University of Vermont

Environmental Health and Safety
667 Spear Street, UVM-ESF
Burlington, VT 05405
802-656-0767

March 28, 2025

Drew Youngs
Vermont Department of Environmental Conservation
Hazardous Waste Program

RE: 2024 Annual Toxic Use and Hazardous Waste Reduction (TUHWR) Report

Dear Mr. Youngs,

Please consider this letter the 2024 Toxic Use and Hazardous Waste Reduction (TUHWR) Report for the University of Vermont (UVM), including the tables for the breakdown of the processes and wastes at UVM. This report covers waste management activities at all UVM sites, including those not located within our main campus. Information pertaining to UVM's Environmental Health and Safety (EHS) programs, including the projects discussed below can be found at the EHS web page located at: https://www.uvm.edu/safety

Additionally, the University's *Environmental Management Plan,* which includes the *Pollution Prevention Plan,* is located at: https://www.uvm.edu/safety/laboratory-environmental-management-plan

Results from the 2024 Hazardous Waste Report

The attached Table 1. *Hazardous Waste Generation Information* table shows that UVM generated 48,609 pounds of hazardous waste in 2024. This represents an 18.1% increase over the previous year and a 21.4% decrease compared to the average of the previous 10 years (61,845 pounds).

Included in this report are 2024, 2023, 2022, and 10-year averages to show a more comprehensive image of waste production.

Categories	2024	2023	2022	10-year Avg (2012 - 2021)
Total pounds of hazardous waste	48,609	41,166	70,970	64,243
Pounds from research and teaching	34,390	29,681	32,773	40,470
Pounds from on-going maintenance	7,870	10,306	11,286	10,224
Pounds from one-time facilities projects	6,350	1,180	26,910	13,549

The processes generating hazardous waste at UVM are grouped into three categories. Wastes generated from: ***1)*** *research and teaching activities;* ***2)*** *on-going maintenance of our facilities; and* ***3)*** *one-time projects (building renovations, tank removals, hazmat spills, etc.)*

1. **Research & Teaching:** Waste generated in 2024 from research and teaching activities increased 15.9% over the previous year and is the highest since 2019. Total waste generated from these activities is still an 11.6% decrease compared to the 10-year average.

    A. Success Stories

        i. **Glove Recycling:** UVM still operates an active glove recycling program throughout campus. Individual departments manage their involvement in the program. Collecting non-contaminated, used gloves in this format helps divert waste from the landfills and hazardous waste streams. Approximately 1,400 pounds of nitrile gloves were diverted in 2023, but no additional shipments have been made.

        For more information on the glove recycling program see: https://www.kcprofessional.com/en-us/solutions/rightcycle-by-kimberly-clark-professional.

        ii. **Delahanty Acid Neutralization:** UVM's Rubenstein School of Environment and Natural Resources operates an acid neutralization system for acids with no other hazards, including hydrochloric acid, hydrofluoric acid, and nitric acid. In 2024, this system treated over approximately 12,674 pounds of would-be hazardous waste so that it was safe for drain disposal. Regular maintenance and monitoring ensure that the equipment efficiently neutralizes the waste. Additional training is also provided to the users of this system. UVM provides the quarterly volumes of acid treated to the City of Burlington Wastewater Treatment Operator.

    B. Ongoing Initiatives

        i. **Systematic Laboratory Auditing System:** UVM continues to use an electronic auditing system to manage and track laboratory inspections conducted by EHS staff. The system covers health and safety parameters, in addition to proper waste characterization and management. During these audits safety staff review labeling of chemicals and wastes in addition to their storage. These audits help keep the number of chemical "unknowns" low and prevents aging compounds that become unstable with age, such as explosive peroxides.

ii. **Laboratory Safety Training:** UVM maintains an extensive safety-training program for laboratory personnel that includes information about chemical safety, biological safety, hazardous waste management and pollution prevention. Training is provided by EHS through a collection of on-line and classroom courses. Classroom courses for 2024 continue to mostly be provided through a virtual, live-format.

