LIGAR POLYMERS

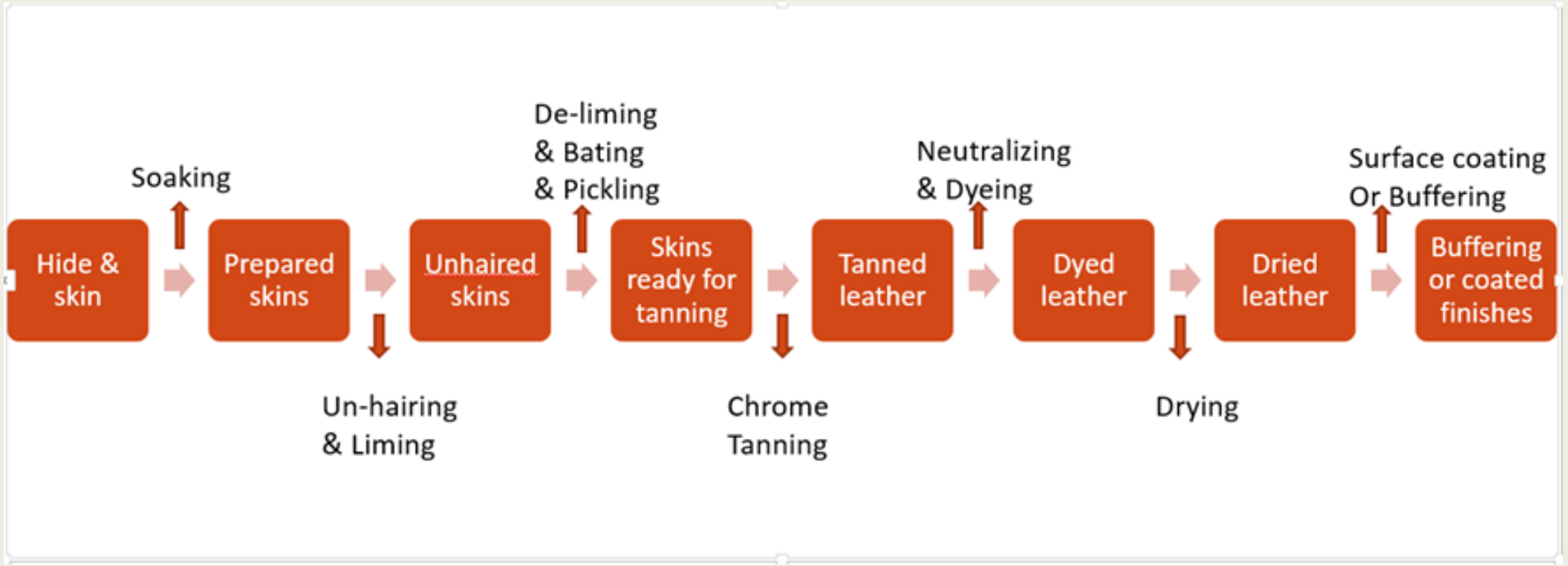
CHROMIUM RECOVERY FROM TANNING LIQUOR

AARON LOW
AARON@LIGARPOLYMERS.COM

Introduction

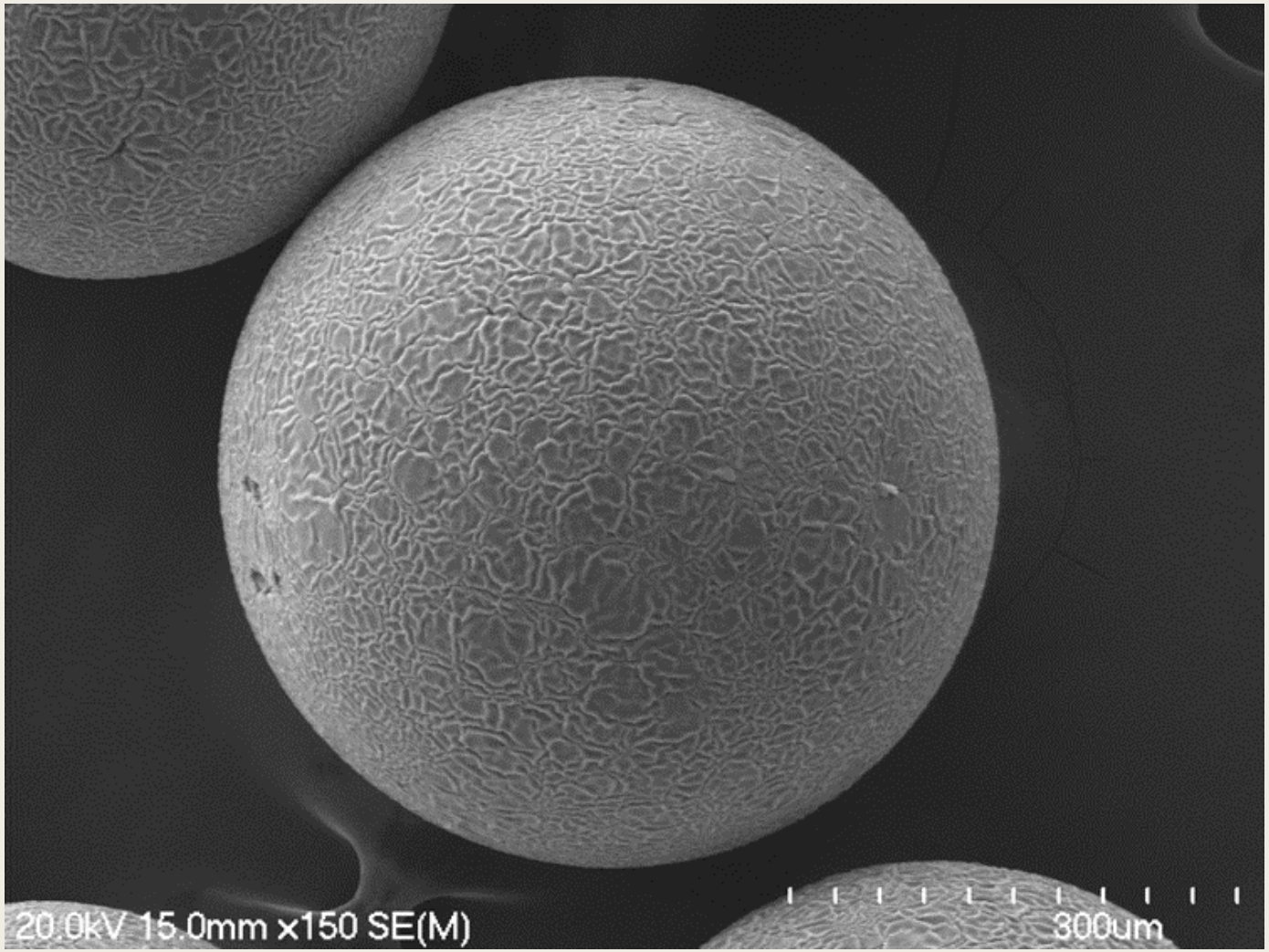
- Chromium in the tanning process
- Why it is important to remove chromium from tannery waste water
- How chromium was recovered using molecularly imprinted polymers
- Potential to reuse recovered chromium
- Economic analysis
- Conclusions

