Division of Materials and Waste Management
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Environmental Protection Agency

General Beneficial Use Permit for DWTM from Surface Water Systems used as Liming Material

The purpose of this document is to provide guidance on the application for General Beneficial Use Permit BUGPDWTM002 and BUGPDWTM004, the beneficial use of drinking water treatment material (DWTM) from surface water systems by placement on land as a replacement for mined lime used for agronomic benefit

Who is the applicant?

In general, the applicant is the person applying for coverage under the general permit by submitting a Notice of Intent (NOI) form. The applicant can be: the generator of the DWTM (public water system (PWS)); a third party such as a distributor; or the end user (farmer). The NOI form can be found on Ohio EPA's Beneficial Use webpage.

Who is the permittee?

The applicant becomes the permittee when the applicant receives written notification from the Director of Ohio EPA that coverage under the general permit is granted.

Eligibility Criteria

Only DWTM that meets all the following criteria is considered a beneficial use byproduct and is eligible for beneficial use under this permit.

1) The DWTM is a byproduct resulting from the treatment of a public water system's surface water source water supply for drinking water by the addition of aluminum salt, or ferric salt, and lime for coagulation and/or softening.
2) The DWTM does not exceed any of the constituent concentration limits specified in Table 1 of this guidance document.
3) The DWTM does not exceed a total microcystins concentration of 180 µg/L (µg/kg) for all surface water systems.
4) The DWTM is not a hazardous waste as defined by Ohio Revised Code (ORC) Section 3734.01, Ohio Administrative Code (OAC) Rule 3745-50-10(A) and OAC Rule 3745-51-03.

Applicable Statutes

- 6111
- 3734

Contact

If you have questions regarding this document or would like more information, please contact the Beneficial Use Unit in Central Office at 614.644.2621.

Disclaimer

The procedures set out in this document are intended solely for guidance. The procedures are not intended and cannot be relied upon to create rights, substantive or procedural, enforceable by any party against Ohio EPA. While this guidance document is not legally binding, all statutes and rules referenced herein are binding and enforceable. Ohio EPA reserves the right to vary this guidance or to change it at any time without public notice and also reserves the right to deviate from this guidance on a case-by-case basis.

General Beneficial Use Permit for DWTM from Surface Water Systems used as Liming Material

When should I apply for coverage under this general beneficial use permit?

You should apply for coverage at least two months before you want to land apply DWTM. After Ohio EPA has reviewed the complete application package, you will receive a letter granting coverage under the permit if you meet the criteria for coverage.

How long does it take to process a complete application package?

It takes the technical staff about a week to review all the information that is submitted with the application. If the application is complete, the letter granting coverage under the permit can be issued within a month.

What if I do not want to use my DWTM as a liming material under this permit?

You can dispose of the DWTM as you would legally dispose of any other solid waste. DWTM can be incorporated into certain construction materials or used as a fuel or as an ingredient in a combustion unit in accordance with OAC 3745-599-10. These uses do not require a beneficial use permit. You can also apply for an individual beneficial use permit to beneficially use DWTM in another manner, for example, as an ingredient in a soil blend or as a phosphorus binder.

Complete Application Package and Explanation of Requirements

What are the requirements for a complete application package?

Each application package must include all of the following items:

- A completed notice of intent (NOI) form including a demonstration that the DWTM satisfies the eligibility criteria.
- A copy of the liming material license issued by the Ohio Department of Agriculture (ODA).
- Documentation that demonstrates that the DWTM is not a hazardous waste.
- Sampling and analysis plan including a map of where the samples were taken and justification for the samples taken.
- Laboratory sample results with the laboratory certification or Tier I data report of authenticity.
- A statistical evaluation of the sample results.
- A microcystins evaluation which includes a copy of the compliance sampling data required to determine if microcystins sampling and analysis is required. If applicable, microcystins sampling plan and laboratory results. To obtain a copy of the compliance sampling data, see How do I know if there has been a detection of microcystins in the compliance samples?.