EHS Training	2024	2023	2022
Completed On-line Courses	10,630	9,940	10,590
Completed Classroom Courses	739	1,692	1,067

In 2024, EHS expanded the use of our laboratory management system to include several training programs. This system now tracks both in-person and online courses, enhancing our ability to monitor compliance and participation. Over 1,500 trainings were completed through the system, with additional courses planned for 2025. By providing improved tracking and automated reminders for required trainings, the system supports safer practices and stronger compliance. We believe the heightened awareness fostered by our rigorous training program has played a key role in the continued success of effectively managing UVM's hazardous materials.

iii. **Unknown Chemical Waste:** The number of chemical unknowns increased in 2024 compared to the previous year. This increase was due to multiple laboratory cleanouts, including within our Chemistry Department. EHS continues to communicate and partner with laboratories to emphasize the importance of proper waste management, and to minimize the generation of chemical unknowns.

Unknown Chemical Waste	2024	2023	2022	10-year Avg (2011-2020)
# Containers of unknown waste	105	56	87	75

C. Changes in Research and Teaching Activity

The indicator *pounds-of-hazardous-waste per $1,000-in-research-funding* has been calculated to assess a "Production/Service Factor."

Funding	2024	2023	2022	10-year Avg (2011-2020)
Dollars received by UVM to fund research	$224,762,798	$230,154,131	$214,118,857	$143,960,610
Hazardous waste from research & teaching	34,390 lbs.	29,681 lbs.	32,773 lbs.	40,929lbs.
Pounds of waste / 1,000 research dollars	0.153	0.129	0.153	0.273

Our "Production/Service Factor" for 2024/2023 is **1.19.**

2. **On-going Maintenance:** *Waste generated from on-going maintenance decreased 23.6% from the previous year, and is 22.2% lower than the 10-year average. The most substantial impact was due to the reduction of waste oil in 2024.*

   Recycling Opportunities: In 2024, UVM recycled 2,289 pounds of alkaline, rechargeable, and non-rechargeable batteries (*includes: nickel-cadmium, lithium, and nickel-metal hydride*) through "Call2Recycle". UVM also shipped 4,602 pounds of lead-acid batteries to Interstate Battery Solutions for lead reclamation, and 2,602 pounds of latex paint to the Chittenden Solid Waste Environmental Depot for reuse.

3. **One-Time Facilities Projects:** One-time facility projects continue to be the most variable waste total. In 2024, "one-time" facilities projects accounted for 6,350 pounds of UVM's waste. The majority of this waste was due to a one-time disposal of COVID-19 disinfectant products. This category of waste varies depending on building renovations, facility upgrades and spills. Starting in 2024, damaged batteries are being tracked separately due to the growing presence of battery powered transportation (i.e., cars, skateboards, e-bikes, etc) on campus. To emphasize the importance of proper waste management, EHS staff attend monthly coordination meetings led by UVM's Planning Design and Construction (PD&C) team where projects are planned and tracked. Our staff provides consulting services to the project on ways to minimize and best manage any regulated materials and wastes generated from these activities. In addition, EHS is beginning regular training with UVM Physical Plant, PD&C, and other campus staff to discuss safety programs on campus. This allows us frequent interaction with our other campus partners for better support and training.

4. Universal Wastes & Recycling

UVM recycles waste whenever possible. Wastes sent for recycling, universal wastes, and wastes that are not listed as hazardous are excluded from the above totals.

Fluorescent Bulbs and Electronic Waste: UVM manages its electronics waste and fluorescent light bulbs under the Universal Waste regulations. Many of the fluorescent lamps are being switched to LED throughout campus, so we would expect to continue to see a decrease in the number of lamps generated each year; however, campus projects, including building demolition/remodeling can cause an increase in waste. Unwanted electronic equipment generated varies per year based on a variety of factors.

Name of Waste Stream	2024	2023	2022
Fluorescent Lamps - *Straight*	27,806 feet	31,126 feet	31,578 feet
Fluorescent Lamps - *Compact & Specialty*	3,946 bulbs	4,394 bulbs	4,256 bulbs
Electronic equipment	23.89 tons	25.63 tons	18.62 tons

Summary

The University of Vermont's total amount of hazardous waste generated increased by 18.1% from 2023 to 2024, which is still a reduction of 21.4% compared to our 10-year average.

