

**SOLID WASTE MANAGEMENT FACILITY
CERTIFICATION
10 V.S.A. §6605**

PERMITTEE: Town of Lyndon, VT

OPERATOR: Utility Partners, LLC.

AUTHORIZED REPRESENTATIVE: Justin Smith, Municipal Administrator

SOLID WASTE I.D. NUMBER: SW-134

CERTIFICATION NUMBER: F1601

PROJECT ID NUMBER: SJ96-0264

TREATMENT FACILITY DESIGNATION:

Rotary Drum Sludge Thickener	TLY0102
ATAD Reactor #1	TLY0103
ATAD Reactor #2	TLY0104
Centrifuge	TLY0105
Biofilter	TLY0106

STORAGE FACILITY DESIGNATION:

Aerated Storage Tank	SLY0102
Storage Building	SLY0103

CERTIFICATION PERIOD: Date of Signature through December 31, 2025

PURPOSE OF THE CERTIFICATION: The purpose of this certification is to assure that the solid waste management facilities (facility) for the treatment and storage of wastewater treatment sludge (biosolids), which are owned and operated by the Town of Lyndon, VT (Permittee), are constructed and operated in accordance with the conditions set forth herein to protect the public health and safety, and the environment.

FACILITY DESCRIPTION & LOCATION: This Certification authorizes the designated equipment and structures that are used to treat biosolids to standards established in the Rules for further pathogen reduction and to the federal Class A pathogen standards. The facility will treat biosolids with a high temperature aerobic digestion method to produce a Class A product that qualifies for unrestricted public distribution and beneficial use, such as a soil amendment for agricultural lands, recreational areas, and/or landscaping purposes.

The solid waste management facility includes: a rotary drum thickener, a pre-ATAD (autothermal thermophilic aerobic digestion) holding tank, two ATAD reactors, a centrifuge, a storage tank that can be aerated, a storage building for the dewatered final product, and a biofilter odor control system. The facilities are located at the Town of Lyndon's existing wastewater treatment facility at 217 Rose Lane in Lyndon. These facilities are identified and described in the submitted biosolids management plan entitled, "*Application for Re-Certification of Sludge Management Plan for Sludge Treatment & Handling*" (Plan) dated March 2014 and received by the Department on March 10, 2014.

FACILITY OPERATION: The solid waste management facility is designed to process 186 dry tons per year of biosolids at design capacity. To meet the requirements of a Process to Further Reduce Pathogens (PFRP, or also known as Class A), biosolids will be treated by high temperature aerobic digestion (autothermal thermophilic aerobic digestion, or ATAD), where the heat is supplied by the biological process. After ATAD treatment, the biosolids are temporarily stored in a tank that can be aerated, and then dewatered using a centrifuge. Dewatered, treated biosolids will be stored in the storage building.

The Permittee's primary strategy for finished product management is to market and distribute to the public. Once distributed to the end user, the class A biosolids become an unregulated commodity. As a contingency management option for the management of treated biosolids that fail to meet the regulatory standard for Class A pathogen treatment or for events when biosolids cannot be managed in accordance with this certification, the biosolids can be disposed at a suitable in-state or out-of-state solid waste management facility.

Odors from the facility will be controlled by the use of a biofilter treatment system designed to treat air from the pre-ATAD holding tank, the rotary drum thickener, the two ATAD reactors and the aerated post-ATAD storage tank. Liquid from the biofilter system will be collected and returned to the wastewater treatment plant.

APPLICATION REVIEW: The Application for this certification amendment, dated March 2014, was reviewed in accordance with the Vermont Solid Waste Management Act, 10 V.S.A. §§6601 et. seq., and the Vermont Solid Waste Management Rules, revised March 15, 2012 (Rules). A written application is on file in the office of the Agency of Natural Resources (Agency), Department of Environmental Conservation (Department), Wastewater Management Division in Montpelier, Vermont.

