CEO CFO: Mr. Fraley, what is the concept behind PanAridus?

Mr. Fraley: For agriculture to be successful in the future, we need to grow productive crops sustainably on arid lands while using much less water, similar to the challenges in Arizona, where we are headquartered. To that end, our mantra is, “Seeds that grow innovation.” In this case, for the last five years, we have been working to improve the agronomics and genetic yield of a native Sonoran Desert species called guayule (pronounced ‘why-oo-lee’) from which a polymer almost identical to the tropical Hevea (rubber tree) is extracted. Currently, the United States has to import 100 percent of our natural rubber from OPEC-like cartels in South East Asian nations like Malaysia, Indonesia, Thailand and Vietnam, which control about 80 percent of the world’s supply. Industrial rubber users, like tire companies, have been reliant on this 10,000 mile supply chain for decades, but with the rise of the global economies (especially China and India) demand is outstripping supply, and there is a predicted million metric ton shortfall of natural rubber by the end of the decade. Because guayule is a desert species, it’s perfectly situated to be a complement to the supply from rubber tree; however, what was needed was to make this a commercial viable crop was to increase the yield of rubber per plant and per acre while shortening the growth pattern. Today, our research team can proudly say we have the world’s largest germplasm and proprietary germplasm bank in the world with this

“With the independent validation of the quality of our guayule natural rubber, tripling the yield from the original germplasm base and our intellectual portfolio covering the entire plant to extraction process, it has become increasingly clear to tire companies we’ve solved the Rubik’s Cube of an alternative, domestic and sustainable natural rubber source.” - Michael R Fraley
species. We have nine patents just in plant variety genetics, and we are expanding our intellectual portfolio in measuring and extracting as well to give industries like tire manufacturers greater comfort about their inputs.

**CEOCFO: How did you come upon guayule?**

Mr. Fraley: Guayule has a rich history in Arizona, but it was the combination of the drought, impending natural rubber shortfall and 21st century science that was finally going to turn 100 years of dreams into reality. There have been people such as Thomas Edison, Nelson Rockefeller and Harvey Firestone that have looked at guayule over the years, but the weak link was they did not have a sustained research program, even though the federal government had been involved sporadically. My discipline has been in genetics and increasing genetic yields to benefit not only the agricultural community, but also consumers. We knew we needed to improve the yield potential to make it profitable for farmers to grow while extracting a high rubber content and quality from each plant to make guayule commercially successful.

**CEOCFO: Where are you in the process today?**

Mr. Fraley: For the first time in history, we are at the commercial stage—in part thanks to demand, timing and scientific advancement. Our lane is very specific. We are working with tire companies because they use two-thirds of all natural rubber consumed. We are at this stage because in 2012, we took the leap to become the first company in the world to have our guayule independently validated by some of the largest tire companies in the world. Collectively, they all said our polymer not only meets their criteria, but also in some cases excels beyond what they expect for a new natural rubber or polymer source. With the independent validation of the quality of our guayule natural rubber, tripling the yield from the original germplasm base and our plant to extraction process intellectual portfolio, it has become increasingly clear to tire companies we’ve solved the Rubik’s Cube of an alternative, domestic and sustainable natural rubber source. Finally, over the last 18 months, we’ve been the lead materials supplier for a federal grant to research the applications and lifecycle of guayule. The tons of rubber we’ve produced for the grant go to Cooper Tire, which is compounding, formulating and actually making tires. The next step is producing it in larger quantities to prove the economies of scale.

**CEOCFO: How do you know that rubber created from your polymer will be sustainable over time?**

Mr. Fraley: Guayule is sustainable in a couple of different aspects: the science and economics behind it and its harmony with our natural environment. We’ve proven and documented our yield improvements and tire companies have put our guayule natural rubber under the microscope to ensure it’s consistent with the polymers they need to compound a tire. Remember, the tire market is clamoring for an alternative source of rubber because global demand is outstripping supply and the Hevea tree is very inflexible to meet changes in demand. It takes on average six to eight years between planting a rubber tree to the first time rubber can be tapped. Guayule is a perennial and it only takes 18-24 months to harvest the first growth cycle. One of our breeding objectives is to further reduce the growth cycle and produce guayule as an annual crop. Also, unlike the tropical rubber tree, which is still harvested using virtual slave labor and a 19th century process, we are direct seeding our plants and have mechanized the entire process, including the measurement of rubber in each plant and the extraction of
the rubber. These are the economic certainties that give multi-billion dollar companies a greater degree of comfort about their inputs. Secondly, guayule is much kinder to growers. Not only can they generate more revenue per acre growing guayule than current large scale crops in the Southwest like cotton or alfalfa, but guayule uses half the water of cotton and two-thirds that of alfalfa. In a drought stricken region with record high water prices for irrigation, it means more crop per drop and a significant opportunity to reduce water usage. Also, because guayule is a naturally adapted desert species, it requires almost no pesticides, which is a key in protecting the water table in the Southwest. The contrast to Hevea couldn’t be more stark: just last week a leading researcher concluded over half of all rubber plantations in Southeast Asia aren’t sustainable due to poor farming methods, while new plantations are being carved out of protected lands.