In February 2025, UVM achieved an R1 Research Activity Designation from the Carnegie Classification of Institutions of Higher Education, recognizing the university for its highest level of research activity. This milestone is expected to attract more researchers and grant funding. Currently, most research funding is awarded to our College of Medicine, which historically generates less hazardous waste than chemistry-based research. As a result, increased funding may not directly lead to higher waste volumes. Additionally, with uncertainties in federal funding, the long-term impact on research activities and subsequent waste generation remains unclear.

We continue to track the Net Assignable Square Feet of laboratory and laboratory support spaces to monitor trends in waste generation. Over the past period, these spaces decreased by 15,685 square feet (3.295%). However, space alone does not correlate directly with waste generation—some departments occupy larger areas but generate less waste, while others produce more waste within smaller spaces. Additional review is needed to better understand these variations and accurately link waste generation to specific departments and their activities.

In 2025, UVM will continue the implementation of our comprehensive laboratory management system, including expanding the hazard-specific training platform and chemical inventory system. Labs have already begun tracking their chemical inventory within the LMS and EHS has also begun completing our regular lab inspections in the system. We expect this system will help support proper waste management within research and teaching labs across campus.

If you have any questions regarding this update, please contact me at (802) 656-0767.

Sincerely,

Dorian Evans, MS, REM, CHMM
Environmental Compliance Manager
Environmental Health and Safety
University of Vermont & State Agricultural College

VERMONT

Toxic Use and Hazardous Waste Reduction (TUHWR)
Annual Progress Report

I. Facility Information & Certification

Note: If you need more than one line to enter your information (e.g., facility mailing address should include street, municipality, and zip code) use the "ENTER" key to add a line to the shaded box.

Facility Name: University of Vermont & State Agricultural College

Facility Mailing Address: Environmental Safety Facility, 667 Spear Street – UVM Burlington, VT 05405

Facility EPA ID: VTD000636563

Contact Person: Dorian Evans

Telephone Number: 802-656-0767

E-mail Address: dorian.evans@uvm.edu

Planning Status for Report Year:

- **Class A** ☒
- **Class B** ☐
- **Large User** ☐
- **Class A & Large User** ☐
- **Class B & Large User** ☐
- **Exempt*** ☐

If your facility did not exceed planning thresholds for hazardous waste generation or toxic substance use in the previous reporting year and you would like to request an exemption, complete this report (indicate "exempt" above) but do not submit the annual fee. You will be contacted to provide additional information supporting your request.

Certification: I certify that the information provided in this report and all attached documents is true, accurate, and complete to the best of my knowledge and belief.

Signature:* Dorian Evans Digitally signed by Dorian Evans Date: 2025.03.28 13:26:35 -04'00' Date: 03/29/2024

Title: Environmental Compliance Manager

This report must be signed by an officer of the company or the person responsible for the operation of the site.

II. Hazardous Waste Generation Information

This information only needs to be provided by Class A and Class B generators.

Report all waste streams that were subject to planning during the reporting year (even if a waste stream was eliminated or represented less than 5% of the annual total). Also include any "new" waste streams generated during the reporting year that are subject to planning. Please give the quantity in pounds and as ***a percentage of the total amount of hazardous waste generated at the facility for the year.*** Do not list non-hazardous waste streams such as those with a VT99 waste code.

WASTE STREAM			ANNUAL QUANTITY GENERATED			
EPA OR VT WASTE CODE(S)	Name of Hazardous Waste Stream	Process Generating Waste Stream	REPORTING YEAR (2024)		PREVIOUS YEAR (2023)	
			pounds	percent	pounds	percent
	See following sheet					
		Total of Hazardous Waste Generated				

