AN INTRODUCTION TO PSMA'S REAL ESTATE TRANSFER INSPECTIONS

History of my experience

- 1988 – 37 years ago
- Requests for Septic Certifications
- Inspectors were doing their own thing
- Resulted in lawsuits and legal battles

Penn State University Ag Extension Service Approached PSMA About Septic Certifications.

PA Regulators did not want anything to do with septic certifications.

Penn State and PSMA approached DEP (actually DER at that time) and they responded with: Pennsylvania's Act 537 program regulates On-lot wastewater treatment systems and sets up a program where each Local agency - Township or County has a Sewage Enforcement Officer (SEO's) to issue permits, inspect newly installed systems and resolve malfunctions. We do not want to be involved with certifications. The Act does not include this as the job of an SEO and we don't need the legal entanglements this could lead to.

Due to economic issues at the time:
Homes would be sold, septic systems would fail, and the occupants would leave. The lending institution would be stuck with a home that needed a new septic system.

Their solution was to require the septic system to be certified prior to lending any money.

- PSMA members, plumbers, and home inspectors each began doing their own version of inspections. Many PSMA members ended up in court rooms as either defendants or as witnesses.

In 1988 the PSMA's Board of Directors hired Joe Macialek.

He became PSMA's Executive Director.

He was a former Penn State Ag Extension Agent.

PSMA Board of Directors

Joe was our connection to Penn State and he made the arrangements for a meeting.

The PSMA Education Committee met with Dr. Paul Robillard at Penn State in order to discuss developing an inspection program.

The Committee brought a draft set of guidelines to work from.

This was composed of a collection of inspection procedures used by companies that were conducting inspections.

After a year's worth of work the Committee and Penn State agreed on a common set of Guidelines.

This was the start of the PSMA inspection program.

- By 1989 a set of Guidelines were produced that had been reviewed by individuals from Academia, Engineers, Regulators and Practitioners.
- The Guidelines were adopted by the PSMA Board of Directors

PENNSTATE

College of Agricultural Sciences • Cooperative Extension

Agricultural and Biological Engineering

F-166

Level 1 Septic System Inspections During Real Estate Transactions

Paul D. Robillard, Associate Professor of Agricultural and Biological Engineering
Kelli S. Martin, Sr. Research Technologist of Agricultural and Biological Engineering

Real estate transactions occur everyday. Prospective buyers purchase new or existing homes, load their belongings into moving vans, and eventually settle into the role of a homeowner. Unfortunately, for people who purchase existing homes, unforeseen expenses can appear almost immediately after moving day. One such expense is the replacement of a failed on-lot sewage disposal system. No sooner are the closing papers signed when foul-smelling septage is found in the backyard or sewage backs up in

conditions. Inspection results are based on the experience and expertise of a knowledgeable inspector. Each inspection results in a septic system report that states:

- the type and condition of the system and its components
- potential problems or "red flags" in the system and possible need for additional testing
- list of corrective measures

The Level 1 inspection described in this fact sheet is the first step to learning about

Penn State proceeded to develop some Inspection Videos.

During the 1990 PASEO Conference in Penn State Dr. Robilard presented the level 1 guidelines
and
his vision of a level 2 and Level 3 version.

THE VARIOUS LEVELS NEVER WORKED OUT

What was considered level 2 is what we now call More investigation needed.

In 1999 the guidelines were adopted as Standards for the inspection of onlot wastewater treatment systems

The intent of these standards is for the inspection of existing systems at the time of a Real Estate transaction or as some refer to it as a point of sale inspection, or property transfer inspection.

The PSMA Inspection Program Has Evolved in Many Areas Beyond Real-Estate Inspections

- The inspectors have been taught methods to locate treatment tanks, components and absorption areas and to evaluate their condition.
- Many management programs require service providers to be PSMA certified inspectors.
- PSMA inspectors have been hired to identify undocumented systems for various reasons.

Many States Have Adopted Regulations or Regulatory Guidance Documents for The Inspection of Onlot Wastewater Treatment and Disposal Systems at the Time of Sale.

The PSMA Inspection standards have been used as a model for many states.

Currently The National Association of Wastewater Technicians (NAWT) is developing a national inspection standard using the PSMA inspection standards as its model.

Thanks for allowing me to review a portion of the history of the PSMA Inspection program.

- Every three years the PSMA education committee reviews the inspection standards and modifies them to keep up with current technology changes, current regulatory changes, and address issues and problems our inspectors encounter.

PSMA STANDARDS

of the National Onsite Foundation

National Onsite Foundation

Pennsylvania Septage Management Association
Environmental Responsibility • Integrity • Regulatory Compliance • Ethics
Founded 1986

For the Inspection of
Onsite Wastewater Systems
2025

Training Partners

National Onsite Foundation

Pennsylvania Septage Management Association
Environmental Responsibility · Integrity · Regulatory Compliance · Ethics
PSMA MEMBER

Pennsylvania College of Technology
PENNSTATE

A good Example why we update the Standards on a Regular Basis Are:

The Dry Aggregate Rules

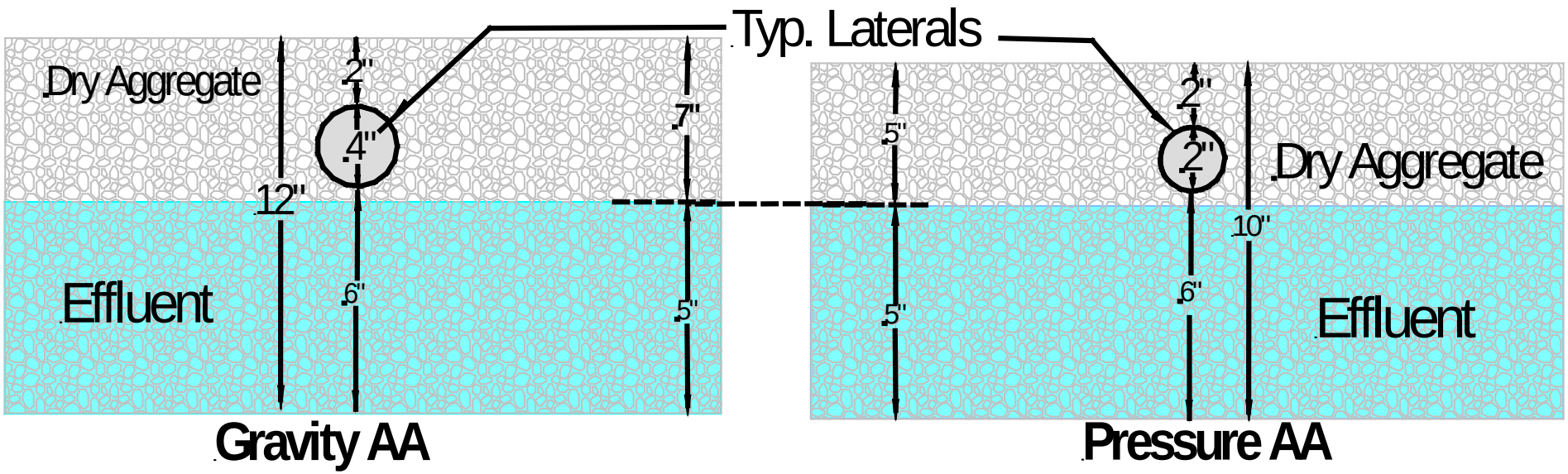
The Dry Aggregate Rule

- Initially, PSMA guidelines did not require the inspector to evaluate the soil treatment area or absorption area other than is there sewage surfacing, entering the waters of the commonwealth or backing up.
- However feedback from inspectors in the field shared the need to evaluate the accumulation of liquid present in the aggregate.
- We initiated a new process that measured how high the liquid level was from the infiltrative surface to the top of the liquid.

The Dry Aggregate Rule

- The idea was that once the liquid in the absorption area (AA) reached the perforations in the pipe or laterals, the AA was experiencing slow absorption in the surrounding soil and the gravity flow from the discharge pipe could be affected and not functioning as initially intended.

The Way it Was



Gravity System- 7" or Less liquid accumulation= Satisfactory

Gravity System- 7" to 11" of liquid accumulation = a concern

Gravity System- 12" or More liquid accumulation= Unsatisfactory

In 2003 PSMA was asked to train on-lot inspectors in New Jersey and because of the difference in depth of aggregate in NJ code PSMA found that New Jersey's absorption areas (AA) have much deeper aggregate under the perforated laterals than typical PA systems, but both required 2" of aggregate over the 4"1ateral pipe (in a gravity system).

Due to the differences and commonalities between the codes, PSMA changed to measuring the remaining dry aggregate rather than the accumulated liquid and incorporated the use of the hydraulic load test to evaluate the absorption area's functionality when the liquid levels reach the levels of operating with concerns to determine if the AA is still functioning as intended and absorbing the effluent.

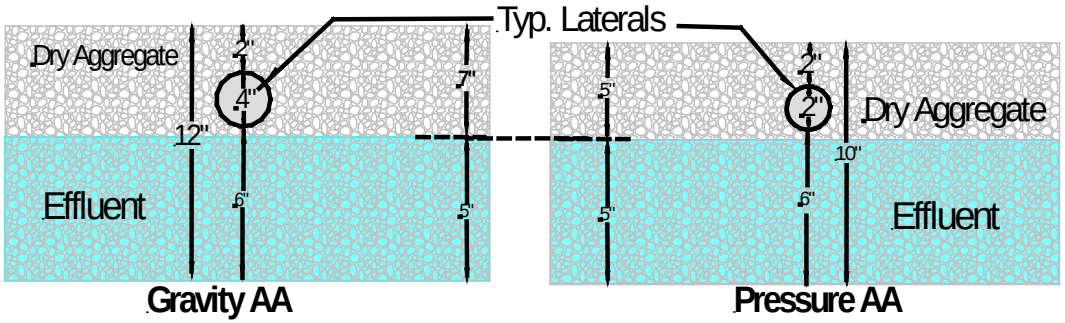
Here are the Dry Aggregate Rules We Currently Use.

DRY AGGREGATE RULE - SSSF

Distribution System	Pipe Size (Diameter)	Presence of Liquid In Aggregate	Condition or Action Required
Gravity SSSF	4"	No Measurable Liquid	Satisfactory
Gravity SSSF	4"	More Than (>) 5" of Dry Aggregate Plus The Presence of Any Measurable Liquid	Hydraulic Load Test
Gravity SSSF	4"	Less than or equal (<=) 5" of dry aggregate	Unsatisfactory
Pressure SSSF	2"	No Measurable Liquid	Satisfactory
Pressure SSSF	2"	More Than (>) 4" of Dry Aggregate Plus The Presence of Any Measurable Liquid	Hydraulic Load Test
Pressure SSSF	2"	Less Than or equal (<=) 4" of Dry Aggregate	Unsatisfactory

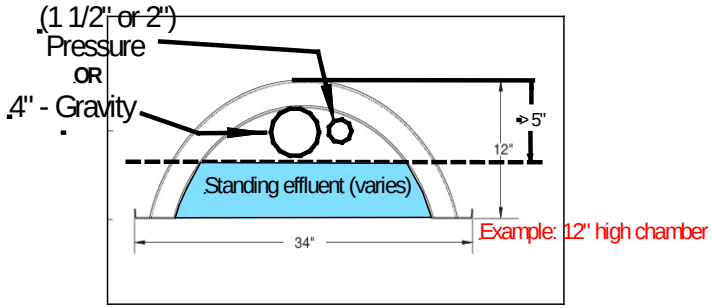
A subsurface sand filter absorption area which was subjected to and passed a hydraulic load test, because of liquid in the absorption area, shall ALWAYS be described as satisfactory with concerns- See satisfactory with concerns.