FINDINGS

1. Certification for the Applicant's solid waste management facility (Facility) is required by 10 V.S.A. §6605 and Section 6-303 of the Rules.
2. On March 10th, 2014, the Applicant submitted an application consisting of a plan titled "*Application for Re-Certification of Sludge Management Plan for Sludge Treatment & Handling*" for the management of wastewater treatment sludge (biosolids), dated March 2014 to the Agency of Natural Resources, Department of Environmental Conservation for recertification of the Facility.
3. The proposed Facility consists of a rotary drum thickener, two ATAD reactors, a centrifuge, an aerated storage tank and storage building, and a biofilter, all located at the Town's wastewater treatment facility (WWTF).
4. The application was prepared by Gary A. Leach, P.E. of Tata & Howard, St. Johnsbury, VT, who is registered in the State of Vermont and has certified that this application meets all the standards set forth in the Rules for certification of a Solid Waste Management Facility.

5. In accordance with 10 V.S.A. §6605(f), the Applicant provided notice of the application to the Town of Lyndon.
6. The application was determined to be administratively complete on March 11, 2014.
7. The Applicant provided public notice of the application and a solicitation of public comment on the application materials, as required by §6-305 (a)(2) of the Rules. On October 7, 2014, notice was provided by direct mail to the parties established in the Rules and by publication of the notice in *The Caledonian Record* and *The Chronicle*. No comments were received.
8. A draft certification and fact sheet were prepared by the Department in January 2016 in accordance with Subchapter 3 of the Rules and were released for public comment. The Secretary actively solicited comment on the draft certification and fact sheet via the public comment period, which ran from February 3rd to February 24th, 2016. Notice was provided by direct mail to the parties established in the Rules and by publication of the notice in *The Caledonian Record* and *The Chronicle*. No comments were submitted to the Department.

CONDITIONS AND REQUIREMENTS FOR OPERATION

- A. The Permittee shall perform all actions necessary for the proper management of biosolids in accordance with the Application, the facility management plan, and the conditions of this certification.
- B. The Permittee shall comply with the provisions, requirements and standards set forth in 10 V.S.A. §§6601 et. seq. and the Rules, except as expressly provided herein.
- C. The facilities required for treatment, storage, and distribution of biosolids, as described above, are the only facilities authorized by this certification. The use of other biosolids management strategies or facilities, or changes in the operational performance of the facility certified herein, without prior written authorization from the Secretary, shall constitute grounds for revocation of this certification. Processing of biosolids generated by any other WWTFs must be authorized in writing by the Department.
- D. The Permittee shall comply with all the provisions and requirements set forth in section 6-701 of the Rules including, but not limited to, the prevention and control of any nuisance odors, dust, vectors, or other emissions or discharges from the facility.
- E. The Permittee shall maintain the biofilter in accordance with the Operations and Maintenance Manual provided by the designer. The Permittee shall operate the biofilter such that nuisance odors will not occur beyond the property line of the facility. Spent biofilter media (wood chips) will be disposed of in a manner authorized by the Department upon assessment of volume, odor and proposed use of material.

- F. The Secretary specifically reserves the right to require the Permittee to install and operate another air pollution control device as the Secretary may approve in the event that the biofilter is not able to successfully control the creation of nuisance odors beyond the property line of the facility.
- G. For final product that fails to meet the pathogen reduction standards established in Condition Q and/or the vector attraction reduction standard established in Condition S of this certification, the Permittee may:
- 1) blend the product with untreated sludge and reprocess the blend through the ATAD reactors at the facility to meet these requirements; or
 - 2) dispose of the biosolids via the contingency option established in Condition S(2) of this Certification.
- H. The Permittee shall not blend or reprocess final product or distribute any biosolids that fails to meet the standard for any contaminant concentration established in Condition P of this certification, and shall dispose of such product via the contingency option established in Condition S (2) of this certification.
- I. The Permittee shall store all treated liquid product inside the storage tank while on-site at the WWTF. Dewatered product shall be stored in the existing storage building located at the WWTF. All product contained in the existing storage building shall be managed as necessary in order to prevent excessive rehydration of the dewatered product. No final product shall remain on-site of the facility for more than one (1) year following placement in the storage building. Final product that remains on-site of the facility for one (1) year following placement in the storage building shall be either immediately distributed or disposed via the contingency option established in Condition S (2) of this certification.

COMPLIANCE SCHEDULE

- J. On or before June 30, 2025, the Permittee shall either submit an application for renewal of the facility's certification and the activities certified herein, or submit a plan for closure of the facility if recertification will not be sought.

