Crystalline Silicotitanate (CST) Ion Exchange - New Facility Vitrification

The proposed process would employ the crystalline silicotitanate (CST) resin to remove Cs from the salt solution. There may also be some level of decontamination of Sr, Pu, and U from the salt solution. If Sr, Pu and U are not adequately removed, monosodium titanate (MST) could be added to sorb these radionuclides. The Cs loaded resin would be vitrified into a very highly loaded CST/borosilicate glass (up to 60 wt% CST) in a separate facility thus achieving a very large volume reduction. This glass would be stored on-site until the Cs activity becomes negligible (~300 years). The decontaminated salt solution would go to the Saltstone Facility to be made into a Class A grout after treatment to remove Hg.

The process would include these steps: MST addition to remove Sr, Pu, U. Filtration to remove sludge and MST solids from the salt solution and prevent plugging of the IX columns. These solids would go to the DWPF via the sludge stream. Treatment in a CST IX column(s). The Cs loaded CST would be mixed with frit and fed to a new dedicated vitrification facility. The glass product would be stored in a shielded vault which could ultimately be closed when the Cs activity decayed sufficiently. The melter would require an offgas treatment system. The offgas condensate could be included with the DWPF recycle or go directly to the Tank Farm after caustic addition. The decontaminated salt solution would be transferred to Hg removal (GT73) and then to the Saltstone Facility to produce a Class A grout.

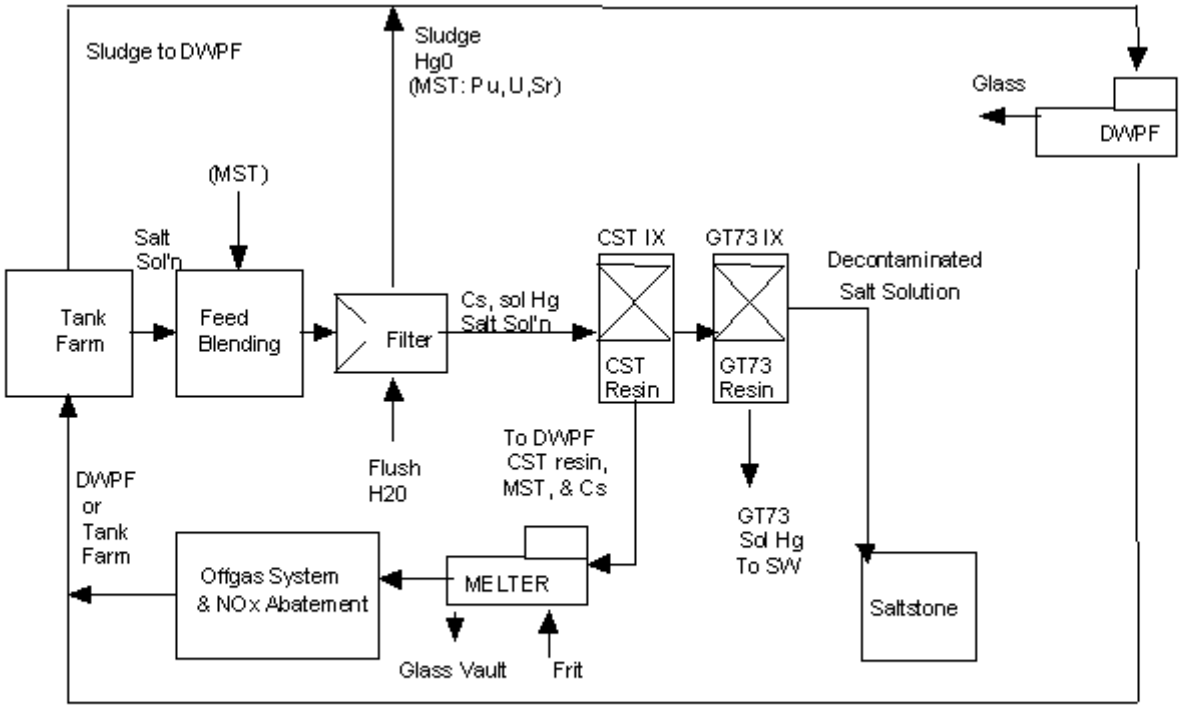
Variations:

1) A series of "batch & stir" CST removal steps (tanks) could be employed instead of the CST IX column(s).
2) The Cs loaded glass could be stored in DWPF type canisters in the GWSB.

Merits:

1) Non-hazardous inorganic reagent
2) High efficiency Cs removal
3) Minimal impact on current DWPF process and waste form

4) Reduced volume of glass based on potassium going to the Saltstone Facility



DWPF Recycle