STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

July 6, 1999

SeptiTech
Attn.: James Gray President
220 Lewiston Road
Gray, Maine 04039

FILE COPY

Subject: Approval for General Use, SeptiTech System

Dear Mr. Gray:

This letter confirms the meeting between you, John Bastey, and I on June 30, 1999. At that meeting you presented the results of monitoring for various SeptiTech systems installed pursuant to the Division's December 24, 1997 experimental system approval under provisions of Section 1801 of the 1997 Subsurface Wastewater Disposal Rules (Rules).

These data demonstrate that the SeptiTech treatment units routinely achieve BOD^5 and TSS reductions to single digit levels, both in the high 90's percent range of reduction. The units also achieve E. Coli reductions in excess of 99 percent.

Therefore, the Division approves SeptiTech systems for general use under the Rules, and hereby removes SeptiTech systems from experimental status with the following conditions for individual system installations:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table or other limiting factor, and the lowest elevation of the system's disposal area;

2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal area;

3. Stone trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;

4. Proprietary devices such as plastic chambers and gravel-less trenches are allowed a 50 percent reduction in size, based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers;

5. Eljen In-drains may be used with SeptiTech systems, but with no reduction in size; and

6. Maintenance agreement contracts shall be standard with all system installations. Terms and duration of the contracts shall be in accordance with SeptiTech's company policies.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system. Further, the Division strongly recommends that property owners enter into long term maintenance contracts with SeptiTech, in accordance with SeptiTech's company policies.

Please feel free to copy and distribute this letter as necessary. If you have any questions, please feel free to contact me.

Sincerely,

James A. Jacobsen

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: File

Author: James Jacobsen at dhe
Date: 12/23/1999 9:35 AM
TO: info@septitech.com at InternetSubject: points award------------------------------------
- Message Contents

To: James Gray, President

From: Jim Jacobsen, Program Manager

A while ago you asked the Division to increase SeptiTech's point allotment, for first time variances, from 15 points to 20 points.

That request got us thinking about advanced treatment in general. As a result, we will be proposing a new point table to Chapter 20 of the Subsurface Wastewater Disposal Rules, for advanced treatment. We propose the following:

Strength of effluent (BOD5 plus TSS)	Points
150 to 101 mg/l	5
100 to 51 mg/l	10
50 to 11 mg/l	15
10 mg/l or less	20

These values are based upon the fact that 240 mg/l is assigned a multiplication factor of 1.0 on Table 603.1 (i.e., is "normal"), and the idea that there should be a significant drop in strength before points are awarded.

This should accomplish what you wanted, although perhaps in a different way.

Happy Holidays!

SeptiTech®
Zero Pollution Waste Water Systems

October 19, 1999

Mr. James Jacobsen
Department of Humam Services
Division of Health Engineering
10 State House Station
Augusta, ME 04333

Dear Mr. Jacobsen:

As per our conversation this morning, SeptiTech would like to formally request that the points allowed for new systems variance when installing a SeptiTech unit be increased from 15 to 20 points which I understand is the maximum allowed under current code.

Sincerely,

Jim

James R. Gray

December 22, 1999

To: Scott Samuelson, SeptiTech

From: Jim Jacobsen, DHS-DHE

Re: background

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

1981-Associate of Science, Environmental Control, EMVTI

1981-1984 Operator I, Water Pollution Control Facility, City of Brewer

1984-1988 Sanitarian II, Wastewater and Plumbing Control Program, Bureau of Health, Division of Health Engineering

1988-1990 Project Analyst, Land Use Regulation Commission, Department of Conservation

1990-1997 Senior Project Analyst, Land Use Regulation Commission, Department of Conservation

1997-present Program Manager, Wastewater and Plumbing Control Program Bureau of Health, Division of Health Engineering

Post-it® Fax Note 7671	Date 12/22/99 # of pages ▶ 1
To Scott Samuelson	From Jim Jacobsen
Co./Dept. SeptiTech	Co. DHS-DHE
Phone #	Phone # 287-5695
Fax # 657-4665	Fax #

AEROBICALLY TREATED DOMESTIC WASTEWATER TO RENOVATE FAILING SEPTIC TANK - SOIL ABSORPTION FIELDS

James C. Converse and E. Jerry Tyler[1]

ABSTRACT

Aerobically treated domestic wastewater was used to renovate biologically clogged, failing septic tank-soil absorption units. In the initial study, 12 of 15 soil absorption units successfully accepted all aerobically treated wastewater. One system was vastly overloaded. Another system needed pumping during the first six months and the third system continues to need pumping 22 mo. after installation of the aerobic unit. Fifteen months after the initial study all systems except one are successfully accepting all the aerobically treated wastewater. Two of the initial 15 systems were removed from the study. Seven additional systems, with the aerobic units on line for 2-9 months, were added to the study in 1995. Five of the seven are accepting wastewater with two remaining severely ponded in which occasional pumping is needed. Using aerobically treated effluent appears to be a viable method of renovating failing soil absorption systems.

INTRODUCTION

Soil absorption systems receiving septic tank effluent form a biological mat at the soil infiltrative surface. The level, to which the mat forms, is dependent upon many factors such as hydraulic and organic loading rates, temperature and age. Siegrist et al., (7) discuss the

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[1] James C. Converse, Professor and Chair, Agricultural Engineering Department and E.J. Tyler, Professor, Soil Science Department and Director of Small Scale Waste Management Project, University of Wisconsin-Madison. Research supported by the Small Scale Waste Management Project and College of Agricultural and Life Sciences.

humic substance formation during wastewater infiltration in soil absorption systems. Ronner and Wong (5) have identified more than 160 bacteria in the clogging mat while identifying the composition of the biological mat.

As the biological mat develops, the soil infiltration rate decreases. Once the hydraulic loading rate exceeds the soil infiltration rate, ponding starts. The ponding may be intermittent but if the hydraulic and organic loading rates exceed the ability of the soil to assimilate the effluent, ponding will become progressively deeper. At some point wastewater will either back up into the home or break out on the soil surface. Experience has shown that resting for long periods of time will renovate the soil absorption unit but during the resting period alternative treatment and dispersal methods will be required. Hargett, et al., (3) showed that hydrogen peroxide was effective in reducing the clogging mat but it also reduced the wastewater infiltration rates significantly. Mickelson, et al., (4) showed that hydrogen peroxide is effective in reducing the clogging mat in clean sands for one or two applications. Lower organic loading rates will retard the development of the biomat (Siegrist, 6).

Since organic matter is one of the factors affecting biological mat development, it may be possible to reduce the biological mat and increase infiltration rates if the soil absorption unit received higher quality effluent (BOD and SS values less than 10-15 mg/L) instead of typical septic tank effluent with BOD and SS in range the of 100- 250 mg/L.

The objective of this study was to determine how effectively aerobically treated domestic wastewater renovated soil absorption units that failed due to an excessive biological mat formation. Aerobically treated effluent is defined as effluent exiting a properly operating mechanical aerobic unit or sand filter with typical BOD and SS in range of 2- 15 mg/L.

MATERIALS AND METHODS

In 1987 an aerobic unit replaced the septic tank with the effluent entering a failing 3(year old soil absorption unit. In 1990 aerobic units were installed at two other sites. Basec on the results of these three units, the State of Wisconsin in 1991 allowed this concept to be used if the site met the condition that the infiltrative surface was 3 ft above high water table (Burks, 1).

In February 1994, the authors contacted county sanitarians for a list of sites using aerated wastewater to renovate failing systems. Seventeen sites were identified. Two of the 17 systems were not included for study. One was not failing prior to installation of the aerobic unit and the other was serving a summer home. Telephone and written surveys were developed for the homeowner and installer, respectively. There was 100% response to the surveys. Converse and Tyler (2) reported the results.

In August 1995, a follow-up evaluation was completed on all 15 sites reported in 1994 and seven sites were added in 1995. The seven sites were selected based on the number a local contractor had installed. There have been additional aeration systems installed for renovation purposes since 1994 but are not included here.

RESULTS AND DISCUSSION

Table 1 gives the characteristics for the systems (1-15) evaluated in 1994 and the seven systems (16-22) evaluated in 1995. Twenty of the systems serve homes, one serves a town hall and the other serves a rental duplex. For the 15 initial systems, the ownership and number of people served remained the same before and after installation of the aerobic unit except Site 2 where the number of people remained the same. No change in ownership

Table 1. Home and System Characteristics and Performance

Site (a)	No. Bedrm. (b)	House Size (ft^2) (c)	Population (d)	Water Appliance (e)	System Type-Date (f)	System Size (ft) (g)
1	3	2-3000	2(3)	D,W,G	M-78(2-93)	5X94
2	3	2-3000	2(2)*	D,W,G	M-86(4-92)	8X47
3	2	2000	2(1)	D,W,G	B-78(5-90)	24X34
4	3	2-3000	2(0)	D,W,S	B-75(6-90)	6X58
5	3	2-3000	2(0)	D,W,G,S	B-85(4-91)	12X52
6	3	1-2000	2(1)	W	D- -(4-91)	-
7	3	1-2000	2(1)	D,W,G,S	T-77(10-93)	5x110
8	3	1-2000	2(2)	D,W,S	T- -(2-92)	5x62
9	4	1-2000	2(1)	W,S	B-72(7-92)	18x62
10	4	>3000	2(3)	W	B-75(10-91)	14x47
11	3	1-2000	2(2)	W,S	T-60(8-87)	-
12	3	2000	2(2)	D,W	B-72(5-92)	20x38
13	T.H.	-	Same	-	B-74(5-92)	20x35
14	4	2-3000	2(4)	D,W	B-74(10-93)	18x30
15	5	2-3000	2(5)	-	D- -(8-90)	-
16	3	1-2000	2(4)	W,S	B-73(9-94)	20x42
17	3	2-3000	2(4)	D,W,S	B-83(3-95)	18x70
18	4	2-3000	2(3)	D,W,G,S	M-85(11-94)	-
19	4	>3000	2(2)	D,W,G,S	B- -(11-94)	-
20	6	Duplex	-	D,W,G,S	P-80(12-94)	30x50
21	3	1-2000	2(1)	S	P-82(10-94)	18x53
22	3	1-2000	2(0)	D,W,G,S	B-76(5-95)	20x45

Notes:

Col. b-T.H.-Town Hall with offices with 4 employees and meeting rooms.

Col. c-2-3000 means house size between 2000 and 3000 sq. ft.

Col. d-Number of adults (number of children), *ownership change at time of aerobic installation.

Col. e-Appliances: D(Dishwasher), W(Washer), G (Garbage Grinder), S (Softner discharge to unit).

Col. f-B-Bed, M-Mound, T-Trench, D-Drywell, P-I-inground pressure, year original system installed (date aerobic unit installed).

Col. g-System size was taken from plans on file in county offices. Drywell units are single units with unknown dimensions, typically 6-10 ft. diameter, with bottom 8-9 ft from ground surface.

occurred in the seven sites identified in 1995. Systems renovated included 12 in-ground beds, 3 trenches, 2 drywells, 3 mounds and 2 in-ground pressure.

Table 2 gives the water use and system performance after installation of the aerobic units. The water use, based on interviewing the owner, remained essentially the same except for four sites in which three used more and one used less water. At Site 1 the water softener discharge was diverted elsewhere, and at Site 9 the basement sump was disconnected from the system.

The symptoms were either backup in the basement, severe ponding with no breakout or breakout on the ground surface (Table 2). Obviously those that backed up or broke out on the lawn surface were ponded. In most cases ponding is normally not considered a failure by itself. However, in several cases the ponding was severe enough to warrant corrective action by the homeowner/banker/prospective buyers. In all but one case the symptom disappeared after installation of the aerobic unit. Symptoms reappeared in seven cases. In two of the seven, the reappearance of symptoms is seasonal during the spring wet season. The other five systems, with reappearing symptoms, needed occasional pumping. Sixteen owners were satisfied with the performance of the system. Five owners were somewhat satisfied. Four of the five somewhat satisfied owners needed some pumping of their systems.

Table 3 summarizes each system before and after the installation of an aerobic unit. Systems 9 and 10 are in high ground water sites. System 9 ponded during Spring 1993 but did not during Spring 94. System 10 exhibited a small spongy spot during Spring.

