

Grantee with a Midas touch speaks at NIEHS

By Eddy Ball

As his company develops equipment for extracting metals from toxic acid rock drainage (ARD), with the potential for turning hazardous waste water into valuable metals like copper and zinc or useful compounds such as iron sulfate, NIEHS grantee Patrick James, Ph.D., has taken to heart the environmental concept of sustainability.

As James told his audience during a talk at NIEHS March 9, “Our paradigm is to treat ARD as a resource, not a waste.” If the equipment ultimately performs as expected — and early results are very promising — James’ company, Blue Planet Strategies, LLC, (BPS) could become instrumental in cleanup efforts at orphaned legacy mines, extend the profitable life of mines in the U.S., and possibly make James and his partners wealthy men.

The host of James’ talk was NIEHS Superfund Research Program (SRP) Health Scientist Administrator Heather Henry, Ph.D. Most of the people in James’ audience were NIEHS grant administrators managing opportunities with the NIH Small Business Innovation Research (SBIR)/Small Business Technology Transfer (SBTT) program. Funded by a set-aside of 2.6 percent of an agency’s extramural budget, the program fosters research and development that further the agency’s mission and have a potential for commercialization.

SBIR funds start up

SBIR funding would help get the prototype off the ground, they reasoned, but they would still need private sector demand to fully develop extraction potential for net revenue generation. “If it’s not economically viable,” James explained. “it’s not going to get out the door.” So Blue Planet Strategies set about enhancing a proprietary method for extraction, using a single-electrode, two-step electrowinning/electroplating procedure that would cost less to operate than the value of materials (metals and metallic salts) it reclaimed from wastewater.

Because of regulatory and legal concerns, Blue Planet decided to use samples from operating mines that were similar in composition to waste water at the Summitville Superfund site. That approach would simultaneously demonstrate both the procedure’s potential for toxic metal remediation and its value for the private sector.

The company’s equipment was originally developed around copper extraction. Recent upgrades have greatly expanded its range of utility and initial tests on ARD targeted iron sulfate recovery because iron is a common ARD contaminant present in large amounts but is not of sufficient value to warrant recovery of the metal, James said. In initial efforts the cost of production, at \$350 per ton, and market value of the extracted mineral, in the form of ferrous sulfate, at \$700 per ton, demonstrated the high potential for profitability. Ferrous sulfate is a high-value product widely used in a variety of number of industrial processes, including textile manufacturing, water treatment, printing, and agriculture.

James said he hopes to reduce production cost to around \$200 per ton as the equipment is scaled to increase the treatment volume to as much as 2,000 gallons per minute.

Sustainability

The private sector has a compelling interest in the extraction technique for turning what is currently waste into additional revenue and extending the lives of existing mines in the U.S., where the purest ores are quickly becoming depleted. “Because of high closure costs, nobody wants to shut down mines,” James explained. Furthermore, getting permits for new mines takes years, and the costs are also enormous.

“So they’re very, very interested,” James said. Augmenting existing processing facilities with BPS technology will enable the use of vast quantities of waste quality ore for copper production while consume about half as much energy overall of conventional processing. The augmentation would be economically viable, as long as copper stays above \$2 per pound, and the process could double the life as well as the production capacity of existing mines, thus reducing the need for imported ore and/or new mine development.

James is hoping that with a proven prototype, his new technology will find its place in Superfund cleanup, once legal and regulatory issues are worked out. As an entrepreneur, he is also striving to achieve a healthy return on his company’s investment of time, ingenuity, and capital.



James 1421c.jpg - courtesy of Steve McCaw

Following the presentation, Henry, left, and James stayed to answer questions from the audience. James noted that USGS estimates indicate that there are 450,000 contaminated legacy mining sites in the U.S. alone.