**CEOCFO:** What is involved on the agriculture side in growing guayule?

**Mr. Fraley:** Here is where PanAridus has a tremendous advantage in guayule. Because we have the largest talent pool of experienced guayule researchers working with our team, we’ve been the first company in the world to successfully replicate direct seeding, which shortens the growth pattern. Also, to my knowledge, we are the only company that has applied for and been granted certification of our crop seed. To the consumer, these might seem like small advancements, but to growers it sends a strong signal about the consistency of the plant and of the growth cycle, which in turn means consistency of revenue. In a more macro setting, Arizona has lost 75 percent of its cotton crop over the last two decades due to a number of factors, but it can no longer be considered one of the state’s five economic C’s (copper, climate, cattle, citrus). Alfalfa production is down as well. This means farmers are in need of a new cash crop, preferably one that uses less water and fewer pesticides, which are significant cost drivers in addition to labor. Because it’s a desert species, guayule has some capabilities to be insect resistant. Again, this makes it an attractive alternative crop because it removes risk that exists with other species that are being commercially produced in the Southwest. One final note on the farm economics: guayule has no waste; the plant is 100% usable. The remains of the plant post-rubber extraction are an excellent high-energy source of biomass that has applications for both power generation and building materials, while the plant resins are an excellent feedstock for the flavor, fragrance and adhesive markets.

**CEOCFO:** Are people skeptical?

**Mr. Fraley:** Absolutely! Probably the number one adversary that I have had to overcome with this project is its ephemeral history. It’s popped up in the background with more famous people than Forrest Gump. Early on, names like Thomas Edison, Harvey Firestone, Henry Ford and others were interested in a domestic source of rubber, but they couldn’t find the equation for economic success, mainly because of the limited body of genetic knowledge in the early 20th century. What has remained the same since that time though are the geopolitical and global economic issues serving as a driver for much of the demand. When Thomas Edison and Mr. Firestone looked at guayule, it was because the source of natural rubber at that time, which was the rubber tree, was no longer produced in abundance. There was a leaf blight that wiped it out in Brazil. Guayule was used as an alternative source, because they didn’t have natural rubber from the Hevea tree yet. Guayule was native to
Mexico and in the 1920’s up to almost 50% of all of the natural rubber that was manufactured for tires came from guayule. We were consuming a great deal less at that time, but there was increasing demand because we had entered the age of the automobile. Unfortunately, global rubber prices dropped significantly by the late 1920’s as Hevea was introduced in Southeast Asia and the Great Depression caused a sharp drop in demand. During that same period, then-Major Dwight Eisenhower wrote a paper stressing the need for a domestic source of rubber in case our supply lines to Asia were ever cut off, and sure enough, once the U.S. entered World War II, the government launched a 25,000 acre guayule project in California because Japan controlled the shipping lanes we used to supply our domestic need. For reasons that defy all logic, at the end of the war, the government stopped funding the project and burned the entire crop. It was another 30 years before another ambitious research project was conducted, and it neatly coincided with the OPEC oil embargo, which had driven the prices of synthetic rubber (made with petroleum) sky high, once again creating a need for an alternative. What’s different about PanAridus is our focus on sustained research in order to look at how you can increase this yield, make it a feasible new industrial crop and then have all of the co-product valuation that you product from that. Over five years of research later, we’ve solved the historical conundrums around yield per plant and per acre and the global rubber shortfall is once again driving demand for an alternative. Today, we are closing in on the goal line: to produce it in a large enough quantity because it is a commodity. Natural rubber is traded on the commodity markets, just as corn and soy are. We’ve already gone from test tubes of guayule to guayule by the bale. Now it’s just a matter of industrializing the process.

**CEOCFO: Where do you find desert land to grow?**

**Mr. Fraley:** By some accounts, we have over 70 million acres in the Southwest that would potentially be available for production. In areas such as West Texas or Arizona, the growing community is looking at ways that we can produce agricultural crops that maximize efficiency, but also have a profit per acre. Profits can be in terms of lower inputs; they can also come from lower inputs and a higher yield. Our objective so far has not been to displace other crops, but with Arizona’s diminishing cotton acreage, the availability is certainly there. With the water we currently use to produce one acre of cotton, we could produce almost three acres of guayule. Obviously, the Sonoran Desert isn’t the only desert in the world, which gives us the opportunity to grow guayule closer to areas with the greatest rubber demand.

**CEOCFO: What is the strategy for the next year?**

**Mr. Fraley:** This is going to be a very exciting year for us. We have some very major news releases that will be coming out in August. The industry will finally be able to see that this is a commercial species that does have applications, because products are being produced. Our next step is moving towards a commercial facility, where we will be producing much larger quantities than we are currently capable of as well as our co-products.

**CEOCFO: How long will your funding last?**

**Mr. Fraley:** As long as there is demand, our funding will last. No one has ever been this close to providing an industrial scale domestic source of natural rubber with real world applications and a built-in market ready to buy it. We are also the lead material supplier for a DOE/USDA grant
because of our ability to perform and produce high quality rubber, which also helps our bottom line. Finally, as news of our progress has received more coverage, we’ve been sought out by a number of different entities that see the long-term investment potential.

**CEOCFO: Put it all together for our readers. Why pay attention to PanAridus today?**

**Mr. Fraley:** People should pay attention to PanAridus because we are living up to our promises. We have been very directed at what we know was required to make this crop commercially successful. We have not deviated from that lane. Now, we are the only organization in the world producing high quality guayule in abundance for industry to validate and test in their end products. In addition, we have the greatest variety of plant intellectual property in the world along with increased yields per acre, higher rubber content and mechanized ways to farm and extract it efficiently and profitably. As part of the DOE/USDA grant team, we are on the vanguard of turning commodity into commercialized products, and we’ll be years ahead of any competition, who either don’t have the expertise or the intellectual property to compete. PanAridus will simply be known as the company where natural rubber meets the road.

*Interview conducted by: Lynn Fosse, Senior Editor, CEOCFO Magazine*