MATERIALS, MANAGEMENT AND MONITORING REQUIREMENTS

- K. The Permittee is authorized to process the lesser of a maximum of 1,020 pounds of solids per day (dry weight) or 1,800 gallons of thickened sludge per day through the ATAD system.
- L. To prevent short-circuiting of the pathogen treatment process, the Permittee shall move biosolids into and from the ATAD reactor vessels using the following sequence: (1) a volume of sludge shall be transferred from reactor #2 into the aerated storage tank; then (2) a volume of sludge shall be transferred from reactor #1 into reactor #2; then (3) reactor #1 shall be charged with a volume of sludge; and (4) in no case shall the charge

to reactor #1, the transfer from reactor #1 into reactor #2, and/or the transfer from reactor #2 into the aerated storage tank be conducted concurrently or in any other sequence than established herein. In the case of changing the volume of biosolids in the ATAD reactors, the Permittee may remove zero volume from ATAD reactor #2 but must follow the above sequence for any transfer of biosolids into reactor #2 and the charging of reactor #1.

- M. The Permittee shall conduct sludge and biosolids sampling and testing in accordance with the parameters and frequencies set forth in Table 1. Table 1 of this certification establishes the parameters and minimum testing frequency for untreated sludge and final product. Representative composite samples of all final biosolids produced shall be tested for the parameters established therein, the analytical results shall be received, and compliance with the appropriate standards established, prior to biosolids release for marketing and distribution. Testing for metals and PCBs shall be for the total form and shall be reported in units of milligrams per kilogram (mg/kg), dry weight basis. Sampling shall be conducted by a qualified individual and analysis shall be conducted by a qualified independent laboratory. The sampling frequency and parameters to be analyzed may be increased at the discretion of the Secretary.
- N. In accordance with Table 1 of this certification, the Permittee shall conduct a TCLP analysis for all parameters regulated under Section 7-208 of the Vermont Hazardous Waste Management Regulations, effective March 2013, prior to April 2017 and again prior to April 2022 (TCLP analysis is required every five years and was last performed in April of 2012). A mathematical demonstration of passing the TCLP criteria, based upon the most recent total metals analysis, is acceptable for the regulated metals only. All other regulated parameters must be tested using the full extraction and analysis procedure. Any metal which equals or exceeds the regulatory standards via the mathematical demonstration must be subjected to the full extraction and analysis procedure.
- O. Prior to the release of any final product for marketing and distribution, the Permittee shall have received or generated information documenting the following:
- 1) that the material to be released for marketing and distribution does not exceed the contaminant concentration standards established in Condition P of this certification;
 - 2) that the material to be released for marketing and distribution has been treated in compliance with the pathogen reduction standard established in Condition Q of this certification; and,
 - 3) that the material to be released for marketing and distribution has been treated in compliance with the vector attraction reduction standard established in Condition R of this certification.
- P. The Permittee shall not release final product from the facility for marketing and distribution if it contains any regulated contaminant in excess of the following concentrations:

<u>Parameter</u>	<u>Concentration (mg/kg, dry wt.)</u>
arsenic	15
cadmium	21
chromium	1200
copper	1500
lead	300
mercury	10
molybdenum	75
nickel	420
selenium	100
zinc	2800
PCB (total)	10

Q. The Permittee shall not release final product from the facility for marketing and distribution if it has not been treated to meet the following standards for pathogen reduction:

1) Pathogen Treatment:

- a) while in the ATAD system, the biosolids shall meet the time and temperature requirements of the following equation:

$$D = 50,070,000 / 10^{(0.14t)}$$

where, D = time in days, where $D \geq 0.021$ days

t = temperature in °C, where $t \geq 50^\circ \text{C}$

For the period of time as calculated by this formula, no untreated biosolids shall be added to the ATAD reactors; or

- b) of ten (10) days with an average biosolids temperature of 55° to 60°C .

