

Q&A with Larry W. Reaugh, President and CEO of American Manganese Inc. the First Company to successfully develop a Metallurgical Process for Economically Treating Low-Grade Manganese Deposits for Recovery and Recycling 100% of the Cathode Metals from Spent Lithium Ion Batteries used in Electric Vehicles



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CEOCFO: *Mr. Reaugh, you have 53 years' experience in the mining industry and have raised more than \$350 million for mining exploration and development. What attracted you to American Manganese?*

Mr. Reaugh: For most of my companies I have been founder, President & C.E.O. American Manganese Inc. was a company that I took over in 1998, but it was not because of the assets; it was a company that I could put products and assets into.

CEOCFO: *Would you tell us about your focus on recycling lithium ion for electric vehicle batteries?*

Mr. Reaugh: This is an interesting route that we have followed. There was a need for a process for treating very low grade deposits of manganese, which the US has in abundance, so we successfully created a metallurgical process that was developed and patented by the company. Research company Kemetco Research Inc. recognized that the process that we patented for treating low-grade deposits could be adapted with some changes into recovery and recycling the cathode metals from spent lithium ion batteries.

CEOCFO: *Would you tell us about the market picture for the electric vehicles, which is creating the great need for the products to produce the batteries?*

Mr. Reaugh: Happily for us the ground is shifting all the time on the vehicle aspect. There are more companies getting involved in building electric vehicles, many of which have nothing to do with the automobile industry. It is a very popular theme and a much-needed trend going forward that is only going to increase our business because every one of them needs a lithium ion battery which will eventually end up in our

recycling yard. Therefore, we are very excited about the potential growth. We are seeing numbers out there that are staggering. However, most important for us is that recycling is a big part of the battery chain and you cannot say that you are cradle to grave environmentally conscious EV company unless you do something with the recycling of the cathode metals in a manner that is green and safe. Furthermore, we reuse water that goes back into the system. When we do our closed circuit hydrometallurgical testing nothing goes back into the environment.

CEOCFO: *So you actually use all the material?*

Mr. Reaugh: Yes, the simple part is just tearing off the skeleton and the shell and getting down to the cells. The aluminum skins, copper harness, stainless steel and plastics all can be recycled by companies that are already equipped to do so. We can ship it off to recyclers and there is no hazardous waste involved. We get down to the battery cells and that is where we use an automated process that will allow us to strip off the outer shell, pull out the foils and put them into a solution.

CEOCFO: *Is recycling a competitive market?*

Mr. Reaugh: Well there are a lot of people trying to break into it and we are the most advanced. Intensive research by both Kemetco Research Inc. and ourselves reveals nobody else has advanced to the stage where we are. We have been very transparent about what we have done. We have gotten 100% recovery of all metals including lithium; nobody has been able to reach those benchmarks. The cathode metal that we recycled through our hydrometallurgical system on a bench scale basis has recovered 100% of the powders and we have made rechargeable batteries out of those. In addition, they meet all of the standards, so the powders could go right back to the battery manufacturer.

CEOCFO: *Are you going to be doing this globally or in the US?*

Mr. Reaugh: Worldwide. We applied for a US patent on November 9, 2017. We have just completed the research. This has gone from an idea to a proof of concept and we have actually made batteries in a year and a half, which is a very short time. Some companies have been working on this for seven or eight years.

CEOCFO: *Would you tell us about Kemetco Research Inc. and your relationship with them?*

Mr. Reaugh: Kemetco Research has some very brilliant scientists involved. Norm Chow the CEO is the smartest guy I have ever met. Kemetco is a company that he started by taking over another research firm called BC Research, which had been around for sixty years. It is a well-known research company and the second largest in Canada. Norm and his crew researched and developed a process for us to take very low-grade ores of manganese and successfully developed the system that would allow us to produce at competitive rates around the world. The US is totally dependent on outside sources for manganese and they should have a source internally, so they could benefit from our work. In addition, Kemetco's clients are some of the largest mining companies, large battery companies and chemicals companies, and they have scientists on the staff who can build batteries. They are a one-stop-shop, but the greatest thing is they do have a very big background in hydrometallurgy, and that is what helped us move ahead with our recycling process.

CEOCFO: *Dr. Shailesh Upreti, an advisory board member of the Company, is leading an initiative to establish a lithium-ion battery*

“giga-factory” in New York. Would you tell us about that and the ultimate objective?

Mr. Reaugh: The ultimate objective is they want to build up to a 15 kilowatt “giga-factory” in New York, and there are also plans for “giga-factories” all over the world. However, it is a big feather in American Manganese cap that Dr. Shailesh is a member of our advisory committee and heads up a NY Gigafactory. He has his own battery manufacturing company. He has received an award in New York of \$500 thousand which is given out once a year. His background is invaluable to the company and we are going to start utilizing that value in the near future.

CEOCFO: You have properties in Arizona and British Columbia. What do you like about these areas? What is the discovery and recovery history in the areas you are in?

