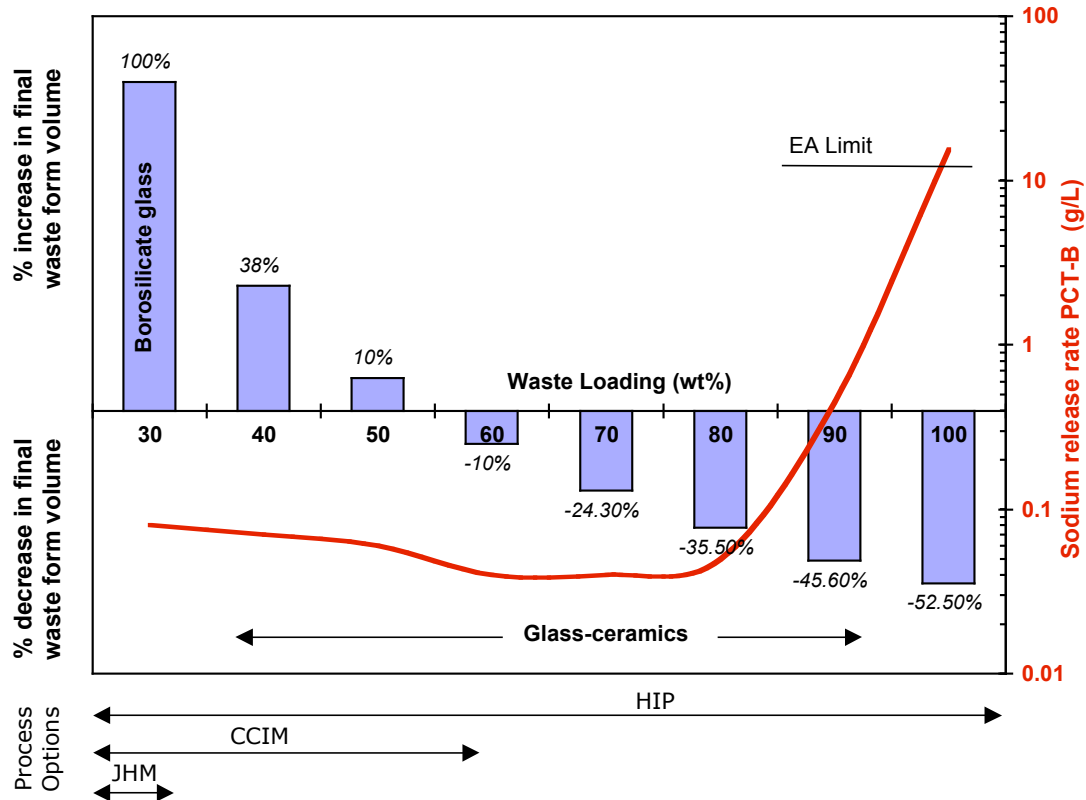


FACT SHEET: Immobilization of the INL HLW Zirconia Calcines

Waste Form Volume & Durability vs Waste Loading for INL HLW Zirconia Calcine



Background

Sixty percent of the HLW calcines currently stored in bin sets at INL may be described as rich in zirconia and calcium fluoride. DOE has not defined the disposition requirements for these HLW calcines.

The graph above shows the relationship between various waste form alternatives including process options as a function of waste loading, final disposal volume (relative to as stored calcine), and chemical durability (PCT-B).

synrocANSTO advantage

If DOE requires immobilization of HLW Zr-calcine to meet EA glass standard...

- HIP process can be used to produce glass-ceramic waste forms with waste loadings in excess of 90 wt% that have chemical durability at least 10 times better than EA glass. This delivers volume reductions in excess of 45% compared to as stored calcine.

If DOE does not require treatment of HLW Zr-calcine to meet EA glass standard...

- HIP process can still be used to consolidate as stored calcine directly with no additives (100% waste loading) delivering volume reductions in excess of 50%.

The flexibility of HIP technology enables a common process line to deliver maximum cost savings independently of disposition path dictated by DOE. This is achievable since the chemical durability of the matrix can be readily tailored to meet the durability requirements, by the addition of only a small amount of additives and using the same process line. Consequently, the HIP process effectively mitigates any legal uncertainty regarding the disposition pathway for the HLW calcines. Maximum cost savings are achievable by delivering maximum volume reductions, which minimizes all associated HLW shipping and disposal costs.

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Contact: bruce.begg@synrocanssto.com

ANSTO, Inc. • 1220 L Street N.W. Suite 100-170 • Washington, DC 20005

Tel: +1 (202) 390 2044 • Web: www.synrocanssto.com