2) Pathogen Testing:

- a) the density of fecal coliform bacteria, as determined from a representative composite sample of the batch of final product, shall be less than one thousand (1000) Most Probable Number (MPN) per gram of total solids (dry weight basis). Samples shall be obtained a maximum of thirty (30) days prior to release of the material from the facility; or,
- b) the density of *Salmonella sp.* bacteria, as determined from a representative composite sample of the batch of final product, shall be less than three (3) MPN per four (4) grams of total solids (dry weight basis). Samples shall be obtained a maximum of thirty (30) days prior to release of the material from the facility; and
- c) sampling and analysis for either fecal coliform or *Salmonella sp.* shall be conducted in accordance with EPA Fecal Coliform Methods 1680 (LT-EC) and 1681 (A-1) or the EPA Salmonella Method 1682 (Modified MSRV), as established at 40 CFR Part 136 as amended on March 23, 2007.

- R. The Permittee shall not release final product from the facility for marketing and distribution if it has not been treated to reduce the attraction of vectors. The vector attraction reduction requirements must be met by a minimum volatile solids reduction of thirty-eight (38) percent. Monitoring of volatile solids reduction shall be conducted as established in Condition T of this certification. If at any time the biosolids fall below the required volatile solids reduction, the biosolids shall be managed as established in Condition S of this certification.
- S. The Permittee shall monitor and record the temperature of the biosolids, as necessary, in the two ATAD reactors at two representative locations in each reactor. The Permittee shall monitor and record the period of time the biosolids is at 55° C or higher for each batch. If at any time, the biosolids do not meet the time and temperature or pathogen indicator density requirements of Condition Q, the biosolids shall:
- 1) be reprocessed through the ATAD system in order to meet the requirements of the certification for Class A biosolids; or
 - 2) be disposed at a suitable and permitted in-state or out-of-state solid waste management facility, in accordance with the contingency option established in Condition U of this certification.
- T. The Permittee shall monitor and document the volatile solids reduction of biosolids treated in the ATAD reactors once per month. Volatile solids reduction shall be measured across the treatment system from the feed to the pre-ATAD sludge thickener to the transfer point from the ATAD reactors to the dewatered biosolids.
- U. The Permittee shall transport final product that exceeds the concentration for any parameter established in Condition P of this certification, or that needs to be disposed for any other reason, to a suitable and permitted in-state or out-of-state solid waste management facility.
- V. The Permittee shall not store dewatered final product for greater than one (1) year from placement in storage or at any location other than the storage building identified in this certification, prior to its release as an unregulated commodity. The final product is considered to be an unregulated commodity once the following requirements are met:
- 1) all standards established in Conditions P, Q, R, S, T, and U have been met; and
 - 2) the product is transferred in ownership, or used by the Permittee in a manner that is no longer storage.

RECORD KEEPING AND REPORTING

- W. The Permittee shall maintain, at a minimum, the following records:
- 1) for final product:

- a) a log adequate to demonstrate compliance with Conditions P, Q, R, S, T, U, and V of this certification;
 - b) a log tracking batches of final product that do not meet the specifications established in Conditions P, Q, and R of this certification, and how those batches were managed or disposed;
- 2) for the operation of the facility:
- a) a log of all complaints received regarding operation of the facility, responses to those complaints, and any resolution reached when appropriate;
 - b) any other records or logs as may be necessary to document compliance with this certification or the requirements of 40 CFR Part 503.
- X. The Permittee shall submit quarterly reports to the Department by the 15th day of the month following the end of each quarter (April 15th, July 15th, October 15th, and January 15th) on forms provided by the Secretary. These quarterly reports shall include, at a minimum:
- 1) all sampling and monitoring results required by Condition P and Table 1 of this certification;
 - 2) an accurate record of the quantity and origin of biosolids managed at the facility;
 - 3) a summary of the records required by Condition W of this certification; and
 - 4) any other information that may be reasonably requested by the Secretary.
- Y. The Permittee shall keep all records regarding activities, management practices, complaints, and observations in a secure, dry place for a minimum period of five (5) years following expiration of this certification.
- Z. In the event of any discharge or emission from the facility which poses a threat to public health and safety, a danger to the environment, or the creation of a nuisance, the Permittee shall report the event within twenty-four (24) hours, or on the next working day, to the Department, to the local health officer, and to the town manager of the affected municipalities.
- AA. The Permittee shall submit a report to the Department within five (5) working days of the receipt of any information indicating noncompliance with any term or condition of this certification, the Rules, or other operating authority.
- BB. If the results from any required testing and monitoring indicate a violation of any standard for final product, as established in Condition Q of this certification, the Permittee shall take the following actions:

- 1) within five (5) working days from receipt of the analytical result(s), resample the affected media and submit the sample to an independent laboratory for a confirmatory analysis;
 - 2) within five (5) working days from receipt of the result(s) of the confirmatory analysis, submit the analytical result(s) to the Department; and
 - 3) on the appropriate form with the next quarterly report, submit a written evaluation of the original analytical result and the result of the confirmatory analysis, along with a description of all actions taken to investigate and eliminate the cause of the exceedance.
 - 4) In addition, if such an exceedance occurs, the Secretary reserves the right to require the Permittee to:
 - (a) require additional biosolids or final product quality analyses;
 - (b) conduct all studies necessary to determine the source of contamination;
 - (b) take all actions necessary to control or repair the cause of any impacts; and
 - (c) take all actions necessary to remediate any impacts.
- CC. The Permittee shall submit an application for an amendment to this certification if, except as provided in Condition U of this certification, the Permittee chooses to utilize an alternative method of biosolids treatment at the facility during the effective term of this certification.
- DD. The Permittee shall make any other reports that may be reasonably required by the Secretary during the term of this certification.
- EE. The Permittee shall report to the Secretary all complaints regarding operation of the facility. Notification to the Secretary shall be made by telephone within twenty-four(24) hours, or on the next working day, of receiving the complaint; and subsequently, in writing, along with a description of all actions taken (if any) to mitigate the condition(s) generating the complaint, within five (5) working days of receiving the complaint.

CLOSURE AND POST-CLOSURE REQUIREMENTS

- FF. Upon determination by the Secretary that no further storage or treatment of biosolids will be conducted at the authorized facilities, the Permittee shall comply with the closure requirements set forth in the Application and §§6-1001 through 1006 of the Rules.
- GG. Upon determination by the Secretary that no further storage or treatment of biosolids will be conducted at the authorized facilities, the Permittee shall ensure financial responsibility for the full costs of facility closure, as identified in the Application.

GENERAL CONDITIONS

- HH. The Permittee shall comply with all existing federal and state laws, rules and regulations that apply to wastewater treatment biosolids use and management practices and with the technical standards set forth in Section 405(d) of the federal Clean Water Act. If an applicable management practice or numerical limitation for pollutants in biosolids more stringent than existing federal and state regulations is promulgated under Section 405(d) of the federal Clean Water Act, this certification shall be modified or revoked and reissued to conform to the promulgated regulations. Permittee shall comply with the limitations no later than the compliance date specified in the applicable regulations as required by Section 405(d) of the federal Clean Water Act.
- II. This certification does not convey any property rights of any sort or any exclusive privilege nor does it authorize any injury to private property or any invasion of personal rights.
- JJ. This certification is not alienable, assignable, or transferable without prior written approval from the Secretary. The request for such approval shall include an application for reissuance under the new name and a written agreement which specifies the date of transfer and includes the signatures of the authorized representatives.
- KK. If the Permittee anticipates that any compliance date or operating condition will not be met, the Permittee shall notify the Secretary in writing of this fact and reasons for the anticipated non-compliance at least five (5) days prior to the compliance date or conditions in question.
- LL. The Permittee shall report to the Department, all significant changes in the design plans or operation of the facility at least five (5) working days prior to implementing such modification for review and approval. If the Department determines that an amendment to this certification is a precondition to such changes, those changes may not be implemented until this certification is amended under the Rules.
- MM. This certification may be modified during its term for cause with the written approval of the Secretary. If the Secretary determines that modification is appropriate, only the conditions subject to modifications are reopened. Until a modification is granted, all conditions set forth in this certification remain in full force and effect, pursuant to Section 6-307(a) of the Rules.
- NN. This certification may be revoked, in whole or in part, during its term in accordance with the Rules.
- OO. The Permittee agrees to allow Agency personnel access to the facility during normal business hours to perform such inspections or other activities pursuant to 10 V.S.A. §8005 as may be required to ensure compliance with this certification, with all applicable statutes, and with the Rules.
- PP. The Secretary retains the right to require the Permittee to perform any other action he or she deems necessary in accordance with 10 V.S.A. §6610a.

