



## **GUIDELINE 39 – SEPTAGE, SUMP AND PIT WASTE, AND RESTAURANT GREASE TRAP WASTE MANAGEMENT**

North Dakota Department of Health – Division of Waste Management

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### **Introduction**

These guidelines provide pumpers with information about how to manage septage and restaurant grease trap wastes. Because land application is a common and sometimes complex management option, these guidelines focus on requirements for land application. These guidelines combine the federal rule requirements and the North Dakota Department of Health (NDDoH) management guidelines for land application of septage into one document. If these guidelines are followed, pumpers will be in compliance with 40 CFR Part 503 and the NDDoH's septage management guidelines. These guidelines also include requirements for land application sump and pit waste and restaurant grease trap waste.

These guidelines are intended to help pumpers manage their waste materials so as to minimize environmental impact and to be in compliance with North Dakota Administrative Code (NDAC) 33-21. If these guidelines are followed, pumpers will also be in compliance with NDDoH requirements for land application of restaurant grease trap waste. **Requirements for land application of commercial wastes, other than restaurant grease trap waste, are not included in these guidelines.**

Domestic septage is defined by the Environmental Protection Agency as:

*“either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.”*

At the federal level, land application of domestic septage is regulated by 40 CFR Part 503. At the state level, NDCC 23-19 regulates those businesses that fall under the law and which performs pumping of individual sewage treatment systems.

Commercial wastes are any liquid or solid materials removed from septic tanks, holding tanks or similar treatment works that receive either commercial or industrial wastewater. A waste is not considered commercial if the wastewater is only from the sanitary facilities of a business. Examples of commercial wastes are waste pumped from small animal slaughtering operations, pretreatment wastes from a food processing facility, or waste from a flammable trap at a car wash. Land application of nonhazardous commercial waste is regulated at the federal level by 40 CFR Part 257, and at the state level by the North Dakota Solid Waste Management Rules, Article 33-20 NDAC.

It is important for pumpers to be aware that different types of waste should not be mixed, and that not all commercial wastes can be land applied safely. Before land applying commercial wastes, other than restaurant grease trap waste, the NDDoH should be contacted to determine if the waste can be land applied. In most cases, testing of the waste is needed before land application can take place, and in some cases an NDDoH permit or approval is required or the waste should be managed at a permitted solid waste or publicly owned treatment works (POTW) facility.

### **1. Background Information About Septage and Its Characteristics**

Septage is managed in a variety of ways throughout the country and in North Dakota. Common methods of management include transferring septage to a POTW and land application.

In North Dakota, the options for management are determined by where you are located in the state. In the larger metropolitan areas, it is common for septage to be discharged into a POTW where it is treated and managed as biosolids. At that point, the septage becomes the POTW's responsibility and is subject to the requirements of NDAC 33-16-01, NDCC 61-28 and 40 CFR Part 503. In smaller communities or areas that are not close to a POTW, transfers are not practical and septage is typically land applied. Landfilling of septage is not allowed in North Dakota because it is in liquid form and landfills cannot accept materials containing free liquids. Disposal or uncontrolled dumping of septage or other wastes in pits is not allowed; however, land application may be subject to the state solid waste rules.

The quantity of septage removed from septic tanks each year is not tracked by the state or the federal government at this time. Individual sewage treatment systems should be pumped every three years if maintained properly. Land application is the most common method for managing septage in North Dakota.

Federal requirements for land application provide limited information about how to prevent runoff or contamination of ground water. The federal 503 rule simply states that these things cannot occur. The state guidelines provide pumpers with detailed information about site suitability, separation distances to features such as surface waters and wells, and detailed site management requirements. These are practices commonly used for land application of other by-products and wastes in North Dakota. They have proven to be effective for preventing runoff of wastes and contaminants from application sites and preventing contamination of ground water.

Pumpers are not required to analyze septage before land application. Both state and federal requirements use average septage analysis results to calculate allowable application rates. Table 1 contains concentrations for specific parameters that have been determined by testing. Septage supplies about five (5) pounds of nitrogen, and two (2) pounds of phosphorus per 1,000 gallons.

