

HEALTH WARNING

Septic systems contain many disease-causing organisms. Be sure to properly sanitize any tools, clothing, or contaminated areas and be sure to wear disposable gloves.

SAFETY WARNING

Septic systems may contain gases that are potentially hazardous, flammable, and deadly. Do NOT enter a septic tank. Do not put your head into the opening of a septic tank. Always have someone nearby that can go for help in the event of an emergency.

Cowlitz County Health and Human Services (CCHHS) assumes no responsibility for the accuracy of the information provided, nor does it guarantee the future condition or function of the on-site sewage system.

Homeowners are responsible for correcting any problems with their system and obtaining the proper permits prior to repair. If your septic system is not functioning properly, please contact CCHHS for assistance.

Cowlitz County Health & Human Services - Environmental Health Unit -

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Cowlitz County

Homeowners Guide to On-site Sewage Systems

Operations & Maintenance Inspections

To Assist in Completing Inspection Forms 8420/8422



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Per Cowlitz County Code Chapter 15.42, operations & maintenance (O&M) inspections are required annually for septic systems utilizing pressure distribution. Gravity & pump to gravity systems require an inspection once every three years; however, annual inspections are recommended for these systems as well.

Prior to performing O&M on a pressure distribution system, homeowners are required to take a county-approved training class. There is NO training requirement for homeowners performing O&M on gravity or pump to gravity systems, but the county strongly recommends attending a basic informational course.

This guide is designed to assist you in completing the “On-Site Sewage System-Operations & Maintenance Report” (Form 8420) for gravity, pump to gravity, or pressure distribution systems. This guide is NOT a substitute for the homeowner operations and maintenance training required prior to performing an O&M inspection on all systems other than gravity and pump-to-gravity OSS. It is intended to assist you, the homeowner, in properly filling out Form 8420. If you have a sand filter pre-treatment unit before your drainfield, you will also need to complete the “Sand Filter Supplement” Form 8422.

If your system has access points (i.e., risers & monitoring ports), uncover, inspect, and report the condition at those points. If your system does not have any built-in access points, at a MINIMUM, you must open and inspect your tanks for the evaluation to be acceptable. A reasonable effort should be made to determine if the drainfield is functioning properly, even if there is no access. For example, perform a visual inspection of the ground surface.

Commonly Used Acronyms in this Guide

OSS: On-site Septic System

O & M: Operations & Maintenance Inspection

! SEE HEALTH AND SAFETY WARNINGS ON BACK PAGE !

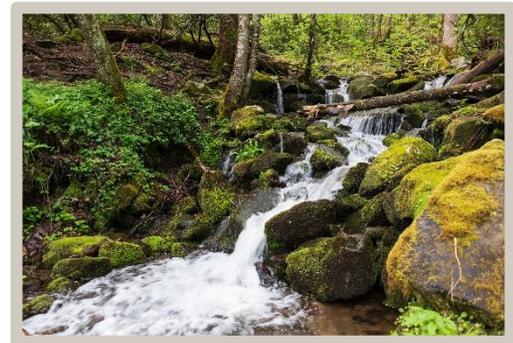
- L. **Open each monitoring port to check for ponding of effluent in the drainlines.** A little bit of ponding is normal and indicates the presence of a biomat (layer of biological growth that develops at the wastewater-soil interface and controls the rate at which pretreated wastewater moves through the infiltrative surface). However, ponding of greater than six inches in a drainline could be a sign of failure and indicate that the drainfield is clogged. Check the appropriate box on the inspection form.

Section 5 of Form 8420: Existing System Drawing

If a record drawing is not available or on file, please make a drawing of the location of each component of your septic system. Include swing ties on the drawing for ease of locating components during the next scheduled operations and maintenance inspection. Indicate what scale you are using for the drawing, for example 1 inch = 50 feet.

Section 6 of Form 8420

- Note whether the home utilizes a garbage disposal and water softener.
- Note whether the septic tank and/or pump chamber was pumped by a licensed pumper. If a tank was pumped, please attach a copy of the Cowlitz County licensed pumper’s report and the pump receipt for your file.
- Note whether any system problems were identified during your inspection and if they have been corrected. Depending on the nature of the repair, a repair permit may need to be obtained from the Building & Planning Department. Please contact the Health & Human Services regarding potential repairs to your septic system. If the correction does not require a permit, please describe what was done to correct the deficiency.
- Sign and date the bottom of the inspection form.
- Health & Human Services will follow up on any reports that are not adequately completed. Health & Human Services will also contact you regarding any problems that were identified during the inspection.