A non-refundable application fee of $200 is also required before the permit can be processed. After submitting your NOI, Ohio EPA will send you an electronic invoice. Payments are processed quickly through Ohio EPA's Electronic Business website.

Why do I need a liming license to land apply the DWTM as a liming material?

The Ohio Revised Code (ORC) Section 905.52 says that no person shall manufacture, sell or distribute in this state liming material without a license to do so issued by the Department of Agriculture. The sampling requirements for the liming license defines the total neutralizing power and effective neutralizing power so you can determine how much DWTM should be applied to the field based on the pH of the soil and the crop that will be grown. Contact the Ohio Department of Agriculture at 614.728.6987 for more information.

When should I apply for an individual beneficial use permit instead of this general permit?

General permits have prescribed eligibility criteria that must be met before Ohio EPA can issue a letter granting coverage under a general permit. If this general beneficial use permit does not fit your desired beneficial use, then you should apply for an individual beneficial use permit. For example, if your DWTM exceeds a constituent concentration limit specified in Table 1 of this general permit, you have the option to apply for an individual permit. In the individual permit application, you may justify how, when used in the manner that you propose, the DWTM is unlikely to create a nuisance or adversely impact human health or safety or the environment and unlikely to cause pollution to waters of the state.

How can I demonstrate that the DWTM is not a hazardous waste?

According to Ohio Administrative Code (OAC) Rule 3745-599-05, prior to applying for any beneficial use individual or general permit, you must demonstrate that the beneficial use byproduct is not a hazardous waste as defined by ORC Chapter 3734.01, OAC Rule 3745-50-10(A) and OAC Rule 3745-51-03. Once you complete the required hazardous waste demonstration, you will not need to repeat this process unless there is a significant change in your drinking water treatment process as defined in OAC Rule 3745-91-01.

For this general permit, Ohio EPA recommends that you use generator knowledge to demonstrate the DWTM is not a hazardous waste. You may use some or all of the following information when using generator knowledge for determining that your waste is not a hazardous waste; 1) facility specific process flow diagram or narrative description of the process generating the waste, 2) a list of all ingredients or materials used in the process, 3) chemical makeup of all ingredients or materials used in the process that generates the waste (e.g. NSF/ANSI 60 listings), 4) data obtained from literature regarding waste produced from a similar process using the same ingredients and/or materials, and 5) Safety Data Sheet (SDS) of material used for treating raw water. Please refer to the ***Generator Knowledge*** guidance document for assistance in using this method of determination.

Sampling and Analysis for the NOI

How do I sample and analyze for Total Metals?

Ohio EPA requires representative sampling of any waste material proposed for beneficial use. The general permits are designed to allow flexibility in determining the number of samples necessary for representative sampling. Not every waste stream or situation is the same. The permit requires that the sampling location and number is adequate to demonstrate that the 95% upper confidence level (UCL) of the mean for each constituent is less than the limits in Table 1 of the general permit. U.S. EPA's Test Methods for Evaluating Solid Waste, ***SW-846 Chapter 9***, (Sample Plan for Evaluating Piles of Wastes) is a good reference tool. It explains different methods and strategies of obtaining representative sampling.

Need help?

Please contact DMWM's beneficial use unit at 614.644.2621 if you need assistance developing your sampling and analysis plan or for any questions regarding sampling or analysis.

For assistance in calculating the 95% UCL of the mean, please see "***Calculating 95% Upper Confidence Level (UCL)***".

General Permit Table 1

Constituent[1][2]	Totals Analysis[3] (mg/kg)
Aluminum[4] (Al)	50,000
Arsenic (As)	41
Barium (Ba)	15,000
Cadmium (Cd)	39
Copper (Cu)	1,500
Lead (Pb)	300
Nickel (Ni)	420
Selenium (Se)	100
Zinc (Zn)	2,800

Sampling for Total Metals at the point of generation

When sampling for total metals, you may sample the DWTM as it is generated, before it is discharged to the containment area. This method of collecting samples is highly recommended, as it will save time and effort compared with sampling in a lagoon or containment area.

