

Designer/Installer Workshop Using New Wastewater Treatment Technologies

Presented by: Mary Clark, Certified Site Technician B

Stone Environmental Inc. Montpelier, Vermont

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August 2004

Workshop Agenda

- Presentation by Mary Clark, Stone Environmental Inc.
- Presentation by Frank O'Brien, P.E., DEC's Innovative Systems Review Engineer
- Presentations by 3 manufacturer representatives
- Questions/Answers

Objectives of Presentation

- What are the new technologies?
- How do they work?
- What are the benefits to new technologies?
- What are the soils, site & design requirements?
- Why is management important?



What are the New Technologies?

- Wastewater Treatment Systems (6 technologies plus sand filters)
- Wastewater Dispersal Systems (EnviroSeptic^R gravelless distribution pipe)
- Other Wastewater Products (effluent filters, polyethylene septic tanks, distributing systems)

Types of I/A Wastewater Treatment Technologies

- Intermittent Sand Filter
- Recirculating Sand Filter
- Geotextile Filter
- Peat Filter
- Trickling Filter
- Recirculating Fixed Film
- Recirculating Reactor



Types of I/A Wastewater Treatment Systems

- Intermittent & Recirculating Sand Filter
- Geotextile Filter (OSI AdvanTex^R)
- Peat Filter (Ecoflow Biofilter^R, Puraflo^R)
- Recirculating Fixed Film Trickling Filter (SeptiTech^R, Bioclere^R)
- Intermittent Recirculating Reactor (Spec AIRR^R)

Manufacturer Representatives

- Wastewater Technologies Inc.

19 Precast Road

Milton, VT 05468

877-212-3219

www.wastewatertechnologies.com, www.orenco.com

- Orenco Systems Inc. (OSI) Sand filter designs and materials
- OSI AdvanTex^R geotextile filters
- Risers, lids, effluent filters, tanks, effluent pumping systems

Manufacturer Representatives

- New England Biofilter Corp.

P. O. Box 912

Stowe, VT 05672

(802) 253-2203 Tim Lake

www.premiertech.com

- Premier Tech Ecoflow^R Peat Biofilter

Manufacturer Representatives

- S. T. Griswold, Inc.
P. O. Box 849, 193 Industrial Avenue
Williston, VT 05495
info@stgriswold.com
1-800-339-4565 Paul Beauregard
Rutland office: 133 Forest Street
www.septitech.com
 - Septitech^R

Manufacturer Representatives

- Aquapoint
241 Ducharme Blvd.
P. O. Box 50120
New Bedford, MA 02745
www.aquapoint.com
"VT" Rep. Is Sam Seymour
(585)473-3300, Rochester, New York
- Bioclere^R

Manufacturer Representatives

- SPEC Industries Inc.

550 Parkson Road

Henderson, Nevada 89015

(702) 558-4444

www.specind.biz

(No local representative currently)

- Spec AIRR

Manufacturer Representatives

- Bord na Mona

P. O. Box 77457

Greensboro, North Carolina 27417

1-800-PURAFLO

www.bna-us.com

(No local representative currently)

- Puraflo^R Peat biofilter

How Do They Work?

- Need a watertight septic tank with effluent filter
- Many have pumps, switches, alarms
- Most provide aerobic treatment media surfaces
- Can be either single pass or recirculating flows



Benefits of Using I/A Systems

- Provides high level of treatment (TSS/BOD 30/30 or better)
- Can provide nutrient and pathogen removal
- Allows reduction in system size (1/2)
- Allows reduction in vertical separation to seasonal high groundwater (3' to 2')
- Can eliminate mound fill
- Can be used on sites requiring filtrate effluent disposal systems (~6-18 inches depth to seasonal high groundwater table)
- Can be used in “best fix” situations where a replacement system cannot meet minimum requirements
- Might help renovate clogged leachfields