DRY AGGREGATE RULE - NO SAND



Distribution System	Pipe Size (Diameter)	Dry Aggregate (inches depth) D above	Condition or Action Required
Gravity	4"	More than (>) 5"	Satisfactory
	4"	Less than or equal (<=) 5" but greater than 0"	Hydraulic Load Test
	4"	0"	Unsatisfactory
Siphon	2"	More than (>) 3"	Satisfactory
	2"	Less than or equal (<=) 3" but greater than 0"	Hydraulic Load Test
	2"	0"	Unsatisfactory
Pump	2"	More than (>) 4"	Satisfactory
	2"	Less than or equal (<=) 4" but greater than 2"	Hydraulic Load Test
	2"	2" or Less (<)	Unsatisfactory

DRY AGGREGATE RULE - GRAVELLESS SYSTEMS



Distribution System	Pipe Size (Diameter)	Presence of Liquid	Condition or Action Required
GRAVITY OR PRESSURE	ANY	More than (>) 5" of clear space between top of liquid and underside of the chamber	None Satisfactory
		Less than or equal (<=) 5" clear space between top of liquid and underside of the chamber	Hydraulic Load Test
		No Clear Space	Unsatisfactory

DRY AGGREGATE RULE - ESM

Distribution System	Pipe Size (Diameter)	Presence of Liquid	Condition or Action Required
Gravity ESM	4"	No Measurable Liquid	Satisfactory
Gravity ESM	4"	Any Measurable Liquid	Unsatisfactory
Pressure ESM	2"	No Measurable Liquid	Satisfactory
Pressure ESM	2"	Any Measurable Liquid	Unsatisfactory

Guidance for Cesspools and Seepage Pits

Distribution System	Pipe Size (Diameter)	Presence of Liquid	Condition or Action Required
Inlet pipe	ANY	Equal to or more than (=>) one days amount of clear space between the top of the liquid and bottom of the inlet pipe.	None Satisfactory
		Less than (<) one days capacity of clear space between the top of liquid and bottom of the inlet pipe.	Hydraulic Load Test
		No Space from the top of the liquid to the bottom of the inlet pipe or higher.	Unsatisfactory

Guidance for Eljen GSF systems

Distribution System	Pipe Size (Diameter)	Presence of Liquid	Condition or Action Required
Pressure	1 1/2" pipe in a 4" pipe	No Measurable Liquid in the 4" dist. pipe	Satisfactory
Pressure	1 1/2" pipe in a 4" pipe	Less than 1 1/2" Measurable Liquid in the 4" dist. pipe	More Investigation
Pressure	1 1/2" pipe in a 4" pipe	1 1/2" or more of measurable liquid in the 4" dist. pipe	Unsatisfactory

The Basic Protocols, Principals or Tasks of a PSMA Inspection are as Follows:

LOCATE

IDENTIFY _

EVALUATE _

CONCLUDE

REPORT

OF COURSE THE ACTUAL INSPECTION BEGINS IN THE OFFICE

Authorization Form

- Key Points to include:
- On your Letterhead.
- Authorization to:
  - Enter the property.
  - Inspect & submit a Report.
  - Pump the tanks.
  - Contact previous inspectors.
  - Contact maintenance providers.
- State your fee for doing the inspection.
- That you will use the PSMA Standards.

Authorization Form

- That your report is not a Warranty.
- Who will be allowed to see your report.
- HLT will be performed if needed.
- Parties signatures.

Sample Authorization Form

If any applicable law, regulation or ordinance requires that the report be filed with or submitted to a state or local agency, or other person, the undersigned acknowledges and agrees that the undersigned property owner or agent shall make such a submittal, and if the requirement to file such report rests upon the inspector, the undersigned agrees that such submittal shall be made.

Accepted and agreed to this date ____/___/___
by _____
Property Owner/Owner's agent

Optional elements you may want to include:

- Name of a company representative that the client can contact
- Preliminary Information Form for the customer to complete
- A breakdown of the buyer's and seller's obligations

Note:

In the event that an inspection is to be performed on a newly-installed or never-used system, such fact must be included in the agreement. If the client requires an HLT on such a system, the following paragraph must be included in both the agreement and in the inspection report.

The hydraulic load test (HLT) is designed to identify problems associated with absorption areas (and cesspools and seepage pits) that have, in the past, been in continuous use for at least 30 days. There is neither reason nor justification to subject these systems to a hydraulic load test.

Preliminary Information Form

- With the Authorization Form signed and in hand:
- Where/How should the inspection begin?
  - Give the Preliminary Information Form to the client for completion.
  - This form may be completed by the client.
  - Any unanswered questions should be resolved before starting the inspection.
- A sketch of the on-lot system is also desirable.

Preliminary Information Form

Preliminary Information Form

For NOF Inspections of Onlot Wastewater Treatment Systems **(OWTS)**

Property owner name(s): _____

Site address: _____

Directions to site: _____

_____

1. Is this inspection a second opinion: Yes_____ No_____
2. Have excessive rains caused flooding conditions at the site: Yes_____ No_____
   Note: Well or home inspectors **should not** discharge ***well test*** water into the OWTS!
3. Age of structure: _____ Age of OWTS: _____
4. Is there more than one OWTS in use: Yes_____ No_____
5. Most recent number of people occupying structure: _____
6. Number of occupants projected to occupy this structure or projected daily flow: _____

   _____
7. Number of bedrooms in structure or daily flow: _____
8. Is structure currently being occupied: Yes_____ No_____
9. If the structure is presently unoccupied, for how long has it been vacant: Yes_____ No_____
   Note: If structure has been vacant for more than one week, a hydraulic load test **must** be performed on the OWTS.
10. Is the structure occupied on a seasonal basis: Yes_____ No_____
    If yes, then list the frequency: _____
11. List any repairs made on the system in the past: _____

    _____
12. Is it possible for the septic system construction or repair permit to be available at the time of the inspection: Yes_____ No_____
    Note: If you answered yes, please make it available at the time of the inspection or prior to it.
13. Do the washing machine or other graywater lines discharge to any other place than the treatment tank? Yes_____ No_____
    If you answered yes, specify where they discharge: _____

    _____
14. When was the treatment tank last cleaned: Yes_____ No_____
15. What is the typical cleaning frequency: _____
16. Please provide the name of the person or company that last cleaned your tank: _____

    _____
17. Is the system covered by a maintenance program: Yes_____ No_____
    If yes, what is the maintenance provider's name: _____
18. Are the treatment and pump tanks accessible (main access dug out) : Yes_____ No_____
19. Was the system subject to a soil fracturing or Terralift process within the last 12 months: Yes_____ No_____

Comments: _____

_____

_____

Signature of person completing this form: _____ Date: ___/___/_____

Preliminary Information

- Age of dwelling.
- Is there more than one system currently in use? If yes, then
  - Complete an Inspection and Field Observations Form and prepare a separate Report for each system.
- Age of sewage disposal system to be evaluated.
- Most recent number of occupants (residential uses) or daily flows (nonresidential uses).
- Number of occupants or daily flow expected by the new occupant.

Preliminary Information

- **Number of bedrooms in dwelling.**
- **Is the structure CURRENTLY occupied and in normal use?**

If the structure has been unoccupied continuously for more than seven days, or the structure is subject to seasonal use or non-continuous use, then in addition to the inspection, a PSMA/NOF Hydraulic Load Test must be conducted.

Preliminary Information

- If the structure is used only on a seasonal basis, what is the usage frequency?
- Request that the landowner obtain the original and any repair permits and arrange to have them on site for the inspector.
- Inquire if there was any repair activity and gather as much detail as possible regarding such repairs.
- Ask where the washing machine, all gray water lines and all other water-discharging appliances discharge. If not to the treatment tank, where do these discharges go (surface of the ground, to a stream)? Note these.

Preliminary Information

- When was the treatment tank last pumped? What is the typical pumping frequency?
- Determine in advance if the treatment and pump tanks will be accessible (main access port dug open).
- Determine if the system was the subject of a soil fracturing process within the last 12 months.
- Is the system covered by a systematic maintenance program? If yes,
  - Record the maintenance provider's name, address and phone information. Contact the provider if possible.

Qualifications:

- **If you perform PSMA inspections or sign an inspection report, you MUST …**
  - **Pass PSMA 101, 102 or 103 within the last 2 years or be in the continuing education cycle.**

Note: If the above does not apply you cannot use the Standards.

System Design or Site Sketch

System Inspection Site Sketch **Owner** _____

te a diagram/map of the property you have inspected. Indicate the following:

- Property lines
- Nearest PUBLIC street/road
- Structure(s) served by onlot system(s)
- Treatment tank – (label specific tank ST; aerobic tank AT)
- Pump tank(s) (label lift pumps LP; dosing pumps DP)
- Filters (label sand filters: free access FASF; buried BSF; commercial filters: Zabel Z; Ecoflo E; other – identify)
- Absorption Area (AA)
- Distribution box (DB)
- Cesspool (CS)
- Subsurface Beds, show perimeter of aggregate
- Subsurface Trenches, show each trench
- ESM – show outer most berm perimeter
- IRSIS – show perimeter of all spray field(s)
- Seepage Pit (SP)
- Chlorinator (tablet T: liquid P)

Show swales, depressions, ditches & downspouts that direct water *toward* absorption areas. **Show all areas where liquid is on the surface.**

Provide distance *from two building corners to points*: CP, ST or AT, PT and DB, and *from two building corners to two corners of the AA* so buried features can be easily relocated in the future.

Notes/Comments

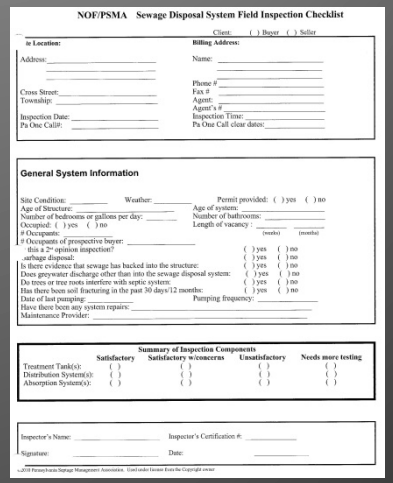
Prepared by: _____ ___/___/___

READY TO GO TO THE SITE?

WHAT TOOLS ARE NEEDED?

Equipment Needed to Complete the Field Inspection

- The equipment needed to perform a field inspection include:
  - Clipboard & pencil
  - Field Inspection Form.
  - Tape(s).
  - Probe



NOF/PSMA Sewage Disposal System Field Inspection Checklist

Client: ( ) Buyer ( ) Seller

re Location: Billing Address:

Address: Name:

Phone #

Cross Street: Fax #

Township: Agent:

Agent's #

Inspection Date: Inspection Time:

Pa One Call#: Pa One Call clear dates:

General System Information

Site Condition: Weather: Permit provided: ( ) yes ( ) no

Age of Structure: Age of system:

Number of bedrooms or gallons per day: Number of bathrooms:

Occupied: ( ) yes ( ) no Length of vacancy : (weeks) (months)

Occupants:

Occupants of prospective buyer:

this a 2nd opinion inspection? ( ) yes ( ) no

garbage disposal: ( ) yes ( ) no

Is there evidence that sewage has backed into the structure: ( ) yes ( ) no

Does greywater discharge other than into the sewage disposal system: ( ) yes ( ) no

Do trees or tree roots interfere with septic system: ( ) yes ( ) no

Has there been soil fracturing in the past 30 days/12 months: ( ) yes ( ) no

Date of last pumping: Pumping frequency:

Have there been any system repairs:

Maintenance Provider:

Summary of Inspection Components

	Satisfactory	Satisfactory w/concerns	Unsatisfactory	Needs more testing
Treatment Tank(s):	( )	( )	( )	( )
Distribution System(s):	( )	( )	( )	( )
Absorption System(s):	( )	( )	( )	( )

Inspector's Name: Inspector's Certification #:

Signature: Date:

Equipment Needed to Complete the Field Inspection

- The equipment needed to perform a field inspection include:
  - Spray paint or flags
  - Mirror.
  - Flashlight.
  - Sludge Judge or Sludge Stick.
  - Shovel
  - TV camera

Equipment Needed to Complete the Field Inspection

- The equipment needed to perform a field inspection include:
  - Snake
  - Water Tank, valve, hoses, water meter.
  - Rake
  - Hook.

