



Aqua Metals electrolyzer

technology tales

AQUA METALS

LEAD REINVENTED



Lead Reinvented.

**Innovative World
Leader in Reno**

Steve Cotton lives in

Arrowcreek and is the president and CEO of Aqua Metals (Nasdaq: AQMS), which has pioneered a proprietary process for recycling lead-acid batteries that is environmentally friendly by using water instead of fire and begets ultrapure metal for next-generation batteries. I thought it would be interesting for the residents to learn about this Nevada business and technology, which has survived a trial by fire and the pandemic.

Steve, how about some background on the company and your role in its development?

The company was founded in late 2014 in Oakland, CA. I had sold Canara in 2012, which provided battery systems and monitoring for many of the large server farms in data centers around the globe. The batteries were lead-acid, so I was very familiar with the issues associated with battery manufacturing and smelting for recycling. Aqua Metals had developed the only clean recycling technology for lead-acid batteries. I knew the founders and had considered being an independent director as the plan was to IPO.

I was really interested in commercializing the technology, so I invested in the company and became the chief commercial officer in Jan. 2015, and we had the IPO in June. I then developed a relationship with Interstate Batteries where they would supply batteries for recycling (feedstock) and with Johnson Controls Power Systems (JCI), now called Clarios as a first-mover partner. Both companies invested in the company, and Interstate contracted to provide the feedstock, while Clarios contracted to buy the recycled lead and had the rights to use the technology in their own facilities.



Electrolyzer output, ultrapure lead



Traditional smelting furnace

Funded by the IPO proceeds plus a USDA-backed loan, we broke ground on our 135,000 sq. ft. aqua-refinery in Tahoe Reno Industrial Park in August 2015 and had the facility outfitted and commissioned by June 2016.

Why is this technology of interest to commercial partners and recycling centers?

Lead is the most recycled commodity on Earth. However, standard lead recycling is very environmentally “challenging,” as it is done in smelters with high temperatures, toxic gasses, and emissions that are causing facilities to be shuttered or moved offshore. We offer the only clean battery recycling in the world and lead is recycled at room temperature using biodegradable organic acids and water, we call it aqua-refining. The lead-acid battery market is growing (\$47B in 2015 to \$87B in 2025) of which our partner Clarios enjoys a ~40% market share; 80+% of the batteries are made from recycled lead with the remaining 20% coming from mines to fuel the growth in demand.

How did the start-up of production go (usually, there are some hiccups)?

By 2017, I felt that the commercial progress we had made had outpaced the manufacturing. There were some issues primarily with throughput and process flow. I also had a “Silicon Valley” mentality that

didn’t always mesh well (haha) with the founders. So, I decided to leave in June of 2017.

In 2018, an investor/activist named Dave Kanen of Kanen Wealth Management believed we should change our strategy from being a company operating large production facilities to a “capital-light” model that embraced licensing and earned a return based upon helping existing recycling and manufacturing companies employ our technology. There were other funds and high-net-worth investors that agreed, and ultimately the founding CEO exited, a blended board of old and new members was established, and I was brought back to be the president and CEO in May 2018, joined by Shariq Yosufzai, a high-level executive from Chevron as a new independent chairman of the board.

Wow, how did things progress from there?

We got the facility running at 25% of capacity, were certified as a North America lead supplier to Clarios, converted to operating 24 hours/7 days, and produced and sold for a premium 35,000 aqua-refined ingots at 63 pounds apiece that were 99.996% pure through Sept. of 2019. My family and I moved to ArrowCreek to be closer to the company that I had also moved from California to Nevada. We were prepared to sell the facility, as we had demonstrated a production scale capability using our technology. We shut down the operation so that we could have all the contractors come in to expand our production facility for 100% capacity prior to a sale without all the restrictions of being in a working plant. In late November while this work was being done, there was a devastating fire in the 25,000 sq. ft. aqua-refining area that had such intense heat that it

melted wiring and destroyed 96 electrolyzers, virtually all our high-value assets. Fortunately, there were no injuries. We have a firewall that protected the rest of the facility, but it was a terrible blow. We went from 130 employees to 20.

Trial by fire for sure -- now, what?



We decided not to rebuild but rather to accelerate the sale of the land and building and accelerate the pursuit of the equipment supply, licensing, and partner model. We collected \$23M of up to \$50M in insurance proceeds, paid off the \$10M loan to be debt-free, and completed the customer-ready aqua-refining and electrolyzer product, which produces twice as much material as the original version. We have interest around the world, and in China and India, for example, with the clear skies they hadn’t experienced in 40+ years, there is a new push to replace old “dirty” manufacturing facilities with new environmentally friendly technologies, and we are a great fit. Also, elsewhere in the world, there is a strong push toward sustainable technologies and practices, and we believe the combination of growing demand for batteries driving capacity in production coupled with tightening environmental regulations is the perfect backdrop for aqua-refining.

We have patents granted in countries around the world, and there are a couple of models. If you have an existing facility, you could add aqua-refining to increase production without increasing emissions. Another option is to keep the output the same but reduce emissions by trading old capacity for new. Or, in a new build, everything is clean. We first do an engineering package with the client to determine the equipment and design, just like an architect might do on your home. Then, we will assist in the installation and ramp to production. Finally, we aim to have a long-term relationship through the royalties generated on the volume produced and of course follow on equipment and service sales. We plan to continue to engineer, assemble and support global deployments from right here in Reno.

Our website has more detail, and this short link is to a video on the site <http://bit.ly/AQMSVideo>, which summarizes everything in two minutes. I’d be happy to talk with people in the neighborhood who are interested in our technology or introducing us to potential partners around the U.S and the world.

Thanks, Steve. Congratulations on bringing innovative technologies to Northern Nevada.


Spring Fresh
CLEANING SERVICE
HOME and OFFICE
359.5534

-  Weekly, Bi-weekly, 3-Week & 4-Week Service
-  One-Time or On-Call Service
-  Licensed, Bonded & Insured

775-359-5534

Serving the Reno/Sparks area since 1997

info@springfreshclean.net | www.springfreshclean.net



***There's clean Then there's
Spring Fresh Clean!***

**\$40 off your initial visit
when you mention this ad**

Min. 2 hour visit - 2 person team