

Monday April 28, 2025

Kat Taylor Testimony **Neither For Nor Against [LD 1604](#) - An Act to Protect Groundwater and Surface Waters from Perfluoroalkyl and Polyfluoroalkyl Substances from Landfill Leachate**

Good Afternoon Members of the Environmental and Natural Resources Committee:

My name is Kat Taylor. I am a resident and property owner in Argyle Twp., located about 20 miles north of Bangor and 2.5 miles west as the crow flies from Juniper Ridge Landfill (JRL). For 15 years I have been fighting the waste mismanagement practices in my area.

I am **Neither For Nor Against LD 1604**.

While it may seem that my testimony on LD 1604 was off topic, I am neither for nor against this bill as it requires testing for PFAS/PFOS but offers no solutions for contamination. So I brought up my Phytoremediation testimony for a bill on using sunflowers as a biofuel feedstock by Senator Trey Stewart. The ACF committee was interested in using sunflower for Phytoremediation as an added value in using soil not suitable for food production.

Phytoremediation (Planting hyperaccumulators) is essentially a natural filtration system and would be a cheap, fast acceptable method for removing PFAS/PFOS chemicals from soil and water rather than expensive unproven mechanical methods which still leave contaminated materials to be disposed of.

Landfull Leachate containing Forever Chemicals is being dumped into the Penobscot River through the closed Nine Dragons paper mill in Old Town. While I feel filtering contamination should begin at Waste Water Treatment (WWT) facilities, we must address the other end of the pipeline which is landfill.

Foam Refractionation (FR) methods were discussed as being a working treatment method removing PFAS/PFOS by Casella in their Coventry, VT landfill. However the speakers said things like this method is “recognized” and “in development” alluding to its use. But **FR has not yet proven to be an effective treatment**.

So effective FR **does not yet exist in Casella’s Coventry, Vermont landfill**

newportvermontdailyexpress.com

Amended Solid Waste Permit Hearing
ED BARBER, Staff Writer **Mar 16, 2025**

“NEWSVT received a solid waste permit for the Casella landfill in 2018, which is renewed every 10 years. It included what Casella had to do to treat leachate to remove PFAS chemicals. By 2022 the decision was made to establish a temporary treatment plant in Coventry as a pilot program. A final decision on the location of the treatment plant is still pending.”

https://www.newportvermontdailyexpress.com/news/amended-solid-waste-permit-hearing/article_5250a628-02a9-11f0-83bf-9f3f243cec88.html

The federal EPA has not yet set standards for safe PFAS contamination levels and is unlikely to do so in the near term.

So instead I want to offer a solution that has a proven track record and can be employed or studied with little to no risk, or expense, to the state. We needn't wait for the Federal Government to establish acceptable levels before acting.

Phytoremediation

Mill sites and defunct air force bases are contaminated by years of industrial uses and **Brownfield and Superfund money may fund research in Phytoremediation** efforts such as planting hyperaccumulators like sunflowers.

East Millinocket's Brownfields Assessment Program

“The Town of East Millinocket has been awarded a United States Environmental Protection Agency (US EPA) Brownfields Assessment Grant for conducting environmental assessments and cleanup planning at eligible properties in East Millinocket.

EPA defines a "Brownfields site" as any property for which the expansion, redevelopment, or reuse may be complicated by the presence or perceived presence of a hazardous substance, pollutant, or contaminant. Many Brownfields sites are undeveloped and/or underutilized, and can have negative effects on property values, human health, the environment, and public safety.

When a site is redeveloped there is an opportunity for an increase in tax base, employment opportunities, tourism, and sustainable economic development for the site as well as the rest of the community, among others.”

<https://www.eastmillinocket.org/brownfields.aspx>

LORING AIR FORCE BASE

“The Loring Air Force Base Superfund site is in Limestone, Maine. The roughly 9,000-acre Base was a major Strategic Air Command (SAC) base for the U.S. Air Force for over 40 years, before its closing in 1994. The Base housed a bomber wing and had SAC's largest capacity for weapons and fuel storage.

Military operations contaminated soil, groundwater, surface water and sediment. The EPA added the site to the National Priorities List (NPL) in 1990. Cleanup included waste removal, excavations, landfill capping, institutional controls to prevent uncontrolled use and consumption of groundwater, provisional water supplies, long-term monitoring, and groundwater management zones.”

<https://www.epa.gov/superfund-redevelopment/superfund-sites-reuse-maine>

DOW AFB

The Bangor WWT plant operator stated during the public hearing that the old base is highly contaminated contributing to Bangor's high PFAS/PFOS leachate levels.

Phytoremediation:

August 2023

Phytoremediation of soil and groundwater contaminated with per- and polyfluoroalkyl substances (PFAS)

*“This thesis examines the efficacy of phytoremediation as a **potential technique for managing PFAS-contaminated soil and groundwater.***

The aim was to investigate the phytoextraction potential of trees growing at these sites. Plant tissue concentration and composition profiles highly depended on the soil and groundwater fingerprints. Birch and willow showed the highest PFAS concentrations in the field.

*Furthermore, the **phytoextraction potential of five plants** (i.e. **sunflower**, mustard, **hemp**, willow and poplar) was also investigated in pot experiments.”*

<https://pub.epsilon.slu.se/31571/1/nassazzi-w-20230821.pdf>

Why Sunflowers Are The Finest Plants For Phytoremediation?