Table 2: Water Use and System Performance

Site	Water Use	Symp toms	Symp Disappear	Symp Reappear	Owner Satisfied	Status 1995
	(a)	(b)	(c)	(d)	(e)	(f)
1	S/L	P	Y	N	Y	OK
2	M	P	Y	N	Y	OK
3	S	B	Y	N	Y	OK
4	S	B	Y	N	Y	OK
5	S	B	Y	N	Y	OK
6	S	L	Y	P	Y	OK
7	S	B	Y	N	Y	OK
8	S	L	Y	N	Y	OK
9	S/L	P	Y	S	Y	OK
10	S	L	Y	S	Y	OK
11	S	L	Y	N	Y	*
12	S	L	Y	N	Y	OK
13	S	L	Y	N	Y	OK
14	L	L	N	P	S	
15	S	L	Y	P	S	**
16	S	P/L	Y	N	Y	-
17	S	L/B	Y	P	S	-
18	M	L	Y	N	Y	-
19	S	B	Y	N	Y	-
20	S	L	Y	P	S	-
21	S	P	Y	N	S	-
22	M	B	Y	N	Y	-

Notes:

Col. a-Water usage compared to prior use based on homeowner opinion. S(Same), M(More), L(Less), S/L(Same use in house, less to system).

Col. b-P(Ponding), B(Backup), L(Breakout on Lawn).

Col. c-Symptoms disappear; Y(Yes), N(No).

Col. d-Symptoms reappear; Y(Yes), N(No), S(Seasonal), P(Occasional pumping) after aerobic unit installed.

Col. e-Owner satisfied; Y(Yes), S(Somewhat).

Col. f-Status of 1994 units as evaluated in 1995; OK (System working fine and owner is pleased), *System working fine for 7 years but taken off-line as wastewater was directed to another exp., ** System still needs pumping aboout every 90-120 days 22 months after installation of aerobic unit, ***System removed in 1992 as house was destroyed.

Each system accepted all of the wastewater without requiring pumping. Within a few weeks ponding disappeared. Samples of ground water, taken twice in Spring 1994 (Site 9) from the 4 observation wells surrounding the soil abosrption unit, had fecal coliform below detectable levels. The drywell on Site 6 needed periodic pumping for 6 months then accepted all of the wastewater. The Site 14 system is still experiencing problems 22 months after installation of the aerobic unit. The system continues to need periodic pumping about every 3-4 mo. The cause has not been identified. At Site 15, less frequent pumping was needed after installation of the aerobic unit, but the drywell was vastly undersized.

In Sites 16-22, the aerobic units were installed 2-9 months prior to the author inspection. Some of them have not had time to renovate while others with longer time periods appear to be well on the way to being renovated. Visual inspection of the effluent in the observation or vent tubes yielded an effluent that was relatively clear with minimal odor. It was quite obvious that the effluent was from an aerobic unit as it did not resemble septic tank effluent.

A phone survey of the homeowners and contractors in August 1995, revealed that 12 of the 15 systems were continuing to perform satisfactorily (Table 2). Systems 11 and 15 are no longer being operated. The house on Site 15 was destroyed and the effluent from Site 11 was being diverted to another experiment after operating satisfactorily for seven years. The system on Site 14, as mentioned earlier, continues to require periodic pumping.

Table 3. Description of Symptoms before and after Installation of Aerobic Unit

Site	System Type	Infiltration Area Condition: Prior to Aeration	Infiltration Area Condition: After Aeration	Comments
1	Mound	At least 6-8 months severe ponding	No ponding after 6 months, dry in July, 94[a].	Diverted softener discharge elsewhere after aerobic unit installed.
2	Mound	Mound ponded.	No ponding after 6 months, dry in July, 94.	New owners indicated previous owners practiced water conservation for extended period, unconfirmed.
3	Bed	Ponding for some time, backed up in house	In-ground bed dry.	Aerobic unit installed within 90 days of backup.
4	Bed	Ponding for some time, backed up in house.	Ponding continues for several years (Fig. 1).	Septic tank pumped for a month before aerobic unit installed.
5	Bed	Ponding with intermittent back up in house for 3 years.	Bed dry in July, 94.	Septic tank pumped frequently for 3 years before aerobic unit installed.
6	Drywell	Ponding with breakout on lawn in winter at end of trench connected to drywell.	Drywell needed periodic pumping for 6 months, about 5 ½ in. of effluent in drywell in July, 94.	Aerobic unit installed within 6 mo. after detecting problem. Trench disconnected at time of aerobic installation.
7	Trench	Ponding with intermittent back up in house for 6 years.	Noticeable drop in ponding within 2 weeks. There was about 2" of ponding 6 mo. later. Dry in July, 94.	No further backup into home.
8	Trench	Ponding with breakout on lawn for about 6-8 months.	Symptoms disappear with ponding in vent tube.	There could be ponding in trench as vent tube doesn't extend to base.

Table 3. Continued

9	Bed	Ponding in vent tube to about 6" of ground surface.	No ponding shortly after installation but ponded during Spring 93 due to high water table, basement sump and wet spring. No ponding in Spring 94. Dry in July, 94 but some gound water in 3 of 4 wells.	Installed observation tubes to bottom of system. Basement svmp pumped into system until Summer 93. Spring 94 drier but water table did rise into wells which were installed around system. Water table recedes in summer.
10	Bed	Ponding with effluent surfacing on lawn.	No surfacing but ponded in Spring due to high water table. Vent tube dry in July, 94.	Spot, where previously surfaced, spongy in Spring but dry rest of year.
11	Trench	Ponding with breakout through distribution box for one year.	Ponding continued in trenches for several years. (Fig. 2).	Trenchers are probably undersized for home. System no longer in service as of Sept. 94.
12	Bed	Ponding with breakout for 3 years. with spetic tank pumped quarterly.	Observation tubes indicate 6-8 in. ponding from Dec.-April and 2-4 in. for May-Nov. There was 4-6 in. of ponding in July, 94.	Soil added to breakout point as low. No more break out.
13	Bed	Ponding with septic tank pumped frequently. Effluent standing in distribution box which sits in aggregate of bed.	No ponding in distribution box as of Spring 94. In July 94, effluent just below aggregate surface.	System accepting all effluent with no septic tank pumping.
14	Bed	Ponding with periodic bleeding through retaining wall at end of system.	System continues to need periodic pumping with 15 in. of pond and no bleeding to surface as of July, 1994.	Problems in getting aerobic unit started. Aerobic unit & bed continue to need pumping every 3-4 mo as of Aug. 95.
15	Drywell	Ponding with periodic breakout to lawn for several years.	Ponding continued with occasional pumping until large family moved. No further pumping required with only one person.	Drywell vastly undersized for amount of effluent added. System no longer in service as of July 92.

Table 3. Continued

16	Bed	15" ponding in vent tube occassional surfacing on lawn.	Vent tube dry as of 3-15-95 <1" in vent in Aug. 95[b].	-
17	Bed	23" ponding in observation tube with 4" sludge in bottom of tube. Surfacing on lawn occasionally and back up in basement.	Ponding remaings at ≈20-27", sludge gone, no surfacing or back up.	Effluent in observation tube is relatively clear with little odor. Partially pumped once since installation.
18	Mound	Mound ponded, seeping at top for 2-3 years.	No seeping immediately after installation. In August 95, trace in one observation tube and 1-2" sludge in other tube.	-
19	Bed	Back up in house on peak flows before installation. 6" of sludge in vent tube.	As of 3-15-95, vent tubes dry and verified in August 95.	-
20	In-ground pressure	Effluent surfacing. 10-21" ponding in vent tube.	Ponding remains & may surface occasionally. As of Aug. 95, ponding ranged from 7-27" in 3 observation Tube. System undersized.	Renters of duplex use a lot of water and have not changed habits. System partially pumped 5 times between Dec. & Aug. Water in tube relatively clear with little odor.
21	In-ground pressure	Ponding & recycling to pump chamber 10" ponding in observation tubes for about year.	Tubes dry in March & August 95.	-
22	Bed	Water in basement after heavy use & rains.	No back up but 12" ponding in observation tubes in Aug. 95.	Reduced water use for 2 years prior to installation. Effluent somewhat clear & less odorous than septic tank effluent.

[a]Authors visited all but Site 3 in June and July 1994 to verify performance of sites 1-15 and visited Sites 16-22 in Aug. 1995. Other data is result of interviews of owners and contractors.

Construction Details

All soil absorption units, except two (Site 2 and 3) were pumped prior to the system coming on line after the new pretreatment unit was installed (Table 4). This allowed the system to start its renovation process by allowing aearated effluent to reach the infiltration surface immediately and provided some storage capacity in the aggregate. Table 4 gives a summary on how the effluent was removed from the soil absorption unit. Effluent was drained from five systems with a cut into the side of the unit, allowing the effluent to drain

Table 4: Effluent removal from the soil absorption unit.

Site	Pumped	Description
1	Yes	Mound with 2 observation tubes*, pumped through tubes
2	No	Mound
3	No	In-ground bed
4	Yes	In-ground bed, cut into side
5	Yes	In-ground bed, pumped into observation tubes
6	Yes	Drywell, pumped it
7	Yes	In-ground trench, cut into side
8	Yes	In-ground trench, cut into side
9	Yes	In-ground trench, cut into side
10	Yes	In-ground bed, pump from distribution box, accidently cut into side of bed during installation of aerobic unit.
11	Yes	In-ground trench, pump from distribution box
12	Yes	In-ground bed, cut into side
13	Yes	In-ground bed, pumped from the distribution box
14	Yes	In-ground bed, cut into header pipe
15	Yes	Pumped dry well
16	Yes	Pumped vent tube
17	Yes	Pumped obervation tube
18	Yes	2 observation tube
19	Yes	Two vent tubes
20	Yes	3 observation tubes
21	Yes	2 observation tubes
22	Yes	1 observation tube

*Observation tubes extend to soil infiltrative surface and vent tubes extent to the 4" laterals, which are from 6"-12" above the infiltrative surface. Thus, if liquid is not present in the vent tube, there may still be ponding in the aggregate.

from the aggregate. The drywell units were pumped out. All others were pumped from the distribution box, vent tubes or observation tubes. The degree of removal of effluent varied from site to site. In some systems most of the effluent was removed while in others only a portion was removed.

Long Term Monitoring

Sites 4 and 11 were closely monitored for several years to evaluate response to aerobically treated effluent. Site 4 has two vent tubes with effluent entering the center of the bed. Both vent tubes, which extended to the distribution pipe and not the bottom of the bed, exhibited ponding prior to the installation of the aerobic unit with effluent backing up into the home. The bottom of the vent tubes are not at the same elevation thus inferring that the bottom of the bed is not level but slopes. After the system was pumped and the aerobic unit installed (Day Zero) only one vent tube exhibited ponding. Liquid levels are shown in Fig. 1. The liquid level fluctuated between 20 and 38 cm (8-15 in.) for about 1,000 days and then started to drop. The times the vent tube was dry coincided with the owners being on vacation. The system has accepted all of the wastewater since installation of the aerobic unit. In July 1995, about 1,850 days after startup, the effluent depth was about 10 cm (4 in.) (not shown on figure).

Figure 2 shows the ponding depth with time for Site 11. Effluent was flowing out of the distribution box for about a year before the aerobic unit was installed at Day Zero. However, for a few months prior to Day Zero, the septic tank was pumped for several weeks to measure ponding response through the observation tubes extending to the aggregate/soil interface. There was a decrease in ponding level prior to Day Zero when no effluent was entering the system. Immediately after the aerobic unit was installed, the ponding level rose with a gradual

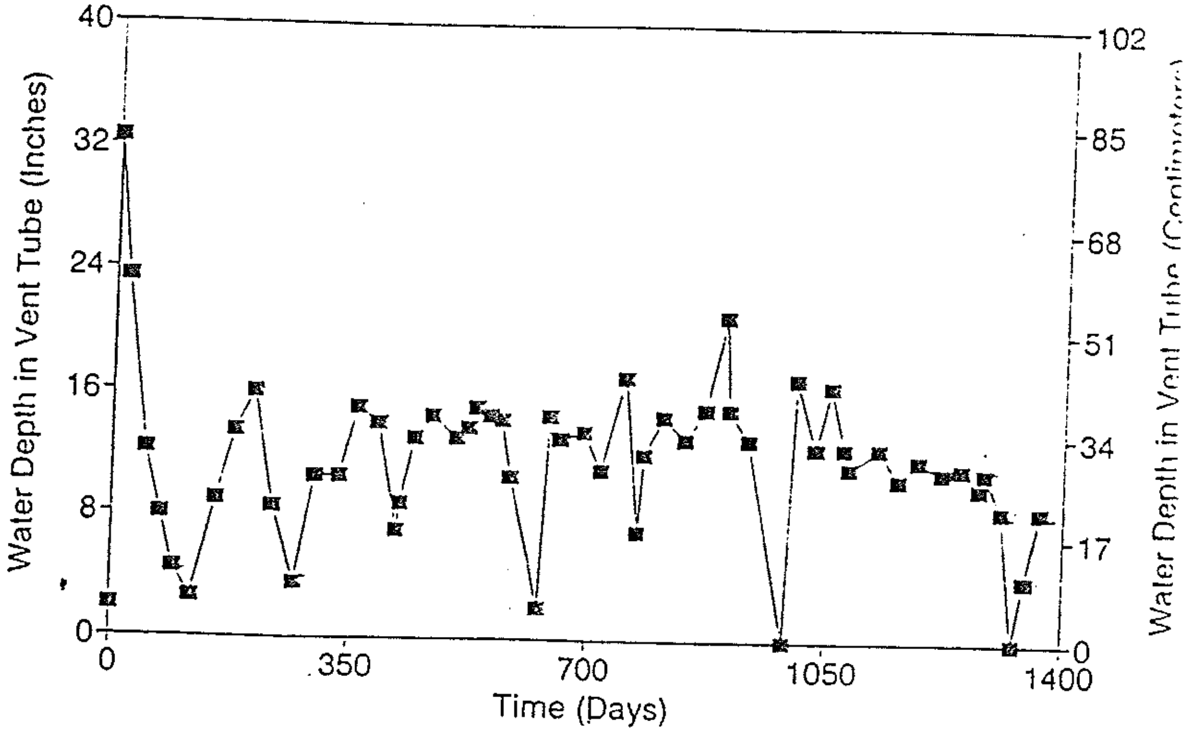

Figure 1. Ponding Depths in Soil Absortion Bed with Time for Site 4. Depth Zero Represents the Invert of the Distribution Pipe, not the Bottom of the System.