To collect samples of DWTM as it is generated, you will need to collect enough volume of DWTM so that there are 100 grams of DWTM (solid material) available per sample for the total metals analysis. You can collect one or two samples per week for one month until you have 4-8 samples to analyze for total metals. The permit requires that you determine the 95% UCL for each constituent. Therefore, the samples collected for metals analysis must be discrete grab samples and cannot be composited. If the analyzed samples are not sufficient to satisfy the statistical analysis, you can collect and analyze additional samples.

Sampling for Total Metals from a lagoon or containment area

If it is not feasible to collect samples of DWTM before discharge to the containment area, you can collect representative samples from across the containment area.

Let's say you want to sample the DWTM in a lagoon and the lagoon is 130 feet by 300 feet and is about 10 feet deep. Ohio EPA suggests that you evaluate your lagoon by quadrants (N,S, E, W). Grid the entirety of the lagoon into sections using survey flags along the bank. Take one grab sample every 70-75 feet from north to south and one sample about every 25-30 feet from east to west, resulting in 16 discrete samples. Taking samples only along the edge of the lagoon would not be representative of the whole lagoon; if it is burdensome to collect these samples, you may want to collect more samples than you need so that you do not have to go back out and resample.

Since DWTM is reasonably homogeneous, you should not need to analyze all 16 samples for total metals to make your 95% UCL demonstration. Rather, you can start by analyzing one or two grab samples from each quadrant of the lagoon, while reserving additional samples. If the results of the sampling analysis exceed the 95% UCL of the mean

[1] Al, Ba: U.S. EPA Regional Screening Levels, Residential Soil.

[2] As, Cd, Cu, Pb, Ni, Se, Zn: U.S. EPA 40 CFR Part 503 Pollutant Concentrations (Table 3 of 501.13)

[3] U.S. EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846), Section 1.2 of the TCLP Method 1311 does allow for a total constituent analysis in lieu of the TCLP extraction. "If a total analysis of the waste demonstrates that individual analytes are not present in the waste, r that they are present but at such low concentrations that the appropriate regulatory levels could not possible be exceeded, the TCLP need not be run."

[4] With aluminum concentrations exceeding 50,000 mg/kg, special care may be needed to prevent plant phosphorous deficiency. High aluminum materials should be considered for phosphorus sorption. Dayton, E.A., S. Whitacre, N. Basta, P. McDonough, 2016. Beneficial Use of Aluminum-Based Drinking Water Treatment Residuals (WTR): Urban and Agricultural Applications. Ohio Environmental Protection Agency.

for a constituent, you can analyze the additional samples that were collected and combine the results of the additional analysis with the previous results to calculate a new 95% UCL of the mean.

It is recommended that you store the grab samples until you no longer need the samples for laboratory analysis. These samples may be stored at 4°C for up to six months if needed before analysis. You will need to check the pH of your samples within 48-hours of collection, to not exceed the holding time allowed for pH. You can record the pH of your samples using a pH meter from your public water system (PWS).

If your DWTM is stored in more than one lagoon or containment area, and the raw water treatment process has not changed since DWTM was added to all of the containment areas, you can assume that the metal concentrations in each containment area are equal.

If the banks of your lagoon are overgrown or it is not feasible to use a boat, you can use a track hoe to reach out into the lagoon and scoop the residuals. A large metal scoop can be used to transfer the DWTM from the track hoe bucket to a metal pan. Ohio EPA used aluminum turkey pans because they are economical and disposable.