- H. If monitoring ports are present, **open each port to check for ponding of effluent in the drainlines**. A little bit of ponding is normal and indicates the presence of a biomat (layer of biological growth that develops at the wastewater-soil interface and controls the rate at which pretreated wastewater moves through the infiltrative surface). However, ponding of **greater than six inches in a drainline** could be a sign of failure and indicate that the drainfield is clogged. Check the appropriate box.

Note: If monitoring ports are not present, Cowlitz County does not recommend that homeowners dig into the drainfield. If you would like to install monitoring ports for future monitoring and maintenance activities, contact a professional service provider.

Pressure Distribution OSS

- I. Pressure distribution systems should have **access at grade** to the manifold and any ball or check valve attached to each drainfield lateral. Check the appropriate box.



- J. Each drainfield lateral consists of a PVC pipe with orifice holes drilled at a specified distance apart. (Figure 21) At one end of the lateral is a ball valve. At the other end is an elbow with a cleanout. The ball valves are used to assure each lateral is receiving an equal pressurization. During normal operation, the cleanouts have a solid cap over the top, however during a maintenance inspection, a cap with a small diameter hole can be placed on the cleanout.

To verify equal distribution of the laterals, turn the pump on using one of the methods described on Page 10 (method depends on if the system is on-demand or time-dosed). Observe the squirt height of each lateral (Figure 22), or how high the liquid is squirting out of each cleanout orifice. **The heights should be about equal**. If the heights are not equal, adjust the ball valves until they are equal. **If one lateral does not appear to be pressurized at all OR has a very high squirt height in comparison to the other laterals, contact a professional service provider.**

- K. Your OSS should have **monitoring ports** (at the end of each drainline (See Figure 17 on Page 12). Check the monitoring ports for any structural deficiencies.

Lateral cleanouts showing equal distribution during a squirt



Section 1 of Form 8420: Overall System Status

Walk the entire area of your septic system, beginning at the clean out of your house, to the septic tank and/or pump chamber area, transmission line, distribution box, and drainfield. Do you notice any surfacing effluent or ponding as shown in Figure 1? Liquid near the septic area that has a grayish color, odor, or sheen to it may be surfacing effluent. Wet spots with lush, green grass are also an indication of surfacing effluent. Check the appropriate box.

If you think there is surfacing effluent or ponding present in your septic area, please contact Health & Human Services immediately.



Figure 1
Surfacing Effluent



Section 2 of Form 8420: Septic Tank Status

For the O&M inspection to be acceptable, the septic tank must be located, uncovered, and inspected. Please complete each portion of Section 2 of Form 8420. Blank portions may result in the report being returned to the homeowner for completion.

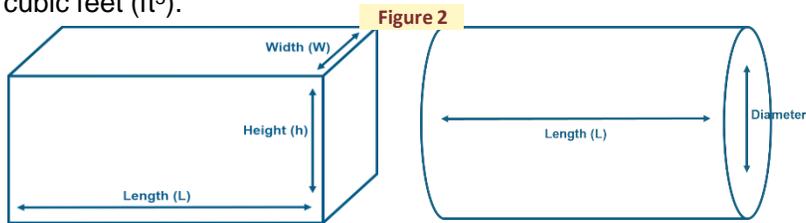
If you have an “as-built” or record drawing of your septic system, this will show the location of your septic tank. If this document is not available, you will need to use some investigative skills. If a crawl space or basement is present, you may be able to determine where the plumbing leaves the foundation wall. You can also use a metal probe bar to locate the tank by gently tapping into the ground in the vicinity of where the sewer line leaves the foundation. Fiberglass and polyethylene tanks can be ruptured with a probe bar, so use caution!

! SEE HEALTH AND SAFETY WARNINGS ON BACK PAGE !

- A. **Is there any presence of odor in the general vicinity of the septic system (septic tank & drainfield)?** If so, check the box that best describes the odor and note the source of the odor if possible. If odors are detected, check for damaged or cracked septic tank and/or pump chamber risers and lids, missing caps on drainfield observation ports, or surfacing effluent.