Last updated: June 25, 2024

*“Traditionally, **sunflowers** are grown for food and oil production but are **now being used in phytoremediation, a cost-effective and environmentally friendly technique that uses plants to extract metals and toxins from soil.** Sunflowers have shown high tolerance to heavy metals and are **considered the most important Asteraceae plant for phytoremediation of heavy metals such as cadmium and lead.***

Phytoremediation uses plants to clean up contaminated environments, including metals, pesticides, explosives, and oil. Sunflowers are an excellent candidate for phytoremediation due to their adaptability to various environments and their capacity to uptake a wide range of pollutants. They are also one of the most studied species for phytoremediation of heavy metals and are

considered the most ideal plant due to its greater potential for removing pollutants.”

Phytoremediation At Chernobyl

*“Sunflowers have been used to absorb radiation on the site of the Chernobyl nuclear disaster and in Fukushima. They **can take up high concentrations of radioactive isotopes, sequestering them in their stems and leaves (Not seeds!! ~ Kat)**. They are called **hyperaccumulators** due to their **enhanced ability to uptake metal**. They **can absorb 95% of radioactive contaminants in a 24-hour period.**”*

<https://www.scienceabc.com/nature/why-were-sunflowers-planted-in-the-shadow-of-nuclear-disasters.html>

A tribe in Maine is using hemp to remove ‘forever chemicals’ from the soil

*“For Stanley and Silliboy, the focus was not so much the hemp they were growing as what it was doing. Their farm, once part of the **Loring Air Force Base**, is also a **Superfund site** — an area so polluted it’s **marked high-priority for federal cleanup**. Later, when the **Aroostook Band of Micmacs** took over the site’s ownership, they found its **soil was rife with per- and polyfluoroalkyl substances, better known as PFAS**, cancer-causing compounds that are so difficult to break down they’re commonly known as “forever chemicals.”*

*“In 2020, researchers discovered that the Micmacs’ **hemp plants were successfully sucking PFAS out of the contaminated soil**. This practice, known as **phytoremediation**, could **guide farmers across the country who have had to shut down after discovering their soil is tainted with the ubiquitous class of chemicals.**”*

*“At the end of the day, **the data support phytoremediation as a viable approach and definitely established proof of concept.**”*

<https://grist.org/science/pfas-is-contaminating-farms-can-hemp-help/>

Recent studies in PFAS contamination removal have brought forth so many solutions it would take pages of links to encompass them coherently. I’ve listed a couple that feasibly could be used onsite at contaminated facilities in Maine which may bring back soil and water health rather than using food grade land which we need to keep our food supply viable.

What to do with the contaminated plants?

While Phytoremediation has long been proven to be a solution to cleansing soil and water, the question then becomes how to dispose of contaminated plants? Sunflower seeds do not collect the contaminants. But the roots, stalks and leaves will need to be disposed of. Best scenario, the contaminants are removed prior to disposal. Worst case the land or Waste Water Treatment Sludge (WWTS) is

cleansed and the plants put in landfill as a stabilizer. Sunflower stalks can also be converted to Bio-Char, another stabilizing agent.

Mineralization of captured perfluorooctanoic acid and perfluorooctane sulfonic acid at zero net cost using flash Joule heating

31 March 2025

Nature Water

*“Granular activated carbon (GAC) is widely used for PFAS removal but becomes secondary waste (PFAS-GAC). Current treatment methods are energy intensive and release hazardous fluorocarbons. This study demonstrates electrothermal **mineralization of PFOA and PFOS-GAC via flash Joule heating**, a scalable and efficient process.*

Heating PFAS-GAC with sodium or calcium salts converts PFAS into inert fluoride salts with >90% fluorine conversion and >99% PFOA and PFOS removal. Simultaneously, the spent carbon is upcycled into flash graphene, offsetting treatment costs by US\$60–100 per kg. This solvent- and catalyst-free method substantially reduces energy use, greenhouse gas emissions and secondary waste.

*A techno-economic assessment highlights its scalability and environmental benefits, offering a rapid (~1 s), **cost-effective solution for PFAS remediation and upcycling of waste carbon into high-value products.***

<https://www.nature.com/articles/s44221-025-00404-z>

Low-temperature mineralization of perfluorocarboxylic acids

18 Aug 2022

(Also contains information on **Decarboxylation** ~ Kat)

Forever chemicals’ Achilles’ heel

*“...current PFAS destruction strategies use nonselective destruction mechanisms, we found that perfluoroalkyl carboxylic acids (PFCAs) could be mineralized through a sodium hydroxide–mediated defluorination pathway. PFCA decarboxylation in polar aprotic solvents produced reactive perfluoroalkyl ion intermediates that **degraded to fluoride ions (78 to ~100%) within 24 hours.***”

<https://www.science.org/doi/10.1126/science.abm8868#Science>

Using Northern Maine locations such as Millinocket and Limestone and Dow AFB in Bangor, to test this process serves a dual purpose since all sites have contaminated soil, are brownfield and/or superfund sites and cleanup money may help support ongoing efforts.

State PFAS funding could also help support remediation efforts on farmland using natural Phytoremediation instead of expensive intrusive excavation methods.

Incorporating UMaine students into the study would position graduates to find employment in pfas remediation keeping them in the state. I would also add Technical schools to train certified staff in both fields.

The benefits of passing LD 1604 could go far beyond testing for PFAS/PFOS.
Adding Phytoremediation for PFAS removal to the bill enhances the value could be the genesis of a new sustainable solution to our Forever Chemical problem.

I would be happy to supply the ENR Committee with additional information to encourage you to consider Phytoremediation as an amendment to this or a stand alone bill.

Respectfully,

Kat Taylor
Argyle Twp.