Mr. Reaugh: The property in Arizona is a low-grade manganese deposit 2%-3% in the Artillery Peak area which is probably the biggest manganese district in the US. It is the sort of material that you would be driving over or walking over when you are mining in South Africa or Australia, with grades of 40% to 50%. You got all this material and it covers a large area and the total area can amount to billions of pounds manganese. We have identified resources in those areas and we have patented a process for getting the manganese at a competitive cost to China, which is saying something. Unfortunately, the EMM (Electrolytic Manganese Metal), and the EMD (Electrolytic Manganese Dioxide) or CMD (Chemical Manganese Dioxide), prices are at a low level. We have not recently advanced on that project yet. Other than that, it is a great resource and the key to the whole thing is our process. The Rocher Debole, B.C. project, has high grade copper-gold, cobalt, which has been mined in the past. I am happy to announce that we have recently taken on a joint venture partner that will spend \$2 million over four years to earn a 60% interest.

CEOCFO: American Manganese is involved with exploration, production, recycling and some related technology. What is the strategy going forward and why should people looking at American Manganese believe that you have the experience and ability to implement such a very large scale plan?

Mr. Reaugh: We certainly have an ambitious plan. We have had some companies that I was the CEO of in the past which were billion-dollar projects but that was in mining. In recycling we are learning things as we move along. We have to bring that expertise in from the outside to help us out. If you look at the track records of our companies that had big ambitious plans in the past, we took companies that had a million-dollar market cap up to as high as over \$300 million and in a couple of cases from about \$1 million to around \$70 to \$80 million. The mining industry is really dependent on the price of commodities. If you get caught in a down cycle, then things go wrong for you. What is in your control is the engineering and scientific work. We do not have that so much in recycling, as cobalt can go back to \$10 and still be very profitable. Cobalt is hanging around \$30 a pound, so that is super. If you look at the metals that we are involved with, the lithium cobalt battery itself has a \$6,000 value in the battery weighing 1,000 lbs. and on the lower end of the scale, lithium cobalt aluminum has a \$1,700 value. Which is still rich material for us to recycle.

CEOCFO: Going forward will you continue to be in both fields, with the mining and the recycling?

Mr. Reaugh: Exploration and development is a field that I have been in for years. I was actually the president and CEO of an operating mining company that made a discovery of a significant deposit and went into production. However, the recycling area is probably the nearest term cash flow project that we have. Mining depends on various things before it can get going. First of all you have to get permits, find the ore body, and then you have to show that you can get it out metallurgically. Then you have to design a plant and raise a lot of capital. It is capital intensive. We do not have anything definite on the horizon except for the manganese project that could be reactivated at any time, because we think we can process EMD even today. We are focusing where the most benefit is to the company and its shareholder, and that is getting the recycling process, which has much lower capital costs into the commercial stage.

CEOCFO: *What are you doing to get the word out about your efforts? Are you attending conferences? You have a website where you list your releases; are you keeping up with social media and blogs to enable people to follow you and your efforts?*

Mr. Reaugh: I have about three or four social media outlets that I use on a constant basis. I have attended six or seven conferences in the last year and three of those we were invited to present at. That is a big feather in our cap, one of which was the NAATBATT International Workshop on Advanced Battery Recycling, which is an association out of Illinois that has members from car companies, battery manufacturers and recycling companies. They asked us to present our process, which was in the very early stages, so Kemetco sent them our process for a peer review. We had peer reviewed presentations at the Cobalt Conference in Morocco and recently the 22nd International Congress for Battery Recycling ICBR September 20-22, 2017 in Lisbon, Portugal. This is a big endorsement for a junior company like AMI, as their members are all large companies. We are getting the word out. In addition, we attended some investor conferences and a benchmark conference in Newport California recently. We are already booked to attend a conference in January or February right here in BC. Moving ahead, we will pick and choose which conferences to attend because it is time consuming and expensive. I do a lot of podcasts, mostly once a week on a Friday; try to keep everybody up to date in laymen's language. They seem to be a big hit with our shareholders.

CEOCFO: *Where are you with funding? Are you seeking investors or partners to continue to grow you company?*

Mr. Reaugh: We are always looking for a big partner. We are always looking for funding. We talked to some household names out there but nobody has stepped up to the plate. The perception is that recycling is down the road and the reality is it is actually near-term. In fact, we could have a recycling plant going now which would be very profitable especially in what we call scraps. Scraps are the material that is rejected in a battery run. When you do a battery run, the cathode material is put on aluminum foil and then they punch out a bunch of strips and build batteries. When they find something wrong with them, they will reject that entire run, which could be several tons. We are looking at this opportunity to start immediately because we do not have to disassemble.

CEOCFO: *Who takes care of the logistics?*

Mr. Reaugh: The logistics will be something we are working on down the road. This is where guys like Dr. Shailesh Upreti come in. He already has a battery company that operates and he is going to be heading up the

“giga-factory” in New York. It is a different area and we will have to bring in some special people.

CEOCFO: *In closing, what sets you apart from other companies in your industry and what should your readers in the business and investment communities remember most about American Manganese?*

Mr. Reaugh: What sets us apart is that most of our competitors in recycling end up burning the batteries, getting 40% to 70% of the cobalt back and the rest of it goes into slag, which is not usable; that is the lithium, nickel, cobalt, aluminum, manganese, which all end up in the slag. That is not a solution, as it also releases a great deal of CO2 during the smelting process. Our process is closed loop, it reuses water, and nothing goes back into the environment. Our footprint is small.



AMERICAN MANGANESE INC.

*A Critical Metal Company Focused on
Recycling Lithium Ion Electric Vehicle Batteries*

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