B. Check the box that describes the material of your septic tank. Most tanks will be concrete or fiberglass/polyethylene. Steel tanks, due to their poor structure and easy ability to rust and corrode, are no longer permitted under state and county regulations and **should** be replaced. If you need to replace a septic tank, contact CCHHS for a tank replacement permit.

C. Determine the size of your septic tank. The size of the septic tank should be noted on the record drawing, if one is available. If not available, use the calculations in Figure 2 to get an approximate volume in cubic feet (ft³).



Volume (cubic feet) = L x W x h

Volume (cubic feet) = $\pi r^2 \times L$

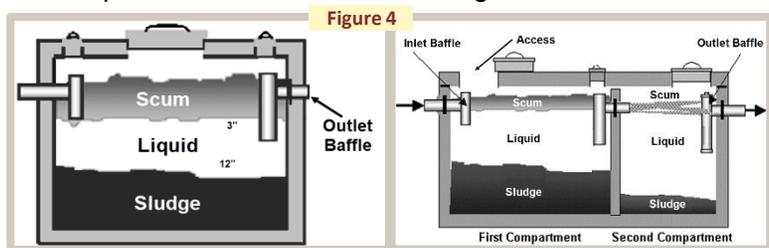
r (radius) = 1/2 d

Multiply the volume in cubic feet by 7.48 gallons/ft³ to get the size of the septic tank in gallons as demonstrated in Figure 3. Record the size of the tank in gallons on the inspection form.

Figure 3 Example of septic tank volume calculation

L = 6 ft	Volume (ft ³) = L x W x h = 6 ft x 5 ft x 4.5 ft = 135 ft ³
W = 5 ft	
h = 4.5 ft	Volume (gallons) = 135 ft ³ x 7.48 g/ft ³ = 1010 gallons

D. Check the box that best describes the number of compartments in your septic tank. Most septic tanks are either single compartment or double compartment tanks as shown in Figure 4.



Single Compartment

Double Compartment

GRAVITY AND PUMP-TO-GRAVITY OSS

E. Some gravity systems utilize a distribution box or series of drop boxes to distribute effluent to the drainlines as shown in Figure 18. Newer OSS regulations require these components be accessible at grade. If you have an older OSS with these components, they may be buried. Check the box that describes the location of these components. If your system does not have a distribution box or drop boxes, check the “NA” box.

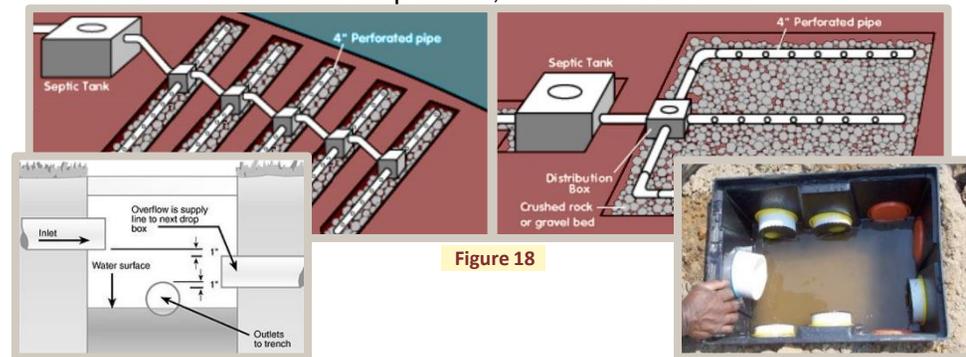


Figure 18

F. Check the integrity of the distribution box or drop boxes. If this component is not accessible at grade, use a metal probe to locate and uncover the component. Check for root intrusions or other structural deficiencies. Additionally, this component should **NOT** have sludge or other solids present. If sludge is present, it should be removed from the component. This could indicate that solids are entering the drainfield.

Note: For distribution boxes, adjustable weirs or auto levelers (Figure 19) can be installed on each outlet pipe. These assure that effluent is distributed EQUALLY to each drainline. Additionally, they can be used to “shut off” the flow to a drainline that may be nearing failure. *If you think that changes need to be done to the distribution component of your drainfield, Cowlitz County recommends contacting a professional maintenance provider.*



Figure 19

G. If your OSS has been installed recently you may have monitoring ports (Figure 20) at the end of each drainline. If monitoring ports are present, are there any structural deficiencies? Check the appropriate box.



