



Agri-Mark, Inc.
869 Exchange Street
Middlebury, Vermont 05753

Attach letters of commitment from the municipality and private entity

Project Description:

Pre-treatment system upgrade for Agri-Mark / Cabot, the largest industrial user within the Town of Middlebury, VT.

Name of Municipality:

Town of Middlebury, Vermont

Name of Private Entity:

Agri-Mark, Inc.

Name of Municipal Wastewater Treatment Facility Related to the Project:

Middlebury POTW

Municipality's Contact Information:

Kathleen Ramsay
Town Manager
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EIN:

Private Entity's Contact Information:

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Environmental Engineer
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EIN:

Address of Proposed Project:

Agri-Mark, Inc.
869 Exchange Street
Middlebury, VT 05753

Type of Project:

Design and installation/construction of a pretreatment system to treat the process wastewater discharge from a business to a VT municipal WWTF (POTW).

Executive Summary:

The Agri-Mark dairy processing facility “the facility” is the largest contributor of BOD, TSS, Phosphorus, and hydraulic load to the Town of Middlebury Publicly Owned Treatment Works (POTW). Agri-Mark operates a dissolved air floatation (DAF) unit to meet BOD, TSS, and Phosphorus permit limits. The DAF is too small to treat the full wastewater volume on an average day. The facility periodically experiences production upsets that result in loads that exceed the removal capabilities of the DAF unit and travel downstream to the POTW. Additional pre-treatment capacity on these days will help reduce upsets at the Publicly Owned Treatment Works (POTW), provide an additional tool for the facility to remain in compliance, and help the town consistently meet their NPDES permit. In 2022 there were multiple instances where a larger DAF unit would have reduced loads that ultimately exceeded the POTW’s capacity.

The existing dissolved air floatation (DAF) can treat 80% of the flow on average days and 60% on peak days. The DAF unit is highly effective at removing biochemical oxygen demand (BOD), total suspended solids (TSS), and Phosphorus and is necessary to consistently meet the permit limits and keep the POTW functioning properly. Agri-Mark proposes to replace the DAF unit with another that is roughly twice the capacity. Upsizing to a DAF that can treat ~400 GPM will match the facility’s peak flows and handle 100% of the daily volume, if necessary. The larger DAF unit will generate larger volumes of sludge and will require more storage. Therefore, the proposed project also includes the installation of a new 10,000-gallon tank which is sized to store 24-hours of sludge. Some building modifications and electrical upgrades may also be required.

The proposed project will increase energy efficiency, coagulant/flocculant effectiveness, and pre-treatment capacity significantly. This will be accomplished by leveraging existing infrastructure to the extent possible and will only include modest modifications to the pre-treatment plant (limited engineering and construction).

The project will dovetail very nicely with a new anaerobic digester that is being installed down the road from Agri-Mark. Purpose Energy is currently constructing the Middlebury Resource Recovery Center (MRRC). Agri-Mark has a feedstock agreement in place with Purpose Energy

that will allow the DAF sludge to be pumped via pipeline to the MRRC where the organics will feed methanogen bacteria that will generate biogas and ultimately create renewable power for Vermont's energy grid / renewable energy goals.

Without the grant it is unlikely the dairy farmers of Agri-Mark will take on an expensive replacement when the existing treatment system is not at end of life. However, as the Town will attest, it would be extremely beneficial to have the flexibility to run *the entire discharge through the DAF unit* during certain periods where either the facility or the POTW may be experiencing issues where it would be helpful to have more removal capacity. It is precisely this situation that can be addressed with a larger DAF unit. This upgrade will also allow some flexibility for Agri-Mark to process more milk (increase plant capacity) in the future without occupying additional capacity at the POTW. The facility as an economic driver for the entire region will not be limited by wastewater capacity.

Eligibility:

Agri-Mark discharges wastewater to the Town of Middlebury POTW which holds a NPDES equivalent permit. This project is eligible under both defined eligibility requirements for private entities.

- 1) Design and installation/construction of a **pretreatment system to treat the process wastewater discharge from a business to a VT municipal WWTF**. These projects shall be designed and implemented by a Vermont Professional Engineer with experience in industrial wastewater treatment design and construction.
- 2) **Equipment/infrastructure to manage/store high-strength waste** or concentrated by-products from your manufacturing process (side streaming, pollution prevention).

