

Vermont DEC
Residuals Management Program
2023

Sludge & Biosolids Management in Vermont – Challenges and Opportunities

2021 Vermont Sludge & Biosolids Management Statistics			
Management Option	In-State	Out-of-State	Totals
Volume (Dry Tons)			
Beneficial Reuse*	3,561	4,734	8,294
Landfill Disposal	2,699	605	3,304
Total	6,260	5,339	11,598
Percentages			
Beneficial Reuse	30.7	40.8	71.5
Landfill Disposal	23.3	5.2	28.5
Total	54.0	46.0	100.0

*includes both Class B land application and EQ biosolids distribution

- 72% of sludge is recycled as biosolids
- 28% of all VT sludge is landfilled, of that, 82% to Coventry
- 46% of all sludge is exported out of state
- 44 M gallons of septage hauled in VT, 90% to VT WWTFs

2021 Vermont Septage Management Statistics			
Management Option	In-State	Out-of-State	Totals
Volume (Gallons)			
Land Application	702,484	81,275	783,759
Wastewater Treatment Facility Disposal	39,908,558	3,329,358	43,237,916
Total	40,611,042	3,410,633	44,021,675
Percentages			
Land Application	1.6	0.2	1.8
Wastewater Treatment Facility Disposal	90.7	7.6	98.2
Total	92.3	7.7	100.0

*275 acres permitted for class B land application (April 2023)

*50 acres permitted for septage land application (April 2023)

Residuals Management Options Available to Vermont Facilities

	Wastewater Sludge	Class B Biosolids	Class A/ EQ Biosolids	Septage
Landfill	Capacity limitations			
Incineration	No incinerators located in VT			
Biosolids Land Application		Site Specific Permit	Permit for Treatment Standards + Potential New Regulation	Site Specific Permit
EQ Biosolids Distribution				
Transfer to Facility	Between WWTFs or Export			98% to WWTF (State-wide Study underway)

Sludge & Landfill Disposal Challenges

- Capacity limited/declining in Vermont (one active landfill)
- ***Capacity limited/declining in NE Region***
- Landfill stability depends on ratio of sludge to more ‘dry’ wastes (Juniper Ridge, ME)
- Municipalities competing against each other for contracts for disposal
- Greater hauling distances outside region to find landfills with capacity
- Increased costs (to public) associated with declining capacity vs demand
- Refusal of waste due to odors, etc

General Environmental Impacts from Sludge Disposal at Landfills:

- Increases landfill methane - potent greenhouse gas 25x CO₂
- Pollutant emissions and greenhouse gas from ***hauling*** (*increasing distances*)
- Environmental Justice challenges – more trucks, more odors
- Generates landfill leachate (emerging contaminants) for management at WWTFs

Sludge Incineration Challenges

- No sludge incinerators in Vermont
- Most incinerators are in Connecticut
- Capacity challenges throughout NE Region
- Municipalities competing against each other for contracts for disposal