Background Information



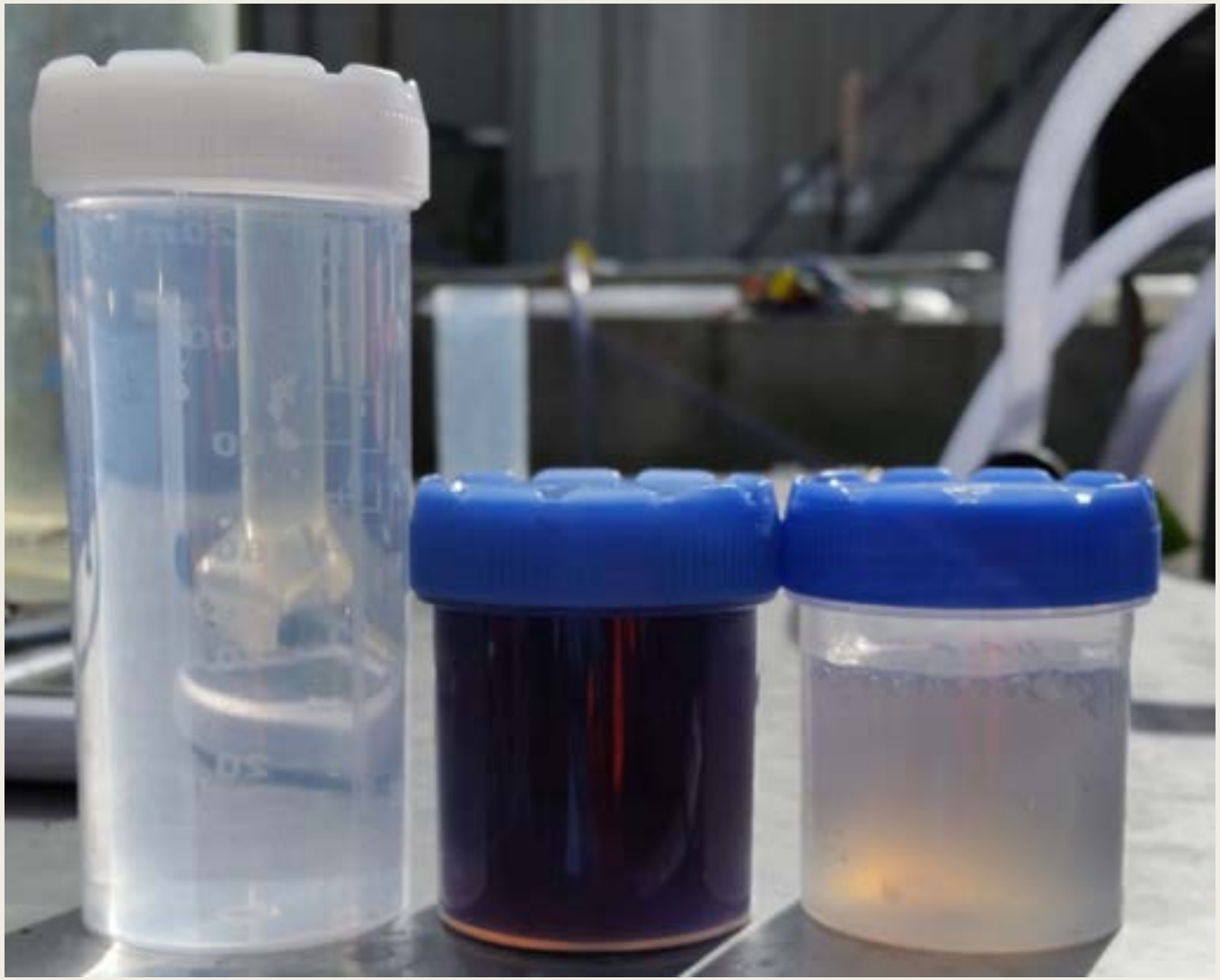
Recovering Chromium Using MIPs

MIP Coated Bead