Background:

Agri-Mark, Inc operates a dairy and whey processing facility at 869 Exchange Street, Middlebury, VT. This facility operates seven days per week producing cheddar cheese and powdered whey products more well-known as the Cabot Creamery brand. Agri-Mark is a major economic player in the New England and New York dairy markets. Agri-Mark has over 1,000 employees, most of which live and work in Vermont. The facility has about 150 employees. Middlebury is the largest of Agri-Mark's cheese facilities producing more than 70,000,000 pounds of cheese and receiving more than 700,000,000 pounds (~80,000,000 gallons) of milk from the region's dairy farms annually. In addition to cheese, the facility also processes whey from three cheese plants and is therefore essential for not just this plant, but the operation of the Cabot, Vermont and Chateaugay, NY cheese plants.

The Agri-Mark facility discharges wastewater to the Town of Middlebury Wastewater Treatment Plant. The facility has a Town and state permit to discharge as a Significant Industrial User. The State permit is administered by the Department of Environmental Conservation permit number 3-0401. Agri-Mark is the largest industrial user within the municipality discharging an average of 386,000 gallons per day or 44% of the facility's average flow.

The POTW discharges to Otter Creek which is a tributary of Lake Champlain. As such, it is very important to the proper operation of the POTW for Agri-Mark to be discharging within permit limits.

The tables below show the allocated and actual discharges from Agri-Mark compared to the POTW overall loading.

TABLE 1

PERMIT ALLOCATED / DESIGN CAPACITY								
Entity	BOD (lbs)	TSS (lbs)	TP (lbs)	Flow (gal)	%BOD	%TSS	%TP	%Flow
POTW	8,819	5,863	169	2,200,000				
Agri-Mark / Cabot	4,650	1,150	115	450,000	53%	20%	68%	20%

TABLE 2

ACTUAL LOADING (2020)								
Entity	BOD (lbs)	TSS (lbs)	TP (lbs)	Flow (gal)	%BOD	%TSS	%TP	%Flow
POTW	4,201	17,41	95	885,583				
Agri-Mark / Cabot	2,613	828	80	386,000	62%	48%	84%	44%

These tables illustrate the following:

- 1) Agri-Mark accounts for most of the wastewater loading within the Town of Middlebury.
- 2) Agri-Mark accounts for 62% of the organic load and 84% of the POTW's phosphorus load
- 3) Effective pre-treatment and management of Agri-Mark's waste streams is necessary to keep the facility below 80% of the design capacity for BOD and Phosphorus in particular.
- 4) The ability of the Town of Middlebury to accept additional industrial users may be limited due to the capacity that has already been allocated to existing users.

Pre-Treatment Systems:

Agri-Mark's existing pretreatment system consists of the 200,000-gallon stainless steel equalization tank, a pH adjustment tank, and a Bubble Accelerated Floatation (BAF) system – also known as a dissolved air floatation unit - for BOD, TSS, and Phosphorus removal.

DAF units are highly effective at removing a variety of constituents, particularly phosphorus, a nutrient that has a Total Maximum Daily Load (TMDL) within this watershed which is set by the EPA. Recent testing on Agri-Mark's DAF unit indicates the following removal efficiencies:

TABLE 3: Agri-Mark BAF Removals

Constituent	Percent Removal 2022 testing
BOD5 Soluble	45%
BOD5	52%
COD	63%
TKN	60%
TSS	83%
FOG	>79%
Phosphorus	88%

Performance Measures:

Installation of a larger DAF system will be measured against the following:

1) TBD

Project Timeline

Lead time for most of the equipment is expected to be about six months or less. However, some of the controls may have longer lead times. Assuming grant award is acknowledged by October, 2023 the work is expected to commence by August 2024 and be complete by September 2024.