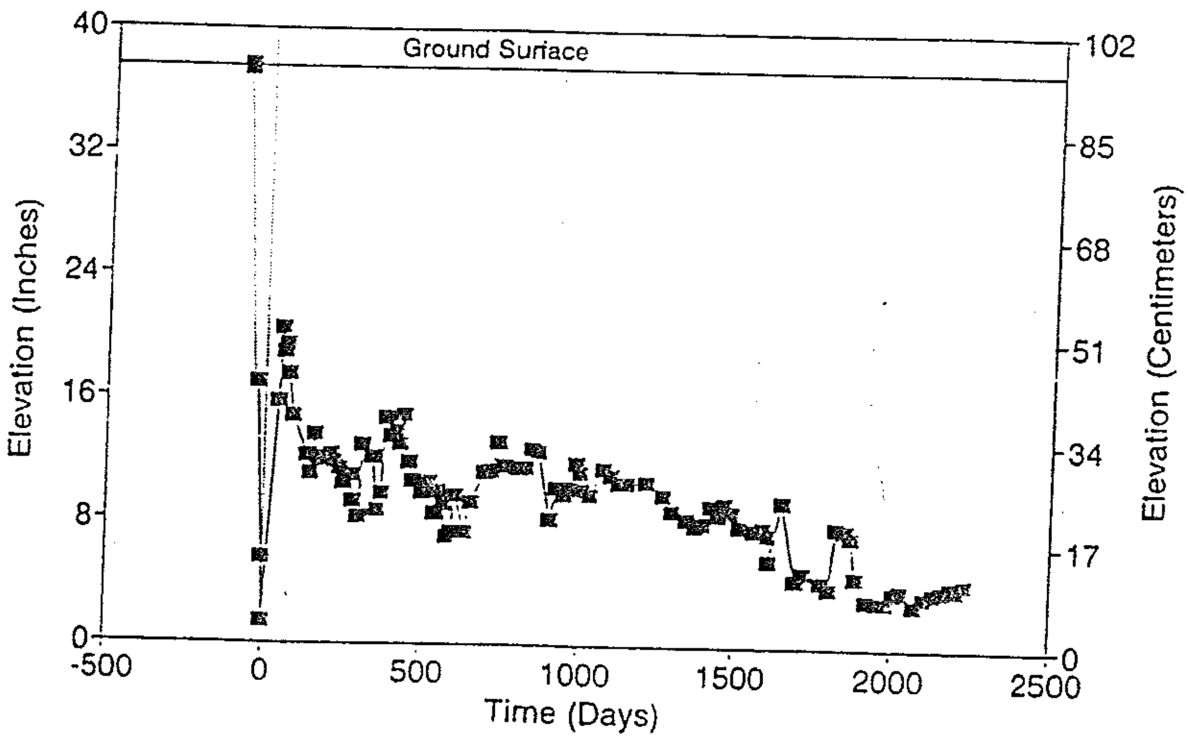

Figure 2. Ponding Depths in Soil Absorption Bed with Time for Site 11 to Bottom of System.

decrease over 2000 days, around which time one or more of the observation tubes were reported dry. These measurements are the average of four observation tubes with two per trench served by a common distribution box. Although the size of the system is not known, it is believed to be undersized for the home and the soil conditions. Had the soil absorption system been sized, according to current standards, it is believed that the liquid level would have dropped much faster than observed (Table 3). The system accepted all of the wastewater after the aerobic unit was installed.

SUMMARY AND CONCLUSIONS

This study evaluated the concept of adding aerobically treated effluent with low BOD and suspended solids from aerobic units in an attempt to renovate the failing soil absorption unit. Fifteen units were evaluated in 1994 with a reevaluation in 1995 and seven additional systems were evaluated in 1995. The only alteration of systems was the installation of the aerobic unit and pumping of the soil absorption unit in all but two of the systems. In the 1994 study, 13 of the 15 systems accepted all of the wastewater added after installation of the aerobic unit. The dry well on one system was vastly undersized and needed occasional pumping. Another system needed occasional pumping for only six months at which time it started to accept all of the wastewater. The soil absorption unit/ aerobic unit at another site continues to need pumping every 3-4 months. In the 1995 follow up of the 15 systems, all systems but one appear to be accepting the effluent. Two systems were removed for other reasons.

Five of the seven new systems put on line in 1995 appear to be accepting all of the effluent with two still severely ponded and in need of occasional pumping. The effluent in the observation tubes is of aerobic effluent quality instead of septic tank effluent quality. Some have had the aerobic unit installed less than six months.

Taking into account these limitations, it appears failing soil absorption system can be successfully renovated by adding aerobically pretreated effluent. As a result of this study, the State of Wisconsin is allowing systems that are failing, due to biological clogging mat development, to be renovated using aerobically treated effluent from aerobic units or sand filters provided the site meets separation requirements between the aggregate/soil interface and limiting conditions of high water table or bedrock.

REFERENCES

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4. Mickelson, M., J.C. Converse, and E.J. Tyler. 1989. Hydrogen peroxide renovation of clogged wastewater soil absorption systems in sands. Trans. of ASAE, 32(5): 1662-1668.

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SeptiTech®

Zero Pollution Waste Water Systems

June 2, 1999

JUN 1999
Received
Div. of H...
Engine...

Mr. James Jacobson
Waste Water Manager
Division of Health Engineering
Dept. of Human Services
State House Station 10
Augusta, Maine 04333-0010

Dear Jim,

A quick note to confirm our plans for June.

On June 9th I will meet you at your office and you and Linda and I will drive to Gray. From Gray we will visit several SeptiTech sites, inland and along the coast. Jim Gray and Roland Mayo will be with us as well. Since there will only be the three of us from Augusta I would rather take my Saab (which is air conditioned) than a state car (which, as I remember, will not be) to make the trip. That way we will have a place to recover from the heat if it is one of those 90° days. By the way, there are, as of today, 6 year-round units and 8 seasonal ones in place, of which you will see 5, three seasonal (two as yet unfinished) and two year-round, which should give you a broad view of the units in place.

Concerning the second meeting in June, the one with Clough, we have agreed that it will take place on June 30 at 10:00 AM in Clough's office. I think it may take as much as an hour or an hour and a half and we might want to continue over lunch.

During that meeting we hope to meet the terms of condition 6 of the approval, to wit:

> "6. A twenty four month monitoring program designed to document effluent characteristics using a representative sample of SeptiTech Model 400 installations and designated Attachment A to this protocol will be implemented by SeptiTech. The purpose of the monitoring program will be to evaluate the performance of the SeptiTech Model 400 installations."

Since the approval does not specify either the format or the date a report is to be submitted we decided to gather data for a year and then write the report rather than submit it piecemeal over the months. I think you will be impressed with the results.

Please give me a ring if you want to alter the schedule or content of these meetings. If I don't hear from you I will assume we will meet as noted.

Sincerely,

John Bastey

Vice President

220 Lewiston Road, Gray, Maine 04039 • Business: 207-657-5252 • Fax: 207-657-5246 • E-Mail: info@SeptiTech.com • Internet: www.SeptiTech.com

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

July 6, 1999

SeptiTech
Attn.: James Gray President
220 Lewiston Road
Gray, Maine 04039

Subject: Approval for General Use, SeptiTech System

Dear Mr. Gray:

This letter confirms the meeting between you, John Bastey, and I on June 30, 1999. At that meeting you presented the results of monitoring for various SeptiTech systems installed pursuant to the Division's December 24, 1997 experimental system approval under provisions of Section 1801 of the 1997 Subsurface Wastewater Disposal Rules (Rules).

These data demonstrate that the SeptiTech treatment units routinely achieve BOD^5 and TSS reductions to single digit levels, both in the high 90's percent range of reduction. The units also achieve E. Coli reductions in excess of 99 percent.

Therefore, the Division approves SeptiTech systems for general use under the Rules, and hereby removes SeptiTech systems from experimental status with the following conditions for individual system installations:

1. A minimum separation distance of 12 inches shall be maintained between the seasonal high groundwater table or other limiting factor, and the lowest elevation of the system's disposal area;

2. A minimum separation distance of 12 inches shall be maintained between bedrock and the lowest elevation of the system's disposal area;

3. Stone trenches are allowed a 75 percent reduction in size, based upon the standard sizing requirements of the Rules;

4. Proprietary devices such as plastic chambers and gravel-less trenches are allowed a 50 percent reduction in size, based upon the standard sizing requirements of the Rules, absent prohibitions by manufacturers;

5. Eljen In-drains may be used with SeptiTech systems, but with no reduction in size; and

6. Maintenance agreement contracts shall be standard with all system installations. Terms and duration of the contracts shall be in accordance with SeptiTech's company policies.

Because installation and maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of this system. Further, the Division strongly recommends that property owners enter into long term maintenance contracts with SeptiTech, in accordance with SeptiTech's company policies.

Please feel free to copy and distribute this letter as necessary. If you have any questions, please feel free to contact me.

Sincerely,

James A. Jacobsen

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: File

FILE COPY

SeptiTech®
Zero Pollution Waste Water Systems

JUN 1999
Received
Div. of Health
Engineering

June 15, 1999

Mr. James A. Jacobsen
Department of Human Services
Division of Health Engineering
10 State House Station
Augusta, Maine 04333

RE: Systems for New Construction

Dear Mr. Jacobsen:

SeptiTech systems have been operating in Maine now for over a year and we have had no problems with any one. We at SeptiTech are highly committed to system reliability and customer satisfaction and we will continue to maintain our products at exemplary levels.

I am enclosing a packet of test results for your files.

With this in mind, I would like to request that the State relax the rule requiring the design of a back up conventional system for new construction and change this to allow consideration on a case by case basis if mitigating circumstances exist.

Sincerely,

James R. Gray

Enc.

220 Lewiston Road, Gray, Maine 04039 • Business: 207-657-5252 • Fax: 207-657-5246 • E-Mail: info@SeptiTech.com • Internet: www.SeptiTech.com

Results of Phase I, Phase II and Research and Development tests of the SeptiTech Waste Water Processing System

Updated on June 16, 1999

SeptiTech, Inc.
220 Lewiston Rd.
Gray, Maine 04039
Telephone: 207-657-5252 Fax: 207-657-5246
E-Mail: Infor@SeptiTech.com

Test Results from SeptiTech Installations in Maine

SeptiTech tests its systems according to Phase I and Phase II of the DHE approval protocol as well as additional tests for research and development. The following is a compilation all the Five Day Biological Oxygen Demand (BOD5), Total Suspended Solids (TSS), Oil and Grease and E. Coli tests run using SeptiTech technology. The results are complete and include tests from the initial pilot tests (noted as Home, Lab and Pilot Systems) to current tests done under Phase I and II of the the DHE approval issued on 5/12/98. **UPDATED: 6/16/99**

Cole Farms Restaurant: Pilot system

Date		BOD5	TSS	Oil/Grease
8/8/97	Input	507	97	65
	Output	21	23	8
	% Removal	95.86%	76.29%	87.69%
8/18/97	Input	727	148	
	Output	36	34	
	% Removal	95.05%	77.03%	
8/29/97	Input	783	114	
	Output	21	19	
	% Removal	97.32%	83.33%	
9/5/97	Input	690	130	
	Output	11	12	
	% Removal	98.41%	90.77%	
9/15/97	Input	*	*	72
	Output	*	*	5
	% Removal	*	*	93.06%
Average Treatment Levels:		**22.25**	**22**	**6.5**

SeptiTech Lab: Uses 150 G/D of wastewater from a 40 unit mobile home park diverted through a SeptiTech system. Input to the system is uniform because it comes from two large common septic tanks.

