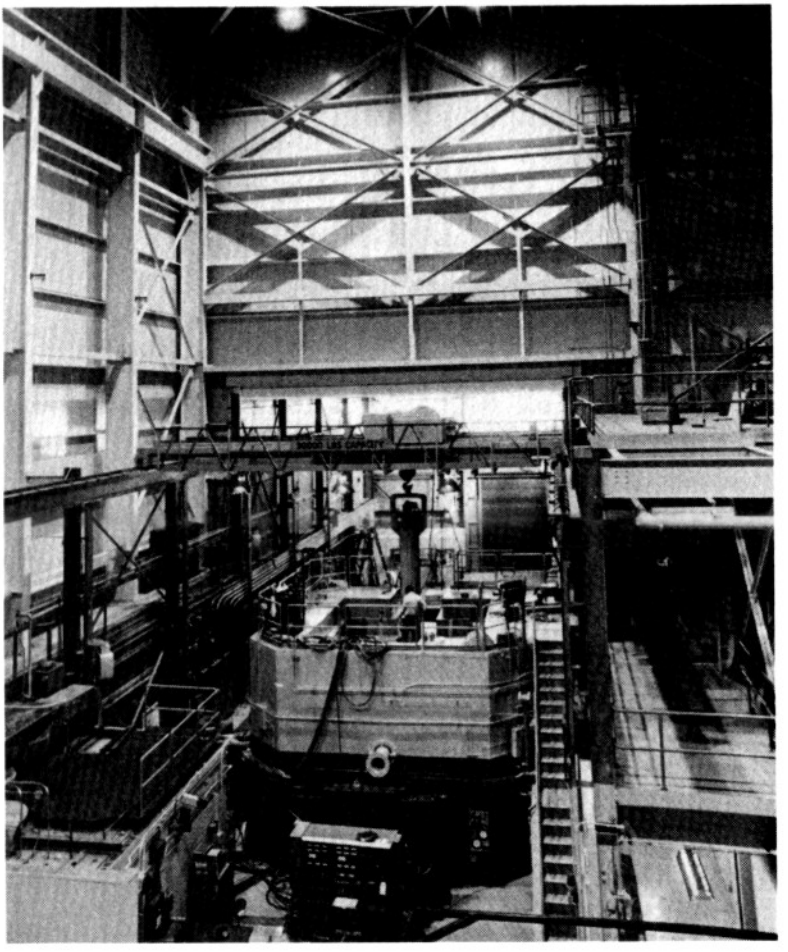
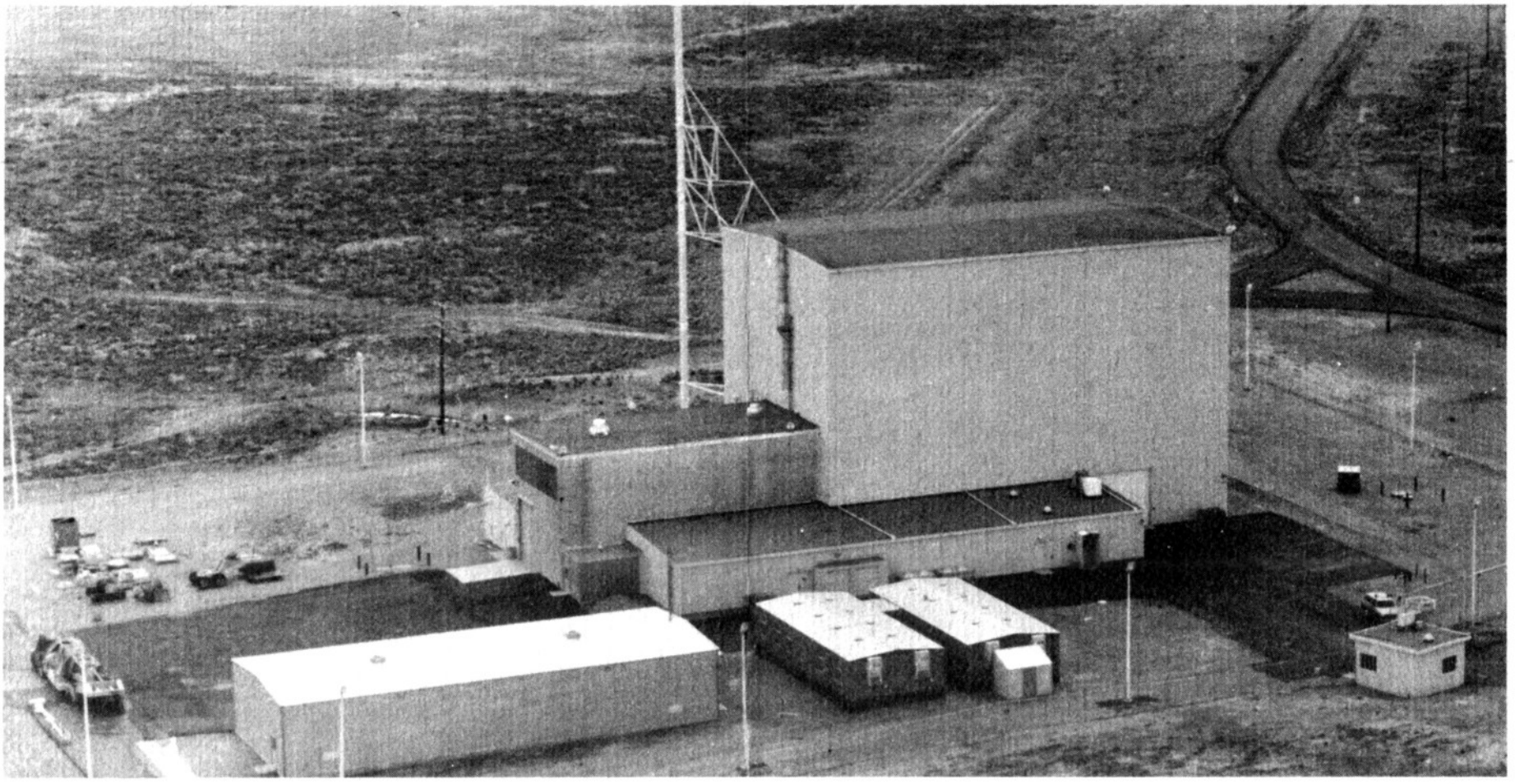
TREAT
Transient Reactor Test Facility