A lagoon may have multiple feet of water overlying the sludge, you can use a small boat to paddle out onto the lagoon and use the survey flags placed on the banks to determine where you are on the grid. Ohio EPA finds that using geo-probe core tube liners with/without the core catcher work well for collecting DWTM samples. Push the tube to the bottom of the lagoon to collect the DWTM. Empty the contents of the tube into a labeled metal pan so the samples can easily be brought to shore. Some people have successfully used a sludge judge to collect samples of DWTM from the bottom of a lagoon. The water content of the DWTM will vary from facility to facility. You may need to try a few different devices to find what works best for you. No matter which tool you use to collect samples, you will want to make sure that the tool is clean, has been thoroughly rinsed with deionized water, and kept clean (bagged if possible) until it is used. This will reduce your chances of introducing contamination and reduce the chance of causing interference with the analytical method that is used. It is not essential for lagoon sampling to clean the tools between samples.

Sampling for Total Metals from a dewatering pile

If your DWTM has been dewatered and is sitting in a pile at the PWS, sample the pile in a 3-D manner by collecting grab samples from at least three equally divided depths. Depending on the size of your pile, you should anticipate collecting 8-10 grab samples. You can use a backhoe to dig into the pile if it is very large.

Sampling for Totals Metals from a tank

If your DWTM is stored in a tank, you can use a composite liquid waste sampler (COLIWASA) to collect samples. The COLIWASA is an appropriate device for obtaining a representative sample from stratified or unstratified liquids. Its most common use is for sampling containerized liquids, such as tanks, barrels and drums. A COLIWASA may also be used for pools and other open bodies of stagnant liquid such as DWTM. When using a COLIWASA, there is no need to resuspend the DWTM prior to collecting the samples. The tip of the COLIWASA must touch the bottom of the tank or pit when collecting the sample. You will need a minimum of four grab samples to run a statistical evaluation (the 95% UCL of the mean) of the sampling results. Depending on the water content (5% solids or less) of your DWTM, you may be able to use a sludge judge to collect the sample. COLIWASAs can handle a higher percentage of solids in the matrix than the sludge judge.

Sample handling and calculating the 95% UCL of the mean

For total metals analysis, you must store the samples on ice or at 4°C and ship the samples on ice to the lab. The laboratory must complete the analysis within 180-days from the date of sample collection to be within the technical holding times set forth in SW-846. Samples may be stored at 4°C for up to six months if needed before analysis. The laboratory detection limit for each constituent should be less than its corresponding standard in Table 1.

General Beneficial Use Permit for DWTM from Surface Water Systems used as Liming Material

DWTM should be a consistent and homogeneous material so that 4-5 samples would be adequate to demonstrate that the 95% UCL of the mean for each constituent is less than the limit for each constituent specified in Table 1 of the general permit. You can use a laboratory of your choosing to run your analysis. An acceptable lab should be able to provide the analytical results along with a copy of the Tier I Data Report. Please see ***Tier I Data Reports*** for a list and an example data report.

A statistical evaluation is necessary for Ohio EPA to have a level of confidence that the results of the sampling and analysis of the DWTM are valid. A 95% UCL is one way to provide this level of confidence. In general, calculating the 95% UCL requires you to determine the mean, standard deviation, and T-value of your dataset for each constituent. Please see ***Calculating the 95% Upper Confidence Level*** on the beneficial use webpage. You can also download free software from U.S. EPA that will calculate the 95% UCL of the mean for you at ***epa.gov/sites/production/files/2016-05/documents/proucl_5.1_fact_sheet.pdf***.

Remember to submit your sample plan, the sampling results, the Tier I data package, and the statistical evaluation with the NOI.

Why do I need to have a microcystin evaluation to apply for coverage under this general permit?

Anyone who applies to beneficially use DWTM from a PWS that gets all or even some of its raw water from a surface water source should be aware that microcystins could be present in the DWTM. If the PWS is exclusively using groundwater for its drinking water source, then they should apply for coverage under the active general beneficial use permit for groundwater DWTM. Every applicant must have a microcystins sampling and analysis plan in place if microcystins are detected in the PWS's compliance samples.

