medical and industrial isotopes. It is the most versatile test reactor in the world.

Idaho National Laboratory



Materials Test Reactor (No. 30) was the second reactor built at the National Reactor Testing Station, now INL. It was used to test the performance of materials in intense radiation environments.

12. Critical Experiment Tank *(1958-1962)*
13. Engineering Test Reactor *(1957-1981)*
14. Engineering Test Reactor Critical Facility *(1957-1982)*
15. Experimental Beryllium Oxide Reactor *(never operated)*
16. Experimental Breeder Reactor No. 1 *(1951-1963)*
17. Experimental Breeder Reactor No. 2 *(1961-1994)*
18. Experimental Organic Cooled Reactor *(never operated)*
19. Fast Spectrum Refractory Metals Reactor *(1962-1968)*
20. Gas Cooled Reactor Experiment *(1960-1961)*
21. Heat Transfer Experiment No. 1 (*1955-1956)*
22. Heat Transfer Experiment No. 2 *(1957-1961)*
23. Heat Transfer Experiment No. 3 *(1958-1960)*
24. High Temperature Marine Propulsion Reactor (*1952-1964)*
25. Hot Critical Experiment *(1958-1961)*
26. Large Ship Reactor A *(1958-1994)*
27. Large Ship Reactor B *(1959-1987)*
28. Loss of Fluid Test Reactor *(1973-1985)*
29. Materials Test Reactor *(1952-1970)*
30. Mobile Low-Power Reactor No. 1 *(1961-1964)*
31. Natural Circulation Reactor *(1965-1995)*
32. Neutron Radiography Facility *(continuing)*
33. Nuclear Effects Reactor *(1968-1970*)
34. Organic Moderated Reactor Experiment *(1957-1963)*
35. Power Burst Facility *(1972-1985)*
36. Reactivity Measurement Facility *(1954-1962)*
37. Shield Test Pool Facility *(early 1960s)*
38. Special Power Excursion Reactor Test No. I *(1955-1964)*
39. Special Power Excursion Reactor Test No. II *(1960-1964)*
40. Special Power Excursion Reactor Test No. III *(1958-1968)*
41. Special Power Excursion Reactor Test No. IV *(1962-1970)*
42. Spherical Cavity Reactor Critical Experiment *(1972-1973)*
43. Stationary Low-Power Reactor *(1958-1961)*
44. Submarine Thermal Reactor *(1953-1989*)
45. Systems for Nuclear Auxiliary Power (SNAP) 10A Transient No. 1 *(early 1960s)*



Submarine Thermal Reactor (No. 45) was the prototype power plant for the nation's first nuclear submarine, the USS Nautilus.

46. Systems for Nuclear Auxiliary Power (SNAP) 10A Transient No. 2 *(1965-1966)*
47. Systems for Nuclear Auxiliary Power (SNAP) 10A Transient No. 3 *(1964-1964)*
48. Thermal Reactor Idaho Test Station *(last operated in 1964)*
49. Transient Reactor Test Facility *(1959-1994, 2017-present)*
50. Zero Power Physics Reactor *(1964-1992)*
51. Zero Power Reactor No. 3 *(1955-1970)*

As of 2022, three new reactors are proposed to be built at INL: the Versatile Test Reactor (VTR), the Microreactor Application Research Validation and Evaluation Project (MARVEL), and the Carbon Free Power Project small modular reactor plant. VTR is designed to rapidly test reactor materials and components, which will accelerate nuclear research. MARVEL is a microreactor that will be used to explore the possibility of nuclear microgrids and allow for end-user application design testing for industry partners. The small modular reactor plant will provide clean, carbon-free energy to Intermountain West communities by deploying six, 77-megawatt modules that will generate 462 megawatts of electricity.

Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy.

FOR MORE INFORMATION

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