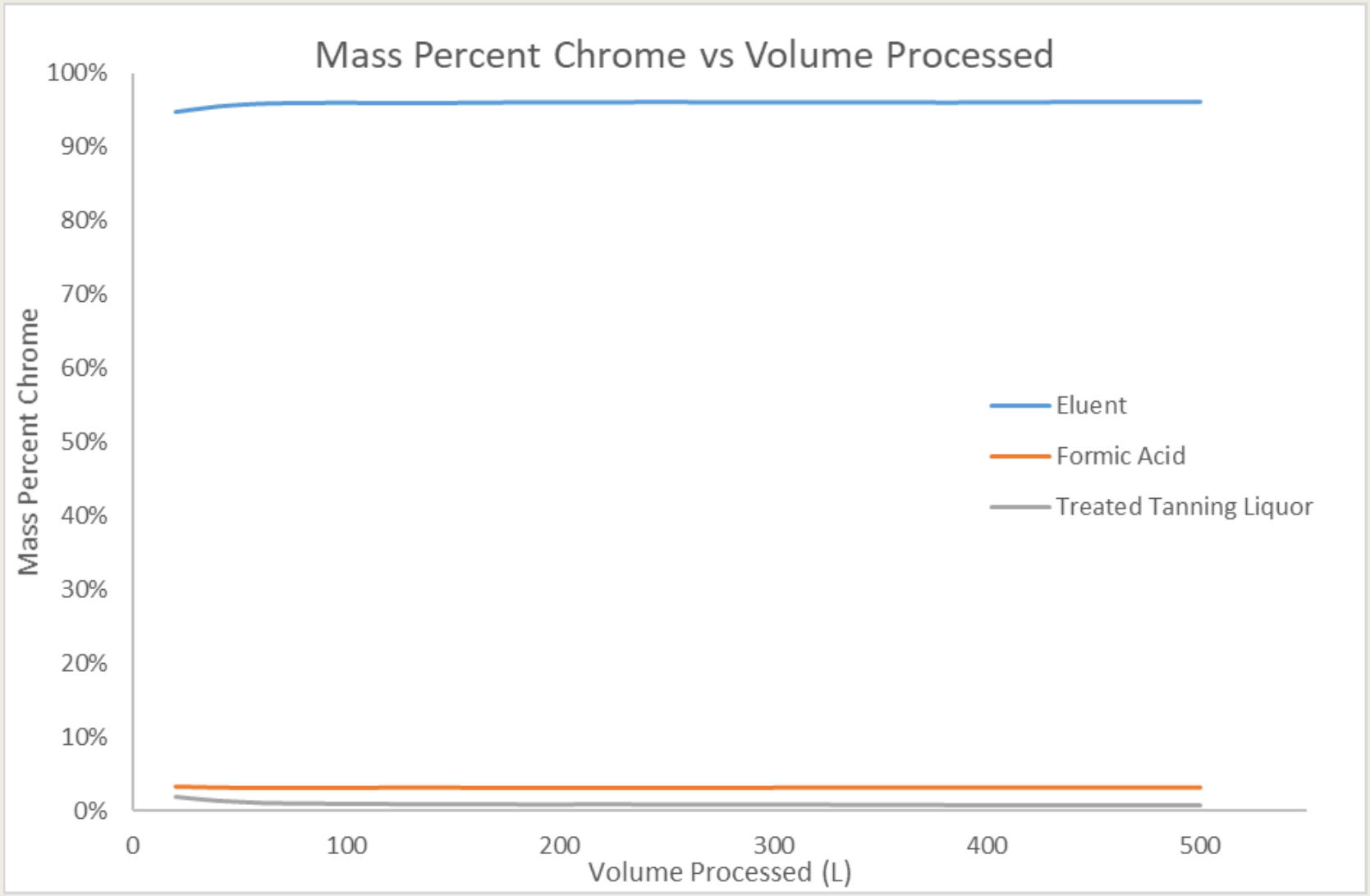


Pilot Trial

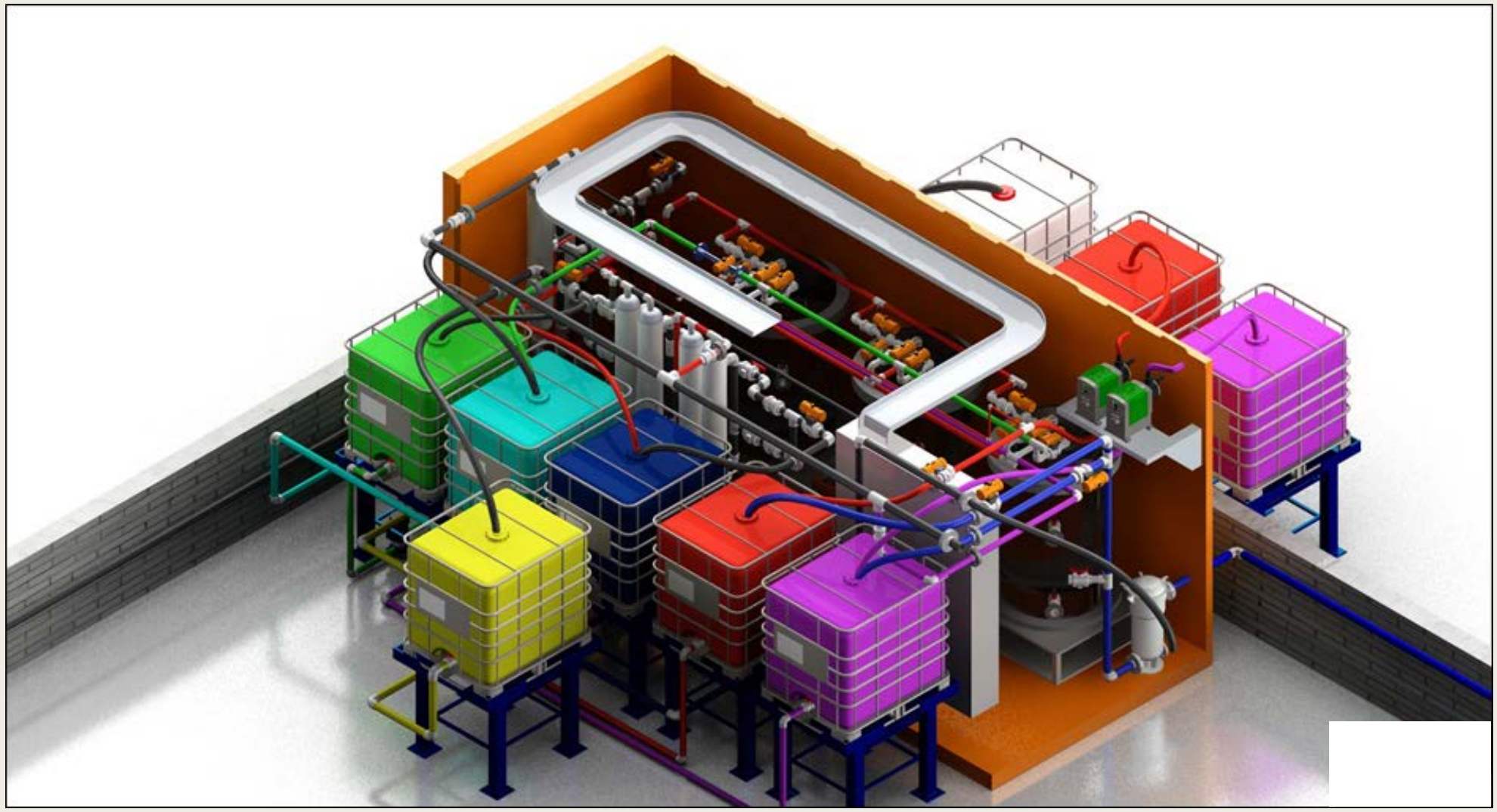
Pilot Trial