**Table 1. Characteristics of Septage.<sup>1</sup>**

Parameter	Concentration (mg/L)		
	Average	Minimum	Maximum
<b>Conventional Parameters</b>			
Total Solids	34,106	1,132	130,475
Total Volatile Solids	23,100	353	71,402
Total Suspended Solids	12,862	310	93,378
Volatile Suspended Solids	9,027	95	51,500
Biochemical Oxygen Demand	6,480	440	78,600
Chemical Oxygen Demand	31,900	1,500	703,000
Total Kjeldahl Nitrogen	588	66	1,060
Ammonia Nitrogen	97	3	116
Total Phosphorus	210	20	760
Alkalinity	970	522	4,190
Grease	5,600	208	23,368
PH	-	1.5	12.6
<b>Metals</b>			
Arsenic	0.141	0	3.5
Barium	5.76	0.002	202
Cadmium	0.097	0.005	8.1
Chromium (total)	0.49	0.01	34
Cobalt	0.406	<0.003	3.45
Copper	4.84	0.01	261
Cyanide	0.469	0.001	1.53
Iron	39.3	0.2	2,740
Lead	1.21	<0.025	118
Manganese	6.09	0.55	17.1
Mercury	0.005	0.0001	0.742
Nickel	0.526	0.01	37
Silver	0.099	<0.003	5
Tin	0.076	<0.015	1
Zinc	9.97	<0.001	444
<b>Organics</b>			
Methyl Alcohol	15.8	1	396
Isopropyl Alcohol	14.1	1	391
Acetone	10.6	0	210
Methyl Ethyl Ketone	3.65	1	240
Toluene	0.17	0.005	1.95
Methylene Chloride	0.101	0.005	2.2
Ethylbenzene	0.067	0.005	1.7
Benzene	0.062	0.005	3.1
Xylene	0.051	0.005	0.72

<sup>1</sup> Taken from "EPA Guide to Septage Treatment and Disposal", EPA/625/R-94/002, September 1994.

## **2. Background on Sump and Pit Waste**

The mixture of dirt, grime and grit that accumulates in sumps and pits is classified as a solid waste sludge and must be appropriately disposed. The types of wastes collected in a sump or pit depend upon the type of business that is using the device. For example, car wash residue and material washed into sumps or pits from the floors of vehicle maintenance shops will differ from waste that is collected in floor sumps at industrial manufacturing plants. The NDDH presently does not have rules specific to the management of sump and pit wastes. Therefore, this management outline has been created to assist generators and pumpers in making reasonable, environmentally sound decisions when handling these wastes. In doing this, future liability for such waste can be minimized.

Based upon the Hazardous Waste Program's experience, sump or pit waste generated by car wash and vehicle maintenance shops generally do not meet the definition of a characteristic hazardous waste. An exception to this assumption would be if hazardous waste was placed, spilled, leaked or released into the sump or pit. As a result, unless hazardous waste is known or suspected to be present in the sump or pit, such wastes from car wash and vehicle maintenance shops can be considered a solid waste and managed in accordance with the recommendations outlined in the attached chart.

## **3. Guidelines for Handling Sump and Pit Wastes**

Sump wastes generated at manufacturing plants will need to be analyzed in order to determine whether the waste should be regulated as a hazardous waste. For more information regarding the testing requirements and the management of hazardous waste, please contact the Hazardous Waste Program at 701.328.5166.

Although the burden of proper disposal of sump or pit waste lies with the business that generated the waste, sump pump service companies also carry the responsibility of disposing the waste at a proper site. To document that the wastes are properly disposed, sump pump service companies must maintain the following records for each sump or pit that is serviced:

1. The source of the sump or pit waste, the generator/company name and address.
2. A description of the waste, including a copy of the test results showing the waste characteristics and that it is not a regulated hazardous waste, if applicable.
3. The location of disposal (application) site, including the legal description or name of the permitted facility.
4. Application rates and management issues as described in this guideline and/or the permit.

Note: This industrial sump or pit waste management outline does not apply to domestic waste (septic tanks and/or food-related grease traps).

Pumpers should check on the type of material in the sump and look out for significant oil or grease, solvent or chemical odors, etc. If such materials are in the sump, it should not be pumped and the NDDOH should be notified.

Sump Type	Testing	Disposal Options
Vehicle Wash (and similar inert sump wastes)	None if no free oil or contaminants are evident.	<ol style="list-style-type: none"> <li>1. Land application on agricultural, crop or pasture land (no permit required) in the manner outlined for land application of septage in sections 6.2 through 6.6 of this guideline.</li> <li>2. Disposal in a permitted wastewater treatment facility after receiving approval from the operator.</li> <li>3. Disposal at a permitted solid waste facility, with approval from the facility operator. Note: Permitted landfills are not allowed to accept liquids for disposal, but waste may be solidified, land treated, composted, etc., if approved.</li> </ol>
Vehicle Service and Maintenance Sumps and Pits	<p>None*</p> <p>*Because it has been the NDDoH's experience that a majority of sump wastes from vehicle maintenance operations are not hazardous wastes, it is not necessary for these businesses to conduct hazardous waste testing of this waste stream. However, should the business or pumper have knowledge that a potential hazardous waste has been placed in a sump or pit, an analysis may be required. Please contact personnel in the Hazardous Waste Program for guidance regarding testing needs.</p> <p>Division of Waste Management Hazardous Waste Program 701.328.5166</p>	<p>As a nonhazardous solid waste, the sludge may be disposed using one of the following options:</p> <ol style="list-style-type: none"> <li>1. Disposal of sludge and wastewater in a permitted wastewater treatment facility after receiving approval from the operator.</li> <li>2. Disposal at a permitted solid waste facility, after receiving approval from the facility operator. Note: Permitted landfills are not allowed to accept liquids for disposal, but waste may be solidified, land treated, composted, etc., if approved. Contact the Division of Waste Management, Solid Waste Program at 701.328.5166.</li> </ol>
Industrial Sumps And Pits	Appropriate methods must be used to document whether the waste would be regulated as a hazardous waste. Please contact the Hazardous Waste Program for assistance at 701.328.5166.	Disposal options are determined based upon whether the waste is regulated as a hazardous or nonhazardous waste.