Field Inspection Goals

- Carefully inspect each component of the system in question,
- Complete the Field Inspection Checklist, and
- Assign one of the following value-judgments to each component:
  - Satisfactory
  - Satisfactory with Concerns
  - Unsatisfactory
  - Needs More Information (Testing)

Field Inspection Checklist Page 1; Top Section

NOF/PSMA Sewage Disposal System Field Inspection Checklist

Client: ( ) Buyer ( ) Seller

te Location:

Address: _____
_____
_____

Cross Street: _____
Township: _____

Inspection Date: _____
Pa One Call#: _____

Billing Address:

Name: _____
_____
_____

Phone # _____
Fax # _____
Agent: _____
Agent's # _____
Inspection Time: _____
Pa One Call clear dates: _____

This form found on Appendix L

Field Inspection Checklist
Page 1; General Section

General System Information

Site Condition: _____ Weather: _____ Permit provided: ( ) yes ( ) no
Age of Structure: _____ Age of system: _____
Number of bedrooms or gallons per day: _____ Number of bathrooms: _____
Occupied: ( ) yes ( ) no Length of vacancy : _____ _____
(weeks) (months)
Occupants: _____
Occupants of prospective buyer: _____
this a 2nd opinion inspection? ( ) yes ( ) no
Garbage disposal: ( ) yes ( ) no
Is there evidence that sewage has backed into the structure: ( ) yes ( ) no
Does greywater discharge other than into the sewage disposal system: ( ) yes ( ) no
Do trees or tree roots interfere with septic system: ( ) yes ( ) no
Has there been soil fracturing in the past 30 days/12 months: ( ) yes ( ) no
Date of last pumping: _____ Pumping frequency: _____
Have there been any system repairs: _____
Maintenance Provider: _____

Field Inspection Checklist Page 1; General & Signatures Section

Summary of Inspection Components

	Satisfactory	Satisfactory w/concerns	Unsatisfactory	Needs more testing
Treatment Tank(s):	( )	( )	( )	( )
Distribution System(s):	( )	( )	( )	( )
Absorption System(s):	( )	( )	( )	( )

Inspector's Name: _____ Inspector's Certification #: _____

Signature: _____ Date: _____

Field Inspection Checklist
Page 2; Treatment Tank Section

Treatment Tank **# _____ of _____**

Depth to main lid: _____ Depth to top of tank: _____

Tank Type:	**Measurements** (L x W x H)	**Capacity**	**# of Compartments**	**Material**
( ) Septic tank (tank 1)	_____	_____	_____	( ) Concrete
( ) Septic tank (tank 2)	_____	_____	_____	( ) Steel
( ) Cesspool	_____	_____	_____	( ) Block
( ) Aerobic	_____	_____	_____	( ) Other
( ) Other	_____	_____	_____	

Round: D" x D" F 292.5 x H" **Rectangular: L" x W" F 231 x H"**

Condition of:	**Satisfactory**	**Satisfactory w/concerns**	**Unsatisfactory**	**Needs More Testing**
Tank	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Access to tank	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Top and lids	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Inspection Port	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Inlet baffle	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2 ( )
Outlet Baffle	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Cracks or leaks	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2 ( )
Liquid Level	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Sludge level _____"	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2 ( )
Scum Layer _____"	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )
Effluent Filters ( )n/a	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2 ( )
Solids Retainer ( )n/a	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )	t1 ( ) t2( )

Level void space-from bottom of inlet to liquid _____"

(If any one is recorded other than satisfactory, explain why in the comment section below.)

Do any flushes from the home ***NOT*** enter the treatment tank?	( ) yes	( ) no
Was the treatment tank ***NOT*** pumped during this inspection?	( ) yes	( ) no
Does sewage from the absorption system run back to treatment tank?	( ) yes	( ) no
Portions of treatment tank below a deck, driveway, walkway, etc.?	( ) yes	( ) no
Is there evidence of sewage surfacing above the treatment tank?	( ) yes	( ) no

If any are checked YES, please explain in the comment section below.

Comments: _____

_____

Field Inspection Checklist
Page 2; Holding/Lift/Dose Tank Section

Holding/ Lift/ Dosing Tank **Is one present ? ( ) yes ( ) no**

Size: _____ Gallons: _____

Condition of:	**Satisfactory**	**Satisfactory w/ concerns**	**Unsatisfactory**	**Needs more testing**
Tank and lid?	( )	( )	( )	( )
Access to tank?	( )	( )	( )	( )
Pump working?	( )	( )	( )	( )
Alarm?	( )	( )	( )	( )
Floats?	( )	( )	( )	( )
Electrical connections?	( )	( )	( )	( )
Check valve & purge hole?	( )	( )	( )	( )
Pump elevated off tank floor?	( )	( )	( )	( )
Siphon?	( )	( )	( )	( )

Accumulated solids found in pump tank? ( ) yes ( ) no Infiltration of surface water? ( ) yes ( ) no

Problems recorded from past service records? ( ) yes ( ) no Is alarm ***NOT*** on a separate circuit? ( ) yes ( ) no

Comments: _____

_____

Field Inspection Checklist
Page 3; Absorption Area Section

Absorption System **Located: ( ) yes ( ) no**

Is there more than one absorption system? ( ) yes ( ) no How many? _____ Total Sq. Ft. _____

Type:
( ) Seepage Bed _____x_____ (approx. size)
( ) Trenches _____x_____ (approx. size) How many? _____
( ) Sand Mound _____x_____ (approx. size)
( ) Seepage Pit _____x_____ (approx. size) Gallons? _____
( ) Sub-Surface Sand Filtering _____x_____ (approx. size)
( ) Other (describe) _____
( ) Filters _____

(T = Trench)

How much aggregate in absorption system? _____ inches T1____ T2____ T3____ T4___
How much dry aggregate? _____ inches T1____ T2____ T3____ T4___
If a seepage pit/cesspool, distance from inlet to liquid level? (c/s 1) _____ inches (c/s 2) _____ inches
How many gallons of void space? _____ gallons

Are there visible signs of sewage above or near any system components?	( ) yes	( ) no	( ) n/a
Visible signs of lush vegetation?	( ) yes	( ) no	( ) n/a
Portion of disposal system below a deck, driveway, walkway, etc.?	( ) yes	( ) no	( ) n/a
Are there signs of previous failure?	( ) yes	( ) no	( ) n/a
Is the effluent unevenly distributed in the absorption area?	( ) yes	( ) no	( ) n/a
If exposed, is the distribution box in unsatisfactory condition?	( ) yes	( ) no	( ) n/a
Does the distribution box need to be leveled?	( ) yes	( ) no	( ) n/a
Is sewage above the lateral inverts in the distribution box?	( ) yes	( ) no	( ) n/a
If a sand system, is ponding present?	( ) yes	( ) no	( ) n/a
Does the greywater discharge other than into the system? Where?	( ) yes	( ) no	( ) n/a

(If any are checked YES, please explain in comments below.)

Was a hydraulic load test performed on the disposal system? ( ) yes ( ) no
If yes, please have a hydraulic load test form filled out completely and attached.

Field Inspection Checklist
Page 3; Comments Section

Comments:

Overall Comments & Corrective Measures:

Site Sketch

System Inspection Site Sketch **Owner** _____

te a diagram/map of the property you have inspected. Indicate the following:

- Property lines
- Nearest PUBLIC street/road
- Structure(s) served by onlot system(s)
- Treatment tank – (label specific tank ST; aerobic tank AT)
- Pump tank(s) (label lift pumps LP; dosing pumps DP)
- Filters (label sand filters: free access FASF; buried BSF; commercial filters: Zabel Z; Ecoflo E; other – identify)
- Absorption Area (AA)
- Distribution box (DB)
- Cesspool (CS)
- Subsurface Beds, show perimeter of aggregate
- Subsurface Trenches, show each trench
- ESM – show outer most berm perimeter
- IRSIS – show perimeter of all spray field(s)
- Seepage Pit (SP)
- Chlorinator (tablet T: liquid P)

Show swales, depressions, ditches & downspouts that direct water *toward* absorption areas. **Show all areas where liquid is on the surface.**

Provide distance *from two building corners to points*: CP, ST or AT, PT and DB, and *from two building corners to two corners of the AA* so buried features can be easily relocated in the future.

Notes/Comments

Prepared by: _____ ___/___/___

LOCATE 

IDENTIFY 

EVALUATE 

CONCLUDE

REPORT

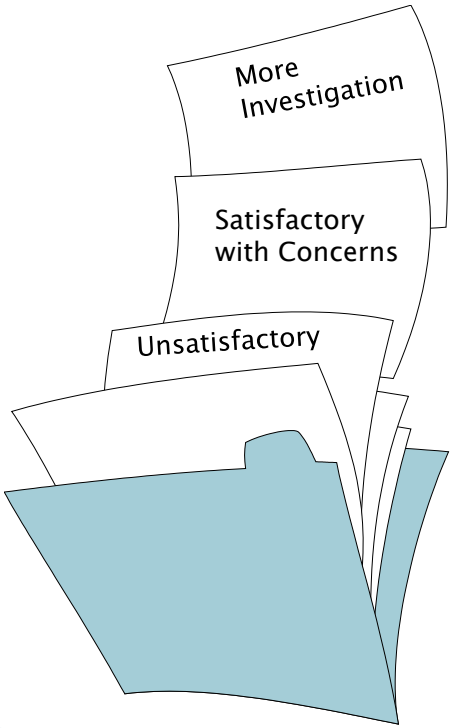
Conclusions

- There are four possible conclusions you may reach about each system component and the system as a whole;
  - More Investigation.
  - Satisfactory w/Concerns.
  - Satisfactory.
  - Unsatisfactory.

In The PSMA Standards We Have Our Conclusion lists

- Since a Satisfactory conclusion indicates the component is ok, we do not have a list.
- We have a list for More Investigation
- For Satisfactory with Concerns
- For Unsatisfactory

The report is based on the check list, notes and site sketch and the conclusion.



Not enough time to look at all the Conclusions but a few Examples follow

Conclusions
Building Sewer

More Investigation	Satisfactory w/Concerns	Unsatisfactory
Surface depression b/t house and treatment tank.	Draining ice maker detected.	Constant flow of liquid in building sewer.
Sinkhole b/t house and treatment tank.		Building sewer with physical defect.
Residential waste debris in clean out pipe or building trap.		

Conclusions
Cesspool or Seepage Pit

More Investigation	Satisfactory w/Concerns	Unsatisfactory
Pumped w/in last 30d.		Liquid level at or above inlet invert.
Unusual waste in unit.		Tree growing over unit.
Cannot access.		
< 24hr. volume capacity b/t operating level and inlet invert. (HLT)		

Conclusions
Holding Tank

More Investigation	Satisfactory w/Concerns	Unsatisfactory
	> 1/3 tank depth is sludge.	Tree growing over tank.
	No alarm device.	Filled with roots.
		Ground water entering tank.
		< 3 d. storage capacity available.

Conclusions
Treatment Tank

More Investigation	Satisfactory w/Concerns	Unsatisfactory
Pumped w/in last 30 days.	> 1/3 tank depth is sludge.	Any leakage.
Unusual waste in tank.	Main access port > 12in. below grade	Filled with roots or ground water entering tank.
Cannot access main manhole.	No observation port to grade at inlet.	Liquid level is below or above outlet invert.
Debris on tank ceiling or baffles.		Baffle(s) damaged or

Conclusions
Dose Tank

More Investigation	Satisfactory w/Concerns	Unsatisfactory
> 50% of dose runs back into dose tank.	> 1/3 tank depth is sludge.	Dose cycle last > 15min. (unless designed to)
Pump runs > 15min. Per cycle.	Sludge is w/in 1” of pump inlet.	Pump short cycles due to run back.
	Pump sets on tank floor.	Filled w/roots.
	Pump not on block.	Tree growing over tank.