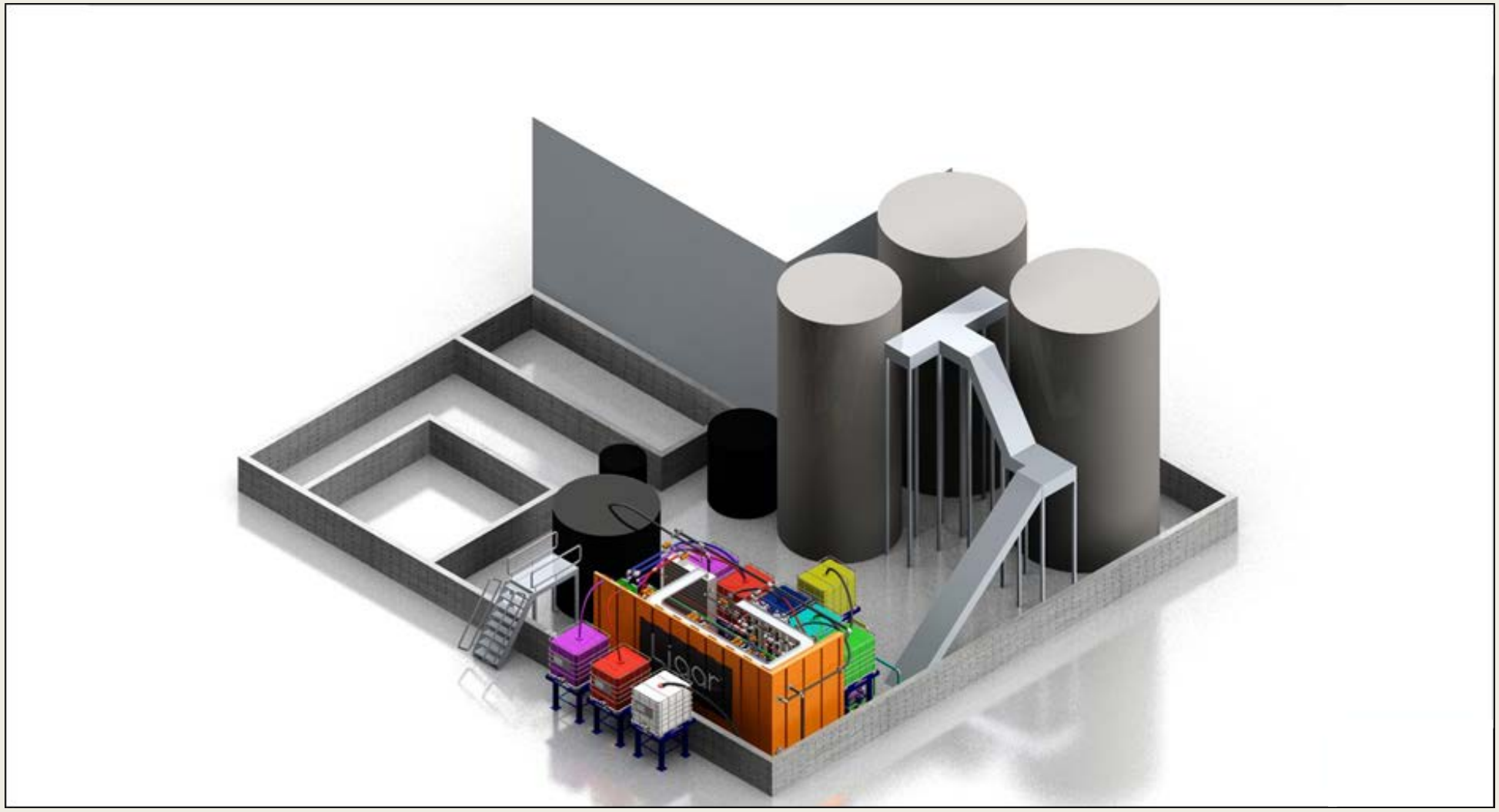
Pilot Trial


Mass Percent Chrome vs Volume Processed
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Mass Percent Chrome
0
100
200
300
400
500
Volume Processed (L)
Eluent
Formic Acid
Treated Tanning Liquor

