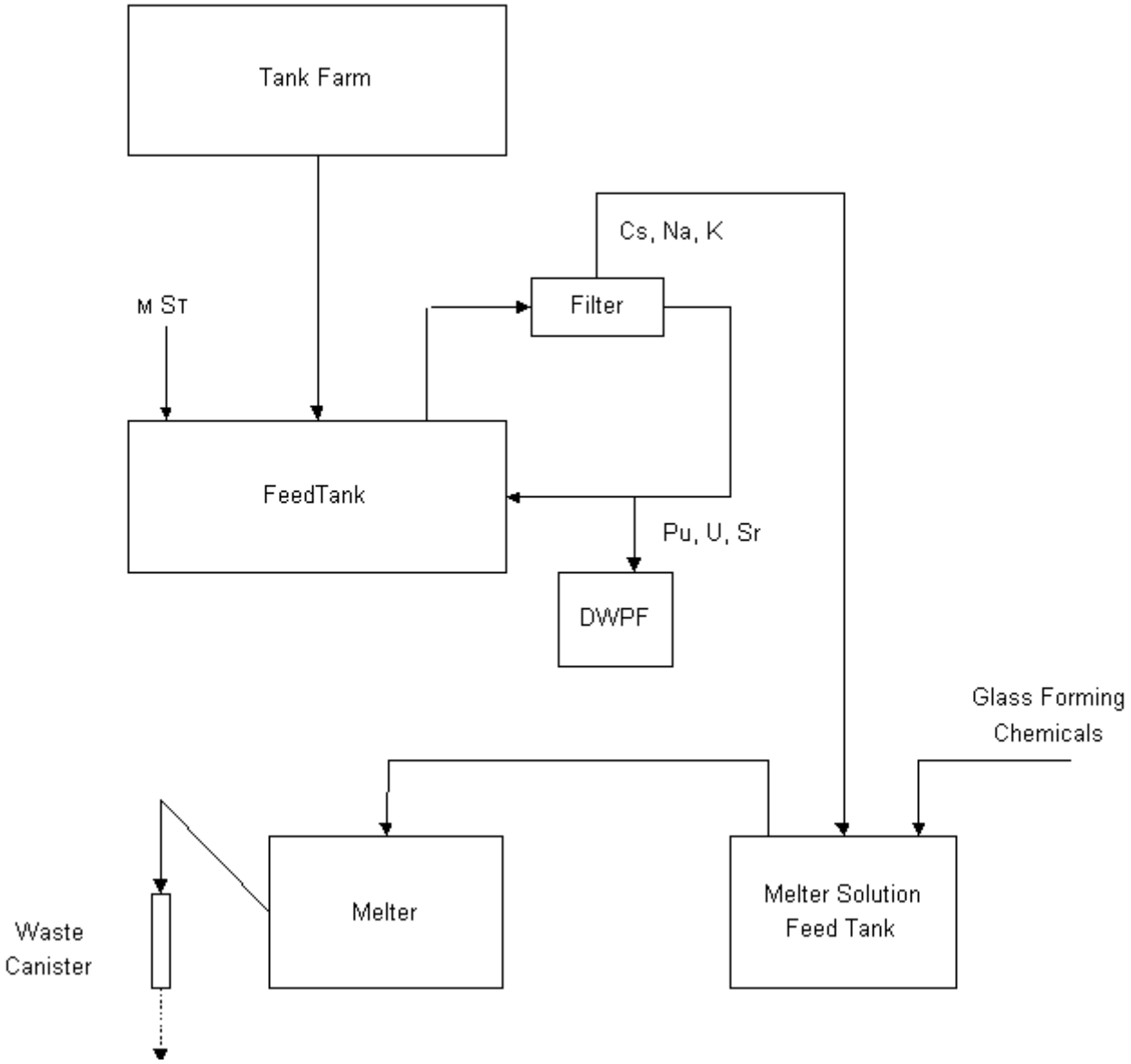
Direct Vitrification

The proposed process will vitrify the entire inventory of salt waste, after pre-treatment to remove U, Pu, and Sr. The essential ideas are (1) the final waste form can be stored on-site (2) the waste form does not need to be as durable as the canistered waste form going to the Federal repository. A new glass formulation would be developed to increase loading at the required leach rate. The glass would be innocuous in about 300 years, so the storage method and waste form would be designed to limit the leaching of the glass for the above period. Removal of decay heat would be a key requirement in the early years of storage.

The salt solution is received into a HLW tank and treated with monosodium titanate to remove soluble uranium, plutonium and strontium. The solids from this step plus residual sludge solids are periodically transferred to the sludge feed stream for DWPF. The salt solution is filtered and the filtrate fed to the cesium vitrification facility. The salt solution is blended with glass forming chemicals and fed to a glass melter. The glass melt is cast into a container which is sealed and transferred to an on-site location for final disposition.

Variations:
1) None

Merits:
1) Minimal changes to DWPF sludge flowsheet
2) No hazardous reagents


Tank Farm
Cs, Na, K
M ST
Filter
FeedTank
Pu, U, Sr
DWPF
Glass Forming
Chemicals
Melter
Melter Solution
Feed Tank
Waste
Canister