TREAT Reactor

TREAT is a uranium-oxide-fueled, graphite-moderated, air-cooled reactor designed to produce short controlled bursts of nuclear energy. The purpose is to simulate accident conditions leading to fuel damage including melting or even vaporization in test specimens, while leaving the reactor's "driver" fuel undamaged.



Such tests provide data on safety margins, fuel-cladding damage, fuel motion, coolant-channel blockages and molten-fuel/coolant interactions during an accident. These data help in determining the consequences of accident conditions, refining margins of computer simulations of reactor accidents, and ultimately, designing reactors with greater safety.

The TREAT driver fuel, consisting of finely divided uranium oxide in a carbon and graphite matrix, has a high heat capacity which enables it to withstand the transient tests. The reactor's air-cooling system is adequate for cooling the core to ambient temperature in a matter of hours after a transient test, or for steady-state operation at up to 120 kilowatts. The nominal peak power allowed in transient tests is 18,000 megawatts of thermal power — more than five times the largest nuclear power plants.

By removal of two central fuel assemblies, TREAT is able to accommodate a self-contained sodium test loop that circulates sodium coolant by means of an internal pump, providing a realistic environment for tests of a bundle of up to seven fuel pins. The loops are used

both for transient-overpower and loss-of-flow tests.

TREAT's features include a closed-loop computer control of fast-acting transient rods for tailoring the shape of power bursts, and fast-neutron hodoscopes for obtaining millisecond-by-millisecond images of fuel motion during a severe test.

TREAT is also used in a steady-power mode as a neutron source for examining fuels and materials by neutron radiography.

Recently the large high bay and open floor space in the TREAT facility has been used to set up a demonstration for transuranic waste processing. A "plasma hearth process" that uses hot gases created by a high-energy electrical arc is being tested for its ability to reduce drums of radioactive waste to relatively small chunks of glass and metal. TREAT's design is amenable to a wide variety of demonstrations for processing radioactive waste that does not require heavy shielding.