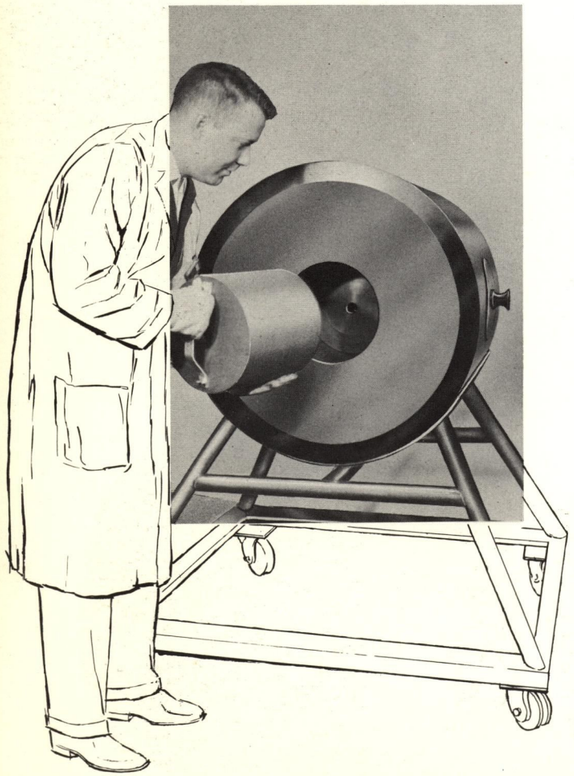
LOCKHEED NUCLEAR PRODUCTS

LOCKHEED LNP

Lockheed's new
subcritical reactor assembly . . .

SPUR



The Lockheed Model 501 Subcritical Portable University Reactor is a unique device for conducting classroom demonstrations. The entire reactor may be disassembled into individual components, large enough to be readily visible from all parts of a normal classroom yet small enough to be easily handled. The five basic components of the SPUR can be assembled in four different configurations, each of which is visually distinctive in a manner that materially aids classroom demonstrations. And since the reactor operates in a dry condition, assembly and demonstrations are further simplified.

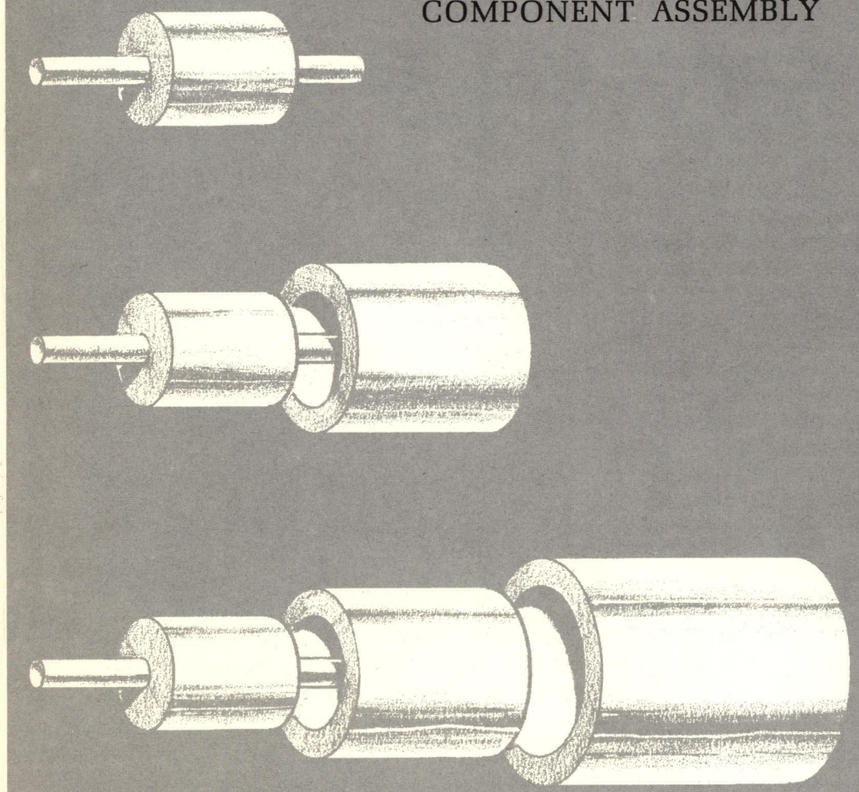
A major advantage of the Lockheed SPUR over other types of subcritical assemblies is its portability. By means of the carts provided, the principal components of the assembly may be readily moved to, and operated in, different locations, thereby promoting more efficient use of valuable classroom space than would be possible in using a fixed installation.

