

Waste to resource: A small business perspective

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First, a little bit of history...

Me: Lou Britton; a NEO local with a background in materials science/chemistry

My business: Started it in 2011, now has 8 employees in Akron, OH.

Went from SQG to LQG generator status (mid-2014)

What we do: hydromet--provide solutions for your (aqueous) solutions.

A “waste” into a resource?

To execute:

- Must fit regulatory framework
- Must be doable/scalable/reliable
- Must have incentive and a willing team.
- Must have contingency

INNOVATE—these are tough times!

NiCoRe as a case study: what's in it?

Profile via ICP-OES chemical analysis:

- $\text{Ni}^{2+}/\text{Co}^{2+}$ (10-35 g/L)
- Free H^+ (D002)
- Cr^{3+} (1-3 g/L)
- Al^{3+} (1-3 g/L)
- Re(VII) (0.1-0.5 g/L)
- Pt(II) (<0.025 g/L)

Bottom two elements we recover by IX.

Made from:



Is this green liquid a waste? Or is it a resource?

What to do with it?

Recycling via metals reclamation

Option 1: Dispose of as hazardous waste on manifest (most \$ / month, material isn't recycled into new product).

Option 2: IX removal of Pt/Re. Elementary neutralization/equalization, concomitantly eliminating D002 corrosivity hazard and state-regulated Cr^{3+} below regulatory levels. (CAPEX, permitting, downtime, etc.).

Option 3: Find an entity using this material as a raw feedstock and sell it on metal content.

Option 3 – beneficial reuse and reclamation

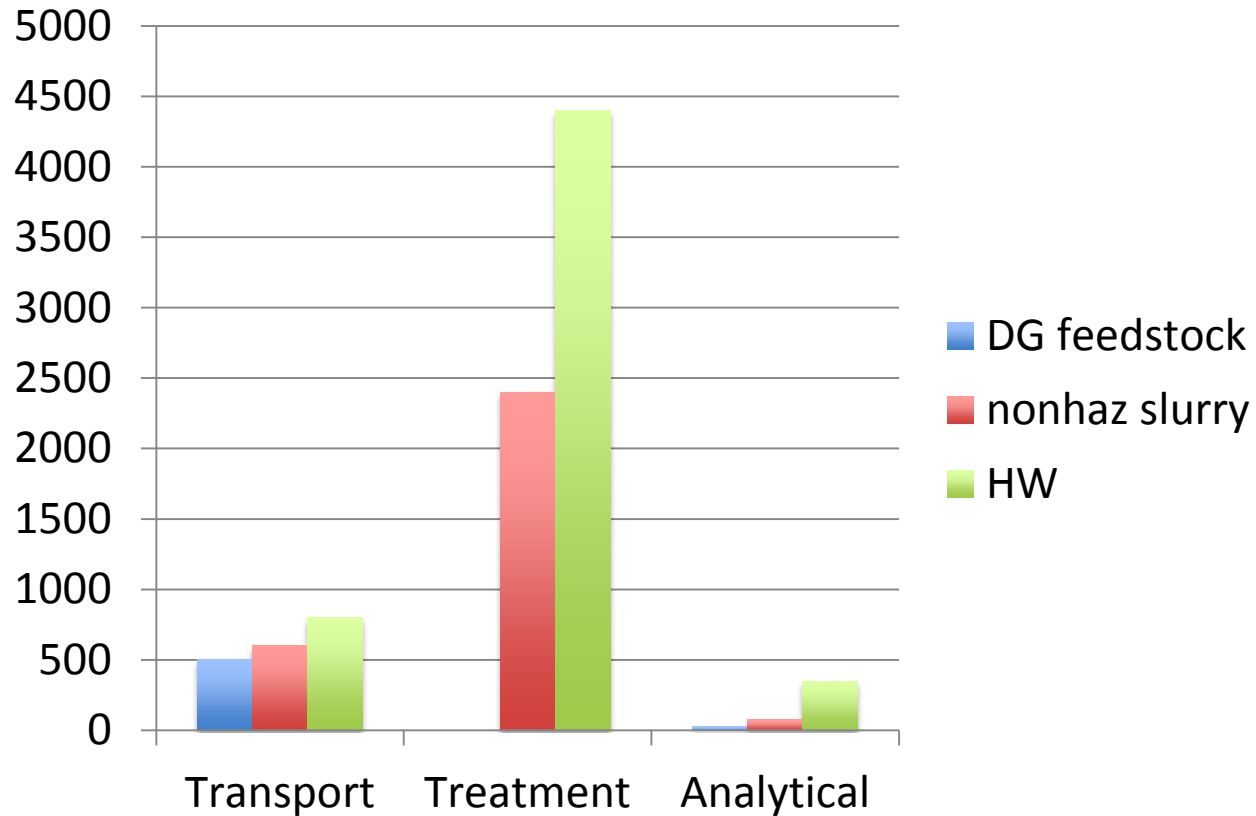
- >> Customer could use it as-is, right into circuit.
- >>> Customer willing to pay for the product such that a net economic benefit may be returned to us.

“One man’s trash is another’s treasure”

Benefits noted:

1. Net economic benefit (immediate)
2. Liability transfer when sold as product
3. Sustainability and responsibility in keeping it from a landfill
4. Lessened man-hour investment
5. Being “zero discharge” and/or being able to reassure customers that their materials’ waste effluent might be reused is a major sales coup.

Cost comparison (40K lb tanker)



Re-use/reduction programs

Reuse—We were able to use solutions no longer effective for one type of alloy and apply them to a less resilient substrate.

Reuse—Able to use permeate from RO system for parts washing to supplement tap.

Reuse—Able to close the loop on certain proprietary processes.

Questions?