#### 4. Restaurant Grease Trap Wastes

Grease traps are used by restaurants to prevent fats, oils and greases from entering the soil treatment area of an individual sewage treatment system or the collection system of a centralized sewage treatment system. Wastes that are pumped from these traps are very high in fats and oils and may or may not contain sanitary (human sewage, etc.) wastes.

Grease traps are set up in two main configurations. One configuration is a separate tank that receives only wastewater from the kitchen that is high in fats, oils and greases. The effluent from the tank is then discharged to a centralized sewage treatment system or an individual sewage treatment system septic tank. Restaurants that have an individual sewage treatment system generally install several septic tanks in series to provide a cleaner effluent before discharging it to the soil treatment area. In this set up, the first septic tank in the series acts as a grease trap. In these guidelines, the first septic tank in the series will be considered the same as a grease trap, and the remaining tanks in series regular septic tanks.

Grease trap wastes may be transferred to a POTW; however, the same issues exist as those for septage transfers. It is not likely that smaller POTWs will accept this waste because of the high biochemical oxygen demand of fats and oils. Landfills cannot accept this waste because of the liquid content; therefore, land application is a common form of management. Some composting of this waste also is being evaluated. Table 2 provides an analysis from a composite of four restaurant grease traps. This data shows that, unlike septage, grease trap wastes are low in nitrogen.

**Table 2. Grease Trap Waste Characterization<sup>1</sup>**

Parameter	Results on Wet Weight Basis
Total Solids (percent)	6.0
Total Volatile Solids (percent)	88.0
Fats, Oils & Grease (percent)	1.1
pH (SU)	4.4
Total Nitrogen (percent)	0.0056
Total Phosphorus (percent)	0.0029
Potassium (percent)	0.0036

<sup>1</sup>Taken from The Pumper, "Land treatment of grease trap wastes. A beneficial use approach", March 2000.

Limited research has been conducted on the effects of land-applied grease trap wastes on the soil or plants. Some studies suggest that the soil can break down this waste and it can even be beneficial to the soil if applied **at appropriate, controlled rates**. The National Association of Waste Haulers conducted a demonstration project and documented observations made on areas receiving grease trap wastes. It was concluded that restaurant grease trap wastes can be land applied safely if rates are limited to four (4) dry tons/acre/year (Rohm 2000). This is approximately 16,000 gallons/acre using a total solids content of 6 percent. This is about 3/5 of an inch. Over-application may kill vegetation and soil bacteria, reduce the ability of soil to treat the waste material, and result in impacts to surface water and groundwater.

Sludges produced by treating wastewaters from meat and poultry processing industries also can contain high percentages of fats, oils and greases. These wastes have been land applied for many years in some areas without causing any known problems. Some farmers believe that application of these sludges has actually improved their soil by making it more permeable and better aerated (these are not measured observations).

One of the problems that occurs when grease trap wastes are applied to forage or cover crops is that the above-ground portions of the plant are coated with the fats, oils and greases. This kills the above-ground portion of the plant temporarily. Plants do recover since the roots are not damaged; however, yields are likely affected.

Excessive application rates can cause clogging of soil pores. This could lead to problems with soil aeration or runoff, since the soil's infiltration capacity and rate may be reduced. To avoid this problem, application rates must be limited, especially when surface applied. The application rate that causes problems like this to occur has not been established, so these guidelines use conservative application rate limits (see section on requirements for land application of restaurant grease trap wastes).

Another concern with land application of grease trap wastes is that they can be very odorous. Odor is not only a nuisance condition but can attract vectors such as flies and rodents to application sites. To reduce the odor problem, it is recommended that incorporation or injection be used as an application method whenever possible and that care be taken when locating sites that will be used for land application of grease trap wastes. If these wastes are surface applied, they must be mixed with septage and lime stabilized.

Some pumpers have noted that restaurant grease traps can contain a lot of floating oils. These oils should be collected in the restaurant and recycled. If there are a lot of oils in the grease trap, the management of the restaurant should be informed and their workers trained about how to collect and manage this oil. Restaurant managers should be encouraged to train their workers to catch as much of the fats, greases and oils as possible before they go down the drain. This will not only reduce problems with their effluent, it will also limit the amount of this waste that is land applied. Waste grease may be converted to bio-diesel if properly managed.

## **5. Transferring Septage, Sump and Restaurant Grease Trap Waste to a Publicly Owned Treatment Works (POTW)**

Septage, sump and restaurant grease trap waste can be transferred to a POTW with its written permission. Because these three waste types have high biochemical oxygen demands, not all POTWs are willing or able to accept them. POTWs may be more willing to accept domestic holding tank waste because the biochemical oxygen demand averages about 500 mg/l.