TABLE 1

MINIMUM REQUIRED SAMPLING AND TESTING FREQUENCIES

<u>PARAMETER</u>	<u>PRE-ATAD BIOSOLIDS¹</u>	<u>FINAL PRODUCT</u>
Arsenic	Annually	Every batch released ²
Cadmium	Annually	Every batch released ²
Chromium	Annually	Every batch released ²
Copper	Annually	Every batch released ²
Lead	Annually	Every batch released ²
Mercury	Annually	Every batch released ²
Molybdenum	Annually	Every batch released ²
Nickel	Annually	Every batch released ²
Selenium	Annually	Every batch released ²
Zinc	Annually	Every batch released ²
Total Kjeldahl Nitrogen	see note #3	Every batch released ²
Ammonia Nitrogen	see note #3	Every batch released ²
Nitrate Nitrogen	see note #3	Every batch released ²
Total Phosphorus	see note #3	Every batch released ²
Total Potassium	see note #3	Every batch released ²
Percent Solids	see note #3	Every batch released ²
pH	see note #3	Every batch released ²
PCBs ⁴	Annually	Annually
Pathogen density	see note #3	Every batch released ²
TCLP ⁵	see note #5	None

NOTES:

- 1: Testing of biosolids which have not been processed in the ATAD shall occur annually regardless of the frequency of distribution of final product qualifying for management via marketing and distribution to the public.
- 2: The frequency of pathogen testing shall be conducted as necessary to satisfy Condition Q of this certification. Accumulated final product in the storage building may be considered to be a single batch.
- 3: The nitrogen series and other nutrients, percent solids, pH and pathogen density of untreated biosolids shall be monitored as frequently as necessary in order to assure that proper treatment conditions in the ATAD reactor(s) is/are maintained.
- 4: An analysis for Total Organic Halides (TOX) may be conducted in lieu of analyzing for PCBs. However, if TOX is detected in concentrations greater than 10.0 mg/kg (dry wt.), an analysis specific for PCB's shall be conducted.
- 5: TCLP testing shall be performed every five years, such that the results are submitted by April 2017 and again by April 2022.

The Department's issuance of this solid waste management facility certification amendment relies upon the data, judgment, and other information supplied by the facility operator, hired professional consultants, and other experts who have participated in the preparation of the application.

The Department makes no assurances that the system certified herein will meet performance objectives of the facility operator and Permittee, and no warranties or guarantees are given or implied.

The Department staff has reviewed the above project application and finds it to conform with current technical standards. It is recommended that the foregoing findings be made and the Solid waste management certification be issued.

I do affirmatively make the findings as recommended by the staff and approve this Certification.