Date		BOD5	TSS
11/15/96	Input	197	73
	Output	15	10
	% removal	92.39%	86.30%
8/18/97	Input	197	73
	Output	4	4
	% Removal	97.97%	94.52%
2/28/98	Input	197	73
	Output	4	6
	% removal	97.97%	91.78%
3/26/98	Input	197	73
	Output	4	4
	% removal	97.97%	94.52%
Average treatment levels:		**6.75**	**6**

Test Home: **Test unit, single mobile home separated from the mobile home park flow.**

Date		BOD5	TSS
8/18/97	Input	190	120
	Output	4	4
	% removal	97.89%	96.67%
Average treatment levels:		**4**	**4**

Lyons Home: **Installation of SeptiTech allowed removal of a holding tank from this 3 bedroom home.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
6/26/98	Output	10	9
	% Removal	95.92%	96.33%
EPA Avg.	Input	245	245
8/12/98	Output	8	11
	% Removal	96.73%	95.51%
EPA Avg.	Input	245	245
8/13/98	Output	4	8
	% Removal	98.37%	96.73%
EPA Avg.	Input	245	245
9/3/98	Output	7	7.2
	% Removal	97.14%	97.06%

Note: **1.** System inop due to flooding by heavy rainstorm, corrected.
2. Owner adding blue toilet tablets containing Nitrogen compounds.

EPA Avg.	Input	245	245
11/19/98	Output	8	4
		96.73%	98.37%
EPA Avg.	Input	245	245
5/19/99	Output	10	7
	% Removal	95.92%	97.14%
Average treatment levels:		**7.83**	**7.70**

Note: Complete retrofit with new venturi air distribution system 6/1/99.

Westerman: Seasonal lakeside camp with failed cess pool.

Date		BOD5	TSS
EPA Avg.	Input	245	245
8/7/98	Output	8	3
	% Removal	96.73%	98.78%
EPA Avg.	Input	245	245
9/3/98	Output	15	3.7
	% Removal	93.88%	98.49%
Average Treatment Levels:		**11.50**	**3.35**

Note: Fan inoperative for part of September due to deactivation of power supply by owner.

Jones: Using SeptiTech removed an Over Board Discharge opening clam flats below this three bedroom home.

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input	245	245	
8/19/98	Output	36	16	
	% Removal	85.31%	93.47%	
EPA Avg.	Input,	245	245	1000000
12/8/98	Output	3	7	11
	% Removal	98.78%	97.14%	99.999%
EPA Avg.	Input	245	245	1000000
1/29/99	Output	11	8.5	13
	% Removal	95.51%	96.53%	99.999%
EPA Avg.	Input	245	245	1000000
3/20/99	Output	5	3	3
	% Removal	97.96%	98.78%	99.9997%
EPA Avg.	Input	245	245	1000000
3/18/99	Output	5	3	3
	% Removal	97.96%	98.78%	99.9997%
EPA Avg.	Input	245	245	1000000
4/21/99	Output	6	1	1
	% Removal	97.55%	99.59%	99.99995%
Averages		**6.20**	**4.70**	**6**

Note: 1. Installation error by contractor noted at maintenance check causing Processor to pump itself dry. Septic tank replacement cured problem.
2. Complete retrofit with new venturi air distribution system 6/8/99.

Cole: **McMahan Island, Brackish water system installed in basement of 5 bedroom seasonal island home.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
8/19/98	Output	20	21
	% Removal	91.84%	91.43%

Note: System tested after a weekend when 17 friends and relavies had visited the island.

Vinalhaven School: **Located on Vinalhaven Island, this 2,500 G/D installation allows opening of a closed clam flat.**

Date		BOD5	TSS
10/21/98	Input	270	185
10/14/98	Output	16	3.5
	% removal	94.07%	98%
10/21/98	Input	270	185
10/21/98	Output	22	2.5
	% removal	91.85%	99%
10/21/98	Input	270	185
11/23/98	Output	9	7
	% removal	96.67%	96.22%
2/9/99	Input	270	185
	Output	3	5
	% removal	98.89%	97.30%
Average Treatment Level:		**12.5**	**4.5**

Note: Samples were taken at end of school year on 6/14/99. Results of the tests had not been processed as of drafting date of this report. Unit was clean and samples were odorless and appeared clear.

Arnold: **A single home unit in Boothbay Harbor, the Arnold system contains a unique denitrification loop as well as a the first venturi aeration system. The old chamber system was left in place and a second leachfield is installed, alongside. The distribution box to the field allows flow to be shifted to eithr the new or the old field.**

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input,	245	245	1000000
12/30/98	Output	9	5	300
	% removal	96.33%	97.96%	99.97%

Note: The first sample was drawn about 2 weeks after system startup and too little time had passed for the formation of bacteriophages in system.

EPA Avg.	Input,	245	245	1000000
2/5/99	Output	6	5	10
	% removal	97.55%	97.96%	99.999%
Actual	Input,	270	30	1000000
3/18/99	Output	8	2	1
	% removal	97.04%	93.33%	99.99988%
Actual	Input,	270	30	1000000
4/21/99	Output	9	3	90
	% removal	96.67%	90.00%	99.99%
Actual	Input,	270	30	1000000
5/19/99	Output	7	4	6
	% removal	97.41%	85.67%	99.99941%
Average Treatment Level:		**7.80**	**3.86**	**26.79%**

Soucy: **A single family home in Biddeford with a fan driven aerobic system. Average daily flow past limit of 400 g/d consistently. Neighborhood teens play pool there at night.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
12/23/98	Output	18	13
	% Removal	93%	95%
EPA Avg.	Input	245	245
1/29/99	Output	20	14
	% Removal	92%	94%
EPA Avg.	Input	245	245
3/17/99	Output	23	52
	% Removal	91%	79%
EPA Avg.	Input	245	245
4/21/99	Output	27	20
	% Removal	89%	92%
EPA Avg.	Input	245	245
5/19/99	Output	18	17
	% Removal	93%	93%
Average Treatment Level:		**21**	**23**

Cheek: **A single family home in Tenants Harbor**

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input	245	245	1000000
3/20/99	Output	3	2	0.09
	% Removal	98.78%	99.18%	99.99999%
EPA Avg.	Input	245	245	1000000
4/21/99	Output	31	7	0.35
	% Removal	87.35%	97.14%	99.99997%
EPA Avg.	Input	245	245	1000000
5/19/99	Output	4	3.7	0.43
	% Removal	98.37%	98.49%	99.99996%
Average Treatment Level:		**12.67**	**4.23**	**0.29**

Note: Lightning strike in early May required removal and replacement of the controller. As a result of this experience all units are now equiped with surge protectors.

SeptiTech, Inc.

Test Results from SeptiTech Installations in Maine

SeptiTech tests its systems according to Phase I and Phase II of the DHE approval protocol as well as additional tests for research and development. The following is a compilation all the Five Day Biological Oxygen Demand (BOD5), Total Suspended Solids (TSS), Oil and Grease and E. Coli tests run using SeptiTech technology. The results are complete and include tests from the initial pilot tests (noted as Home, Lab and Pilot Systems) to current tests done under Phase I and II of the the DHE approval issued on 5/12/98. **UPDATED: 6/16/99**

Cole Farms Restaurant: Pilot system

Date		BOD5	TSS	Oil/Grease
8/8/97	**Input**	507	97	65
	Output	21	23	8
	% Removal	95.86%	76.29%	87.69%
8/18/97	**Input**	727	148	
	Output	36	34	
	% Removal	95.05%	77.03%	
8/29/97	**Input**	783	114	
	Output	21	19	
	% Removal	97.32%	83.33%	
9/5/97	**Input**	690	130	
	Output	11	12	
	% Removal	98.41%	90.77%	
9/15/97	**Input**	*	*	72
	Output	*	*	5
	% Removal	*	*	93.06%
Average Treatment Levels:		**22.25**	**22**	**6.5**

SeptiTech Lab: Uses 150 G/D of wastewater from a 40 unit mobile home park diverted through a SeptiTech system. Input to the system is uniform because it comes from two large common septic tanks.

Date		BOD5	TSS
11/15/96	Input	197	73
	Output	15	10
	% removal	92.39%	86.30%
8/18/97	Input	197	73
	Output	4	4
	% Removal	97.97%	94.52%
2/28/98	Input	197	73
	Output	4	6
	% removal	97.97%	91.78%
3/26/98	Input	197	73
	Output	4	4
	% removal	97.97%	94.52%
Average treatment levels:		**6.75**	**6**

SeptiTech, Inc.

Test Home: **Test unit, single mobile home separated from the mobile home park flow.**

Date		BOD5	TSS
8/18/97	Input	190	120
	Output	4	4
	% removal	97.89%	96.67%
Average treatment levels:		**4**	**4**

Lyons Home: **Installation of SeptiTech allowed removal of a holding tank from this 3 bedroom home.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
6/26/98	Output	10	9
	% Removal	95.92%	96.33%
EPA Avg.	Input	245	245
8/12/98	Output	8	11
	% Removal	96.73%	95.51%
EPA Avg.	Input	245	245
8/13/98	Output	4	8
	% Removal	98.37%	96.73%
EPA Avg.	Input	245	245
9/3/98	Output	7	7.2
	% Removal	97.14%	97.06%

Note: 1. System inop due to flooding by heavy rainstorm, corrected.
2. Owner adding blue toilet tablets containing Nitrogen compounds.

EPA Avg.	Input	245	245
11/19/98	Output	8	4
		96.73%	98.37%
EPA Avg.	Input	245	245
5/19/99	Output	10	7
	% Removal	95.92%	97.14%
Average treatment levels:		**7.83**	**7.70**

Note: Complete retrofit with new venturi air distribution system 6/1/99.

Westerman: Seasonal lakeside camp with failed cess pool.

Date		BOD5	TSS
EPA Avg.	Input	245	245
8/7/98	Output	8	3
	% Removal	96.73%	98.78%
EPA Avg.	Input	245	245
9/3/98	Output	15	3.7
	% Removal	93.88%	98.49%
Average Treatment Levels:		**11.50**	**3.35**

Note: Fan inoperative for part of September due to deactivation of power supply by owner.

Jones: Using SeptiTech removed an Over Board Discharge opening clam flats below this three bedroom home.

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input	245	245	
8/19/98	Output	36	16	
	% Removal	85.31%	93.47%	
EPA Avg.	Input,	245	245	1000000
12/8/98	Output	3	7	11
	% Removal	98.78%	97.14%	99.999%
EPA Avg.	Input	245	245	1000000
1/29/99	Output	11	8.5	13
	% Removal	95.51%	96.53%	99.999%
EPA Avg.	Input	245	245	1000000
3/20/99	Output	5	3	3
	% Removal	97.96%	98.78%	99.9997%
EPA Avg.	Input	245	245	1000000
3/18/99	Output	5	3	3
	% Removal	97.96%	98.78%	99.9997%
EPA Avg.	Input	245	245	1000000
4/21/99	Output	6	1	1
	% Removal	97.55%	99.59%	99.99995%
Averages		**6.20**	**4.70**	**6**

Note: 1. Installation error by contractor noted at maintenance check causing Processor to pump itself dry. Septic tank replacement cured problem.

2. Complete retrofit with new venturi air distribution system 6/8/99.

Cole: **McMahan Island, Brackish water system installed in basement of 5 bedroom seasonal island home.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
8/19/98	Output	20	21
	% Removal	91.84%	91.43%

Note: System tested after a weekend when 17 friends and relavies had visited the island.

Vinalhaven School: **Located on Vinalhaven Island, this 2,500 G/D installation allows opening of a closed clam flat.**

Date		BOD5	TSS
10/21/98	Input	270	185
10/14/98	Output	16	3.5
	% removal	94.07%	98%
10/21/98	Input	270	185
10/21/98	Output	22	2.5
	% removal	91.85%	99%
10/21/98	Input	270	185
11/23/98	Output	9	7
	% removal	96.67%	96.22%
2/9/99	Input	270	185
	Output	3	5
	% removal	98.89%	97.30%
Average Treatment Level:		**12.5**	**4.5**

Note: Samples were taken at end of school year on 6/14/99. Results of the tests had not been processed as of drafting date of this report. Unit was clean and samples were odorless and appeared clear.