Conclusions
Absorption Area

More Investigation	Satisfactory w/Concerns	Unsatisfactory
Unequal depth of dry aggregate.	Uneven bottom but working okay.	Residual material clogging gravel or discharge holes.
W/2 systems. One MUST be satisfactory.	Traffic marks on area.	Well is present in area.
Dry aggregate rules indicate HLT is needed.	SSSF with Satisfactory HLT result after liquid in aggregate.	Effluent goes to well, borehole, cave, or sinkhole.

Conclusions
Absorption Area

More Investigation	Satisfactory w/Concerns	Unsatisfactory
Unusual waste in area.	Insufficient soil-cover above aggregate.	Exposed aggregate.
Cannot be found w/ hand tools.	Trees growing in or over area.	Clogged or broken pipes.
Soil fracturing w/in last 30 d. (HLT)		Unequal distribution in area.
Lush vegetation, green dots.		Dry aggregate = 0 in. (full of liquid)

LOCATE 

IDENTIFY _ 

EVALUATE _ 

CONCLUDE 

REPORT

NOW REPORT

The person who is writing the report should have, at minimum:

1. The preliminary information form,
2. The completed PSMA inspection form (check list),
3. A completed site sketch, to aid them in completing the report.

PSMA Goals of Report Writing

PSMA wants PSMA Inspection Reports to follow the PSMA Inspection Standards.

The Inspection Standards give the PSMA inspector a summary of what is expected to be in the inspection report and what information the inspector should gather.

PSMA Goals of Report Writing

Summarizing the Inspection Form

The Inspection Report is a narrative summary of the Inspection Form presented in terms a lay person can understand.

Do you think most home buyers Would be able to interpret the condition of a septic system by just reading your inspection form or check list?

It is intended to provide the client with information regarding the type and overall condition of the system, a statement of any problem(s) found and suggested corrective measures. The inspection report is prepared, signed and dated by a PSMA/NOF Certified Inspector.

Create a site sketch. Be sure to indicate distances to every component from two fixed points so that it will be easy to relocate the components in the future. Site sketches may be included with final reports.

Pictures can be added to the report and serve as additional documentation to the inspection. They can help highlight problems.

1. Write a summary description of the system components; start at the structure and work downstream.

2. Based on your notes regarding the treatment tank, distribution system, absorption system, pumps and electrical components, determine a condition for each component. Select from:

· Satisfactory
· Satisfactory with concerns
· Unsatisfactory
· Condition cannot be determined; more investigation is needed

The report should indicate the condition of each component.

Include suggested corrective measures for each unsatisfactory component.

Note in the report this is a suggestion – there may be multiple solutions to correct the problem.

In the case of advanced treatment units and filters, the client should be directed to the manufacturer for operation and maintenance requirements.

If more investigation is needed, indicate the component to be investigated, the nature of the investigation to be undertaken and an estimated cost.

Restate basic information such as date(s) of inspection, property inspected, etc.

It is essential to include a series of statements that clearly and succinctly describe what the report is and is not.

Be sure to inform
Your client that any repairs performed will
Require a permit from the Local Agency SEO.

Get permission from your Client prior to sharing a copy of the report

If Time Permits we will Discuss

The PSMA HYDRAULIC LOAD TEST

Shortly after the Guidelines were adopted, inspectors asked; How do we respond to a system that has not been used for more than a month?

What can we tell the buyers?

Can it be expected to work when used on a daily basis?

A septic system could appear to be in satisfactory working order when it has been unused for a week or longer.

In fact, it may function well when used periodically. But how does it work when used on a daily basis?

What happens when one elderly person lives in a home and then it is being sold to a couple with 3 kids?

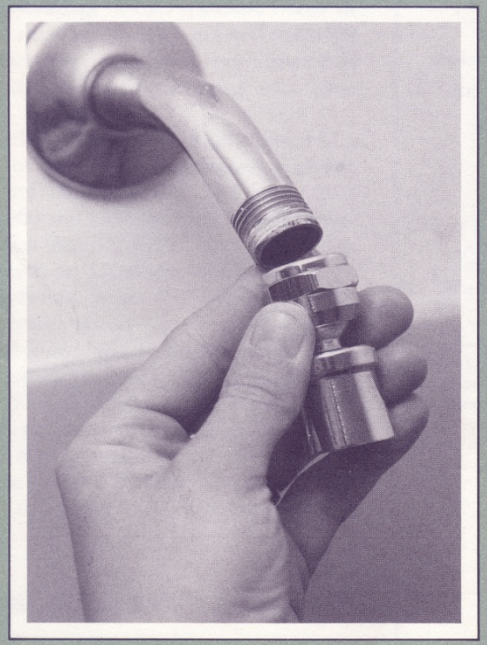
We found some homes
with on-lot systems,
that were vacant for a
period of time, were able to
pass an inspection
but when used on a daily basis
Began to malfunction.

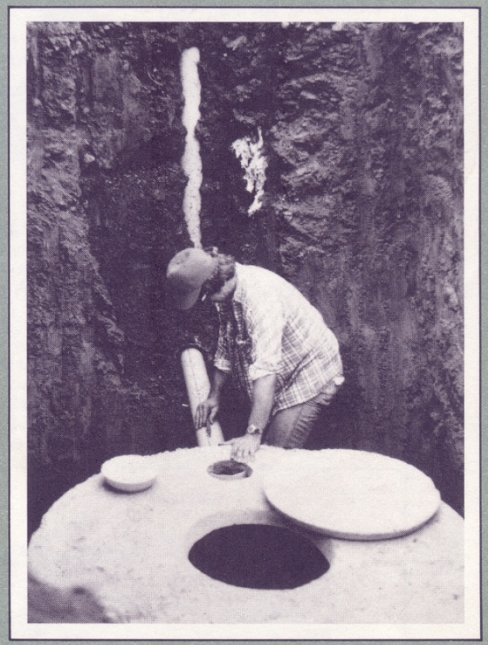
The
se
this

PENNSTATE

College of Agricultural Sciences • Cooperative Extension

Two remedies for failing septic systems





Extension Circular 302

If you own one of the millions of septic systems in this country, someday you may have problems with it. Effluent (wastewater from the septic tank) may back up into your plumbing or pond on your lawn. Besides being unsightly, a nuisance, and the cause of health problems, failing systems are often difficult and costly to fix.

This publication describes two recently tested methods that may be effective in restoring failing septic systems: (1) water conservation and (2) absorption-area resting. While the initial cost of either method may be slightly greater than the cost of reconstructing a system, both methods have benefits that will, in the long run, save money.

The two methods were successfully tested in a detailed study of failing septic systems at eleven homes in central Pennsylvania. The study was conducted in 1980 and 1981 for the U.S. Environmental Protection Agency (EPA) through the Institute for Reseach on Land and Water Resources at The Pennsylvania State University. A high level of water conservation was the only solution tested in three homes, and a low level was combined with the absorption-area-resting method in three others. The remaining five homes were fitted with water-conservation devices only: low-level devices in two homes and intermediate-level devices in three others. In these five homes the lower levels of water conservation weren't successful.

How a septic system works

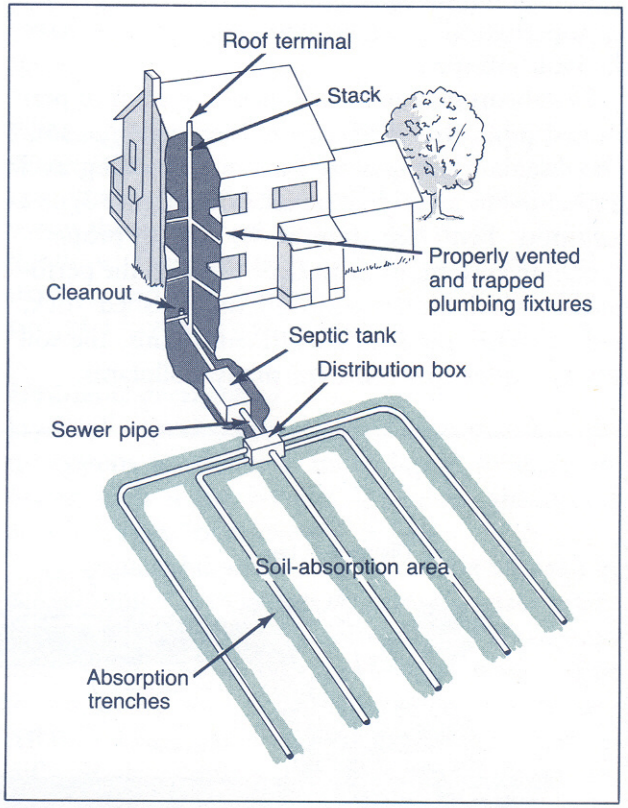
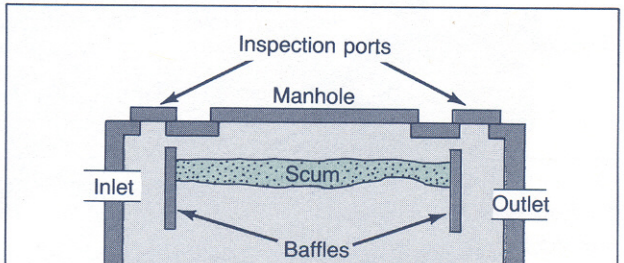


Figure 1. A typical septic system (with trenches). (Adapted from: *Septic System Care,* Environmental Resources Extension Bulletin 10, Cooperative Extension Service Cook College, Rutgers — The State University of New Jersey, New Brunswick.)



may back up into your plumbing or pond on your lawn. Besides being unsightly, a nuisance, and the cause of health problems, failing systems are often difficult and costly to fix.

This publication describes two recently tested methods that may be effective in restoring failing septic systems: (1) water conservation and (2) absorption-area resting. While the initial cost of either method may be slightly greater than the cost of reconstructing a system, both methods have benefits that will, in the long run, save money.

The two methods were successfully tested in a detailed study of failing septic systems at eleven homes in central Pennsylvania. The study was conducted in 1980 and 1981 for the U.S. Environmental Protection Agency (EPA) through the Institute for Reseach on Land and Water Resources at The Pennsylvania State University. A high level of water conservation was the only solution tested in three homes, and a low level was combined with the absorption-area-resting method in three others. The remaining five homes were fitted with water-conservation devices only: low-level devices in two homes and intermediate-level devices in three others. In these five homes the lower levels of water conservation weren't successful.

