



**Vermont Department of Environmental Conservation**

Waste Management & Prevention Division, Solid Waste Program

One National Life Drive, Davis 1 802-828-1138

Montpelier, VT 05620-3520 [VTrecycles.com](https://dec.vermont.gov/waste-management/solid)

Main Group Participants as Outlined in Act 170:

Michael Casella Casella Waste Systems

Steven Cash Vermont Department of Agriculture, Food & Markets

Billy Connelly Vanguard Renewables

Jenna Evans Ben and Jerry’s

Tom Gilbert Black Dirt Farm

Dan Goossen Green Mountain Compost

Erin Sigrist VT Retailers and Grocers Association

Other Group Participants:

Christine Beling EPA

Craig Coker Coker Composting and Consulting

Nick D’Agostino Vermont Compost Company

Natasha Duarte Compost Association of Vermont

Caroline Gordon Rural VT and Protect Our Soils

Sarah Hobson

Sarah Lillibridge Lamoille Solid Waste Mgmt. District

Emma Shouldice Shouldice and Associates

Mark Shea Rutland County Solid Waste District

Shannon Choquette Northeast Kingdom Waste Mgmt. District

Morgan Griffith Vermont Department of Agriculture, Food & Markets

John Brabant VTers for a Clean Environment

Chris Rice

Peter Blair Just Zero

Emily Johnston Addison County Solid Waste District

Matt McMahon MMR

ANR Participants:

Ben Gauthier VT ANR – Solid Waste Management Program

Josh Kelly VT ANR – Solid Waste Management Program

Mia Roethlein VT ANR – Solid Waste Management Program

Dennis Fekert VT ANR – Solid Waste Management Program

Matt Chapman VT ANR – Waste Management and Prevention Division Director

Presenters:

Eric Roy Ph.D. – Associate Professor & Kate Porterfield – University of Vermont

Kyla Bennett, Ph.D., JD – Director, Science Policy – Public Employees for Environmental Responsibility(PEER)

George Parmenter/Judy Knapp – Hannaford’s Grocer/Supermarket Rep

Dr. Raju Badireddy, Ph.D. - Associate Professor, Civil & Environmental Engineering – University of Vermont

**Main Topics:** Food Recovery Management Hierarchy & Source Separation

“*(1) recommendations on whether the organics management hierarchy in 10 V.S.A. § 6605k should apply to each generator of organic waste.*

*(2) whether the Agency of Natural Resources should modify its existing policy surrounding the source separation of organic wastes;*   
*(3) any recommendations on the proper use of depackagers in the management of organic waste.”*

Josh Kelly offered a recap from the last meeting and review of the main charge of the group- refer to language on top of agenda.

Tom Gilbert set up google drive document for the draft policy suggestions and never heard back from other 7 participants.

Tom sent around a vision statement that was based on the discussion from the second meeting. Tom requested group review and send him any edits.

Draft Policy statements – all versions to be shared on website and will print for group to have it in hand.

**Eric Roy and Kate Porterfield-UVM research summary**- ([See youtube recording](https://www.youtube.com/watch?v=BobvsuvNeSQ&list=PLb5jIRj04Vi9mNWkzNWSzuLEyLbnekV4I) beginning at 7:02 mark)

Their research measured microplastics in food waste, digestate and compost

Standard methods do not exist for high organic matter and UVM is among the first labs in the US to develop and test these methods. Some labs in Europe and Asia are a bit ahead which UVM has used as inspiration and modelled after.

Funding from Gund Institute, Casella and new funding from EPA

Life cycle assessment research to take place over next year.

Comprehensive [literature review was submitted as a pre-print](https://anrweb.vt.gov/PubDocs/DEC/Depackager/RESEARCH,%20DATA,%20STUDIES,%20PAPERS/LITERATURE%20REVIEW/MICROPLASTICS%20IN%20COMPOSTS%20DIGESTATES%20AND%20FOOD%20WASTES%20A%20REVIEW.PDF) for peer review - this is currently in final stages of review. Hoping to have a final version to share soon. Some researchers in Europe and Asia have previously published data relevant to plastics in food waste, compost and anaerobic digestate.

What is the % by mass of microplastics in these materials?

How do we measure microplastics?

Isolation with hydrogen peroxide, identification via dichotomous key, characterization(going down to .5mm and above, mass, FTIR spectroscopy polymers are identified by comparing them to a reference library.

% contamination by weight seems to be of most interest

Working on converting between counts and mass currently.

Preliminary putative data

Eric said final results may differ but that he doesn’t expect final results to be substantially different.