Figure 20

compartment of your septic tank. This should be done according to manufacturer recommendations, but at least annually. The EHU recommends cleaning the filter once every 6 months. If no screen is present, check the “NA” box. This should be done according to manufacturer recommendations, but at least annually. The EHU recommends cleaning the filter once every 6 months. If no screen is present, check the “NA” box.

! SEE HEALTH AND SAFETY WARNINGS ON BACK PAGE !

Section 4 of Form 8420: Drainfield Status

If your drainfield has access points or monitoring ports, uncover, inspect, and report the conditions at those points. If it does not, a reasonable effort should be made to determine if the drainfield is functioning properly. This may include walking the drainfield area, visually inspecting the ground, and noticing any strong odors in the area. Complete the applicable portions of Section 4 based on the type of drainfield.



- A. **Are there any signs of sewage discharging to the surface?** Walk the area of the drainfield and check for strong odors, damp or spongy ground, green stripes, and excessive vegetation (Figure 1 on Page 3). Check the appropriate box on the inspection form.
- B. The drainfield area should be **free of roads, vehicular traffic, structures, or other items/activities** that could compact the soil or otherwise damage your drainfield. Check the appropriate box on the inspection form. Soil compaction reduces treatment and disposal functions by reducing the amount of oxygen the soils are able to retain. It also decreases the infiltration of water into the soil and therefore increases runoff and the potential for erosion.
- C. The drainfield area should be **free from surface water drainage and down spouts**. Check the appropriate box on the inspection form. These items increase the hydraulic load of the drainfield and could potentially cause the system to fail over time.
- D. If there is a dedicated reserve area on site, it must be **protected from soil compaction, drainage, or other activities** that may damage the area. Check the appropriate box on the inspection form. If there is no dedicated reserve area onsite (this is common for older systems), check the “NA” box.

When completing Form 8420:

If your system is gravity or pump-to-gravity, complete Section 4, items E thru H.
If you have a pressure distribution system, complete Section 4, items I thru L.

Some pressure distribution systems have a three-compartment tank, where the first two compartments are the septic tank, and the third compartment is the pump chamber as shown in Figure 5. If this is the case, check the “Other” box and write “3” on the blank line.

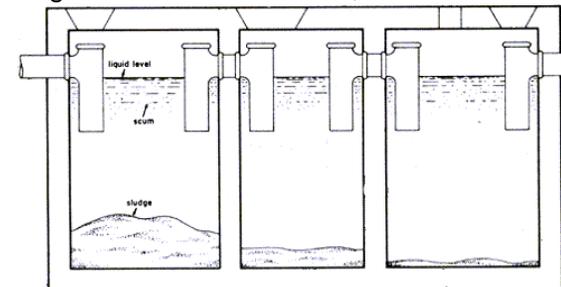
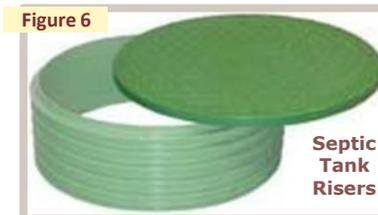


Figure 5
Three
Compartment
Tank

- E. **Is there tank access at grade or are the lids buried?** If the lids are buried, make a note of how deep for the next inspection.
- F. You may have risers as shown in Figure 6 with secured lids attached to your tank for access at grade. Check the integrity of the risers and lids for cracks and watertightness.*



*If your lids are buried, it may be cost effective and convenient to retrofit them with risers to grade for ease of future inspections, however this is not required for existing, in-place tanks.

- G. **Baffle Inspection.** Your septic tank should have three baffles: the inlet, outlet, and crossover baffles (See Figure 4 on page 4 for location of baffles). The inlet baffle directs waste downward and allows venting of the tank gases. The crossover and outlet baffles inhibit movement of solids from the septic tank to the drainfield by drawing liquid from the clear zone of the tank.

Inspect the inlet, outlet and crossover baffles to ensure they are present and not severely corroded. If the baffles are concrete and molded into the inside of the tank, the baffles should have venting holes that are unobstructed. Note the condition on the inspection form. See Figure 7.

Figure 7

Types of Baffles

Concrete & Plastic



This outlet baffle has an effluent filter in it.



