# 5.0 Current Inventory of Recycled Uranium (as of March 30, 1999)

## 5.1 Current Project Hanford Management Contractor (PHMC) Inventory of Recycled Uranium

The remaining inventory of in-scope uranium at Hanford is approximately 1,863 metric tons of depleted, normal, and low-enriched material. The inventory consists of metal billets, unfinished and finished fuel, $UO_3$ powder, and scrap. As shown in Figure 5-1, the inventory, managed by the Hanford contractor, represents about 47% of the approximate 4,000 MTU total uranium inventory. Of this in-scope total, ~669 MTU is legacy $UO_3$ powder and the remaining ~1,194 MTU is metal as billets, unfinished fuel, and finished fuel.

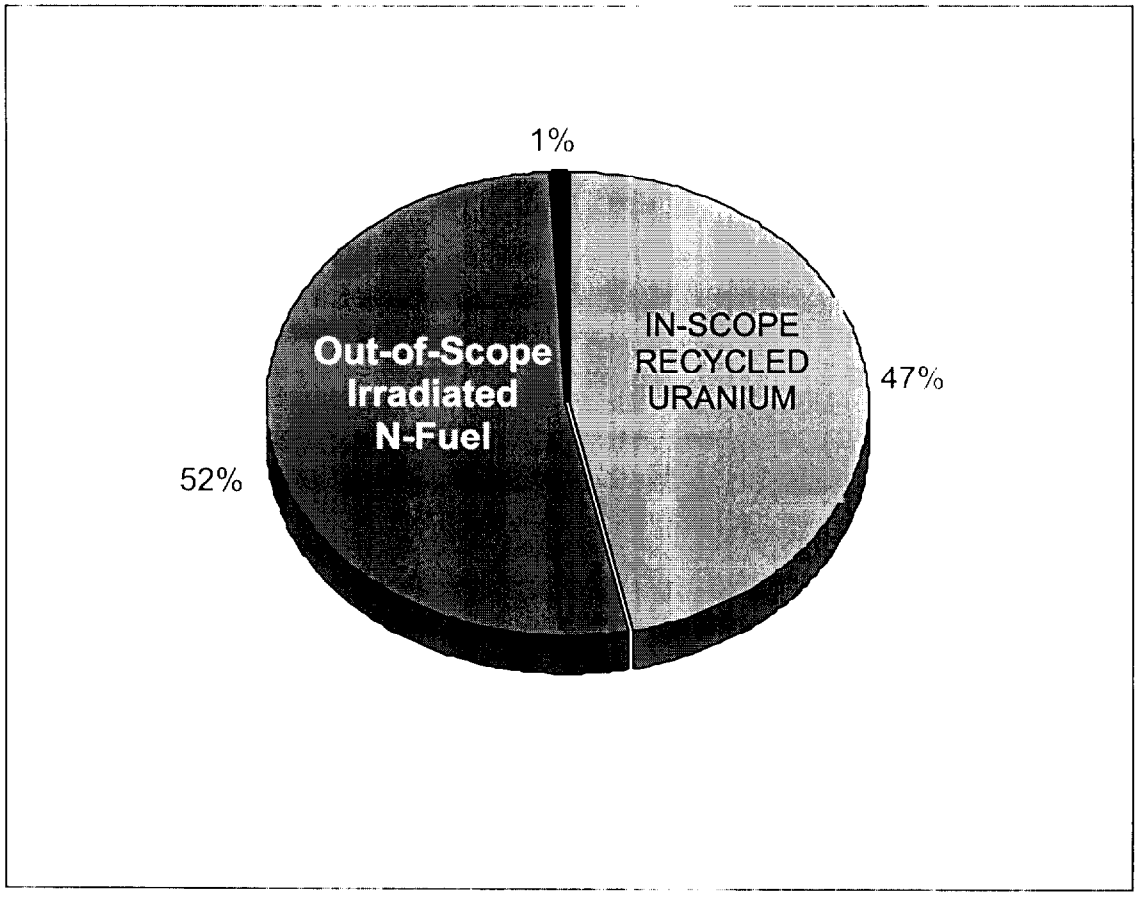


**Figure 5-1 Hanford Total PHMC Uranium Inventory**

The vast majority of the out-of-scope uranium inventory is the irradiated legacy N-fuel stored in the Hanford K-Basins currently awaiting transfer to the Canister Storage Building. The remaining 1% out-of-scope contains miscellaneous spent fuel (PWR Core II, etc.) and Pu/U (MOX) oxides and scrap. Appendix D, Table 5.1.1 provides a detailed listing of this inventory sorted by physical location and Composition of Ending Inventory

(COEI) descriptors. As the table indicates the recycled uranium is stored at the 300 Area Fuel Fabrication complex and the $UO_3$ Plant.

## 5.2 Pacific Northwest National Laboratory Current Inventory of Recycled Uranium

Battelle Memorial Institute (BMI), assumed management of the Pacific Northwest National Laboratory (PNL) research and development activities for Hanford in 1965. PNL later received national recognition and became the Pacific Northwest National Laboratory (PNNL). One of the significant projects of the 1960s was PNL's design of the Fast Flux Test Facility (FFTF) in support of the Atomic Energy Commission's commercial nuclear power program. This project utilized uranium in the fabrication of mixed oxide fuel (MOX) containing uranium and fuel grade plutonium. The role of the PNNL in support of Defense missions has been significantly reduced from the 1960s. The narrative below provides a brief overview of the main PNNL project utilizing recycled uranium. The approximate 6.4 metric ton PNNL inventory is shown in Appendix D, Table 5.1.2. The receipts and shipments relating PNNL recycled uranium transactions with the three Major Tier 1 sites are shown in Section 3.2 and 3.3 tables.

The Kinetic Energy Projectile Project (KEPP) project is an ongoing project that started in 1974. This was an extension of work for others through Picatinny Arsenal, which supported other munitions prior to the depleted uranium (DU) phase. In 1974, the uranium used for PNNL research activities was DOE material. This feedstock started as green salt from Paducah, which was delivered to National Lead of Ohio (NLO/Fernald) for processing into the ingot stage. The ingots were then sent to Rocky Flats (RFETS) for alloying with titanium and processed into billet form. The billets were then shipped to PNNL for final processing and machining. Essentially all of the uranium involved in the project was and is DU alloyed with a small amount of titanium. This alloy is used because of its density and mechanical properties that provide strength to survive extreme launch conditions. After the research penetrators showed great promise for defeating current armor threats, production facilities had to be established. This led to facilities such as National Laboratory of Albany and NLO to produce production quantities. Continuing success led to the private sector getting involved through systems contractors such as Honeywell, etc. The initial private uranium producers were Nuclear Metals Inc and Aerojet Ordnance Company. Both private companies are involved in recycling of the penetrator alloy. The March 31, 1999 DU inventory at 306W building is approximately 4.9 metric tons with a storage limit in the 300 Area limited to10 MTU. (In the past this limit has been 30 MTU.)

The receipts and shipments of normal, and enriched uranium into and out of PNNL were primarily for experimental fuel development of MOX fuel in support of the Liquid Metal Fast Breeder Reactor (Fast Flux Test Facility (FFTF)) program. The uranium itself was mainly supplied to Nuclear Energy (NE), via the DOE allotment process, from Defense Programs recycled production channels. As such, the entire PNNL uranium inventory, including DU, is considered in-scope.