Arnold: **A single home unit in Boothbay Harbor, the Arnold system contains a unique denitrification loop as well as a the first venturi aeration system. The old chamber system was left in place and a second leachfield is installed, alongside. The distribution box to the field allows flow to be shifted to eithr the new or the old field.**

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input,	245	245	1000000
12/30/98	Output	9	5	300
	% removal	96.33%	97.96%	99.97%

Note: The first sample was drawn about 2 weeks after system startup and too little time had passed for the formation of bacteriophages in system.

EPA Avg.	Input,	245	245	1000000
2/5/99	Output	6	5	10
	% removal	97.55%	97.96%	99.999%
Actual	Input,	270	30	1000000
3/18/99	Output	8	2	1
	% removal	97.04%	93.33%	99.99988%
Actual	Input,	270	30	1000000
4/21/99	Output	9	3	90
	% removal	96.67%	90.00%	99.99%
Actual	Input,	270	30	1000000
5/19/99	Output	7	4	6
	% removal	97.41%	85.67%	99.99941%
Average Treatment Level:		**7.80**	**3.86**	**26.79%**

SeptiTech, Inc.

Soucy: **A single family home in Biddeford with a fan driven aerobic system. Average daily flow past limit of 400 g/d consistently. Neighborhood teens play pool there at night.**

Date		BOD5	TSS
EPA Avg.	Input	245	245
12/23/98	Output	18	13
	% Removal	93%	95%
EPA Avg.	Input	245	245
1/29/99	Output	20	14
	% Removal	92%	94%
EPA Avg.	Input	245	245
3/17/99	Output	23	52
	% Removal	91%	79%
EPA Avg.	Input	245	245
4/21/99	Output	27	20
	% Removal	89%	92%
EPA Avg.	Input	245	245
5/19/99	Output	18	17
	% Removal	93%	93%
Average Treatment Level:		**21**	**23**

Cheek: **A single family home in Tenants Harbor**

Date		BOD5	TSS	E. Coli/ml
EPA Avg.	Input	245	245	1000000
3/20/99	Output	3	2	0.09
	% Removal	98.78%	99.18%	99.99999%
EPA Avg.	Input	245	245	1000000
4/21/99	Output lightning	31	7	0.35
	% Removal	87.35%	97.14%	99.99997%
EPA Avg.	Input	245	245	1000000
5/19/99	Output	4	3.7	0.43
	% Removal	98.37%	98.49%	99.99996%
Average Treatment Level:		**12.67**	**4.23**	**0.29**

Note: Lightning strike in early May required removal and replacement of the controller. As a result of this experience all units are now equiped with surge protectors.

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

May 21, 1999

SeptiTech
Attn.: James R. Gray, President
2 Pennell Lane
Gray, Maine 04039

Subject: SeptiTech Wastewater Treatment System, Revised Proposal

Dear Mr. Gray:

The Division of Health Engineering has completed a review of your company's proposal to include proprietary effluent disposal devices in the overall SeptiTech experimental system approval. Pursuant to the SeptiTech Technical Supplement dated January 4, 1999 you propose that:

1. Stone trenches continue to be allowed a 75 percent reduction in size, based upon the standard sizing requirements of Table 700.1 of the Subsurface Wastewater Disposal Rules,
2. Proprietary devices such as plastic chambers and gravel-less trenches be allowed a 50 percent reduction in size, based upon the standard sizing requirements of Table 700.1, and
3. Eljen In-drains be allowed to be used with SeptiTech systems, but with no reduction in size.

The Division approves this revision with the conditions that (1) first time installations shall include a sufficient area of suitable soils for installation of a full sized disposal area in conformance with table 700.1 and (2) this approval shall not supersede any manufacturer's or distributor's installation or sizing recommendations for any proprietary device.

If you have any questions please feel free to contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: SeptiTech File

PRINTED ON RECYCLED PAPER

SeptiTech®
Zero Pollution Waste Water Systems

MAR 1999
Received

3/19/99

James A. Jacobsen, Program Manger
Division of Health Engineering
Wastewater & Plumbing Program
10 State House Station
Augusta, ME 04333-0010

Dear Jim:

It was nice talking with you this afternoon.

Please consider this letter a formal request to change the requirement for disposal fields from "trenches only" to "trenches or proprietary devices following the SeptiTech process."

The enclosed "Technical Supplement" was designed primarily by Dave Rocque and Al Frick and I propose to send it out to all soil scientists. I hope it explains what were we're proposing.

Essentially this "Technical Supplement" allows a soil scientist to design a system with proprietary devices but still allows adequate adsorptive surface and eliminates "double dipping" on size reductions.

We all realize that Holbrooks Wharf is a unique case and that the chambered field proposed is smaller than would ordinarily be calculated but I'm sure that's because that's all the room Al had.

Thanks. I'll call to get your reaction.

Sincerely,

James R. Gray

2 Pennell Lane, Gray, Maine 04039 • Business: 207-657-5252 • Fax: 207-657-4665 • E-Mail: zeropollut@aol.com

SEPTITECH TECHNICAL SUPPLEMENT

January 4, 1999
DISPOSAL AREA SIZING AND DESIGN CRITERIA
FOR THE STATE OF MAINE

The SeptiTech Treatment System is a highly refined adaption of biological trickling filter technologies. It purifies wastewaster to a high degree and is designed to be installed following a two compartment septic tank or two septic tanks in series.

DESIGN CRITERIA

The disposal field may be constructed of stone or proprietary devices provided that a trench (linear) configuration is used. The Minimum separation distance between trenches which dispose of SeptiTech Treated wastewater is two (2) feet, edge of trench to edge of trench. If proprietary devices are to be used six (6) inches of clean coarse sand or gravel is recommended on either side of the device unless the manufacturer of the device has a specific requirement for fill material to be used adjacent to the devices. In such cases, follow the manufacturers recommendations.

DISPOSAL AREA SIZING

Stone Trenches:

To determine the minimum square footage of a disposal area disposing of SeptiTech treated wastewater when using stone trenches use 25% of the Disposal Area Sizing factor from Table 700.1 in the Maine Subsurface Wastewater Disposal Rules (this reduction is based on the lower BOD5 and TSS of SeptiTech treated wastewater and is to be used in lieu of table 703.1 in the SSWWDR).

Other proprietary devices:

When using proprietary devices listed in Tables B-103.2, B-103.3 and B-104.2 (Bio-Diffuser, Infiltrator, EnviroChamber, Contractor, Geoflow and gravel-less cloth disposal tubing) use 50% of the Disposal Area Sizing factor from Table 700.1 in the Maine Subsurface Wastewater Disposal Rules. When using Eljin In-Drains use the full value in Table 700.1, without reduction.

To determine the length of trench or number of proprietary devices needed, refer to the following:

*For stone trenches with **8 inches** of stone.
2 feet wide - Each linear foot of trench is equivalent to 2 sq. ft. of disposal area.
3 feet wide - Each linear foot of trench is equivalent to 3 sq. ft. of disposal area.

*For stone trenches with **12 inches** of stone:
2 feet wide - Each linear foot of trench is equivalent to 3 sq. ft. of disposal area.
3 feet wide - Each linear foot of trench is equivalent to 4 sq. ft. of disposal area.

*For proprietary devices:
As per Appendix B of the Subsurface Wastewater Disposal Rules.

If you have questions concerning this supplement please call or write SeptiTech at 207-657-5252, 2 Pennell Lane, Gray, Maine 04039; E-Mail: septitec@mint.net

EXAMPLES OF SIZING:

1. *Assume a three bedroom home on a 3C soil where stone trenches 12" deep are to be used.*

   From Table 700.1 in the SSWWDS a 3C soil has a Disposal Area Sizing Factor of 3.3. For a SeptiTech treated stone trench wastewater disposal field multiply 3.3 by 25% to obtain the appropriate factor, 0.825. (3.3 X .25 = 0.825)

   Calculation: Three bedrooms X 90 GPD = 270 GPD. 270 GPD X 0.825 factor = 223 sq. ft. of disposal area needed. This means that a minimum of 75 feet (233/3) of 2 ft. wide stone trench OR 56 ft. (223/4) of 3 ft. wide stone trench is needed.

2. *Assume a three bedroom home on a 3C soil where the higher capacity plastic chambers are to be used.*

   From Table 700.1 in the SSWWDS a 3C soil has a disposal area sizing factor of 3.3. For a SeptiTech treated waster water disposal field using chambers or other proprietary device multiply 3.3 by 50% to calculate the appropriate factor, 1.65 (3.3 X .5 = 1.65)

   Calculation: Three bedrooms X 90 GPD = 270 GPD. 270 GPD X 1.65 factor = 445.5 sq. ft. of disposal area needed. According to Table B-103.2 in Appendix B of the SSWWDS, each higher capacity plastic chamber is equivalent to 50 sq. ft. of disposal area. Therefore, 445.5/50 = 8.91, which is rounded up to 9 plastic chambers that are needed, at a minimum.

3. *Assume a four bedroom home on a profile 9 soil where stone trenches 12" deep will be used.*

   From Table 700.1 of the SSWWDS, a Profile 9 soil has a Disposal Area Sizing factor of 5.0. For SeptiTech treated wastewater disposed of in a stone trench, multiply 5.0 X 25% for a new factor of 1.25. (5.0 X .25 = 1.25)

   Calculation: Four bedrooms X 90 GPD = 360 GPD, 360 GPD X 1.25 = 450 sq. ft. of disposal area needed. To determine the length of 2' wide stone trench needed, divide 450 sq. ft. of disposal area by 3 sq. ft. /linear ft. = 150 ft. OR to determine the length of 3' wide stone trench needed, divide 450 by 4 sq. ft. = 112.5 ft.

4. *Same assumptions as for number 3, four bedrooms on a profile 9 soil except 10 inch Environ Septic gravel-less cloth fabric disposal tubing is to be used in trenches.*

   From Table 700.1 in the SSWWDS a profile 9 soil has a disposal area sizing factor of 5.0. For SeptiTech treated waste water using Environ-Septic gravel-less cloth tubing multiply 5 X 50% for a factor of 2.50.

   Calculation: Four bedrooms X 90 GPD = 360 GPD. 360 GPD X 2.5 = 900 sq. ft. of disposal area needed. According to Table B-104.3 of Appendix B in the SSWWDS, each linear foot of "Environ-Septic" is rated at 5 sq. ft. Of disposal area. Therefore, 900 sq. ft. of disposal area divided by 5 sq. ft./linear ft. Of "Environ-Septic" = 180 linear feet of trench needed.

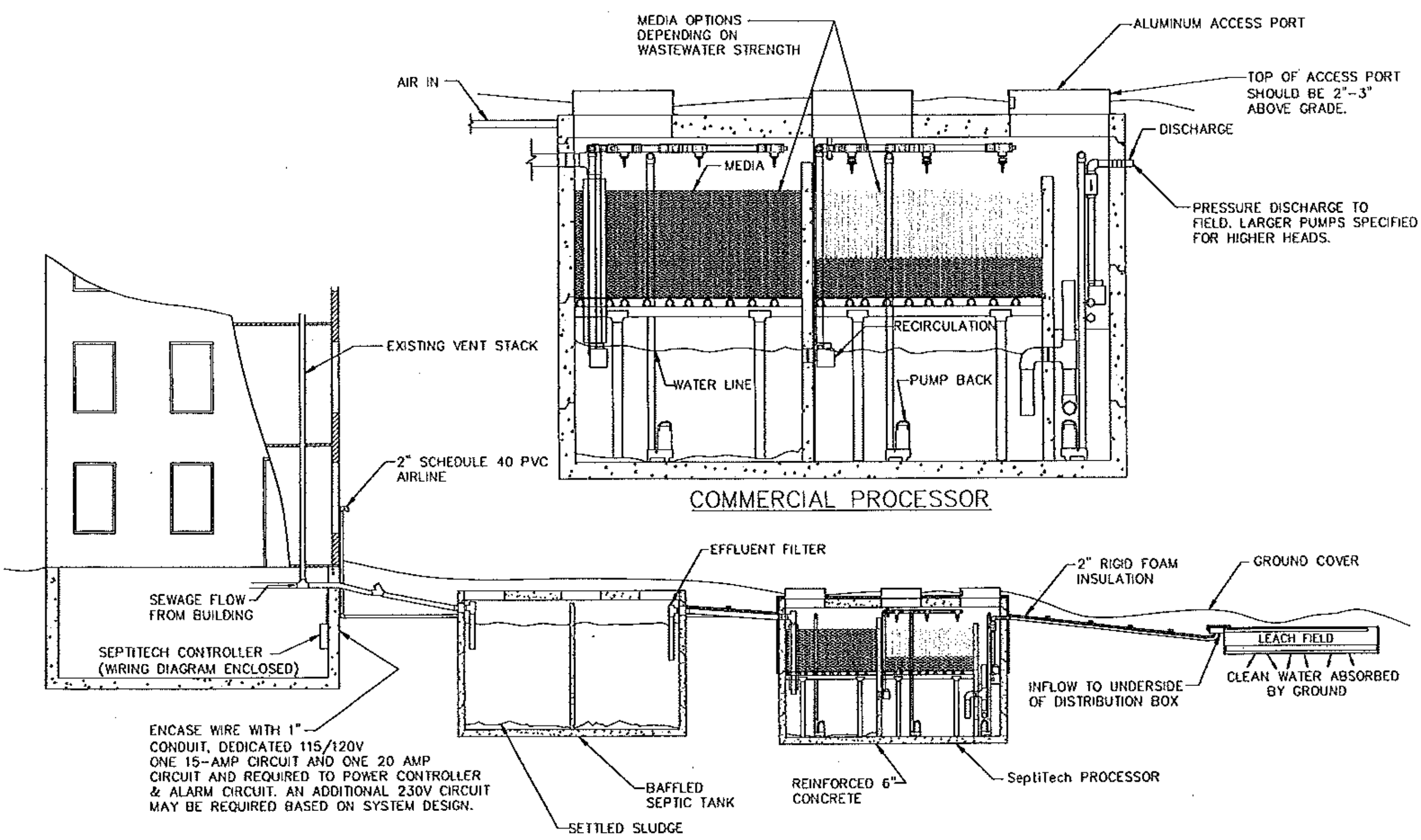
Technical Specification Sheet

SeptiTech Commercial Models (7/25/01)