H. Is there an effluent filter in the outlet baffle of the second compartment of your septic tank? Check “Yes” or “No.” The effluent filter collects solids that would otherwise enter, and potentially clog, your drainfield, and should be cleaned at least once every six months, see Figure 8. To clean the effluent filter, remove the filter from the outlet baffle and spray it off with water into the first compartment of your septic tank. This will allow the solids to settle in the first compartment of the tank and reduce the chance that they will get into your drainfield.*

*Cowlitz County recommends installing an effluent filter in the outlet baffle of the septic tank if one is not already present. This can prevent unwanted solids from entering your drainfield and possibly extend the life of your drainfield.



I. Check the box that best describes the liquid level in your septic tank relative to the invert of the outlet baffle. Your septic tank should remain full and at a constant volume. The liquid level should be at the invert of the outlet baffle (approximate location of the bold blue line in Figure 9). If the liquid level is below the invert, the tank may not be watertight, and liquid could be seeping out of the tank. If the liquid level is above the invert, the effluent filter (if present) may need to be cleaned or there may be a ponding or clogging problem in your drainfield. This could also be a sign that the tank is not watertight, and that liquid (groundwater) is seeping into the tank. If the liquid is NOT at the invert, the only way to fully determine tank integrity is to contact a professional to have the tank pumped.

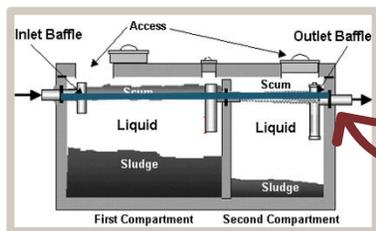


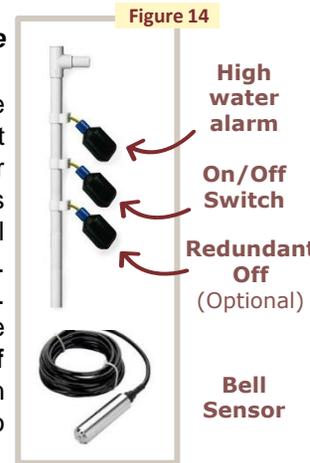
Figure 9
Liquid level in tank at invert of outlet baffle

J. Determine the depth of scum, sludge, and clear zone in your tank. The inspection of the sludge and scum level in your septic tank is the ONLY way to determine if pumping of the tank is necessary. Lack of timely septic tank pumping can cause sewage to back up into your house or solids to overflow into your drainfield. Once solids leave the outlet of the septic tank, they can quickly clog a drainfield to the point where a replacement drainfield is necessary. Follow steps 1 and 2 on the following pages for EACH compartment in your septic tank. See the **RED** boxes titled “When do I need to pump my tank?” to assist in determining if your septic tank requires pumping.

To test the pump for a timed-dose system, open the control panel if possible. There should be a metal switch in the top right-hand corner of the box with three settings, “auto”, “off”, and “manual”. Flip the switch to “manual.” The pump should turn on. Flip the switch back to “auto”. *The switch should always remain in the “auto” position for proper function. If you can not access your control panel, contact a septic professional for assistance.*

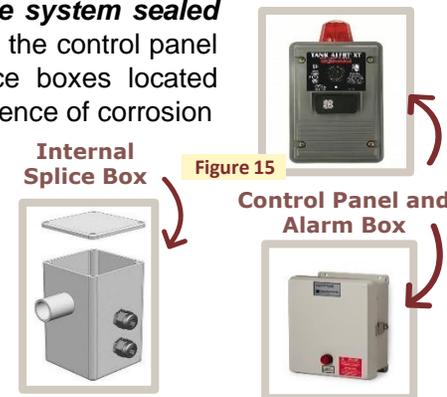
If your system uses a pump, determine if the floats or bell sensor are functional.

Your system should have a series of two or three floats inside of the pump chamber. The float closest to the lid of the pump chamber is the high-water alarm float. Use the “L” stick to lift this float. If it is working properly, the red light on your control panel or alarm box should make an audible noise & flash. Check the appropriate box on the inspection form. The “on/off” float has already been tested in the last step. If your float tree has a **redundant off float**, use the “L” stick to lift float. The red light on your control panel or alarm box should flash, but no audible noise will be heard.



If your pump is not working properly and it utilizes a **bell sensor**, contact a professional service provider to troubleshoot the system.

H. Are all electrical components of the system sealed and watertight? Check the outside of the control panel or alarm box and any internal splice boxes located inside the pump chamber riser for evidence of corrosion or water infiltration. Check the appropriate box on the inspection form. If you believe one of these components is NO LONGER watertight, CCHHS recommends contacting a professional service provider to troubleshoot the component.