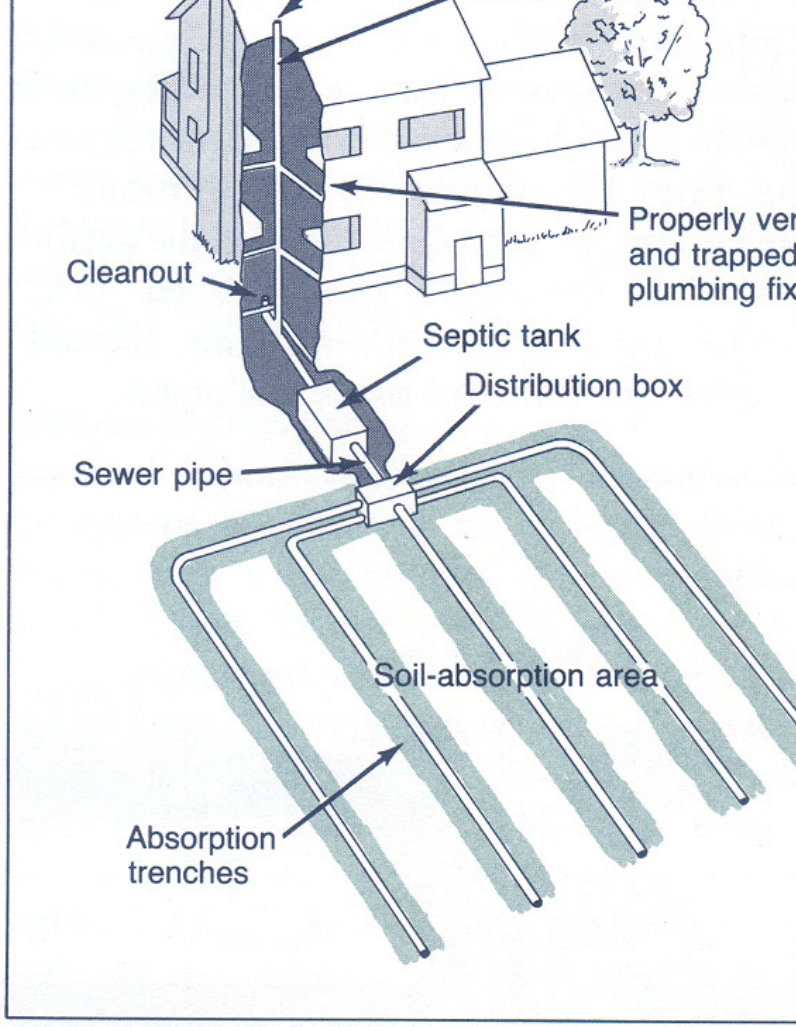
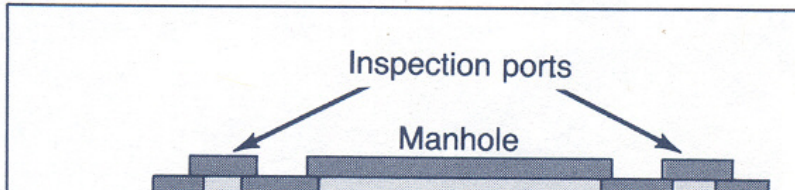


Figure 1. A typical septic system (with trenche
(Adapted from: *Septic System Care,* Environme
Resources Extension Bulletin 10, Cooperative
Extension Service Cook College, Rutgers — T
State University of New Jersey, New Brunswi



What was of interest to us was the method that they used to determine If water conservation would
work on a system.

and dried the soggy yards considerably. Two systems no longer failed and problems with the other occurred much less frequently.

Will water conservation work on my system?

To determine if a failing septic system can be corrected with water-saving devices, you first must know the cause of the trouble. Call the local sewage enforcement officer to determine whether the system is failing because of hydraulic overloading, soil clogging, or some other cause. Installing water-saving devices may help if the system is less than 35 percent overloaded.

There is a procedure, not yet scientifically tested, that can be used to determine the amount of overload on a system. Your house must be equipped with a water meter ($50–$75, installed). Use the water meter to measure the number of gallons of water you use in a month, and divide this figure by the number of days in the month to determine your daily water use. During the measurement period you must not use outdoor faucets since that water doesn't enter the septic tank. The average daily water use will equal the amount of effluent the septic system must dispose of every day.

Now you must find out how much the system can actually handle without developing problems.

	are decompos
★Ultra low volume	Gravity flush; 1 to 1.5 gallon
Shallow-trap	Redesigned fix gallons per flu
Tank inserts (dams, plastic bottles)	Displace wate reduce the vol flush.
Showers	
★Low-flow shower heads	Redesigned sh reduce water affecting the shower.
Shower flow-control inserts	Usually neopr placed inside restrict the flo
Faucets	
★Faucet-flow-control aerators	Attach to the to restrict flow
Spray taps	Replace fauce sinks; produc type spray tha water. Washi quicker, too.
Clothes washers	
★Front-loading washers	Tumbling act less water.
Top-loading washers w/suds saver	Wash water c

amount of water you add, multi
(since 3 x 8 hours = 24 hours), g

of overload on a system. Your house must be equipped with a water meter ($50–$75, installed). Use the water meter to measure the number of gallons of water you use in a month, and divide this figure by the number of days in the month to determine your daily water use. During the measurement period you must not use outdoor faucets since that water doesn't enter the septic tank. The average daily water use will equal the amount of effluent the septic system must dispose of every day.

Now you must find out how much the system can actually handle without developing problems. There are two ways to do this; both must be carried out during the wettest time of the year. When the soil is very wet, the absorption area cannot accept much effluent before the system fails; so you'll be simulating the worst conditions.

If effluent bubbles up from a single point above your absorption area you can use this first method. Don't discharge any wastewater into the septic system for eight hours in order to allow the effluent in the absorption area to drain. After eight hours, check the reading on the water meter and turn on a faucet. Watch the spot where effluent

control aerators

Spray taps

Clothes washers

★ Front-loading washers

Top-loading washers w/suds saver

amount of water you
(since 3 x 8 hours = 2
mum amount of efflue
handle in a day.

Use the following m
exactly where the efflu
To compensate for the
point, you need to cons
the observation point a
If you don't have a diag
look for areas where th
probably located below
tion, dig a hole (or use
to the gravel. If you d

t use outdoor faucets
the septic tank. The
equal the amount of
ust dispose of every

* Front-loading washers	Tumbling action requires less water.
Top-loading washers w/suds saver	Wash water can be reused.

ow much the system
eveloping problems.
this; both must be
est time of the year.
absorption area can-
fore the system fails;
vorst conditions.
a single point above
can use this first
wastewater into the
in order to allow the
a to drain. After eight
the water meter and
spot where effluent
see the effluent, turn
ater meter again. The

amount of water you add, multiplied by three (since 3 x 8 hours = 24 hours), gives the maximum amount of effluent the absorption area can handle in a day.

Use the following method if you can't pinpoint exactly where the effluent comes to the surface. To compensate for the lack of a single observation point, you need to construct one. You *must* locate the observation point above a trench (or the bed). If you don't have a diagram of the absorption area, look for areas where the grass is lush. A trench is probably located below. Then, in the wettest section, dig a hole (or use a soil auger to drill) down to the gravel. If you dig 2.5 feet without finding gravel, you're probably not above a trench. When you do reach gravel, you'll know immediately —

the hole will rapidly flood with grey, foul-smelling effluent. It may even flow out of the hole; if that happens, wait until the flow stops and the effluent level is at the top of the hole before continuing. In other cases, effluent won't completely fill the hole; mark its level by pushing a spike into the side of the hole at the effluent surface.

After you have a point from which to observe the effluent, turn off the water to your house so that you add no water to the septic system for eight hours. During this time the effluent level will fall. After eight hours, note the reading on your water meter; then while you watch the septic-system observation point, have someone in the house turn on a faucet until effluent rises to the surface (or the spike). Check the water meter. The amount used, multiplied by three, will equal the effluent that can be absorbed in a day.

Now you have enough information to estimate the system overload. The overload percentage is

$$\frac{\left(\begin{array}{c}\text{average daily}\\ \text{water use}\end{array}\right) - \left(\begin{array}{c}\text{amount of water}\\ \text{absorbed in 1 day}\end{array}\right)}{(\text{average daily water use})} \times 100$$

By choosing the proper water-saving devices you can reduce the flow of effluent by about 35 percent. So if the "percentage overload" is less than 35 percent, installing the water-saving devices should correct the failure. However, in some cases, occasional malfunctions may still occur.

An example of water conservation calculations

Henry and Helen Homeowner have a failing septic system. Their yard is a mess. They call their sewage enforcement officer who tells them, after an inspection, that the cause is hydraulic overload. The Homeowners want to find out if installing water conservation devices will correct the problem.

First they must determine their average daily water use. Their home has no water meter, so they have one installed and find they use 8100 gallons in a month.

Water-saving devices

To reduce water use, you can install various water-saving devices — they can be additions to existing fixtures or totally new, redesigned fixtures. Table 1 compares typical water use by conventional fixtures with water use by water-saving

This is the concept PSMA used to develop the hydraulic load test we use Today.

Penn State **Extension**

Hydraulic Load Test

The purpose of this fact sheet is to introduce and provide information about the Hydraulic Load Test, which is included as a component of the PSMA On-Lot Wastewater Inspection (Fact Sheet F-166) often employed to protect both the home buyer and home seller during real estate transactions.

During those On-lot Wastewater Inspections when conditions are found in the soil absorption area that raise questions about whether the absorption area is satisfactorily absorbing the effluent delivered to it on a daily basis, the inspector is encouraged to conduct an Hydraulic Load Test (HLT). The HLT is a procedure by which the Inspector can determine if an absorption area can satisfactorily receive and allow to enter into the soil/environment the Design Daily Volume (DDV) of sewage effluent that the prevailing regulatory authority assigns to a structure based on occupancy, number of bedrooms, or other regulatory factors. In its simplest form, the Inspector adds the DDV to the absorption area, then comes back in 24 hours and determines if the liquid-level in the absorption area has returned to its previous level. To prove the absorption area has absorbed the DDV, water is added to bring the liquid level up to the Day 1 final level. If the volume added is equal to or greater than the DDV, the absorption area is satisfactory.

Hydraulic Load Test Procedure

Preparation

- During the HLT no effluent may enter the absorption area. Typically the newly pumped, empty septic tank can serve as an interim holding tank for the two days while the HLT is conducted.
- If rain is forecast for the 24 to 48 hours required for the HLT, the test may be delayed.
- The HLT test should be conducted using the Design Daily Volume (DDV) prescribed by PA-DEP Chapter 73 based on the number of bedrooms in the house.
- The water added during the HLT should be introduced to the adsorption area from a point downstream of the treatment tank.

Day 1

- Prior to starting the Hydraulic Load Test, an observation port must be located in the center of a seepage bed, or in the center of each trench. This/These observation ports can be created by boring or digging into the aggregate until the underlying soil/sand is reached.
- The elevation of water ponded in the observation port is measured and recorded; this is the initial water elevation. In addition, the elevation of the "top of aggregate" and the "bottom of aggregate" is also measured and recorded.
- The Hydraulic Load Test is started by introducing the Design Daily Volume (DDV) of water for the house to the absorption area to determine if there is sufficient storage in the aggregate to hold or store the DDV.
- If after adding the DDV to the absorption area, the elevation of the water in the aggregate is below the top of the aggregate, the elevation of the water surface in the aggregate is measured and recorded and the absorption area is left, untouched, for 24 hours.
- If at any time during the HLT, the liquid level rises above the top of the aggregate, the HLT should be stopped and the absorption area declared unsatisfactory.

Day 2

- At the end of 24 hours, the inspector returns and measures and records the water elevation in each observation port.
- Then the Inspector should add enough water to the absorption area to bring the water level up to the Day-1-water-added elevation. The volume added on Day 2 is considered to be the absorption area's sustained daily loading volume. If this loading volume is greater than or equal to the DDV, the absorption area is assumed to be working satisfactorily. If the absorption area cannot take the DDV before the water elevation reaches the Day-1-water-added elevation, the Inspector must consider the absorption area unsatisfactory because the absorption area was not able to absorb the DDV in 24 hours.

Note: The HLT may be repeated the third day if there is any question about the results from Day 2.

When Should the HLT Be Performed?