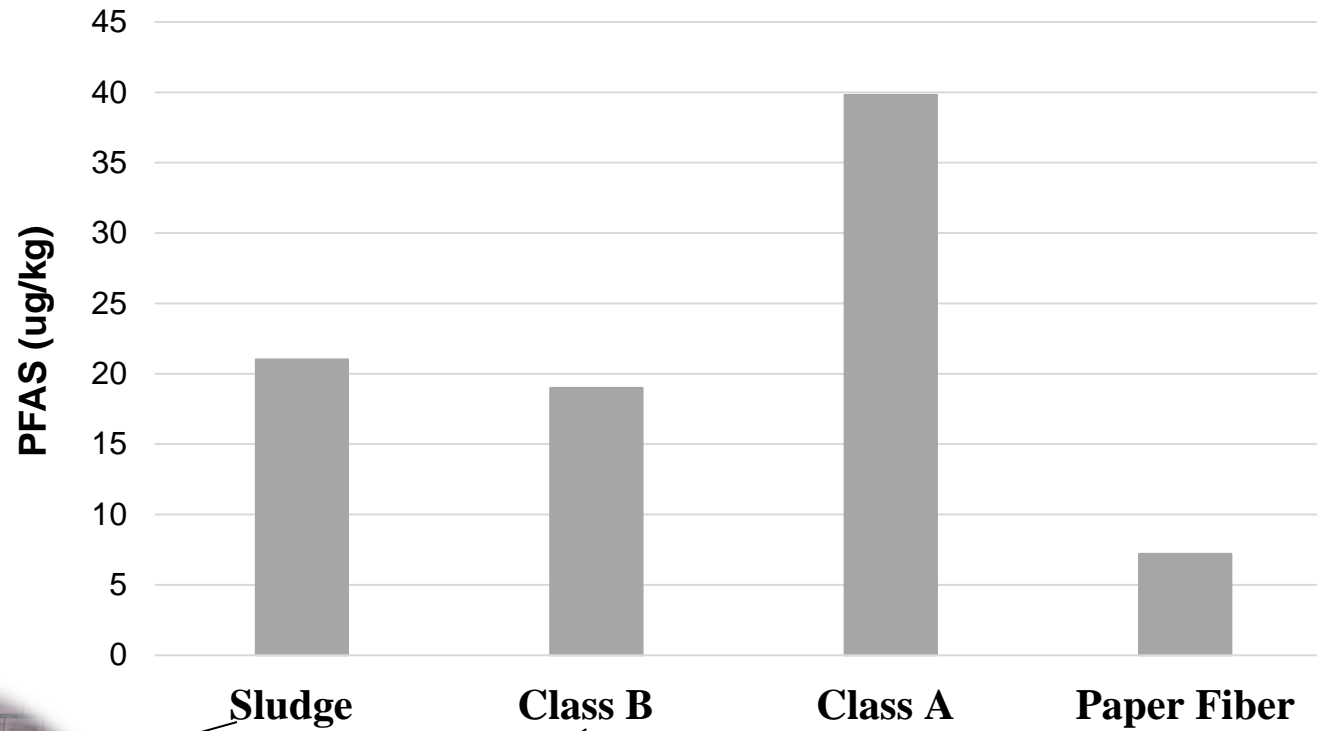
General Environmental Impacts from Sludge Incineration:

- Air emissions – greenhouse gases, particulates, mercury
- Environmental Justice challenges
- ***Sewage sludge incinerators do not destroy PFAS (per current EPA research)***

Land Application/Beneficial Reuse Challenges

- *Per & polyfluorinated alkyl substances (PFAS)*
 - Accumulation in soils
 - Leaching to groundwater
 - Crop uptake/bioaccumulation
 - Not currently tracking/regulating EQ biosolids land application sites
- Odors (septage, some biosolids)
- Uncertainty about the future of land application via additional regulations and/or legislative prohibitions

Average VT-5 PFAS (ppb) in Samples of Residual Materials –2019



PFAS testing results at VT Land Application Sites *

# GW wells tested	# wells > GWES of (20 ppt)	Average VT-5 PFAS in wells tested (ppt)	Range of VT-5 PFAS in wells tested (ppt)
137	30	54.7	No Detect - 226
# fields/soils tested	# soils > Standard (1.2 ppm)	Average VT-5 PFAS in soils tested (ppb)	Range of VT-5 PFAS in soils tested (ppb)
62	0	13.2 (11.6 as PFOS)	No Detect – 48.5
# Drinking Water Wells tested	# wells > MCL of (20 ppt)	Average VT-5 PFAS in drinking water tested (ppt)	Range of VT-5 PFAS in drinking water wells tested (ppt)
44	0	N/A	N/A

*Since Fall 2019, PFAS testing at ~30 unique Class B/septage land application sites in Vermont

Mitigating Risk from PFAS in Recycled Residuals

Reducing risks via updated 2020 Vermont Solid Waste Rules:

- Routine PFAS monitoring/testing of biosolids, soils, groundwater, crops
- Limit duration of Certification (permit) to five (5) years

Draft Residuals Management Interim Guidance via Stakeholder Process

- Exceptional Quality (EQ) biosolids and Short Paper Fiber (SPF)
 - Track locations, material generator/source, volumes
 - PFAS testing in material for comparison to background soil levels
 - Potential additional institutional controls
 - Soil testing (pre and post land application)
 - Ensure set back distance to drinking water wells @ 300'
 - Notification to end user about PFAS content - labelling
 - Prohibit use on crops for human consumption
 - Recommend use on non-food chain crops if used in Ag settings

New PFAS focused Projects by VTANR

- Private well testing initiative 2023-?
- Food waste testing and P2 technical assistance for food processors (2023-2024)
- Comprehensive state-wide PFAS testing at VT WWTFs 2023-2024
 - Phase 2 focused on source investigations
- State-wide Septage Capacity Study (less focus on PFAS, more on WWTF capacity)
- Potential soil standards (iRule) for PFAS based on background soil study
- Surface Water/Fish Tissue – DEC MAPP program
- Ongoing contaminated site response – BTV, schools, etc.
- NEWMOA Draft Model PFAS Legislation - Public Comment Period through 6/29/23