Plant Design



Plant Design



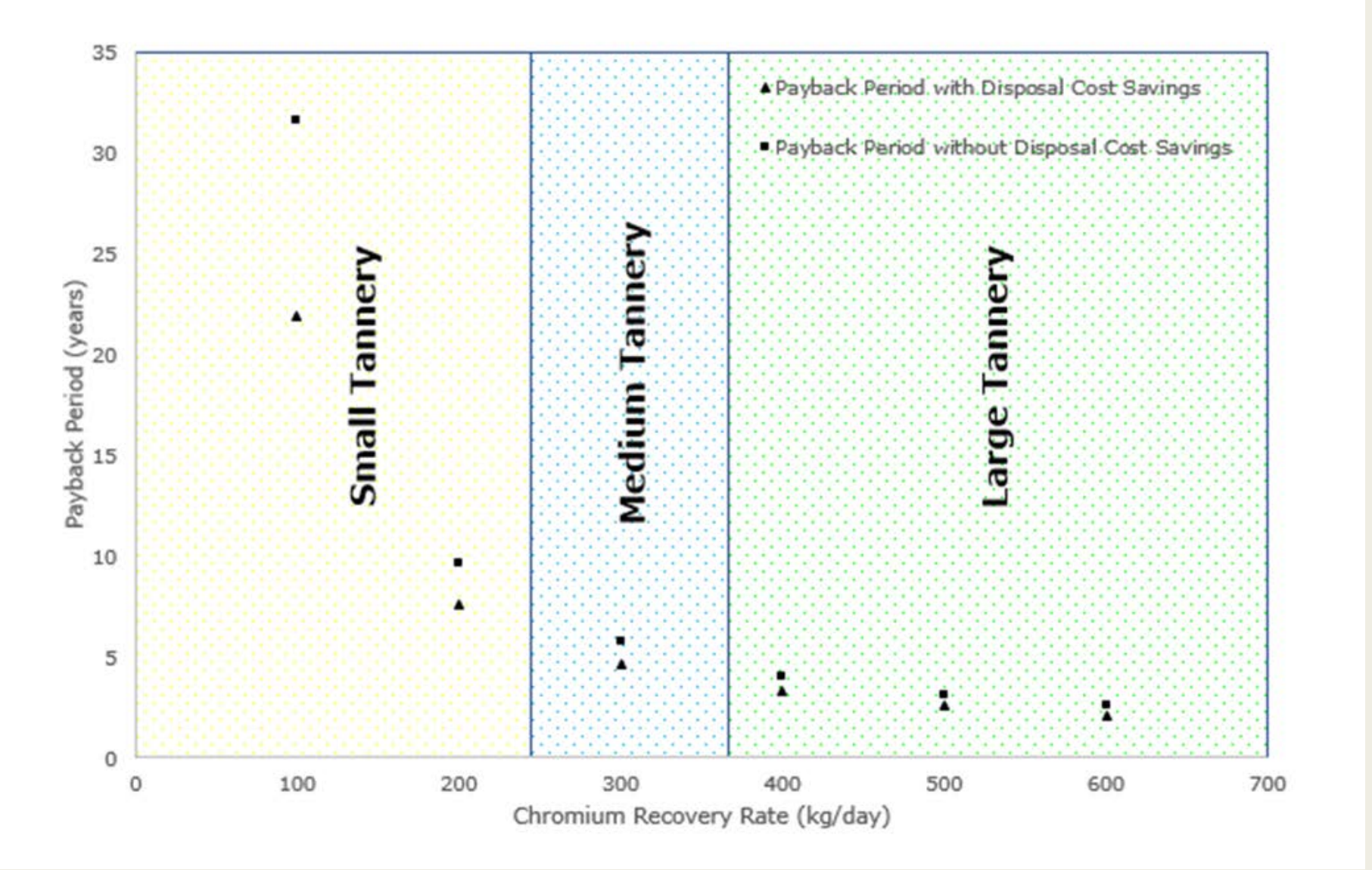
Quality of Hides Tanned with Recovered Chromium

	Acceptable Range	100% Virgin Chrome	80% Virgin Chrome 20% Rec. Chrome	100% Rec. Chrome
Visual Inspection	NA	Acceptable	Acceptable	Acceptable
Shrinkage Temperature (°C)	≥ 100.00	106.00	105.75	93.50
Full Thickness Chrome (% as Cr2O3)	3.50 – 4.00	3.40	4.35	2.55
Grease (%w/w)	1.00 - 1.50	Not Tested	1.40	2.60

Payback Period

Chromium Recovery (kg/day)	100	200	300	400	500	600
Payback with Disposal Cost Savings (years)	21.89	7.61	4.61	3.30	2.57	2.11
Payback without Disposal Cost Savings (years)	31.58	9.68	5.71	4.05	3.14	2.56

Payback Period



Conclusions and Recommendations

- Chromium can be recovered from tanning liquor using MIPs.
- Hides tanned with 100% recovered chromium were visually indistinguishable from hides tanned with virgin chromium. However analysis revealed shrinkage temperature, chromium content and grease content were below acceptable values.
- Hides tanned with 20% recovered chromium combined with 80% virgin chromium were within acceptable values.
- Application of a chromium recovery plant is not economically viable for small tanneries at the current chromium price. It is viable for medium to large tanneries. As the chromium price increases the chromium recovery plant will become more attractive.
- It would be worthwhile completing additional tanning trials with different ratios of recovered chromium to virgin chromium.

Thank You