Pumpers may consider treatment such as separating water from grease or mud contained in sump or grease trap waste. A settling tank and/or an oil water separator may be useful in segregating oils and muds from liquid wastes. Such simple treatment may help get approval from POTW

facilities when they know the resultant waste will be largely water. Landfills or other solid waste facilities may be able to manage muds and greases that are separated from the liquid portion. Each POTW has the authority to refuse or accept these wastes. This decision is based on how the transfers could affect its system's operation. Information is available to assist POTWs to determine whether they can accept septage or holding tank wastes at their facilities. The following documents contain useful information for POTWs trying to decide whether they should accept septage at their facility:

- “Accepting Septage at a Wastewater Treatment Plant,” Minnesota Pollution Control Agency.
- “Septage Handling,” (1997). Water Environment Federation Manual of Practice No. 24. Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994, (703) 684-2400.
- “Handbook Septage Disposal Guide,” (1984). EPA-625/6-84-009, U.S. Environmental Protection Agency Publication.

If septage or restaurant grease trap waste is transferred to a POTW, this information should be indicated on the transporter's daily record log. This type of record is needed to show the final destination of the waste to prove it has been properly managed.

## **6. Septage Storage Requirements**

A structure used to store or treat septage pumped from multiple sources when the structure is not located at a permitted wastewater treatment facility may require an NDDoH permit. Mobile storage units used for the transport of septage do not require an NDDoH permit.

To determine if a storage structure requires an NDDoH permit, contact the NDDoH at 701.328.5166. If a permit is required, you will be requested to submit a permit application. A permit application fee and an annual fee may be assessed, depending on the type of permit that is required.

### **Land Application Requirements for Septage**

These requirements are only for land application of septage on areas referred to as nonpublic contact sites. These are agricultural, forest and mine lands. Areas that are frequented by the public such as ball fields, cemeteries, etc., must meet the more detailed requirements of 40 CFR Part 503 for sewage sludge.

It is important for pumpers to check with local units of government to find out if they have land application requirements or ordinances that must be followed. It is the pumper's responsibility to be up to date on all rules and ordinances related to land application.

### **6.1. Requirements for Pathogen Control and Vector Attraction Reduction**

All septage that is land applied must meet the requirements for pathogen control and vector attraction reduction. These requirements are intended to provide protection against transfer of diseases from the application area. This is done by reducing the number of pathogens present, preventing vectors such as flies and rodents from being attracted to the application site, and



following restrictions on site use. Pumpers must select from the options described in this section to ensure that pathogen control and vector attraction reduction requirements are met.

### 6.1.1. Pathogen Control Requirements

One of the following options for pathogen control must be met when septage is land applied:

**Option 1 – Site Restrictions:** The site restrictions A through F in Table 3 must be maintained.

**Option 2 – Lime Stabilization With Site Restrictions:** The pH of the septage must be raised to 12.0 or greater by alkali addition, and without the addition of more alkali, must remain at 12.0 or higher for 30 minutes, and the site restrictions A through C in Table 3 must be maintained.

**Table 3. Minimum duration between time of septage application and harvest, grazing, and public access to the site.**

Restriction Reference	Restricted Activity	Waiting Period
A	Food crops whose harvested part may touch the soil / septage mixture (melons, squash, tomatoes, etc.)	14 months
B	Food crops with harvested parts below the surface (potatoes, carrots, etc.)	38 <sup>1</sup> months
C	Feed, food, or fiber crops that do not touch the soil surface (field corn, sweet corn, hay, flax, etc.)	30 days
D <sup>2</sup>	Turf harvest	1 year
E <sup>2</sup>	Grazing of animals	30 days
F <sup>2,3</sup>	Public access to land <ul style="list-style-type: none"> <li>• high potential for exposure</li> <li>• low potential for exposure</li> </ul>	1 year 30 days

<sup>1</sup>This can be reduced to a 20 month duration between application and harvest when the septage is surface applied and stays on the soil surface four months or longer prior to incorporation into the soil.

<sup>2</sup>Not required if lime stabilization used for pathogen control.

<sup>3</sup>Lands with high potential for exposure are public contact sites, reclamation sites located in populated areas, turf farms, or plant nurseries. Lands with low potential for exposure are lands with infrequent public use and include areas such as agricultural land, forests, or reclamation sites located in an unpopulated area.

Pumpers are responsible for ensuring that farmers or other end users are informed of site use restrictions and that appropriate precautions are taken to prevent access to sites. This may require that some sites be posted with signs informing the public to stay off the site.

### 6.1.2 Vector Attraction Reduction Requirements

One of the following options for vector attraction reduction must be met when septage is land applied:

**Option 1 – Injection:** Septage must be injected into the soil. No significant amount of septage can be present on the soil surface within one hour after injection has taken place.

**Option 2 – Immediate Incorporation:** Septage must be incorporated by tillage within six (6) hours after surface application.

**Option 3 – Lime stabilization:** The pH of the septage must be raised to 12.0 or greater by alkali addition, and without the addition of more alkali must remain at 12.0 or higher for 30 minutes.

