

Executive Summary

Insecticides are vital in maintaining systems that support basic human needs, such as the need for comfortable shelter, productive agriculture, and mitigation of insect-borne diseases. Conventional insecticides, however, have become less effective because insects have developed resistance to them, making it increasingly difficult to control pest insects. A new class of insecticide active ingredients (AI) for insect control, which were discovered and developed at Vanderbilt University, have the potential to overcome these challenges, functioning in a decidedly unconventional way. As such, **OrcoGuard** will use this novel class of AIs to develop a suite of non-toxic, eco-safe products that overcome the current problem of insect resistance to conventional insecticides. Based on previous conversations with major companies that have developed insect control products, we believe there will be substantial interest and value in our intellectual property once the first AI formulation, *OrcoGuard Premises*, is successfully registered with the EPA.

While there are many markets in the consumer, agricultural, and animal health industries that would benefit from this novel class of AI, the commercialization team has conducted thorough analysis to identify the perimeter treatment market as **OrcoGuard's** beachhead market. This initial product, *OrcoGuard Premises*, would function to protect the perimeter of infrastructure such as residential and commercial buildings. The perimeter treatment market was selected because of lower development costs and swifter regulatory approval process relative to products in other markets. Once *OrcoGuard Premises* is on track for EPA approval and revenue generation, **OrcoGuard** will begin developing additional products utilizing the AI suite for use in the consumer repellent, animal, and agricultural markets. Alternatively, **OrcoGuard** may seek to license its intellectual property to other companies already providing products to those fields. Market research supports the rationale for selecting *OrcoGuard Premises* as the initial product. A recent survey determined that 80% of US households are concerned with protecting their homes from pest insects with over 50% of US households employing perimeter treatments.¹ Perimeter treatments are also heavily used in commercial and government properties with over 65% of US businesses and 100% of US government buildings employing perimeter treatments.¹ The potential market for *OrcoGuard Premises* in the US includes over 70 million households, 2.8 million businesses, 17,000 government pest protection contracts, and over 27,000 pest management and pesticide companies manufacturing perimeter treatments and providing application services.² US revenue generated from the sale of perimeter treatment products grossed \$7 billion with an additional \$5.7 billion in revenue generated from application and pest management technician services.³ Recent financial audits conducted by the agrichemical companies TyraTech and Syngenta determined that new pesticide products achieved an average market penetration of 7% within two years of launch with “non-toxic” and broad spectrum products (i.e., those that target a large number of pest insects) acquiring higher than average market share.^{4,5,6}

OrcoGuard will be given exclusive rights to commercialize the novel class of AIs. **OrcoGuard** plans to ultimately be a holding company for operating subsidiaries, including one to commercialize *OrcoGuard Premises*. We anticipate that the holding company will create other operating subsidiaries to develop and commercialize products in the repellent animal health and agricultural verticals, as well as other consumer products.

¹ ConsumerAffairs, Pest control statistics and trends, retrieved from <https://www.consumeraffairs.com/homeowners/pest-control-statistics.html>

² US Census Bureau. 2019 Annual Survey of Entrepreneurs

³ Patel K. (2020, July). Pesticide Manufacturing in the US. *IBIS World*. US Industry (NAICS) report 32532.

⁴ TyraTech, Inc. Progress in 2018 on current products and major milestones achieved in new product development. (2018), retrieved from https://www.tyratech.com/wp-content/uploads/2018/05/RNS_050918.pdf.

⁵ Syngenta Financial N.V., Annual Report. (2019), retrieved from <https://www.syngenta.com/sites/syngenta/files/company/bond-investors/annual-accounts-syngenta-finance-nv-2019-incl-auditors-report.pdf>.