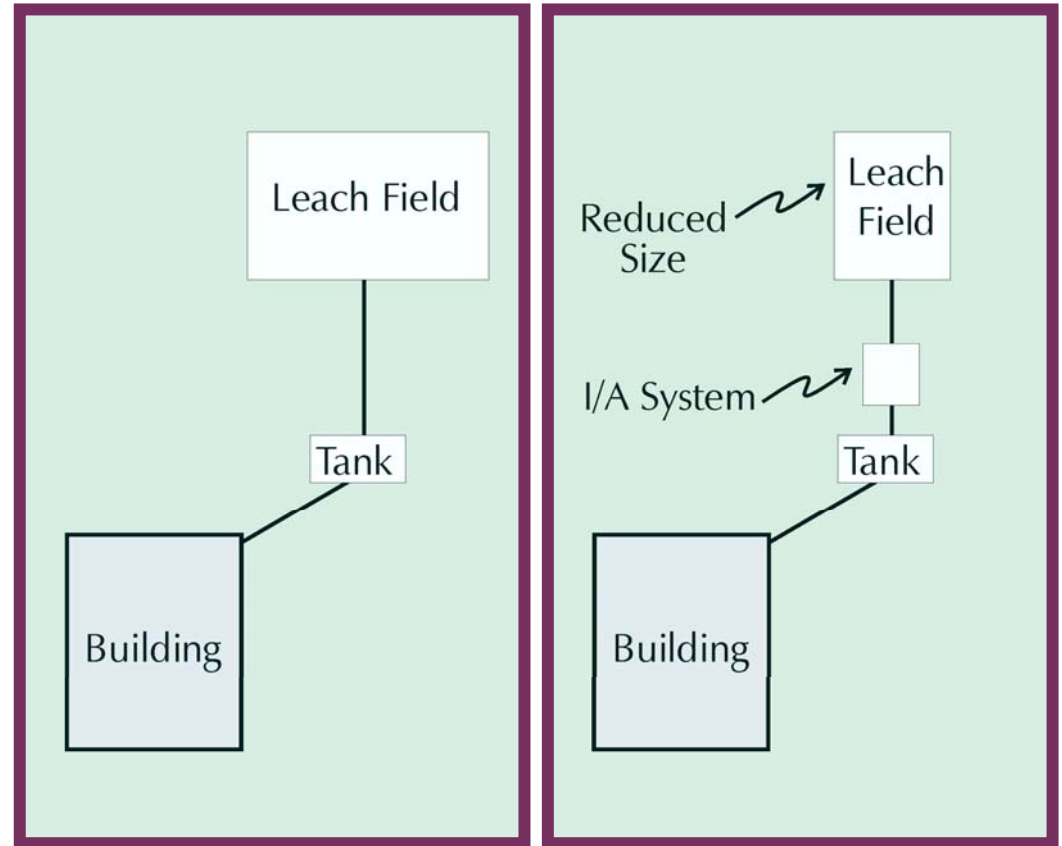
Treatment Performance

- From EPA's 2002 Design Manual

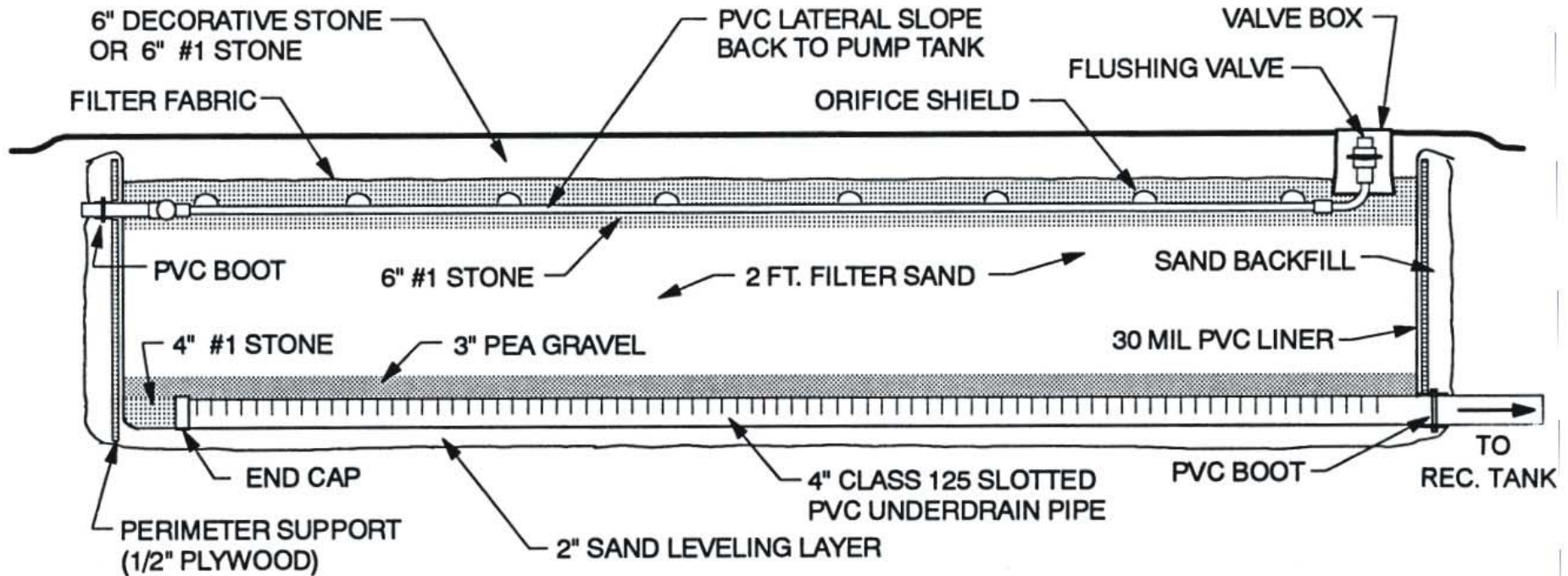
Constituents of concern	Example direct or indirect measures (units)	Tank-based treatment unit effluent concentration					SWIS percolate into ground water at 3 to 5 ft. depth (% removal)
		Domestic STE ¹	Domestic STE with N-removal recycle ²	Aerobic unit effluent	Sand filter effluent	Foam or textile filter effluent	
Oxygen demand	BOD ₅ (mg/L)	140-200	80-120	5-50	2-15	5-15	>90%
Particulate solids	TSS (mg/L)	50-100	50-80	5-100	5-20	5-10	>90%
Nitrogen	Total N (mg N/L)	40-100	10-30	25-60	10-50	30-60	10-20%
Phosphorus	Total P (mg P/L)	5-15	5-15	4-10	<1-10 ³	5-15 ³	0-100%
Bacteria (e.g., <i>Clostridium Perfringens</i> , <i>Salmonella</i> , <i>Shigella</i>)	Fecal coliform (organisms per 100 mL)	10 ⁵ -10 ⁶	10 ⁴ -10 ⁵	10 ³ -10 ⁴	10 ¹ -10 ³	10 ¹ -10 ³	>99.99%

On-Site Replacement Options

- Traditional septic system
- I/A system
 - when to use?
 - allowable I/A systems
 - part of management plan



Recirculating Sand Filter



