



Memphrémagog
Conservation

APPENDIX E

Technical comments on PFAS treatment and pretreatment at Coventry and leachate disposal

1. PFAS treatment underdrain UD-3

Asking for plans of what was installed?

Operational issues

- What is the frequency of sampling and analysis?
- Are the analyses carried out the same way as those for general WHEM monitoring?
- Being a gravity system, how is the flow controlled?
- How is it determined when to change the GAC (Granular Activated Carbon)?
- Based on experience, how often should the GAC be changed?

Mass balance

We recommend that a monthly mass balance be established for the PFAS measured: flow rate, concentration and load at the tributary and effluent, load of PFAS removed in GAC, mass of GAC disposed in landfill.

UD-1 and UD-2 drains

Is it considered that the UD-1 and UD-2 drains could possibly be treated by this system rather than being conveyed with the leachate?

Surety bond for post closure

NEWSVT in its letter of December 28, 2021 to the VTDEC with the subject "Phase III Underdrain Discharge Treatment System Certification Amendment"

(16) A post-closure plan that satisfies the criteria of §6-1008 of these Rules;

See the enclosed post-closure plan created for the UD-3 PFAS Treatment System.

(17) Evidence of compliance with the financial responsibility and capability requirements of Subchapter 8 of these Rules, or a plan for achieving compliance with these requirements which will result in compliance prior to the issuance of the draft certification;

NEWSVT will update the existing surety bond to include the post-closure cost associated with the UD-3 PFAS Treatment System with the approval of the certification amendment Application.

In the UD-3 PFAS TREATMENT SYSTEM DESIGN AND PILOT TEST WORK PLAN document from consultant Sanborn Head, it is shown in the POST-CLOSURE PLAN UD-3 PFAS TREATMENT SYSTEM section a POST CLOSURE COST ESTIMATE table with the assumptions "Assuming annual interest rate of 3%; **1.0% inflation**." Since general real inflation is above 1%, is there not an underestimate of the sums required in the surety bond?

Is there a mechanism for correcting and adjusting the amounts required post-closure over the years to ensure that the amount of money available will be sufficient to consider the intervention requirements during the period of 30 years of post-closure?

2. Leachate pretreatment

Location of pretreatment

The location of the pilot and the leachate pretreatment system would have been considered in a basin other than that of Lake Memphremagog, the latter already having the BURDEN of being the only solid waste site for non-hazardous waste in Vermont.

An equitable distribution of the BURDEN would be to locate the leachate pretreatment system in the Lake Champlain Basin, producer of the maximum solid waste in Vermont.

What is the state of Vermont's position on the location of the final pretreatment system for leachate from Coventry?

Possibility of treating leachate other than that from Coventry

Is it the intention of Casella and the State of Vermont to allow the Coventry leachate pretreatment system to be open to pretreating leachate from other Vermont sites?

Third-party engineer

That the third-party engineer mandated by the VTDEC continues on at least a monthly basis to review and comment on the operations and results. That the comments of the third-party engineer be available on the VTDEC website.

If the third-party engineer's recommendations are not accepted, we ask that NEWSVT details why it did not follow the third-party engineer's recommendations.

Leak retention system possible

The addition of the pretreatment system with its transfer piping adds a risk of spillage. How is the system organized to contain any spills from the transfer lines, lines in the treatment unit and tanks? What is the retention capacity if there is a leak? What alarm systems are provided in the event of a leak? How quickly will NEWSVT staff respond?

Contamination of process air

The SAFF system operates with compressed air, the evacuation of this air is known to contain PFAS as well as undoubtedly other contaminants, particularly the most volatile, contained in the leachate. How are PFAS and other contaminants removed to prevent them from being released into the building and the outside air?

The following article provides information on this air contamination: Foam fractionation for removal of per- and polyfluoroalkyl substances:

[Foam fractionation for removal of per- and polyfluoroalkyl substances: Towards closing the mass balance - ScienceDirect](#)

In extract:

«The elevated aerial PFAS concentrations measured in the experimental facility have implications for worker safety and prevention of PFAS-emissions to the atmosphere and demonstrate the importance of installing appropriate filters on the air outlet of foam fractionation systems. »

How are the residues from the air purification system disposed of?

Mass balance

We recommend that a complete mass balance be carried out at least once a month including any additives as well as Portland cement to encapsulate the PFAS concentrates: flow rate, concentration and load at the tributary and effluent, flow rate, concentration and load of PFAS removed, air flow, concentration and load of PFAS emitted by the system before and after the air purification treatment; mass of PFAS disposed in landfill with other products.

As PFAS are removed unevenly by the SAFF system, we ask that the entire performance be considered and not just the 5 PFAS regulated by Vermont. Other PFAS, including those replacing PFAO and PFOS such as PFBS and GEN-X, which are considered by the US EPA in their health advice, must also be considered by Vermont DEC.

This study «Supplementary Information to Pilot-scale continuous foam fractionation for the removal of per- and polyfluoroalkyl substances (PFAS) from landfill leachate» [ew2c00032_si_001.pdf \(acs.org\)](#) demonstrate that short chains of PFAS such as PFCA may not be well removed by the foam fractionation system.