How do I know if there has been a detection of microcystins in the compliance samples?

You can obtain the compliance sampling data directly from the PWS. Or you can find the data on Ohio EPA's public water system ***harmful algal bloom*** (HAB) website. Visit the ***Public Water System HAB Data and Map*** then click on "Results" at the bottom of the instruction panel. You can sort the results columns for detections and individual PWSs, which will tell you if a PWS has had a microcystins detection in its raw water compliance samples.

You may also contact the Ohio EPA staff identified on the HAB website for further assistance or call 614.644.2752 and ask to speak to someone in the source water characterization and protection program.

What if the PWS has never had a microcystins detection in its compliance samples, but the DWTM was generated before July 1, 2016?

Since microcystin sampling was not required prior to July 1, 2016, Ohio EPA cannot say with confidence that the PWS did not have a microcystin detection in raw water prior to this date. Therefore, DWTM generated prior to July 1, 2016 will need to be sampled for total microcystins.

Each containment area must be sampled using a strategy to obtain representative samples as described in SW-846. If the concentration of total microcystins does not exceed 180 µg/L (µg/kg), then the DWTM is eligible for coverage under the general permit.

How do I sample and analyze for Total Microcystins?

Recommendations for sample collection

Unlike with the total metals analysis, samples collected for microcystins analysis may be composited to determine the average concentration. You must collect samples of DWTM using a representative sampling strategy as described in SW-846; however, you are not required to perform a statistical evaluation on the sampling results from your microcystins analysis. Ohio EPA recommends creating a composite sample for each quadrant of your lagoon. Consider the example for sampling a lagoon as described earlier in this guidance document. You separated your

lagoon into four quadrants and collected 16 discrete samples across a grid. To create four composite samples from the 16 discrete samples, combine equal amounts of the four discrete samples from quadrant (1) into one composite sample for quadrant (1). Repeat for the remaining three quadrants and you will end up with four composite samples, one for each quadrant. Compositing the 16 discrete samples into four composite samples will save you money on the analysis and still give you an average of the total microcystins concentration. If the PWS has multiple DWTM containment areas containing DWTM generated from the process of removing microcystins from raw water, each of these containment areas must be representatively sampled and analyzed for totals microcystins.

Analytical method for Total Microcystins

The analytical method for detecting total microcystins in DWTM was developed in conjunction with Ohio EPA's HAB unit and the Division of Environmental Services (DES). Microcystins analysis of DWTM must be performed utilizing ***Ohio EPA Amenable (Extracellular and Intracellular) Microcystins-ADDA in Sludge by ELISA Analytical Methodology (Ohio EPA DES 701.3)***. Note: At the time this guidance was developed, the method was listed as draft on Ohio EPA's website. This draft designation will remain until an optimized method for microcystins extraction is determined for DWTM through ongoing research.

Each grab sample or composite sample must be analyzed for microcystins by a lab that can run the ADDA-ELISA, or HPLC (UV, MS, MS/MS) MMPB, or MC-LR variant method and can provide a Quality Assurance, Quality Control (QA/QC) data report for validation.

Please see the ***Draft Approved Microcystins Analysis Guidance for DWTM*** for other protocols currently approved by Ohio EPA for microcystins analysis in DWTM.

Reporting results and calculating land application value

Table 2 in the general permit provides a range of microcystin concentrations and appropriate land application volumes. Table 2 provides the microcystin concentration ranges in ug/L. When you receive your laboratory results, the ADDA-ELISA DWTM analysis will be reported in µg/kg. This result is equivalent to the microcystins concentration in µg/L.

For an explanation of how the microcystin ranges and land application limits were determined, review the ***Drinking Water Treatment Material Explanation for Microcystins Limits in Ohio EPA Permit BUGP DWTM002***. For a closer look at the available methodologies and how the laboratory calculates the microcystin concentration, review the *Microcystins-ADDA in Sludge by ELISA Analytical Methodology* linked above.