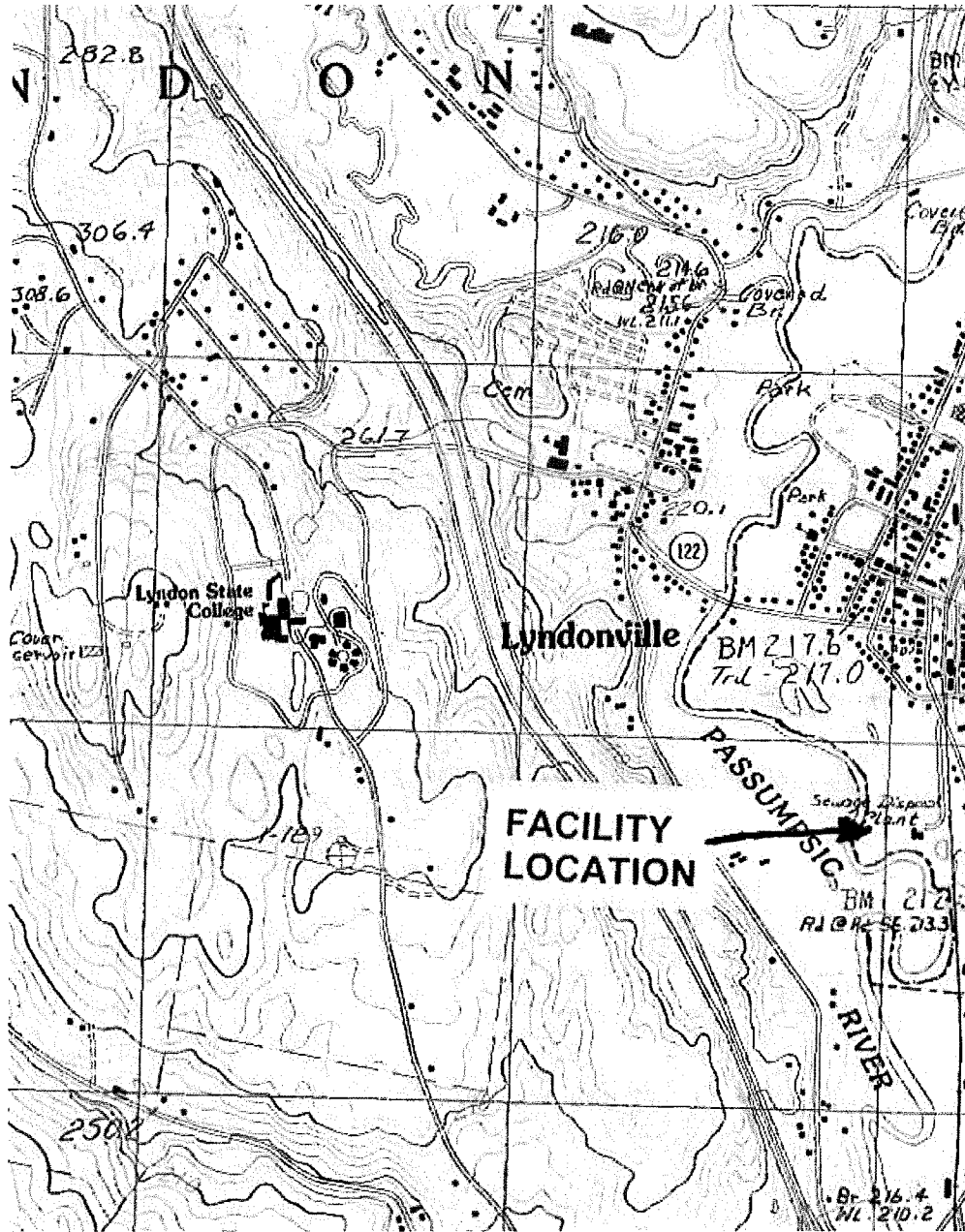
Dated this 3rd day of March, 2016, at Montpelier, Vermont.

AGENCY OF NATURAL RESOURCES

Alyssa Schuren, Commissioner
Department of Environmental Conservation

BY:


Ernest F. Kelley, Manager
Wastewater Management Program
Department of Environmental Conservation



APPENDIX I

*“Procedure Designating Methods for Chemical and Biological Analyses for
Residual Waste Management”*

Updates to this Procedure will be posted to the Residuals Management Section web page at:

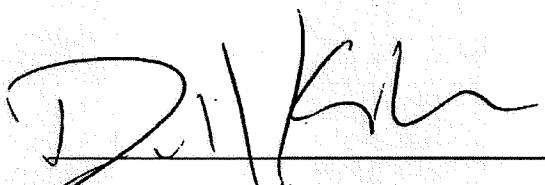
<http://www.watershedmanagement.vt.gov/ww/htm/residuals.htm>

Vermont Agency of Natural Resources
Department of Environmental Conservation

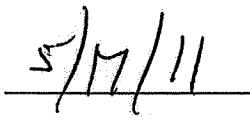
Procedure Designating Methods for Chemical and Biological Analyses
for Residual Waste Management

This procedure establishes the acceptable test methods for the chemical and biological analysis of residual solid wastes, groundwater, soil, and plant tissue as may be required under Subchapter 14 of the Vermont Solid Waste Management Rules. Alternative test methods may be used for any analysis required by Subchapter 14 only with prior written approval by the Secretary of the Vermont Agency of Natural Resources or his/her designee.

For the purposes of Table 1 of this Procedure, "sludges" is defined to include wastewater treatment sludge and/or biosolids, septage, composted and heat dried biosolids products, and any other biosolids derived products.



