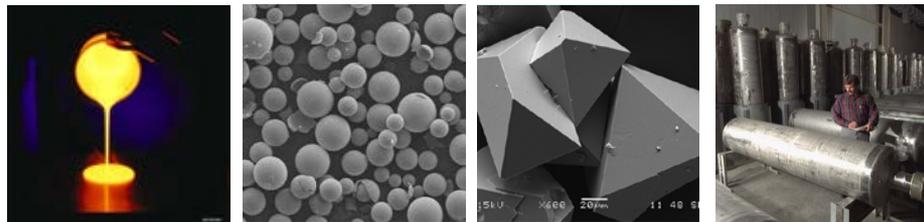


Glass Formulation for DWPF: Current Status, Goals, and Future Challenges

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Increasing Waste Throughput

1) Process Faster → Increase Melt Rate

- More canisters per year
- Reduce production time and mission cost

2) Make Fewer DWPF cans → Increase Waste Loading

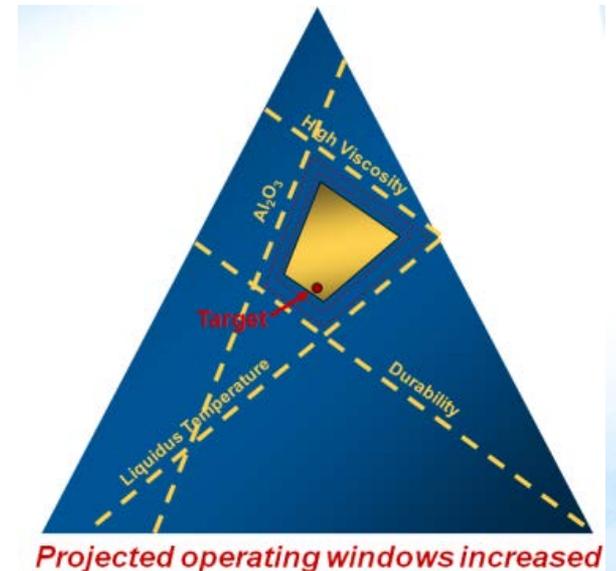
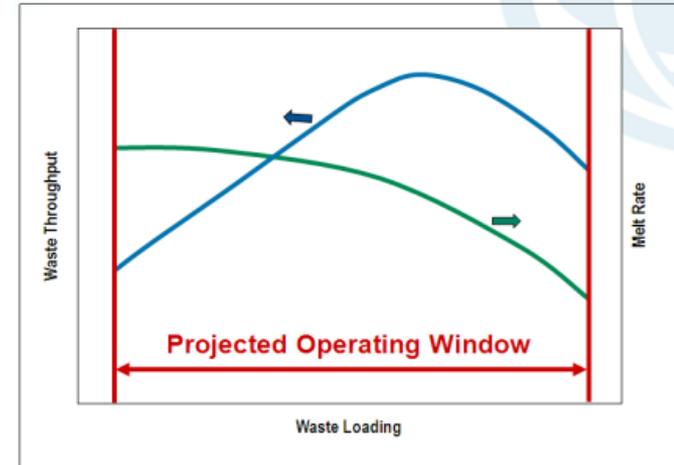
- Less canisters containing more waste
- Reduce production time and mission cost
- Reduce canister storage and disposition cost

Higher waste throughput ultimately reduces the total number of years the HLW system is operated (significant cost avoidance)

Approaches to Improve Waste Throughput

Primary efforts to improve waste loading and/or melt rate in the areas of:

- **Reducing conservatism in process control models**
 - Without compromising process or product performance issues
- **“Shifting” the frit development strategy**
 - “Global” (one frit fits all) concept → “tailor” a frit specifically to each sludge batch
- **Making physical additions to the melter**
 - “Glass pump” followed by implementation of bubblers (ES/VSL)



Historical Perspective

Sludge Batches 1A, 1B, and 2 used Frit 200

- Nominal waste loadings (WL) were ~28%

Implementation of waste throughput approaches resulted in significant increases in WL

- SB2 (Frit 320): nominal 34% WL
- SB3 (Frit 418): nominal 38% WL
- SB4 (Frit 510): nominal 34% WL
 - High waste throughput: SRAT/SME rate limiting
- SB5 (Frit 418): nominal 33% WL
 - Fissile loading limited
- SB6 (Frit 418): nominal 36% WL
- SB7a and SB7b (Frit 418): nominal 36% WL
- SB8 (Frit 803): projected to start processing in May 2013

Future Challenges

- **Development of a single frit that will be robust to:**
 - Significant changes in sludge compositions within a sludge batch assuming flowsheet swings from sludge-only to coupled (salt processing) operations are not dampened
 - Meeting WL expectations or canister production goals with significant compositional shifts for a given sludge batch
- **Updating models to account for higher volume throughput of salt waste processing streams (ARP/MCU and SWPF) and potential alternatives**
- **Supporting development of the High-Level Waste Systems Plan to:**
 - Identify potential technical issues with future processing scenarios
 - Develop blending and washing strategies to optimize processing windows for future sludge batches