

AlCircle Interview Questionnaire for Phil Black, Regain Materials

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AlCircle: How do we establish the credibility of aluminium industry in a condition where energy is scarce, metal price is low and cost of production is huge?

Phil: As Michael Braungart says in Cradle to Cradle, “Less bad is not good”. The industry needs to find the equation, probably by Life Cycle Analysis, that proves that making aluminium actually saves more energy and resources over its lifetime than it consumes in production. The Aluminium Stewardship Initiative is heading down this path, providing this credibility in a certification process for responsible producers.

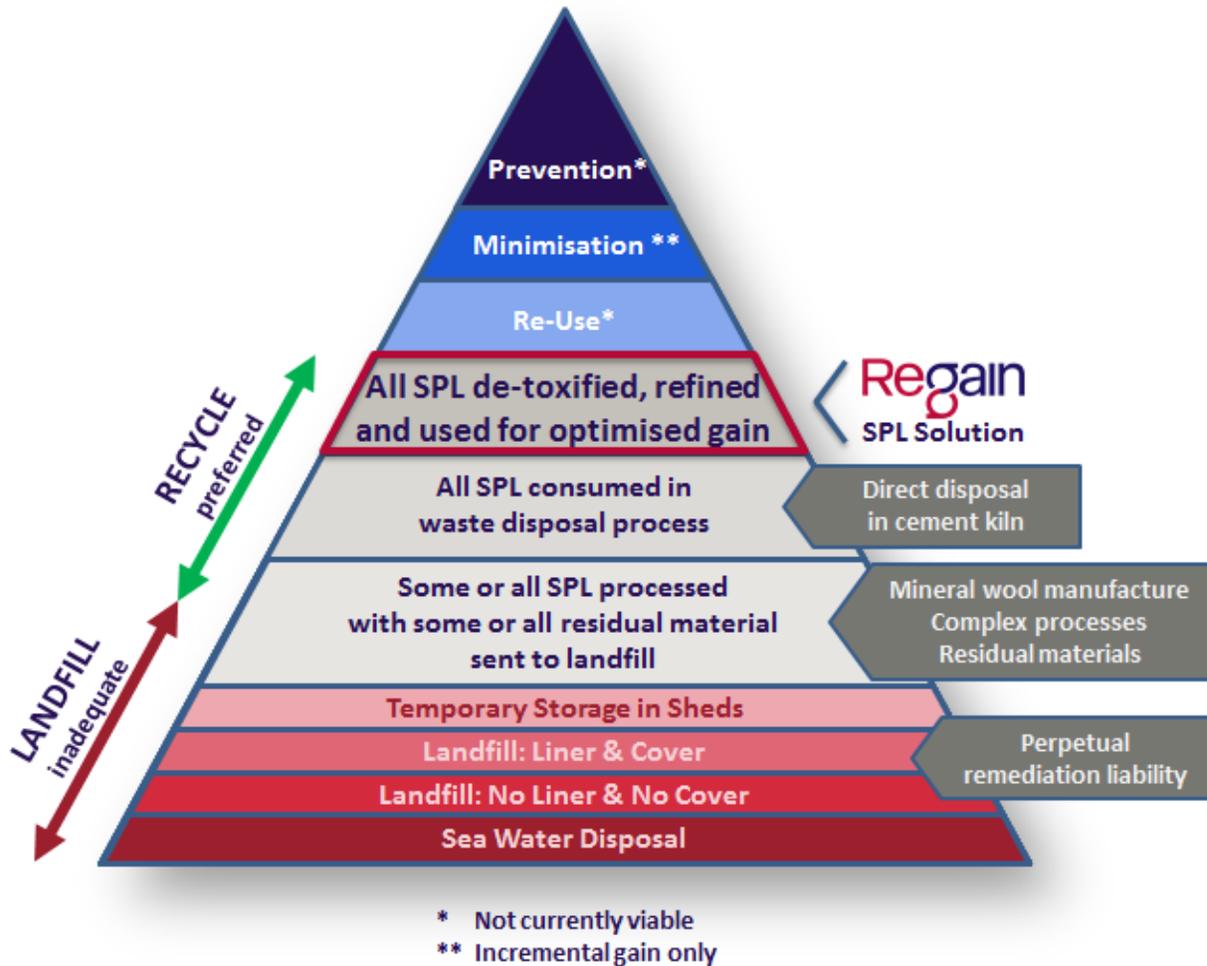
The major issue you raise is the low metal price compared to production costs. This is cyclical, and we have just come off a high pricing period. Unfortunately shareholders’ time horizons have shortened dramatically, so that they don’t recognize that we have been here before; as a result the industry is adopting knee-jerk responses. As a society I believe the resource debate is taking root, so that future investors – our children – are going to recognize consequences of their actions and adjust their time horizons and purchasing decisions accordingly. Perhaps instead of “More - Now!” we will see “Enough Now, Enough Later”. Aluminium is a credible, value-adding metal that fits into that future scenario and will outlast the boom-bust. So the responsible producers will be rewarded in time, but it might require a generational shift to realise this scenario and some smelters built for different times may not survive.

AlCircle: What kind of innovative measures can be taken up to curb the environmental impact of aluminium smelting?