David K. Mears, Commissioner – VTDEC



date

TABLE A-1

**Methods for the Analysis of Sludges, Short Paper Fiber, Wood Ash, and
Water Treatment Residual Wastes**

<u>Analyte</u>	<u>CAS #</u>	<u>Required Analytical Method(s)</u>	<u>Sample Container</u>	<u>Preservation</u>	<u>Reporting Units</u>
<u>Total Metals</u>					
Arsenic	7440-38-2	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Barium	7440-39-3	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Cadmium	7440-43-9	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Calcium	7440-70-2	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Chromium	7440-47-3	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Cobalt	7440-48-4	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Copper	7440-50-8	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Lead	7439-92-1	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Magnesium	7439-95-4	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Mercury	7439-97-6	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Molybdenum	7439-98-7	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Nickel	7440-02-0	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Selenium	7782-49-2	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Silver	7440-22-4	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
Zinc	7440-66-6	SW-846, 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt.
<u>TCLP</u>	multiple	SW-846, Method 1311	amber glass	cool to 4°C	mg/l
<u>Volatile Organics</u>	multiple	SW-846, Method 8260	amber glass	cool to 4°C	mg/kg dry wt.
<u>Semi-volatile Organics</u>	multiple	SW-846, Method 8270	amber glass	cool to 4°C	mg/kg dry wt.
<u>Polychlorinated aromatics</u>					
PCB-1242	53469-21-9	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1254	11097-69-1	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1221	11104-28-2	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1232	11141-16-5	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1248	12672-29-6	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1260	11096-82-5	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
PCB-1016	12674-11-2	SW-846, Method 8081/8082	amber glass	cool to 4°C	mg/kg dry wt.
Chlorinated dibenzodioxins and dibenzofurans	multiple	SW-846, Method 1613B	amber glass w/ Teflon lined cap	cool to 4°C	pg/kg and parts per trillion TEQ
PCBs in short paper fiber	multiple	SW-846, Method 1668A	amber glass w/ Teflon lined cap	cool to 4°C	pg/kg and parts per trillion TEQ

TABLE A-1 (con't.)

Methods for the Analysis of Sludges, Short Paper Fiber, Wood Ash, and Water Treatment Residual Wastes

<u>Analyte</u>	<u>CAS #</u>	<u>Required Analytical Method(s)</u>	<u>Sample Container</u>	<u>Preservation</u>	<u>Reporting Units</u>
<u>Pathogen Indicators</u>					
Fecal Coliform	na	SW-846, Method 1681	sterile glass or sterile plastic	cool to 4°C	MPN / g
Salmonella	na	SW-846, Method 1682	sterile glass or sterile plastic	cool to 4°C	MPN / 4 g
Helminth Ova	na	EPA 600/1-87-014	sterile glass or sterile plastic	cool to 4°C	viable ova / 4 g
Enteric Viruses	na	ASTM D 4994-89	sterile glass or sterile plastic	cool to 4°C	PFU / 4 g
<u>Nutrients</u>					
Nitrate/Nitrite	NO ₃ 1479-76-50 NO ₂ 7697-37-2	SW-4500-NO ₃ or SW-846 Method 9210 or EPA 353, 3000 series	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
TKN	na	SM-4500-N _{org} or EPA 351.3	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
Ammonia	na	SM-4500-NH ₃ or EPA 350	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
Total Organic Nitrogen	na	calculation	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
Total Phosphorus	7723-14-0	SM-4500-P or EPA 365	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
Water Extractable phosphorus	7723-14-0	Universal Water Extractable P Test for Manure and Biosolids (see note below)	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
Total Potassium	7440-97	SM-3500K or SW-846 6000/7000 series	glass or plastic	cool to 4°C	mg/kg dry wt. (or %)
<u>Compost Stability</u>					
	na	TBD			
<u>Other</u>					
pH	na	SM-4500H	glass or plastic	cool to 4°C	Standard Units (S.U.)
Total Solids	na	SM-2540G	glass or plastic	cool to 4°C	%

Note:

Determining Water Extractable P in Animal Manure and Biosolids

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Peter Kleinman, USDA-ARS, University Park, PA

Dan Sullivan, University of Oregon

<http://agsci.psu.edu/aasl/manure-testing/standard-manure-test/selection-of-a-water-extractable-phosphorus-test-for-manures-and-biosolids-as-an-indicator-of-runoff-loss-potential>