Permit Operating Conditions

Can I store DWTM until I am ready to land apply?

If the DWTM has been dewatered (the material has no free liquids as determined by Test Method 9095B-Paint Filter Liquids Test maintained in SW-846), then you can store the DWTM at the site of beneficial use for up to 180-days. If the DWTM is not dewatered and is no longer at the PWS, you must check with Ohio EPA's Division of Surface Water (DSW) about obtaining a Permit-to-Install (PTI) to store the DWTM.

When storing dewatered DWTM, the DWTM must be at least 300-feet from occupied buildings, public water system and private wells and surface waters used for drinking water or watering livestock and at least 100-feet from any other surface water. Storage of DWTM must not be over or within a sensitive groundwater area. Storing DWTM or dewatered DWTM at the PWS may or may not be authorized under the PWS's existing National Pollution Discharge Elimination System (NPDES) permit. Please verify with DSW that storing DWTM at the PWS is authorized.

What do I need to do if I plan to dewater the DWTM?

If you want to dewater the DWTM, you must establish a drying area. Areas outside of the PWS will require a permit. Additionally, a permit may be required if dewatering at the PWS. Before you establish the drying area, reach out to Ohio EPA's DSW to ensure your operations will not require a permit. You can reach out to ***your county surface water inspector*** or call the DSW mainline at (614) 644-2001.

What if the PWS has never had a microcystins detection in the compliance samples and they have their first microcystins detection after the DWTM is authorized for beneficial use under this general permit?

You may continue to beneficially use DWTM only from containment areas that were not receiving DWTM following the compliance microcystins detection. You must, however, sample the DWTM from each containment area that received DWTM after the date of the compliance sample microcystins detection and analyze the samples for total microcystins. Each sample should be collected using a strategy to obtain representative samples as is described in this document. The results of your sampling and analysis for total microcystins and a copy of the microcystins results from the raw water compliance samples must be submitted to DMWM's beneficial use unit. All information may be submitted electronically by emailing a member of the beneficial use unit. Ohio EPA will review the sampling plan and the results from the microcystins analysis. If the results demonstrate that the total concentration of microcystins in the DWTM does not exceed 180 µg/L (µg/kg), you will receive written notification from Ohio EPA stating that land application of the DWTM from that sampled containment area may resume in accordance with this general permit.

What if the PWS detects microcystins in the raw water compliance samples after the DWTM is authorized for beneficial use under this permit?

Detections above previous concentrations

If microcystins are detected in a raw water compliance sample at concentrations GREATER than the concentrations detected in previous DWTM samples, you must cease beneficial use of the DWTM from every containment area that received DWTM generated on or after the date the compliance sample was collected. You will need to sample and analyze the DWTM from each of those containment areas for total microcystins using a strategy to obtain representative samples. After you submit the results from the sampling and analysis to Ohio EPA and the results indicate that the DWTM is still eligible for beneficial use under this permit, you will receive written notification from DMWM's beneficial use unit that beneficial use of the DWTM may resume.

If a previously sampled containment area was not in use during or following the elevated microcystins detection, the DWTM in that containment area is still eligible for coverage under this permit.

Detections below previous concentrations

If microcystins are detected in a compliance sample at concentrations LESS than the concentrations detected in previous DWTM samples, you do not need to resample the DWTM. You may assume that the concentration of total microcystins in the DWTM is equal to the concentration determined from the original sampling and analysis. If you want to resample the DWTM to determine the concentration of total microcystins, you may do so.

What Best Management Practices (BMPs) do I need to follow when land applying DWTM?

Any land application of DWTM must comply with the following BMPs:

- DWTM must be applied at a rate consistent with the liming calculations and according to the applicable microcystins limits of Table 2.

