

DULUTH--Ingenuity and surplus materials produced a neutron howitzer now in operation in the basement of the Science building at UMD. It is one of only four such howitzers in Minnesota.

It was built last year by Donald E. Olson, assistant professor of physics, at a cost of about \$200, a fifth of the cost of custom constructed units.

The project began last November when a 25-milligram radium-beryllium-neutron source arrived at UMD. The materials were secured through the U.S. Department of Health, Education and Welfare as surplus property from the Atomic Energy Commission.

The capsulized neutron source of powdered radium and beryllium was placed in a container surrounded by 100 pounds of parafin. This unit was encased in a heavy lead shield to seal off radiation from the "hot" materials inside. The howitzer then was placed in an oil barrel.

Now UMD physics and engineering majors can study neutron-induced reactions and radioactive decay.

As Prof. Olson explains it, alpha particles given off by the radium nuclei react with the beryllium nuclei and produce a neutron. Students place a small cylinder of silver inside the howitzer and the neutrons produce radioactive silver isotopes. Usually a pair of students then dash with their sample to a geiger counter to measure the "half lives" of the isotopes, or the time required for half of the isotopes to decay.

Olson says this fundamental and basic experiment in nuclear physics is an "eye opener" for the students who give it a great deal of interest and attention. He said they have become so proficient that they have measured "half lives" within one percent of accuracy.

A new howitzer, 20 times more powerful, will be in operation at UMD next year. A plutonium and beryllium neutron source will be used in the larger howitzer.

In the last two years, Olson has built three energy-measuring beta ray spectrometers from surplus magnatron magnets. They are the only such instruments in the state for use by undergraduate students.

Olson is a firm believer in the use of surplus government materials as teaching aids in elementary and secondary schools, high schools and colleges. Last year, he and Alan Mandell, science supervisor of the Norfolk County (Va.) schools, were employed as consultants to the U.S. Office of Education. They teamed up to write a manual on "U.S. Government Surplus Material and Science Education," which lists many types of surplus materials and ways in which they could be used in science education.