(Converse 1999, adapted from Orenco)

Recirculating Sand Filter Performance

- From EPA Design Manual

Reference	BOD (mg/L)		TSS (mg/L)		TKN (mg-N/L)		TN (mg-N/L)		Fecal Coliform (#/100mL)	
	Influ.	Efflu. (% Removal)	Influ.	Efflu. (% Removal)	Influ.	Efflu. (% Removal)	Influ.	Efflu. (% Removal)	Influ.	Efflu. (% Removal)
Louden et al., 1985 ^a (Michigan)	150	6 (96.00%)	42	6 (85.71%)	55	2.3 (95.82%)	55	26 (52.73%)	3.40E+03	1.40E+01 (99.59%)
Piluk and Peters, 1994 ^b (Maryland)	235	5 (97.87%)	75	8 (89.33%)	Not reported		57	20 (64.91%)	1.80E+06	9.20E+03 (99.49%)
Ronayne, et al., 1982 ^c (Oregon)	217	3 (98.62%)	146	4 (97.26%)	57.1	1.1 (98.07%)	57.5	31.5 (45.22%)	2.60E+05	8.50E+03 (96.73%)
Roy and Dube, 1994 ^d (Quebec)	101	6 (94.06%)	77	3 (96.10%)	37.7	7.9 (79.05%)	37.7	20.1 (46.68%)	4.80E+05	1.30E+04 (97.29%)
Ayres Assoc., 1998 ^e (Wisconsin)	601	10 (98.34%)	46	9 (98.35%)	65.9	3 (95.45%)	65.9	16 (75.72%)	> 2500	6.20E+01 (> 98%)
Owen and Bobb, 1994 ^f (Wisconsin)	80	8 (90.00%)	36	6 (83.33%)	-	- (> 95%)	Not reported		Not reported	