**NOTE:** When lime stabilization is used for pathogen control or vector attraction reduction, the temperature of the septage must be taken into account when measuring pH. The reading must be taken at the standard temperature of 25° C (77° F), or corrected to 25°C (see the Pumpers Manual for a detailed explanation about how to make this correction).

**6.2. Site Suitability Requirements for Septage Application**

The pumper must determine whether land application sites are suitable. Sites are considered suitable if the suitable soil conditions in Table 4, slope restrictions in Table 5, and separation distances in Table 6 are met.

**Table 4. Suitable Soil Conditions<sup>1</sup>**

Characteristic	Minimum Requirement
Soil texture	At the zone of septage application (surface horizon or injection depth), the soil texture must be one of the following: sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, sandy clay, silty clay loam, silty clay, or clay. The Department may approve other, more permeable soil textures only on a case by case basis, dependent on site conditions, waste type, application rates, frequency of application, land use, etc.
Surface horizon permeability	If 0.2 inches/hour or less, this soil is suitable only for surface application with incorporation within 48 hours or injection.
Depth to bedrock <sup>2</sup>	3 feet
Depth to seasonally saturated soil <sup>2,3</sup>	3 feet
Frequency of flooding	Must not be occasional or frequent

<sup>1</sup>This information can be obtained from the soil surveys published by the Natural Resources Conservation Service or by characterization of the site by a state of North Dakota Registered Professional Soil Classifier.

<sup>2</sup>This depth must be a minimum of 5 feet, if the soil is classified as a “highly permeable soil.”

<sup>3</sup>On sites where tile drainage is installed, the depth to tile lines is considered the depth to the seasonally saturated soil. Tiling must be adequate to ensure the separation distance can be maintained.

**Table 5. Slope restrictions for application sites where septage is land applied.**

Slope (percent) <sup>1</sup>	Surface application	Injection or Immediate Incorporation <sup>2</sup>
<b>Summer:</b> 0 – 6 > 6 – 12 > 12	Allowed Not allowed Not Allowed	Allowed Allowed Not Allowed
<b>Winter:</b> Only areas with slopes from 0 to 2 % can be used for winter applications of septage.		

<sup>1</sup>This information can be obtained from the soil surveys published by the Natural Resources Conservation Service or by characterization of the site by a state of North Dakota registered professional soil classifier or other qualified person.

<sup>2</sup>Immediate incorporation is mixing of septage into the soil with some form of tillage within six (6) hours of application.

**Table 6. Minimum separation distances from the land application site.**

Feature	Separation Distances in Feet			
	Surface Applied	Incorporated within 48 Hours	Injected	
Private drinking water supply wells	200	200	200	
Public drinking water supply wells <sup>1</sup>	1000	1000	1000	
Irrigation wells	50	25	25	
Residences	1000	1000	1000	
Residential developments	1000	1000	1000	
Public contact sites, including roads	1000	1000	1000	
Down gradient lakes, rivers, streams, or tile inlets connected to these surface water features <sup>2</sup> and	Slope 0% to 6%	200	50	50
	Slope 6% to 12%	Not Allowed	100	100
	Winter (0%)	600	Not Applicable	Not Applicable

sink holes	to 2%)			
Grassed Waterways <sup>3</sup>	Slope 0% to 6%	100	33	33
	Slope 6% to 12%	Not Allowed	33	33

<sup>1</sup>There may be special requirements if the land application site is within the boundaries of a wellhead protection area. Check with the NDDH or local unit of government.

<sup>2</sup>Intermittent stream means a drainage channel with definable banks that provides for runoff flow to any of the surface waters listed in the above table during snow melt or rainfall events.

<sup>3</sup>Grassed waterways are natural or constructed and seeded to grass as protection against erosion. Separation distances are from the centerline of grassed waterways. For a grassed waterway which is wider than the separation distances required, application is allowed to the edge of the grass strip.

### 6.3. General Site Management

The following general site management practices must be followed:

- a. Application of septage is not allowed on areas of a site ponded with water or septage.
- b. Application of septage is not allowed when significant rainfall is imminent or is occurring or when soils are very wet or saturated.
- c. Septage cannot be applied by spraying from public roads or across road right of ways.
- d. The application area must be clearly identified with flags, stakes or other easily seen markers at the time of application to identify the site boundaries, separation distances and unsuitable application areas within the site. Where site boundaries can be identified by field roads, fences, etc., identification is not necessary.
- e. All septage that is land applied must be uniformly distributed over the area of the site used during application.
- f. A distribution device (splash plate or spreader) is required on the application vehicle so that even application of septage is possible and application rate limits can be met.
- g. Measures must be taken to ensure that septage remains where it was applied and does not concentrate in low areas of the field or run off the site.
- h. The application vehicle must be moving at all times during application.
- i. Winter applications cannot occur unless measures are taken that allow septage to be applied evenly over the application area. This generally means that fields must be plowed or cleared of snow in some way.

