EPA Nutrient Recycling Challenge – Trident Processes LLC

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Trident Processes LLC has developed and commercialized an innovative nutrient recovery technology that currently captures N 50% P 85% K 20% and will provide a platform for continued development of all advanced nutrient recovery processes. Trident, through scientific research and experimental development is in the early stages of this advancement. These innovations are expected to achieve the following outcomes:

- *Recovery capture rates: N 85% P 95% K 45%*
- *Organic certified granulates 85% DM*
- *Cellulosic ethanol feedstock*
- *Carbon-based organic polymers*
- *Stream dischargeable water*

Although very valuable the nutrients in manure must be transformed into manageable components that facilitate BMP. Costs associated with these transformations must be realized through existing nutrient management cost savings, value added revenue potentials and herd expansion opportunities. We have characterized the key steps in the advancement of our technology in 3 stages:

Completed – commercialized nutrient recovery for anaerobic digestate and raw manure (dairy).
Under Development - fiber transformation, nutrient granulation and ammonia capture (dairy & hog).
Conceptual – organic certifiable polymer, stream dischargeable water and lignin byproducts (dairy & hog).

Trident's existing technologies have been developed by creating a hypothesis based on existing know how then furthered using our in-house laboratory facilities for the experimental development stage. Once favorable results are achieved, a lab scale pilot system is built and tested. After results from piloting are confirmed a side-stream prototype is developed and field tested. Performance is verified at this level then a full size system is built and rigorous long term operational field testing is conducted. All Trident technologies are fostered using the same model. The final step is commercialization.

This platform development process yields outcomes designed to link seamlessly with existing technologies. Once proven it enables the technology users to implement developing processes in stages. This enables user's to expand while continuing to remain in compliance and achieve sustainability in a financially prudent manner.

As the value added products created by these technologies emerge and their markets mature, our efforts continue. With the appropriate funding and our collaborative strategic partnerships Soilnet LLC and Leap Tech LLC, Trident's technological innovations are anticipated to meet the levels of sustainability essential for the protection of the environment and the continued success of the livestock industry.

Keywords:
Anaerobic Digestate, Manure, NPK, Nutrient Recovery, Nitrogen, Phosphorus, Separation, Sustainability