SeptiTech Commercial Models M1200, M1500 & M3000

Model	Treatment Capacity	Concrete Tank Volume	Number Access Ports	Tank Dimension	Tank Material	Inlet Invert	Discharge Head (Standard)[1]
M1200	1200-gpd	2000-gallons	2 (30" x 48" x 6")	10'-6" (l) x 6'-4" (w) x 6'-2" (h)	Reinforced Concrete	4' 11-3/16"	14-feet
M1500	1500-gpd	3800-gallons	2 (30" x 48" x 6")	13' (l) x 7' (w) x 8' (h)	Reinforced Concrete	6' 7"	14-feet
M3000	3000-gpd	7000-gallons	3 (36" x 60" x 8")	17' (l) x 8' (w) x 10'-9" (h)	Reinforced Concrete	8' 11-3/4"	14-feet

[1] Higher head pump available upon request



Technical Specification Sheet

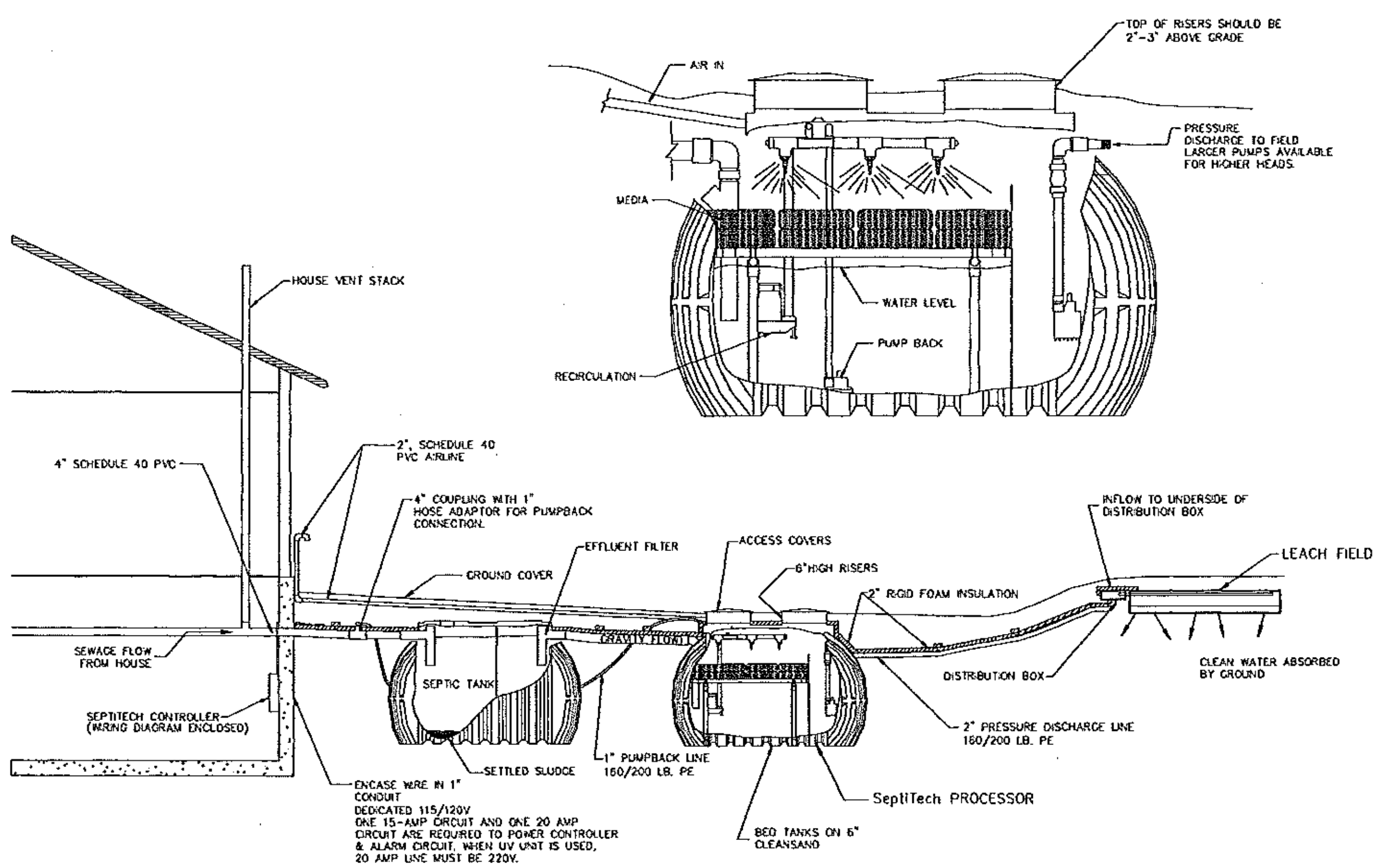
SeptiTech Residential Models (7/01)

SeptiTech Residential Models M400, M550 & M750

Model	Treatment Capacity	Number Bedrooms	Tank Volume	Tank Dimension	Tank Material	Weight	Inlet Invert	Discharge Head (Standard)
M400 & M400UV	400 gpd	4	1000-gal.	8'-6" (l) x 5'-7" (w) x 5'-3" (h)	HDPE Plastic	450 lbs.	53"	14-feet
M550 & M550UV	550 gpd	6	1500-gal.	9'-5" (l) x 5'-9" (w) x 5'-11" (h)	HDPE Plastic	750 lbs.	57"	14-feet
M750 & M750UV	750 gpd	8	1500-gal. + 500-gal.	9'-5" (l) x 5'-9" (w) x 5'-11" (h) + 7'-6" (l) x 5'-2" (w) x 3'-7" (h)	HDPE Plastic	800 lbs. + 200 lbs	57"	14-feet

Recommended Septic Tanks

Tank Volume	Baffle	Effluent Filter	Access Port Reinforcement Rings	Tank Dimension	Tank Material	Weight	Inlet Invert	Outlet Invert
1000-gallons	2-Chambered	Zabel or Equivalent	Stainless Steel	8'-6" (l) x 5'-7" (w) x 5'-3" (h)	HDPE Plastic	370 lbs.	51"	48"
1500-gallons	2-Chambered	Zabel or Equivalent	Stainless Steel	9'-5" (l) x 5'-9" (w) x 5'-11" (h)	HDPE Plastic	575 lbs.	60.5"	57.5"



SeptiTech, Inc. • 220 Lewiston Road • Gray, Maine 04039 • 207-657-5252 • NH Office: 603-659-0371

Author: James Jacobsen at dhe
Date: 5/14/99 8:45 AM
Normal
TO: septitec@mint.net at InternetSubject: Re[2]: septitech-------------------------------
---- Message Contents

John,

No negative judgement on you personally was intended. I apologize if it came across that way. I was adivising the Staff of Mr. Todd's complaint as related to us. The verbatim text of that e-mail is below.

The issue of a privilege being revoked isn't really an issue, since there was/is no special consideration for agent status here that isn't applied everywhere else. In fact, rather the opposite since SeptiTech is the only entity I'm aware of from whom we accepted a verbal assurance of agent status. That's why I singled out SeptiTech in my memo to the Staff about needing written authorization in the future.

If you folks want to be the owners' agent(s), that's fine. But it has to be in writing from now on.

Jim Jacobsen

****

Subject: Author: MD.TODJ@nwh.org at Internet
Date: 5/7/99 1:50 PM

Hello Linda!

I am the property owner of the new Setpitech (sic) system installed at Beach Loop Road, Bristol. Today, for the first time I see correspondence from you which has many dates on it including 10/23/98 and revisions 12/7, 4/99, and 5/4/99.

I do wish to be kept informed, since I am responsible. No copy of a Well Setback Release was enclosed.

I also am FORMALLY notifying you that I was NOT informed of any of the revisions made in the construction design since October 1998. All revisions were made WITHOUT my knowledge or consent. LEGALLY, I do NOT accept the revisions, because prior consent on my part is required by LAW and was not done.

Sincerely yours, James Todd e mail: md.todj@nwh.org

______________________________ Reply Separator ______________________________
Subject: Re: septitech
Author: septitec@mint.net at Internet
Date: 5/13/99 5:01 PM

5/13
Hi Jim,

Your memo of 5/12 to your staff seems somewhat negative where it concerns me. Have I caused a problem I didn't know about?

Since I don't have a copy of what Dr. Todd sent to you I don't know what he is saying. I would be interested in seeing his e-mail to you.

In closing, concerning my being his agent, I stand behind that, I think. If we are the prime contractor we should be the agent for the job. If we are not then someone else should be. In this case we were betwixt and between. Holmes had never done one but was the Prime. I am the guy Todd sends the bulk of his e-mail to. As we work with contractors we are training them to do the work so we don't need to be there. So, I am not sure I mind not being an agent, I guess, I am just confused by how your have phrased it. It leaves me with the uneasy feeling that I am being punished because I did something wrong and as punishment you are removing a priviledge. Is that the case?

-----Original Message-----
From: James Jacobsen <James.Jacobsen@state.me.us>
To: septitec@mint.net <septitec@mint.net>; Jay Hardcastle <Jay.Hardcastle@state.me.us>; Linda Robinson <Linda.Robinson@state.me.us>
Date: Tuesday, May 11, 1999 8:45 AM
Subject: septitech

>
> We've just gotten an e-mail from an irate owner of a SeptiTech system in Bristol. He's upset because they did not advise him of several revisons to their original approval, despite John Bastey's statements to us in the past that agent status is a standard part of any installation.
>
> From this point onward, all correspondence shall be directed to the property owner(s) in any SeptiTech application which does not contain a copy of written agent authorization for SeptiTech, signed by the property owner(s). SeptiTech shall be copied on relevant correspondence in these applications.
>
> Thanks.
>
> Jim
>

SeptiTech™

Solving Wastewater Problems with Technology

Residential and Commercial Pretreatment Systems

SeptiTech™

Solving Wastewater Problems with Technology

THE COMPANY

SeptiTech is a small town company with small town values and integrity. This means pride in manufacturing top quality product, pride in backing our product 110% and most important, pride for the manner in which we treat our customers with the highest degree of responsiveness and respect.

SeptiTech is also a company with a mission, which is to produce the most effective, most reliable, highest value and most owner-friendly wastewater treatment systems in the industry. Relentless research, development and continuous product improvement are SeptiTech hallmarks.

From advanced media and self atomizing spray heads to digital controls, remote monitoring and soaker hose leachfields, the company continues to build its reputation as an innovation leader and has been recognized with a coveted New England EPA Environmental Technology Award.

SeptiTech treatment systems now service hundreds of facilities including:

- *Single Family Houses*
- *Island Communities*
- *Fast Food Restaurants*
- *Inns*
- *Subdivisions*
- *Schools*
- *College Campuses*
- *Restaurants*
- *Business Parks*
- *A Brewery*

From 15 to 100,000-gallons per day, your project is important to us. Thank you for your review and consideration of SeptiTech.