Warren Elementary School Innovative Alternative System

- Orenco AdvanTex^R Geotextile filters
- Recirculating pump tank, force main to Hydro-Splitter
- Gravelless half pipe trenches
- Effluent sampling results usually <10/10 TSS/BOD



State Regulations

- Approvals for General Use
- Designs require Registered in VT P.E. license
- Permits include conditions on construction inspections, annual inspections, maintenance contracts



State Regional Office in Rutland

- 450 Asa Bloomer State Office Building
(802) 786-5900
- Department of Environmental Conservation
 - Environmental Protection Rules (Chapter 1)
 - All new construction requires permits
 - Except for various exemptions
 - Exemptions all go away July 1, 2007

Design and Construction Considerations

- Consider long-term reliability, life cycle costs (construction plus O&M), product testing (NSF)
- Need to consider waterproofing tanks/piping, particularly on sites with high groundwater table
- Access risers need to be included and watertight
- Effluent filters designed for flows, easy access
- Electrical contractor for wiring, telemetry

Dispersal Technologies

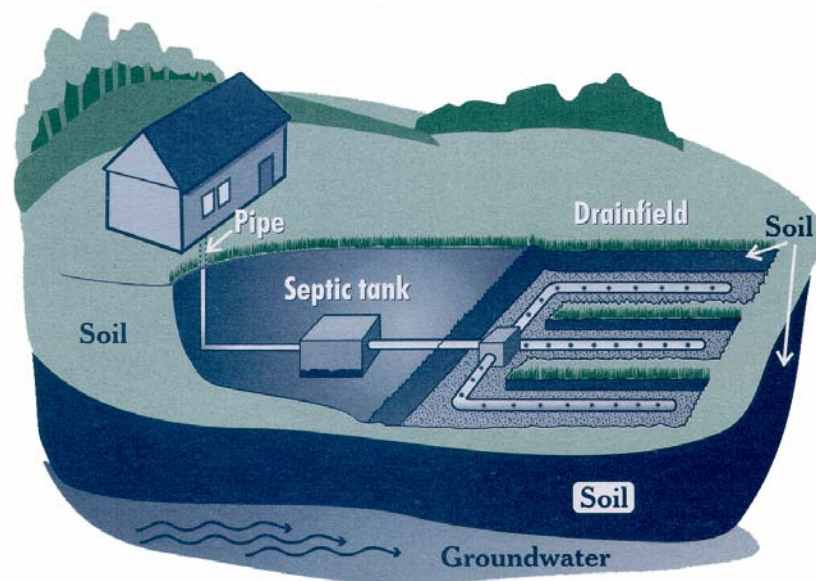
- Timed-dosed trenches
- Enviro-Septic^R gravelless distribution piping
- Flout^R floating outlet distribution box, alternative to dosing siphon
- Orenco Hydro-splitter^R mechanical distribution alternative to d-box

Operation and Maintenance

- Who is responsible? Typically homeowner
- Operation – Amount of water used, garbage disposals, chemicals, drugs
- Maintenance
 - Traditional systems – Check/pump septic tank, check distribution box, check area for ponding
 - Pump and I/A systems – Above, plus check pumps, wiring, alarms, flush lines, sample

Education and Outreach

- Materials and database searches available from National Small Flows Clearinghouse (nsfc.org)
- New EPA design manual and website with materials
- NAWT onsite system inspection training
- NOWRA.ORG
- NEIWPC.ORG
Conference Mystic CT
March 29-31 2005



Questions & Answers

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