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Biosecurity: An Integral Component of the Rendering Industry

A complete biosecurity program is critical to a maintaining a safe and secure food chain

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As North America's leading producer of animal fats and proteins, representatives from Darling International and Griffin Industries (the two rendering companies merged in December 2010) are often asked to define the company's biosecurity program and related safeguards for ensuring the integrity of the animal feed ingredients produced. This paper highlights the company's approach and provides an overall rendering industry perspective of biosecurity. In October 2012, Darling and Griffin unified their go-to-market strategy in the promotion of their related animal fats and proteins under DAR PRO Solutions™, A Darling/Griffin Brand.

Defining Biosecurity: Biosecurity is a unique word that today has become commonplace in nearly every industry and aspect of our lives. But if we look back to the 1957 W. B. Saunders Medical Dictionary, the word was not even listed. Neither was it included in the 1992 edition of Webster's Dictionary.

"Bio" is a prefix used in the construction of compound terms to express organic life. When coupled with the suffix "security," it defines procedures to make things safe from living organisms. Currently, it is a word that defines any management practice or systematic application that prevents the transmission of pathogens from one living organism to another. In this context, biosecurity in reality focuses on microbial forms of organic life that include bacteria, viruses, parasites and protozoa, as they are the primary causes of disease in the higher forms of life which include humans, animals and plants.

The interest in biosecurity as a scientific discipline has surged for all industries as foodborne pathogens, both from animal and plant origins, have received increasing attention. Certainly livestock, poultry producers and companion animal owners now place a greater importance upon biosecurity measures. The increased threat from foreign animal disease has resulted in enhanced biosecurity measures. Bioterrorism is another new word used to describe the intentional introduction of disease-causing pathogens into sovereign territories. Enactment of the Bioterrorism and Preparedness Act of 2002 was further prompted by the terrorist acts of September 11, 2001.

The Rendering Industry's Biosecurity Heritage: Though specific industries have somewhat different needs and practices, the principles of biosecurity are similarly structured. They all identify the various risks and address those risks to minimize or prevent biosecurity threats to human or animal health and welfare. Fortunately, during the rendering industry's past 150-year history, focus has been placed on procedures and practices that

address product safety. In fact, renderers have sent a proactive message to a number of ancillary industries resulting in the adoption of successful biosecurity measures in their programs. Renderers have benefited by having their primary production process based on a time and temperature sterilization process. The production of rendered materials is based on the exposure time and the required temperatures to lethally impact specific micro-organisms. It is a controlled thermal processing procedure that is very similar to that used by the canned food industry. Though the time/temperature function of rendering is a paramount asset to its overall biosecurity program, it only provides the framework for a complete and structured program. All biosecurity programs must be well documented, implemented and validated for compliance. A comprehensive written plan of control must be evident from the time that raw materials are acquired and transported to the rendering facility until the finished ingredients are delivered at the facility of usage. As an industry, renderers are extremely prudent in adhering to these basic requirements.

As stated previously, DAR PRO Solutions™ is a unifying brand that resulted when the two largest rendering companies in North America joined together. Upon completion of the merger in late 2010, one of the first priorities was to examine Darling Internationals' and Griffin Industries' independent biosecurity programs. With long histories of ensuring food safety policies based on adherence to established biosecurity principles, this became an excellent opportunity to capitalize on the best practices of both organizations. As a result, a comprehensive Biosecurity Program Manual was developed by upper management with input from tenured employees from nearly all production and laboratory facilities. These manuals, which include written Best Management Practices (BMPs) and HACCP-like process controls, were provided to each facility to be used not only for employee training but also to serve as a day-to-day guide for auditing the respective biosecurity program requirements.

Basic biosecurity programs for rendering facilities consist of numerous preventative controls both within the facility and those that are ancillary. The rendering industry is a model of innovative value-based recycling, converting billions of pounds of inedible animal byproducts and recovered oils into products used primarily in feed. Like all organically-derived material, these materials in their "raw" or unprocessed state may contain potential biological hazards. For instance, slaughter offal is frequently a component of this raw material; animal mortalities may also be a source of raw materials at some facilities. However, due to certain federal regulations as well as biosecurity safeguards established by the company, specific animal tissues and/or diseased animals are prohibited from entering the rendering raw material processing stream. Compliance with such federal regulations in conjunction with industry biosecurity procedures and safeguards prevent the spread of transmissible spongiform encephalopathy (TSE) diseases such as bovine spongiform encephalopathy (BSE) in cattle.

Over the past three decades, biosecurity procedures for all likely disease pathogens, feed or food hazards have been enhanced by the industry. The development of processing and control practices based on science has been validated for a number of zoonotic and potential foreign animal diseases. The Animal Co-Products Research and Education Center (ACREC) at Clemson University, which was co-founded by the university and the Fats and Proteins Research Foundation (FPRF) in 2004, has concentrated on research with biosecurity as a primary objective.