I. A pump vault or screen may be present in the pump chamber to passively remove solids before the effluent enters the drainfield. These items are essentially effluent filters and require periodic cleaning. To clean the filter, remove it and spray it off with water into the 1st



panel. If you suspect there is a problem, contact a professional. With timed dosing, excessive and peak flows are stored in the pump chamber so only the desired amount of wastewater enters the drainfield at a certain time over the course of a day.

- A. Check the box that describes the material of your pump chamber.** Most tanks will be concrete or fiberglass/polyethylene.
- B. Determine the size of your pump chamber.** The size of the pump chamber should be noted on the record drawing, if one is available. If not, use the calculations in Figures 2 and 3 on Page 4 to get an approximate volume in gallons. If you have a three-chamber tank, the third chamber of the tank is the pump chamber. Record the size in gallons on the inspection form.
- C. Does the pump chamber appear to be watertight and in good condition?** Do you notice any cracks, chipping, or flaking of the concrete? Is there any visible rebar? Is the tank deformed in any way? If no one is using water in the home at the time of inspection, do you hear leaks or running water into the tank? Check the appropriate box on the inspection form.
- D. Is there pump chamber access at grade or is the lid buried?** If the lid is buried, make a note of how deep for the next inspection. You may have a riser with a secured lid attached to your pump chamber for access at grade.
- E. Check the integrity of the riser and lid for cracks and watertightness,** see Figure 6 for an example of what a riser looks like. If your lid is buried, it may be cost effective and convenient to retrofit it with a riser to grade for ease of future inspections, however this is not required for existing, in-place tanks.
- F. Determine the scum depth (if any) and the sludge depth (if any)** using the same steps used to determine the scum & sludge depths in your septic tank (Pages 7-8). Record the scum and sludge accumulation, if present, and check whether solids are present in the tank. If ANY solids are observed in your pump chamber, pumping is required.
- G. Determine if the pump or siphon is functional.** The pump or siphon can usually be heard when activated. Learn what your pump or siphon cycle sounds like and listen for the activation. Check the appropriate box.

Figure 13



If you have a siphon, try to observe the discharge cycle and make sure siphon tank fills and then empties when the siphon discharges. If you hear a trickle coming out of the siphon, it is NOT working properly. CCHHS recommends contacting a professional if there are concerns that the pump or siphon is not working properly.

Is your system controlled by a timer or is it on-demand? Check the box that best describes how the effluent is dosed to your drainfield (see descriptions of these different methods on page 9).

To test the pump for an on-demand system, simply lift the “on/off” float with the “L” end of the scum stick. The pump should turn on if it is working properly.

MATERIALS REQUIRED

- Two 10-foot PVC pipes
 - Four end caps
 - One 90 elbow
 - Two threaded adapters
 - One coupler
 - PVC cement (suitable for use in rain)
 - Disinfecting solution (1/2 cup bleach per gallon of water in a bucket)
- All PVC and fittings are 1/2 inch Schedule 40 PVC plastic
- Pencil or waterproof marker
 - String or duct tape
 - Rubber gloves
 - White rag or towel
 - Plastic bag for towel disposal



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Step 1: Determine the accumulation of scum in the tank.

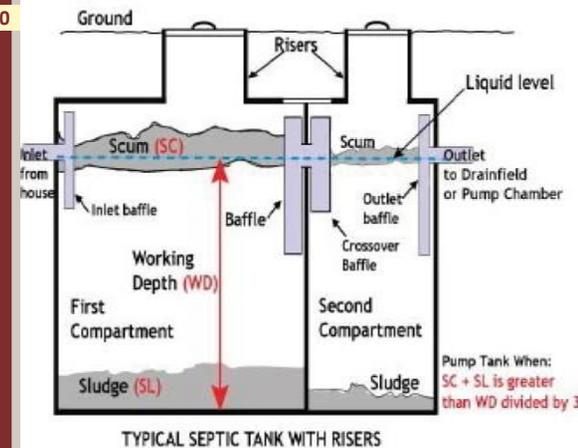
1. Establish a convenient reference point, such as a board laid across the opening of the tank compartment. Attach a 6-inch piece of PVC pipe at 90 degrees to the bottom of a stick at least 6 feet long forming an extended “L”. -- *This is your scum stick.* --
2. At the outlet end of your tank's compartment, carefully push the stick through the scum layer to find the bottom of the baffle or tee. Mark your stick at the reference point to indicate the bottom of the baffle or tee.
3. Raise the stick slowly until you feel or see the stick contact the *bottom* of the scum layer. Mark your stick again at the reference point to indicate the bottom of the scum layer.
4. Raise the stick until you see the stick contact the *top* of the scum layer. Mark your stick a third time at the reference point to indicate the top of the scum layer.
5. Lay the stick aside for comparison with the sludge level stick.
6. Record the scum accumulation in the appropriate box on the O&M Report.