A. Results preliminary experiment

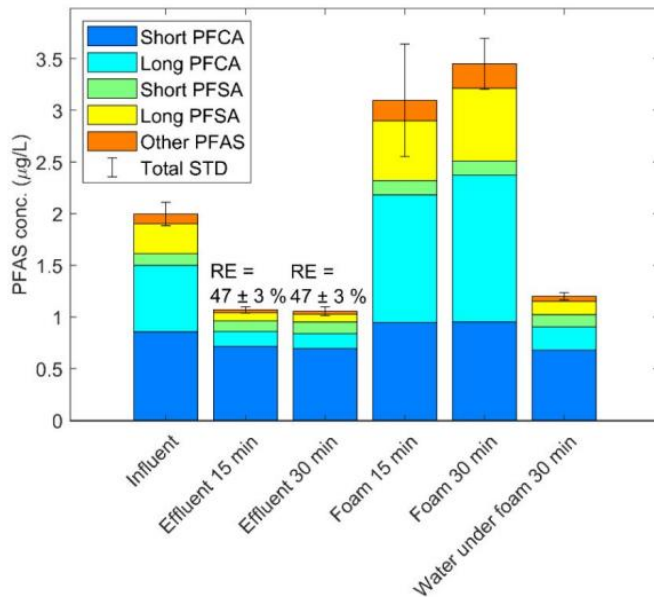


Figure SI. 1: Overview of results of preliminary experiment ($t_c = 10$ min, 30 % foam, AR 2.16, $Q_{air} 10$ L min^{-1}). Error bars represent the standard deviation on the Σ PFAS concentration.

Effluent objectives

What are the effluent performance objectives of the pretreatment system for each of the PFAS analyzed?

A 2021 Vermont DEC study has demonstrated that municipal wastewater treatment facilities remove very little PFAS, and that some of these facilities have even generated more than the 5 regulated PFAS in the effluent by Vermont than what was found at the influent.

Addition to the SAFF system processing chain

Is it considered to reduce PFAS which are little or not sufficiently removed in the SAFF system to add other systems such as filtration on resin and/or on granular activated carbon and/or reverse osmosis?

Disposition of PFAS foam concentrate

How will it be verified that the inclusion of the PFAS concentrate from the SAFF pretreatment system in a concrete matrix with Portland cement will be effective?

Will a leaching test such as the Toxicity Characteristic Leaching Procedure ((TCLP; US EPA Method 1311, 2001), Synthetic Precipitation Leaching Procedure (SPLP; US EPA Method 1312, 2001)) be carried out?

Where and how will cement blocks with PFAS be placed in the landfill? Will they be protected from damage? Will they be sheltered from rain runoff and melting snow?

Proprietary information

If proprietary information would prevent the production of a complete mass balance or the risk assessment of added products, it is requested to produce a list made available on the VTDEC website, indicating the reason for this non-disclosure.

3. Leachate disposal

This permit granted by VTDEC to NEWSVT only authorizes one leachate disposal site in Vermont, Montpelier WWTF.

This is also confirmed in Act 250

18. a. Disposal of landfill leachate from the Facility, including that generated from all Phases of the landfill (Phase I-IV) and from Phase VI, is not permitted at the Newport WWTF. Permittee may not dispose of leachate at the Newport WWTF, nor dispose of landfill leachate on-site or elsewhere within the watershed of Lake Memphremagog, without Act 250 permit amendment. This restriction shall take effect 90 days from the date of issuance of this permit.
- b. Permittee may apply for Act 250 permit amendment, to modify this restriction, if such an amendment application is supported by new science, new technology and/or or new data which demonstrates, or seeks to demonstrate, that the risk to the Lake Memphremagog water quality (drinking water supply) will not be unduly adverse.
- c. Permittee shall apply for an Act 250 permit amendment for any change to its method of leachate management, pre-treatment, and disposal, including but not limited to construction of on-site treatment systems.
- d. Permittee shall submit a copy of its study of treatment options for leachate management (two onsite and two offsite, with both studies to be completed by October 12, 2019) to the District Commission for its file.

We ask that the final disposal of the leachate be kept forever outside the Lake Memphremagog basin given that it is a drinking water reservoir for some 175,000 Canadians. Already, as established in other documents filed by the MCI on this NEWSVT permit application, overdoses of contaminants including PFAS have been released into the Lake Memphremagog basin representing an estimate of 30% of leachate generated since 1993. This is therefore well beyond the approximately 5% of solid waste from Vermont residents of the Lake Memphremagog basin buried in Coventry.

As residents of the Lake Champlain basin are the majority producers of waste buried in Coventry, it is fair and equitable that the leachate ends up in final disposal at Montpelier WWTF or any other WWTF in this basin.

Conclusion

MCI objectives are simple and clear:

to have Newport WWTF removed «forever» from the NEWSVT Coventry list of leachate destination even after treatment and have the leachate final destination out of Lake Memphremagog basin «forever».

What is the state of Vermont's position on MCI's request to completely ban the disposal of raw, pretreated or treated leachate from the NEWSVT Coventry site to the Newport WWTF or elsewhere in the Lake Memphremagog basin?