A HLT should be performed when, during the course of a PSMA Inspection, any of the following conditions are discovered:

- The structure has been vacant for more than 7 days.
- The treatment tank, cesspool, or seepage pit has been pumped less than 30 days prior to the inspection.
- New gray water sources have been directed to the system within the last 30 days.
- Soil fracturing activity has occurred within the last 30 days.
- The initial inspection of the treatment tank reveals that, for whatever reason, the treatment tank's liquid level is below the tank's outlet pipe invert.
- A broken or clogged pipe, a dysfunctional D-box, or other condition that would result in atypical flows reaching all or part of the system.
- There is less than 24 hours' volume capacity in a cesspool or seepage pit.
- If the inspector is informed that the system will be subjected to increased daily flows due to increased occupancy or change in use.
- Standing liquid is observed in an absorption area or gravelless chamber as follows:
- There is liquid standing in the aggregate of a gravity distribution system of an in-ground absorption area such that there is less than 5 inches of dry aggregate above the liquid level.
- There is liquid standing in the aggregate of a pressure distribution system of an in-ground absorption area such that there is less than 3 inches of dry aggregate above the liquid level.
- There is more than 5 inches of dry aggregate and liquid is present in a gravity distributed subsurface sand filter.
- There is more than 3 inches of dry aggregate and liquid is present in a pressure distributed subsurface sand filter.
- There is less than 5 inches of clear space in a gravelless chamber.

Re-inspect and Re-evaluate

The HLT may not be necessary if the house has been reoccupied for 14 continuous days and the tank was not pumped, or if the house has been occupied for 30 continuous days after the tank was pumped. If the HLT is not elected by the homeowner, the system must be re-inspected and re-evaluated.

Newly Installed, Never Used Absorption Areas

An HLT is not recommended for absorption areas that have been in use for less than 30 days.

Cesspools and Seepage Pits

On sites served by cesspools or seepage pits, the HLT can be conducted by assuming the invert of the wastewater-entry pipe is equivalent to the "top of aggregate" described above.

At-Grade Absorption Areas

When conducting an HLT on an At-Grade absorption area, the observation port should be located one foot downslope of the lower pressure distribution pipe. All other components of the HLT remain the same.

For More Information,

refer to the following related Fact Sheets:

- F-161, Septic Tank Pumping
- F-162, Keeping On-Lot Wastewater Systems Healthy
- F-163, Site Evaluations
- F-165, Septic Tank-Soil Absorption Systems
- F-166, On-Lot Wastewater Inspections During Real Estate Transactions
- F-167, Use of Dyes and Tracers to Confirm Septic System Failures
- F-169, Individual Residential Spray Irrigation Systems (IRSIS)
- F-171, At-Grade and Shallow At-Grade On-Lot Systems
- F-173, PSMA On-Lot Wastewater Treatment Inspection vs. A Regulatory Inspection
- F-174, Aerobic Treatment Units (ATU)
- F-266, Geotextile Sand Filter (GSF) On-Lot Systems

PENNSTATE
Cooperative Extension
College of Agricultural Sciences

extension.psu.edu

For additional assistance contact your local Sewage Enforcement Officer or County Extension Agent

Pennsylvania Association of Sewage Enforcement Officers (PASEO) 4902 Carlisle pike #268 Mechanicsburg, PA 17050 Telephone: 717-761-8648

Pennsylvania Septage Management Association (PSMA) Box 144 Bethlehem, PA 18016 Phone: 717-763-PSMA

Revised 6/2014 Albert R. Jarrett, Professor Emeritus of Agricultural Engineering

Contact Information

Albert Jarrett, Ph.D.
Professor Emeritus
arj@psu.edu
814-238-0195

extension.psu.edu

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Publication code: F-269

Of course over the years this has evolved into our current procedure.

We currently use the hydraulic load test when we find the following indications:

Indications

- Less than 24 hours' volume in cesspool or seepage pit
- Structure vacant for more than 7 days
- Treatment tank pumped in past 30 days
- New gray water sources added in past 30 days
- Soil fracturing in past 30 days
- Initial level in treatment tank is below outlet pipe
- When indicated by dry aggregate rules
- Atypical flows to absorption system

Alternatives to HLT

- House is occupied for 30 continuous days after pumping tank or family on vacation. The system can be inspected or re-inspected at that time. This can occur if time is not an issue.

But Wait!

BEFORE A HLT
IS
CONDUCTED
THE SYSTEM
MUST
BE INSPECTED !

For a proper HLT Each component should be:

Located

Identified

Evaluated

It's Important to Stress:

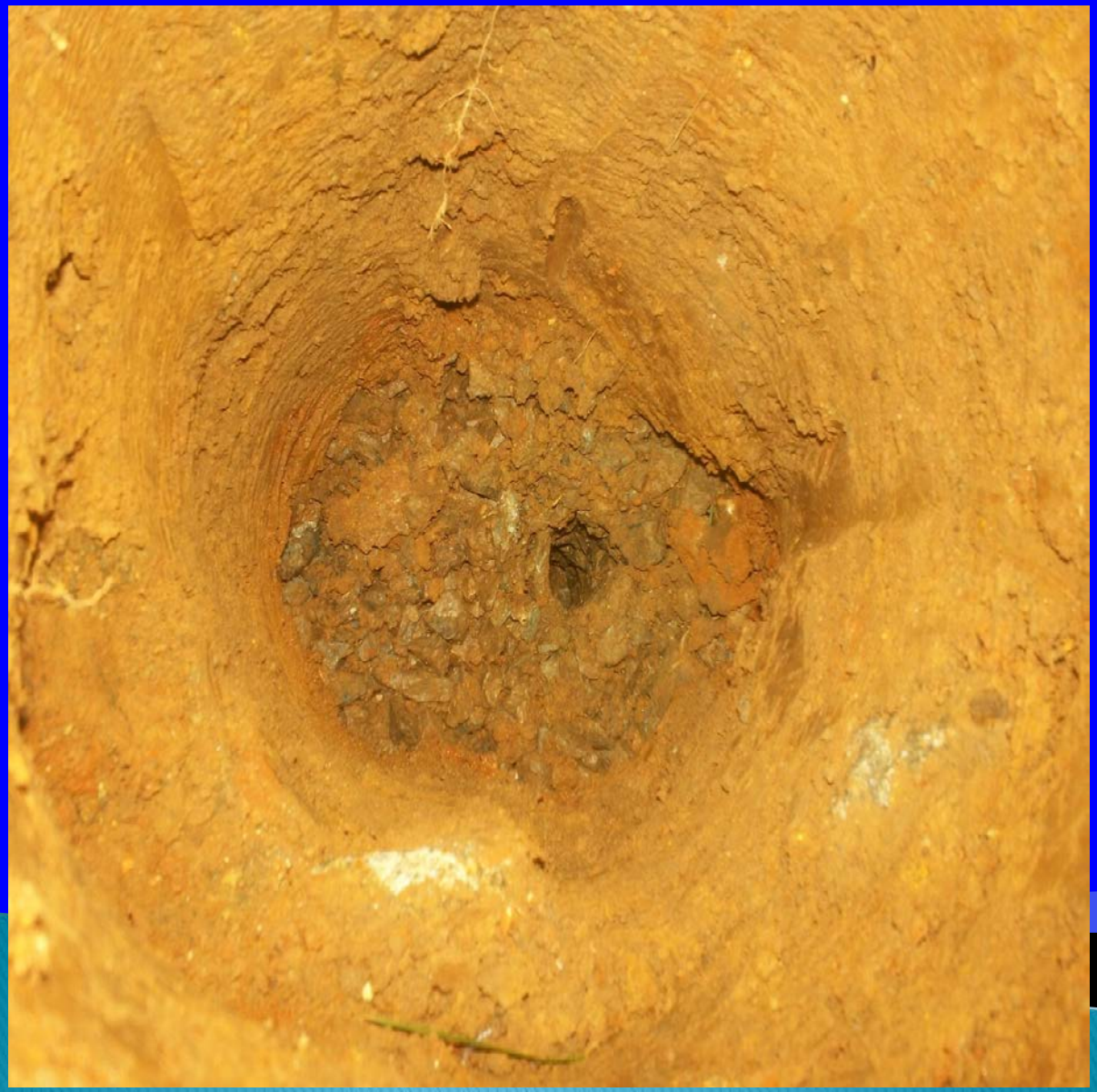
This test is conducted in order to Verify that the system will absorb an assigned amount of liquid over a 24-hour period.

Preparation:

- No effluent may enter AA during the test.
- Postpone if rain is forecast during the test period.
- Use regulated normal daily flow
  - 400 gallons for the first 3 bedrooms
  - 100 gallons for each additional bedroom
- Introduce water downstream from the treatment tank.

Procedure:

- Create Observation Holes
  - Center of a Bed
  - One in each Trench
- Establish a reference point
- Measure distance to
  - Surface of the aggregate
  - Soil below the aggregate
  - Liquid level if present
- Record the information



NAWT HYDRAULIC LOAD TEST LOG

NAWT National Association of Wastewater Technicians

Always consult the NAWT Inspection Standards for conducting a Hydraulic Load Test for protocol and guidance

Measurements of Depth of Liquid in observation holes should be from a defined, fixed and recoverable reference point

CONTACT: ______________________

PHONE: ______________________

EMAIL: ______________________

SITE ADDRESS: ______________________

____

DIRECTIONS TO SITE: ______________________

____

____

Verify that NO liquid will enter the STA during the HLT

Vacant ☐ Occupied ☐

# of Occupants: ☐ # of Bedrooms: ☐

DESIGN FLOW IN GPD: ☐

Where is Water Introduced?

☐ Outlet of Treatment Tank ☐ D-Box ☐ Other

If Other, Where? ______________________

TYPE OF STA

☐ CESSPOOL ☐ BED

☐ SEEPAGE PIT ☐ TRENCHES (HOW MANY)____

☐ SAND MOUND ☐ SUB-SURFACE SAND FILTER

☐ AT-GRADE ☐ OTHER

IF OTHER, DESCRIBE IN DETAIL:

____

____

____

Date:	Name of Tech:		
End time:		Meter reading:	
Start time:		Meter reading:	
Total time:		Total gals:	
DAY 1 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 1 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 1 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 1 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in

Date:	Name of Tech:		
End time:		Meter reading:	
Start time:		Meter reading:	
Total time:		Total gals:	
DAY 2 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 2 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 2 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in
DAY 2 - Observation Hole #			
Depth to Top of Aggregate	in	Depth of Aggregate	in
Comments		Depth to liquid Start	in
		Depth to liquid Finish:	in
		Change:	in

TOTAL GALLONS ABSORBED IN 24 HOURS: ☐

Procedure:

- Introduce the normal daily amount of water
  - Stop if unsatisfactory water level is reached
    - Top of aggregate in a bed or trench
    - Top of chamber or gravelless component
- Measure the water level in each hole after it has stabilized
- Wait 24 hours from when started

Procedure – Day 2:

- Measure and record the water level remaining in the aggregate
- Introduce additional water to bring the liquid level to the level reached at the end of Day 1
- The number of gallons introduced in Day 2 is the number of gallons absorbed in the prior 24 hours

Unlike the Penn State study our goal is to determine if the existing AA will treat and dissipate a predetermined amount of liquid over a 24-hour period.

The goal is not to determine the amount of liquid that the system is currently treating in order to tell the owner if they have X number of people in the home it will handle the flows if you keep water use to X amount of gallons per day.

Hydraulic Load Test Conclusions:

*** * Caution * ***
The results could be expressed as X gallons per day.

Do not express the results in a manner that characterizes a daily capacity of X gallons.

Do not extrapolate a theoretical population (number of people) the system could serve.

Do not prorate the results in any manner.

Why?

If the system will treat a peak flow as rated per bedrooms, or by regulatory standards, then if a small family buys a home and finds out they need to sell it shortly after they move in, they will not have a problem if a larger family buys it.

Remember this is not a flood test

Is there room for test flow?