### 6.4. Allowable Application Rates

Typically, nitrogen is the nutrient used to determine how much septage can be applied to an application site. Septage must be applied at a rate that supplies no more nitrogen than a crop needs. This is referred to as the agronomic application rate. In this guide, the Maximum Allowable Nitrogen Application (MANA) rate is used to calculate the gallons of septage that can

be applied to a site over an entire cropping year. Pumpers can choose one of the following options for determining their maximum annual septage application rate:

**Option 1:** Apply septage at rates that do not exceed the MANA rates identified under Option 1 of Table 7.

**Option 2:** Apply septage at rates that supply the MANA rates identified under Option 2 of Table 7 by using the following equation:

$$\frac{\text{Maximum Allowable Septage Application Rate (gal/ac/yr)}}{0.0026} = \text{MANA rate}$$

Use of either option will ensure compliance with the state recommendations and federal requirements for annual loading rate limits.

Option 1 uses conservative assumptions for yields and septage loading rates to ensure that the agronomic rate for nitrogen is not exceeded. This option should be used when the pumper does not have enough information to determine MANA rates, such as yield goals or soil test information.

Option 2 requires the pumper to determine the MANA rate and calculate the maximum allowable septage application rate. This method should be used only when all information is available for determining MANA rates. Realistic yield goals are needed to determine MANA rates when using option 2 and can be determined by one of the following methods:

- Use the most recent five-year average crop yield, excluding the worst year.
- Use the most recent three- to five-year average crop yield and increase this by 10 percent.
- Use information from the Natural Resource Conservation Service, county extension office, or a crop consultant on typical yields for the soil type and management being used in the area.

For both options, the MANA rate must be adjusted by subtracting other nitrogen applied to the site from fertilizers, manure or other by-products. These are considered nitrogen credits and are subtracted from the MANA rate to determine the amount of nitrogen that can be supplied by the septage.

To ensure that MANA rates are not exceeded, information about rates of applied manure, fertilizer, septage, municipal by-products and any other material applied to the site that supplies nitrogen to the crop must be obtained. To simplify record keeping and management, it is recommended that septage not be applied on sites that receive nitrogen from other sources.

**Table 7. Maximum Allowable Nitrogen Application Rates (MANA Rates).**

Crop	Option 1	Option 2
	MANA Rate (pounds nitrogen/acre/year)	MANA Rate (pounds nitrogen/acre/year)
Non-harvested vegetation or cover crops	50 [20,000 gal/acre]	50
Soybeans	120 [45,000 gal/acre]	3.5 lb Nitrogen X Bushel/acre yield goal
Alfalfa	150 [60,000 gal/acre]	50 lb Nitrogen X Tons/acre yield goal
Clover, alfalfa-grass, clover-grass mixtures, or other legumes	100 [40,000 gal/acre]	50 lb Nitrogen X Tons/acre yield goal
All other crops (e.g. corn, oats, wheat, pasture, etc.)	50 [20,000 gal/acre]	University of Minnesota Publication – Recommendations for Agronomic Crops in Minnesota (BU-6240-GO and its updates)

#### 6.4.1. Specific Nitrogen Management Requirements:

The nitrogen management requirements in this section were developed to prevent nitrogen from being lost by leaching into ground water. All of the requirements in this section must be followed.

- a. After the second cutting of a hay crop, the septage application rate must be reduced to supply no more than half of the MANA rate for the cropping year.
- b. Septage cannot be applied on land that remains fallow for the entire cropping year.
- c. When no crop is grown on the application site during the time period July 1 through August 31 (this generally occurs on sites where early maturing crops such as oats, sweet corn or peas have been harvested), the following requirements apply:
  - Applications of septage are limited to rates that supply no more than 50 pounds of nitrogen per acre (20,000 gallons/acre).
  - All nitrogen applied must be credited to the following cropping year.
  - A crop must be grown the following cropping year.

#### 6.4.2. Hydraulic Loading Rate Limits

Hydraulic loading rate limits are set to prevent ponding of septage on the soil surface and runoff of septage from where it was applied. The following requirements must be met:

- a. Daily application rates for surface-applied septage are limited to 10,000 gallons/acre/day.
- b. Field conditions must be taken into account to ensure that the following requirements are met:
  - No runoff of septage from the application site is allowed.
  - No surface ponding of septage is allowed after six hours from the time of application.
  - Only minimal movement of septage from where it was applied can occur.

- c. Application rates are limited to a total of 15,000 gallons/acre over the entire winter period.

### **6.5. Pumper Qualifications**

A pumper who performs land application of septage is regulated under NDCC 23-19, NDAC 33-21, and all other applicable rules and regulations.

### **6.6. Record-Keeping Requirements**

The pumper must develop and maintain a record-keeping system that provides the information described in this section. These records must be kept for a minimum of five (5) years.

