

DEVELOPMENT OF A LABORATORY SLUG INJECTION MACHINE  
FOR FABRICATION OF HTGR FUEL RODS

## NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

D. D. Cannon      F. C. Davis  
R. A. Bradley     J. D. Sease

Oak Ridge National Laboratory\*  
Oak Ridge, Tennessee 37830

Summary

A major part of the High-Temperature Gas-Cooled Reactor (HTGR) Fuel Refabrication Development Program at Oak Ridge National Laboratory has involved the development of the slug injection process for remote forming of recycled fuel into fuel rods which can be loaded into graphite fuel elements. The HTGR fuel rod considered here is a 1.27-cm-diameter cylinder approximately 5.08 cm long that is comprised of a mixture of fissile, fertile, and shim particles bonded by a carbonaceous matrix consisting of a mixture of graphite filler in a thermoplastic binder. A laboratory slug injection machine has been developed to perform the major processing steps of fuel particle dispensing, blending, and loading and fuel rod forming.

The laboratory slug injection machine, illustrated diagrammatically in Fig. 1, was developed by applying the principles employed in automated assembly equipment wherein the process is divided into steps which can be performed in sequence at individual operating stations. A rotary indexing table to which 24 stainless steel molds are permanently affixed provides the mechanism by which a fuel rod mold is transferred from one operating station to the next for performance of the required processing steps.

The initial processing step performed by the machine is cleaning and lubrication of a fuel rod mold, which is then indexed to the next operating station where a bottom spool piece is inserted. The mold is

\*Oak Ridge National Laboratory is operated by Union Carbide Corporation, Nuclear Division, under contract with the United States Atomic Energy Commission.

**MASTER**