Phil: Good design of scrubbing and potroom ventilation is essential to maintain credibility of the industry in curbing CO₂-equivalent emissions. For new smelters this has become normal design thinking. For older smelters there are retrofit options such as booster systems to increase suction to specific pots during their anode change and countercurrent alumina injection to optimize fluoride adsorption. When I was working in dry scrubbing I designed a flow distributor that made a significant improvement to fluoride capture, just by following the principles of dispersing the alumina across the duct as much as possible when it first hit the gas stream, and some aerodynamics to minimize differential pressure losses. I believe that distributor is still in place today.

Smelters must look at reducing anode butt fuming of gaseous HF by getting the butts offline and into fume recovery systems as soon as possible. Why can’t the boosted pot suction be used for this? Also making anodes in massive batch furnaces is massively inefficient. The future is in using the volatiles in the green anode to heat other anodes – this is the principle behind the Lazar vertical bake furnace. After that we should look at getting anodes rodded and into the pot before they cool down.

Of course I believe that we must eliminate landfill of SPL and other smelter byproducts to move as far up the hierarchy of waste management as possible. While at present we cannot prevent SPL from being produced, or re-use it in new linings, we can minimize the volumes by better design and “design for re-use”. Next on the hierarchy is recycling of all of the SPL for use in other applications – which Regain does.



AlCircle: Tell us something about the Regain Spent Potlining solution and how it can help the Primary Aluminum Industry

Phil: A full SPL solution doesn’t just take the waste and push it somewhere else. At Regain we looked at the SPL situation in the 1990s and thought, “this can’t be right”. There was a quarter century of burying or storing SPL for someone else to worry about, it was just too difficult and there was no money in it. Also the community and regulators were not well-informed, it was a complicated issue. Then smelters in the USA started being called out for their dumping practices when these landfills leached into groundwater - it was a mess.

The key problem was that no-one could isolate the minerals in SPL so that they had commercial value. The Regain solution looks at it from the consumer's side – “what are the valuable components of SPL for us?” We developed equipment that could handle the difficult physical and chemical properties of SPL; we developed the market so there was a viable commercial offtake in place; we made a consistent product that retained the value of the minerals. The best thing is that the energy saved by using our products is greater than the energy consumed by our process. So, proving a net environmental benefit.

The value is not just in the aluminium industry – they already got the value from the lining over six or seven years – but also in the cement industry. They can save up to 10% in production costs. So SPL is never a “waste” to Regain. Progressive smelters, regulators and a resource-conscious society will recognize that and this is where a full SPL solution can help the aluminium industry.

AlCircle: What are the major hazards in putting the spent potlining solutions into application?

Phil: SPL is rightly defined as a hazardous waste because of its cyanide levels and its chemical reaction with moisture to form explosive gases (methane and hydrogen). Any transport and handling of SPL must be undertaken with caution. These hazards are common to both first-cut (carbon) and second-cut (refractory) SPL. Processing both first –cut and second-cut SPL on site at the smelter to detoxify (remove cyanide) and eliminate the explosive gas release is the safest option for smelters and the community.

AlCircle: Do you think it is commercially viable to recycle spent potlining and put it back to industrial use?

Phil: Many smelters have been putting off SPL treatment for 30 years in the hope that this stuff will become valuable enough for someone to pay them for it. This is just wishful thinking. Even by optimizing the value in the mineral components as in Regain's SPL solution, there is just not enough commercial value in SPL. But we have seen cost reductions accruing from the technology learning curve, continuous improvement, economies of scale and revenues from sale of refined products. This means that the costs to a smelter of recycling SPL are now less than the liabilities associated with landfilling, when you take into account the long term contaminating lifespan of SPL and the ongoing landfill remediation requirements.

Of the few commercially viable SPL recycling operations, some can only take part of the SPL and most of them have a limited end-use for the products, or end up with a residue at the end which has to be landfilled anyway. The cement industry can take SPL directly but it is a highly variable hazardous waste with strict transport protocols, so only a solution with a nearby cement plant will work. Even then there are process upsets and safety issues. Where there is no local capable cement plant, the Regain SPL solution can ensure no hazardous waste is transported out of the smelter, any value is optimized and recovered, and 100% of the SPL is consumed in a chemically irreversible process.

But making SPL recycling purely a commercial issue misses the key value proposition. By transforming SPL so that its valuable components can be optimized in another industry, the net energy and environmental effects are positive. It is not “waste burning” by one industry, it is resource optimization by many industry “species” that mimics the way wastes are treated in natural ecosystems. I believe this Industrial Ecology approach is the way forward for all industry.

Biography: Phil Black

Phil has spent the last 22 years involved in the aluminium industry with experience in R&D, smelter development and operations, as well as metal sales and marketing and consulting engineering. He has worked in cast house, refractories, potrooms, carbon bake, dry scrubbing, anode delivery, pot delining, smelter construction, smelter technical and financial assessment and environmental projects at 16 smelters in 12 countries. He now works for Regain Services Pty Ltd as Vice President of Aluminium Industry Development. Phil’s role is to seek new sources of spent potlining to meet the growing demand for Regain’s mineralizing products used in the manufacture of cement clinker.

Phil lives in Melbourne, Australia with his musician wife and three sons.