#### **6.6.1. For each land application site, the following information must be kept:**

- a. Location of each land application site used. This can be recorded as the street address, latitude and longitude of the site, or legal description indicating the quarter section, township coordinate, range coordinate, township name and county name.
- b. A map of the land application site with the site boundaries identified. The map must be from a soil survey when available. If not available, another map with comparable information can be used. Any areas of the site that are not used because they are unsuitable should be indicated on the map by coloring or crosshatching.
- c. Total useable acreage of the site (unsuitable areas should not be included in the site acreage, because application rates are based on the actual area to which septage is applied).
- d. Crop grown on the site.
- e. Maximum allowable nitrogen application rate for the cropping year in pounds/acre.
- f. Maximum allowable septage application rate for the cropping year in gallons/acre.
- g. Running total of gallons of septage applied on the site.
- h. A written description of how the pathogen reduction requirements have been met.
- i. A written description of how the vector attraction reduction requirements have been met.
- j. The following signed certification statement:

*“I certify under penalty of law, that the information that will be used to determine compliance with the pathogen requirements [insert either 503.32(c)(1) or 503.32(c)(2)] and the vector attraction reduction requirement [insert either 503.33(b)(9), 503.33(b)(10) or 503.33(b)(12)] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

#### **6.6.2. For each load of septage applied to a site, the following detailed information must be kept:**

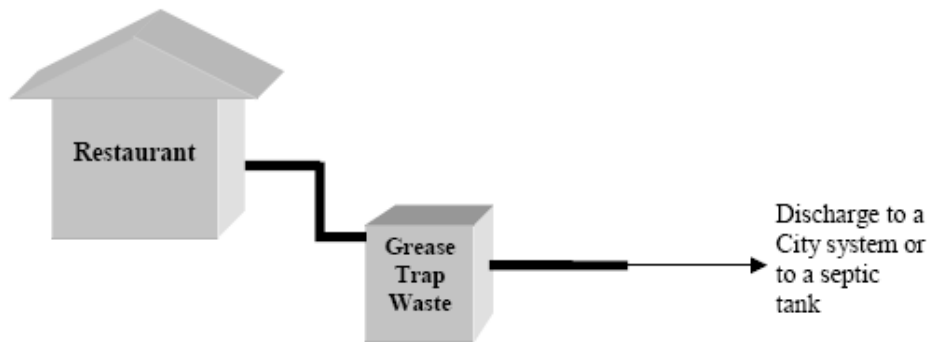
- a. Source(s) of septage in the load. This means the home or facility from which material was removed and can be indicated by property owner name or invoice number. The type of material pumped should be identified (septage, grease trap waste, etc.).
- b. The date each load of septage was applied on the site.

- c. Total gallons land applied.
- d. Total acres covered.

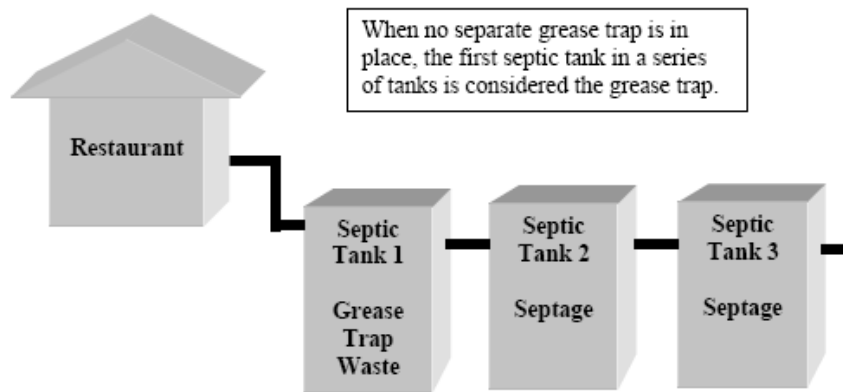
**Requirements for Land Application of Restaurant Grease Trap Waste**

Restaurant grease traps are designed to remove greases, fats and oils before they enter a centralized sewage treatment system or the soil treatment area of an individual sewage treatment system. The waste that is removed from the tank described in Figure 1 and the first septic tank described in Figure 2 are restaurant grease trap wastes and must be managed by following the special management requirements of this section.

**Figure 1** – Tanks designed for the purpose of removing fats, oils and greases from effluent before discharge to a centralized sewage treatment system or to an individual sewage treatment system septic tank.



**Figure 2** - When there is no tank specifically dedicated to collection of greases, fats and oils, the first septic tank that receives effluent from a restaurant is considered the grease trap.



Restaurant grease trap waste can be land applied if **all** of the requirements of these guidelines (pages 11 through 19) for the land application of septage are followed. **In addition**, one of the following options for management must be met:



**Option 1:** Restaurant grease trap waste must be incorporated into the soil within six (6) hours of surface application and is limited to an application rate of 15,000 gallons/acre/year.

**Option 2:** Restaurant grease trap waste must be injected into the soil and is limited to an application rate of 15,000 gallons/acre/year.

**Option 3:** Restaurant grease trap waste from a tank, as described by Figure 1, must be mixed with domestic septage prior to land application. The quantity of restaurant grease trap waste mixed with septage cannot exceed 25 percent of the mixture by volume. Maximum application rates of this mixture are limited to 60,000 gallons/acre/year.