General Beneficial Use Permit for DWTM from Surface Water Systems used as Liming Material

- The DWTM must be at least 300-feet from public water system wells and surface waters used for drinking water or watering livestock; if there is a grass buffer (area of land maintained in permanent vegetation), it can be 100-feet from public water system wells and surface waters used for drinking water or watering livestock.
- The DWTM must be land applied at least 33-feet from any other surface waters of the state as defined in ORC Section 6111.01(H).
- Application methods used must ensure even distribution of DWTM on the field.
- DWTM cannot be applied during precipitation events.
- DWTM cannot be applied onto frozen or snow-covered ground.
- The permittee must take measures to control fugitive dust and other air emissions that may result from activities authorized through this permit.

What additional land application practices do I need to follow if my DWTM contains microcystins?

The following additional practices are required if the microcystins concentration in the DWTM exceeds 20 µg/L (µg/kg):

- Must not land apply DWTM within 300-feet of private wells, 100-feet of waters of the state or within 33-feet of waters of the state if there is a 33-foot grass buffer between the land application area and waters of the state (in this instance, "waters of the state" does not including surface waters used for drinking water or watering livestock); and
- Must not be land applied to subsurface drained fields if the drains are flowing, unless there is an on-site means of stopping the discharge from subsurface drains to waters of the state. The permittee shall ensure that all tile outlets from the beneficial use site are plugged and all tile stops are closed prior to or at the same time as land application of DWTM and that the outlets and stops remain plugged/closed until there is no discharge from the tile stops or tile outlets. You may open the plugged/closed tile stops briefly to see if there is a discharge.

What records am I required to keep?

All permittees must keep the following records for at least five years. You do not need to submit these records to Ohio EPA, but they need to be available for review by Ohio EPA or an authorized representative of Ohio EPA.

- Records of the name, address and telephone number of each PWS from which DWTM was obtained.
- Records of the annual volume of DWTM accepted for beneficial use from each PWS, and the volume of DWTM from each PWS which was beneficially used.
- Documentation which demonstrates that the DWTM is not a hazardous waste as defined by ORC section 3734.01, OAC Rule 3745-50-10(A) and OAC Rule 3745-51-03.
- Records of each date and each location upon which the DWTM is stored or placed on land by the Permittee.
- For each location where the DWTM was placed on the land, records of the volume of DWTM placed on the land, the date upon which the DWTM was placed on the land, and the amount of acreage to which the DWTM was applied.
- The sampling plan detailing where and how samples of DWTM from each PWS were collected, dates that the samples were collected and the list of constituents from Table 1 in the general permit for which samples were analyzed;
- All laboratory data and analyses of the constituent concentrations listed in Ohio EPA General Beneficial Use Permit BUGPDWTM002 Table 1 and the total microcystins analysis in the DWTM, if required.
- Copies of liming material licenses.

Do I need to submit an annual report?

Yes. The annual report can be submitted via the ***Division of Materials and Waste Management's virtual drop box*** or through the ***Division of Materials and Waste Management's ReTRAC reporting system***. Annual reports are used to keep track of how much DWTM is beneficially used. The sampling and analysis information from the annual report

helps Ohio EPA build a database of the concentrations of the constituents in DWTM. Even if you did not beneficially use any DWTM in that calendar year you are required to submit an annual report.

Resources for Reuse

Where can I find reference material for land applying DWTM as a liming material?

The Ohio State University Extension ***Fertility Factsheets, Bulletins and Tools*** has a number of research articles including Bulletin E-2567, Tri-State Fertilizer Recommendations, and ***Soil Acidity and Liming for Agronomic Production*** (this document will assist you in determining soil pH).

Understanding the Value in Lime and the *Soil Acidity and Liming for Agronomic Production* papers compare liming products. The table below is adapted from the *Soil Acidity and Liming for Agronomic Production* paper and provides a comparison of traditional lime sources.