Samples Collected and analyzed by UVM:

* 19 compost samples (13 compost made with food wastes and 6 compost made without food scrap feedstocks)
* 5 Digestates from anaerobic digesters using food scraps
* 8 Depackaged food waste slurry samples (4 mixed and 4 depackaged ice cream)

Material types looked at by UVM study-depackaged, dairy manure, food waste

Generally, contamination numbers are below .100 - the proposed limit under H501.

Billy asked for data on the background data of soils- roadhouse, lawn, etc.

Eric has seen rates that similar to the rates in these materials tested. This is one potential source of microplastics.

Tom asked about the associated materials and practices with each data point.

Eric explained that the samples are split into two groups- Ones that have food waste and ones that don’t have food waste.

High level correlation to management practices- not sure if they are going to be able do that since there is such variation in the practices they are being used.

Tom would like to see if there is a connection between practice and risk.

Tom-Why look at mass? Can appreciate it but Europe they are shifting to surface area. Is that something that can be looked at?

UVM- Mostly finding plastic films in digestate

In compost finding a split of films and fibers. Fibers are incredibly light so would make for light mass.

Measuring in surface area might have variability weaknesses too.

Samples- (intra sample variability within the same sample)

homogeneous sample of packaged ice cream. These were one of the highest.

Jenna asked question of what color the plastic was in the depackaged ice cream sample? UVM responded that plastics were blue.

Jenna pointed that out that the overwrap used by Ben and Jerry’s is blue and could be removed prior to processing.

Caroline asked about samples of water that are used in depackaging process. Could that be looked at?

UVM- not set up to measure nanoplastics in water. This is another type of emerging contaminants.

Ben and Steve both spoke to commercial labs and there are a lot of labs capable of analyzing microplastics in water.

**PEER- Kyla Bennett –** ([see YouTube recording](https://www.youtube.com/watch?v=BobvsuvNeSQ&list=PLb5jIRj04Vi9mNWkzNWSzuLEyLbnekV4I) beginning at the 39:28 minute mark)

Peer is a Client driven non profit group

Microplastics related is PFAS

PFAS- large family of human made compounds

Strong carbon, fluorine bond, almost impossible to break- all PfAS compounds are persistent and many are bioaccumulative

Developmental issues, immune compromised, cancer, reproductive health and more

PFOA and PFOS- 4 parts per quadrillion and 4 part

This is a low level so no safe level of these two PFOS.

DRAFT Management Limits coming out from EPA in December 2022.

When food is separated from packaging- there are lower levels of PFOS.

How many plastics contain PFAS?- many plastics containing food have PFAS in them.

Plastic containers holding pesticides and motor oil also have extremely high levels.

These same types of containers are also used for food.

Massive contamination levels for food b/c of packaging.

Packaging going to landfill can get treated in leachate.

If applied to soil, will stay in soil.

Inhalation of wind blown dust are very high.

Inhalation of PFAS itself

(Biosolids applied to Maine farm and farmers had to abandon farm.)

PEER calling for not adding more PFAS immediately

Do not add any more to the soil b/c it never leaves.

PFAS are a huge component of microplastics

Dr. Bennett mentioned a dataset obtained from EPA by Freedom of Information Act request stating “that as of April 2021, of all the states in the country, VT was the 4th highest generator of waste containing PFAS.” Dan Goossen asked for clarification on this statement and what waste streams it included. It was suggested that it could include waste generated in-state as well as waste imported to the state. Mike stated we do not accept (solid) waste from out of state. Ben requested Dr. Bennett send the data to him and he would circulate to the stakeholders.

*Quick note of clarification to correct the record: The dataset Dr. Bennett referenced comes from Hazardous Waste manifests reported to EPA. Hazardous Waste manifests are required for the transfer of hazardous wastes to a hauler or to a treatment facility. According to e-manifests submitted to EPA for the period selected in 2021 Vermont generators shipped the fourth most PFAS containing waste (by kg) to hazardous waste TSDFs (treatment, storage, and disposal facilities) for proper treatment and disposal. According to the VT Hazardous Waste Program, generators on this list can range from manufacturing processes/products (Global Foundries), isolated spills or cleanups, hazardous waste aggregation centers like ENPRO, Clean Harbors or Safety-Kleen or the historic AFFF foam take-back project in the state. ANR sent* [*this update*](https://anrweb.vt.gov/PubDocs/DEC/Depackager/MEETING%20MINUTES%20AND%20AGENDAS/NOVEMBER%209,%202022/2022.11.10.GAUTHIER.FOLLOW%20UP%20ON%20DR%20BENNETTS%20PRESENTATION%20VT%20PFAS.PDF) *and the* [*Peer.org spreadsheet*](https://anrweb.vt.gov/PubDocs/DEC/Depackager/MEETING%20MINUTES%20AND%20AGENDAS/NOVEMBER%209,%202022/PFAS%20TRANSFERS%20IDENTIFIED%20IN%20RCRAINFO%20E-MANIFEST%20TEXT%20STRING%20AND%20STATE%20WASTE%20CODE%20SEARCH%20PEER%20GRAPHS.XLSX) *by email to the stakeholders on November 10, 2022 and to the other attendees on November 18, 2022.*

Billy Connelly asked how are PFAS and PFOS removed through the waste water treatment process?