**Option 4:** Restaurant grease trap waste from the first septic tank, as described by Figure 2, must be combined with domestic septage and mixed prior to land application. The quantity of restaurant grease trap waste mixed with septage cannot exceed 50 percent of the mixture by volume. The source of the septage used for diluting the grease trap waste can be from the other tanks in series with the first or from another ISTS system. Maximum application rates of this mixture are limited to 30,000 gallons/acre/year.

In addition to the application rate limits specified for each option, the application rate limits used for septage also apply. This means that the maximum application rate for restaurant grease trap waste cannot cause the annual application rate limit specified for septage to be exceeded.

Additional septage also may be applied to sites receiving restaurant grease trap waste or mixtures of restaurant grease trap waste and septage as long as the sum of all these wastes are counted as part of the year's maximum allowable application rate for septage.

## **Definitions**

**“Agronomic rate”** for biosolids, application is a rate that is designed to provide the amount of nitrogen needed by a crop or vegetation to attain a desired yield while minimizing the amount of nitrogen that will pass below the root zone of the crop or vegetation to the ground water (EPA 1994, A Plain English Guide to the EPA Part 503 Biosolids Rule).

**“Biosolids”** are a primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled (EPA 1994, A Plain English Guide to the EPA Part 503 Biosolids Rule).

**“Cover crop”** means crops including grasses, legumes and forbs for seasonal cover and other conservation purposes (Natural Resources Conservation Service, Conservation Practice Standard, Cover Crop, Code 340).

**“Cropping year”** means a year beginning September 1 of the year prior to the growing season and ending August 31 the year the crop is harvested. For example, the 2008 cropping year began Sept. 1, 2007, and ended Aug. 31, 2008.

**“Domestic septage”** is defined as a liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device or similar treatment works that receives only domestic sewage. Domestic septage does not include grease-trap pumpings and commercial or

industrial waste (EPA 1994, A Plain English Guide to the EPA Part 503 Biosolids Rule).

**“Fallow land”** means land that is not cropped and kept cultivated throughout a growing season and has a vegetative cover of less than 25 percent. Any land that is not cropped and cultivated during the months of September through May where a crop will be grown the following growing season is not considered fallow land.

**“Feed Crops”** mean crops produced primarily for consumption by animals.

**“Fiber Crops”** mean crops such as flax and cotton.

**“Food Crops”** mean crops consumed by humans. These include but are not limited to fruits, vegetables, and tobacco.

**“Highly permeable soil”** means soils whose soil leaching potentials are rated as severe, poor filter for soil pesticide loss, by the Natural Resources Conservation Service using the procedure found in Part 620, Soil Interpretation Rating Guides of the United States Department of Agriculture-Natural Resources Conservation Service National Soil Survey Handbook.

**“Pathogens”** are disease-causing organisms, such as certain bacteria, viruses and parasites (EPA 1994, A Plain English Guide to the EPA Part 503 Biosolids Rule).

**“pH”** means a scale that denotes how acidic or basic a substance is. Pure water has a pH of 7.0 and is neither acidic nor basic. The pH scale measures how acidic or basic a substance is. It ranges from 0 to 14. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic. Each whole pH value below 7 is 10 times more acidic than the next higher value. For example, a pH of 4 is 10 times more acidic than a pH of 5 and 100 times (10 times 10) more acidic than a pH of 6. The same holds true for pH values above 7, each of which is 10 times more alkaline – another way to say basic – than the next lower whole value. For example, a pH of 10 is 10 times more alkaline than a pH of 9 (EPA website).

**“Pumper”** means an individual or business performing services as regulated under NDCC 23-19.

**“Septage”** is the liquid and solid material pumped from a septic tank, cesspool or other primary treatment source (EPA 1999, Decentralized Systems Technology Fact Sheet: Septage Treatment/Disposal).

**“Vectors”** are organisms, such as rodents and insects, that can spread disease by carrying and transferring pathogens (EPA 1994, A Plain English Guide to the EPA Part 503 Biosolids Rule).

**“Winter”** means the time that soils are frozen or snow covered, so that incorporation or injection is not possible. This time period varies from year to year.

## References

EPA (1999). Decentralized Systems Technology Fact Sheet: Septage Treatment/Disposal. U.S. Environmental Protection Agency Publication No. EPA/ 832-F-99-068, Washington, DC.

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EPA (1994). Guide to Septage Treatment and Disposal, U.S. Environmental Protection Agency Publication No. EPA/625/R-94/002, Cincinnati, OH.

EPA (1993). A Guide to the Federal EPA Rule For Land Application of Domestic Septage to Non-Public Contact Sites. U.S. Environmental Protection Agency Publication No. EPA 832-B-92-005, Washington, DC.

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EPA (1993). 40 Code of Federal Regulations Part 503. Standards for the use of disposal of sewage sludge. Federal Register 58(32), 9387-9414.

Minnesota Pollution Control Agency (1995). Minnesota Rules Chapter 7041, Sewage Sludge Management Rules,” Office of the Revisor, St. Paul, MN.

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