Total Neutralizing Power (TNP), Fineness, Water Content, and Effective Neutralizing Power (ENP) of Common Liming Materials[5][6]

		Fineness					
		% Passing Mesh Size					
Grade	TNP (%)	8	20	60	Fineness Index	Water (%)	ENP (lbs/ton)
Aglime superfine	100	100	100	100	100	0	2000
Dolomitic hydrated aglime	140	100	99	76	90	0	2520
Calcitic aglime	99	99	60	37	59	0	1168
Dolomitic aglime	105	97	95	90	93	0	1953
Wastewater lime	102	100	100	100	100	74	530
Pelletized lime	93	100	100	100	100	0	1860

When land applying DWTM as a slurry, how do I determine that the soil has the available water capacity to apply more volume than 10,000 gallons per acre?

The table below can be used to determine the available water capacity (AWC) at the time of application and the liquid volume in gallons that can be applied not to exceed the AWC. To determine the AWC, use a soil probe or similar device to evaluate the soil to a depth of eight inches. For land application, liquid DWTM application may also be calculated by converting acres – inch to gallons per acre. This conversion is based on the following formula: 1 acre – inch equals 27,156 gal/ac.

You can also refer to Appendix B of OAC 901:10-2-14, *Available Water Capacity* or ***Guidelines for Applying Liquid Animal Manure to Cropland with Subsurface and Surface Drains***.

[5] R. Mullen, E. Lentz, and M. Watson. 2016. *Soil Acidity and Liming for Agronomic Production*. Ohio State University Extension.
[6] These liming materials are available in the state of Ohio. Depending upon source, lime characteristics will vary.

Maximum Available Water Holding Capacity of Soils[7][8]

Available Moisture in the Soil	Sands and Loamy Sands	Sandy Loam and Fine Sandy Loam	Very Fine Sandy Loam, Loam, Silt Loam, Silty Clay Loam, Clay Loam, Sandy Clay Loam	Sandy Clay, Silty Clay, Clay
< 25% Soil Moisture Amount to Reach AWC	Dry, loose and single-grained; flows through fingers. 20,000 gallons/acre	Dry and loose; flows through fingers. 27,000 gallons/acre	Powdery dry; in some places slightly crusted but breaks down easily into powder. 40,000 gallons/acre	Hard, baked and cracked; has loose crumbs on surface in some places. 27,000 gallons/acre
25–50% or Less Soil Moisture Amount to Reach AWC	Appears to be dry; does not form a ball under pressure. 15,000 gallons/acre	Appears to be dry; does not form a ball under pressure. 20,000 gallons/acre	Somewhat crumbly but holds together under pressure. 30,000 gallons/acre	Somewhat pliable; balls under pressure. 20,000 gallons/acre
50–75% Soil Moisture Amount to Reach AWC	Appears to be dry; does not form a ball under pressure. 10,000 gallons/acre	Balls under pressure but seldom holds together. 13,000 gallons/acre	Forms a ball under pressure; somewhat plastic; sticks slightly under pressure. 20,000 gallons/acre	Forms a ball; ribbons out between thumb and forefinger. 13,000 gallons/acre
75% to Field Capacity Amount to Reach AWC	Sticks together slightly; may form a weak ball under pressure. 5,000 gallons/acre	Forms a weak ball that breaks easily, does not stick. 7,000 gallons/acre	Forms ball; very pliable; sticks readily if relatively high in clay. 11,000 gallons/acre	Ribbons out between fingers easily; has a slick feeling. 7,000 gallons/acre
100% Field Capacity	On squeezing, no free water appears on soil, but wet outline of ball on hand.			
Above Field Capacity	Free water appears when soil is bounced in hand.	Free water is released with kneading.	Free water can be squeezed out.	Puddles: free water forms on surface

Contact

For more information about this general permit or any beneficial use question, you can contact the beneficial use unit of the Division of Materials and Waste Management at 614.644.2621.

[7] J. Hoorman, J. Rausch, L. Brown. 2009. *Guidelines for Applying Liquid Animal Manure to Cropland with Subsurface and Surface Drains*. Ohio State University Extension.

[8] Ohio-NRCS Conservation Practice Standard 633