<u>Task #</u>	<u>Task Description</u>	<u>Pre-requisite</u>	<u>Duration</u>	<u>Estimate Complete</u>	<u>Responsible Party</u>
<u>1</u>	<u>Grant Agreement Execution</u>	<u>Award</u>		<u>October, 2023</u>	<u>VT DEC / Town of Middlebury / Agri-Mark, Inc.</u>
<u>2</u>	<u>Basis of Design / Preliminary Engineering Report</u>	<u>Task 1</u>	<u>3 months</u>	<u>January 31, 2023</u>	<u>Consulting Engineer</u>
<u>3</u>	<u>Request for Proposals Equipment</u>	<u>Task 1</u>	<u>1 month</u>	<u>November 30, 2023</u>	<u>Consulting Engineer</u>
<u>4</u>	<u>Vendor Proposals Received</u>	<u>Task 3</u>	<u>1 month</u>	<u>December 31, 2023</u>	<u>Vendor(s)</u>
<u>5</u>	<u>Request for Proposals Installation</u>	<u>Task 4; may be</u>	<u>1 month</u>	<u>January 31, 2023</u>	<u>Consulting Engineer</u>

		<u>concurrent with task 4</u>			
<u>6</u>	<u>All Proposals Received</u>	<u>Task 5</u>	<u>1 month</u>	<u>February 28, 2023</u>	
<u>7</u>	<u>Review Period</u>	<u>Task 2-5</u>	<u>1 month</u>	<u>February 28, 2024</u>	<u>Agri-Mark, Town of Middlebury</u>
<u>8</u>	<u>Issue Purchase Orders</u>	<u>Task 7</u>	<u>0.5 month</u>	<u>February 28, 2024</u>	<u>Agri-Mark</u>
<u>9</u>	<u>Receive / Stage Equipment</u>	<u>Task 8</u>	<u>8 months</u>	<u>August, 2024</u>	<u>Agri-Mark</u>
<u>10</u>	<u>10,000 gallon Tank Install</u>	<u>Task 8 plus six months</u>	<u>10 days</u>	<u>August, 2024</u>	<u>Civil/Concrete Contractor</u>
<u>11</u>	<u>Remove & Replace DAF</u>	<u>Task 8 + six months</u>	<u>5 days</u>	<u>September, 2024</u>	<u>Mechanical & Electrical Contractors</u>

Scope of Work

Cost Item	Budget Estimate
1) Engineering/Planning	
upsized only)	
a. Preliminary Engineering Report (limited scope / replace and	\$30,000
b. Develop and issue Requests for Proposals	\$10,000
c. Structural and Architectural Engineering Review	\$15,000
d. Post-construction inspection	\$5,000
2) Vendors	
a. 400 GPM Dissolved Air Floatation Unit	\$350,000
i. feed pump balance tank to DAF	
ii. DAF air compressor	
iii. Flocculation tube and chemical dosing system	
iv. Chemical feed pumps variable speed	
v. Controls Including On-site Support	
vi. Installation On-site Support	
b. Chemical Dose Controller	\$20,000
i. chemical dosing turbidity meter	
c. Sludge tank	\$15,000
i. 10,000 gallon tank	
ii. Freeze protected	
iii. Agitated	

<ul style="list-style-type: none"> v. Inlet and outlet with serviceable valves & cleanouts 	
<ul style="list-style-type: none"> d. Electrical/Controls Equipment <ul style="list-style-type: none"> i. New sub-panels, if necessary ii. Variable speed drives for new pumps/motors iii. Controls integration 	\$50,000
3) Installation / Construction Contracts	
<ul style="list-style-type: none"> a. Building Modifications <ul style="list-style-type: none"> i. Building code updates ii. Door and wall modifications iii. Misc. building related expenses 	\$20,000
<ul style="list-style-type: none"> b. Sludge Tank <ul style="list-style-type: none"> i. Excavate and pour foundation for new sludge tank ii. Install new sludge tank on foundation iii. Terminate inlet and outlet pipes inside building 	\$20,000
<ul style="list-style-type: none"> c. Demo / Remove Existing Equipment <ul style="list-style-type: none"> i. Disconnect and remove existing sludge tanks ii. Disconnect and remove old DAF unit iii. Remove flocculant tube & dosing system 	\$10,000
<ul style="list-style-type: none"> d. Rig & Install New Equipment <ul style="list-style-type: none"> i. Mechanical ii. Electrical iii. Vendor on-site support 	\$30,000
Subtotal	\$575,000
<ul style="list-style-type: none"> 4) Tax 6% <ul style="list-style-type: none"> a. Equipment a. Materials 	\$26,100
5) Grant Administration 10%	\$57,500
5) Contingency 10%	\$57,500
Project Cost & ARPA Request Amount	\$716,100