II. Hazardous Waste Generation Information

WASTESTREAM			ANNUAL QUANTITY GENERATED			
Waste Codes	Name of Hazardous Wastestream	Process Generating Wastestream	2024		2023	
			pounds	% of total	pounds	% of total
Listed below	Labpack waste	Research and Teaching	3,645	7.5%	5,901	14.3%
D001;D002;D004;D008;D011;F002;F003;F005;VT20;	Contaminated debris organic/inorganic	Research and Teaching	685	1.4%	155	0.4%
Listed below	Labpack waste with acute toxicity	Research and Teaching	1,185	2.4%	1,036	2.5%
Listed below	Bulk acid lab waste	Research and Teaching	5,352	11.0%	3,155	7.7%
D002;D005;D011;VT20;	Bulk alkaline waste	Research and Teaching	4,417	9.1%	1,702	4.1%
D001;D002;D004;D007;D009;F002;F003;U151;	Labpacked mercury waste	Research and Teaching	200	0.4%	5	0.0%
Listed below	Bulk solvents	Research and Teaching	15,980	32.9%	14,114	34.3%
D001;D002;F002;F003;U122;	Other organic liquid wastes	Research and Teaching	1,120	2.3%	1,182	2.9%
D001;D004;F002;F003;F005;	Solids contaminated with flammable materials	Research and Teaching	1,800	3.7%	2,425	5.9%
D001;VT20;	Corrosive solids	Research and Teaching	5	0.0%	5	0.0%
D001	Compressed gasses	Research and Teaching	0	0.0%	0	0.0%
D001	Aerosols	On-going maintenance	2,475	5.1%	2,380	5.8%
VT03	Cutting Oils	On-going maintenance	209	0.4%	375	0.9%
VT08	Ethylene glycol / water	On-going maintenance	459	0.9%	667	1.6%
VT02	Hydraulic oil debris	On-going maintenance	0	0.0%	0	0.0%
VT02;VT08	Oil filters	On-going maintenance	350	0.7%	0	0.0%
VT02	Oil, water, sludge	On-going maintenance	0	0.0%	0	0.0%
D001;VT02;VT08	Oily debris	On-going maintenance	2,314	4.8%	1,875	4.6%
D001	Sternos	On-going maintenance	470	1.0%	490	1.2%
D001;D018;VT02	Used Fuel Filters	On-going maintenance	0	0.0%	170	0.4%
D001;D018;D039;D040;F001;F002;F005	Waste Oil	On-going maintenance	749	1.5%	3,829	9.3%
D001;D008;D011;U002	Paint-related material	On-going maintenance	845	1.7%	520	1.3%
VT20	Alkaline Boiler Treatment Debris	One-time facilities project	0	0.0%	0	0.0%
VT02	Diesel sludge	One-time facilities project	0	0.0%	0	0.0%
D008	Lead contaminated soil	One-time facilities project	0	0.0%	0	0.0%
D009;U151	mercury waste	One-time facilities project	0	0.0%	185	0.4%
VT01	PCB waste	One-time facilities project	0	0.0%	265	0.6%
D005;D006;D007;D008;D009;D011;VT02;VT08;VT20	Contaminated debris	One-time facilities project	320	0.7%	730	1.8%
D018	Gasoline contaminated speedi dry/ debris	One-time facilities project	0	0.0%	0	0.0%
D008;D009;D010	Fly Ash with metals	One-time facilities project	0	0.0%	0	0.0%
D008	Lead paint chips and debris	One-time facilities project	0	0.0%	0	0.0%
D001;D002	Covid-related cleaning supplies	One-time facilities project	6,000	12.3%	0	0.0%
D002;D008	Damaged Batteries	One-time facilities project	30	0.1%	0	0.0%
		Total of Hazardous Waste Generated	**48,609**		**41,166**	

Hazardous Waste Generation - *Averages and Year-Over-Year*

Waste Streams	10-Year Average pounds	2024		2023	
		pounds	% of total	pounds	% of total
Pounds from research and teaching	**38,883**	**34,390**	70.7%	**29,681**	72.1%
% increase/decrease over previous year		15.9%		-9.4%	
% increase/decrease over 10-year average		-11.6%			
Pounds from on-going maintenance	**10,119**	**7,870**	16.2%	**10,306**	25.0%
% increase/decrease over previous year		-23.6%		-8.7%	
% increase/decrease over 10-year average		-22.2%		1.9%	
Pounds from one-time facilities projects	**12,843**	**6,350**	13.1%	**1,180**	2.9%
% increase/decrease over previous year		438%		-97%	
% increase/decrease over 10-year average		-50.6%			
Total Pounds	**61,845**	**48,609**	100.0%	**41,166**	100.0%
% increase/decrease over previous year		18.1%		-48.5%	
% increase/decrease over 10-year average		-21.4%			

All waste codes for the waste streams below are listed here to allow for space in the table above.

