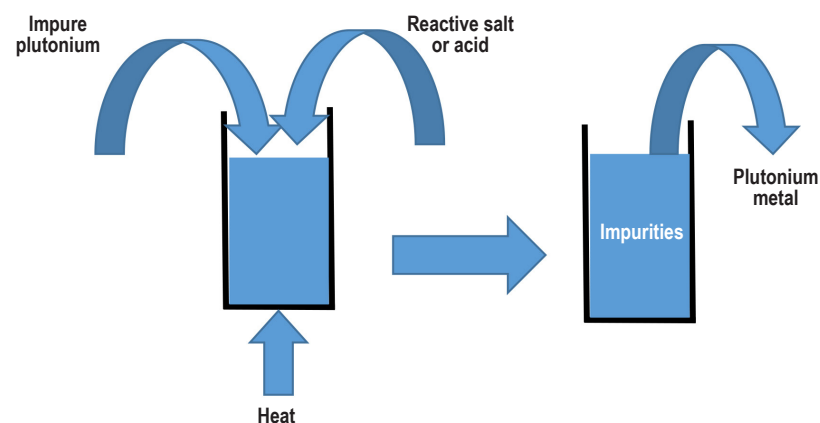
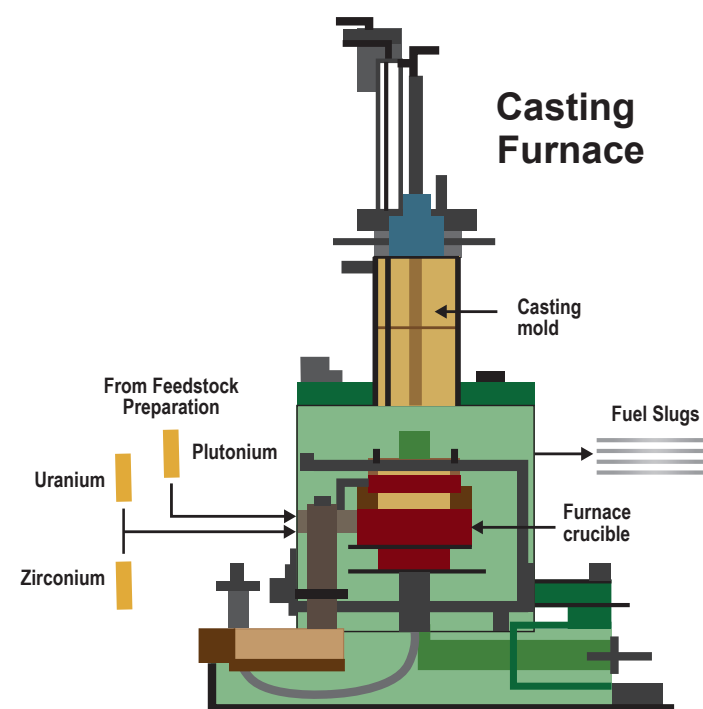


VTR Fuel Production Options

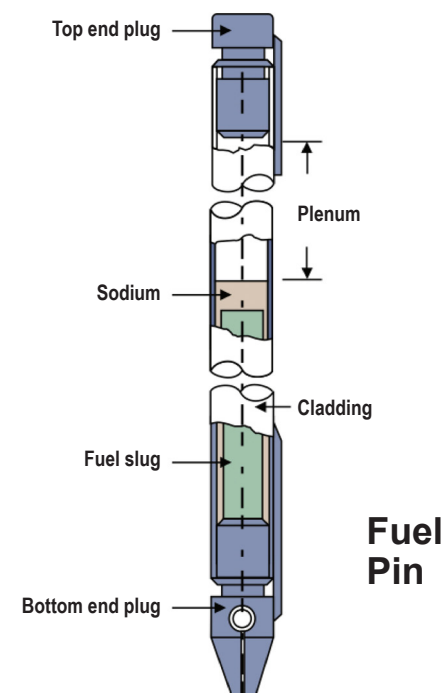
The driver fuel (fuel used to power the VTR) would be a metal alloy composed of uranium, plutonium, and zirconium. Similar fuels have been used in previous DOE test reactors. DOE would undertake actions required to produce the fuel including feedstock preparation and fuel fabrication.



Feedstock Preparation: The degree of feedstock preparation required would depend on the characteristics of the feedstock. Capabilities may be required for removing impurities from feedstock plutonium to reduce dose rates (e.g., from ingrowth of americium-241) or remove contaminants that would affect performance. If plutonium feedstock is received in another form, it would need to be converted to metal for used in the fabrication process. Many feedstock preparation processes start with the dissolution of the plutonium in an acid or salt bath at elevated temperatures. Through chemical and electrical reactions, the contaminants are removed from the plutonium and the plutonium metal collected.



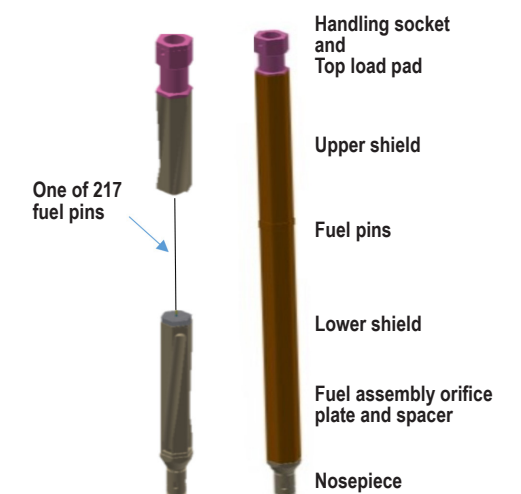
Fuel Fabrication: Uranium, plutonium, and zirconium metals are melted, alloyed, and cast into fuel slugs. To conserve resources, any fuel slugs that fail quality standards could be collected and used as feed material for the feedstock preparation facility and remade into feed material for fuel fabrication.



The slugs with a small amount of sodium (to improve the transfer of heat from the fuel slug to the fuel cladding) and an inert gas (to form a space, called plenum, above the fuel) are sealed inside stainless steel cladding to make fuel pins.

Fuel pins and upper and lower shields (made of reflector material) would be assembled with additional structural materials to make a driver fuel assembly.

Fuel Assembly



Driver fuel assemblies would be stored at the fuel fabrication facility pending shipment to the VTR facility. About 45 driver fuel assemblies would be required for each year of VTR operations.