The cylindrical, homogeneous core is 10 inches in diameter and 14 inches long. It is made up of high-density polyethylene, impregnated with 20% enriched UO_2. Foil holders, furnished with the assembly, can be inserted into the axial and radial holes to permit neutron distribution measurements in a multiplying medium around a point source with the reactor in one of its various configurations. A dummy core of high-density polyethylene, also included with the assembly, permits measurements in a nonmultiplying medium. Such measurements can be extended into both the axial and the radial reflectors. This same demonstration can be performed for an approximated plane source by inserting a neutron source into the thermal column supplied with the assembly. And the core may be immersed to demonstrate the characteristics of water as a reflector.

Wrap-around, electrically heated blankets can be furnished to raise the temperature of the assembly over a range of 65°F to 150°F. This increases the utility of the device appreciably in that it affords the means for conducting similar experiments at varying thermal conditions.

The Subcritical Portable University Reactor may be operated with either a particle accelerator or some other neutron source, such as a polonium-beryllium type.

COMPONENT ASSEMBLY



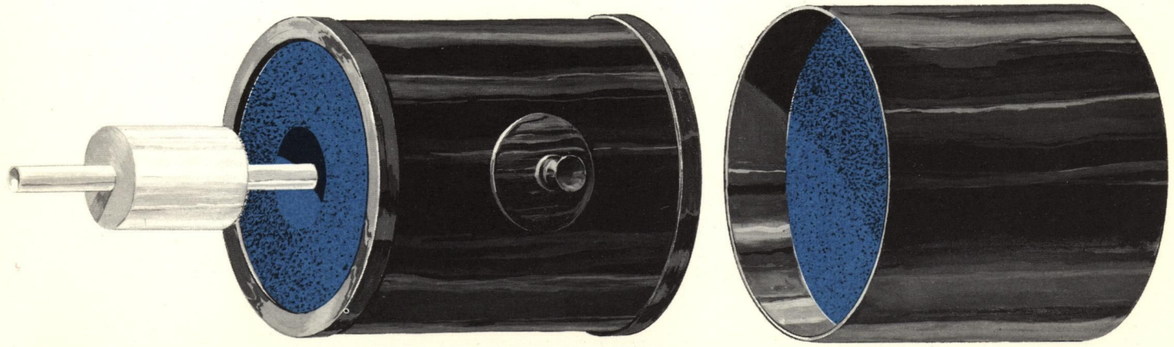
The two cores provided are each ten inches in diameter and fourteen inches long. One core is pure high-density polyethylene; the other, a homogeneous mixture of polyethylene and 20% enriched UO_2. Either core can be inserted into.....

..... the smaller of the polyethylene sleeves to produce an assembly with a reflector three inches thick. A polyethylene plug is inserted at one end to provide uniform reflector thickness around the core. Inserting this assembly into···

.....the larger polyethylene sleeve results in an assembly with a reflector six inches thick. Again, a polyethylene plug at the end of the assembly gives a uniform reflector thickness around the core.

Inserting the core into the graphite sleeve results in an assembly with a graphite reflector ten inches thick. A graphite end plug completes the assembly.

A thermal column with a radial hole for inserting a neutron source is used to provide a plane source of neutrons to the assembly mounted on the pedestal.



The Lockheed SPUR is that desirable laboratory device which is safe and inexpensive . . . and which can properly introduce the college student to the broad field of nuclear facilities. SPUR's portability and ease of handling will allow the students to perform all set-up work, conduct the actual demonstrations, and evaluate the results of their work—all in one classroom period. Their confidence in their own abilities will develop rapidly as they safely become familiar with all of the discipline and care necessary to be exercised around more advanced nuclear facilities.

Typical demonstrations and experiments that can be performed with the SPUR are . . .

NEUTRON FLUX MEASUREMENTS

Flux distributions in multiplying and non multiplying media
Foil and counter techniques
Point and plane sources

CONTROL ROD EFFECTS

Neutron flux distribution
Neutron amplification

NEUTRON AMPLIFICATION MEASUREMENTS

Bare core
Graphite-reflected core
Polyethylene-reflected core
Water-reflected core

PULSED SOURCE EXPERIMENTS

Kinetics of subcritical, multiplying systems
Time of flight measurement of neutron spectrum

In addition to the reactor assembly, Lockheed provides the following services:

All information required to file for allocation of fuel and the necessary licenses from the Atomic Energy Commission

Complete manuals

A list of experiments to be performed

A thorough check out of all components and operation of the reactor prior to delivery

SPUR can be your new laboratory facility 90 days after your decision is made. To assist you further in your evaluation of this subcritical assembly, we respectfully solicit your inquiry.

Nuclear Sales Manager

LOCKHEED NUCLEAR PRODUCTS

LOCKHEED AIRCRAFT CORPORATION, *Georgia Division, Marietta, Georgia*