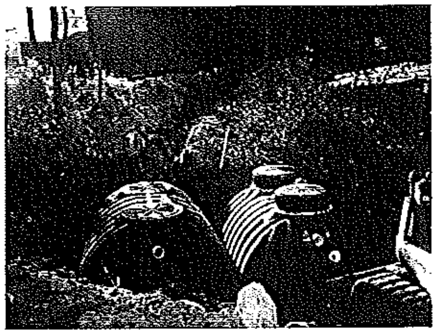
WHY PRE-TREAT WASTEWATER?

Think of SeptiTech pretreatment as a personal sewage treatment plant that discharges clean water to the leachfield. Five basic reasons to pre-treat wastewater include:

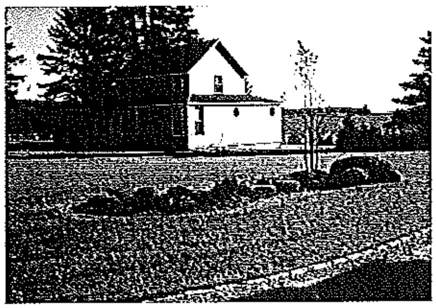
1. Increase Property Value
   - Minimize leachfield size. Regulations typically allow smaller leachfields because treatment occurs in the SeptiTech processor and not the leachfield. SeptiTech pretreatment allows reduction or elimination of unsightly mounds in your yard.
   - Increase loading rate without increasing leach field size.
   - Eliminate overboard discharges.
   - Provide an alternative to holding tank inconvenience and cost.
2. Ensure Against Costly Leachfield Failure
   - Prevent leachfield failure on difficult septic sites.
   - Rejuvenate a failed leachfield where a slime layer or biomat has reduced the field efficiency.
3. Ensure Your Health and Safety by Preventing Environmental Pollution
   - Prevent contamination of drinking and/or recreation waters -now and for future generations
4. Preserve Natural Resources
   - Recycle treated wastewater for toilets and irrigation where water resources are scarce.
5. Comply with Regulations
   - Many state and local governments throughout the country are imposing increasingly stringent wastewater effluent quality standards.

Residential Systems

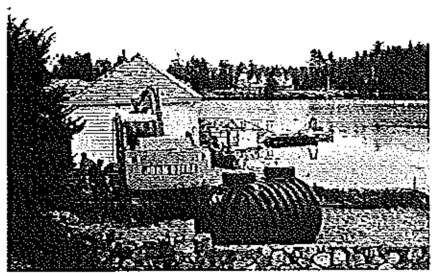
SeptiTech offers a range of residential models that treat up to 750-gallons per day. Fabricated in rugged HDPE plastic tanks. Shipped completely ready to install. Weight: 300-600 Lbs.



SeptiTech M400 and septic tank being installed for a single family system.



Subsurface systems are installed flush to the ground and easily landscaped.



This SeptiTech unit prevents a large leachfield from consuming a small yard.

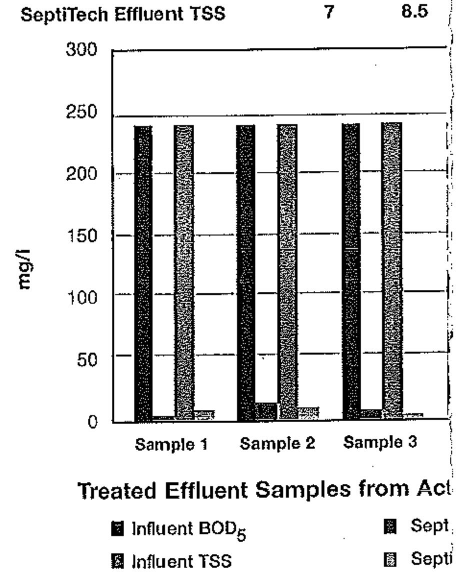
Drip Hose Systems

Available with most SeptiTech units, this system couples SeptiTech standard treatment technology with an enhanced UV disinfectant to render wastewater clean, sterile and able to pass through SeptiTech drip hose in a safe and efficient manner. Designed for seasonal applications, this system offers multiple advantages over a conventional leachfield. For instance, trees don't have to be cut and leachfields can be installed with simple hand tools.

Septic tank and SeptiTech processor with UV for a residential drip hose system hidden from view under summer cottage porch.

Typical SeptiTech Pollutant Remov

	Sample 1 mg/l	Sample 2 mg/l
Influent BOD_5 (EPA med*.)	245	245
SeptiTech Effluent BOD_5	3	11
Influent TSS (EPA med.*)	245	245
SeptiTech Effluent TSS	7	8.5



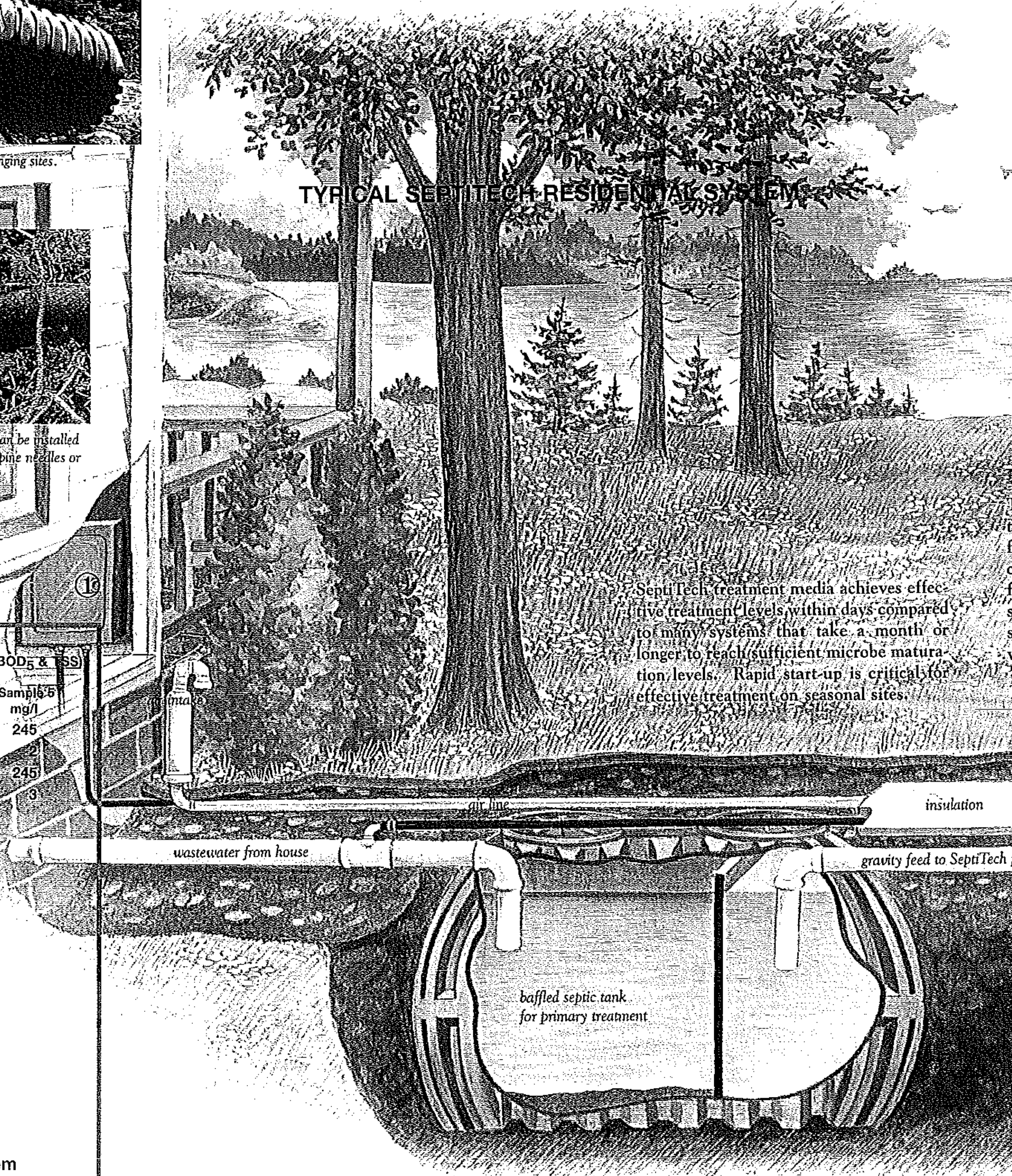
SeptiTech uses a patented, enhanced recirculating biologic water. Computer controlled to consistently remove 95+ oxygen demand and total suspended solids) and 99.99% performance far exceeds National Sanitation Foundation and smells like fresh water.

**EPA Design Manual Onsite Wastewater Treatmen*

SEPTIT

SeptiTech thrives on challenging sites.

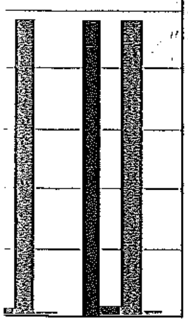
SeptiTech drip hose can be installed by hand under duff, pine needles or bark mulch.



SeptiTech treatment media achieves effective treatment levels within days compared to many systems that take a month or longer to reach sufficient microbe maturation levels. Rapid start-up is critical for effective treatment on seasonal sites.

Performance (BOD$_5$ & TSS)

Sample 3 mg/l	Sample 4 mg/l	Sample 5 mg/l
245	245	245
5	6	2
245	245	245
3	1	3



nple 4 Sample 5

Residential System

h Effluent BOD$_5$

h Effluent TSS

ickling filtration system to clean waste- f pollutants (measured by biochemical coli from the wastewater steam. This dards. SeptiTech treated effluent looks

Disposal Systems, 1980,391pp

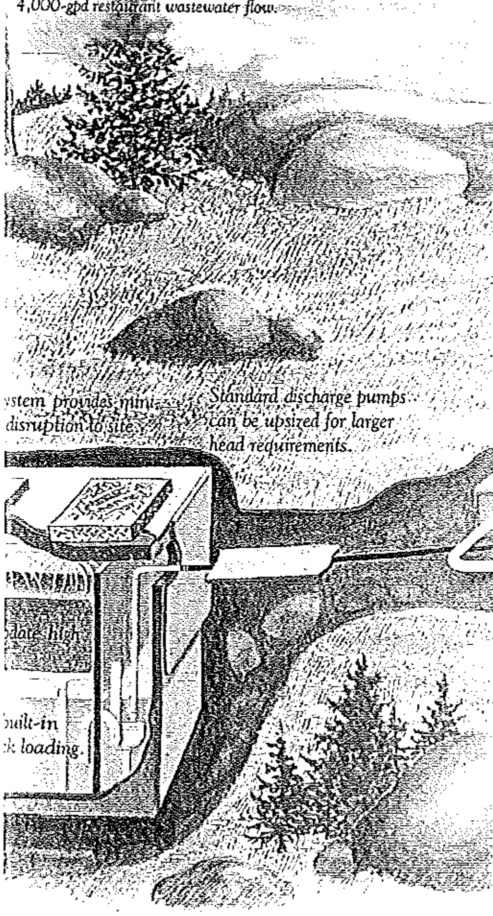
① **Computer Controlled**
A programmable logic controller manages all system functions, alarms and ensures consistent treatment. Customers can choose a system autodialer which will automatically call and alert SeptiTech of any problem and a modem to allow for off site monitoring and control.

② **Efficient Oxygenation**
Oxygen, necessary for efficient treatment, is introduced into the system passively. No blowers to break down, no additional electrical cost, no noise.

SeptiTech™

Solving Wastewater Problems with Technology

This freshly installed system is designed to treat 4,000-gpd restaurant wastewater flow.



SeptiTech Commercial and Engineered Systems
BENEFITS

1. In-house engineering design team.
2. In-house digital controller design and programming to provide:
    - customized treatment process
    - remote monitoring and system control
    - data logging of pump hours, system flows
    - manual adjust keypad
    - pump, fuse, high level alarm sensing
    - delayed audible alarm
3. Experience with high strength and difficult wastewater streams such as brewery and restaurant waste.
4. Field supervised installation and free unlimited phone consultation after system is installed.
5. Experience with wastestream flows ranging from 15-gpd to 50,000-gpd.
6. Seasoned installation and service team committed to being the most responsive in the industry.
7. Standard discharge pumps eliminate need for pump stations.
8. Enhanced nitrogen reduction incorporated as necessary.
9. Difficult site specialists. Extensive experience with island systems.