Renderers' Proactive Biosecurity Solutions: Today, biosecurity programs in the rendering industry address numerous processing and procedural controls. These controls are designed to minimize potential food safety hazards and to prevent accidental and/or intentional contamination of rendered products. Essential industry components of a biosecurity program also include the registration of rendering facilities with the FDA; facility security measures, which can include the use of fencing and employee I.D. cards to control access; and the implementation of control points in the process to prevent or mitigate potential raw material and finished product hazards. A complete biosecurity program also includes requirements for training, record keeping, auditing, recall and the establishment of non-compliance standards and corrective action validation. The implementation, continued oversight and helm of control must be assumed by well-trained employees who accept such tasks as a

cornerstone of their assigned responsibilities. Career employees are critical to an overall quality program where employees derive their self-confidence and skill through tenure. The rendering industry prides itself on the hiring, training and retention of this caliber of quality, established personnel.

Audits have become one of the critical requirements to monitor biosecurity success. Audits are a planned and documented assessment to determine whether the requirements of the biosecurity program are being met. The audits may be internal or external, with the external audits being performed by a third-party agency/auditor. Audits can also be scheduled or unscheduled. The internal audits, traditionally conducted by designated Quality Assurance personnel, can involve the complete operation of a facility or be broken down into segments of the facility's operation, i.e. raw material, records, equipment and maintenance, recalls or sanitation. Complete or full audits for a facility generally are more convenient and productive than in scheduled phases. The internal audits should be viewed as an opportunity to improve and prepare for third-party audits to follow. The rendering industry participates in a number of third party audits, but an internal audit is typically more intense than an external audit.

Third-party audits most common to the rendering industry are the APPI Code of Practice (COP), AFIA Safe Feed/Safe Food (SF/SF) and Hazard Analysis Critical Control Point (HACCP) plans. A very high percentage of North American rendering facilities submit to audits performed by the Facility Certification Institute (FCI). FCI was established in 2001 as an internationally recognized third-party certification organization specifically for the animal feed and ingredient industry. As of January 1, 2013, FCI merged with Validus Ventures LLC to become FCI-Validus. FCI will retain its original core of independent contract auditors and their years of feed industry experience in animal nutrition, manufacturing, processing and distribution of all types of animal feeds, while gaining additional resources, technological and training capabilities, international experience and ISO 9001 accreditation. Third-party audits will become even more important to the rendering industry as the Food Safety Modernization Act (FSMA) is fully implemented. Signed into law on January 4, 2011, FSMA grants the FDA new authorities, including a mandate to require science-based preventative controls that affect the entire food supply chain. The FDA was given the enhanced authority regarding inspection, compliance, response to hazards, and recall requirements. It is anticipated that the FDA will expand its regulatory presence and increasingly use its new authorities under FSMA. As a result, the importance of a clearly-defined biosecurity program and the need for internal and external compliance audits is further reinforced.

It has been said that "In God we Trust! All others we test." The overall biosecurity program must be supported by a number of other ancillary support groups. Access to certified analytical laboratories that are staffed with well-trained technicians and supported with the necessary equipment to monitor both incoming raw material and finished products is a critical component of biosecurity prevention and control. Laboratory support is one of the major investments for a rendering company, but it is a necessity. This support can be obtained from commercial laboratories or as part of the internal corporate structure. Consolidation has been evident in nearly all of agribusiness, including rendering. When Darling International and Griffin Industries merged, the analytical support system from each company was retained. Operating under the unified name, Darling Analytical Laboratories, these facilities, located in Butler, Kentucky and Ankeny, Iowa, have strengthened the analytical testing capability and quality assurance support for DAR PRO Solutions' branded products. For a biosecurity program to be complete, it must address the requirements for a robust and disciplined testing program of both raw material and finished products.

Conclusion: In closing, biosecurity is dependent upon numerous factors. If any single definition can be applied it would be accessibility. In reality, biosecurity is heavily dependent upon controlling accessibility. Controlling microbial pathogens that may be present in raw animal byproducts by thermal processing is only the first step in controlling biological hazards. A critical second step is to limit access to product post-processing to prevent opportunities for cross contamination. Developing, implementing and monitoring such process controls are basic components for a biosecurity program in the rendering industry. Customers buying finished rendered products

can be assured that rendering facilities certified under the APPI Code of Practice follow HACCP-like principles and have the necessary process controls in place to provide safe products for use in animal feed and pet food. This basic review of safeguards certainly does not construct a “Biosecurity Manual” nor does it make a complete Quality Manual. Biosecurity, in itself, addresses the safety procedures for preventing biological hazards, as well as controlling physical and chemical hazards in finished products. Another important component of a complete quality assurance program, which is not discussed in this paper, is the nutritional value of the final rendered product, including levels of essential nutrients and the bioavailability of such nutrients. Nutritional value and safety are both major considerations in evaluating the value of feed ingredient products and their role in a safe and secure food chain.

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