Kyla responded that they are not. You can prefilter leachate for PFOS and PFAS.

Mike Casella asked if food can contain PFAS from just sitting in a container.

Kyla answered yes. And FDA looking into not allowing fluorinated containers for food packaging.

Though more is present in the packaging itself and when it is broken down into microplastics it becomes more bioavailable.

Eric Roy mentioned the benefits of diverting food scraps and how do you weigh the benefits with the negatives of packaging?

Kyla not suggesting putting food waste in landfills but doesn’t have a good answer.

Biosolids and land application- no good answer to what to do with them if you stop land application

But ultimately the goal should be to stop producing PFOS and limit the amount of PFOS getting into soil.

Minimizing the amount of plastic that gets into the soil.

Background levels of soil in PFAs can be high but shouldn’t be adding more.

**George Parmenter and Judy Knapp- Hannaford’s** – ([See YouTube recording](https://www.youtube.com/watch?v=BobvsuvNeSQ&list=PLb5jIRj04Vi9mNWkzNWSzuLEyLbnekV4I) at the 1:03:06 mark)

Safe edible food donated to hunger relief agencies

Looking into animal feed options for VT. Doing that in other states.

Everything goes into the bins packaged or not and gets picked up twice a week by the hauler

2.5 million pounds of food diverted in 2021- VT Hannaford’s stores only.

No food goes into trash compactor

Reason they have been successful in the simplicity of using one bin for all food waste packaged or not.

Tom asked about packaged materials that are back hauled.

-George- Could be shelf stable stuff- food or non food. All goes back to distribution center and gets sorted for donation

Tom- used to work with Hannafords to collect food scraps prior to depackaging.

Explained that hannaford’s would separate food from packaging and remove PLUS.

Two and half hours per week to pick off PLUs .

Tom asked what the justification was for not removing PLUs to save such a small amount of money.

George responded that Hannafords is always looking to streamline and having trouble finding staff.

Tom highlighting that Hannaford’s was a shining example of good diversion practices

Hannafords moved to Agricycle who can take all the food from them.

Source separation and the cost of it.

Erin called for discussion to come back around to how it would impact retailers in VT.

Steve called for discussion about source separation to happen among the group.

Dan asked George- if state moved forward with a source separation requirement- would it be possible to do that with multiple 65 gallon toters and some going for depack and some going for source separating compost?

George responded that staffing needs are dire in VT and they like having one contracted hauler.

Dan asked if it would be possible for Hannaford’s do that though. i.e. have multiple bins?

George asked that Agricycle be the one to weigh in on where the food is going and current practices.

Mike called for looking at trucking implications for running two routes to a generator and to end destination and also to look at capacity options too.

Ben asked George if Agricycle offered two streams under one contract. George not sure but could be good to follow up on.

**Dr. Badireddy from UVM- PFAS Study and Overview** – ([see YouTube recording](https://www.youtube.com/watch?v=BobvsuvNeSQ&list=PLb5jIRj04Vi9mNWkzNWSzuLEyLbnekV4I) at the 1:25:43 mark)

PFAS are a major contamination problem

PFAS are ubiquitous

There is a need to minimize exposure.

Emerging innovation treatment technologies- hold promise in destroying PFOS

Electrochemical treatment, super critical water oxidation, mechanochemical milling, pyrolysis/gasification

Went over data showing how effective each destruction technique is and still evaluating more.

Consider Minimizing packaging that has the higher concentrations of PFAS and separating them from feedstocks. And look to using packaging with less PFAS.

Depending on Food acids, etc. they can enhance/encourage leaching and break down the PFAS

ANR to Send out Doodle poll for an early December meeting.

Steve asked if the group could come to the next meeting with an answer to the 3 charges from the legislature and then the group could all discuss.

Tom asked for participants to review the visioning tool.

Tom will post the working suggestion document on google docs and all group members will comment on that in addition to answering the 3 charges for the next meeting.