SeptiTech Product Line

Model	Treatment Capacity	Tank
M400	4-bedrooms	1,000-gallon HDPE Plastic
M550	6-bedrooms	1,500-gallon HDPE Plastic
M750	8-bedrooms	1,500-gallon HDPE Plastic plus 500-gallon HDPE Plastic
M1200	1,200-gallons per day	2,000-gal. Precast Concrete
M1500	1,500-gallons per day	3,800-gal. Precast Concrete
M3000	3,000-gallons per day	7,000-gal. Precast Concrete
Engineered	Up to 100,000 gallons per day	Custom Precast Tanks

Enhanced denitrification and UV disinfection systems available with all models.

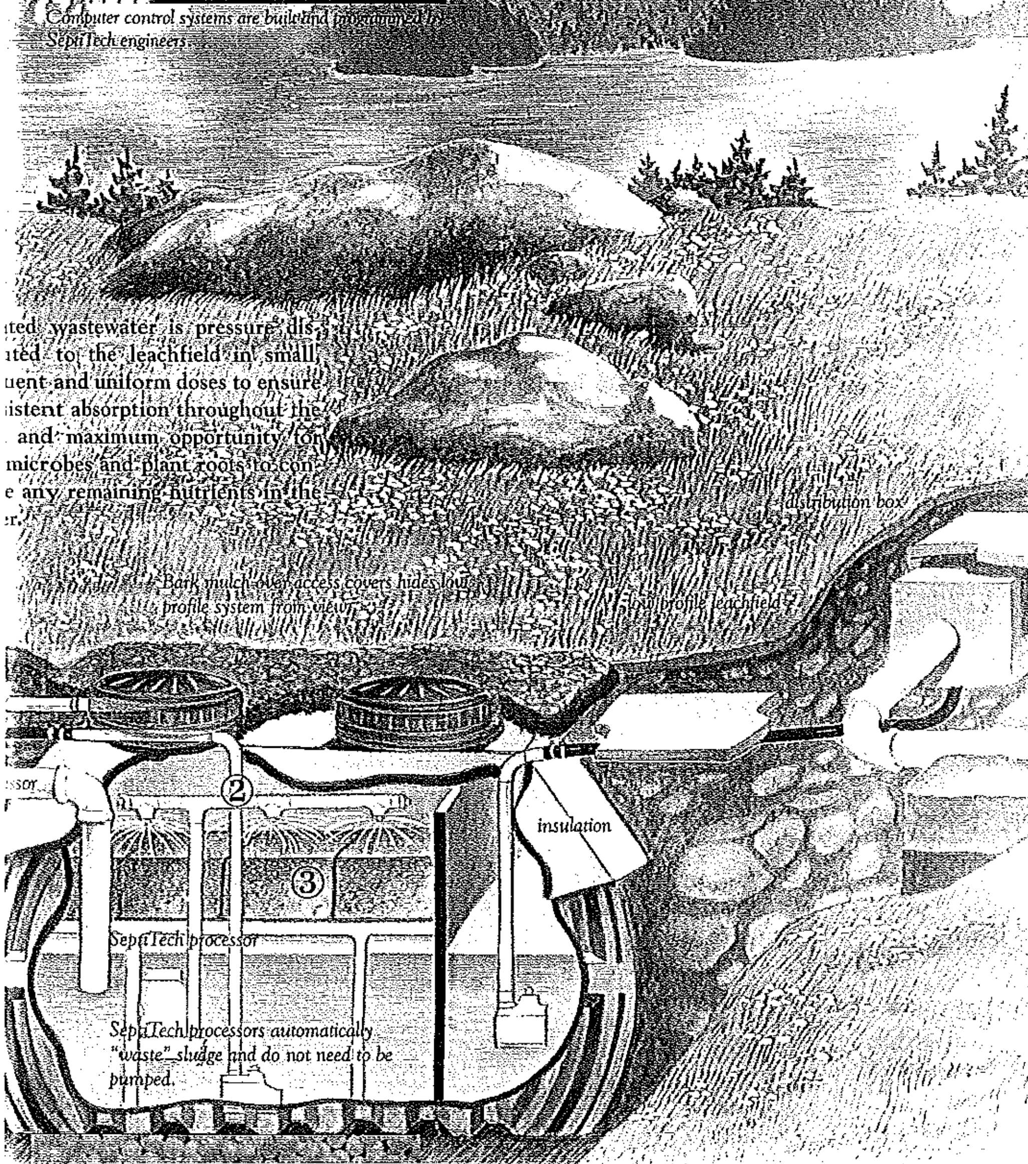
...ystem is engineered to treat very high strength ...0 mg/l BOD) brewery wastewater and preserve the ...ry's leachfield.

SeptiTech, Inc. (Home Office)
220 Lewiston Road Gray, ME 04039
tel: 207-657-5252 fax: 207-657-5246
e-mail: info@septitech.com website: www.septitech.com

Printed on recycled paper

ECH ADVANTAGES

Computer control systems are built and programmed by SeptiTech engineers.



CONSISTENTLY HIGH-LEVEL PURIFICATION

Programmable logic controller computer controls all systems, functions and alarms and manages the treatment process to ensure consistently high-level treatment and efficient energy use.

Untreated septic on right; treated effluent on left.

NO OPERATIONAL MAINTENANCE

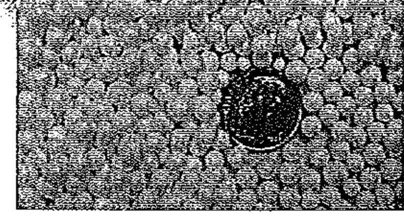
SeptiTech engineers an ultra-reliable product that is operationally maintenance-free. No additives, no filter-cleaning. Built to last, SeptiTech processors are manufactured of stainless steel fittings, PVC piping and plastic, inert media that should last indefinitely.

No worry, no hassle systems.

PROMPT, RELIABLE SERVICE

SeptiTech prides itself on prompt and professional customer service and will respond to any problem at any time. Our service technicians are thoroughly familiar with every SeptiTech system. A 2-year full-service and parts warranty and extended warranty option is provided with every system.

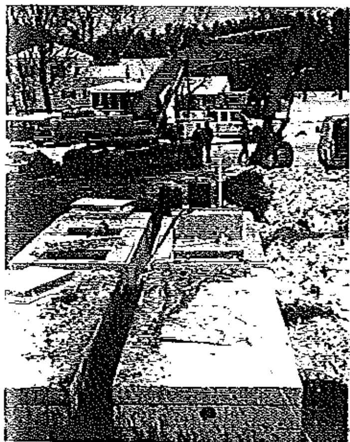
24/7 service.



Proprietary SeptiTech treatment media provides about 1-million treatment pores per cubic foot for intense biological waste processing.

③ Patented Treatment Media

Trickling filter systems need surface area to operate effectively. SeptiTech's patented hydrophobic treatment media promotes wastewater beading on the media surface which vastly increases the volume of effective treatment area. Proprietary media also facilitates efficient sloughing of dead microbes thereby ensuring against media clogging.



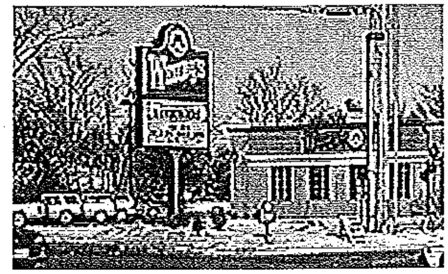
Once tanks are set, on-site SeptiTech technicians complete system installation.

Commercial and Engineered Systems

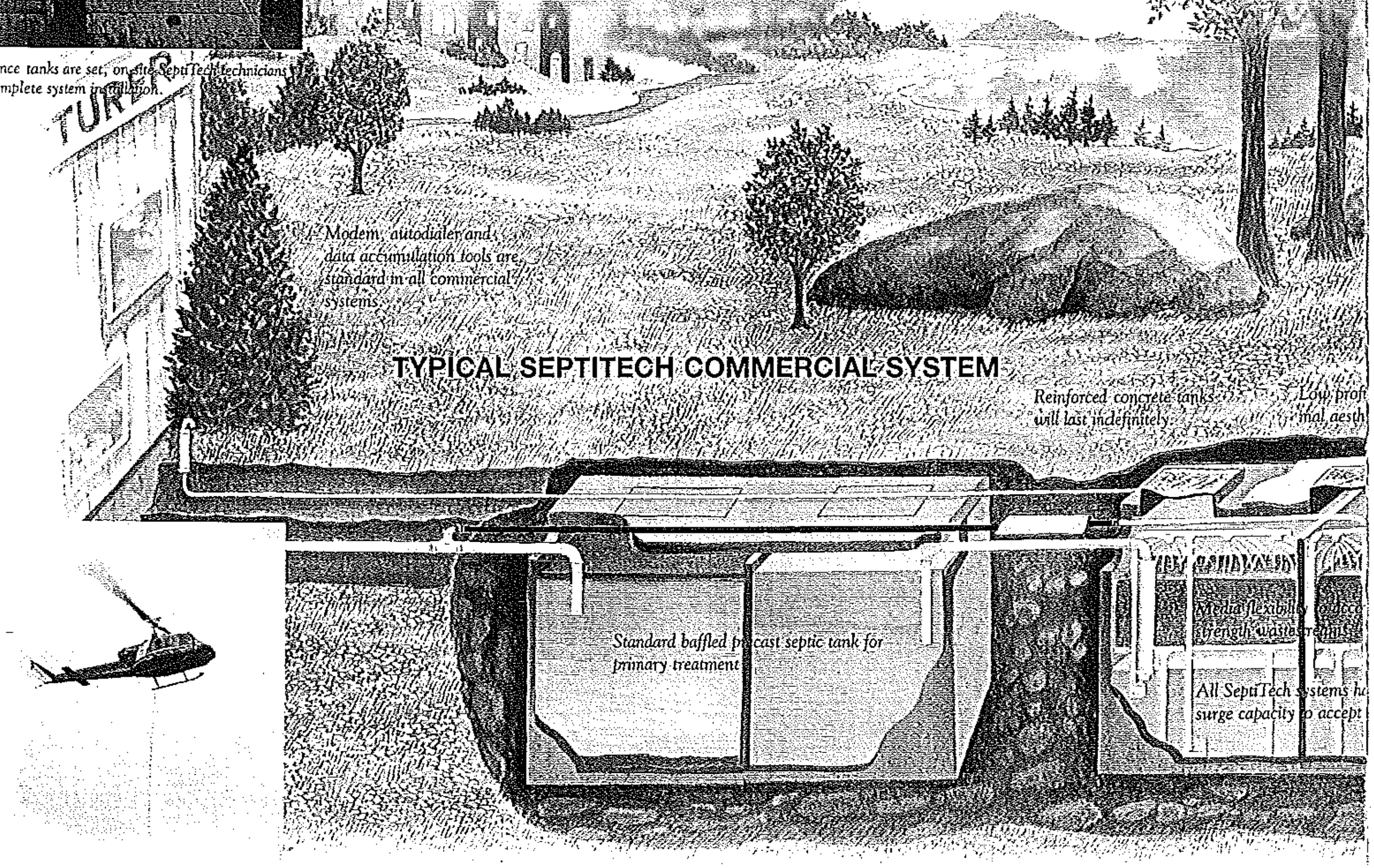
Treat up to 100,000 gallons per day.

SeptiTech commercial systems are fabricated on-site in pre-cast concrete tanks. They feature aluminum access risers, internal decant tank, pressure discharge pump(s), autodialer and modem.

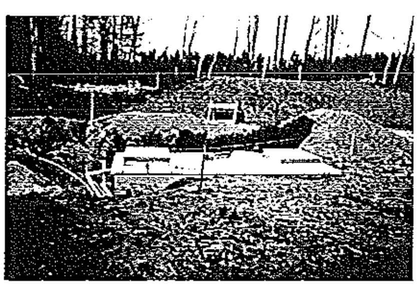
SeptiTech engineered systems are custom designed for special applications such as high strength wastewater, local regulatory requirements or difficult site access. In-house design and engineering staff provide prompt quotations, service and solutions.



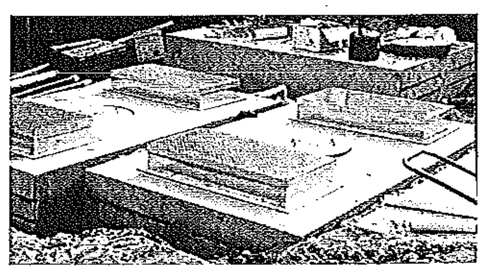
SeptiTech commercial systems are designed to treat wastewater of many different strengths.



Custom engineered system for an island community includes recycling loop to feed graywater system and thereby conserve scarce island water. Rocky coastline and inadequate road access necessitated airlift to the site.



Standard SeptiTech commercial systems are installed in 2 to 3 days.



Rugged, low profile diamond plate aluminum covers provide easy access to commercial systems.