Standard Bed – 12’ wide x 50’ long x 12” deep

12 x 50 x 1 = 600 cubic feet

Aggregate has ≈ 40% void space

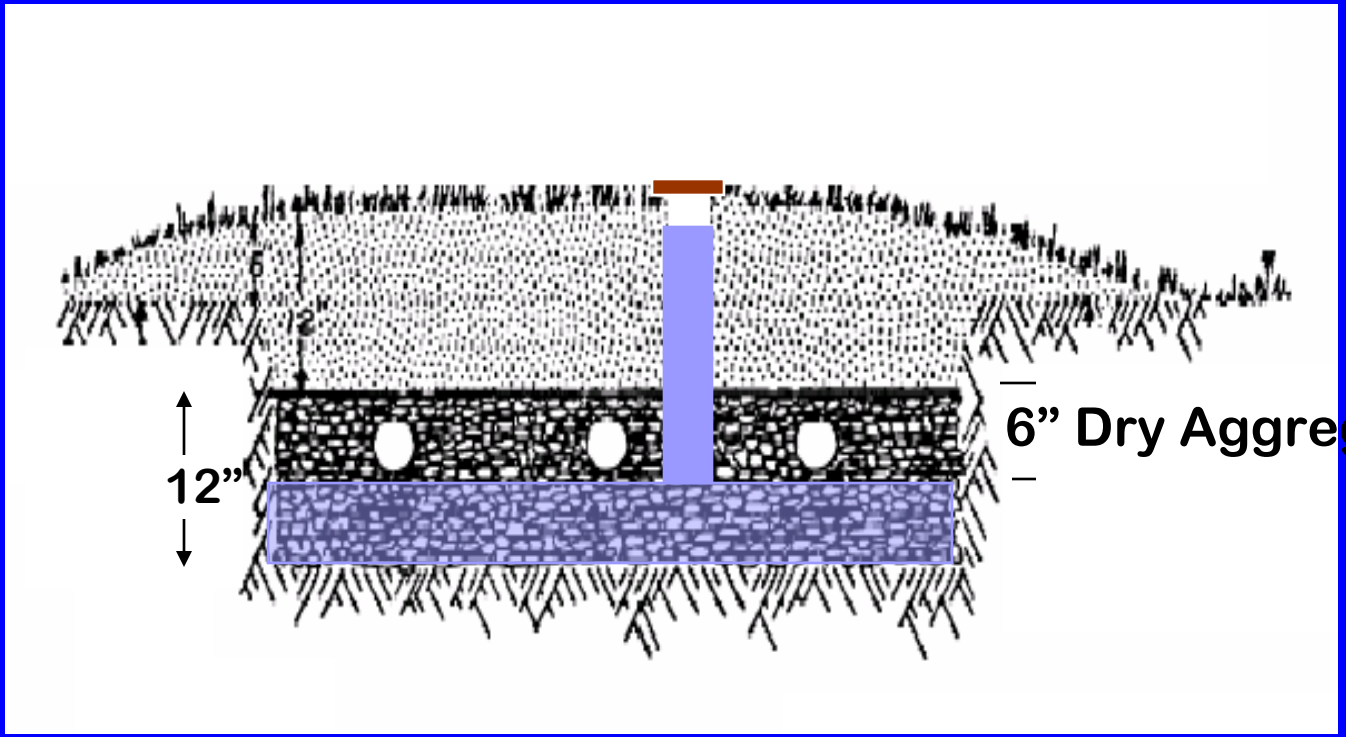
1 cubic foot holds ≈ 7.5 gallons of water

600 x 7.5 x .4 = 1800 gallons

1800 ÷ 12 = 150 gallons per inch of (height)

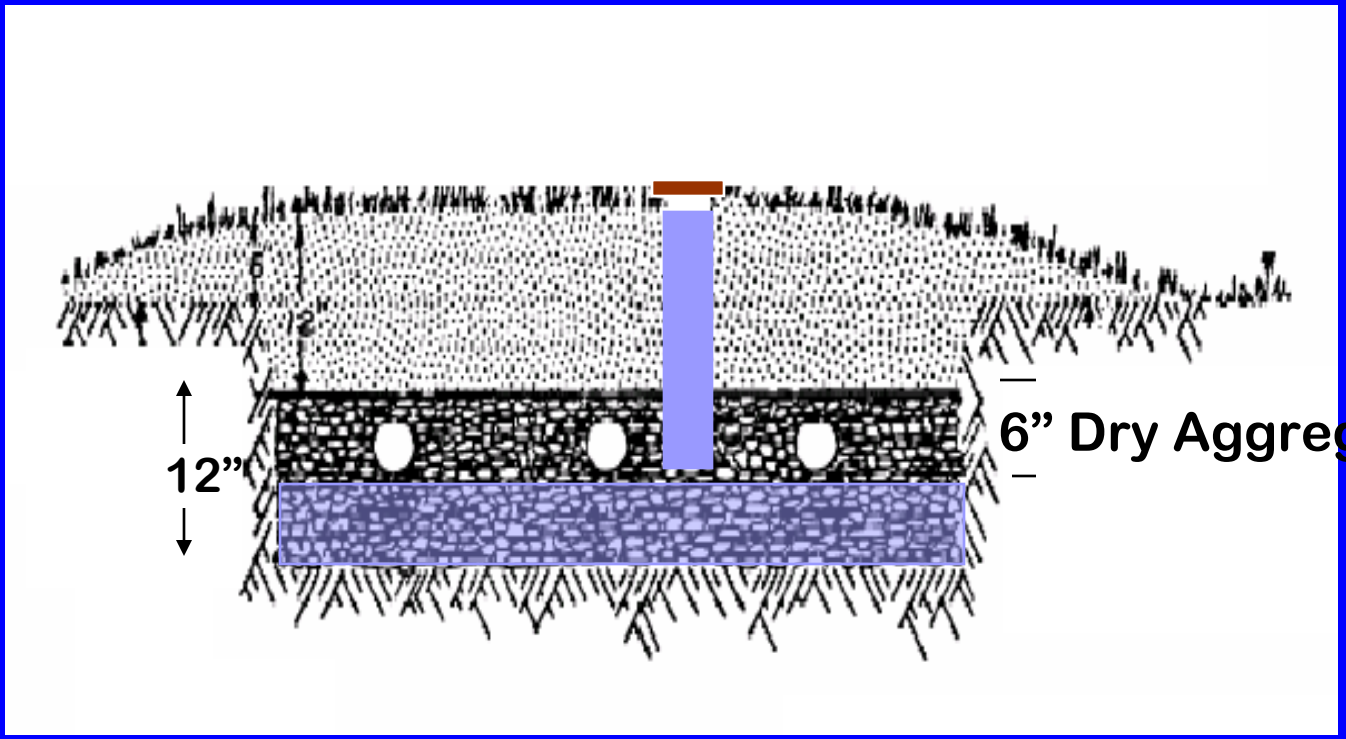
Bring in water by truck or tank?
Or
Meter the water on site?