Labpack waste	D001; D002; D003; D004; D005; D006; D007; D008; D009; D010; D011; D016; D022; D036; D042; F002; F027; U007; U044; U053; U058; U067; U098; U103; U119; U133; U134; U136; U138; U144; U160; U165; U169; U188; U197; U223; U236; U240; VT20
Labpack waste with acute toxicity	D001; D002; D003; D004; D005; D007; D008; D011; D018; D021; D022; D028; D038; F002; F003; P003; P005; P022; P030; P042; P075; P077; P087; P089; P098; P105; P113; U001; U002; U017; U019; U037; U041; U044; U061; U072; U077; U080; U102; U113; U136; U148; U162; U169; U170; U188; U196; U197; U201; U353
Bulk acid lab waste	D001; D002; D003; D004; D005; D006; D007; D008; D010; D011; F002; U123; U147; U190; VT20
Bulk solvents	D001; D002; D004; D005; D007; D008; D010; D011; D018; D022; D028; D038; D040; F002; F003; F005; U002; U003; U006; U031; U056; U057; U108; U112; U117; U154; U213; U220; U239; U359; U404; VT20

III. Annual Hazardous Waste Reduction Progress

This information only needs to be provided by Class A and Class B generators.

The purpose of this section is to report progress made by Class A and Class B generators in reducing hazardous waste generation during the reporting year relative to the previous year. Generators should only report reductions that are attributable to the implementation of some reduction measure(s), as opposed to a downturn in business. It is possible to realize a reduction, on a per unit basis, even though yearly generation may have increased due to increased production (see Section VI, Production Index).

Reduction Measure Code	Hazardous Waste Stream Affected	Briefly Describe the Reduction Measure Implemented	Amount Reduced (in pounds) from 2023 to 2024	Check the box below if this reduction opportunity was identified on Worksheet 10 of your Plan.
		Please see narrative.		☐
				☐
				☐
				☐
				☐
				☐
		Total Reduction Attributable to Hazardous Waste Reduction Measures		

Reduction Measure Codes:

PC - Process Change
PM - Product Modification
IS - Input Substitution
IR - In-Process Recycling
OM - Improved Operations/Maintenance
SP - Spill/Leak Prevention
IC - Improved Inventory Control
OR - Recycling Outside Process
PE - Process Elimination
EU - Equipment Upgrade

VI. Production/Service Level

Toxic Use and Hazardous Waste Reduction progress should be measured relative to changing production/service levels. This is done by comparing units of production/service during the reporting year with units of production/service from the previous year. The ratio is referred to as the production index. This index will be greater than 1.0 if production has increased and less than 1.0 if it has decreased. If you manufacture multiple products or provide significantly different services, it may be useful to develop a production index for each product or service that uses toxic substances or generates hazardous waste. Please provide a production index for the current year in the space provided below.

Example: *Current Year (2024) Production/Service Level = 120,000* ***120,000***
Previous Year (2023) Production/Service Level = 100,000 ***100,000*** ***= Index of 1.2***

Production/Service Factor:
Current Year Production/Service Level = 0.153
Previous Year Production/Service Level = 0.129
Index = 1.19

Please provide a brief description of any applicable factors present during the reporting year that may have affected hazardous waste or toxics use reduction, including change in business activity, change in waste classification, natural phenomena or other factors affecting the quantity of waste generated, or waste management practices used at the facility:

Please see narrative.

Personnel are available to assist businesses with the preparation of TUHWR Plans, Annual Progress Reports, and identification and assessment of potential toxic use and/or hazardous waste reduction opportunities.

Please contact:
Drew Youngs
(802) 461-5929
andrew.youngs@vermont.gov