Figure 10



When do I need to pump my tank?

- If the top two pencil marks are three inches or less apart on the scum stick
- If the top of the scum is within one inch of the top of the outlet baffle



Step 2: Determine the accumulation of sludge layer in the tank.

This process is to determine the distance from the bottom of the outlet baffle or tee to the top of the sludge layer, and the total depth of the sludge layer.

1. Wrap a white rag or old towel around the bottom three feet of a stick at least six feet long and fasten it with tape or string.
2. Carefully lower the stick to the bottom of the first compartment. To avoid pushing it through the scum layer, lower the stick behind the outlet baffle or through the outlet tee.
3. Hold the stick in the tank for a few minutes to allow sludge particles to adhere to the towel. Mark the stick at the reference point to indicate the bottom of the tank.
4. Remove the stick carefully and note a distinct dark stain on the towel representing the sludge layer. Lay the stick beside the scum stick. Line up the top pencil marks.
5. Measure the distance from the bottom of the scum stick ("L" portion) to the top of the dark stain on the sludge stick.
6. Record the sludge accumulation (length of the brown stain on the towel) in the appropriate box on the O&M Report.

Figure 11

When do I need to pump my tank?

If the distance in step 5 is 12 inches or less

Another method to determine when to pump

Calculate the % of solids (sludge and scum) in tank:

- Add the sludge depth and the scum depth
- Divide by the liquid depth
- Convert total to percent

EXAMPLE:

15" (sludge) + 6" (scum) = 21" (solids)

21" (solids) / 50" (liquid depth) = 0.42

0.42 X 100% = 42% solids in tank

42% Greater than 33% = TIME TO PUMP TANK!

Another method to determine when to pump

Pump the tank when the total sludge & scum occupy 25% to 33% of your total tank volume.

- K. If the tank is pumped, take the opportunity to **evaluate the structural conditions inside the tank**. Check the integrity of the tank top, sides, and bottom. The inside of the tank should show no signs of structural failure, such as exposed rebar, rust stains from rebar in a concrete tank, spalling (the physical degradation of a concrete structure), or other deformations.

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Section 3 of Form 8420: Pump Chamber Status

If your system is a gravity system with NO pump, skip this section and continue to Section 4 of Form 8420. If your system contains a pump (either a pressure distribution system or a pump-to-gravity system), this section on Form 8420 must be completed. For the O&M inspection to be acceptable, the pump chamber must be located, uncovered, and inspected. Complete each portion of Section 3 on Form 8420.

Pump Chamber Basics

A pump chamber will have either a **pump** or a **siphon** (See Figure 13) to dose the septic tank effluent to the drainfield. When a pump is used there will also be a switch to control the pump. There are two types of switches: a **float tree** with two or three floats connected to it, or a **bell sensor** (See Figure 14). A siphon may be used when the pump chamber is located at a higher elevation than the drainfield, and it does not need a float tree or bell sensor to operate properly. There should be a **control panel** or **alarm box** (See Figure 15) attached to the side of your house or garage in clear sight of the pump chamber. The alarm will go off when the water level in the tank is too high, to tell you that the pump is not working properly, or the designed daily flow of the system is being exceeded.

Two methods of dosing are possible, **on-demand** and **timed**. **On-demand dosing** occurs when a sufficient volume of wastewater has accumulated in the dose tank to activate the pump switch or siphon. Dosing continues until the preselected low water level is reached. With on-demand dosing, there is no way to control how much wastewater enters the drainfield or at what rate. **Timed dosing** is performed by a pump on a timed cycle, controlled by the control panel, to occur at equal intervals and for preset doses. *For this reason, do not attempt to make changes to the settings of your control*