Day One

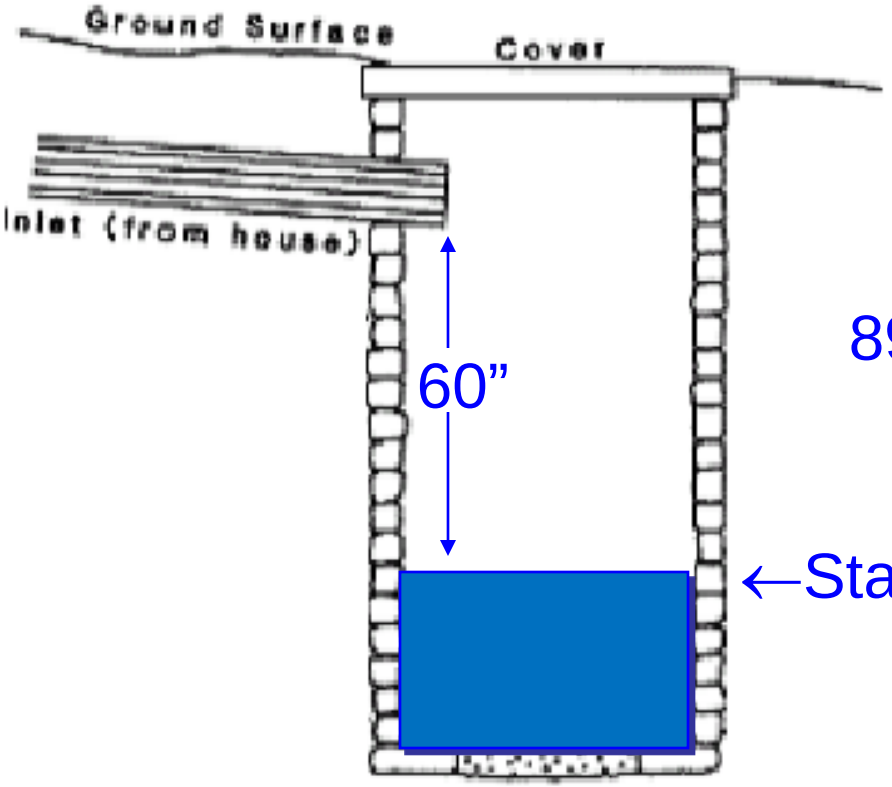


Day Two

Satisfactory – 500 gallons
Absorbed in 24 hours



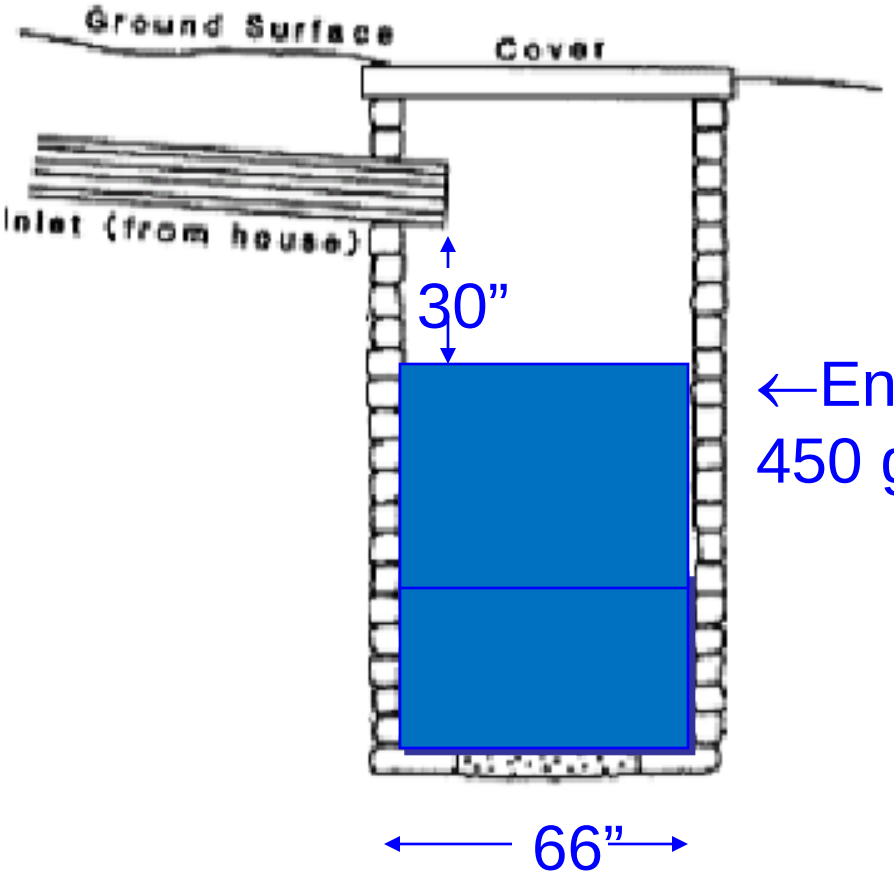
Before Day one



890 gallons capacity

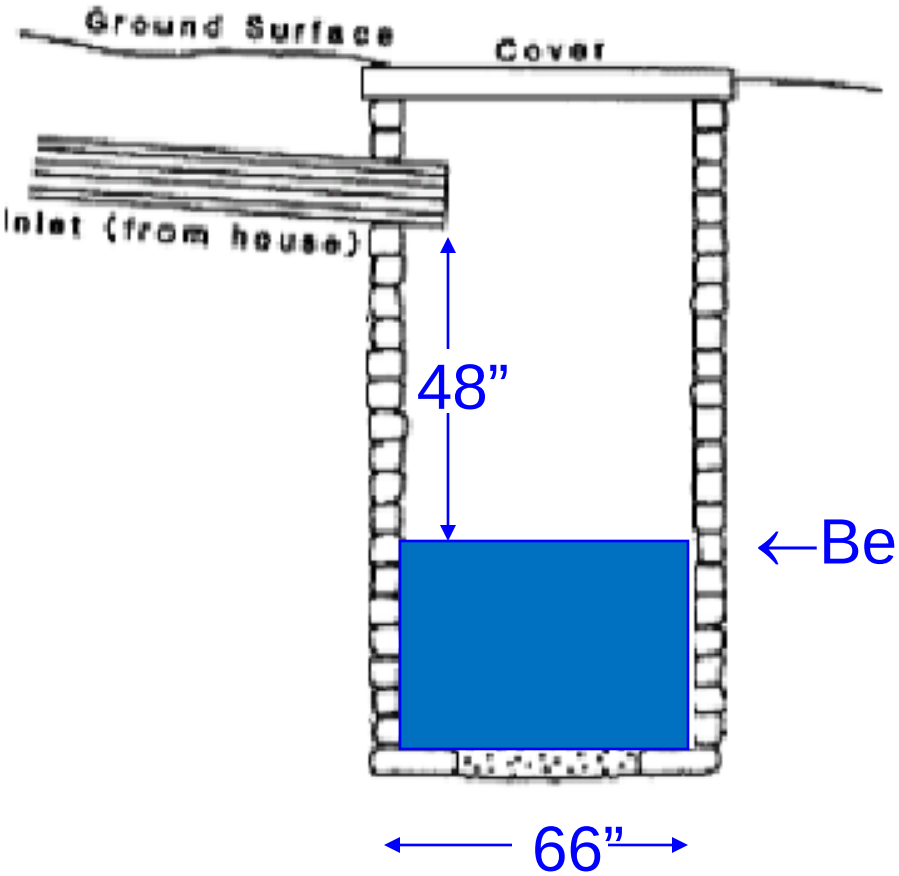
←Starting Level

3 Bedroom Home



←End Day 1 Level
450 gallons added

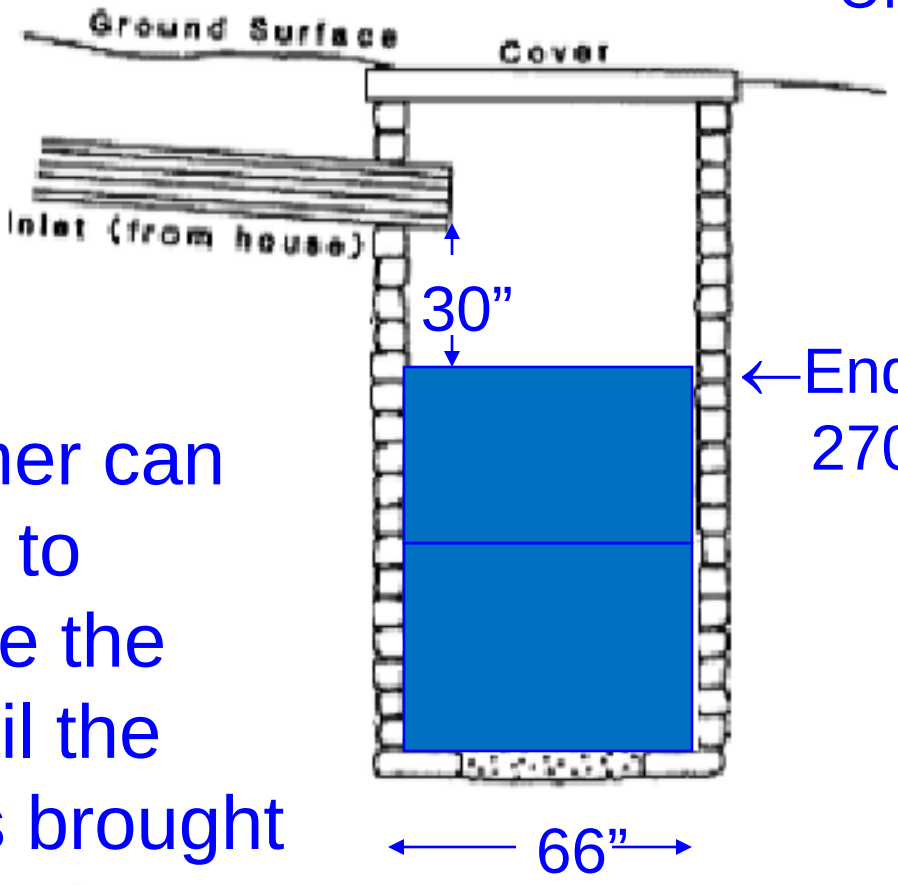
3 Bedroom Home



←Begin Day 2 Level

3 Bedroom Home

Did not accept 450 gallons
Unacceptable



←End Day 2 Level
270 gallons added

Customer can choose to continue the test until the liquid is brought up to the invert of the inlet pipe

IN NEW JERSEY AND MARYLAND

The presence of a cesspool will result in an unsatisfactory or unacceptable result.

Differences with A Regulatory Vs. A PSMA Inspection

Some of it boils down to
The
Definition
Of a
Malfunction

A regulatory malfunction in most cases can Be described as a violation of the law or a health hazard.

So if a baffle has fallen
Off a septic tank
It could be
described as broken
But not
A regulatory
Malfunction.

Dr Al Jarrett wrote
A good paper or fact sheet
On the differences between
A regulatory inspection and
A PSMA inspection.

PSMA On-lot Wastewater Treatment Inspection vs. A Regulatory Inspection

F-173

The local Sewage Enforcement Officer (SEO) focuses on system malfunctions. The PSMA certified septic tank inspector focuses on the overall well being and health of your system. On the surface these two purposes may sound similar, but they are not.

Often the question is asked; *"Why did the local Sewage Enforcement Officer (SEO) state this septic system does not have a 'Malfunction' but the PSMA Certified inspector reported the system is 'Unsatisfactory'"?*

Homeowners seeking to have their septic system inspected, especially during real estate transfers, are usually interested in the overall health of the system;

- is it properly located
- has it been maintained (pumped) on a regular basis
- is it working properly
- is there any evidence that the system might fail (and require replacement) in the near future, etc?

There are several practitioners a homeowner might engage to obtain reliable information;

1. the local SEO
2. a septic tank pumper
3. an independent inspector.

Independent inspectors are not very common, so most homeowners or homebuyers usually turn to the local SEO thinking this is the best and most reliable source of information. The septic tank pumper is often forgotten, or it is

Sewage Enforcement Officer (SEO) Inspection

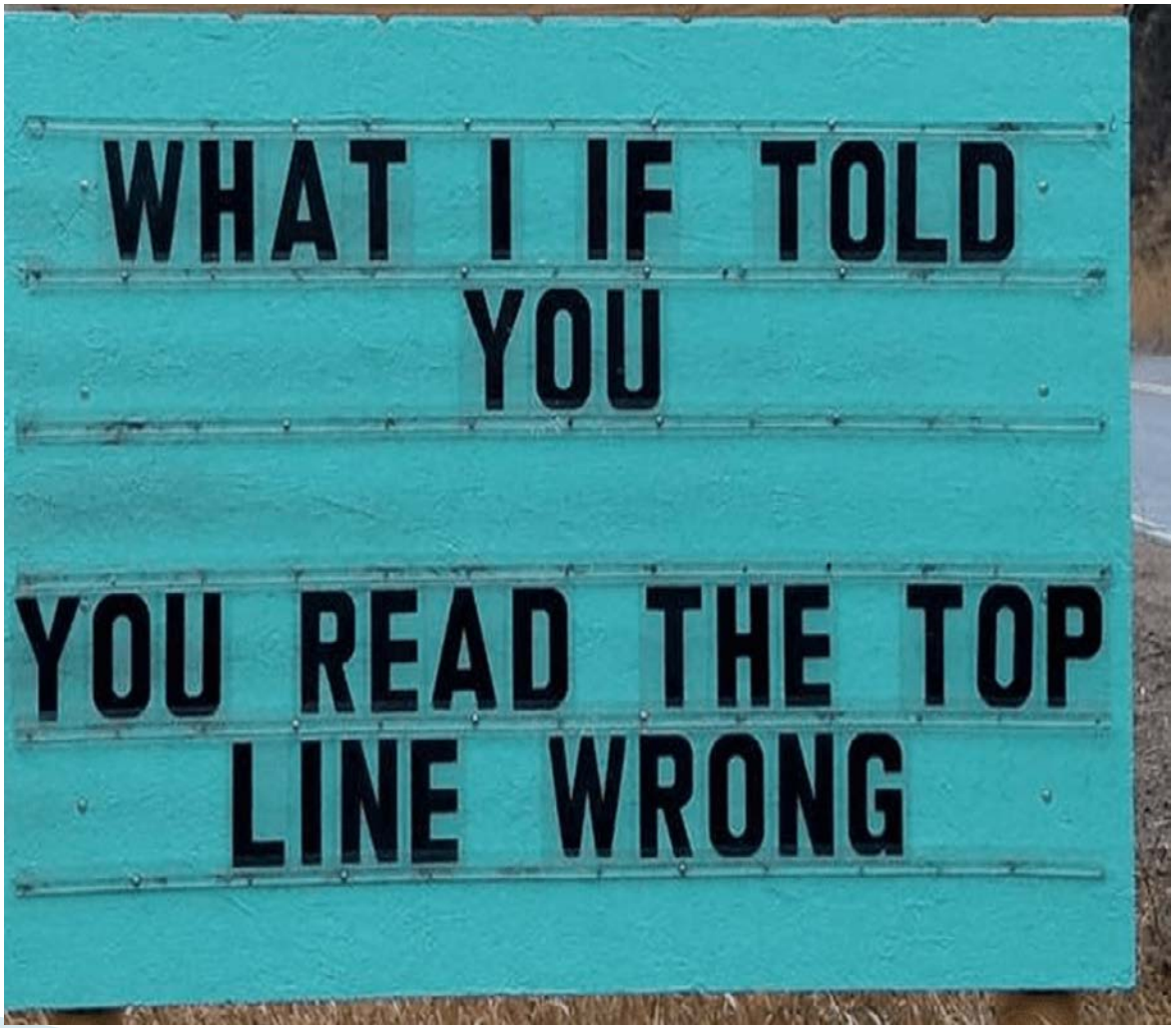
SEOs are agents of the local municipality, hired by the municipality to administer the PA-DEP regulations set forth in Title 25 Chapters 71, 72, and 73 of the PA code. Much of an SEO's responsibility is focused on permitting and overseeing the installation of new on-lot sewage systems. When it comes to inspections of an on-lot sewage system, the SEO is taught that there is no violation unless the system malfunctions. **Therefore, according to an SEO, your system is not malfunctioning unless there is observable wastewater emerging onto the land surface or the sewage has backed up into the home.**

PSMA Certified Inspection

PSMA Certified Inspectors, which includes most septic tank pumpers, are trained to understand how on-lot systems work, why they fail, and recognize impending malfunctions. They are taught how to examine a septic tank and make sure the baffles and pipes are correctly placed and functioning.

A certification exam must be passed before they receive the PSMA Inspector Certification. When a PSMA Inspector checks out a septic system, he/she will examine the various parts of the system to make sure all necessary components are in place and in good shape. The PSMA inspector will also estimate your actually water usage and look for water ponded in the absorption field and other evidences that may signal a system that may soon fail or need extensive maintenance or replacement. These inspection standards have not been developed by PA-DEP or any other governing agency. The PSMA inspection procedures have been developed in

Questions?



Thanks For Being Here