

**Ag Clean Water Fund Initiative
Biannual Narrative Report
Semi Annual Report – Nov. 30, 2017**

Organization Name: Newtrient, LLC

Project Name: Strategic Pathway for Inducing Phosphorus Control Technologies at Vermont Dairies

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1. Summary of Key Accomplishments and Highlights (Deliverables, Outputs, and Outcomes)

Newtrient's Clean Water Fund Grant is subdivided into 3 Elements:

Element 1: Development of NRCS Interim Practice Standard for Manure Handling, Separation and Processing.

The goal of Element 1 is to work closely with Vermont NRCS to craft an interim practice standard to help producers obtain federal funding for phosphorus removal technology installation via the NRCS EQIP Program (to help defray the cost of adopting nutrient management technologies). Our initial meeting with VT NRCS (July 18, 2017) focused on introducing Newtrient and outlining objectives related to executing our Clean Water Fund Grant. The Newtrient Technology Catalog was introduced as an unbiased source for manure treatment technologies and insight. NRCS Interim State Engineer Bob Thompson requested more detail regarding the technologies with the greatest potential for adoption in Vermont. As a follow up, we met with NRCS on October 19, 2017, to review four classes of technology (primary separation, centrifugation, physical/chemical treatment and membrane-based systems). Subsequent to this meeting, a summary report detailing the technologies was sent to Acting State Engineer Bob Thompson. A follow up phone meeting with Bob Thompson was conducted on November 17, 2017, to review the report and discuss next steps. NRCS Practice Standard 632 (Solid/Liquid Waste Separation Facility) currently provides a path for EQIP funding for the first two classes of technologies (primary separation and centrifugation). Vermont NRCS' current pay structure provides for coarse fiber separation. Though coarse fiber separation only removes limited phosphorus from the liquid stream (on the order of 10%), it does offer the opportunity for creating a compostable product and is practiced on some Vermont Dairies. Centrifugation is not currently offered under Vermont's pay structure but could be adopted to allow for EQIP eligibility in 2019.

The other two classes of technology presented to VT NRCS, physical/chemical separation (e.g. chemical facilitated dissolved air flotation followed by dewatering) and membrane technologies are not currently recognized by NRCS at the federal level. Newtrient is working on a simultaneous effort to connect these technologies to existing NRCS Practice Standard 629 (Waste Treatment) via engagement with NRCS at the federal level. An initial meeting was held on November 27, 2017, with NRCS at the federal level (Bill Reck, NRCS National Environmental Engineer and Jeff Porter, NRCS Manure Management Team Leader) to discuss options for advancing promising technologies toward EQIP viability. Bob Thompson, Acting VT State Engineer was invited and participated in this meeting.

Element 2: Identification of recovered P products/markets and Innovative Markets for Environmental Assets.

A preliminary report detailing product opportunity was completed in November. This report evaluates current market opportunities for manure-based products.

Element 3: Protocol Development

We have developed a draft approach to the protocol. We believe the key to success requires the adoption of a calculation protocol for translating (and quantifying) farm practice to water quality benefit. To this end, we have connected with the stakeholders in Vermont (NRCS, UVM, UVM Extension

and Stone Environmental) to discuss existing tools used and gain their insight regarding our goal of developing a protocol with the necessary scientific rigor to gain widespread acceptance in the state.

2. Work Progress

Major Activities Conducted

Element 1: Development of NRCS Interim Practice Standard for Manure Handling, Separation and Processing.

- Meetings with VT NRCS
- Development of recommended treatment options for VT Dairy Farms
- Meeting with NRCS at national level

Element 2: Identification of recovered P products/markets and Innovative Markets for Environmental Assets.

- A preliminary report detailing product opportunity was completed in November. This report evaluates current market opportunities for manure-based products.

Element 3: Protocol Development

- We are conducting a technical working session (November 30 and December 1) with key stakeholders in the state.

3. Anticipated Activities Next Quarter

Element 1: Development of NRCS Interim Practice Standard for Manure Handling, Separation and Processing

Further effort will be placed into supporting VT NRCS on the adoption of centrifugation under existing NRCS Practice Standard 632. We also plan to continue working with VT NRCS and NRCS at the federal level to create an interim practice standard to allow for the adoption of DAF technology (we view this as a proven and commercial technology that could directly impact VT dairy operations).

Element 2: Identification of recovered P products/markets and Innovative Markets for Environmental Assets.

There is a centrifuge at Machia Brothers Dairy; however, a market does not currently exist for the P-cake produced by the centrifuge and, as a result, it is only used periodically. Based on the findings of our preliminary market analysis report, we believe there are potential market opportunities for a P-cake that has been dried and pelletized or granulated. To this end, a pilot test using a rotary drum dryer system is planned for Quarter 2 of 2018. Machia Brothers dairy will be contacted in the next month to request their permission to allow for testing on their farm. Further, we plan to interface with one or more organic fertilizer blenders in Vermont to evaluate the potential of creating an organic product that could fill a void in Vermont (for organic producers currently using poultry-based fertilizer) or for potential export out of the state.

Element 3: Protocol Development

Adoption of a phosphorus quantification model for translating farm practice to water quality benefit will be selected. Calibration proceedings will be initiated to develop background support for model adoption. A written summary of the protocol will be refined and prepared for review. A policy forum will be held in January to present the concept of integrating the protocol with what we are calling an Environmental Services Marketplace as a vehicle for enabling low cost phosphorus treatment alternatives to offset higher cost obligations with the overall goal of improving water quality in the Lake Champlain Basin.